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JEL Classification: D72, P48, H7

Keywords: Elections, Campaign finance, Electoral expenditures, Information technologies

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It Takes Money to Make MPs: New Evidence from 150 Years of British Campaign Spending *

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Abstract

We study electoral campaigns over the long run, through the lens of their spending. In particular, we ask whether changing media technologies and electoral environments impacted patterns of spending and their correlation with electoral results. To do so, we build a novel exhaustive dataset on general elections in the United Kingdom from 1857 to 2017, which includes information on campaign spending (itemized by expense categories), electoral outcomes and socio-demographic characteristics for $69,042$ election-constituency-candidates. We start by providing new insights on the history of British political campaigns, in particular the growing importance of advertising material, including via digital means, to the detriment of paid staff and electoral meetings. We then show that there is a strong positive correlation between expenditures and votes, and that overall the magnitude of this relationship has strongly increased since the 1880s, with a peak in the last quarter of the 20th century. We link these transformations to changes in the conduct of campaigns, and to the introduction of new information technologies. We show in particular that the expansion of local radio and broadband Internet increased the sensitivity of the electoral results to differences in campaign spending. These results encourage greater contextualization in the drafting of campaign finance regulations.

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1 Introduction

Have the patterns and influences of campaign spending changed over time? In particular, how have evolutions in the electoral environments and campaign finance regulations affected the relationship between candidates' expenditures and electoral results? While there is an important literature on campaign finance, its focus is mainly on recent decades (see e.g. Da Silveira and De Mello, 2011; Ben-Bassat et al., 2015; Avis et al., 2017; Spenkuch and Toniatti, 2018). Yet, many argue that the introduction of new technologies, such as the Internet, can radically change the way candidates and parties campaign, notably by making it cheaper to reach out to voters (Hersh, 2015; Larcinese and Miner, 2018). Despite the intrinsic policy significance of campaign finance regulations, there is very little empirical evidence on the long-run evolution of the role played by money in elections. This article attempts to fill that gap.

We build a novel exhaustive dataset on general elections in the United Kingdom from 1857 to 2017 – a period that covers major innovations in electoral regulations, technologies and environments. We show that, while the amounts spent on candidates' campaigns have decreased dramatically since 1880, the correlation between this spending and the votes they received has in fact risen, leading to ambiguous conclusions regarding the importance of money in elections. Using additional data and empirical strategies, we explain these evolutions by the introduction of new media technologies and shifts in candidates' campaign strategies, stressing the importance of taking these into consideration in the design of electoral policies.

The UK was the first country worldwide to require candidates to lodge the details of their campaign expenses (in 1854) and to introduce limits on campaign expenditure (in 1883). We collect data from the *UK Parliamentary Papers* on campaign spending by category (printing and advertising, public meetings, transport, etc.) covering 40 elections and $20,085$ election constituencies, for a total of $34,398$ unique candidates. We complement these data with detailed candidate and constituency characteristics using a variety of archival sources. The database we built is, to the best of our knowledge, the most exhaustive dataset on elections and campaign expenditures available over the long run.[1] Producing these data is our first contribution.

We start by reviewing the historical changes in the conduct of campaigns and their technologies, from open-air election meetings to the targeting of voters on the Internet, and relate these qualitative accounts to the aggregate statistics from our data. Several stylized facts emerge. First, we document that the average amount spent by candidates (both in total and per registered voter) has decreased dramatically over the centuries: a candidate in the 1860s-1870s spent on average, for her campaign, the equivalent of 27.21 annual household revenues; in the most recent elections, this number has decreased to 0.18. Changes in the spending limits are not enough to rationalize this dramatic drop. Second, the composition of candidates' spending also changed radically, with the emergence of new modes

[1] Fouirnaies (2021a) also (concomitantly) collected data on candidates' spending in the UK between 1885 and 2019. Our data – unlike his – includes the elections between 1857 and 1880, and detailed characteristics of candidates and constituencies.

of communication and broadcasting technologies. In particular, we observe a progressive shift away from paid staff (such as agents or messengers) towards advertisement services and material (leaflets, posters, etc.).

We then investigate the long-run patterns of the relationship between campaign spending and votes. To do so, we use a conditional logit model to estimate the average effect of candidates' electoral expenditures on vote shares (Bekkouche et al., 2020). Our estimations control for constituencies' (socioeconomic data, age structure and occupations) and candidates' (age, gender, diploma, previous occupation and political mandates) characteristics, and include party-election and constituency fixed effects. Besides, the historical depth of our data allows us to include, in some specifications, candidate fixed effects, i.e. to exploit variations in the spending of the same candidate over time and constituencies, which effectively captures time-invariant candidate heterogeneity (such as, arguably, quality or charisma). In all specifications, we find a positive and statistically significant correlation between the share of the constituency total spending represented by a candidate and the share of the votes she obtains.[2] The magnitude of this effect is economically significant: in our most conservative specification, a one-percentage-point increase in the spending share of a candidate is associated with a 1.1% increase in her votes count (keeping abstention constant). These results are robust to the use of different samples, sets of fixed effects, absolute spending rather than spending share as an explanatory variable, and to controlling for spatial autocorrelation.

While the large set of fixed effects (especially candidate) and time-varying dimensions for which we control allows us to partly mitigate the potential bias arising from the endogeneity of campaign spending, it does not entirely absorb it. There could still be unobserved, time-varying elements at the candidate or district-level that correlate with both expenses and votes. As such, the goal of this article is not to single out the causal impact of money on votes[3]; rather, we aim to study how their relationship has evolved over time, space and campaign strategies.

Strikingly, we show that the magnitude of the correlation between campaign spending and votes has consistently increased since the 1880s, despite the passing of stricter campaign finance rules. It peaked during the last three decades of the 20th century – a result that contrasts with the general consensus in the political science literature on the importance of local campaigning at the time (see in particular Kavanagh, 1995; Butler, 1989). The correlation then suddenly dropped in the early 2000s,

[2]Investigating the relationship between the spending share and the vote share – rather than the impact of one additional euro spent – presents many advantages in our context. In particular, even controlling for inflation, an extra euro in the 1850s is hardly comparable to the same euro nowadays. Besides, given that campaigning is an equilibrium game, recent theoretical papers make the argument that the key dimension is not your level of spending but what you spend *compared to the other candidates* – i.e., your share (Acharya et al., 2019).

[3]A number of articles in the literature have tried to pinpoint this causal impact, using a number of different empirical strategies: Levitt (1994) uses same-races repetition in U.S. Congressional elections; Gerber (1998) instruments spending with variables affecting fundraising abilities; Jacobson (2006) resorts to survey data and Gerber (2004) to field experiments. Recent papers use fine grain geographical data to exploit quasi-random variations in exposure to campaign advertising (Spenkuch and Toniatti, 2018; Larcinese and Miner, 2018), or natural experiments (Bekkouche et al., 2020). While these articles make an important contribution to causally estimating the effects of campaigning, they consider – by construction given their empirical methodology – only specific time periods.

but remained at levels close to those of the notedly corrupt Victorian elections (Rix, 2008). Further, on top of these temporal variations, we document heterogeneity across UK regions, as well as across campaign techniques used by the candidates. In particular, we show that the temporal patterns we observe are mainly driven by the "printing and advertising" spending category. To the extent of our knowledge, we are the very first to document these changing historical patterns in the importance of campaigning. We then try to rationalize them.

First, we link these patterns to the introduction of new media technologies. Novel information technologies indeed change both how candidates design their campaigns and how these campaigns are conveyed to citizens. Using natural experiments, we document the causal impact of the introduction of two technologies which developed at key turning points of our temporal patterns: local radio and broadband Internet. For the former, we exploit a freeze in independent radio licensing that occurred between 1976 and 1980, in the midst of local radio expansion. Comparing – in the spirit of Gentzkow (2006) and Angelucci et al. (2020) – "similar" constituencies that gained access to local radio just before or after the freeze, we show that electoral results are more sensitive to differences in campaign spending in places covered by the media. We reach a similar conclusion when using Gavazza et al. (2019)'s rainfall strategy to instrument for broadband Internet penetration in the 2000s: between the 2005 and 2010 general elections, we observe a higher correlation between spending and votes in places that gained relatively more exogenous Internet access. We explain these findings by the amplification potential of these local and decentralized media, which cover and comment local campaign efforts.

Second, we relate our temporal trends to important changes in the electoral environment and the conduct of campaigns. The second half of the 20th century was a time of "professionalization" of campaigns (Lawrence, 2009; Johnston and Pattie, 2014), with the introduction of new techniques from marketing science, and of electoral strategies that put marginal constituencies at the center of attention. We show that, since the 1960s, these marginal constituencies display higher correlation between campaign spending and votes, a finding that seems to be driven by changes in the behaviors of both candidates and voters. The former mobilized larger and more sophisticated campaigning efforts – as measured with both spending and survey data – in close constituencies, while the electorate displayed more variability in voting intentions and partisan identification.

However, since the turn of the century, several factors have triggered what Fisher (2015) calls the "end of the national campaign", i.e. the fact that parties progressively gave up the costly national efforts to the benefit of centrally coordinated local campaigns. As it is concomitant to the drop in the correlation between spending and votes we observe in the 2000s, we investigate the role played by this new tendency of national parties to intervene in local constituencies' affairs. Our results indicate that this involvement overshadowed local efforts – those that are paid by candidates' own spending – progressively decreasing the efficiency of the latter. This also had consequences for local campaigns themselves, which started to span longer periods but in a more diffuse, less intense fashion: though the spending limits were stable, the average amount spent by candidates during the 21st century has

continued to decrease. We show that campaign spending seems to matter less in these “low intensity" electoral environments.

Overall, our article is the first to uncover the growing importance of campaign spending over the very long run (150 years), to highlight the extent to which it varies over time and space, and to relate these transformations to changes in information technologies, campaigning efforts and characteristics, and electoral environments. While we are well aware of the caveats of our empirical analysis, to begin with the fact that we cannot – and do not claim to – fully pinpoint the causal impact of spending, our findings stress the importance of contextual factors in the understanding of whether and how campaigns – and their spending – matter. This may have important implications for campaign finance regulations.

Literature review Our article brings a long-run perspective to two strands of literature. The first investigates the relationship between campaign expenditures and votes. While its focus has traditionally been on the US (Jacobson, 1978, 1980, 1985, 1990, 2006; Abramowitz, 1988; Green and Krasno, 1988; Gerber, 1998; Levitt, 1994; Stratmann, 2005; Schuster, 2020), a growing set of papers discuss the patterns of spending in other Western democracies (Palda and Palda, 1998; Foucault and François, 2005; Benoit and Marsh, 2008; Da Silveira and De Mello, 2011; Ben-Bassat et al., 2015; François et al., 2016; Avis et al., 2017; Carvalho, 2020). Johnston and Pattie (2014) and Bekkouche et al. (2020) focus like us on the UK, but they only consider a subset of recent elections. On the contrary, our empirical setting covers more than 150 years of data, which allows us to identify the historical trends in the relationship between money and votes as well as their causes.

The only other paper studying UK campaign spending over a long time period is Fouirnaies (2021a). Relying on the same data source for expenditures (the *Parliamentary Papers*), he collected candidates' spending since 1885 and investigates the extent to which the introduction of spending limits has impacted political competition. While the research question of our paper – the relationship between campaign spending and votes and the role played by new information technologies – clearly differs from his (the impact of spending limits on electoral competition), we view them as complementary; in particular, our results help to inform the mechanisms behind his finding regarding political selection. Furthermore, compared to Fouirnaies' work, we also contribute to the existing literature by providing additional new data. On the one hand, we build a rich dataset of constituency-level controls, merging historical census data from different sources. On the other hand, we construct a new dataset on candidates' characteristics using biographical data. Finally, our data go back to 1857 – when candidates' expenditures were reported for the very first time – while Fouirnaies (2021a) begins his analysis in 1885, with the introduction of spending limits.

The second literature investigates the role and impact of political campaigns, and in particular their interaction with new media technologies. Following the seminal work of Eldersveld (1956), researchers have used natural or randomized experiments to evaluate the effectiveness of a wide array

of campaigning methods on vote shares[4]: positive effects have for instance been found for door-to-door canvassing (Braconnier et al., 2017; Pons, 2018) and lawn signs (Farrer et al., 2016), but not for phone calls (Shaw et al., 2012). Similarly, researchers have looked at the effects of political advertising on different media technologies. Studies have highlighted the role played by the Internet (Larcinese and Miner, 2018) and Twitter (Fujiwara Thomas et al., 2021) in increasing Democratic vote shares in presidential elections, while Broockman and Green (2014) find that Facebook ads might have helped voters to recall candidate's names, but not favoring them in the polls. TV ads can impact electoral results by changing both the composition of the electorate (Spenkuch and Toniatti, 2018) and voters' preferences (Gerber et al., 2011). Larreguy et al. (2018) show that radio advertising in Mexico benefited candidates from lesser-known parties, as did the rollout of free mail delivery in the US during the late 19th century (Perlman and Sprick Schuster, 2016). If all these studies are particularly helpful for understanding the causal channels through which campaigns influence votes, they usually estimate their effects at a given moment in time, and for one specific means of communication. Yet, it is likely that both the costs and effectiveness of campaign technologies have evolved over time, generating changes in their relative efficiency and their substituability in candidate strategies. We contribute to this literature by investigating these historical evolutions.

The remainder of the paper is organized as follows. Section 2 below introduces the new dataset we built for this study, together with its electoral and regulatory context. Section 3 walks the reader through the history of British electioneering, in light of the new insights from our data. Section 4 investigates the long-term relationship between campaign spending and votes, and highlights several dimensions of heterogeneity. In Section 5, we explain the causes of these variations. Finally, Section 6 concludes.

2 A novel dataset on electoral expenditures, candidates and constituencies: background and presentation

We create a new, exhaustive dataset on campaign expenditures and electoral results at the candidate level in the UK for all the general elections between 1857 and 2017, which we complement with detailed candidate and constituency characteristics. Our dataset covers 41 elections (40 with available electoral expenses), $22,877$ ($20,085$) election-constituency observations, $35,698$ ($34,398$) unique candidates and $71,751$ ($69,042$) election-constituency-candidate observations. Producing these data is our first contribution. This section briefly describes the context, sources and content of our dataset. More details are provided in the online Appendix.

[4]On their effect on turnout, see Panagopoulos and Green (2008) for a literature review, and examples in Gerber and Green (2000) for the US, and Fieldhouse et al. (2013) for the UK.

2.1 General background

Between 1857 and 2017, 41 general elections took place in the UK. The time interval between two general elections is set at five years (seven, before 1911), assuming no earlier election is called. Before the 2011 Fixed-term Parliament Act, the law allowed Prime Ministers to dissolve Parliaments before their maximum duration was attained, and in practice, this has always been done.[5]

Elections are held in parliamentary constituencies[6], each electing one (or several, until 1948[7]) Member(s) of Parliament (MP) in a first-past-the-post system (or block-vote system, for multi-member constituencies). The number of constituencies and their boundaries have changed over time, to adapt to the evolution of demography (the idea of equal apportionment was initiated by the Redistribution of Seats Act 1885), and are administered, since the *House of Commons (Redistribution of Seats) Act of 1944*, by independent bodies called the "Boundary Commissions".[8] In this article, we consider all the constituencies of Great Britain (Ireland is excluded given the particular political history of the country) for a median number of 613 constituencies per election.

At the beginning of our period, only adult (21-year-old) male British citizens with sufficient property qualifications (the "franchise") were eligible to vote at general elections[9]. Over the course of the 19th and early 20th centuries, four "Reform Acts" (1832, 1867, 1884 and 1918) progressively extended the franchise to universal male suffrage. Overall, the size of the electorate in Great Britain increased from 1.13 million voters in 1857 (3.7% of the population) to 16.8 million in 1918 (41.4%) (see online Appendix Figure H.1). 1918 was also the first general election in which women could vote, provided they were above 30 and met specific franchise requirements; they gained the right to vote on equal terms with men in 1928. In 1969, the minimum age for voting was lowered from 21 to 18.

The right to run for election is granted to anyone with the right to vote and who does not enter specific additional disqualification categories (mostly members of the police and armed forces, the judicial system, and clergy). Since the RPA 1918, a deposit system has been implemented to deter the less serious candidates: candidates would pay £125 (£500 since 1983) upon registering, and would be reimbursed only if they attain 12.5% (5%) of the votes.

[5] In other words, no Parliament has ever reached its expiry. The current (2011) law requires a "no confidence vote" or a two-third majority vote in the House of Commons to dissolve the Parliament, which is said to have tempered the variation. The average interval between two elections in our data is four years, with few elections taking place within the same year (in 1910 or in 1974) and the only gaps larger than five years are due to the two World Wars.

[6] UK constituencies have historically been divided into two categories: "counties" and "boroughs", the former covering rural areas, the latter towns and cities. In practical terms, the distinction mattered for the franchise, spending limits, and certain allowed expenses.

[7] The share of constituencies with more than one seat in Parliament progressively decreased from 62% at the beginning of our period to 2.1% at the 1945 general election, after which they were abolished.

[8] This relative independence means that there is little gerrymandering in the UK. However, it does not prevent commissions or their recommendations to sometimes favor a political party (Johnston et al., 2017).

[9] With the exception of a few disqualification categories, such as peers (since 1999, only those sitting in the House of Lords), people deemed mentally insane (abolished in 2006), agents employed in campaigns (from 1867 to 1918), recipients of poor relief (until 1918), and prisoners (still in application) (Johnston, 2013).

2.2 Candidates' campaign spending

Since the *Corrupt Practices Prevention Act 1854*, candidates have been required to lodge the details of their election expenses with specially appointed Election Auditors (see in particular Ewing, 1987). Election expenses include all the spending incurred by a candidate and her staff for the promotion of her candidacy (in multi-member constituencies, candidates from the same party can submit a joint return). Before 2001, no time period was clearly defined, and electoral expenses incurred during or after the election could be qualified as such (Ewing, 1987). The *Political Parties, Elections and Referendums Act* (PPERA) *2000* set up a "regulated period", which would start the day of the official dissolution of Parliament – or, if later, the day after the candidate's nomination – and end on the day of the election.[10] In both cases, these periods usually varied from 3 to 6 weeks.

The data from 1857 to 1997 are published in the *UK Parliamentary Papers* as the "*Return of expenses of each candidate at the General Election*", which we encoded for every general election (but the 1918 one, for which no data has been published). Online Appendix Figure H.2 shows an example of these sources. Data from 2001 onwards come in electronic format from the *Electoral Commission* website. The returns include information, for each candidate, on (i) all the expenses incurred during the campaign detailed into a number of different spending categories; (ii) the applicable spending limits; (iii) the number of votes polled; (iv) the full name and (since 1970) the party of the candidate; and (v) the name of the constituency, its type (county or borough) and the number of registered voters.

Expenses by categories An interesting feature of the British context is that the electoral expenses data are disaggregated into several categories of spending, depending on disbursement objects.[11] Three different time periods need to be distinguished here: 1857-1865, 1885-2001, and 2010-2017.[12]

The same categories run for the 1885-2001 period. These are (i) printing expenses (on printing, stationery, etc.) which include the advertising expenses; (ii) expenses on public meetings, such as the payment of speakers or refreshments; (iii) expenses on committee rooms, usually used to organize the campaign; (iv) expenses on agents, overseeing the campaign[13]; (v) expenses on clerks and messengers; and (vi) other expenses (on miscellaneous matters). Further, the candidates need to report their "personal expenses", i.e. all the expenses occurred only for the candidate's personal needs (lunches, accommodation, etc.), but that are not subject to the spending limit.

For the elections that took place between 1857 and 1865, no homogeneous categorization was

[10] To account for the fact that campaigns could start before the official dissolution of Parliament when its expiry was approaching, the Political Parties and Elections Act 2009 sets that a proportion of the expenses incurred after the 55th month of Parliament by candidates(-to-be) was also part of campaign expenditures (Johnston and Pattie, 2014).

[11] Note that, on the contrary, no systematic information exists on the sources of candidates' spending.

[12] See online Appendix Section A.1 for a detailed definition of each spending category and examples. For a detailed analysis of the different items of campaign expenditures in the US between 2004 and 2014, see Limbocker and You (2018).

[13] Every candidate is required to appoint an election agent (Fisher et al., 2006). Election agents are candidates' campaign managers, upon which most of the administrative and legal requirements – such as the payment, recording, and transmission of election expenses – fall. The 1883 Act limited their number to one per candidate; and a candidate can be her own agent. See the online Appendix A.1 for more details.

pre-established at the national level, hence the level of reported details varies significantly across constituencies.[14] To allow for a long-run comparison, we manually classified disbursement items into the seven categories described above, with minor adaptations: the salaries and related expenses of all staff (including agents, clerks and messengers) have been grouped into one category, and an additional "conveying voters to the poll"category has been added.[15]

There is no data on candidates' expense categories for the 1868, 1874 and 2005 elections. Since 2010, the expenses categories have been slightly modified, in particular to distinguish between spending on advertising (including advertising on the Internet) and spending on unsolicited material (such as letters or leaflets).

Although these categories are wide and varied, it should be noted that several items have been strictly regulated throughout the period. Political advertising on broadcast media for instance has always been forbidden (in contrast, advertising in newspapers is allowed). The provision of any asset (rooms, material, etc.) for free needs to be accounted at market value; free labor does not, however.[16]

Data reliability Because they are self-reported, one could question how reliable these expenses data are. As a matter of fact, Gwyn (1962) and Pinto-Duschinsky (1981) warn that the figures for the first elections in our sample (before 1885) have to be considered with caution, given that expenses reporting was still in its infancy and poorly enforced: election petitions, the main tool for contesting election results, were dealt with in Westminster by MPs themselves. Subsequent reforms alleviated these issues. The 1868 *Election Petitions and Corrupt Practices at Elections Act* transferred the trial of election petitions to election judges (drawn from superior courts) sitting in the constituency (Rix, 2017). Then, as it imposed caps on total spending and better qualifications of allowed expenses, the *Corrupt and Illegal Practice Act 1883* (CIPA) facilitated the use of these petitions to notify abnormal spending, and increased the threat of punishment (Rix, 2008). Offenders indeed risked criminal convictions, heavy fines or, at the very least, their election declared void.[17] Hence, most observers agree that, since the late 19th century, expenses data can be considered reliable. Since 2000, the Electoral Commission acts as a watchdog, and failures by candidates to properly report spending lead to fines and investigations by the Crown Prosecution Service.

Limits Limits on campaign spending were set by the *CIPA 1883*, thereby applying for the first time at the 1885 General Elections. These limits included all the aforementioned expenditures incurred by candidates or their agent over the course of the campaign, with the exception of their personal expenses and of those covering Returning Officers charges (the cost of organizing elections, which, until 1918,

[14] See online Appendix Figure H.3 for an example.

[15] The payment of voters' conveyance to the poll was a common practice in the mid-19th century; it was forbidden in boroughs in 1868 and in counties in 1885 (Gwyn, 1962; Rix, 2008).

[16] As we will see in the next section, this is one of the reasons why the use of volunteers has progressively developed over time.

[17] See online Appendix Section A.2 for examples of the latter.

candidates had to bear).[18]

The formula used to calculate the effective limits has remained the same over the years: a fixed amount plus a variable one depending on the number of registered voters. Those amounts differed whether a constituency is a borough or a county, and were modified regularly to adapt to changes in both the cost of living and the electorate. We report the spending limit formula in the online Appendix Section A.3; online Appendix Figure A.1 plots the evolution of the average effective spending limit.

2.3 Candidate-level controls

Expenses Returns provide the full name of the candidates. To create a unique candidate identifier across elections, we apply on these names automated fuzzy grouping techniques, which we improved with manual corrections. We obtain a total of $35,698$ unique candidates. On average, there are 3.09 candidates running per seat, but we observe an increase in electoral competition over time.[19]

For each of these candidates, we compute a number of characteristics. First, using our candidate identifiers (and data on by-elections), we compute the incumbency status of the candidates and the number of times they participate in elections (whether in the same constituency or not).[20] Next, using their first name, we infer their gender[21]; names also include candidates' nobility title (e.g. Baron, Viscount, etc.), civilian honors (e.g. Commander of the Order of the British Empire), as well as a grade in the army or a position within a religious institution (e.g. Reverend).[22]

Finally, we complement these data with detailed information on the candidates' date of birth, the high school and university they attended (if applicable), their past occupations and public offices held, including committee and cabinet positions. These data come from *The Times Guide to the House of Commons*, and has been collected as part of our companion paper (Cagé and Dewitte, 2020).[23] See online Appendix Table G.6 for candidate-level summary statistics.

[18]The *1918 Representation of the People Act* (RPA) also excluded from the limit the salaries of election agents (provided they do not exceed a certain amount), but they were included again by the 1948 RPA. Furthermore, since 1918, there has been a strict control on "third parties expenses", i.e. spending by individuals for the promotion of candidates without coordination with them or their agents, which was limited to 50 pence (1918), £5 (1983) and £500 (1997).

[19]The median is 3, with a standard deviation of 1.56; see online Appendix Table G.1 for summary statistics by election. In 2017, 5 candidates ran in each constituency on average. We come back to this point later, given it may be linked to the emergence of new – and cheaper – campaigning technologies. Fouirnaies (2021a) provides another likely explanation through the tightening of spending limits, which is also consistent with the results of Avis et al. (2017) in the case of Brazil.

[20]The votes polled by each candidate are included in the expenses returns for the period 1868-2017; for electoral results between 1857-1865, we take the data from Eggers and Spirling (2014).

[21]Out of the $35,184$ candidates with identifiable firstnames, 87% are males. The share of female candidates has increased over time, however (see online Appendix Figure H.6).

[22]Candidates' nobility titles mostly denominate heirs of peerages of a higher rank, their parent being forbidden to run for the House of Commons, as they were entitled to sit in the House of Lords. Note that these characteristics can vary across elections, as candidates obtain new or higher titles – e.g. John Robert Pretyman Newman was a captain when he unsuccessfully ran for the first time in 1906 as a Conservative candidate. He then became Lieutenant-Colonel.

[23]*The Times Guide to the House of Commons* is a paper format repertory of all the candidates that we digitize and analyse in details in Cagé and Dewitte (2020) for all years since 1918. Data for 2015 are from Lamprinakou et al. (2016). Online Appendix Figure H.7 provides an example of the format of the data.

Political parties General elections in the UK are fought between individual candidates. However, most candidates choose to use the label of a political party while campaigning. For each of the candidates running, we thus collect information on their party. Given that prior to 1969 candidates were not allowed to state the name of their party on the ballot paper (Johnston and Pattie, 2014)[24], this information is not reported in the election expenses returns before 1970. For earlier years, we thus merge our expenses data with Ball and Smith (2016) using the name of the candidates and the score they obtain.[25]

While candidates could rely on parties' public image and the support of their local branch, it is important to note that national political parties were supposed to campaign at the national level and not at the local level in the UK; otherwise, their campaign expenditures were included in the candidates' local expenses. That being said, the blurring between what counts as national party level and what counts as candidate expenditure at the constituency level has always been an issue in British politics (see e.g. Fisher, 2018).[26] We will discuss this point in more details in our empirical analysis.

2.4 Constituency-level controls

As for candidates, we build a dataset on electoral and socio-demographic profiles of constituencies.

Our "Return of expenses" data first allow to compute the electoral characteristics of the constituency: the number of candidates running[27], the number of registered voters, the total spending per registered voters, the number of consecutive elections won by the incumbent party and the victory margin at the last election. For these last two variables, we face the challenge that constituencies are regularly redrawn over our time periods, making the mapping of the same constituency over time uneasy.[28] From 1983 onward, we use historical sources (in particular the *BBC/ITV Guides to the New Parliamentary Constituencies*) to obtain the precise many-to-many mapping of constituencies across

[24]This was modified by the *Representation of the People Act 1969*. Moreover, new rules were introduced regarding the ballot paper format – in particular the possibility of including the party logo – with the *Representation of the People Act 1983*.

[25]Doing so allows us to cross-check our voting results data and correct a number of small mistakes found in both datasets. Online Appendix Figure H.4 plots the vote shares (and online Appendix Figure H.5 the seats) obtained at the national level by the different parties at the General Elections since 1857. See Appendix Section B for more information of the parties, their evolution, finance and processing within the empirical analysis.

[26]Fisher (2018) gives the following example: *"In the general elections of 1950 and 1951, there was controversy over a poster campaign opposing Labour's policies (1950) and an advert in The Times doing likewise (1951). In both cases, it was argued that these were political propaganda and contravened the legislation that no expenditure should be incurred to procure the election of a candidate unless authorised by the candidate's electoral agent (...). The 1951 case came to court in 1952 and The Times was acquitted on the grounds the advertisement was general propaganda and did not assist a particular candidate (Butler, 1952, p.33). The implication of this ruling was that posters and newspaper advertisements (...) where a candidate was not named, did not contravene the rules on candidate spending."*

[27]Until 1950, a number of constituencies were uncontested – i.e. the number of candidates in the constituency equaled the number of seats available. More than 70% of the constituencies were uncontested in 1857, a share that quickly declined over time (from around 30% in 1868 to less than 10% in the 1930s and 1940s; see online Appendix Figure H.11). Note that even in uncontested districts, we observe candidate spending; but on average candidates spend much less than in contested districts, as illustrated in online Appendix Figure H.12.

[28]The major redistricting of our period occurred before the 1885, 1918, 1950, 1955, 1974, 1983, 1997 and 2010 general elections.

redistricting. For the 1885, 1918, 1948 and 1970 boundary reviews, we overlay GIS maps and assign each new constituency to the old one containing its centroid. [29]

Next, we construct a unique set of socio-demographic characteristics at the constituency level using UK Decennial Censuses since 1851. This process is not straightforward for two reasons. First, before the 1966 census, only total gendered population figures are provided at the constituency level: all other variables are released for smaller (or sometimes larger) administrative levels, which do not map uniquely into constituencies' boundaries. Online Appendix Section C describes in details how we proceed to build cross-walk tables. Second, given we want to produce *time-varying* information, we need information at at least two census years in order to interpolate the values for the years inbetween. This is made difficult by both the redrawing of constituencies discussed above, which means we often need the same year information at two different constituency levels (e.g. the 1991 census at 1983 and 1997 boundaries), and by the fact that the number and definition of variables contained in each census changed over time, so that efforts of homogeneization are required. For this reason as well, the constituency-level controls we can include in our analysis vary depending on the time period under consideration. They are described in the online Appendix Section C, together with descriptive statistics.

3 A dive into the history of British campaigns, through the lens of election expenses

Over the 19th, 20th and 21st centuries, the way candidates campaign has changed radically, in particular with the appearance of new modes of communication, broadcasting technologies and electoral regulations. This section discusses our novel descriptive evidence in light of these changes. In the sections 4 and 5 below, we investigate quantitatively how they have affected the sensitivity of electoral results to differences in campaign spending.

General long-term patterns Table 1 reports summary statistics on candidates' spending by time period.[30] We observe a dramatic drop in total spending over time (from €$141,001$ per candidate and campaign on average in 1857-1885 to €$4,999$ in 2001-2017), which is even more pronounced when normalized by the average annual nominal earnings.[31] The decrease is also larger for total spending *per voter*, given the subsequent extensions of the franchise, and true even if we consider total spending at the constituency level, despite the increase in the number of candidates. In a similar fashion, Figure

[29] Given the lower precision of this mapping, and the extent of these redistrictings, we assume all constituencies were "new" on these dates for the computation of constituency fixed effects.

[30] These periods delimit groups of five to eight general elections that face relatively homogeneous electoral rules and technology environments, as presented below. They serve to clarify the presentation, and do not impact the empirical analysis. For election-level data, see online Appendix Tables G.3, G.4, and G.5.

[31] All the figures in the article are in 2016 constant euros to make them easily comparable over time. Data on nominal earning are from Greg Clark's "Measuring Worth" project (Clark, 2019).

1 displays how the overall amount spent on general elections (i.e. summed over all the candidates) has evolved since 1857, normalizing it by the average national income. While in the 19th century, as much as the equivalent of $20,000$ adults' average income was spent on campaigning, this number went down to 500 in recent years (i.e. less than one adult per electoral district).

One of the key drivers of this general pattern is without a doubt the introduction and tightening of campaign spending limits, as documented by Fouirnaies (2021a). However, it is worth noticing that an important share of the candidates spend much less than the legal maximum, particularly in recent years. While the average spending as a share of the legal maximum was equal to 75% of the limit on average in 1885-1911, it is only one third of the limit in the recent period. This drop is partly driven by the increase in the number of candidates – with the entry of relatively "small" candidates – but not solely: as shown in the online Appendix Figure G.2, when we focus on the main three parties, we also see a drop in spending as a share of the cap.[32]

Two elements could explain this fact. First, candidates could be financially constrained. Survey data from Fisher and Denver (2009) show that this is the case, at least for recent elections (see also Denver et al., 2003; Fisher, 2015). On average, between 1992 and 2001, 15 to 21% of the Conservative candidates' election agents reported that they did not have enough money to run their campaign, while 23 to 34% of Labour candidates and over 43% of Liberal candidates reported the same issue (see online Appendix Figure H.8).[33] What was the reason for this? In their study of the local party accounts made public by the PPERA 2000, Johnston and Pattie (2014) observe that very few of them received money from central parties for their campaigning activities. In other words, funds spent locally had to be found locally. Over most of the period, there are numerous accounts of candidates relying primarily on their personal wealth to fund their campaign (Gwyn, 1962; Butler and Lovenduski, 1995) – in fact this was one of the drivers of the progressive tightening of spending limits.[34]

At the same time, historical developments could have impacted the nature and relative efficiency of the different campaign spending items (or simply help candidates learn these efficiencies), so that candidates changed their basket of expenses and how much they consider appropriate to spend. Suggestive of that, Figure 2 reports significant changes in the relative importance of the different spending categories over time. To better understand these evolutions, we delve into the historical accounts of their epochs.

[32]Online Appendix Figure H.13 plots the average total spending of the candidates, depending on the time period and on the political party to which they are affiliated. Conservative Party candidates always spent more on average than their opponents. This is consistent with evidence from other countries (see e.g. Bekkouche et al., 2020), and also with the fact that right-wing parties tend to receive more donations than their left-wing counterparts (Cagé, 2018). While until WWII candidates of the Liberal Party spent more on average than candidates of the newly created Labour Party, this has no longer been the case since the 1950s.

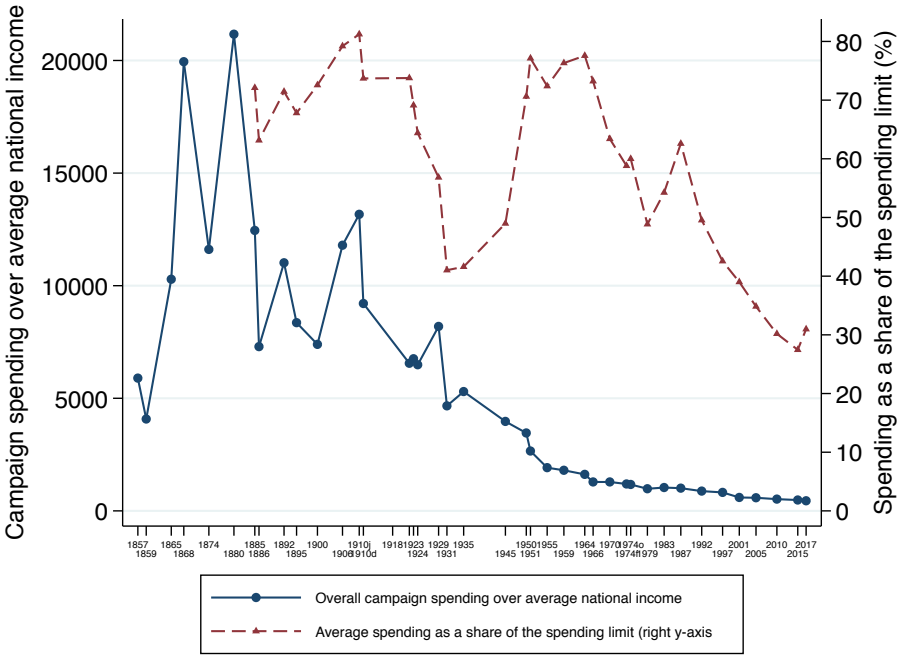
[33]In the online Appendix Figure H.9, we also show that the candidates whose election agents declare themselves to have insufficient funds to run their campaign tend to spend much less on average as a share of the spending limit.

[34]Note that there is no public reimbursement of campaign expenditures in the UK. Since the RPA 1918, every candidate can have one free electoral communication by mail to every voter, and every candidate can use public schools or city halls for public meetings (see e.g. Ewing, 2007), however. Aside from the candidates' personal wealth, the rest of the money come from local fundraising: individual donors, but also corporations and, for Labour Party candidates, Trade Unions, which directly sponsored a subset of candidates until the New Labour reforms of the late 1990s (see e.g. Fouirnaies, 2021b).

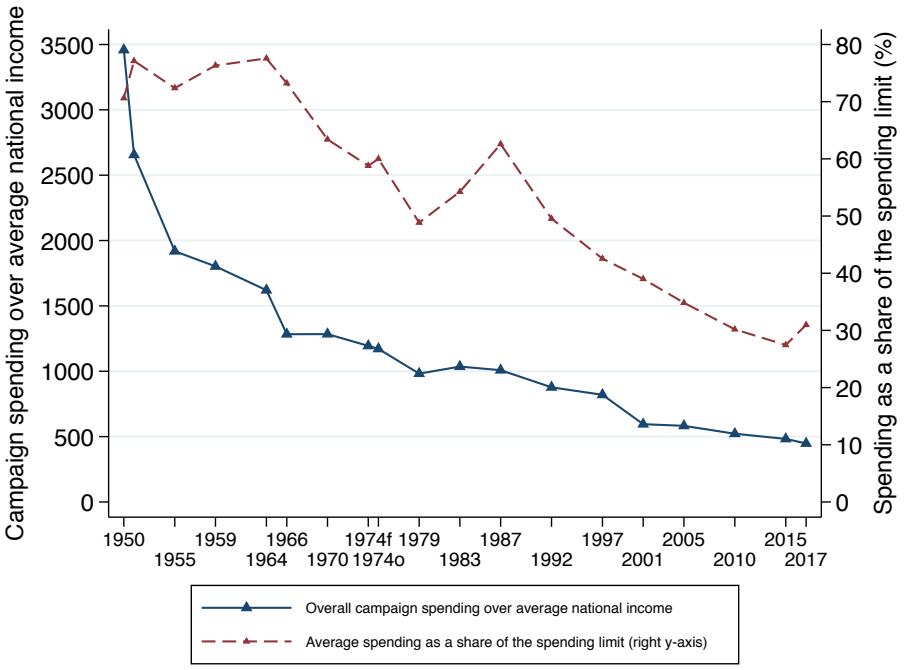
Table 1: Summary statistics: campaign spending

	Spending (cst 2017 €)					
	Mean	Median	sd	Min	Max	N
Total spending per candidate						
1857-1884	141,001	81,293	157,858	0	1,603,151	3,328
1885-1910d	126,653	117,143	54,927	2,489	587,285	7,912
1922-1945	36,778	35,797	17,371	243	155,565	9,887
1950-1970	15,566	15,443	6,282	0	33,663	11,276
1974-1997	7,287	7,245	4,584	0	38,536	17,807
2001-2017	4,999	2,590	5,045	0	32,598	16,970
— Normalized by Average Annual Earnings						
1857-1884	27.21	15.60	30.66	0	345.22	3,328
1885-1910d	11.44	10.39	5.37	0	53.16	7,912
1922-1945	4.22	4.11	2.02	0	15.57	9,887
1950-1970	1.33	1.19	0.69	0	3.46	11,276
1974-1997	0.38	0.38	0.25	0	1.98	17,807
2001-2017	0.18	0.09	0.18	0	1.20	16,970
Total spending per constituency						
1857-1884	602,367	419,183	542,492	19,652	3,198,625	349
1885-1910d	345,693	350,253	135,460	100,199	1,163,060	537
1922-1945	129,320	124,909	42,671	32,359	443,076	617
1950-1970	60,382	60,439	12,991	26,760	101,022	653
1974-1997	34,263	34,394	8,835	10,636	68,598	1,065
2001-2017	33,080	32,832	10,397	10,109	104,861	781
Total Spending per candidate & per voter						
1857-1884	26.44	14.14	35.28	0	372.98	3,328
1885-1910d	12.03	11.55	5.43	1	52.97	7,912
1922-1945	0.86	0.83	0.45	0	2.39	9,887
1950-1970	0.28	0.28	0.12	0	0.95	11,276
1974-1997	0.11	0.11	0.07	0	0.56	17,807
2001-2017	0.07	0.04	0.07	0	0.59	16,970
Spending as a share of the legal maximum						
1857-1884	.	.	.	.	.	0
1885-1910d	0.73	0.78	0.24	0	1.49	7,912
1922-1945	0.57	0.56	0.26	0	1.32	9,887
1950-1970	0.73	0.79	0.24	0	1.11	11,276
1974-1997	0.53	0.53	0.32	0	1.49	17,807
2001-2017	0.33	0.17	0.33	0	1.45	16,970

Notes: The table presents summary statistics on total spending by candidates running for general elections, excluding expenses for the organization of the election (Returning Officers' charges). For the "total spending per candidate" and the total spending "per candidate & per voter" variables, an observation is a candidate/election. For the "total spending per constituency" variable, an observation is a constituency-election. There is no value of the "Spending as a share of the legal maximum" variable for the 1857-1884 period given spending limits were only introduced in 1885.



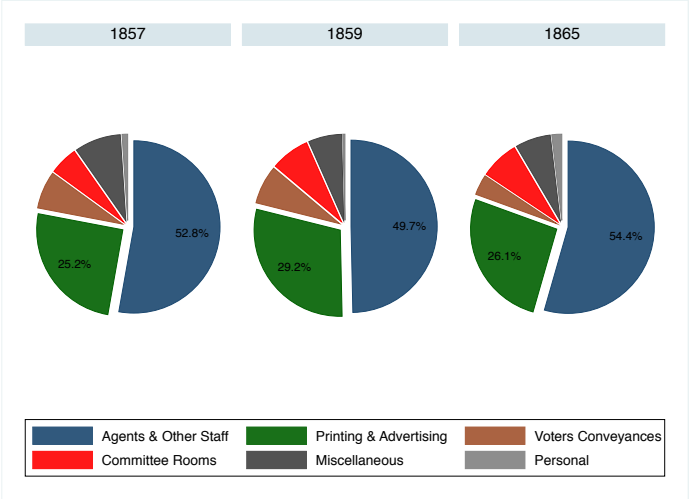
(a) **1857-2017**



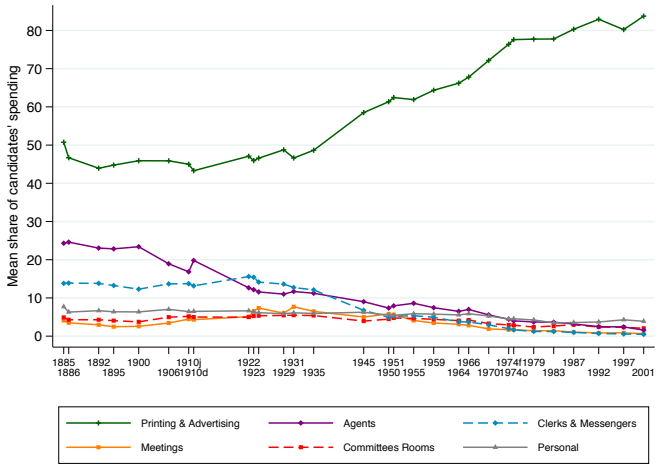
(b) **Zoom on 1950-2017**

Notes: The figures plot the long-run evolution of campaign spending. The blue lines with dots report the evolution of the overall campaign spending (summed over all candidates at the general elections in a given year) over the average national income between 1857 and 2017, and the red dashed line with triangles reports the evolution of the average amount spent by candidates as a share of the spending limit. In the sub-Figure 1b, we zoom in on the 1950-2017 period. Data on the average national income are from the World Inequality Database.

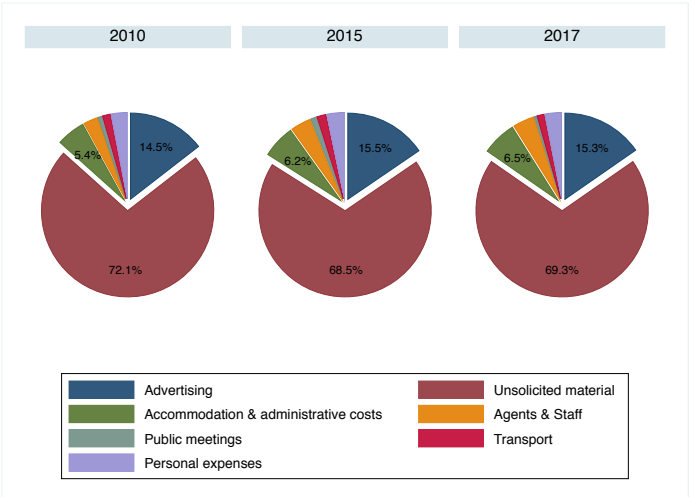
Figure 1: Long-run evolution of campaign spending



(a) **1857-1865**



(b) **1885-2001**



(c) **2010-2017**

Notes: The figures plot the average share of candidates' total expenses spent on each expenses category at every general elections between 1857 and 2017. Sub-Figure 2a reports these data over the 1857-1865 period, sub-Figure 2b for 1885-2001, and sub-Figure 2c for 2010-2017. The expenses categories are described in details in the online Appendix Section A.1.

Figure 2: Electoral expenses by category over time

The pre-modern era (1857-1880) The first elections of our sample are unique for several reasons. As noted earlier, the electorate before the 1868 and 1884 extensions of the franchise was extremely small: around 2-3% of the population. Lacking the equal apportionment installed in 1885, some constituencies had no more than a few hundred electors.[35] Besides, before the *Parliamentary and Municipal Elections* ("Secret Ballot") *Act 1872*, general elections were conducted by a show of hands and reproduced in a public register, so that candidates could observe who voted for them. They thus had the ability to target each elector individually (several campaign expenditures returns display the cost of issuing "copies of voters' registers" from the sheriffs) with canvassing, conveying and monitoring. Because no limits were set on expenses, they could hire extensively to do so.

This explains why paid staff were the main item of expenses at the time, as shown in Figure 2a. The category indeed comprises a large share of election agents and professional canvassers, but also mentions "men to protect voters", "night and day watchers" or "men relieving voters in their employment". In fact, our data corroborate the qualitative evidence that candidates at that time sometimes managed, through their election agent, hundreds of paid campaigners (Denver and Hands, 1997; Rix, 2008).

Another reason why paid staff were so important was the fact that transportation and information technologies were still in their infancy: in order to coordinate campaigns, clerks and messengers needed to be hired and the cost of their horses and carriages reimbursed. It also meant that it could be extremely costly for voters to travel to the polling stations, so that candidates would pay for their transport, a practice authorized in counties until 1885: this represented on average 7 to 10% of candidates' budgets. Similarly, the high cost of printing meant the material to be advertised to voters amounted to 25 to 30% of candidates' spending.

Besides, note that these patterns of expenses are compatible with the fact that Victorian elections were notoriously corrupt. The practice of "colourable employment" – i.e. hiring voters as canvassers or messengers with barely any workload (Rix, 2008) – could have for instance contributed to inflate spending on paid staff.[36] Instances of extremely high spending reported for agents (for some candidates more than $€200,000$), through which most candidates' money transited, is another indicator of potential bribery. Only the reforms that took place during the 1868-1885 period managed to curb this tendency (Seymour, 1915).[37]

Finally, the returns reveal the very high cost of organizing the elections during the pre-modern era. The "Returning Officer" or "Sheriff" charges were to be borne equally by all the candidates within a constituency until 1918. They represented on average 5 to 10% of total expenses, and included in

[35] Coupled with the high share of uncontested constituencies, it in fact helps to explain the variability in the total constituency spending at the time, ranging from $€5,464$ to $€3,166,721$ (in 2016 constant euros terms).

[36] Individuals paid by campaigns were in fact formally forbidden to vote, but this rule was rarely enforced in practice. Note that the *1854 Act* requiring expenses to be recorded was first and foremost an Act against corruption, with better qualifications of corruption and realistic penalties (Seymour, 1915).

[37] Whether that change happened swiftly or gradually up until WWI is still debated by historians, with the classical accounts of Seymour (1915) and O'Leary (1962) being nuanced by more recent work (see e.g. Rix, 2008).

particular the cost of erecting the hustings, maintaining the electoral registers and poll books, and announcing and policing the elections.[38]

The (news)paper era (1885-1910) The 1867-1885 period of electoral reforms saw the birth of political campaigns as we understand them (Kavanagh, 1995; Lawrence, 2009).[39] With the secret ballot and the extension of the franchise, candidates had to find new ways to reach the mass of anonymous electors on which their fate depended. Hence the growth of open-air election meetings, whose costs start to appear systematically in the expenses data. Because candidates were most often simply standing on a chair or improvised stage, without amplification, and could hold as many meetings as the current infrastructure would permit, these costs remain relatively low (less than 5% of their total spending, on average). But although exhausting and of doubtful effectiveness – audiences comprised mostly of non-voters and were often disrupted by the opposition (a practice only made illegal in 1908) – these meetings were said to represent an essential step to assert candidates' legitimacy (Lawrence, 2009).

As a matter of fact, our data indicates that election candidacies were still, at the time, the privilege of a wealthy elite. The newly set campaign spending limits were sufficiently high (several times the median annual salaries, see Table 1) to act as a strong barrier to entry. This was particularly true given the fact that the costs of "nursing" the constituency (i.e. be financially involved in local activities and patronizing organizations), although they had been drastically reduced by the 1883 qualifications of allowed expenses, were still standard practice at the dawn of the 20th century (Gwyn, 1962; Rix, 2008). Besides, MPs were not paid until 1911 ; and only in 1918 candidates stopped paying the *Returning Officers'* expenses which, during that period, increased by 10 to 30% their total campaign spending (see online Appendix Figure H.14). Some researchers in fact argue that the rise of the Labour Party as a major contender in the interwar period is directly linked to these reforms that alleviated the financial burden imposed on candidates (Dawson, 1992).

Yet, by imposing spending limits, a single agent per candidate and forbidding the payment of canvassers, the *CIPA 1883* sparked a decrease in the number of employees a campaign could rely on, as evidenced by a lower spending share on paid staff. This in fact contributed to the creation of local party organizations, which would coordinate volunteers (Lawrence, 2009). Agents themselves, now simply acting as campaign organizers, were more inclined to offer their service for free – or be replaced by the candidates – so that their cost slowly decreased over the century from 25% to less than 5% of total candidates spending (for a careful analysis of the role of constituency agents, see Fisher et al., 2006).

The main technological innovations of this period were to be found in printing, with techniques such as offset-lithography and rotogravure, opening a new era of paper-based propaganda through two key channels: election leaflets and the press (Lawrence, 2009). Following the demise of the "taxes on

[38]Online Appendix Figure H.16 shows an example of a detailed list of a Sheriff's expenses.

[39]The rest of the section borrows extensively from Lawrence (2009).

knowledge" in the 1850s[40], the number of newspapers published in Britain increased, with expanding circulations and a widening readership, to peak in the early 20th century (Williams, 2010). At the time highly local and politicized, they also experimented with the creation of titles such as the *Daily Mail* in 1896 and the growth of commercial advertising in an effort to develop a more visual and attractive format; political parties quickly seized the opportunity and bought an increasing share of advertising space. It was not uncommon to see candidates subsidizing – or even buying – local newspapers a few months before a contest, in order to boost their popularity (Dawson, 1992; Kavanagh, 1995).[41]

The radio days (1918-1945) The inter-war period was a time of more humble and low-profile politics (Lawrence, 2009). The war had tempered exuberance – both financially and emotionally – and the *RPA 1918*, by controlling candidates' and third parties' expenses more strictly while expanding the electorate, practically ended the nursing of constituencies and other lavish practices of the Edwardian period (Denver and Hands, 1997). Besides, while microphonic technologies allowed meetings to grow in size, speeches became less about arousing popular feelings and more about presenting opinions to an unassertive and peaceable crowd (Lawrence, 2009). These meetings, which were always well attended thanks to the rise of motor vehicles, remained the central location of British politics (Joyce, 2004): in our data, the interwar period is in fact the time when the share of total spending on meetings is the highest.

The era also witnessed the spread of radio broadcasting: launched in 1922, the BBC reached a quarter of British homes in 1929; by 1935, almost two-thirds were able to hear the national parties' studio recordings (Swaddle, 1988).[42] Together with the first political broadcasts in cinemas (in the early 1930s), this led to the rise of national party figures, building a more intimate connection between them and electors (Lawrence, 2009). However, as they were managed and used mostly by the national parties, these new broadcasting technologies still had little impact on local campaigns.[43] If anything, general election candidates had to redefine their relationship with the press, whose centralization had made it much harder to influence (Dawson, 1992).

In that context, local parties still relied heavily on self-produced material, with posters being the chief weapon of war (see e.g. Roudaut, 2016). Leaflets, produced by national and local machineries, grew in numbers as the *RPA 1918* provided every candidate with one free postal delivery to all registered electors (Denver and Hands, 1997): expenses on printing and advertising reach 60% of candidates' total spending after WWII. On the other hand, the development of telephones and typewriters rendered

[40]The advertisement duty was abolished in 1853, the newspaper stamp duty in 1855, and the paper duty was removed in 1861.

[41]On the use of newspapers as political instruments, see also Cagé (2015).

[42]While the ban on political advertising on television or radio has been in place ever since the birth of these technologies (it was made explicit in the *Representation of the People Act 1949*), political parties are given free airtime in the run-up to an election. Political broadcasts were first carried by BBC radio prior to the general election of 1924, and televised party election broadcasts (PEB) were first shown in 1951.

[43]As we will see, it was the expansion of independent *local* radio stations in the 1970s that really made this medium an essential tool for election campaigns (see Section 5.1).

the “Clerks & Messengers" obsolete: the share of total spending they represent is divided by three over the period.

The television era (1950-1970) A key element would fundamentally change the conduct of campaigns post-WWII: television. While there were only a few thousand TV sets in the country at the end of the war, approximately 50% of British homes were equipped with one in 1955, and almost 90% by 1964 (Lawrence, 2009). As with the first radio channels, local constituency candidates initially had little to do with TV news coverage of the *national* campaigns of party leaders, which started in 1959. But the shift of attention it brought, at a time when two-party politics was at its height and political behaviors were more homogeneous across the country, meant that, in most constituencies, local campaigns became totally overshadowed by national politics (Lawrence, 2009; Johnston and Pattie, 2014). This was strengthened by the fact that national campaigns had no limits on their expenditures, contrary to their constituency counterparts.

Local party organizations experienced a relative decline during this period – as measured by the number of members and election agents[44], whose importance in candidate expenses continued to decrease. Public meetings lost popularity, and their spending share returned to pre-WWI levels. However, the period also witnessed the birth of most of the practices that would become widespread during the following decades: the increasing use of the local press for flashy advertising; the development of “knocking-ups", i.e. local parties making home visits to supporters who had not yet voted on election day; the invention of “walkabouts", a form of canvassing where candidates engaged their constituents in discussion during random walks in carefully chosen neighborhoods (Denver and Hands, 1997); and, importantly, the realization that, in a first-past-the-post system, the national balance of power could depend on a small set of “marginal constituencies", in which efforts should be focused. This tendency can in fact be observed when comparing as shown in online Appendix Figure H.17 average spending in marginal vs. safe constituencies. Although candidates have always spent more on average in close seats (ratio always smaller than 1)[45], the difference between safe and close seats started to widen after WWII, and has continued to grow progressively ever since. We come back to this point in Section 5.2 below when studying the role played by the electoral environment in the sensitivity of electoral results to differences in campaign spending.

Diversification (1974-1997) In the 1970s, as the tendencies towards nationalization and mass broadcasting of campaigns became fully accomplished, the tone and intensity of electoral communication entered a new era (Lawrence, 2009). Before 1974, political appearances on broadcasting media remained a relatively rigid and formal exercise, over which parties had clear control. With the in-

[44]For instance, while the Conservatives had well over 500 full-time agents in 1950, this number was down to 300 by 1987, whereas Labour had 70 full-time agents in 1979 and only 43 in 1983 (Fisher et al., 2006).

[45]This is in fact consistent with the predictions of the theoretical literature, and in particular with Bouton et al. (2018) who show that equilibrium contributions increase when the support for the candidates is more equal (what they call a “closeness effect").

troduction of live audiences, phones-in and spontaneous interviews, candidates found themselves in increasingly dynamic and fragile positions. Outside of the broadcasting room, the growth in the number of tabloids and cameras boosted the intensity of coverage, and the competition for electors' attention grew dramatically (Denver and Hands, 1997).

This intensity spread to local campaigns, which had experienced a revival by the end of the century. With the opening of local radio stations and regional TV channels, candidates increased the frequency of walkabouts and canvassing and resorted to a wide array of innovative methods – some even organized torchlight processions or festivals (Lawrence, 2009) – in order to catch the attention of the local media. Besides, the whole electioneering process became more "professional" with the increasing use of strategy consultants and marketing techniques (Wring and Ward, 2010a; Lawrence, 2009). Computer-based registers of voters saved hours of address handwriting (Lawrence, 2009) and improved the efficiency of knocking-ups (Denver and Hands, 1997). Together with focus groups, they also paved the way for targeted campaigning, initially through mailing (Swaddle, 1988) and, in the 1990's, faxes (Fisher and Denver, 2009; Denver et al., 2003) and telephones (Lawrence, 2009). All in all, the share of spending devoted to advertising kept increasing over the period (while spending on staff and meetings continued to plunge).

The Internet age (2001-2017) The 21st century media revolution is of course the Internet. All four 1997-2010 elections have been labeled the "first Internet election" (Wring and Ward, 2010a). While the BBC launched its website in 1997, the new technology did not have a significant coverage in the UK until the early 2000s: at the 1997 general election, only 2% of British homes reported using the Internet; by 2001, 33% (Coleman, 2001). Similarly, while in 1994 no MP had ever used emails to reach out to her constituents, by 2002, 73% had done so (Coleman, 2001). By 2010, two-thirds of the main parties' candidates had their own website (Wring and Ward, 2010a).

In a world where targeted campaigning was ever increasing, the Internet improved the collection and redirection of voters' data (Wring and Ward, 2010a). Candidates devoted on average around 85% of their total expenditures to "advertising" and "unsolicited material" (Figure 2c), which includes the costs associated with targeting or identifying voters, the database costs and the cost of analyzing social media content. As political parties' websites became a main channel of information on parties themselves (Jackson, 2018), the Internet also allowed minor candidates and parties to enter the political arena at little cost; the number of candidates peaked at an average of 6.2 per constituency in 2010 (see Table G.1).

Overall, these spending patterns indicate that candidates strategically adapt their expenditures to their environments, and spend large amounts on elements that could impact voters' decisions to vote. Online Appendix Figure H.10 shows the "raw" relationship between the proportions of total spending and total votes represented by each candidate in a constituency, depending on the time period (and the associated campaigning technologies). While the correlation is strongly positive for all the elections

under consideration, it varies over time. The next section investigates in more details this changing relationship between spending and votes.

4 The long-term relationship between campaign spending and votes

4.1 Empirical strategy

Estimating the relationship between the spending of each candidate and her electoral results presents two empirical constraints: the vote shares are always between 0 and 1 and, within a constituency, they are interdependent, as they need to sum up to one[46] (Katz and King, 1999). To obtain meaningful and statistically consistent estimates, we thus follow Bekkouche et al. (2020) and formalize voter i choice of candidates c as a discrete choice model in conditional logit form, where the choice probability P_{ic} depends on a set of candidates' characteristics $\mathbf{X}_{ic}$, one of which is campaign spending. We then proxy these individual probabilities with the observed, aggregate, share of votes s_c for each candidate c. As in any logit model, one then needs to select a reference choice s_0 to single out the expression of the choice probabilities: we set it as the outside option of "not to vote" (i.e. abstain), which is the only choice uniformly available in all elections and constituencies; further, spending on abstention has the advantage of always been equal to zero. The estimation equation then writes[47]:

$$\ln\left(\frac{s_{cmt}}{s_{0mt}}\right) = \alpha + \beta \text{spending}_{cmt} + \mathbf{X'_{mt}}\gamma + \mathbf{Y'_{ct}}\delta + \mathbf{Z'_{c}}\theta + \zeta_m + \omega_{jt} + \epsilon_{cjmt} \tag{1}$$

where c indexes the candidates, j the political parties, t the electoral years, and m the electoral constituencies. Our left-hand side variable, $\ln\left(\frac{s_{cmt}}{s_{0mt}}\right)$, is the logarithm of the ratio of the number of votes obtained by candidate c in district m in election t over the abstention in district m in election t. Our main explanatory variable, spending_{cmt}, is the share of the district m total spending represented by the candidate c in electoral year t (alternatively, we use the absolute candidate spending). $\mathbf{X'_{mt}}$ is a vector of constituency-level covariates: all specifications include the number of candidates running,

[46] Regarding this last point, the usual strategy of the campaign spending literature since Jacobson (1978) has been to estimate only one equation per district, regressing incumbent vote shares on both challenger's and incumbent's spending. In the presence of more than two (effective) parties, however, this strategy is impracticable without losing important information about individual candidates.

[47] See the online Appendix Section E for a complete development. Note that our empirical model relies on the assumption that the ratio of the probabilities of choosing alternative c to alternative c' for voter i is independent of the probability of choosing the other alternatives, i.e. the "Independence of Irrelevant Alternatives" (IIA) assumption. While Alvarez and Nagler (1998) have shown that IIA is violated for UK elections held in the 1980s, they estimate that the bias arising from using a conditional logit model is nonetheless low. Besides, in their discussion of the issue, Dow and Endersby (2004) argue that it can be greatly mitigated by using right-hand side variables that capture characteristics of the other choices, and choice-specific intercepts: this is one of the reasons our spending variable is expressed as a *share* of all candidates' spending, and our preferred empirical specification includes candidate fixed effects. We show in Bekkouche et al. (2020) that, indeed, estimating this specification for the 1997-2017 period produces estimates that are both qualitatively and quantitatively similar to those we obtain when using a less flexible but not IIA-constraint model like that of Katz and King (1999). Finally, we would reiterate that the goal of this paper is not to pinpoint the exact causal impact of campaign spending, but to study changes in the sensitivity of electoral results to differences in expenditures. Hence, as long as the bias coming from the IIA assumption is relatively stable over time, it is not such an important issue for us here.

the number of consecutive general elections won by the incumbent party, the margin at the last election, and the population (see online Appendix Table G.7); the socio-demographic characteristics included depend on the time period under consideration (see Section 2.4). $\mathbf{Y'_{ct}}$ is a vector that includes the time-varying candidates' characteristics (such as incumbency and age), and $\mathbf{Z_c}$ their time-invariant characteristics (such as gender).[48] All the specifications include party-election ω_{jt} fixed effects, which control for the change over time in the popularity and the electoral strategies of national parties. The above specification also includes constituency fixed effects, ζ_m, and clusters standard errors at the same level.[49]

In our most conservative specification, we focus on candidates who run multiples times and control for candidate fixed effects:

$$ln\left(\frac{s_{cmt}}{s_{0mt}}\right) = \alpha + \beta \text{ spending}_{cmt} + \mathbf{X'_{mt}}\gamma + \mathbf{Y'_{ct}}\delta + \xi_c + \omega_{jt} + \epsilon_{cjmt} \tag{2}$$

This allows us to capture the unobserved candidate characteristics that are constant over time, in addition to the electoral "popularity" of their political party in a given year and the time-varying observed characteristics. Doing so, however, limits our sample of analysis to those candidates who run multiple times, i.e. a selected set of candidates.

Furthermore, it should be noted that controlling for candidate fixed effects does not entirely mitigate the estimation biases that may arise from the endogeneity of campaign spending. In particular, our estimates might suffer from a downward bias if the candidates who are behind spend more to compensate for the gap. One way to solve this issue is to use an historical shock as an instrument for spending (see e.g. Bekkouche et al., 2020). However, doing so only allows us to estimate the causal impact of campaign expenditures *at a given moment of time*. Our focus here is to study the *changes* in the sensitivity of electoral results to differences in campaign spending over time, not to pinpoint the exact causal impact of spending.

4.2 A positive – and changing – correlation

Average effect In this section, we first present the results of the estimation of equations (1) and (2) considering the entire 1857-2017 time period. Table 2 presents the results. Columns (1) and (2) include all the candidates; in Columns (3) and (4) we only consider the candidates who have run multiples times, and we control for candidate fixed effects in Column (4). Constituency and candidate-level controls are included in Columns (2) to (4).[50]

[48] See online Appendix Table G.6 for summary statistics. We drop the candidates in uncontested constituencies, where no election is held (2.68% of candidates), and the candidates submitting joint returns, i.e. reports aggregated at the party level in multi-member constituencies (0.54%).

[49] Remember that the large redistrictings of 1885, 1918, 1948 and 1970 force us to treat redrawn constituencies as "new" ones. Therefore, our number of unique constituencies (hence clusters) is $3,352$ when considering the entire time period, around five times more than their average number by election (613).

[50] For the sake of readability, coefficients for these controls are not included in this table. We include them in the online Appendix Tables G.9 to G.12.

Table 2: Relationship between candidates' share of total spending and vote share (logarithm of the ratio of the number of votes over abstention), 1857-2017

	1857-2017			
	(1)	(2)	(3)	(4)
Share of constituency total spending	0.025***	0.021***	0.018***	0.011***
	(0.000)	(0.000)	(0.000)	(0.000)
Constit FE	✓	✓	✓	
Election-Party FE	✓	✓	✓	✓
Candidate FE				✓
Constit-level controls		✓	✓	✓
Candidate-level controls		✓	✓	✓
Candidates	All	All	Mtp times	Mtp times
R-sq (within)	0.24	0.30	0.29	0.15
Observations	66,777	66,683	46,346	46,327
Cluster (Constit)	3,357	3,354	3,295	3,295
Mean DepVar	-0.7	-0.7	-0.2	-0.2
Sd DepVar	1.6	1.6	1.3	1.3

Notes: * p<0.10, ** p<0.05, *** p<0.01. The models are estimated using OLS estimates. An observation is a candidate-election. The dependent variable is the logarithm of the ratio of the number of votes obtained by a candidate over abstention. All the estimations include election-party fixed effects. Columns (1) to (3) also control for district fixed effects, and Column (4) for candidate fixed effects. Standard errors are clustered at the district level. The district-level controls are listed in the text. The candidate-level controls include the sex, and an indicator variable equal to one if the candidate is the incumbent and to zero otherwise. Coefficients for the controls are not reported for the sake of space. Variables are described in more detail in the text.

Overall, we obtain a positive relationship between the share of the total district spending represented by a candidate and the share of the votes she obtained. According to our estimates, a one-percentage point increase in the spending share is correlated with a 2.1 to 2.5% increase in the votes-on-abstention when we control for constituency and election-party fixed effects (Columns (1) and (2)). Introducing constituency- and candidate-level controls only slightly decreases the estimated coefficient.

The effect is robust to controlling for candidate fixed effects but, when we do so, the magnitude of the effect is halved: a one-percentage-point increase in the spending share is associated with a 1.1% increase in the votes-on-abstention (Column (4)). This means that candidates' unobserved heterogeneity plays an important role in the relationship between spending and votes. Our empirical specification here only allows us to capture the part of the heterogeneity that is constant over time.

The magnitude of the estimated effect is economically significant. On average, the total spending in an electoral district amounts to €$90,528$. Hence, a one-percentage-point increase in the spending share of a candidate corresponds on average to an additional €905 in campaign spending. If we consider our most conservative estimate (Column (4)), such an increase is correlated with a 1.1% rise in votes-on-abstention. Holding abstention constant (i.e. assuming, for the sake of simplicity, that the change in votes comes solely from other candidates' voters), this corresponds on average to 119 additional votes (the average number of votes received by a candidate is $10,806$).

Change over time and space To investigate the evolution of the relationship between campaign spending and votes over time, in Figure 3 we plot our main estimates interacted with time fixed effects as estimated in the following equation:

$$ln\left(\frac{s_{cmt}}{s_{0mt}}\right) = \alpha + \beta \text{spending}_{cmt} + \sum_t \beta_t \text{ spending}_{cmt} * \phi_t + \mathbf{X'_{mt}}\gamma + \mathbf{Y'_{ct}}\delta + \xi_c + \omega_{jt} + \epsilon_{cjmt} \quad (3)$$

Several interesting patterns emerge. First, for all the elections except for those of 1886 and 1892, the relationship is statistically significant at the five-percent level. Until the end of the mid 1880s, however, the correlation between spending and votes is relatively noisy, which is probably due to the wide diversity of spending categories, the absence of spending limits and the less stringent monitoring of reporting that we discuss in Section 3.

The average relationship between spending and votes is somehow of lower magnitude following the reforms of 1885, and then gradually increases up until WWII. Then, the correlation remains stable until the early 1970s, when it surges to unprecedented levels, two to three times higher than during the rest of the century. The peak in 1997 (0.023) is almost ten times larger than the lowest point in 1886 (0.0025). Finally, the estimated coefficients drop in 2001, to remain at a level that is still relatively high in historical comparisons. We rationalize these patterns in Section 5 below.[51]

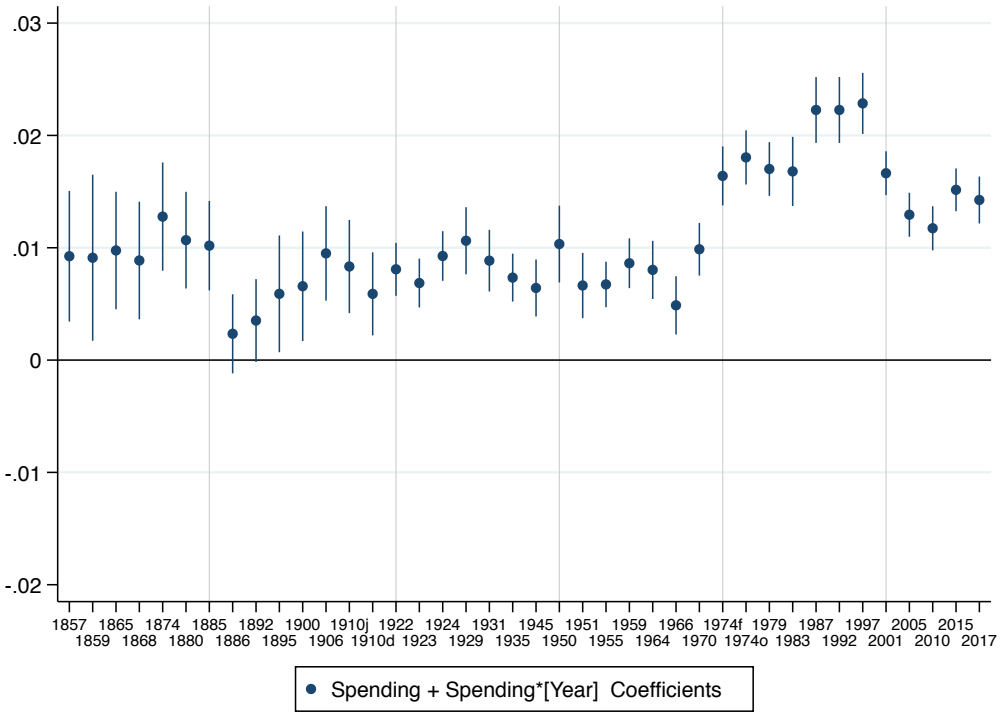
Interestingly, these time trends are not homogeneous from a geographical point of view either, as shown in Figure 4 where, for each time period, the spending coefficients are plotted with their interaction with region fixed effects.[52] Strikingly, in recent periods, coefficients can display twofold differences across regions. Besides, a few regions stand out as having persistently higher correlations: the South, and, more recently, Scotland and Wales.

Heterogeneity depending on the expenses categories Next, we investigate whether the correlation between campaign spending and votes varies depending on the expenses categories. For instance, is the correlation between expenses on public meetings and votes higher than the one between expenses on printing and votes? To answer this question, we aggregate the spending data into four broad categories: (i) printing and advertising, (ii) paid staff (mostly agents, clerks and messengers[53]), (iii) meetings, and (iv) other expenditures, and study the relationship between candidates' votes and their spending on one expense category as a share of the total spending on this category in the constituency, for the

[51] Alternatively, to estimate the evolution of the relationship between spending and votes and also control for a richer set of district-level covariates, in the online Appendix Table G.8, we estimate equations (1) and (2) separately for five different time periods that broadly coincide with the introduction of the different campaign technologies described in Section 3 above. With or without controlling for candidate fixed effects, we obtain a positive and statistically significant correlation in all the time periods. The observed changes in the magnitude of the coefficients are consistent with the relationship plotted in Figure 3, though estimates for the 1857-1880 period appear smaller than suggested by the graph.

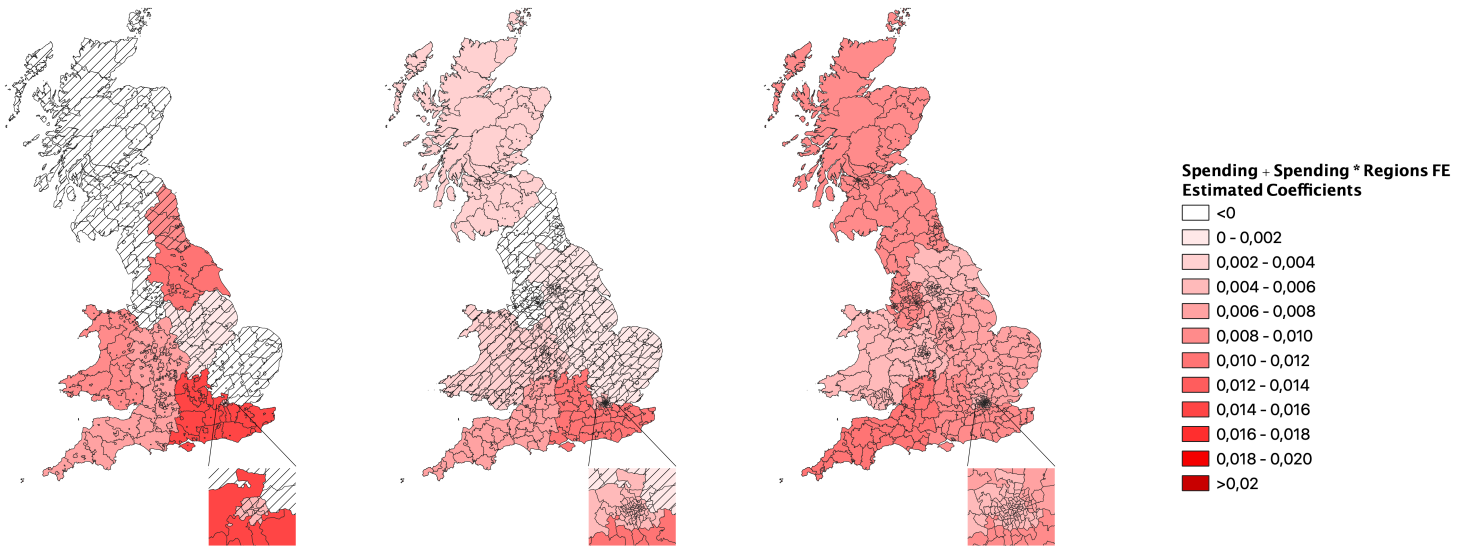
[52] Alternatively, we estimate equation (2) separately for the different regions. Online Appendix Table G.15 presents the results when we control for constituency fixed effects, and Table G.16 for candidate fixed effects.

[53] See online Section Appendix A.1.



Notes: The figure plots, for each election year, the point estimates and 95% confidence intervals of the linear combination of the share of spending coefficient and its interaction with an election-year dummy (the coefficients $\beta + \beta_t$ in equation (3)). Vertical lines indicate the time periods described in Section 3.

Figure 3: Evolution of the relationship between the candidates' share of the constituency total spending and their vote share, 1857-2017



(a) 1857-1880 (b) 1885-1918 (c) 1922-1945 (d) Legend

(e) 1950-1970 (f) 1974-1997 (g) 2001-2017 (h)

Notes: The maps represent the estimated spending coefficients plus the coefficients of their interaction with a region fixed effect (we mapped each historical constituency into one of the nine current regions of England, Scotland and Wales). Hashed areas denote estimates with p-values $>$ .01.

Figure 4: Evolution of the relationship between candidates' share of total spending and vote share, depending on the region, 1857-2017

Table 3: Effect of candidates' share of total spending on vote share (logarithm of the ratio of the number of votes over abstention), depending on the expenses categories, 1885-2017

	1885-2017				
	(1)	(2)	(3)	(4)	(5)
Printing & Advertising	0.0099***				0.0084***
	(0.0003)				(0.0003)
Agents & Other Paid Staff		0.0025***			0.0013***
		(0.0001)			(0.0001)
Meetings			0.0018***		0.0009***
			(0.0001)		(0.0001)
Other expenditures				0.0027***	0.0010***
				(0.0002)	(0.0002)
Election-Party FE	✓	✓	✓	✓	✓
Candidate FE	✓	✓	✓	✓	✓
Constit-level controls	✓	✓	✓	✓	✓
Candidate-level controls	✓	✓	✓	✓	✓
Candidates	Mtp times	Mtp times	Mtp times	Mtp times	Mtp times
R-sq (within)	0.13	0.09	0.09	0.09	0.14
Observations	41,455	41,455	41,455	41,455	41,455
Cluster (Constit)	3,011	3,011	3,011	3,011	3,011
Mean DepVar	-0.2	-0.2	-0.2	-0.2	-0.2
Sd DepVar	1.3	1.3	1.3	1.3	1.3

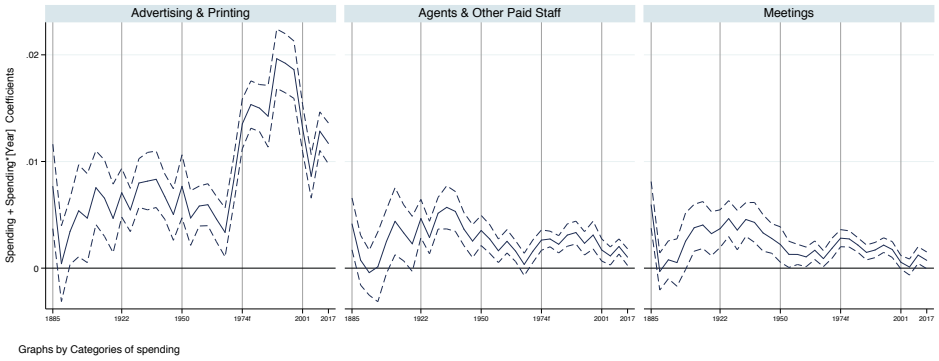
Notes: * p<0.10, ** p<0.05, *** p<0.01. The models are estimated using OLS estimates. Time period is 1885-2017, with the exception of 2005. An observation is a candidate-election. The dependent variable is the logarithm of the ratio of the number of votes obtained by a candidate over abstention. All the estimations include election-party fixed effects and candidates fixed effects. Standard errors are clustered at the district level. Variables are described in more detail in the text.

1885-2017 period.[54] In other words, we re-estimate equation (2), but our main explanatory variable of interest is now $\beta_e \text{spending}_{ecmt}$, where e indexes the different expenses categories, and spending_{ecmt} is the share of the district m total spending represented by the candidate c in electoral year t on expenses category e.

Table 3 presents the results. All the specifications include candidate fixed effects.[55] In Columns (1) to (3), we consider each of the spending categories independently, and Column (4) includes all the categories simultaneously. We find that the positive relationship between spending and votes seems to be mainly driven by the "printing and advertising" spending category. A one-percentage-point increase in the spending share on printing and advertising represented by a candidate is associated with a 0.84 to 0.99% increase in the votes-on-abstention she obtains.

[54]This aggregation allows us to perform the analysis for the entire 1885-2017 time period, despite the change in the expense categorization that took place in the 2000s. Online Appendix Figure H.18 reports the evolution of the relative importance of these four aggregated categories over time. Including the 1857-1880 period requires us to drop the meeting category, as spending on meetings is inconsistently mixed with other categories in the reporting of those years (see Section 2). Doing so (putting spending on meetings for 1885 onwards in the "Other" category) does not alter our results, however (online Appendix Table G.18).

[55]Online Appendix Table G.13 reports the results of the same estimation but with constituency fixed effects rather than candidate fixed effects.



Notes: The figure plots, for each election, the point estimates and 95% confidence intervals of the linear combination of spending-category (as the share of the candidate spending in this category over all candidates spending in this category) coefficient and its interaction with an election indicator variable.

Figure 5: Evolution of the relationship between campaign spending and votes, depending on the expenses categories, 1885-2017

This is further strengthened when looking at the effects across time that are plotted in Figure 5: the time pattern observed in Figure 3 is mostly visible for the “printing and advertising" category; only in the interwar period are the other categories comparable in terms of magnitude. The role played by “meetings", in particular, is always much lower, with a peak in the 1920’s and 1930’s, a pattern consistent with the qualitative accounts we present in Section 3. Similarly, the decline in the impact of agents over the XXth century is concomitant to their progressive “de-professionalization" (Fisher et al., 2006). On the other hand, the importance of printing and advertising material could be rationalized by their its provision of information to voters, which has been shown to matter for campaigns (see, among others, Da Silveira and De Mello, 2011; Le Pennec, 2020), and its use by door-to-door canvassers and other volunteers, whose persuasion impact has also been demonstrated (Pons, 2018).

Does this necessarily mean, however, that using advertising is a more “efficient" way to campaign than organizing meetings? To tackle this question, we investigate whether there is a “compositional" effect of spending, i.e. whether the electoral performance of a candidate – for a given share of the total constituency spending – varies depending on the composition of her spending. To do so, we use as a dependent variable the spending on a category as a share of the candidate’s *own* total spending, controlling for the candidate’s total spending as a share of the total *constituency* spending (our initial spending variable). Online Appendix Figure H.19 reports the results. Conditional on the overall expenditure effort of the candidate, spending an additional percentage point on meetings is associated with higher votes, and significantly more than spending on printing and advertising or on paid staff.

How to make sense of this puzzling result? One explanation resides in the levels of spending devoted to each category: as seen in Figure 2 meetings rarely represent more than 10% of candidates’ expenses, thus adding a percentage point of spending is highly significant. However, another explanation could be found in the fact that candidates spend their money differently depending on the varying status and

prospects of their campaign, including their levels of spending (a dimension that is not captured by the set of fixed effects included in our empirical model). Online Appendix Figure H.20 shows that a basket of spending with a large proportion of meeting expenses is linked to *low* levels of share of spending in general, while the opposite is true (at least to a certain extent) for advertising, as shown in Figure H.21. In other words, it appears as though a fixed amount of spending on meetings was required by campaigns (unless you are a “very minor" candidate), and any additional euro (i.e. the extensive margin of campaigns) would go on printing and advertising. As more spending is related to more votes, printing and advertising thus becomes the main determining elements of our pattern, without being the “best" campaign tool per se.

4.3 Robustness

Before explaining the changes over time and space in the sensitivity of electoral results to differences in campaign spending, we show that the documented relationship between spending and votes is robust to a number of alternative empirical specifications that we describe here. The corresponding tables and figures are reported in the online Appendix Section F.

Sample and time period As noted in Section 2.2, pre-1885 data are considered less reliable than the information provided after that date. Hence, in the online Appendix Table F.1, we present similar estimations but only for the sub-period 1885-2017. Doing so does not affect our main estimates quantitatively or qualitatively. Online Appendix Table F.2 displays the results dropping the 4.74% observations in multi-member constituencies (such constituencies existed until 1948); conclusions are unchanged.

Absolute spending In our preferred specification, our main independent variable of interest is the share of the constituency total spending represented by each candidate. In the online Appendix Tables F.3 and G.14, we show that our results are robust to using absolute spending (per registered voter) instead. We indeed find a positive and statistically significant relationship between the total amount spent by the candidates and their vote share. Furthermore, this result is robust to controlling for decreasing returns to scale; as expected given the existing literature (Jacobson, 1978; Gerber, 1998), the total spending squared term is negative and statistically significant.

Spatial autocorrelation In the online Appendix Table F.4, we show that our results are robust to controlling for spatial autocorrelation. To do so, we rely on the $acreg$ Stata package developed by Colella et al. (2020), which allows us to compute standard errors corrected for spatial correlation. We show that our findings are robust to accounting both for spatial correlation between observations of the same year and for temporal correlation between observations from the same constituency.

Clustering and fixed effects In the online Appendix Table F.5, we show that our findings are robust to clustering the standard errors at the candidate rather than at the electoral district level. Further, in Column (5), we introduce region-year fixed effects and show that doing so does not affect our results neither.

Overall, we have shown in this section that there is a robust and persistent correlation between campaign spending and votes, but that the magnitude of this relationship varies over time. The next section aims to better understand these time-varying patterns and, by doing so, to improve our understanding of the mechanisms through which campaigns make a difference.

5 The changing sensitivity of the electoral results to differences in campaign spending: Mechanisms

In Section 3, we have highlighted how changes in information technologies and electoral environments have shaped spending patterns and campaign strategies. This section asks whether they have also affected the sensitivity of electoral results to differences in campaign spending. While, for some of these evolutions, we are able to isolate causal effects thanks to systematic (and exogenous) variations in both time and space, for others we can only offer suggestive evidence; this does not mean, however, that they are of less interest to us. Besides, though we believe the factors we present here played a key role, they are by no means exhaustive.

5.1 Local media, amplification and the diversification of information technologies

As already discussed, media technologies can be used by campaigns to publicize messages or improve coordination. But they also contribute by covering and discussing campaigns, an "amplification" dimension that makes broadcasting technologies – on which campaign advertising is forbidden – also relevant to our study. In this section, we focus on the introduction of local radio and broadband Internet. Our choice is driven by several facts: first, the timing of their development (the 1970s and the 2000s) is concomitant to the abrupt changes we observe in Figure 3; second, their local/disaggregated anchor particularly fits in with the dynamics of the *local* campaigns we study; finally, both underwent natural experiments that allow for interpretable causal analyses.

Local radio Radio has already been shown to provide important political information and affect the way citizens vote (Strömberg, 2004; Ferraz and Finan, 2008), and one could expect that it might also impact how local campaign messages and activities are conveyed. In the UK in particular, radio has always been a key channel of political information (see Section 3), especially given its very large audience (in the 1950s, about 90% of British homes had radio licenses, and between 15 and 20% listened to BBC evening news broadcast on a daily basis (Paulu, 1956)). Until the late 1960s, however,

the UK only had a few *national* radio channels (with some regional variation in programs), limiting journalists' ability to cover local elections. This radically changed at the end of the 1960s when, under pressure to tackle pirate radio stations, the government allowed radio to diversify by setting up local BBC stations from 1967 onwards and, starting in 1973, by licensing operations to "independent" (i.e. commercial) radio stations. Between these two starting dates and 1985, respectively 19 public and 44 commercial local stations were launched in the British Isles.

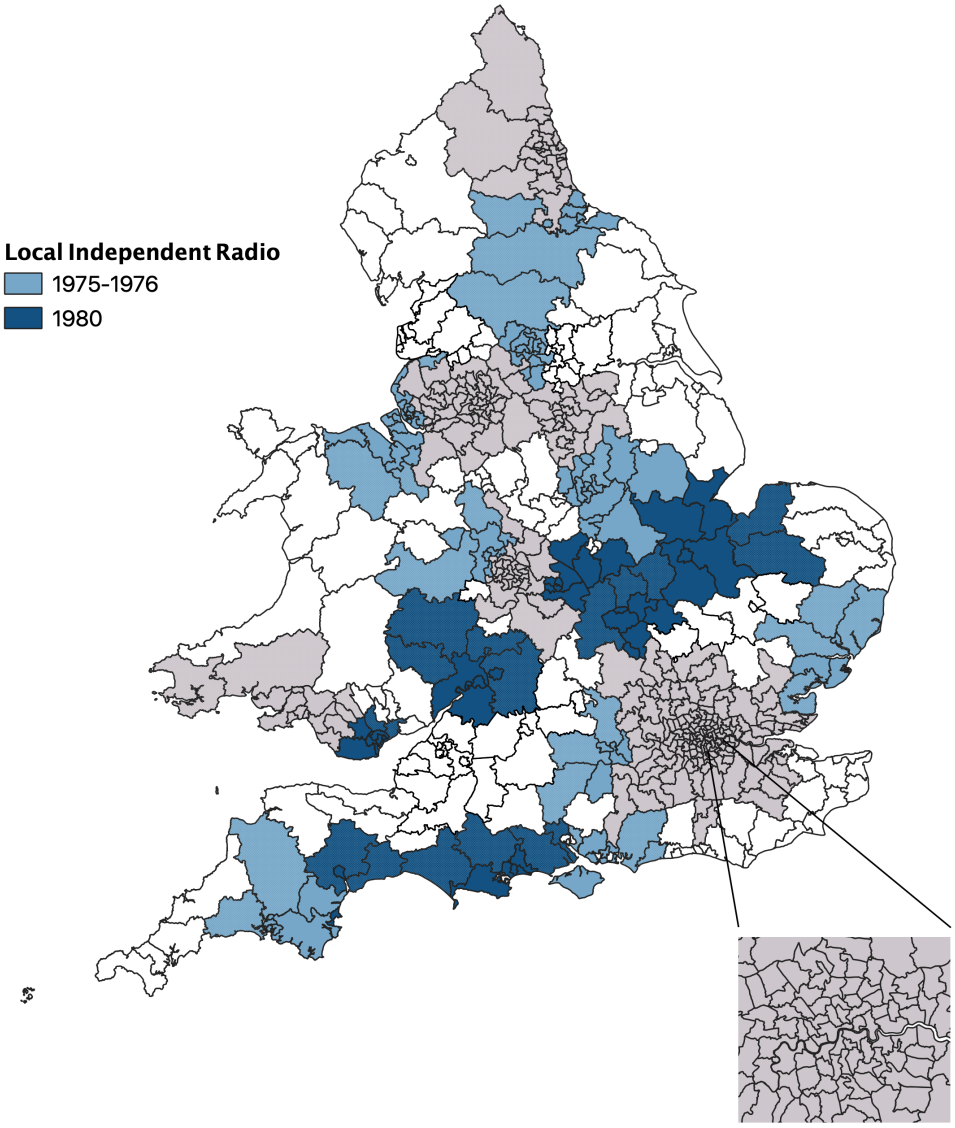
To investigate the consequences of this expansion, we hand-coded the coverage of all local radio stations broadcasting on January 1st, 1985, using the Radio Atlas published by the Radio Marketing Bureau, the intelligence organization of commercial radio. An example of the data is given in the online Appendix Figure H.22. For each constituency, we determine the number of radio stations, the date of their launch, and the extent of their coverage differentiating between full, partial, or no coverage. This allows us to study the interaction of local radio with campaign spending by comparing constituencies with extensive radio coverage with those with little or none, before and after the beginning of that coverage.

One concern might be that the decisions to launch local stations, whether driven by public or commercial motives, were made based on local population characteristics, which could themselves interact with the effectiveness of campaigns. In order to deal with this endogeneity issue, we exploit a freeze in independent radio licensing.[56] After a rapid expansion (19 licenses granted in three years), the growth of commercial radio stopped suddenly in 1976 because of budgetary restrictions and the new Labour government's reticence towards these commercial players (Jones, 1989). It would take four more years and a new Conservative government before their activity resumed, with 31 new stations launched between 1980 and 1985. More specifically, 10 radio stations were launched between the October 1974 election and the April 1976 radio freeze, and seven in the year immediately after the restrictions ended (between April and December 1980). Figure 6 plots the geographical spread of local radio stations right before and right after the freeze.

Following Gentzkow (2006) and Angelucci et al. (2020), we hypothesize that locations in which radio was introduced right before the freeze (102 constituencies) are comparable to those in which it was introduced immediately after (56 constituencies), conditional on a large number of observables. This is supported by the online Appendix Table G.23, where we compare these constituencies on multiple electoral dimensions, none of which is statistically different between the two groups[57]. Only the vote shares obtained by the main parties slightly differ, but reassuringly online Appendix Figure H.24 shows that these shares follow similar trends before the introduction of local radio. Parallel trends are also visible on our main outcome variable: Figure H.23 reports the spending coefficient for the "treated" constituencies (where local radio was introduced just before the freeze) and the "control"

[56]Note that the number of public radio stations remains constant over the period. A similar freeze indeed occurred for public radio, during which no new stations were launched between 1973 and 1980.

[57]In particular, we show that these constituencies do not differ with respect to their population, nor with respect to the intensity of the electoral competition.



Notes: The figure plots the spread of local commercial radio stations right before and after the freeze in licenses that occurred between 1976 and 1980. Boundaries are those of parliamentary constituencies. Light and dark blue areas correspond to full or partial coverage starting between October 1974 and April 1976 and between April 1980 and December 1980 respectively. Grey areas correspond to constituencies with existing local radio coverage in October 1974.

Figure 6: Local Independent Radio Coverage, 1974-1980

constituencies (where it was introduced just after) over time; there is no difference in the correlation between spending and votes before the introduction of radio.

We can thus investigate how this correlation was affected between the 1974 (October) and 1979 elections by the emergence of local radio. To do so, we estimate the following model:

$$\ln\left(\frac{s_{cmt}}{s_{0mt}}\right) = \alpha + \beta_1 \text{spending}_{cmt} + \beta_2 \text{radio coverage}_{mt} + \beta_3 \text{spending * radio}_{mt} + \mathbf{X'_{mt}}\gamma + \mathbf{Y'_{ct}}\delta + \mathbf{Z'_{c}}\theta + \zeta_m + \omega_{jt} + \epsilon_{cjmt} \quad (4)$$

where radio coverage$_{mt}$ is a categorical variable equal to 1 / 0.5 / 0 if the constituency is fully / partially / not covered by a local independent radio. We focus on the October 1974 elections – when no constituency had local radio – and the 1979 elections – when only the treated ones did. β_3 is our coefficient of interest, estimating the impact of (partial) radio coverage on the correlation between candidates' share of spending and votes.

Table 4 presents the results. In Columns (1) and (2), we control for constituency and election-party fixed effects; in Columns (3) and (4), we focus on the candidates who run multiple times and introduce candidate fixed effects. In all four columns, and consistently with our previous results, we find a positive relationship between candidates' spending and votes. In the even columns, we consider the interaction between the presence of local radio and spending: it is positive and statistically significant. A one-percentage-point increase in the spending share is associated with a 2.4% increase in votes-on-abstention absent any local radio station, but a 2.9% increase when the constituency is fully covered (Column (2)).

Interestingly, this increase in magnitude is consistent with that observed in the 1970s (Figure 3). While it is certainly not the only factor, we can thus conjecture that the expansion of local radio that occured from the late 1960s to the late 1980s contributed to the high level of the observed correlation between spending and votes during that period. How so? By increasing people's awareness of their local candidates and campaigns, radio can impact the reaches of campaigning efforts. A meeting organized in a constituency with local radio could, for instance, be announced in the evening news or commented on the next political bulletin.

Internet Given the important role played by local radio, we might expect other media technologies, which are often considered more "efficient" in their ability to reach a very large number of citizens, to have further deepened the relationship between spending and votes. A good example of such technology with rapid expansion is the Internet: as highlighted by Gavazza et al. (2019), between 2003 and 2011 the share of UK households with a broadband Internet connection increased from 6% to 74%. Its spread not only increased people's access to mass media, but also candidates' access to people through the introduction of new campaigning instruments, such as micro-targeting on social

Table 4: The impact of local independent radio on the relationship between candidates' spending and votes, 1974-1979

	1974(Oct)-1979			
Share of total spending	0.026***	0.024***	0.009***	0.003
	(0.002)	(0.002)	(0.003)	(0.004)
Local Radio	-0.046	-0.193*	-0.053	-0.442***
	(0.058)	(0.106)	(0.066)	(0.157)
Radio * Share Spending		0.005*		0.011***
		(0.003)		(0.003)
Constit FE	✓	✓		
Election-Party FE	✓	✓	✓	✓
Candidate FE			✓	✓
Constit-level controls	✓	✓	✓	✓
Candidate-level controls	✓	✓	✓	✓
Candidates	All	All	Mtp times	Mtp times
R-sq (within)	0.45	0.46	0.46	0.53
Observations	867	867	340	340
Cluster (Constit)	122	122	112	112
Mean DepVar	-0.6	-0.6	-0.0	-0.0
Sd DepVar	1.4	1.4	0.9	0.9

Notes: * p<0.10, ** p<0.05, *** p<0.01. The models are estimated using OLS estimates. An observation is a candidate-election. The dependent variable is the logarithm of the ratio of the number of votes obtained by a candidate over abstention. The radio coverage is a categorical variable equal to 1/.5/0 if the constituency is fully/partially/not covered by a local independent radio. Standard errors are clustered at the district level. Coefficients for the controls are not reported for the sake of space. Variables are described in more detail in the text.

media.

Of course, the expansion of the Internet was not homogeneous across all regions, and both observable and unobservable characteristics correlated with Internet penetration might also be linked to the patterns of campaign spending. Hence, to investigate the impact of this new technology, it is necessary to instrument the supply of broadband Internet across different geographic areas. We follow here the empirical strategy of Gavazza et al. (2019), who use local variation in the average yearly rainfall to instrument for broadband Internet penetration, adapting their Ofcom data to our constituency-level analysis.[58]

Focusing on the 2005 and the 2010 general elections, for which fine-grained Internet penetration data is available, we first show in the online Appendix Table D.2 that, consistently with Gavazza et al. (2019), constituencies with more rainfall in the previous year have lower Internet penetration.[59] Then, similarly to what we did for radio coverage, we interact the (predicted) Internet penetration of the constituency with the share of spending variable. Results are shown in Table 5: a one standard deviation (4.7%) increase in the share of households with broadband Internet increases the correlation between spending and votes by 5 and 3 percentage points respectively when we control for constituency (Columns (1) and (2)) candidate fixed effects (Columns (3) and (4)).

In other words, just like local radio, it seems that this new media technology has increased the sensitivity of the electoral results to differences in campaign spending. Aside from the numerous accounts of campaigns taking advantage of this new technology (Wring and Ward, 2010a; Larcinese and Miner, 2018), this is supported by the fact that, in constituencies where Internet penetration is higher, the use of computers by campaigns is greater, as shown in the online Appendix Figure H.26.[60]

Overall, our findings point to a positive role played by new local media technologies in the relationship between spending and votes, and we could expect other, less easily identifiable, examples of this.[61] However, while these factors are consistent with the patterns we observe over the 20th century, they cannot explain the break in the trend (or return to normal) we see in the 2000s. Other important dimensions may be at play, in particular changes in the electoral environment and in local campaigning, which we now consider in turn.

5.2 Marginality, electoral competition and the professionalization of campaigns

A key dimension of British electoral politics – and of many first-past-the-post systems – is the closeness of a seat, i.e. the level of perceived certainty that a constituency will be won by a certain party/candidate.

[58] Gavazza et al. (2019) use ward-level variables, unavailable for general elections. Details on the procedure we used are provided in online Appendix Section D.

[59] Online Appendix Figure H.25 illustrates this relationship geographically in 2010. Places that suffer from more rainfalls in 2009 are characterized by a lower Internet penetration on average at the beginning of 2010. See online Appendix Section D for more details on the estimation.

[60] Overall, the use of computers by campaigns strongly increased in the 1990s and early 2000s, as reported in the online Appendix Figure H.27.

[61] This will be explored in future research.

Table 5: The impact of broadband Internet on the relationship between candidates' spending and votes, 2005-2010

	2005-2010			
Share of total spending	0.025***	0.025***	0.010***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)
Broadband Internet (predicted, std)	0.407**	0.255	0.342	0.250
	(0.194)	(0.194)	(0.223)	(0.221)
Internet * Share Spending		0.005***		0.003***
		(0.001)		(0.001)
Constit FE	✓	✓		
Election-Party FE	✓	✓	✓	✓
Candidate FE			✓	✓
Constit-level controls	✓	✓	✓	✓
Candidate-level controls	✓	✓	✓	✓
Candidates	All	All	Mtp times	Mtp times
R-sq (within)	0.34	0.36	0.25	0.26
Observations	5,903	5,903	1,864	1,864
Cluster (Constit)	627	627	579	579
Mean DepVar	-2.1	-2.1	-1.4	-1.4
Sd DepVar	1.6	1.6	1.5	1.5

Notes: * p<0.10, ** p<0.05, *** p<0.01. The models are estimated using OLS estimates. An observation is a candidate-election. The dependent variable is the logarithm of the ratio of the number of votes obtained by a candidate over abstention. The predicted internet penetration is obtained from estimating equation and is standardized (it has mean 0 and standard deviation 1). Standard errors are clustered at the district level. Coefficients for the controls are not reported for the sake of space. Variables are described in more detail in the text.

While the effect of closeness on turnout is still debated (see discussion in Bursztyn et al., 2017), closeness is nowadays acknowledged as directly influencing the behaviors and strategies of candidates (Cann and Cole, 2011; Gerber et al., 2017), as well as the impact of campaign spending (Gerber, 2004). In our context, we expect this impact to be particularly visible after the generalization of one-seat constituencies post-WWII, and the progressive "professionalization" of campaigns during the last part of the century (see Section 3), which, following the development of an electoral science, encouraged the use of more modern and sophisticated techniques, especially in constituencies that matter for the overall election outcome – i.e. the marginal seats.

Closeness is often measured by the votes margin between the two main contenders – the lower the margin, the more uncertain the outcome, and the "closer" the election. Given that opinion polls are unavailable at the constituency level, we take the margin from previous election results in the same constituency (the margin at time t being of course highly endogenous to the analysis).[62] Table 6 reports the results of our estimations when we interact the share of spending with the winner margin at the previous election.[63] Columns (1) and (2) report the results for the entire period. In Column (2), we find a statistically significant positive interaction between marginality thus measured and the share of spending represented by the candidate. Hence, the closer the elections, the higher the apparent correlation between campaign spending and votes, which is consistent with previous findings by Erikson and Palfrey (2000) and Gerber (2004). In terms of magnitude, increasing the closeness of a constituency from the 25th percentile of its distribution (6.7%, a fairly close district) to its $75th$ percentile (26.8%, very safe), decreases the spending coefficient from $0.013 - 0.009 * 0.067 = 0.0124$ to $0.013 - 0.009 * 0.268 = 0.0106$, i.e. a 15% drop.

This effect is not homogeneous over time, however. Columns (3) to (8) report the estimations by sub-periods. The interaction between marginality and spending share is only statistically significant in the post-WWII periods. This finding is also visible in the online Appendix Figure H.28, where we plot our main coefficients from estimation 3 separately for districts that are below and above the median (15.2%) in terms of marginality: since the late 1960s, competitive constituencies indeed start to display significantly higher correlations between spending and votes than safe ones, and this is the case up until the end of our period.[64]

[62]There are a number of technical details regarding the data construction that we would like to highlight here. First, in multi-member constituencies, we take the margin between the highest unelected candidate (in terms of votes) and the lowest elected candidate *from a different party*. Second, after a redistricting, we assign to new constituencies the values of the old constituencies in which their centroid lies, as explained in the online Appendix Section C. Third, for the interpretability of our coefficients, in our preferred specification, we drop constituencies whose previous election was uncontested. Online Appendix Table G.19 shows the results we obtain if we instead use a categorical variable close/safe/very safe/uncontested at previous election; results are unchanged. In the online Appendix Figure H.29, we report the changes in election closeness since 1857. Note that part of the volatility and extreme values are due to special elections, such as those of 1918 and 1931, where the main parties formed coalitions prior to the poll (Lee, 1996).

[63]As a reminder, all our previous specifications include the winner margin at previous election as a control.

[64]Alternatively, we use another measure of constituency-level electoral competition: Laakso and Taagepera (1979)'s effective number of parties (at the previous election). Online Appendix Figure H.34 plots the evolution of this average number during our time period. We see that it slowly increased over time, accelerating in the 1970s. Table G.20 reports the results of our main specification interacting spending share and the number of parties. Just as with marginality, we find that

Table 6: Relationship between candidates' share of total spending and vote share (logarithm of the ratio of the number of votes over abstention), depending on the closeness of the election (measured by the winner margin at previous elections) and on the time period

	1857-2017		1857-1880	1885-1911	1922-1945	1950-1970	1974-1997	2001-2017
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of constituency total spending	0.011***	0.013***	0.004	0.002	0.008***	0.012***	0.023***	0.018***
	(0.000)	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Winner margin at previous election	-0.576***	-0.255***	-0.276	-0.415	-0.132	-0.178	-0.024	0.067
	(0.028)	(0.061)	(0.801)	(0.374)	(0.111)	(0.158)	(0.135)	(0.106)
Margin * Share Spending		-0.009***	0.001	-0.007	-0.003	-0.015***	-0.017***	-0.015***
		(0.001)	(0.016)	(0.007)	(0.002)	(0.004)	(0.004)	(0.003)
Constit FE								
Election-Party FE	✓	✓	✓	✓	✓	✓	✓	✓
Candidate FE	✓	✓	✓	✓	✓	✓	✓	✓
Constit-level controls	✓	✓	✓	✓	✓	✓	✓	✓
Candidate-level controls	✓	✓	✓	✓	✓	✓	✓	✓
Candidates	Mtp times	Mtp times	Mtp times	Mtp times	Mtp times	Mtp times	Mtp times	Mtp times
R-sq (within)	0.14	0.14	0.18	0.23	0.14	0.22	0.22	0.16
Observations	44,066	44,066	1,073	5,191	6,892	8,249	10,493	8,788
Cluster (Constit)	3,251	3,251	211	522	593	653	1,056	777
Mean DepVar	-0.3	-0.3	0.2	0.8	0.2	0.3	-0.5	-1.5
Sd DepVar	1.4	1.4	1.0	0.6	0.6	0.8	1.3	1.5

Notes: * p<0.10, ** p<0.05, *** p<0.01. The models are estimated using OLS estimates. An observation is a candidate-election. The dependent variable is the logarithm of the ratio of the number of votes obtained by a candidate over abstention. All the estimations include district fixed effects, election fixed effects, and election-party fixed effects. Columns (2) and (3) also control for party fixed effects, and Column (4) for candidates fixed effects. Standard errors are clustered at the district level. The district-level controls are listed in the text. The candidate-level controls include the gender, and an indicator variable equal to one if the candidate is the incumbent and to zero otherwise. Coefficients for the controls are not reported for the sake of space. Variables are described in more detail in the text.

As such, our results indicate that it is not so much the changes in the degree of election closeness per se (or the number of marginal seats[65]) that could explain the temporal pattern we observe in the sensitivity of votes to differences in spending, but how much this marginality matters for the design of campaign strategies, in terms of both the efforts made and the sophistication of the techniques used. We have already mentioned in Section 3 that candidates spend more when running in more competitive constituencies (see online Appendix Figure H.17). Another way to measure this extra effort is by using survey data from Denver et al. (2003) and Fisher and Denver (2009), who have studied the transformations of campaigning in the UK by sending out a questionnaire to the candidates' election agents. For the 1992, 1997, 2001 and 2005 general elections, seven different measures of campaign efforts are available: (i) distributing leaflets; (ii) telephone canvassing; (iii) door-to-door canvassing to introduce the candidate; (iv) sending out election addresses; (v) organizing postal votes; (vi) special efforts to appeal to specific groups of voters; and (vii) getting media coverage.[66] Figure 7 plots the average efforts reported on these different items depending on the marginality of the seat. It appears clearly that, at least on average, campaigns seem to systematically make more effort in constituencies that are more marginal. Interestingly, the largest difference is to be seen in telephone canvassing, arguably the most "modern" form of campaigning on the list.

At the same time, changes in the importance of marginality could reflect changes in the attitudes of voters that make them less certain of their decision beforehand. At the national level, an indicator of this indecisiveness can be measured by the variability of voting intentions across country-wide polls. Wlezien et al. (2013) have compiled the most complete dataset of available national polls in the UK between 1950 and 2017[67]; online Appendix Figure H.32 reports the raw data, from which we build the daily variance of the voting intentions for the three main parties during the last 30 days of the cycle (Figure H.33). Interestingly, we see a large increase in this variance in the 1970s.

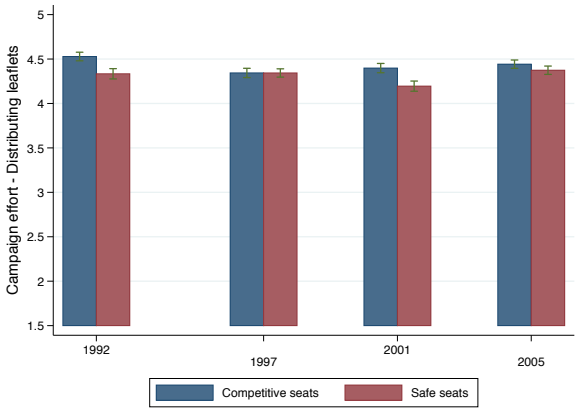
A similar observation arises when computing the average strength of self-reported party identification from survey data. Since 1963, the British Election Survey (BES) has included questions on individuals' party affiliation and its strength – i.e. whether individuals identify themselves *"very strongly"*, *"fairly strongly"*, or *"not very strongly"* with the party they support. In the online Appendix Figure H.31, we show that this strength drastically decreased in the last quarter of the century (a decline

an increase in the effective number of parties (i.e. an increase in competition) is statistically significantly associated with an increase in the share of spending coefficient (Column (1)), and this is particularly the case in the post-WW2 period (Columns (5) to (7)).

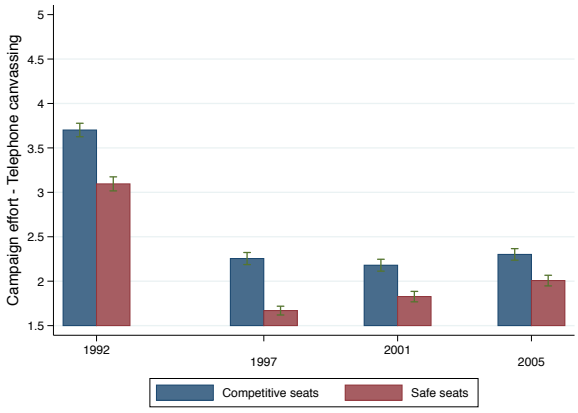
[65]Aside from the online Appendix Figure H.29, see Figure H.30, which plots the evolution of the share of the constituencies with lower than the median (15.2%) closeness: from both figures, it appears that very few of these evolutions seem meaningful enough to explain our time pattern.

[66]The agents were asked the following question: *"Here is a list of activities which frequently form part of a constituency campaign. Please indicate on the scale shown below how much effort was put into each of them during your campaign, whether very little or no effort (1), a very substantial effort (5), or somewhere in between"*. The "Survey of election agents for study of constituency campaigning" at the British general elections is still performed as of today; however, the data are only available until 2005 at the constituency level. Hence, our focus on the 1992-2005 general elections here.

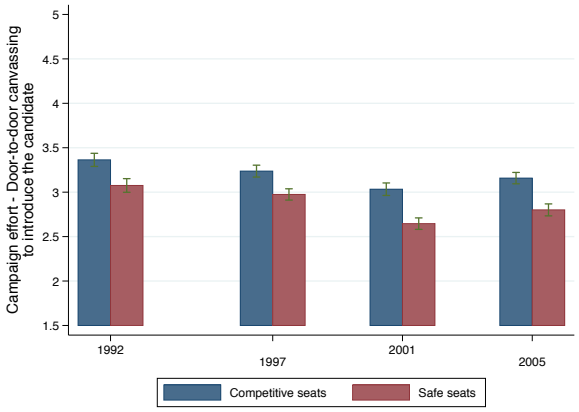
[67]Their original article covers the period 1950-2010. The "dataset on polls and the timeline of elections" (which is available here) also includes the 2015 and 2017 elections.



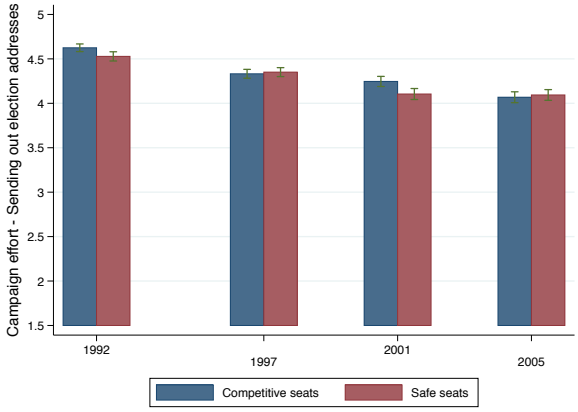
(a) Distributing leaflets



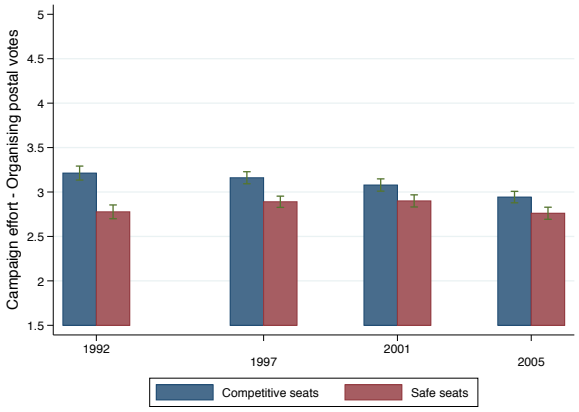
(b) Telephone canvassing



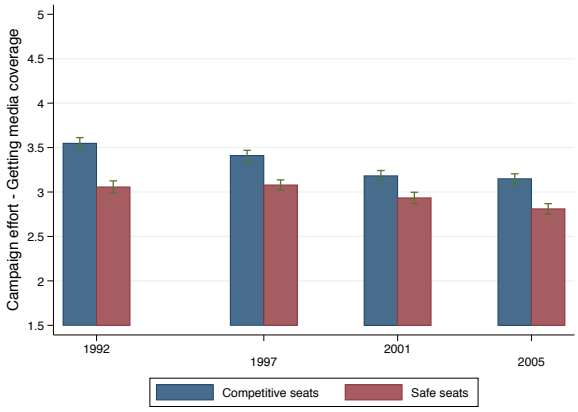
(c) Introduce the candidate



(d) Election addresses



(e) Postal votes



(f) Media coverage

Notes: The figure plots the average campaign efforts reported by the surveyed candidates' election agents depending on the competitiveness of the seats. Competitive seats are seats for which the margin at last election is below 20%; safe seats seats for which it is above that figure. The survey data come from Denver et al. (2003) and Fisher and Denver (2009). The agents were asked the following question: *"Here is a list of activities which frequently form part of a constituency campaign. Please indicate on the scale shown below how much effort was put into each of them during your campaign, whether very little or no effort (1), a very substantial effort (5), or somewhere in between."* The answers are ranked between 1 and 5 (the higher the effort, the higher the number).

Figure 7: Campaign effort depending on the competitiveness of the seats

already documented in Seyd and Whiteley, 2002; Whiteley and Seyd, 2002). However, the interaction between the share of spending and the strength of identification is not statististically significant (online Appendix Table G.21). Still, this “no result" needs to be taken with a grain of salt since it might be due to the fact that the BES data is not meant to be representative at the constituency level [68].

The volatility of voting decisions and the related level of electoral competition also crucially depends on the composition of the voter pool; however, this pool changed in 1969, when the voting age was lowered from 21 to 18, increasing the electorate by about 3.5 million (10%). Studies have indeed shown that the characteristics of individual voters, such as their age, affect their susceptibility to persuasion by political campaigns. For instance, it has been argued that electors with a low level of education lack strong political awareness and are more sensitive to political advertising (Zaller, 1992) – and hence to campaign spending. Further, the new young 1969 voters were also first time voters; they might thus been less informed about the campaign and so be more likely to change their attitude toward the candidates after being exposed to it (Rothschild and Ray, 1974; Kaid et al., 2007). In the online Appendix Table G.22, we investigate whether constituencies with a relatively high fraction of young (15-24[69]) people before the reform (at the 1966 elections) display a different correlation between campaign spending and votes following the franchise extension, compared to the constituencies with relatively less young people and thus a lower change in the relative composition of their electorate. The triple interaction indicates that, indeed, the correlation between spending and votes is higher in the constituencies with a relatively higher share of young people after the extension of their electorate.

Overall, our findings point to the fact that changes in the behaviors of both campaigners and voters during the last part of the 20th century could have contributed to the relatively high levels of correlation between spending and votes witnessed during the period. As the level of electoral competition increased in certain areas, parties and candidates adapted their campaign efforts, which impacted the effectiveness of campaigns. But these dynamics were to change in the early 2000s, which is the period we now turn to.

5.3 Targeting, intensity and nationalization of local campaigns

A second but no less important change in the strategy of parties occurred around the turn of the millennium: the increasing tendency of national parties to intervene in local constituencies' affairs. Seyd and Whiteley (2002) distinguish between three types of general election campaigns: (i) the central campaign, which is organized from party headquarters; (ii) the centrally coordinated local campaigns, in which party headquarters provide local parties with personnel, technological support services and literature; and (iii) the purely locally managed campaigns, in which local party members organize their campaign according to their own priorities and resources (see also Whiteley and Seyd,

[68] To generate the variable at the constituency level, we simply average its value over all individuals with declared residence in the constituency.

[69] Ideally, we would use the fraction of 18-20 year olds, but census data only display 15-19 and 20-24 population brackets.

2003). Interestingly for us, the drop in the correlation between spending and votes we observe in the 2000s is concomitant with what Fisher (2015) calls the "end of the national campaign", with parties progressively giving up costly national campaigns to the benefit of centrally coordinated local campaigns. This was partly driven by the *PPERA 2000*, which not only increased campaign finance transparency but also limited for the first time what parties could spend nationally.[70] The question we ask in this section is whether this inversion affected the correlation between the third form campaigning (at the candidate level, which is our focus in this article) and votes.

To measure the relative importance of national parties' interference in constituencies over time, we again use the survey data from Denver et al. (2003). We exploit a number of different dimensions: whether the constituency has been identified as a target seat by the national party[71] (this variable is available for the 1997 and 2001 general elections); the extent to which leading national figures visited the county during the campaign (this information is available for the 1992, 1997, and 2005 elections); and the level of resources made available by the national party at the local level – in particular the relative importance of regional and national vs. local leaflets (available for all four elections)[72]. Table 7 presents the results we obtain when we interact these measures with our main spending variable.[73] In the odd columns, we present the results with constituency fixed effects, and report the estimates with candidate fixed effects in the even ones. In Columns (1) and (2), we interact the share of total spending with a "Target" indicator variable equal to one if the constituency was considered a target seat by the party national headquarters, and to zero otherwise. In Columns (3) and (4), we approximate party politics by a "number of visits" variable measuring the number of visits by leading national figures to the constituency during the campaign (using data for the 1992 and 1997 elections), and in Columns (5) and (6), by an indicator variable equal to one if there is at least one visit by a national figure (also including the 2005 general elections, for which no information on the number of visits is provided). Finally, in Columns (7) and (8), "National leaflets" is the number of regional or national leaflets distributed in the constituency during the campaign, and in Columns (9) and (10) ,"Sub-agent" is an indicator variable equal to one if the national party hired a sub-agent for the constituency, and to zero otherwise.

Our estimates seem to point to a lower sensitivity of electoral results to differences in spending in places where national parties intervene extensively in local campaigns, at least in the specification with constituency fixed effects. The interaction between "Target" and "Share spending", for instance, is negative and statistically significant in Column (1); so are those with "number of visits" and "hire of

[70] In the online Appendix Figure H.15, one can indeed see that after overcoming their own candidates sum of spending in the 1960s, and peaking in 1997, the national parties' spending was tempered in the 2000s.

[71] See e.g. Denver and Hands (1997) who highlight that "*the first and most important constituency variable is the electoral status of the seat. Although all parties provide training for campaign workers generally and some help to all constituency campaigns, they all also draw up lists of 'target' marginal constituencies, upon which resources and effort are concentrated."*

[72] Online Appendix Figure H.35 reports the evolution of these measures over time.

[73] Note that the different number of observations between the columns is driven by the fact that not all the questions were asked in the different surveys.

sub-agents" in Columns (3) and (9).[74] One explanation for this finding could be that these interferences overshadowed local efforts – those that are funded by candidates' own spending – progressively decreasing the efficiency of the latter. After all, during the second half of the century the shift of attention from local to purely national campaigns did not mean the former no longer needed to be fought. As local campaigns were left to their own devices, minor advantages in their wealth could thus prove crucial. On the other hand, as national parties started to neglect national campaigns and to become more involved locally, it was their efforts, and not local spending, that began to determine the election outcome.

In addition, this change of behavior among national parties also directly impacted the conduct of local campaigns. First, the high level of resources enjoyed by national parties pushed these local campaigns to expand well beyond the election periods, with MPs and parties undertaking electorally driven actions during the whole election cycle (Johnston and Pattie, 2014), thereby diminishing the measured impact of campaign spending (spending is indeed only measured during the official campaign). Second, this change in strategies is concomitant to a general tendency for candidates to campaign with decreasing intensity. This can be seen very clearly if we consider the overall campaign spending by candidates in recent years (online Appendix Figure 1b): normalized by the average national income, we see that the total amount spent has declined continuously since WWII, and that this trend further accelerated in the 2000s (the drop is even sharper if we consider the amounts per candidate).

Why should the overall amount spent by candidates in a district matter for the correlation between spending shares and votes? It is important to remember that what we are studying here is the relationship between the *share* of spending represented by a candidate in a constituency and the votes she obtains; different levels of total constituency spending imply different interpretations of these spending shares. Let us take a simple example with only two candidates and a given spending distribution of, say, 30% vs. 70%: we might expect a higher correlation between the spending share and votes in a case where one candidate spends £$30,000$ and the other £$70,000$, than in a case where the amounts spent by each candidate are respectively £30 and £70. In other words, it does not really make a difference if you canvass ten times more than your opponent if it reflects the fact that you canvass ten citizens while she only canvasses one.

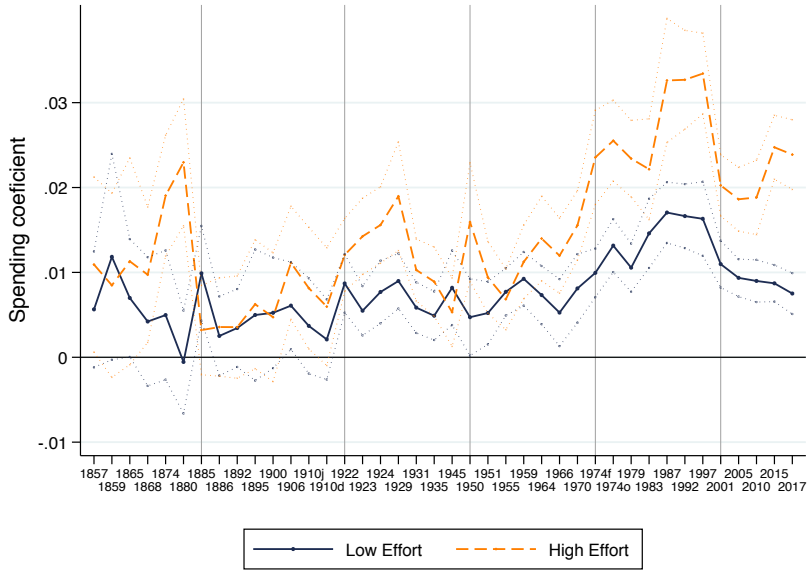
To investigate whether this intuition is right, we estimate the correlation between spending and votes separately for districts where candidates overall spent more than the median amount spent per registered voter in all constituencies in a given electoral year, and for constituencies where they spent less (i.e. districts with high vs. districts with low spending efforts). Figure 8 reports the results. It clearly shows that the correlation between spending and votes is consistently higher in high-spending than in low-spending constituencies. Furthermore, the difference is greater and statistically significant

[74]Note however that party campaigning *per se* is positively related to electoral results. The coefficients we obtain for our different measures of national politics (target, visit, and national leaflets) are indeed positive and statistically significant.

Table 7: Relationship between candidates' share of total spending and vote share (logarithm of the ratio of the number of votes over abstention), Depending on the relative nationalization of campaigning, 1992-2005

	Target seat		# national figures visits		Dummy national figures visit		National Leaflets		Sub-agents	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Share of constituency total spending	0.027***	0.014***	0.034***	0.022***	0.030***	0.019***	0.029***	0.019***	0.028***	0.023***
	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.002)
Share spending * Target	-0.013***	-0.006								
	(0.003)	(0.005)								
Target	0.745***	0.359*								
	(0.112)	(0.188)								
Share spending * # visits			-0.003***	-0.000						
			(0.001)	(0.001)						
Number of visits by leading figures			0.138***	0.025						
			(0.023)	(0.043)						
Share spending * Dummy visit					-0.001	-0.004				
					(0.002)	(0.003)				
Dummy $= 1$ if # visits ≥ 1					0.151***	0.228**				
					(0.049)	(0.113)				
Share spending * # National leaflets							-0.000	-0.000		
							(0.000)	(0.000)		
Number of national Leaflets							0.000	0.000		
							(0.000)	(0.000)		
Share spending * Sub-agent									-0.001*	-0.008***
									(0.001)	(0.002)
Use of sub-agent									0.182***	0.359***
									(0.028)	(0.058)
Constit FE	✓		✓		✓		✓		✓	
Election-Party FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Candidate FE		✓		✓		✓		✓		✓
Constit-level controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Candidate-level controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Candidates	All	Mtp times	All	Mtp times	All	Mtp times	All	Mtp times	All	Mtp times
R-sq (within)	0.72	0.26	0.71	0.32	0.68	0.29	0.68	0.27	0.68	0.31
Observations	2,598	834	2,186	586	2,846	930	4,027	1,752	4,185	1,853
Cluster (Constit)	626	389	655	345	698	466	723	619	731	635
Mean DepVar	-0.7	-0.4	-0.3	-0.0	-0.4	-0.1	-0.6	-0.3	-0.6	-0.3
Sd DepVar	0.8	0.7	0.7	0.7	0.7	0.6	0.8	0.7	0.8	0.7

Notes: * p<0.10, ** p<0.05, *** p<0.01. The models are estimated using OLS estimates. An observation is a candidate-election. The dependent variable is the logarithm of the ratio of the number of votes obtained by a candidate over abstention. All the estimations include election-party fixed effects. Odd columns also control for district fixed effects, and the even ones for candidate fixed effects. Standard errors are clustered at the district level. The district-level controls are listed in the text. The candidate-level controls include the gender, and an indicator variable equal to one if the candidate is the incumbent and to zero otherwise. Coefficients for the controls are not reported for the sake of space. Variables are described in more detail in the text.



Notes: The figure plots, for each election year, the point estimates and 95% confidence intervals of the linear combination of the share of spending coefficient and its interaction with an election-year dummy (the coefficients $\beta + \beta_t$ in equation (3)). The relationship is estimated separately for districts where the overall amount spent by candidates is low and for districts where it is high. "Low-spending" and "high-spending" constituencies are defined with respect to the median amount spent per registered voter in constituencies in a given election year.

Figure 8: Evolution of the relationship between candidates' share of total spending and vote share, 1857-2017, depending on the overall amount spent in the constituency

from the 1970s onwards, making the changes in the overall intensity of campaigns over that period potentially even more impactful on the correlation between spending and votes.

5.4 Wrap-up and Discussion

The goal of this section was to improve our understanding of the reasons why the magnitude of the relationship between campaign spending and electoral results varies over time and space. Throughout the section, we have highlighted the caveats of our empirical analysis, and in particular the fact that, for a number of factors under consideration, we cannot fully pinpoint their causal impact, nor the exact extent of their contribution. However, despite these limitations, we think that our explanatory analysis has allowed us to draw a number of meaningful conclusions.

First of all, the geographical and temporal variations we observe in the relationship between campaign spending and votes should not hide a first-order finding: the correlation between spending and votes has been consistently positive and statistically significant since 1857: i.e. campaign spending seems to matter when it comes to explaining votes (even if our estimates could not fully capture bias coming from omitted variables). That being said, this correlation displays large variations over time and, in particular, an increasing trend since the 1880s. Admittedly, there is a reversal in the 2000s, but to a level that is still significantly higher than that observed for nearly 100 years, between 1885 and

1970.

This increasing trend in the relationship between spending and votes might contradict the historical consensus among many psephologists (Kavanagh, 1995; Butler, 1989), who have argued that constituency campaigning somehow became obsolete after WWII, overshadowed by the highly mediatized national campaigns. If citizens are focusing on party leaders and TV broadcasts, why does local campaigning still matter? And, most importantly, why does it matter *even more*?

Our first explanation can be found in the introduction of new media technologies, such as broadcast media or the Internet. Even if candidates are not allowed to advertise on radio or television, these technologies change the way they campaign and make it easier for them to reach voters. We have shown in particular that the presence of local radio has increased the sensitivity of the electoral results to differences in campaign spending. This could rationalize the strong increase in the relationship between spending and votes we observe in the 1970s, a time where the media environment was expanding locally and diversifying rapidly.

Why do we not observe a similar pattern with the expansion of the Internet in the 2000s? Likely because these media expansions were concomitant to other changes, in particular in the strategies deployed by both local and national campaigns – changes to which they in fact sometimes contributed. Political parties originally believed that national television was sufficient to mobilize voters in their easy-win constituencies, and therefore they only needed to focus on the key marginal seats. Election closeness thus became increasingly important for the relationship between campaigning and votes, and, eager to improve their performance in these target constituencies, campaigners borrowed techniques from the growing sector of marketing and mass-consumption advertising (such as focus groups, micro-targeting and media teasing). This "professionalization" of local campaigns likely played a significant role in the sudden increased correlation between spending and votes we observe in the 1970s.

In the 2000s, however, these changes were counteracted by the positive impact of the Internet. The rise of this decentralized media and its platforms, the limits on *national* spending and fundraising transparencies imposed by the PPERA 2000, and the economic turmoils of the late 2000s, all helped to shift the focus of national parties from national campaigns towards local ones. Now interfering extensively in constituencies' strategies, these nationally-led efforts overshadowed candidates' localized activities, including their spending. This also had consequences for local campaigns themselves, which would now span longer periods in a more diffuse, less intense fashion. In international comparisons, and in particular compared to the US, the UK is indeed known for running short, relatively inexpensive campaigns; but what is striking in our data is that this is even more true today that it was 20 years ago (i.e. regardless of any changes in spending limits). These very low levels of campaigning could thus have helped to diminish the importance of differences in spending across candidates involved with regard to their results.

We would like to make some disclaimers regarding this narrative. First, we do not argue that national campaigning is no longer important. Its importance in recent times can be seen in the impact

of the first televised leaders' debates – a major innovation for a British general election – that took place before the 2010 general elections (see e.g. Wring and Ward, 2010b).[75] These debates dominated the media agenda and became the centerpiece of the campaign (Wring and Ward, 2010b), generating considerable public interest; furthermore, Pattie and Johnston (2011) show that they also influenced voters' attitudes towards the parties, their leaders and the government's performance in office, as well as their decision-making in the run-up to the election[76] (see also Stevens et al., 2011). Second, while the Internet seems to improve the efficiency of spending for candidates who use it as a campaign tool (e.g. to better target voters), overall, its introduction had a negative impact on the use of other traditional media because of a crowding-out effect (see e.g. Prior, 2007; Gavazza et al., 2019). However, we have seen that these traditional media – or at least local radio – seem to increase the sensitivity of votes to differences in spending *for all candidates* (considering there is no heterogeneity in access to these media according to the candidates' resources, given that advertising on radio is banned). Hence, in a world now saturated with media technologies, new entrants such as the Internet could divert citizens' attention away from campaigns on other media, having an ambiguous overall impact on the effectiveness of campaigns.

Finally, we shall conclude by reiterating that the relative decline in the 2000s should not hide the fact that the levels of correlation between campaign spending and votes we observe nowadays are still high from an historical perspective. This serves to counter-balance the argument that because candidates spend much less money on campaigning than they did decades ago (in part because of tighter spending limits), the influence of money on UK politics has diminished.[77] In other words, our findings stress the importance of accounting not only for the total euro amounts candidates spend on campaigns, but also their average (or marginal) impact, when assessing the role played by financial wealth in electoral politics.

6 Conclusion

In this paper, we have used a novel dataset to analyze the long-term patterns of campaign spending in the UK between 1857 and 2017. First, we have documented a dramatic drop in this spending over time, both at the candidate level, per registered voter, and overall at the constituency level. While the overall campaign spending represented up to $20,000$ times the average national income in the 1860s-1870s, and was still equivalent to $3,500$ national incomes in the aftermath of WWII, it has only accounted for around 500 national incomes since the turn of the 21st century. This drop was accompanied by important changes in campaigning itself and its technologies, which altered the composition of

[75] In 2010, for the first time, the leaders of Britain's three main national parties agreed to engage in three 90-minute televised national debates, to be held at weekly intervals during the campaign. The debates were spread across different TV channels, BBC, ITV and Sky each getting one (Pattie and Johnston, 2011).

[76] To do so, they use the British Election Study's 2010 campaign Internet panel survey.

[77] Note that the two cannot only be linked by decreasing returns to scale: remember we are working with spending *shares*, which are not affected by the total amounts spent.

campaign spending: while initially including a large share of paid staff and, to a lower extent, meeting expenses, it is now comprised almost exclusively of advertising material.

We have then provided the first estimation of the relationship between campaign spending and votes over a very long period of time. We have shown that, overall, the magnitude of the correlation has consistently increased since the 1880s, peaking in the last quarter of the 20th century, and that this pattern can be rationalized – at least partially – by the introduction of local radio and the professionalization of campaigns. The introduction of broadband Internet had a similar positive effect; however, it was concomitant to an increase in the local involvement of national parties and a decrease in the intensity of candidates' campaigning at the local level, which, as we document, might explain part of the sudden drop – albeit to levels that are still high by historical standards, – in the correlation between spending and votes observed in the early 2000s.

Overall, our findings – based on the study of the whole time span of British modern elections – may have important policy implications regarding optimal campaign finance regulations. First, they indicate that, absent the observed drop in the amount spent by candidates – which partly stems from candidates' difficulties with fundraising and increased transparency – the impact of money in UK politics has become more important in recent decades. Second, they stress the importance of contextual elements, such as campaign technologies and strategies, in the understanding of whether and how campaigns matter. This not only gives directions for future research, which will need to better understand these factors, but may also have policy implications. Our results indeed make a contribution to understanding the role played by spending limits – the most common regulation tool – in a broader context, and pave the way for regulations on the role of media platforms.

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