The Effects of Local Campaigning in Great Britain

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Abstract

During the campaign period prior to election day, parties devote many of their efforts to local campaigning: contacting voters directly to sway them their way. Parties do not choose to contact voters at random; instead, they contact those voters they believe more likely to be swayed. This behavior introduces an empirical challenge in estimating the effect of local campaign efforts: separating the effect of contact itself from the fact that the voter is more likely to be swayed in the first place. I rely on a multinomial logit model with correlated random effects that, I argue, allows me to control for this selection effect as unobserved heterogeneity. I apply this model to panel data from the 2015 and 2017 UK General Elections. My findings show that: (1) ignoring this selection effect can lead to significant overestimation of the effects; (2) local campaigns efforts by a party increase the probability that a voter supports it by between 1 and 2 percentage points; and (3) most of this additional support comes from a reduction in abstention rather than conversion of supporters of other parties.

1 Introduction

During electoral campaigns, parties devote their efforts to mobilizing voters to turn out to vote and support their party. A substantial literature is devoted to the study of campaigns and their effects on voter behavior. With the advent of mass communications a 'received wisdom' in UK politics prior to the 1990s was that constituency campaigns were made irrelevant by national campaigns. However, research mostly beginning in the 2000s has found that parties benefit electorally from organized and intense campaigning conducted at the local level, in each constituency. Local campaigning is a loosely defined term that is defined best by what it is not: the mass media and its typically more uniform message. Local campaigning is instead composed of practices designed to reach particular voters, from traditional in-person canvassing, to telephone calls, to mail, and even to targeted online approaches.

The empirical challenge in estimating the effect of local campaigning lies in correctly identifying its effect on turnout and vote choice, independent of the effect of unobserved confounders. The most important concern is that parties are likely to (or at least will aim to) contact the voters that they believe are more likely to respond to the parties' message or appeals. However, researchers do not observe how parties decide which voters to contact. Thus, from a researchers' point of view, this constitutes unobserved heterogeneity in voters' behavior that is also correlated with the observed covariates, in this case, being contacted by a party. Ignoring this unobserved heterogeneity in voters will lead to overestimation of the effectiveness of local campaign efforts.

To address this identification challenge, I use the panel data from the British Election Study collected prior to the 2015 and 2017 UK General elections. For each election, the use of panel data with multiple measures of vote intention and indicators of contact by the different political parties allows me to significantly reduce or eliminate the concerns that arise from parties' instrumental use of appeals to voters. In particular, panel data estimators control for unobserved heterogeneity to the extent to which it is constant in time, at least within the time-frame of the study. In that sense, this unobserved heterogeneity captures voters' overall characteristics and

tendencies, which are likely closely related to the information (unknown to researchers) that parties use to decide which voters they want to contact.

I rely on a Multinomial Logit with Correlated Random Effects (MLCRE) for estimation. While this is not the only method available for estimating discrete outcome panel data models with unobserved heterogeneity, MLCRE has the advantage of controlling for unobserved heterogeneity (under some assumptions) while at the same time allowing the estimation of partial effects and probabilities. Alternative methods that control for unobserved heterogeneity do not permit the estimation of partial effects and probabilities (Chamberlain, 1980), or produce biased estimates (Greene, 2004).

The results first show that unobserved heterogeneity matters: ignoring the unobserved heterogeneity leads to estimates of the effect of direct appeals to voters by parties that are twice as large as those obtained when controlling for unobserved heterogeneity. This suggests that parties are indeed targeting voters they believe more likely to be swayed with some accuracy.

The results controlling for unobserved heterogeneity show that local campaigning efforts matter, but that its effects are not particularly large. For the two major parties in the England, party contacts increase the probability of supporting the party by up to 2 percentage points. Most of this additional support comes from increased turnout or undecided voters, with few instances of conversion of supporters of other parties. A minor exception to this is that there is some evidence that the Conservative and Labour parties did convert UKIP voters to some extent. The results also show that the Conservative party and the Liberal Democrats were more effective in their local campaigning efforts during the 2015 election than during the 2017 election. The results for Scotland and Wales, analyzed separately because of their slightly different party system, show little noticeable effects of local campaigning.[1]

[1]This is perhaps to some extent due to smaller sample sizes in Scotland and Wales.

2 Literature Review

Experimental evidence from the United States shows that citizens are responsive to efforts aimed at getting them out to vote (see, for example, Gerber et al., 2008; Arceneaux and Nickerson, 2009). Studies based on observational data have also found this positive effect (see, for example, Geys, 2006; Karp et al., 2008). There is a substantial literature on British elections that studies the effects of local campaigning (like canvassing and other methods). While the 'received wisdom' prior to the early 1990s was that that constituency campaigns were made irrelevant by the advent of mass national media, more recent research has found that parties benefit electorally from more organized and intense local campaigning, both in terms of mobilization (Clarke et al., 2004, 2009; Cutts, 2014; Fisher et al., 2011; Whiteley and Seyd, 1994, and references therein) and in terms of their vote share (Fisher et al., 2011, 2016; Pattie and Johnston, 2003; Johnston et al., 2013, and references therein).

A significant portion of the literature on campaign effectiveness in the United Kingdom focuses on aggregate data at the constituency level, e.g., the effect of constituency campaign spending (or other measures of campaign intensity) on turnout and parties' vote shares. A smaller portion of the literature focuses on analyses at the individual voter level, and is closer to the study in this paper. The effects found in the literature that uses aggregate data tend to be relatively high.[2] For example, Denver et al. (2004) study the effect of campaign effort measured via an index constructed from constituency level campaign activity using principal components. They find that a strong local campaign, relative to an average local campaign gains parties about 5% higher vote share (in some cases more, in some less). Fisher et al. (2011) use a similar measure and find effects on the order of 30% when campaign intensity goes from the intensity of a non-target seat to the intensity of a target seat (an increase of about 50% in their measure of intensity). Johnston et al. (2013) focus instead on spending as a percentage of the spending limit finding that, for Labour, increasing spending to the limit would result in a 6% higher vote

[2]It is hard to conduct direct comparisons of the effects found in the different papers, in no small part because all papers use slightly different measures and the exact interpretation of their coefficients is sometimes difficult.

share for the party. Fisher et al. (2014) use a campaign spending index as well and find effects ranging from -0.1% to 5.1% when increasing said index by 1 unit. These effects are extremely large, as the index in a target constituency is about 120 whereas in a non-target constituency is about 85. Cutts (2014) find effects in the order of 1 to 1.5% using a similar index (very different specification, however).Fisher et al. (2016) also uses a similar index of campaign intensity at the constituency level, finding effects in the order of 1 to 2%. These effects are generally quite large, especially considering that the campaign intensity indices typically average 100 with wide variation; therefore, within the normal range of variation of the campaign intensity indices, the regression coefficient results typically imply enormous returns to local campaigns.

As mentioned before, another portion of the literature relies on analyses at the individual level. Pattie and Johnston (2003) use data from the 1997 British Election Study (BES) and find that doorstep canvassing has an impact on respondents' vote choices, but that telephone contacts do not. The effects, reported in odds ratios, go from 0 to 1.7 greater odds due to contacts by the parties. Denver et al. (2004) also include individual level results. The coefficient estimates from a their logit model are somewhat large, but probabilities and partial effects are not reported in the original paper. **?** focus on the United Kingdom Independence Party during the 2015 election. They find that UKIP contact increases UKIP support in the order of 12%, whereas contacts by the other parties reduce UKIP support between 3 and 8%, depending on the party. Their model uses a multilevel logit model designed to account for many individual level-covariates as well as constituency characteristics. However, all these studies (both individual and constituency level) tend to suffer from the problem that parties may be more likely to contact those voters who are already more likely to turn out to vote and vote for their party; and similarly, that parties may be more likely to target those constituencies where there are already more likely to make gains. This is a difficult problem to address, since it is hard to determine the decision process that prompts parties to contact one voter over another. Fisher et al. (2011) partially resolve this issue using data from the 2010 BES. They use the pre-election wave to identify those respondents who initially declared themselves to be undecided. With

this subsample, they study whether voters contacted by the different campaigns were more or less likely to support the Conservatives, Labour, or the Liberal Democrats. They find strong campaign contact effects in all cases, between 17 and 34% marginal effects. These strong results should be interpreted with caution, however. First, undecided voters are probably more likely to be swayed by parties' appeals, leading to high estimates by focusing only on this section of the electorate. Second, parties likely still choose to contact voters they deem more likely to be swayed, even among those who are undecided. For example, an undecided voter may be undecided between Labour and the Liberal Democrats, thus the Conservative campaign, if correctly targeting voters, may avoid contacting this hypothetical voter (thus inflating the effectiveness of Conservative campaigning).

A notable exception that deals with the problem of parties selecting which voters to contact is Whiteley and Seyd (2003). They study respondents' intention to turn out to vote and vote choice. Importantly, they are able to control for respondents' self-reported willingness to turn out and vote derived from an earlier panel wave. This way, their estimates of party campaign efforts are teased out from parties' mobilization efforts. Their findings show substantially smaller effects than those found in the rest of the literature. In particular, they find that canvassing face to face for the Labour party increased the probability of voting for Labour by 6%, whereas canvassing by phone increased it by 5%, which are in line with the partial effects at the mean presented in this paper (see appendix).

3 Data & Methods

3.1 Data

To study the effect of party contacts on the probability of casting a vote for each of the parties (or abstaining), I use data from six waves of the British Election Study (BES) Online Panel (Fieldhouse et al., 2020). The first three waves correspond to the months prior to the 2015 General Election, while the others cover the run-up to the 2017 General Election. Both

panels include the post-election wave.[3] I study the 2015 and 2017 data separately. I restrict the sample to respondents who reported vote intention in at least two of the waves for each election. Due to the presence of the Scottish National Party (SNP) in Scotland and Plaid Cymri (PC) in Wales, I analyze England, Scotland, and Wales separately.

The outcome of interest is a categorical variable that indicates the individual respondents intends to vote Conservative, Labour, Liberal Democrat, United Kingdom Independence Party (UKIP), Green, other party or abstain from voting. For Scotland, the outcome also includes vote intention for the SNP and UKIP and Green party votes are grouped with Others because of smaller vote intentions and sample sizes; for Wales it includes vote intention of PC and the Green party is grouped with others. The outcome is measured as vote intention in the in the first two waves of each panel. For the third wave in each panel, the outcome corresponds to reported vote cast. Finally, undecided individuals are included as abstentions for estimation purposes.

The main independent variables are indices that measure the number of ways in which a given party contacted an individual in the four weeks prior to each survey wave. The modes of contact considered are telephone, mail (letter of leaflet), home visits, meeting in the street, email, SMS, and social media.[4]

As control variables, I include the feeling thermometer scores for all parties (which varies in each wave), as well as several time-invariant demographic characteristics like gender, year of birth, having a university degree, being white British, household and personal income, and home ownership status (renting, mortgage, or owning outright).

The sample sizes for 2015 are substantially smaller than for 2017, in no small part because of a technical issue with party contact questions (see footnote 4). The sample sizes in the three constituent countries are still sufficiently large for 2015, perhaps with the exception of Wales.[5]

[3]The study covers England, Scotland, and Wales, but excludes Northern Ireland.

[4] Due to a technical error the party contact questions were not asked of those respondents who took the survey during the first week of the 2015 campaign in wave 5. It was asked of respondents who took the survey on and after April 24th, 2015. Therefore, data for these respondents for this wave is not included, reducing the number of observations available for estimation of local campaign effects in 2015.

[5]While 1,536 observations can seem like a sufficiently large sample size, it is important to remember that the

Table 1: Sample Sizes

	2015	2017
England	12,156	40,157
Scotland	2,895	7,435
Wales	1,536	4,019
Total	16,520	51,510

3.2 Methods

As mentioned in the introduction, the empirical challenge in estimating the effect of party contacts on the probability of casting a vote for the different parties is that parties will tend to contact those voters they think will be more likely to be swayed in the desired direction. This implies that models that do not account for this selection effeect will produce upwardly biased estimates of the effect of party contacts on voters' choice: parties do not contact voters at random, but are instead more likely to contact those for which their efforts will be more rewarded.

Without knowledge of how parties choose which voters to contact, it is not possible to directly control for this selection effect. Obtaining this knowledge from survey data is extremely difficult, because parties can rely on on-the-ground knowledge and volunteer networks that are hard to capture and measure. However, the panel structure of the BES data allows me to account for individual level heterogeneity. To the extent that who is targeted by the parties does not vary significantly across survey waves *and* parties' contact strategies remain relatively stable, controlling for unobserved heterogeneity removes the bias introduced by the way parties decide which voters to contact. While the first condition is not testable, it is unlikely that in the short term of the campaign voters will change their tendencies strongly.[6] The second condition, that parties' contact strategies do not vary significantly over the period of analysis, is partially testable. In Appendix C, I show that the types of voters that parties contact throughout the three waves considered for each election have almost exactly the same observ-

multinomial models require the estimation of a parameters for each one of the outcomes.

[6] A voter who is extremely unlikely to be swayed by a party' arguments, will probability remain extremely unlikely to be swayed throughout the period covered by each study.

able characteristics, suggesting that there is no change in parties' contact strategies. Contacted and non contacted voters might differ in their unobserved characteristics, which would violate this condition. However, it is unlikely that these unobservable characteristics are fully independent of the observable ones. Therefore, finding no significant difference in voters' observed characteristics provides reasonable evidence that they may not differ in the unobservable ones.

The model I estimate, therefore, considers the probability of casting a vote for each party (or abstaining) as a function of the covariates of interest and the unobserved heterogeneity:

$$P(y_{it} = j) = \Lambda\left(\alpha + \sum_{p} \beta_{jp} Contact_{it}^{p} + \delta_j Controls_{it} + c_{ji}\right) \quad (1)$$

where y_{it} indicates which party j respondent i intends to vote for at wave t; $Contact_{it}^{p}$ indicates whether i was contacted by party p in the four weeks prior to wave p; $Controls_{it}$ includes a number of control variables (see Section 3.1); c_{ji} represents the unobserved heterogeneity; β_{jp} is the effect of being contacted by party p on the probability of voting for party j; δ_j is a vector that captures the effect of the control variables on the probability voting for party j; and $\Lambda(\cdot)$ is the cumulative logistic distribution function.

The estimation of discrete outcome models with unobserved heterogeneity presents a few challenges. One alternative is to use the fixed-effects approach (e.g., including a dummy variable for each respondent), but this is well-known to lead to inconsistent estimates of the model parameters and probabilities due to the incidental parameters problem (Neyman and Scott, 1948). The incidental parameters problem can be overcome when panels are not too short, usually consider to be at least 8 observations per individual (see, for example, Katz, 2001; Greene, 2004; Coupe, 2005, for indications of the necessary length of panels). Since the data used here contains, at most, 3 observations per individual, this approach is not appropriate. A second alternative, only available in for the Logistic case, is to rely on the conditional logit presented in Chamberlain (1980), which by conditioning on individuals whose outcome varies over time differences out the model's constant and unobserved heterogeneity term. This method produces consistent estimates of the model parameters. However, this is a double-edged sword.

By removing the constant and unobserved heterogeneity from the model, it cannot produce estimates of probabilities and partial effects, which are ultimately the quantities of interest (see, for example, King, 2001).[7]

The third estimation method, which is adopted in this paper, is to rely on Correlated Random Effects (CRE), as introduced by Mundlak (1978), originally developed for binary outcome models (see Wooldridge, 2010, for the multinomial model version). This method relies on imposing an explicit functional form that captures the correlation between the unobserved heterogeneity c_i and the covariates in the model. The CRE method represents a compromise that allows for capturing some of the unobserved heterogeneity while at the same time permitting the estimation of probabilities and partial effects. A potential drawback is that the explicit functional form needs to be correctly specified, otherwise estimates (or parameters and probabilities) will be biased. However, research into the binary outcome case shows that CRE tends to be relatively robust to misspecifications (see Crisman-Cox, 2020; Nunez, 2020).[8]

The estimations used in this paper model the unobserved heterogeneity in the following way:

$$f(c_{ji}|Contact_{it}, Controls_{it}) = \gamma_j z_i \tag{2}$$

where $f(\cdot)$ is a probability distribution function, γ_j is a vector of parameters; and z_i is the time-average of the time-varying independent variables for each individual i. Thus, the model including the assumption in equation 2 becomes:

$$P(y_{it} = j) = \Lambda\left(\alpha + \sum_p \beta_{jp} Contact_{it}^p + \delta_j Controls_{it} + \gamma_j z_i\right) \tag{3}$$

The transformed model in equation 3 can then be estimated with the usual methods for Multinomial Logit models.

[7]The reason for this is that in non linear models partial effects depend on the values of the unobserved heterogeneity, as opposed to linear models in which they do not. Since this method differences out the unobserved heterogeneity, there is no estimate for it and therefore partial effects and probabilities cannot be calculated.

[8]The degree to which there CRE estimates are biased will depend on the complexity of the relationship between the unobserved heterogeneity and the observed covariates in the model.

Intuitively, the time-invariant z_i capture parties' tendencies to contact voters. To see this, imagine that the Conservative party contacted a particular voter in only one of the campaign waves. Among the z_i terms there is one that indicates that the Conservative party contacted voter i at some point. Importantly, this term takes the value of 0.33 for all the waves in the panel.[9] Thus, it is in a sense capturing the selection effect: the Conservative party wanted to contact this voter (regardless of whether it did so in the first, second, or third waves). We can interpret this as the fact that the Conservative party aims to target this voter. The variable $Contact_{it}^{Conservative}$, on the other hand, takes the value 1 only for the particular wave in which this voter was contacted by the Conservative party, and takes the value of zero for all other waves. That is, it indicates the wave in which the contact by the Conservative party actually occurred. Thus, when both variables are included in the model, the first one will measure the selection effect while the second one will measure the effect of contact on vote intention, free from the selection effect. The same logic applies when the Conservative party contacts in more than just one wave, as well as for all other parties.

As previously mentioned, this method's benefits are twofold. First, it controls for unobserved heterogeneity (which captures the selection effect), albeit under some restrictions. Second, by explicitly modeling the unobserved heterogeneity, it is possible to estimate the partial effects and probabilities that are the quantities of interest which other methods cannot estimate or estimate with bias.

4 Results

4.1 Naive Estimation

Before presenting the estimates that control for unobserved heterogeneity and factor in the fact that parties may be contacting those voters whom they believe will be more likely to be swayed, it is useful to discuss naive estimates. These estimates are derived from standard

[9] Since the party contacted this voter once and there are three waves, the time average of Conservative contact for this voter is $\frac{1}{3}$.

multinomial logit model and includes the controls discussed in the previous section, but do not account for the selection effect reflected in the unobserved heterogeneity; that is, they do not include the $_i$ terms from equation 3. Because these estimates ignore the unobserved heterogeneity, thus ignoring the selection effect, we should expect them to be biased away from zero.

Table 2 presents the Average Partial Effects (APE) for the contact index for each of the five main parties in England (Conservative, Labour, Liberal Democrat, UKIP, and Green).

Table 2: Main Estimates 2015: Average Partial Effect

	Con	Lab	LD	UKIP	Grn	NV
Con Index	0.034***	0.001	-0.006	-0.010**	-0.003	-0.018**
	(7.29)	(0.15)	(-1.47)	(-2.72)	(-0.68)	(-3.10)
Lab Index	-0.004	0.047***	-0.011**	-0.003	-0.014***	-0.013*
	(-0.77)	(10.75)	(-2.80)	(-0.64)	(-4.58)	(-2.39)
LD Index	-0.010	-0.022***	0.042***	-0.005	-0.005	-0.005
	(-1.59)	(-3.44)	(11.92)	(-0.94)	(-1.48)	(-0.83)
UKIP Index	0.005	-0.006	-0.012*	0.026***	0.006	-0.021*
	(0.57)	(-0.77)	(-2.11)	(4.57)	(1.20)	(-2.09)
Grn Index	-0.007	-0.018*	-0.004	-0.008	0.028***	0.009
	(-0.66)	(-2.15)	(-0.69)	(-0.81)	(8.28)	(0.71)
Observations	12513	12513	12513	12513	12513	12513

t statistics in parentheses

Average of marginal effects for each individual in the sample

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The first thing to note is that the effect of contact by a party increases the probability of voting for that party, while reducing the probability of voting for all other parties and of abstaining.[10]. Focusing on those effects that are statistically significant at the 5% level, contact by the Conservative party increases the probability of voting Conservative by 3.4 percentage points, while reducing the probability of voting UKIP by 1.0 and of not voting by 1.8 percentage points. Contact by the Labour party increases the probability of voting Labour by 4.7 percentage

[10]With minor exceptions that are not statistically significant

points, while reducing the probabilities of voting Lib-Dem, Green and not Voting by 1.1, 1.4, and 1.3 percentage points, respectively. Contact by the Liberal Democrats increases support for that party by 4.2 percentage points, while reducing the probability of Labour support by 2.2 percentage points. UKIP contact increases the probability of a UKIP vote by 2.6 percentage points, while reducing that of the Liberal Democrats by 1.2 percentage points and of abstaining by 2.1 percentage opints. Finally, contact by the Green party increases the probability of voting for the Green party by 2.8 percentage points, while reducing that of voting Labour by 1.8 percentage points. The remaining effects are not statistically significant at the 5% level.

The two major parties (Labour and the Conservatives) draw support from people who might otherwise stay on the sidelines, as evidenced by the fact that both these parties increase turnout (reduce non-voting) when contacting voters. UKIP also had the ability to turn voters out. In fact, UKIP's local campaigning had a stronger effect on abstention than that of the two mayor parties. The Green party and the Liberal Democrats do not show any significant turnout effects.

Table A1 in the appendix presents the Partial Effects at the Mean from these same estimates. As the results there show, the magnitude of the effects is much larger, with contact by a party increasing its own support by upwards of 10 percentage points in some cases.The fact that the Partial Effects at the Mean are larger makes sense: by setting all variables at their means, the feeling thermometers would represent a voter who is more or less lukewarm towards all parties. Interpreting this as a form of indifference, it makes sense that contacts would have a larger effect on these hypothetical individuals.

Table 3 presents the same results using data from the 2017 General Election. The results bear a good similarity with the 2015 ones, but the effects are generally larger. First, parties increase their own support by contacting voters. Contact by the Conservative Party increases support for them by 4 percentage points, while reducing the probability of voting UKIP or not voting by 1.3 and 2.3 percentage points, respectively. Contact by the Labour party increases the probability of a Labour vote by 6.4 percentage points, while reducing that of the Liberal Democrats, Green party, and of not voting by 3.6, 0.6, and 1.3 percentage points. The contacting

efforts by the Liberal Democrats increase the probability of voting for them by 7.1 percentage points, while reducing support for Labour and the Greens by 4.0 and 1.4 percentage points, respectively. Contact by UKIP increase UKIP support by 2.4 percentage points, while reducing that of the Liberal Democrats by 1.9 percentage points. Finally, contact by the Green party increases the probability of voting Green by 3.9 percentage points, while decreasing that of voting Conservative by 2.9 percentage points. The other effects are not statistically significant at the 5% level.

Similarly to 2015, both the Conservative and Labour parties increase their votes by increasing turnout. Contrary to 2015, however, UKIP's local campaigning does not increase turnout. Overall, the sources of support derived from parties' contacting efforts in 2017 appear similar to the sources from the 2015 election.

Table 3: Naive Estimates 2017: Average Partial Effect

	Con	Lab	LD	UKIP	Grn	NV
Con Index	0.040***	-0.001	-0.002	-0.013***	-0.003	-0.023***
	(8.51)	(-0.23)	(-0.63)	(-4.05)	(-1.27)	(-5.16)
Lab Index	-0.002	0.064***	-0.036***	-0.004	-0.006**	-0.013**
	(-0.53)	(14.96)	(-9.20)	(-1.32)	(-2.90)	(-3.28)
LD Index	-0.009	-0.040***	0.071***	-0.004	-0.014***	-0.004
	(-1.68)	(-7.64)	(18.66)	(-1.08)	(-4.83)	(-0.70)
UKIP Index	0.010	-0.005	-0.019**	0.024***	-0.002	-0.010
	(1.20)	(-0.54)	(-2.70)	(5.61)	(-0.50)	(-1.17)
Grn Index	-0.029*	0.006	-0.007	-0.005	0.039***	-0.013
	(-2.22)	(0.61)	(-0.86)	(-0.50)	(11.35)	(-0.98)
Observations	40207	40207	40207	40207	40207	40207

t statistics in parentheses

Average of marginal effects for each individual in the sample

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Considering these large payoffs from contacting voters, it is rather surprising that parties are not exhausting the campaign spending limits (see Figure XXXX in Appendix). In fact, in most constituencies, even the large parties do not reach the spending limits, and in many cases

being significantly below it.

It is important to note, however, that these large effects from the naive estimation are likely the result of selection issues. That is, parties do not contact voters at random; instead, they likely target some voters (or some types of voters) but not others, based on the parties' belief that these voters can be swayed their way. If parties successful, even if only partially, in contacting those voters that they are more likely to sway in the first place, then the effects presented in Tables 2 and 3 may partially (or even completely) driven by the result of parties' selection of voters to contact, rather than the effect of contact itself.

4.2 Main Results

In this section I discuss the estimates derived form the model described in equation 3, that controls for the unobserved heterogeneity that is a reflection of parties' selection of voters for contact. As mentioned in section 3.2 modeling the selection effect via unobserved heterogeneity requires the assumption that this selection effect is constant over the time frame of the study (covering three waves of BES survey for each election). This, in turn, necessitates of two assumptions. The first one is that the types of voters who are "swing" voters must be the same throughout the time frame of each study. Unfortunately, this assumption cannot be verified. However, it is difficult to imagine that the types of voters who are "swing" voters could significantly change within each of the periods of study, that cover less than 3 months prior to each of the general elections.

The second assumption is that parties' contact strategies must also remain constant over the period under study; that is, parties must be trying to contact the same types of voters throughout the corresponding campaign. In Appendix C I show that parties' contact strategies do not differ across survey waves, based on observable characteristics of the voters. I do so in two ways. First, I use tests of comparison of means for the characteristics of contacted voters by each party throughout the three waves composing each study. The results clearly show that there are no significant differences among voters contacted in each wave. Second, I rely on

random forest estimates of the contact strategy in one wave and use it to predict contacting in the other waves. I do this for all waves and then calculate an Index of Agreement (Willmott, 1981). The results from this approach also show no evidence that parties' contact strategies differ from wave to wave. Consequently, the use of unobserved heterogeneity is appropriate for controlling for the selection effect in this particular application.

Table 4 presents the Average Partial Effects for the main model described in Section 3.2. As expected, the findings show effects that are much smaller than those derived from the naive estimates presented in Section 4.1, in some cases being less than a third as large and with many more statistically insignificant results.

Table 4: Main Estimates 2015: Average Marginal Effect

	Con	Lab	LD	UKIP	Grn	NV
Con Index	0.017**	-0.003	0.006	-0.002	-0.005	-0.017*
	(2.74)	(-0.49)	(1.31)	(-0.43)	(-1.22)	(-2.20)
Lab Index	-0.005	0.018***	0.004	0.003	-0.005	-0.014*
	(-0.66)	(3.58)	(0.75)	(0.52)	(-1.24)	(-2.15)
LD Index	0.003	-0.003	0.016***	-0.010	-0.001	-0.009
	(0.37)	(-0.45)	(3.36)	(-1.40)	(-0.12)	(-0.99)
UKIP Index	0.014	0.012	-0.012	0.010	-0.005	-0.019
	(1.55)	(1.42)	(-1.90)	(1.71)	(-0.89)	(-1.56)
Grn Index	0.003	0.006	0.001	0.008	0.012**	-0.027*
	(0.30)	(0.65)	(0.11)	(0.74)	(2.90)	(-2.03)
Observations	12513	12513	12513	12513	12513	12513

t statistics in parentheses

Average of marginal effects for each individual in the sample

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The first thing to notice is that contact by a party does tend to increase the support for that party. In fact, contact by the Conservative party leads to a 1.3 percentage points higher change of voting Conservative. The same figure for Labour, Liberal Democrats, UKIP, and Green party are 1.8, 1.6, 1.0 and 1.2 percentage points, respectively. All of these are statistically significant at the 1% level, with the exception of UKIP (which is only significant at the 10%

level). Previously mentioned, these effects are notably smaller than those obtain by the naive estimates in Table 2, being generally half as large or smaller.

Beyond these notably smaller effects, another important difference with the estimates from the previous section is that there is no evidence that contact by one party reduces the support of another one. That is, there is no statistically significant evidence of cross-party effects.

The extra support that parties obtain for themselves comes instead from reducing abstentions (or reducing undecided voters). In tact, the Conservatives, Labour, and the Green party reduce abstentions at the 5% level of statistically significance; the Conservatives reduce it by 1.7 percentage points (the same amount they gain in vote share) whereas Labour does it by 1.4 percentage points and the Green party by 2.7 percentage points. The Liberal Democrats and UKIP do not show a statistically significant effect on abstentions (although the estimated effects are also negative).

Table 5 presents the Average Partial Effects for the main model using data from the 2017 General Election. Similarly to the 2015 results, the findings show that the effects of local campaigning are significantly smaller than those presented in Table 3 of Section 4.1, which do not control for the selection effect reflected in the unobserved heterogeneity.

As was the case for 2015, contact by a party increases the probability that a voter will support that party. In particular, contact by the Conservative party increases the probability of voting Conservative by 0.8 percentage points. These same figure is 2.1 for Labour, 0.7 for the Liberal Democrats, 0.8 for UKIP, and 0.7 percentage points for the Green party. All these effects are statistically significant at the 5% level.

Some of these additional support comes from reduced abstentions (or reduced undecided); such is the case for the Conservative, Labour, and Green party, which reduce abstentions by 1.6, 0.8, and 6.7 percentage points, respectively. Unlike the results from 2015, however, party contacts in 2017 do show some evidence of cross-party effects. In particular, Conservative party contacts also decrease support for UKIP by 0.7 percentage points and increased support for Labour by 1.6 percentage points. Contact by the Labour party reduced for support for the

Liberal Democrats and UKIP by 0.7 percentage points. Finally, contact by the Green party also increased Labour support by 4.4 percentage points. Other cross-party effects are not significant at the 5% level.

Table 5: Main Estimates 2017: Average Partial Effect

	Con	Lab	LD	UKIP	Grn	NV
Con Index	0.008*	0.016***	-0.002	-0.007**	-0.002	-0.016***
	(2.06)	(3.91)	(-0.55)	(-2.96)	(-0.85)	(-3.31)
Lab Index	0.000	0.021***	-0.007*	-0.007***	0.002	-0.008*
	(0.05)	(6.43)	(-2.46)	(-3.36)	(1.22)	(-2.01)
LD Index	0.003	0.003	0.007*	-0.004	-0.002	-0.007
	(0.54)	(0.56)	(2.35)	(-1.19)	(-0.96)	(-1.26)
UKIP Index	0.011	-0.002	-0.010	0.008*	0.001	-0.009
	(1.32)	(-0.27)	(-1.72)	(2.35)	(0.37)	(-0.89)
Grn Index	0.004	0.044***	0.004	0.003	0.007***	-0.067***
	(0.32)	(4.37)	(0.59)	(0.34)	(3.57)	(-3.37)
Observations	42007	42007	42007	42007	42007	42007

t statistics in parentheses

Average of marginal effects for each individual in the sample

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Estimates of the Average Partial Effects of party contacts in Scotland and Wales are presented in Tables B1, B2, B3 and B4 in Appendix B. Overall, there is little evidence that party contacts significantly influence the probability of voting for the different parties in these constituent countries. There are a few exceptions, however. For Scotland, the evidence shows that the Labour party increased its support by 2.3 and 1.6 percentage points in 2015 and 2017, respectively. This additional support seems to mostly derive from a reduction in abstentions due to contact by said party. There is also some evidence that the SNP contact reduced Conservative support in 2015, and that Conservative contact reduced SNP support in 2017. In the case of Wales for 2015, Conservative contact increased their support by 4.1 percentage points, while UKIP contact increase their support by 4.4 percentage points. Additionally, Plaid Cymru contact tended to reduce the support of UKIP by a significant amount (4.8 percentage points).

For 2017, Labour contact increased Labour support by 2.2 percentage point, while Plaid Cymru contact once more reduced UKIP support, this time by 1.5 percentage points.

Overall, the results for England presented in the tables in this section and those for Scotland and Wales presented in Appendix B.1 and B.2 show that the effects of party contacts on the propensity to support the different parties are generally significantly smaller than those obtained when ignoring the selection effect due to parties' decision to contact some types of voters but not others. Nonetheless, the results that account for the selection effect still show that party contacts are effective; that is, they tend to increase the support of the party making the efforts. The evidence suggests that most of the parties' gains due to party contacts is derived from increased turnout (or swaying undecided) rather than from converting voters from other parties.

5 Conclusions

The goal of a party's local campaign effort is to drive support towards its party, or at least subtract from other parties' support. To that end, parties will tend to put their effort in contacting the voters they deem more likely to be swayed their way, if only to make efficient use of limited resources (either time and money). Parties' strategic decision to contact some voters (or types of voters) but not others implies that any analysis of local campaign effectiveness that does not account for this strategic decision will produce upward biased estimates: local campaigns will seem more convincing than they really are, simply because parties are approaching the right type(s) of voters. Since the parties' strategies are unobserved to researchers, or in any case hard to measure and quantify, parties' strategies can be thought to introduce unobserved heterogeneity in voter behavior.

To address this issue, I rely on panel data, the preferred empirical strategy to deal with time-invariant unobserved heterogeneity. I argue that, at least during the time frame of the campaigns for the 2015 and 2017 UK General Elections, parties' contact strategies remained stable over time, making panel data an appropriate method for accounting for this heterogeneity.

While there are multiple methods for estimating panel data models with discrete outcomes, I rely on a Multinomial Logit with Correlated Random Effects (MLCRE). Under relatively mild assumptions, MLCRE produces consistent estimates , unlike the Fixed Effects estimator, which suffers from the incidental parameters problem. MLCRE also allows for the estimation of partial effects and probabilities, which the conditional maximum likelihood method proposed by Chamberlain (1980) cannot provide (even though it consistently estimates model parameters).

The results can be summarized in three main points. First, unobserved heterogeneity matters. Ignoring it, and consequently ignoring the selection effect derived from parties' strategic contact decisions, leads to significant overestimation of the effect of party contacts on both voter turnout and choice. In many cases, these overestimation leads to effects that more than twice as large. Second, even after accounting for the selection effect and unobserved heterogeneity, local campaigning matters. The results show that parties' contact effort tend to increase the probability of a voter supporting that party by about 1 to, at most, 2 percentage points on average. These effects are smaller than those typically found on the literature on UK elections, regardless of whether the data used is individual level or aggregate constituency level. Finally, unlike many papers in this literature, I find that there is very little evidence of conversion of voters; the parties' increased support is typically derived by increasing turnout (or swaying undecided), but not from converting supporters of other parties. This is particularly the case for

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Appendix A Partial Effects at the Mean

This section presents the estimates of the partial effects at the means, instead of the Average Partial Effects presented in the main results section.

A.1 Partial Effect at the Mean: Naive Estimates

These Partial Effects at the mean present a similar picture to that described by the Average Partial Effects presented in the main results section. However, the estimates are much larger. This is due to the fact that by setting the mean for each of the variables, the feeling thermometers are essentially set at 'lukewarm' towards all parties. Thus, this is akin to considering individuals who are practically indifferent between all the alternatives. For this reason, it is reasonable that the partial effect at the means will be larger than the average partial effects.

Table A1: Naive Estimates 2015: Partial Effects at the Mean

	Con	Lab	LD	UKIP	Grn	NV
Con Index	0.086***	-0.010	-0.006	-0.004	-0.002	-0.069***
	(6.15)	(-0.62)	(-1.00)	(-0.91)	(-0.92)	(-3.34)
Lab Index	-0.030*	0.124***	-0.014*	-0.005	-0.006**	-0.060**
	(-2.30)	(8.75)	(-2.45)	(-1.05)	(-2.82)	(-3.10)
LD Index	-0.008	-0.044*	0.057***	-0.006	-0.002	-0.016
	(-0.46)	(-2.29)	(8.34)	(-1.01)	(-0.98)	(-0.67)
UKIP Index	0.041	-0.008	-0.014	0.030***	0.003	-0.063
	(1.78)	(-0.36)	(-1.69)	(4.44)	(0.96)	(-1.83)
Grn Index	-0.026	-0.018	-0.002	-0.010	0.018***	0.039
	(-0.88)	(-0.65)	(-0.30)	(-0.93)	(5.44)	(0.89)
Observations	12513	12513	12513	12513	12513	12513

t statistics in parentheses

Marginal effects are calculated at the mean of each variable

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2: Naive Estimates 2017: Marginal Effects at the Mean

	Con	Lab	LD	UKIP	Grn	NV
Con Index	0.080***	-0.014	-0.002	-0.003**	-0.003	-0.062***
	(8.02)	(-1.61)	(-0.49)	(-2.65)	(-1.81)	(-5.62)
Lab Index	-0.026**	0.093***	-0.020***	-0.002	-0.001	-0.041***
	(-2.68)	(12.82)	(-6.16)	(-1.90)	(-1.05)	(-4.35)
LD Index	0.006	-0.033**	0.056***	-0.002	-0.005**	-0.025
	(0.46)	(-3.24)	(14.35)	(-0.96)	(-2.61)	(-1.92)
UKIP Index	0.060*	-0.034	-0.022*	0.010***	-0.000	-0.020
	(2.49)	(-1.65)	(-2.54)	(5.31)	(-0.14)	(-0.76)
Grn Index	-0.027	0.094**	0.014	-0.000	0.026***	-0.129*
	(-0.72)	(3.25)	(1.40)	(-0.13)	(7.73)	(-2.20)
Observations	42007	42007	42007	42007	42007	42007

t statistics in parentheses

Marginal effects are calculated at the mean of each variable

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A.2 Partial Effect at the Mean: Main Estimates

These Partial Effects at the mean are presents a similar picture to that described by the Average Partial Effects presented in the main results section. As was the case with the naive estimates, the effects are much larger for the reason explained in the previous subsection.

Relative to the APE results presented before, the main difference is that Contact by the Labour party in 2017 not only increased support for Labour, but it also reduced support for the Conservative party in roughly the same amount. The remaining results are similar, beyond their magnitude.

Table A3: Main Estimates 2015: Marginal Effects at the Mean

	Con	Lab	LD	UKIP	Grn	NV
Con Index	0.053**	-0.012	0.010	0.002	-0.003	-0.065*
	(2.91)	(-0.57)	(1.45)	(0.39)	(-1.12)	(-2.26)
Lab Index	-0.010	0.059***	0.007	0.003	-0.001	-0.055*
	(-0.53)	(3.68)	(1.04)	(0.45)	(-0.39)	(-2.27)
LD Index	0.006	-0.000	0.023**	-0.010	0.001	-0.037
	(0.28)	(-0.00)	(3.18)	(-1.27)	(0.20)	(-1.07)
UKIP Index	0.047	0.026	-0.014	0.014*	-0.003	-0.070
	(1.75)	(0.95)	(-1.55)	(2.08)	(-0.78)	(-1.60)
Grn Index	0.025	0.048	0.007	0.011	0.010**	-0.092
	(0.81)	(1.46)	(0.78)	(0.97)	(2.85)	(-1.88)
Observations	12513	12513	12513	12513	12513	12513

t statistics in parentheses

Marginal effects are calculated at the mean of each variable

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4: Main Estimates 2017: Marginal Effects at the Mean

	Con	Lab	LD	UKIP	Grn	NV
Con Index	0.009	0.037***	0.001	-0.003**	-0.000	-0.050***
	(0.76)	(3.51)	(0.25)	(-2.82)	(-0.30)	(-3.75)
Lab Index	-0.017	0.051***	-0.004	-0.004***	0.003	-0.027*
	(-1.51)	(5.85)	(-1.12)	(-3.55)	(1.94)	(-2.33)
LD Index	0.002	0.010	0.010*	-0.002	-0.001	-0.023
	(0.17)	(0.83)	(2.41)	(-1.21)	(-0.65)	(-1.40)
UKIP Index	0.045	-0.016	-0.013	0.004**	0.000	-0.026
	(1.75)	(-0.70)	(-1.71)	(2.58)	(0.07)	(-0.86)
Grn Index	0.009	0.132***	0.019	0.001	0.010***	-0.187***
	(0.24)	(4.27)	(1.84)	(0.26)	(3.85)	(-3.35)
Observations	42007	42007	42007	42007	42007	42007

t statistics in parentheses

Marginal effects are calculated at the mean of each variable

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix B Results for Scotland and Wales

B.1 Results for Scotland

The results for Scotland show very few significant effects. For 2015, Labour contact increases Labour support, mainly through reducing abstention. Contact by the SNP, on the other hand, seems to reduce Conservative support, with no clear beneficiary. In the case of 2017 Labour contact also increase Labour support, once again mainly through a reduction in abstention. Conservative contact, on the other hand, seems to increase SNP support, a somewhat surprising result. All other effects are not statistically significant.

Table B1: Main Estimates 2015: Average Marginal Effect

	Con	Lab	LD	SNP	Other	NV
Con Index	-0.003	-0.002	0.007	0.019	-0.023	0.002
	(-0.25)	(-0.15)	(0.66)	(1.70)	(-1.93)	(0.15)
Lab Index	0.017	0.023*	0.004	0.005	-0.011	-0.038**
	(1.82)	(2.42)	(0.37)	(0.56)	(-1.32)	(-3.07)
LD Index	-0.022	0.015	0.005	0.000	0.006	-0.003
	(-1.57)	(0.94)	(0.49)	(0.03)	(0.46)	(-0.21)
SNP Index	-0.020**	0.004	0.009	0.010	-0.000	-0.002
	(-2.63)	(0.39)	(1.31)	(1.33)	(-0.05)	(-0.17)
Others Index	0.026	0.011	0.004	0.014	0.015	-0.069
	(1.89)	(0.61)	(0.33)	(0.93)	(1.77)	(-1.88)
Observations	2957	2957	2957	2957	2957	2957

t statistics in parentheses

Average of marginal effects for each individual in the sample

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B2: Main Estimates Scotland 2017: Average Partial Effect

	Con	Lab	LD	SNP	Other	NV
Con Index	0.002	-0.003	-0.009	0.020**	-0.003	-0.006
	(0.29)	(-0.35)	(-1.42)	(2.68)	(-0.47)	(-0.69)
Lab Index	0.003	0.016*	-0.001	0.008	-0.008	-0.018
	(0.39)	(2.06)	(-0.07)	(1.16)	(-1.28)	(-1.95)
LD Index	-0.010	0.006	0.004	0.001	-0.008	0.006
	(-1.09)	(0.54)	(0.62)	(0.18)	(-1.31)	(0.54)
SNP Index	-0.004	-0.005	0.002	0.004	0.004	-0.002
	(-0.54)	(-0.52)	(0.24)	(0.87)	(1.00)	(-0.29)
Others Index	-0.014	-0.017	0.009	0.009	0.010	0.004
	(-0.85)	(-1.70)	(0.76)	(0.88)	(1.88)	(0.29)
Observations	7677	7677	7677	7677	7677	7677

t statistics in parentheses

Average of marginal effects for each individual in the sample

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

B.2 Results for Wales

In the case of Wales for 2017, Conservative and UKIP contact benefit their own parties, increasing their support in 4.1 and 4.4 percentage points, respectively. It is not clear where these extra support for each of these parties originates from. Contact by Plaid Cymru seems to reduce support for UKIP by 4.8 percentage points and increase it for the Liberal Democrats by 4.0 percentage points. Contact by the Liberal Democrats seems to increase support for Plaid Cymru instead. All other effects are not statistically significant at the 5% level.

In the case of the 2017 General Election, Conservative contacts in Wales reduced abstentionism by 3.1 percentage points, with no clear beneficiary of this action. LAbour contact, on the other hand, increased Labour support by 2.2 percentage points. Finally, Plaid Cymru's contact tended to reduce UKIP support by 1.5 percentage points, a similar effect to that found for 2015 (although much smaller in magnitude). All other effects are not found to be statistically significant at the 5% level.

Table B3: Main Estimates Wales 2015: Average Partial Effect

	Con	Lab	LD	UKIP	Other	PC	NV
Con Index	0.041*	0.016	-0.003	-0.001	-0.006	-0.022	-0.025
	(2.44)	(0.77)	(-0.18)	(-0.09)	(-0.51)	(-1.54)	(-0.86)
Lab Index	-0.015	0.019	0.007	-0.002	-0.007	0.000	-0.003
	(-0.68)	(1.14)	(0.52)	(-0.07)	(-0.67)	(0.05)	(-0.13)
LD Index	-0.004	-0.029	0.016	-0.014	0.003	0.033*	-0.003
	(-0.20)	(-1.14)	(1.06)	(-0.87)	(0.30)	(2.55)	(-0.14)
UKIP Index	0.011	0.014	-0.027	0.044*	0.025	0.000	-0.067
	(0.43)	(0.51)	(-1.62)	(2.26)	(1.46)	(0.02)	(-1.80)
PC Index	-0.020	-0.006	0.040*	-0.048*	-0.023	0.001	0.055
	(-0.96)	(-0.31)	(2.14)	(-2.35)	(-1.60)	(0.09)	(1.89)
Observations	1525	1525	1525	1525	1525	1525	1525

t statistics in parentheses

Average of marginal effects for each individual in the sample

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B4: Main Estimates Wales 2017: Average Partial Effect

	Con	Lab	LD	UKIP	Other	PC	NV
Con Index	0.003	0.013	-0.002	0.001	0.009	0.007	-0.031*
	(0.28)	(1.01)	(-0.28)	(0.14)	(1.06)	(0.69)	(-2.58)
Lab Index	-0.004	0.022**	-0.002	-0.000	-0.005	0.007	-0.017
	(-0.46)	(2.65)	(-0.32)	(-0.07)	(-1.22)	(1.06)	(-1.81)
LD Index	0.000	-0.006	0.007	0.004	-0.012	-0.002	0.010
	(0.02)	(-0.52)	(0.84)	(0.47)	(-1.57)	(-0.22)	(0.76)
UKIP Index	-0.007	0.018	0.003	0.002	-0.013	0.023	-0.026
	(-0.32)	(0.74)	(0.19)	(0.25)	(-1.13)	(1.29)	(-0.78)
PC Index	0.014	-0.002	0.001	-0.015*	0.007	-0.005	0.001
	(1.31)	(-0.20)	(0.15)	(-2.07)	(0.83)	(-0.91)	(0.09)
Observations	4005	4005	4005	4005	4005	4005	4005

t statistics in parentheses

Average of marginal effects for each individual in the sample

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix C Parties' Contact Strategies

For the main estimation method used in this paper to be valid, it is necessary that the unobserved heterogeneity be time-invariant. A key requirement for this to hold is that parties' contact strategies be time-invariant. That is, it requires that the individuals that parties decide to contact across the different survey waves have similar observed and unobserved characteristics.[11] While it is not possible to test whether individuals contacted by the parties across the different survey waves have the same unobserved characteristics, it is possible to analyze whether their observed characteristics are the same (or similar).

To determine whether parties target the *same kinds* of voters across survey waves, I first compare the average characteristics of voters contacted by each party in each of the waves, using a t-test for the comparison of means. As an alternative method, I estimate the contact strategy of each party in each wave, and compare its predicting power for different waves. In both cases, I find that the types of voters contacted by the parties is essentially the same throughout the survey waves covered in the study (for both 2015 and 2017). Finding no differences in observable characteristics does not prove that there are no differences in unobserved characteristics. However, it is unlikely that voters contacted in difference waves will differ substantially in their unobserved characteristics when they are extremely similar in terms of their observed ones.

C.1 Comparison of Means

For each wave, I calculate the average characteristic of voters contacted by a given party: μ_1, μ_2, and μ_3. Then, I produce t-test for difference in means between all the waves. Thus, $t_{1,2}$ is the t-test for a comparison of means between wave 1 and wave ; $t_{1,3}$ is the t-test for a comparison of means between wave 1 and wave 3; $t_{2,3}$ is the t-test for a comparison of means between wave 2 and wave 3. As can be seen from Tables B1 through B9, the t-tests reject any difference in means across contacted voters in each wave for all parties and both General Elections (the

[11] Notice that variation in the intensity of the campaign does not violate this, as long as the types of individuals campaigns contact are similar across the survey waves.

highest t-test is 0.42, well below standard critical values for statistical significance).

Table C1: Comparison of Means, Conservative Contact, 2015

	μ_1	μ_2	μ_3	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
Age	53.09	52.14	53.34	0.06	-0.02	-0.08
Agreeableness	6.09	6.08	6.07	0.00	0.01	0.00
Conscientiousness	6.89	6.87	6.84	0.01	0.03	0.02
Extrovert	4.28	4.22	4.19	0.02	0.04	0.01
Neuroticism	3.55	3.57	3.58	-0.01	-0.02	-0.00
Openness	5.62	5.61	5.62	0.01	0.00	-0.01
White British	0.93	0.93	0.92	0.01	0.02	0.01
Female	0.47	0.48	0.49	-0.02	-0.03	-0.01
Own Home Outright	0.48	0.46	0.45	0.06	0.06	0.00
Home Mortgage	0.32	0.33	0.32	-0.03	-0.00	0.03
Renter	0.17	0.19	0.20	-0.04	-0.08	-0.03
Household Income	7.21	7.22	7.24	-0.00	-0.01	-0.01
Personal Income	5.27	5.17	5.20	0.03	0.02	-0.01
University Degree	0.53	0.54	0.55	-0.02	-0.03	-0.01
Con Thermometer	4.70	4.49	4.45	0.06	0.07	0.01
Lab Thermometer	3.79	4.03	4.08	-0.08	-0.09	-0.02
LD Thermometer	3.30	3.97	3.89	-0.26	-0.22	0.03
UKIP Thermometer	3.06	3.15	2.99	-0.03	0.02	0.05
Green Thermometer	3.82	4.05	4.26	-0.08	-0.15	-0.07

Table C2: Comparison of Means, Labour Contact, 2015

	μ_1	μ_2	μ_3	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
Age	49.66	49.82	52.01	-0.01	-0.15	-0.14
Agreeableness	6.10	6.13	6.09	-0.01	0.01	0.02
Conscientiousness	6.69	6.75	6.74	-0.03	-0.02	0.01
Extrovert	4.25	4.19	4.18	0.03	0.03	0.00
Neuroticism	3.67	3.63	3.66	0.02	0.01	-0.01
Openness	5.74	5.70	5.67	0.02	0.04	0.02
White British	0.91	0.92	0.91	-0.03	-0.01	0.01
Female	0.49	0.49	0.49	-0.01	-0.00	0.01
Own Home Outright	0.39	0.40	0.40	-0.02	-0.04	-0.01
Home Mortgage	0.33	0.34	0.33	-0.02	0.00	0.02
Renter	0.25	0.23	0.24	0.04	0.03	-0.01
Household Income	6.82	6.97	6.98	-0.04	-0.04	-0.00
Personal Income	4.92	4.91	4.97	0.00	-0.02	-0.02
University Degree	0.55	0.55	0.55	0.01	0.02	0.01
Con Thermometer	2.94	3.26	3.38	-0.10	-0.13	-0.03
Lab Thermometer	5.27	5.02	4.89	0.08	0.12	0.04
LD Thermometer	3.20	3.80	3.77	-0.23	-0.22	0.01
UKIP Thermometer	2.18	2.40	2.52	-0.07	-0.11	-0.04
Green Thermometer	4.70	4.69	4.70	0.00	-0.00	-0.00

Table C3: Comparison of Means, Lib-Dem Contact, 2015

	μ_1	μ_2	μ_3	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
Age	51.97	51.54	52.87	0.03	-0.06	-0.08
Agreeableness	6.07	6.08	6.07	-0.00	-0.00	0.00
Conscientiousness	6.80	6.84	6.81	-0.02	-0.01	0.02
Extrovert	4.24	4.25	4.16	-0.00	0.03	0.04
Neuroticism	3.56	3.54	3.59	0.01	-0.01	-0.02
Openness	5.79	5.73	5.70	0.04	0.05	0.02
White British	0.91	0.92	0.92	-0.03	-0.02	0.01
Female	0.47	0.48	0.49	-0.01	-0.02	-0.01
Own Home Outright	0.47	0.45	0.44	0.04	0.04	0.01
Home Mortgage	0.31	0.32	0.32	-0.03	-0.02	0.01
Renter	0.20	0.21	0.21	-0.03	-0.03	-0.00
Household Income	7.17	7.07	7.18	0.03	-0.01	-0.03
Personal Income	5.16	5.05	5.14	0.04	0.01	-0.03
University Degree	0.60	0.57	0.58	0.05	0.04	-0.01
Con Thermometer	3.54	3.81	3.87	-0.08	-0.10	-0.02
Lab Thermometer	4.28	4.42	4.40	-0.05	-0.04	0.01
LD Thermometer	4.06	4.38	4.19	-0.11	-0.05	0.07
UKIP Thermometer	2.31	2.58	2.63	-0.09	-0.10	-0.02
Green Thermometer	4.47	4.55	4.64	-0.03	-0.06	-0.03

Table C4: Comparison of Means, UKIP Contact, 2015

	μ_1	μ_2	μ_3	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
Age	53.14	51.42	53.02	0.11	0.01	-0.10
Agreeableness	6.04	6.04	6.06	0.00	-0.01	-0.01
Conscientiousness	6.83	6.86	6.79	-0.01	0.02	0.04
Extrovert	4.32	4.19	4.13	0.06	0.09	0.03
Neuroticism	3.57	3.57	3.60	-0.00	-0.01	-0.01
Openness	5.61	5.66	5.64	-0.03	-0.02	0.01
White British	0.94	0.93	0.93	0.02	0.05	0.03
Female	0.44	0.47	0.47	-0.05	-0.06	-0.00
Own Home Outright	0.46	0.44	0.44	0.04	0.04	0.01
Home Mortgage	0.31	0.34	0.33	-0.06	-0.04	0.02
Renter	0.21	0.20	0.22	0.02	-0.02	-0.04
Household Income	6.70	7.03	7.07	-0.09	-0.10	-0.01
Personal Income	4.79	4.96	5.02	-0.06	-0.07	-0.02
University Degree	0.47	0.54	0.54	-0.13	-0.14	-0.01
Con Thermometer	4.14	3.95	4.05	0.06	0.03	-0.03
Lab Thermometer	3.76	4.22	4.28	-0.15	-0.16	-0.02
LD Thermometer	2.91	3.60	3.75	-0.26	-0.32	-0.06
UKIP Thermometer	4.35	3.65	3.41	0.18	0.26	0.07
Green Thermometer	3.58	4.03	4.31	-0.15	-0.25	-0.10

Table C5: Comparison of Means, Green Contact, 2015

	μ_1	μ_2	μ_3	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
Age	46.97	49.53	52.03	-0.14	-0.30	-0.15
Agreeableness	6.06	6.10	6.07	-0.02	-0.01	0.02
Conscientiousness	6.51	6.70	6.67	-0.10	-0.08	0.02
Extrovert	4.26	4.29	4.21	-0.01	0.02	0.03
Neuroticism	3.65	3.70	3.65	-0.02	0.00	0.02
Openness	6.15	5.92	5.89	0.13	0.15	0.02
White British	0.88	0.92	0.90	-0.14	-0.07	0.06
Female	0.46	0.48	0.48	-0.04	-0.03	0.01
Own Home Outright	0.36	0.44	0.42	-0.16	-0.12	0.04
Home Mortgage	0.25	0.28	0.30	-0.08	-0.11	-0.03
Renter	0.36	0.26	0.26	0.22	0.22	-0.01
Household Income	6.48	7.04	6.97	-0.15	-0.14	0.02
Personal Income	4.47	4.92	4.94	-0.15	-0.15	-0.01
University Degree	0.59	0.60	0.60	-0.02	-0.03	-0.01
Con Thermometer	2.40	3.07	3.09	-0.21	-0.21	-0.01
Lab Thermometer	4.63	4.70	4.71	-0.02	-0.03	-0.00
LD Thermometer	3.14	3.84	3.88	-0.26	-0.27	-0.01
UKIP Thermometer	1.64	2.20	2.14	-0.19	-0.17	0.02
Green Thermometer	6.14	5.43	5.47	0.23	0.22	-0.01

Table C6: Comparison of Means, Conservative Contact, 2017

	μ_1	μ_2	μ_3	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
Age	56.05	55.33	54.00	0.04	0.13	0.08
Agreeableness	6.11	6.13	6.11	-0.01	-0.00	0.01
Conscientiousness	6.97	6.93	6.85	0.02	0.07	0.05
Extrovert	4.13	4.11	4.06	0.01	0.03	0.02
Neuroticism	3.51	3.54	3.66	-0.01	-0.07	-0.05
Openness	5.56	5.56	5.59	-0.00	-0.02	-0.02
Female	0.48	0.48	0.51	-0.01	-0.07	-0.06
Own Home Outright	0.52	0.51	0.47	0.02	0.10	0.08
Home Mortgage	0.31	0.30	0.31	0.02	-0.01	-0.03
Renter	0.15	0.17	0.19	-0.05	-0.11	-0.06
Personal Income	5.27	5.21	5.01	0.02	0.08	0.06
University Degree	0.58	0.55	0.56	0.05	0.03	-0.01
Con Thermometer	5.20	4.90	4.19	0.09	0.29	0.20
Lab Thermometer	3.74	4.26	4.78	-0.16	-0.32	-0.16
LD Thermometer	3.84	3.86	3.95	-0.01	-0.04	-0.03
UKIP Thermometer	2.63	2.32	2.14	0.10	0.16	0.06
Green Thermometer	4.06	4.26	4.59	-0.07	-0.17	-0.11

Table C7: Comparison of Means, Labour Contact, 2017

	μ_1	μ_2	μ_3	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
Age	52.43	52.62	52.67	-0.01	-0.01	-0.00
Agreeableness	6.16	6.15	6.13	0.01	0.02	0.01
Conscientiousness	6.69	6.73	6.74	-0.02	-0.03	-0.01
Extrovert	4.13	4.12	4.08	0.00	0.02	0.01
Neuroticism	3.71	3.69	3.72	0.01	-0.00	-0.01
Openness	5.77	5.67	5.67	0.06	0.06	0.00
Female	0.49	0.51	0.52	-0.03	-0.05	-0.02
Own Home Outright	0.44	0.45	0.43	-0.02	0.01	0.02
Home Mortgage	0.31	0.31	0.31	0.00	0.01	0.01
Renter	0.22	0.22	0.23	0.01	-0.03	-0.04
Personal Income	4.75	4.86	4.79	-0.04	-0.01	0.02
University Degree	0.56	0.55	0.55	0.02	0.02	-0.00
Con Thermometer	3.10	3.37	3.26	-0.08	-0.05	0.03
Lab Thermometer	5.77	5.81	5.76	-0.01	0.00	0.02
LD Thermometer	4.16	4.16	4.11	0.00	0.02	0.02
UKIP Thermometer	1.75	1.78	1.81	-0.01	-0.02	-0.01
Green Thermometer	5.23	5.11	5.05	0.04	0.06	0.02

Table C8: Comparison of Means, Lib-Dem Contact, 2017

	μ_1	μ_2	μ_3	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
Age	53.94	53.91	53.45	0.00	0.03	0.03
Agreeableness	6.08	6.07	6.10	0.00	-0.01	-0.01
Conscientiousness	6.82	6.86	6.79	-0.02	0.02	0.04
Extrovert	4.16	4.14	4.07	0.01	0.04	0.03
Neuroticism	3.67	3.62	3.65	0.02	0.01	-0.01
Openness	5.78	5.69	5.72	0.05	0.03	-0.02
Female	0.49	0.49	0.50	-0.01	-0.02	-0.01
Own Home Outright	0.48	0.49	0.47	-0.02	0.03	0.04
Home Mortgage	0.31	0.29	0.30	0.04	0.02	-0.03
Renter	0.19	0.20	0.21	-0.04	-0.07	-0.03
Personal Income	5.11	5.20	5.07	-0.03	0.01	0.04
University Degree	0.60	0.61	0.60	-0.01	0.01	0.01
Con Thermometer	3.91	3.89	3.54	0.01	0.11	0.11
Lab Thermometer	4.56	4.86	5.22	-0.10	-0.21	-0.11
LD Thermometer	5.04	4.74	4.59	0.10	0.16	0.05
UKIP Thermometer	1.84	1.73	1.68	0.04	0.06	0.02
Green Thermometer	4.99	4.95	5.08	0.01	-0.03	-0.04

Table C9: Comparison of Means, UKIP Contact, 2017

	μ_1	μ_2	μ_3	$t_{1,2}$	$t_{1,3}$	$t_{2,3}$
Age	56.21	56.16	54.23	0.00	0.13	0.12
Agreeableness	6.28	6.19	6.17	0.05	0.06	0.01
Conscientiousness	7.04	7.03	6.82	0.01	0.12	0.11
Extrovert	4.17	4.09	4.14	0.03	0.01	-0.02
Neuroticism	3.43	3.43	3.69	0.00	-0.12	-0.12
Openness	5.72	5.66	5.71	0.04	0.01	-0.03
Female	0.43	0.47	0.47	-0.07	-0.07	-0.00
Own Home Outright	0.52	0.54	0.44	-0.05	0.17	0.22
Home Mortgage	0.26	0.25	0.34	0.01	-0.17	-0.18
Renter	0.20	0.18	0.21	0.04	-0.02	-0.05
Personal Income	4.90	4.86	4.79	0.01	0.03	0.02
University Degree	0.50	0.49	0.54	0.02	-0.08	-0.09
Con Thermometer	5.03	4.63	3.65	0.12	0.41	0.29
Lab Thermometer	3.82	4.47	5.05	-0.20	-0.36	-0.17
LD Thermometer	3.34	3.65	3.86	-0.11	-0.18	-0.07
UKIP Thermometer	4.04	3.13	2.56	0.25	0.42	0.17
Green Thermometer	3.93	4.28	4.73	-0.11	-0.25	-0.14

C.2 Contact Strategies Test Predict

For each survey wave I split the sample into a training (E_k, for *e*stimation, $k = 1, 2, 3$) and test (T_k, for *t*est, k=1,2,3) sets. Then, for each training set, I estimate a random forest where the outcome is being contacted by the party and the input variables are all those in the previous subsection. Then, for each of the random forests, I predict the outcomes for each of the test sets. Finally, for each test set, I compare whether the predicted probabilities of contact using the Index of Agreement (Willmott, 1981).

$$f_k(\cdot) = RF(E_k), \quad k =, 1, 2, 3 \tag{4}$$

$$p_k^r = f_k(T_r), \quad k = 1, 2, 3, \quad r = 1, 2, 3 \tag{5}$$

$$a_{k,j}^r = 1 - \frac{\sum (p_k^r - p_j^r)^2}{\sum (|p_k^r - \overline{p}_j^r| + |p_j^r - \overline{p}_j^r|)^2} \tag{6}$$

Thus $a_{i,j}^r$ the Index of Agreement in prediction for test set r using the random forests that relied on training sets i and j, where $\overline{p}_k^r$ is the average predicted probability in test set r using the random forest estimated with random forest k. The Index of Agreement varies between 0

and 1, with 1 being perfect agreement, and 0 indicating no agreement at all.

Table C10: Index of Agreement of Contact Strategies

		2015			2017		
		T_1	T_2	T_3	T_1	T_2	T_3
Conservative	f_1 v. f_2	0.48	0.57	0.60	0.55	0.53	0.61
	f_1 v. f_3	0.54	0.58	0.61	0.53	0.56	0.58
	f_2 v. f_3	0.56	0.58	0.54	0.62	0.55	0.59
Labour	f_1 v. f_2	0.52	0.56	0.66	0.62	0.59	0.68
	f_1 v. f_3	0.58	0.58	0.66	0.61	0.66	0.62
	f_2 v. f_3	0.60	0.59	0.58	0.78	0.61	0.63
Lib-Dem	f_1 v. f_2	0.51	0.57	0.63	0.61	0.60	0.71
	f_1 v. f_3	0.55	0.57	0.63	0.55	0.65	0.63
	f_2 v. f_3	0.59	0.56	0.53	0.69	0.55	0.61
UKIP	f_1 v. f_2	0.45	0.52	0.57	0.37	0.42	0.52
	f_1 v. f_3	0.47	0.52	0.59	0.31	0.46	0.48
	f_2 v. f_3	0.50	0.51	0.49	0.46	0.34	0.40
Green	f_1 v. f_2	0.49	0.54	0.67			
	f_1 v. f_3	0.48	0.54	0.65			
	f_2 v. f_3	0.52	0.47	0.52			

Overall, the measures of agreement are quite similar to each other, suggesting that the contact strategies that parties used in the difference campaign waves are relatively similar. The only deviation from agreement is that for UKIP in 2017, where agreement is relatively low and also differs somewhat across testing sets. Despite this, the evidence suggests that there are little (very few at worst) differences in the contact strategies used by the parties in both the 2015 and 2017 General Elections.

Appendix D Validation of Contact Data

A concern in utilizing voters self-reports of being contacted by parties is that this may not entirely reflect contacts actually made by parties; voters may incorrectly remember a contact that did not occur, or forget a contact that did not occur. Validating the contacts received by a particular voter is not possible. However, it is possible to validate party contacts, to some extent, in a more aggregate context, by comparing it to campaign spending. It should be noted, however,

that the campaign effort does not exclusively depends on campaign spending. A substantial amount of campaigning is often performed on a volunteer basis (see, for example, Denver and Hands, 1997). Moreover, Fisher et al. (2014) show that free campaigning (voluteering, etc) has an independent impact on electoral results. Thus campaign spending cannot fully capture a party's effort.

Nonetheless, it is expected that campaign contacts to be correlated with campaign spending. To validate contact data, for each constituency, I calculate the percentage of voters who report having been contacted by each of the parties. I then compare the constituency level contact rate (derived from voters' self-reports) with campaign spending at the constituency level. Presumably, if a particular party is contacting more voters, it should be reflected in higher campaign spending.

Figure D1 shows the effect of a one-standard deviation increase in a party's spending on the standardized percentage of voters contacted. For example, for 2015 it shows that a 1 standard deviation increase in Conservative spending is associated with a 0.95 standard deviation increase in the percentage of voters contacted by the Conservative party. The results overall show that there is a positive and significant association between campaign spending and self-reported contact at the constituency level. For the more established national parties (Conservative, Labour, Liberal Democrats) these standardized associations are close to 1, while for Plaid Cymru they are significantly above 1. For the other parties (SNP, UKIP and Green) they are below 1, but still show a positive and significant association between the two variables. For 2017, the associations are somewhat smaller overall, but still strongly positive and statistically significant.

Figures D2 and D3 show the scatter plots of the standardized campaign spending and voter self-reported contact by constituency. Visual inspection of the scatter plots confirm the results previously presented in Figure D1

Figure D1: Contact and Spending 2015 (upper) and 2017 (lower)

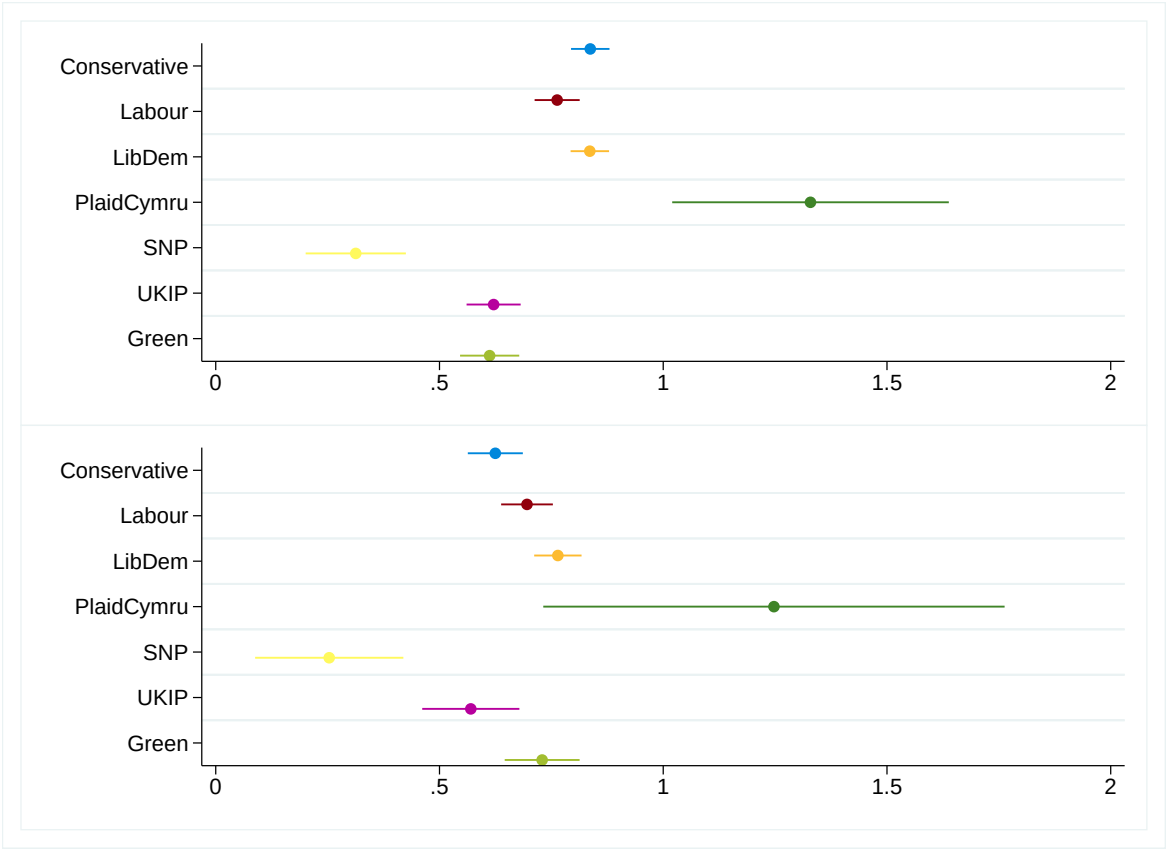

Figure D2: Contact and Spending 2015, Scatterplots by Party

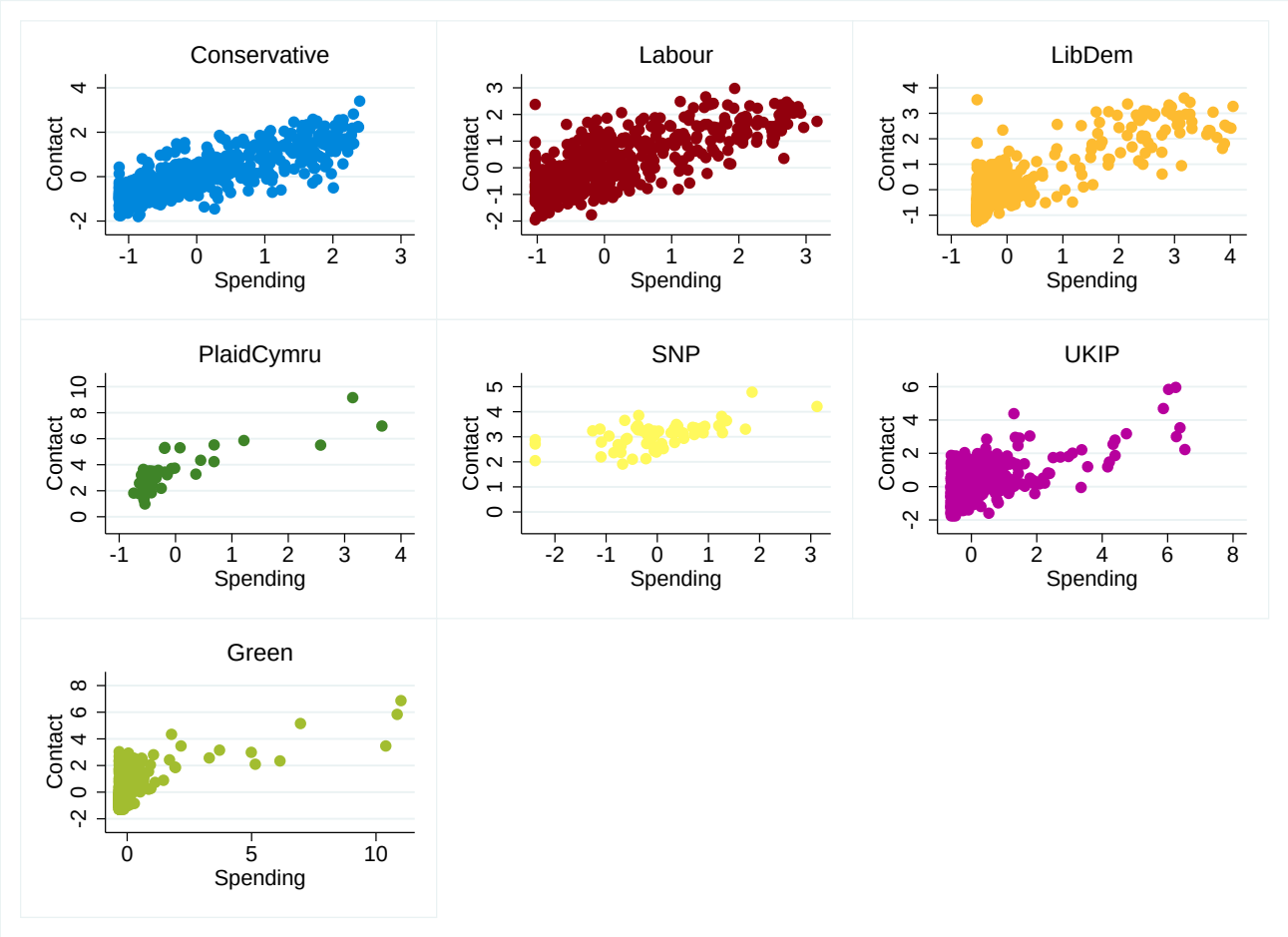

Figure D3: Contact and Spending 2017, Scatterplots by Party