

The impact of political advertising on voting behavior:

Empirical analysis in Switzerland

2011-2015

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Prof. Dr. Melly Blaise

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Verfasserin:	Zumofen Guillaume
Studienrichtung:	Volkswirtschaftslehre
Matrikelnummer:	11-206-950
Postadresse:	Chemin des jardins 9 3967 Vercorin
E-Mail:	guillaume.zumofen@students.unibe.ch
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Abstract

Ubiquity of political advertising suggests that it must play a crucial role in influencing voter behavior. However, its effect remains an enigma for scholars. Our paper contributes to the ongoing debate on the impact of political advertising on voters' behavior. Specifically, we focus on political advertising in print media in Switzerland from 2011 to 2015. The goal is to test the "minimal effect" hypothesis. The impossibility to measure directly the intrinsic quality of a political/candidate object creates an omitted variable bias. It is a recurrent issue for research on the political advertising effect. Thanks to a database elaborated by the Année Politique Suisse (APS) we developed three methodologies to tackle the risk of endogeneity. Firstly, we create two proxies to measure candidate's intrinsic quality. Secondly, we adopt a first differencing with repeat challengers only to drop the variable quality out of the equation. Thirdly, we take advantage of spatial media markets discontinuities in Switzerland. Our results indicate that political advertising in print media has a minimal and non-significant impact on voter behavior. From a policymaker point of view we obtain different results for election and popular vote. If advertising caps seem superfluous for election in Switzerland, they might be desirable for the popular vote. The effect of political advertising may be sufficient to change final results of popular vote with a winner-take-all setting. To be specific, we find a large positive and significant effect if we restrict our database to close votes. Further research is essential in order to dig deeper into the topic.

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Index of abbreviations

APS	Année Politique Suisse
BDP	Bürgerlich-Demokratische Parteien
BRCA	Bipartisan Campaign Reform Act
CMAG	Campaign Media Analysis Group
CVP	Christlichdemokratische Volkspartei
FCC	Federal Communications Commission
FDP	Die Liberalen
FECA	Federal Election Campaign Act
FSO	Federal Statistic Office
GLM	Generalized Linear Model
GLP	Grünliberale Partei
GP	Grüne Partei
IV	Instrument Variable
OLM	Ordinary Linear Model
OLS	Ordinary Least Square
RDC	Regression Discontinuity Design
SP	Sozialdemokratische Parteien
SVP	Schweizerische Volkspartei
USA	United States of America

1. Introduction

Marketing strategy and intense advertising have invaded our capitalist society, and the political process has not been exempt. It is easy to cite numerous resemblances between marketing of goods and services, and political marketing. For example, it can be said that candidates or parties are similar to brands, or product positions can be assimilated to policy positions. In addition, political communication relies on emotional appeals and social influences as well (Gordon et al., 2011). Nevertheless, if marketing impact on the consumer appears to be broadly accepted in the literature, the political advertising effect remains an enigma for political scientists. Goldstein and Ridout (2004, p.206) come to the conclusion that “determining whether political campaigns influence individual vote choice and election outcomes has become a Holy Grail”. Academic research related to voter behavior in a democratic process started in 1940 at Columbia University. Lazarsfeld with a team of political scientists opened the path for a wide discussion on electoral behavior. Since then, the democratic process went further and mass media took on a growing importance. However, questions linked to voter behavior are still part of an ongoing debate.

Ubiquity of political advertising and the tremendous growth of campaign spending suggest that it must play a crucial role in influencing voter behavior. In other words, ads should win elections. Such a view seems to be widely accepted in society. Nonetheless, academic research on the topic has come to an elusive conclusion. No final evidence on the effectiveness of political advertising has yet to be found. It can be said that prevalence is not a scientific and rigorous argument to posit that political advertising has an effect on voter behavior. This situation is puzzling. Why do candidates and political parties spend so much if money does not matter? To be precise, it is possible to take a quick look at campaign spending evolution in presidential campaigns in the USA. In 1996, the Bill Clinton campaign cost \$80 million approximately. 8 years later, George W. Bush spent \$307 million and his adversary spent up to \$550 million (Stratman, 2005). It came to almost \$730 million with Barack Obama in 2008. Furthermore, increasing campaign budgets is not strictly reserved to American presidential elections. In Switzerland, between 2007 and 2011, political parties spending rose 18%. It reached a total amount of about CHF 24 million (Hermann, 2012).

Political advertising has multiple potential effects on voter behavior. It could be informative or persuasive, reinforce a party identification, increase or decrease voter's turnout. This variety of effect is certainly one explanation of the various results in the academic literature.

Additionally, the unresolved rationality/irrationality question about human behavior is part of the problem. Future research in psychology and behavioral economics should help in solving that puzzle. However, one of the major reasons for this inconclusive literature is probably related to methodology issues. Empirical studies on political advertising and campaign spending effects appear to be a very challenging job. Two clear difficulties come directly to mind: reverse causality and omitted variable bias. Instinctively, it is obvious that campaign contributions and a candidate's resources are correlated with his personal characteristics, his ability, his previous electoral performance, his party affiliation and last but not least his electoral prospect. That is, campaign contributors are looking for political influence. They donate more to candidates who are likely to win the election. This means that endogeneity concerns are part of the equation. Hence, failure in measuring heterogeneous a candidate's quality and regional specific factors create an omitted variable bias. Such characteristics are intrinsic to each voter and candidate. They thus remain complex to evaluate for scholars. In conclusion, most of the existing papers fail to detect a source of exogenous variation.

Numerous researchers tried to tackle these challenges. Two trends exist in the literature. On one side, laboratory experiment is a solution to randomize exposure to political advertising. Ansolabehere and Iyengar (1996), Valentino et al. (2004) and Brader (2005) find a political advertising effect on voters' behavior. Even though laboratory experiments solve most of the methodological issues, the external validity of such experiments is questionable. Still, laboratory tests to evaluate political advertising influence are popular as they avoid all complications associated with very complex data collection. On the other side, a few recent papers succeeded in elaborating a database from real world situation. Field experiments from Gerber et al. (2007), Huber and Arceneaux (2007), Da Silveira and De Mello (2011), Gordon and Hartman (2013), Larreguy et al. (2014), Durante and Gutierrez (2014), Gerber and Bühlmann (2014), Kendall et al. (2015) and Spenkuch and Toniatti (2015) exploit natural data to estimate the impact of political advertising. Although all these contributions are a step forward on the political advertising effect path, they still face some drawbacks.

Most of the literature on the topic centers his attention on American presidential elections and Congress race. Lately, many researchers expanded the scope of their study and explored the political process in other democratic countries such as Brazil, Mexico or South Korea. We decided to focus on Switzerland. The Swiss democratic process is unique. The multiparty political spectrum and direct involvement of Swiss citizens in political decisions through numerous popular votes about a wide variety of subjects make Switzerland an inimitable real

world laboratory to exploit. Besides, it is important to pinpoint that campaign financing data remains fuzzy in Switzerland. It is not mandatory for parties to disclose their funding. Consequently, it makes it complicated to study. In addition, before going further, it is important to determine the extent of our contribution. Even though campaign spending and political advertising are obviously related, it is crucial to not put them in the same box. Our paper does not concentrate on campaign spending but specifically on political advertising impact on voting behavior.

The goal of this paper is to study the causal effect of political advertising on vote choice. In other words, the objective is to determine if campaign communication matters. Our dataset consists of a collection of more than 14,021 party/candidate/object advertisements published in print media in Switzerland from 2011 to 2015. The dataset has been built by a team from *Année Politique Suisse*. Data are collected at the cantonal as well as at the national level. It can be divided in two parts. Firstly, we take advantage of the data regarding the federal elections in 2011 and 2015. Then, the second part of our study focuses on the popular vote from 2013 to 2015. The Swiss direct democracy calls citizens to ballot up to 4 times a year. The repetition of popular votes on various topics allows us to obtain a large dataset at the national and cantonal level. It is important to emphasize that our dataset consists only of political advertisements in print media¹. Then, we combine this unique dataset with federal and cantonal statistics on elections and popular vote.

To tackle the endogeneity issue, we develop three econometric strategies. In the first part, we concentrate on election outcomes during the Federal elections of 2011 and 2015. Our first identification strategy is simple: evaluate quality of candidate. To do so, we employ data related to political objects such as motion and postulate. We estimate that the intrinsic quality of a candidate is related to how many of the political objects he filed are actually adopted. This measure works as a proxy. Then, the second identification strategy employs first differencing. Similar to the strategy developed by Levitt (1994), we cancel the omitted variable bias focusing only on repeat candidates. First differencing with repeat candidates partially isolates the impact of political advertising on voting behavior. In the second part, we use the dataset on popular vote from 2013 to 2015. The objective is to exploit differences at the cantonal level. Grouping cantons in pairs allows us to develop an econometric strategy

¹ It is obvious that other media channels play a role in political communication. For example, in the United States, most of the studies on the topic focus on TV and radio advertisements as they form a major part of communication budget campaign. At the opposite, according to Selects Survey 2011, Swiss citizens consider political advertisement in print media much more than on web pages or other communication channels.

close to a regression discontinuity design (RDC). Pairs of cantons that are politically as similar as possible give us the possibility to detach the effect of political advertising in print media, as most of the newspapers in Switzerland are specifically associated with one canton only. This strategy enables us to isolate the effect of political advertising trying to keep all other variables as constant as possible. In conclusion, we can affirm that the three econometric strategies look for an isolation of the causal effect of political advertising.

To sum up our main findings, it is possible to say that political advertising has a minimal and non-significant effect on voting behavior. In none of our three identification strategies we can reject the hypothesis that political advertising in print media has zero effect on vote share. This conclusion contributes to the wide range of literature that affirms a minimal effect of political advertising. However, it is necessary to go in detail. Firstly, in the case of National Council elections in Switzerland, the minimal positive effect is non-significant no matter the restrictions we impose on our regression. Therefore, we can conclude that an advertising cap would not be an appropriate policy decision. Secondly, the conclusion for popular vote is slightly different. For close races, pro- and against-committees invest massively in political advertising. A relative large difference in advertisement is sufficient to change the final result for a close vote. Consequently, the positive and significant effect that we find for popular vote with more than 1200 ads indicates that political advertising may be decisive. Keeping all other variables constant, a 1% increase in ads share could increase vote share by 0.76%. This result is significant. It implies that the advertising cap has to be taken into consideration for popular vote. Nevertheless, policymakers must carefully consider the participation-fairness trade-off.

Our contribution proceeds as follows. Section 2 gives an overview of the academic literature on the topic. Section 3 focuses on the methodological challenges that come with political advertising effect. It introduces a wide range of techniques that have been employed and emphasizes the pros and cons of this strategy. Section 4 briefly draws a picture of the Swiss political as well as the media system. It illustrates the distinctive characteristic of the Swiss direct democracy that makes it a fertile ground for our study. Section 5 describes our dataset in detail before exploring our three different econometric strategies to study the effect of political advertising on voting behavior. Section 6 opens the discussion. For example, it puts in balance the “minimal effect” wisdom and the conventional view that political advertising matters. It questions the importance of limits and explores the relationship between

advertising and voter turnout. Section 7 emphasizes the limits and investigates fields for future research. Section 8 concludes.

2. Literature review

2.1 Electoral behavior

Before all else, to understand the causal effect of political advertising on voting behavior, it is first necessary to apprehend the history of voting behavior. Academic voting research roots are located at Columbia University. Lazarsfeld et al. (1944) pioneered the study of electoral behavior. Along with another study headed by Berelson et al. (1954), it paved the road for future researchers. Focusing on presidential campaigns and using surveys, both studies found little impact of media on voters' choice. At the opposite, electoral behavior seemed to be strongly influenced by party loyalty. Based on their study, they posit that religious beliefs, family traditions, social class determination and face-to-face interactions determine electoral choices. These studies stimulated further research. Most important of them is probably the so-called "Michigan Model". Campbell and Kahn (1952) developed the potential explanatory power of surveys. Their repeated national survey gave them information about the various influences on the decision of a vote. It became a long-run research project that lasted for years. Campbell et al. (1960) exploited this enormous database to emphasize the role of long-term and short-term influence in voters' behavior. Even though they recognized the importance of long-term party loyalty, they identify also the potential impact of short-term fluctuations in partisan decisions to vote. Moreover, the emergence of the "rational choice" paradigm with Downs (1957) opened a new discussion. Over the years it gave birth to the "median voter theorem". Furthermore, it revitalized new methods to analyze voters' behavior. Specifically, it began the quest for causal effect on the electoral choice. Causal models reinforced the discussion with testable hypotheses. However, the "minimal effect" of campaign spending and mass communication on voters' behavior remained over the years. In other words, based on academic literature, long-standing party identification explained most of the political behavior. Nevertheless, Campbell et al. findings that short-term fluctuations were possible opened the door for other studies. In conclusion, personal characteristics and background, or party attachments did not form 100% of the explanatory power of electoral choice.

2.2 Campaign spending effect on voter behavior

Although this paper specifically centers its attention on political advertising, it is necessary to remember that political advertising and campaign spending cannot be disentangled. One of the reasons is that the reverse causality and omitted variable challenges that go hand in hand with any study on voting behavior are similar to both campaign spending and political advertising discussions. Consequently, we continue this review with a detour to give a brief overview of the literature on campaign spending. Since 1978, campaign spending effect on voters' behavior has been a hotly and still ongoing debate. Previous studies came to conflicting and intriguing conclusions. Numerous empirical studies explain that, keeping other things equal, money buys votes. Banaian and Luksetich (1991), Nagler and Leighley (1992) and Gerber (1998) write down that money matters. At the opposite, one of the earliest statistical studies on the topic is the work of Jacobson (1978). Using an Ordinary least square (OLS) regression he found a small negative effect of campaign spending for an incumbent. From then, many academic researchers came to similar conclusions (see for example, Jacobson 1985, 1990; Feldman and Jondrow, 1984; Abramowitz, 1991; Grier, 1989; Ansolabehere and Gerber, 1994; Coates, 1998). Levitt (1994) concludes that campaign spending has a small positive impact on voters' behavior not only for incumbent but also for challengers. Such findings are puzzling. Why do candidates spend so much time fundraising if it has a small or even negative impact on vote share? One of the reasons lies probably in the type of data that has been collected over the years. To be precise, most of the studies on the topic focus on elections in the United States of America (USA) and with an incumbent-challenger setting. It can be argued that an incumbent-challenger setting, specifically in the case of presidential elections, is the type of elections that is the "least likely to find campaign spending effects in general and advertising effects in particular" (Goldstein and Ridout, 2004). Party loyalty is more likely to make a difference in such contests. Furthermore, political scientists have aimed at tackling the endogeneity issue that comes along with campaign spending effects. Many researchers developed varying techniques to address this challenge. Green and Krasno (1988) built an Instrument variable (IV) regression. They exploited lagged incumbent spending as an IV. With a similar approach, Gerber (1998) used candidate wealth and state population as instruments. Levitt (1994) tried to cancel the omitted variable bias. Since individual ability of a candidate is almost impossible to measure, Levitt restricted his dataset to a repeat challenger. Another technique to counteract the endogeneity issue is the one by Erikson and Palfrey (1998). They employed a method of simultaneous

equation with zero-covariance restrictions to identify the impact of campaign spending. Finally, Erikson and Palfrey (2000) defined conditions under which spending effect can be interpreted as exogenous. They consider that campaign spending in very close elections can be considered as mainly exogenous. Then, they performed OLS regression on a subsample focusing only on close elections. To conclude the discussion about campaign spending, it can be said that although campaign spending in the USA is an available measure of political communication intensity, it is only an indirect measure. To measure campaign intensity, it is necessary to take into account political advertising in mass media (Kriesi, 2009).

2.3 Political advertising effect on voter behavior

Precisely related to political advertising and election outcome, the “minimal effects” approach of Klapper (1960) has been accepted in the literature since the 1990s. Academic research in the late century came to different and conflicting results. For example, using data on political television advertising, Shaw (1999) directly focuses on the impact of political advertising on vote choice. He discovers a significant positive effect of campaign on election outcome. Goldstein and Freedman (2000) find an identical positive effect. Other studies arrived at similar conclusions. They find that political advertising is positively correlated with winning an election. However, they often find only indirect ways through which advertisement influences election outcome. Atkin and Heald (1976) explain that citizens are better informed about candidates thanks to television advertisement. Similarly, television advertising enhances candidate name recognition (Kaid, 1982). Not only can a campaign increase a candidate’s recognition, but it also enhances understanding of a candidate’s policy position (Hinich and Munger, 1989; Bailey, 2002). Other scholars find that advertising informs about a candidate’s quality (Ortuno-Ortin and Schultz, 2000; Coate, 2004). Moreover, political advertising is able to sway late deciders (Bowen, 1994). At the opposite, Kahn and Kenney (1999) consider that intense campaigns increase the probability to rely profoundly on party loyalty. It is also possible that negative advertisement has a negative impact on the democratic process. Ansolabehre and Iyengar (1995) and Geys (2006) estimate that negative political advertising reduces voter turn out. Inconclusive results bring us back to our starting point. Most of these identification strategies are not able to isolate the causal effect of political advertising on voter behavior.

Recent developments in informatics and econometric strategy launched scholars on new identification perspectives. Constantly trying to overcome the endogeneity issue, researchers developed interesting models. Looking at the Texas gubernatorial campaign, Gerber et al.

(2007) ran a large randomized field experiment. Randomized assignments of television and radio political advertising combined with daily electoral opinion surveys delivered a positive effect of advertisement on candidates' evaluation. Authors controlled the timing and location of advertising across 18 media markets. Even though it seems to be only a short-term positive impact, the combination of survey information and field data is a step forward in terms of methodology.

Then, Huber and Arceneaux (2007) focused on the 2000 presidential campaign in the USA. Through a field experiment, they compare differences in exposure to political advertising. They exploit similarities between adjacent states and fragmentation of the media market in the USA to control for omitted variable bias. Authors conclude that political advertising can influence vote choice by influencing perception of candidates' personal traits. Focusing on the presidential campaign in the USA in 2000 and 2004, Gordon and Hartmann (2013) find a significant positive effect of political advertising. Through an aggregate discrete model choice, researchers evaluate the potential shift of voters' preferences for another candidate due to advertising. They adopt an IV approach exploiting advertising market prices as an instrument. Moreover, they cancel the state political specific factor bias due to omitted observations using fixed effects at the party-market level. Two years later, Spenkuch and Toniatti (2015) studied presidential campaigns in the USA. Their empirical strategy takes advantage of Federal Communications Commission (FCC) regulations. Similar to Huber and Arceneaux (2007), they exploit similarities between geographical regions to cancel the identification issues. Even though they find no impact of political advertising on voters' turnout, they identify a positive effect of political television advertising on voting behavior.

Da Silveira and De Mello (2011) strongly question the "minimal effect" conventional agreement. Exploiting Brazil's electoral regulation, they study the two-round system of gubernatorial elections. To counteract potential bias, they use the difference between rounds to isolate the impact of political advertising. Opposing most of the existing literature, they find not only a positive impact but also a large positive impact on election outcome. Nevertheless, although this empirical strategy is creative and interesting, it suffers from a major flaw. The electoral dynamic between the first and second round is extremely different. Durante and Gutierrez (2014) take advantage of Mexico's campaign law. To be precise, Mexican regulation randomizes assignment of TV and radio political advertising based on previous elections. Scholars exploit this exogenous variation. Similar to Da Silveira and De Mello (2011), they combine this data with survey information. They affirm that political

advertising has a positive but short-term effect on vote choice. Furthermore, the dataset allowed the authors to identify the source of impact. They write that vote choice is not influenced by provision of new information but by non-informative mechanisms of persuasion. Based on a similar context in Mexico, Larreguy et al. (2014) associate polling stations and political advertising inventory to identify a positive large causal effect of political advertising on voting behavior.

Exploiting political advertising on a different continent, it is necessary to mention a very recent study by Kendall et al. (2015). Thanks to a partnership with an Italian mayor, authors send randomized messages to potential voters. Exploiting a quasi-laboratory setting, they utilize differences between a control group and a treatment group to identify impact of political communication. They identify a positive effect on candidate's support.

Last but not least, it is interesting to take a look at an empirical study in Switzerland. In a similar context to our paper, Gerber and Bühlmann (2011) combine data on political advertising in print media and survey data on elections in Switzerland. They conclude that more intense political advertising exposure reinforces initial vote choice in the case of individuals with strong party loyalty.

In summary, it is interesting to observe the evolution of studies on the impact of political advertising on voting behavior. From a “minimal effect” agreement to conflicting results, political advertising is still a vigorous and ongoing discussion. Additionally, much of the breakthroughs in the area of political advertising effects have been made in the case of indirect effects. Concerning the question “does political advertising win elections/vote?” a long road is still ahead of political scientists. Recent developments in identification strategy and diversification of geographical location of the studies brought new light to the topic. Our contribution follows this new path, exploiting field data and econometric strategy to counteract endogeneity. Moreover, a focus on a different country than the USA i.e. Switzerland contributes to this new literature that explores new data and context to enhance our understanding on the topic.

3. Political Advertising and Methodology

3.1 How to measure political advertising? Pros and Cons

The literature review gives us an overview of the conflicting conclusion in the literature. Even though the final goal of political advertising is to win an election, the variety of channels that

can help attain this objective is probably one of the major reasons of these inconclusive results. A second challenge that explains why this debate is still going on is: how to measure political advertising effect? This section explores the numerous paths that have been taken by scholars to measure this independent variable. Embedding a summary of all these methods in our research not only provides us a deep understanding of the remaining challenges, but also gives us information about how to develop better methodologies.

Beforehand we explained that campaign spending and political advertising could not be clearly disentangled. An obvious proof is that campaign spending has often been used as a proxy to estimate political communication intensity. This first and perhaps most famous technique has the interesting advantage to be a readily available proxy. Although this approach is somehow naïve, campaign spending is a “quick and dirty” proxy to measure campaign intensity (Goldstein and Ridout, 2004). Nevertheless, this common method encounters numerous flaws. Firstly, campaign spending data are not available in every country. Often employed in the case of American presidential elections, campaign spending is one of the best-kept secrets in Switzerland politics (Bühlmann et al., 2016). Secondly, campaign spending fails to match the actual political communication that voters receive. Thirdly, citizens are not exposed to the same volume of political advertising. The intensity of a political campaign is not evenly distributed among geographical regions. Hence, campaign spending fails to recognize this variation across mass media markets. Fourthly, campaign spending of a candidate does not incorporate the intervention of external interest groups and individuals that participate indirectly in the political campaign of a candidate.

To overpass the disadvantages of using campaign spending as a proxy, many scholars decided to focus directly on political advertising data. Utilization of archived political advertisements brought details about the different channels through which political communication can impact voters’ choice. For example, Kahn and Kenney (1999) used a dataset developed at the University of Oklahoma to study the impact of negative advertising. Similar to campaign spending, archival data faces drawbacks. Mainly, it can be said that archival data provides no information about the intensity of the campaign. The impact of political advertising is not the same if an advertisement is broadcasted 1 or 50 times. A second problem is the absence of data about the geographical distribution and volume of political advertising.

To counter the disadvantages of archival data, some researchers directly collected data from mass media. For instance, in the case of television advertisement, they obtained contracts, invoices or station logs. Such technique provides a better understanding of the volume and

timing of the advertisement broadcasting. The major problem of this approach is simple: the data are often unavailable. Disclosure of contracts is not mandatory for mass media. Furthermore, television, radio or newspapers often do not keep precise track of all broadcasted advertisement. Another solution is to directly collect these data by watching the television, listening to the radio or reading the newspaper. While this intensive data collection would deliver a powerful dataset, it is extremely time consuming and almost impossible in a media market such as the one in the USA. The Campaign Media Analysis Group (CMAG) specialized in data tracking during political campaign. Not only does it dispense evidence about the frequency the advertisement is broadcasted, but it also brings specific content information. Even though this new method is promising, it is essential not to have over expectations about it. It is possible to consider that data tracking does not provide appropriate individual-level measures. The substantial variation of behavior across individuals facing mass media opens the box for some critiques.

Consequently, to recognize individual differences, a solution that is considered is experimental manipulation. Campaign spending, archival data, and data tracking are direct measures of campaign intensity. However, none of these techniques take individual-level perception of political advertisement into account. The specific nature of a laboratory experiment allows the researcher to have control of the treatment. Conditions, specific content of the advertisement or volume of exposure are under full control of researchers. This methodology enables causal proposition and provides an incomparable degree of internal validity. Nevertheless, an experimental manipulation setting often suffers from problems of external validity. Many conclusions that arise in a laboratory may have difficulties to export themselves in the real world. Such an argument is especially true regarding voter behavior. Electoral period often sets a very unique and incomparable environment. The artificial environment of a laboratory hardly reproduces a real world situation. In other words, saying that I would vote for a candidate is not the same as actually voting for him. Doubts about the reality of the experimental treatment cannot be ignored. Furthermore, laboratory treatments frequently evaluate only short-term effects. The peculiar settings of laboratory environments last for a few hours maximum. At the opposite, political communication lasts for months prior to the electoral day. Kahn and Geer (1994), Ansolabehre and Iyengar (1995) and Noggle and Kaid (2000) are scholars that adopted the experimental method to isolate the effect of political advertising on citizens.

3.2 Econometric challenge and potential solutions

The major challenge ahead of us is related to the identification strategy. If many scholars carefully studied the political advertising effect on voting behavior, only a few of them succeeded in isolating the causal effect. Methodological challenges are due to the reverse causality and omitted variable biases that are both inherent to any model on political advertising effect. The simplicity of the conventional equation to study this effect is treacherous. It conceals the real challenges behind the regression.

$$\begin{aligned} \text{Candidate vote share \%} = & \alpha + \beta_1 \text{ candidate ads} & (1) \\ & + \beta_2 \text{ candidate characteristics} \\ & + \beta_3 \text{ region political preferences} + \epsilon \end{aligned}$$

Equation (1) identifies the impact of political advertising on vote share for a candidate. To be precise, β_1 estimates this causal effect. Then, β_2 and β_3 play the role of control variables. It measures the impact of candidate characteristics and specific geographical political trends on the vote share that a politician obtains. Most of the time, scholars assumed that political advertising and candidate vote share were linearly related. Nevertheless, it would be possible to use the square or the natural logarithm of candidate vote share to sharpen this identification strategy. Even though this regression is adequate in a hypothetical world, it does not match a real world situation. Two major problems loom: omitted variable bias and reverse causality.

To begin with, it is worth mentioning the obvious omitted variable issue that occurs. Both candidate characteristics and region political preferences are unobserved. Failure to control for candidate characteristics and region partisanship leads to a bias. On one hand, a trustworthy and high-quality candidate may decide to reduce its campaign intensity given that he knows that he will be elected. Similarly, a poor-quality candidate that invades mass media with political advertisements may still lose the election. In both cases, the impact of political advertising would be underestimated. To sum up, failure to control for a high- or poor-quality candidate leads to a downward bias. On the other hand, unobserved region specific political preferences bring a bias as well. A candidate running in a region where the majority of party loyalty is oriented towards the opposite party will fail to be elected in spite of his campaign intensity. It means that a second downward bias occurs. In conclusion, unobserved candidate quality and region partisanship are major threats to our identification strategy.

Secondly, reverse causality must be considered seriously. It is easy to claim that candidate vote share and political advertising may be simultaneously determined. If we argue that political advertising has an impact on vote share, it is also possible that candidate expected vote share influences campaign intensity. For instance, a candidate facing a very competitive race will reinforce his political communication intensity. Inversely, a candidate free of any major challenging threat will logically lower the volume of political advertisement that is displayed in the mass media. At the end, it is worth mentioning that omitted variable bias and reverse causality are linked. Full control of candidate characteristics and region political preferences is the main solution to both of these problems.

In summary, in order to obtain an unbiased estimate of β_1 using equation (1), some assumptions must be fulfilled. Firstly, it is necessary to have no correlation between the candidate ads variable and the error term. Secondly, candidate characteristic and region partisanship must be controlled. Similarly, any risk of simultaneous correlation between candidate ads and expected candidate vote share has to be dismissed. To satisfy these conditions, scholars developed a broad set of identification strategies.

Jacobson (1978) started with a standard OLS regression. He immediately faced a rain of critiques. Many political scientists argued that it was hardly sustainable that campaign intensity was not correlated with the omitted variables. Then, as often in cases of endogeneity, researchers reoriented their methodology towards IV. For instance, Green and Krasno (1998) used lagged campaign spending as an instrument, and Gerber (1998) adopted state population and candidate wealth as instruments. However, none of the instruments employed are fully convincing. It is worth to say that in such cases, a bad instrument may do more harm than good. A creative approach is the repeat challenger technique by Levitt (1994). Restricting his sample to repeat candidate only is a smart strategy to partially cancel the omitted variable bias. Stratman (2004) followed a similar methodology. Nevertheless, focusing on repeat candidates only reduces the bias but does not cancel it. If the repeat candidate strategy concentrates on the unobserved candidate characteristics, a strategy restricting the sample to close or neighboring geographical regions attempts to minimize the unobserved region political preferences bias. Huber and Arceneaux (2007) and Spenkuch and Toniatti (2015) are two papers that follow this identification strategy. Then, experimental manipulations have been attended. As already explained in section 3.1, laboratory experiments give full control of numerous variables for researchers. Randomization to obtain an exogenous variation is possible. However, external validity of the results in laboratory experiment is highly

questionable. Finally, to use the advantages of both field and laboratory experiment, some recent studies developed randomization strategies to isolate the effect of political advertising. Gerber et al. (2007) and Kendall et al. (2015) are worth mentioning. Although promising, such a strategy is complicated to implement.

Our contribution is one more step forward on the path of how to identify the causal relationship between political advertising and voting behavior. In line with previous studies, we look for identification strategies that overpass endogeneity issues. To do so, we develop three strategies. A combination of already employed and interesting methodology, creativity and specific attributes of the Switzerland political context enable us to get closer to an isolation of the political advertising effect. Further details on the strategies and the results follow in section 5.

4. Political and Media System in Switzerland

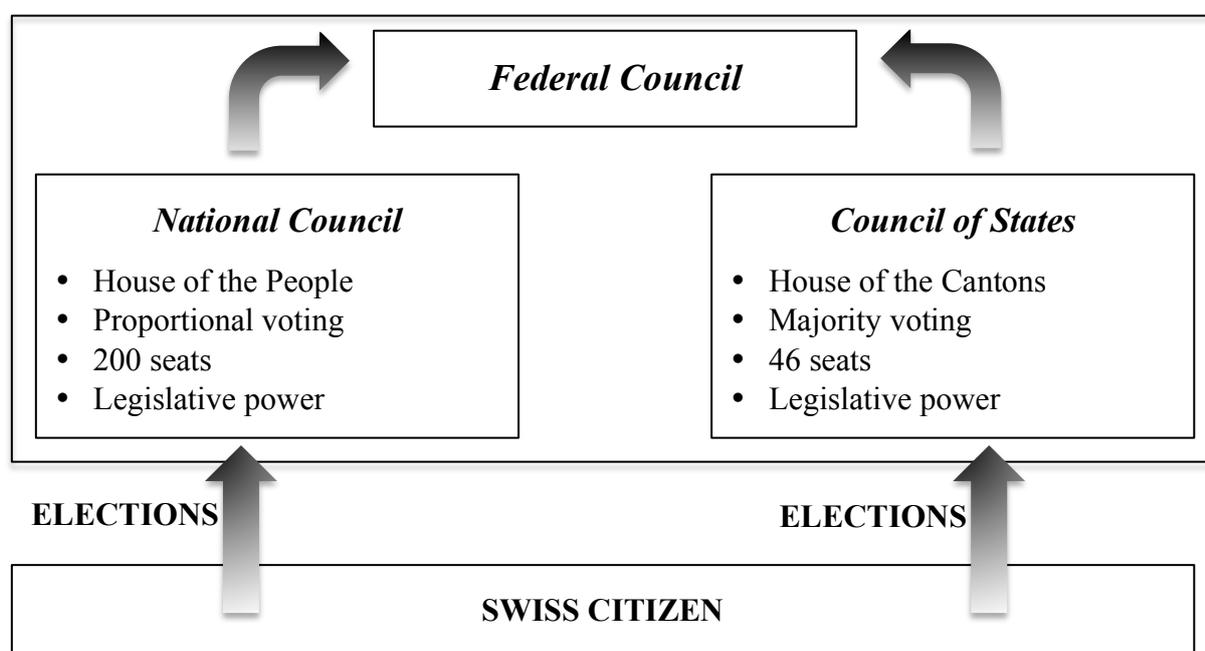
Switzerland's unique political system is not only intriguing but also full of potential for researchers. Speaking specifically about the political advertising effect on voting behavior, the extensive establishment of direct democratic institution and the small size of the country makes Switzerland an almost natural-laboratory environment for political scientists. In order to understand the obvious reasons the Switzerland political system offers a particularly interesting environment to study campaign effect, it is first necessary to apprehend the Swiss political system.

Direct democracy defines itself at the three different levels that organize the Swiss political system: federal, cantonal and local. Federalist system displays a high degree of independence for cantons as well as for communes. Not only do cantonal and communal institutions have extensive power, but also they partially rest on their own source of income. Direct democracy principles are deeply incorporated in Swiss citizen identity. It influences Swiss political culture. Direct democracy denotes a wide range of political processes and institutions that directly involve citizens in the political decision-making (Maduz, 2010). Two main channels can be identified to illustrate the direct involvement of Swiss citizens in the political process.

The first and probably most common one, is the election of representatives to fulfill legislative work at the national level. Similar to any representative democracy, every four years Swiss citizens elect members of the National Council and the Council of States. To sum up, this system is often compared to the one in place in the United States. On one side, the

National Council represents the Swiss population. Allocation of seats is proportional to a canton's population. A total of 200 deputies are nominated. They are elected through a proportional vote system. On the other side, the Council of States speaks for the 26 cantons. Two senators are designated to each canton². A majority vote rule applies for the election of councilor of states. Further details are provided in figure 1. Our contribution specifically focuses on 2011 and 2015 elections. To run our identification strategy we restrict our dataset to the National Council elections only. Proportional vote system, campaign intensity and a specific number of seats for each canton suit our identification strategy. At the opposite, Council of States majority vote system with two rounds, usually less intense campaign intensity and often incumbents' reelection do not correspond to our strategy.

FIGURE 1. SWISS POLITICAL SYSTEM



Source: Made by author

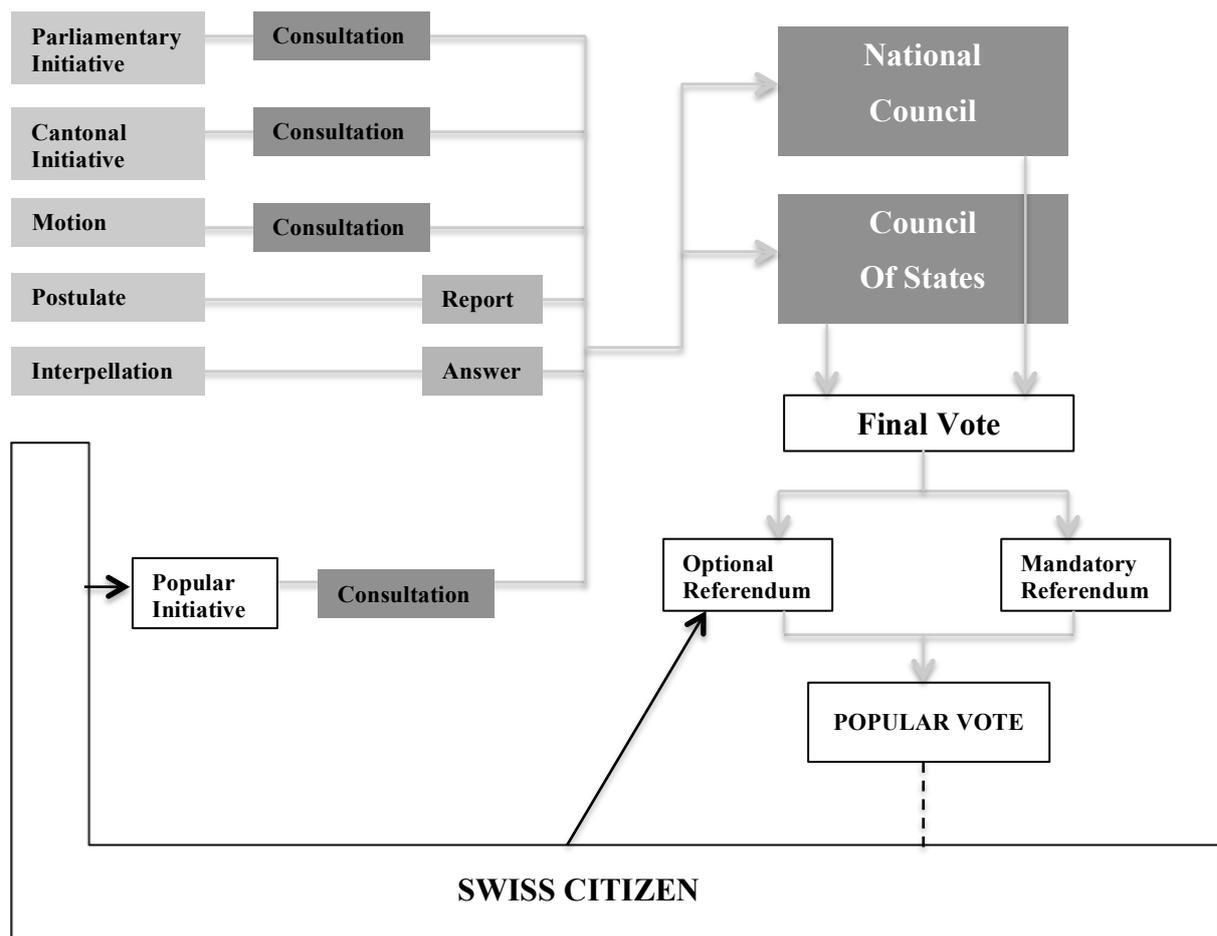
A second channel corresponds specifically to direct democratic institutions. Two instruments directly involve Swiss citizens in the decision-making process i.e. popular initiative and referendum. Even though, mandatory and optional referendums play crucial roles for direct democracy in Switzerland (Kriesi, 2008), the recent intensity of popular initiative cannot be neglected. From 1970 to 2015, 372 popular votes occurred in Switzerland (Federal Statistic Office (FSO), 2015). Figure 2 provides details to obtain a clear understanding of the political process in action in Switzerland and precisely of the role that Swiss citizens play directly. To

² Six cantons that are historically « half-cantons » are represented by only one senator: Obwalden, Nidwalden, Basel-Stadt, Basel-Landschaft, Appenzell-Ausserrhoden and Appenzell-Innerrhoden.

conclude, it is possible to say, without any specific statistics to confirm, that Swiss citizens are called to the ballot more often than any citizen in the World. This specificity justifies the use of the Switzerland context for our scientific contribution.

Moreover, it is important to specify that Switzerland is a multiparty democracy. Most of the time, candidates are affiliated to a national or a cantonal party. To take into account this country specificity, we concentrated on the 7 major political parties that are represented in the Parliament³.

FIGURE 2. DIRECT DEMOCRATIC INSTITUTIONS IN SWITZERLAND



Source: Made by authors. Based on Prozessschema, *Année Politique Suisse* (2014)

In addition, one peculiarity of Switzerland is its multilingual identity. It confers to the country a specific cultural identity and deeply influences the political and the media system. Directly related to the media system in Switzerland, it is obvious that direct democracy not only

³ The 7 major political parties at the national level are the Schweizerische Volkspartei (SVP), Sozialdemokratische Partei (SP), Die Liberalen (FDP), Christlichdemokratische Volkspartei (CVP), Bürgerlich-Demokratisch Partei (BDP), Grüne Partei (GP) and Grünliberale Partei (GLP). We decided to gather together parliamentary members affiliated to others smaller political parties.

reshapes the political communication between citizens and politicians but also the communication among citizens. Discussion preceding any vote occurs at the level of the whole society. In other words, debates are not restricted to politician and elitist circles. The interesting consequence is the key role that mass media plays. Citizens are in quest of information to make the “correct” choice at the ballots (Feld and Kirchgässner, 1999). The decisive role that the media plays in political communication is stronger in direct democracy. Therefore, our identification strategy that focuses on advertisements in print media makes sense. Even though we restrict our sample to only print media, it is still a very interesting proxy for campaign intensity in general. However, future research should increase the scope of the database and include other media platforms such as online media, social media and radio. Furthermore, Sciarini and Tresch (2014) consider that political advertisements are still popular tools among politicians.

Democratic institutions and country specificity of Switzerland such as its small size and its multilingual environment severely influence print media setting. Without going in details, it is necessary to cite numerous features that impact our identification strategy. Firstly, the existence of different languages in Switzerland prevents the publication of a national newspaper. Therefore, regional titles play a crucial role at the cantonal level. Two exceptions are worth mentioning. The journal *LeTemps* and the *NZZ* are leading newspapers in their respective French and German speaking part of Switzerland. Secondly, Swiss readership remains high compared to most of the European countries. Although the emergence of new media induces a concentration of publishing house, it seems as if the readership did not vary considerably. Thirdly, newspaper budget reposes mainly on advertising income. Dependence towards advertising occurs as up to 75% of income comes from advertising activity (Meier, 2011). Fourthly, the rise of a free-of-charge press newly captured a wide share of readership. The *20Minuten* has established itself as the leader of this new market. Appendix 1 emphasizes the fragmentation of the print media system in Switzerland at the cantonal level. In conclusion, direct democratic institutions in Switzerland provide an adequate field for identification of a causal relationship between political advertising and voting behavior. Federalism, multilingualism, cantonal media and party system, and direct democratic institutions together create the perfect environment to run our three identification strategies.

5. Econometric Strategy and Empirical Evidence

5.1 Federal Election in Switzerland: 2011 and 2015

5.1.1 Federal Election Data

We draw on various sources of data. Political advertisement data comes from the *Année Politique Suisse* (APS). We have (1) political advertisement records of candidates for National Council elections in 2011 and 2015; (2) we assemble cantonal information to obtain candidates' vote and cantonal participation in 2011 and 2015; (3) we take advantage of Federal Office of Statistics (FSO) in order to find distribution of seats by party at the National Council in 2011 and 2015; (4) cantonal administrative data allows us to collect data about distribution of seats by party in each cantonal parliament prior to national elections in 2011 and 2015. The last two datasets give us the opportunity to measure national and political trends. Finally, (5) we estimate the intrinsic quality of candidates using the national parliamentary database. We obtain data on the motion and postulate filled by each candidate. We use as a proxy of quality the number of motion and postulate adopted by the Parliament.

Firstly, a uniquely detailed dataset about the intensity of political advertising in Switzerland during Federal elections in 2011 and 2015 forms the core of our strategy. A team at the *Année Politique Suisse* collected a total of 2550 political party ads during 2011 Parliamentary elections. Data comes from 20 daily newspapers in 17 different cantons. Newspapers selection is based on their national and interregional importance. Consequently, data comes from only 16 out of the 26 cantons⁴. Table 1 displays descriptive statistics for the campaign intensity in Switzerland during Federal election 2011. Data are grouped by canton. Some interesting numbers come out of a first observation of these raw statistics. To begin with, campaign intensity varies widely across cantons. In canton Bern, 80 candidates invested in newspaper political advertising for a total of 685 ads. On the contrary, we find weak campaign intensity in Valais with only 12 candidates and 38 ads. Obviously, it is necessary to interpret this statistic relative to the number of seats allocated in each canton. Furthermore,

⁴ Collection of political advertisements in newspaper is complex and time-consuming. Due to this challenge, *Année Politique Suisse* had to make choices regarding newspapers. No political ads were collected in small and rural cantons of Uri, Schwyz, Obwalden, Nidwalden, Glarus, Zug, Appenzell Innerrhoden, Appenzell Ausserrhoden and Thurgau. They used the following newspaper: ZH: NZZ and TA; BE: Bund und BZ; LU: NLZ; FR: Lib.; SO: SZ; BS and BL: BaZ; SH: SN; SG: SGT; GR: SoS; AG: AZ; VD: LM and 24H; VS: NF; NE: Exp.; GE: TG, LT; JU: QJ. For detailed information see Appendix 1.

looking at the total number of seats allocated by canton. We can affirm that although we had to drop 9 cantons for data collection, the study covers 181 out of the 200 seats that exist at the National Council. Then, average ads per candidate provide us a better insight. On one hand, candidates in canton Schaffhausen had almost 12 ads in newspaper on average. On the other hand, only 1.4 ads per candidate were collected in canton Neuchâtel. Moreover, it is interesting to compare mean and median statistics. Not only is the median always smaller than the average but also the difference is often important. The interpretation is straightforward. Only a few candidates decided to have an intense communication campaign in newspaper. In cantons Aargau, Bern and Schaffhausen the maximum number of ads go up to 31, 48 and 52 respectively. However, means are only 7.6, 8.5 and 11.7 ads per candidate, and medians 4, 6 and 4 ads respectively. Finally, large standard deviation is another proof that observations are spread out and not concentrated around the mean. In conclusion, we observe a large variation of campaign intensity across candidates within cantons.

TABLE 1. DESCRIPTIVE STATISTICS POLITICAL ADS 2011 BY CANTON

	Number of candidates per canton	Number of seats per canton	Total ads per canton	Average ads per candidate	Standard deviation	Median	Maximum number of ads per candidate
CANTON	<i>N</i>	<i>N</i>	<i>Sum</i>	<i>Mean</i>	<i>Sd</i>	<i>p50</i>	<i>Max</i>
AG	38	15	291	7.7	7.3	4	31
BE	80	26	685	8.6	9	6	48
BL	16	7	46	2.9	2.8	1.5	11
BS	25	5	120	4.8	5.3	3	20
FR	34	7	118	3.5	3.3	2	18
GE	29	11	53	1.8	1.5	1	7
GR	25	5	125	5	1.9	3	24
JU	13	2	41	3.2	4.9	3	7
LU	30	10	153	5.1	0.7	4	24
NE	10	5	14	1.4	2.6	1	3
SG	20	12	80	4	15	4	10
SH	17	2	199	11.7	6	4	52
SO	29	7	129	4.4	6.9	2	36
TI	16	8	41	2.6	2	2	8
VD	18	18	63	3.5	2.2	3.5	9
VS	12	7	38	3.2	2.6	2.5	8
ZH	53	34	354	6.7	9.1	4	52
TOTAL	465	181	2550	5.5	7.2	3	52

Source: Made by author

Secondly, to obtain a global immersion in our database, it is necessary to group statistics by political parties. Table 2 provides descriptive statistics about campaign intensity by political parties in 2011. To begin with, it is logical that political parties like SVP (652), FDP (663), SP (441) and CVP (368) account for more ads than other parties. Still, it is interesting to see

that with the most ads, the FDP obtained only 26 seats at the National council. At the opposite, the SVP with almost the same number of ads received 48 seats for the 17 cantons that we take into account. More interesting, it is possible to look at the average ads per candidate in each party. With 7.2 ads per candidate, FDP candidates are the one's with the higher campaign intensity average. At the opposite, with only 2.4 ads per candidate, remaining small parties tend to have weaker political campaign communication. Without sketching any clear conclusion, it is possible to draw some parallels between political advertising and campaign spending. In other words, it is no secret that major parties such as SVP or FDP have larger campaign budgets. Consequently, it is maybe not surprising to find these two parties with the higher number of ads per candidate. However, it is important not to be naïve. Such rapid conclusions do not consider the endogeneity issue carefully. Finally, looking at average ads per candidate, median and maximum number of ads per candidate altogether, it is simple to come to the same conclusion than in table 1. We observe a large variation of campaign intensity among candidates within political parties. Large standard deviations confirm this conclusion.

TABLE 2. DESCRIPTIVE STATISTICS POLITICAL ADS 2011 BY POLITICAL PARTY

	Numbers of candidates	Number of seats per party	Total ads per party	Average ads per candidate	Standard deviation	Median	Maximum number of ads per candidate
PARTY	<i>N</i>	<i>N</i>	<i>Sum</i>	<i>Mean</i>	<i>Sd</i>	<i>p50</i>	<i>Max</i>
BDP	23	8	108	4.7	3.7	3	16
CVP	78	25	368	4.7	4.8	3	24
FDP	92	26	663	7.2	8.6	4	39
GLP	16	12	43	2.7	2.3	2	9
GP	34	15	190	5.6	6.6	4	38
OTHERS	36	3	85	2.4	1.6	2	6
SP	90	44	441	4.9	6.5	2.5	52
SVP	96	48	652	6.8	9.4	4	52
TOTAL	465	181 ⁵	2550	5.5	7.1	3	52

Source: Made by author

For 2015, the coverage was expanded to the 26 cantons of Switzerland. The *Année Politique Suisse* collected a total of 7018 political ads in 56 newspapers. Table 3 exhibits main descriptive statistics about political advertisements in newspaper prior to National Council elections in October 2015. Statistical information is grouped by cantons. We first observe uniquely these raw statistics before outlining parallel or trends comparing database 2011 and

⁵ There are 200 members in the National Council. However, given that we restrict our database to only 17 cantons. We obtain 181 seats for the 17 cantons that we take into consideration.

2015. If high total number of ads are expected in canton Zürich (528) or Bern (658) given their high number of seats at the National Council, it is surprising to find cantons such as Valais (1005) or Thurgau (602) with even stronger campaign intensity. Interestingly, even though canton Vaud has 18 seats at the National Council, the campaign intensity was very weak in this canton (53). Logically, we observe the same kind of heterogeneity across cantons than in 2011. Average ads per candidate vary from 1.3 to 21.7. Moreover, it is possible to note a large variation among candidates in each canton. For example, in canton Aargau, average ads per candidate is 8.9 and the median is 6. However, the maximum ads per candidate go up to 58. A similar observation is possible in canton Thurgau. Then, it is interesting to focus on differences between 2011 and 2015 data. First of all, it is necessary to mention how careful we have to be comparing these two datasets. With 36 new newspapers and 9 new cantons, the expansion of the coverage from 2011 to 2015 makes for a delicate comparison. Nevertheless, it is possible to look at the average ads per candidate. Our conclusion is obvious; campaign intensity in each canton varies from one election to the other. In canton Valais, 3.2 ads per candidate were counted in 2011 and 7.2 in 2015. In this example, it is interesting to note that the acquisition of one more seat at the National council, going from 7 seats to 8 seats, may have played a role. However, a large difference between 2011 and 2015 is not an absolute rule. We note high and consistent intensity of campaign in cantons Aargau (7.7; 8.9), Bern (8.6; 7.2), Zurich (6.7; 6.1) and Schaffhausen (11.7; 10.7). In addition, total standard deviation is slightly higher in 2015 (8.1) than in 2011 (7.2). It means that observations are more spread out in 2015. We observe again a variation among candidates within canton.

TABLE 3. DESCRIPTIVE STATISTICS POLITICAL ADS 2015 BY CANTON

	Number of candidates per canton	Number of seats per canton	Total ads per canton	Average ads per candidate	Standard deviation	Median	Maximum number of ads per candidate
CANTON	<i>N</i>	<i>N</i>	<i>Sum</i>	<i>Mean</i>	<i>Sd</i>	<i>p50</i>	<i>Max</i>
AG	63	16	558	8.9	9.6	6	58
AI	2	1	27	13.5	0.7	13.5	14
AR	3	1	111	37	2.6	36	40
BE	92	25	658	7.2	6	6	38
BL	31	7	143	4.6	6	2	28
BS	28	5	216	7.7	8.9	4.5	37
FR	46	7	321	7	5.3	7	22
GE	17	11	51	3	1.7	2	8
GL	2	1	42	21	12.8	21	30
GR	39	5	395	10.1	9.8	7	46
JU	16	2	54	3.4	4.6	2	15
LU	44	10	335	7.6	6.8	6	31
NE	13	4	17	1.3	0.6	1	3
NW	1	1	5	5	.	5	5

OW	1	1	22	22	.	22	22
SG	53	12	488	9.2	8.4	7	39
SH	11	2	118	10.7	8.8	9	25
SO	53	6	254	4.8	4.4	3	26
SZ	37	4	193	5.2	4.7	3	18
TG	79	6	602	7.6	10.2	2	39
TI	45	8	322	7.2	8.5	2	27
UR	3	1	65	21.7	18.6	13	43
VD	30	18	53	1.8	1.9	1	10
VS	139	8	1005	7.2	7.4	5	43
ZG	48	3	435	9.0	12.9	3.5	72
ZH	86	35	528	6.1	5.7	4	28
TOTAL	982	200	7018	7.1	8.1	4	72

Source: Made by author

TABLE 4. DESCRIPTIVE STATISTICS POLITICAL ADS 2015 BY POLITICAL PARTY

	Numbers of candidates	Number of seats per party	Total ads per party	Average ads per candidate	Standard deviation	Median	Maximum number of ads per candidate
PARTY	<i>N</i>	<i>N</i>	<i>Sum</i>	<i>Mean</i>	<i>Sd</i>	<i>p50</i>	<i>max</i>
BDP	34	7	200	5.9	6.8	4	30
CVP	131	28	1132	8.6	9	6	43
FDP	173	33	1694	9.8	9.8	7	58
GLP	9	7	47	5.2	4.6	3	15
GP	67	11	272	4.2	5.5	3	43
OTHERS	183	6	643	3.5	4.1	2	31
SP	178	43	1208	6.8	6	6	35
SVP	207	65	1822	8.8	9.5	6	72
TOTAL	982	200	7018	7.1	8.1	4	72

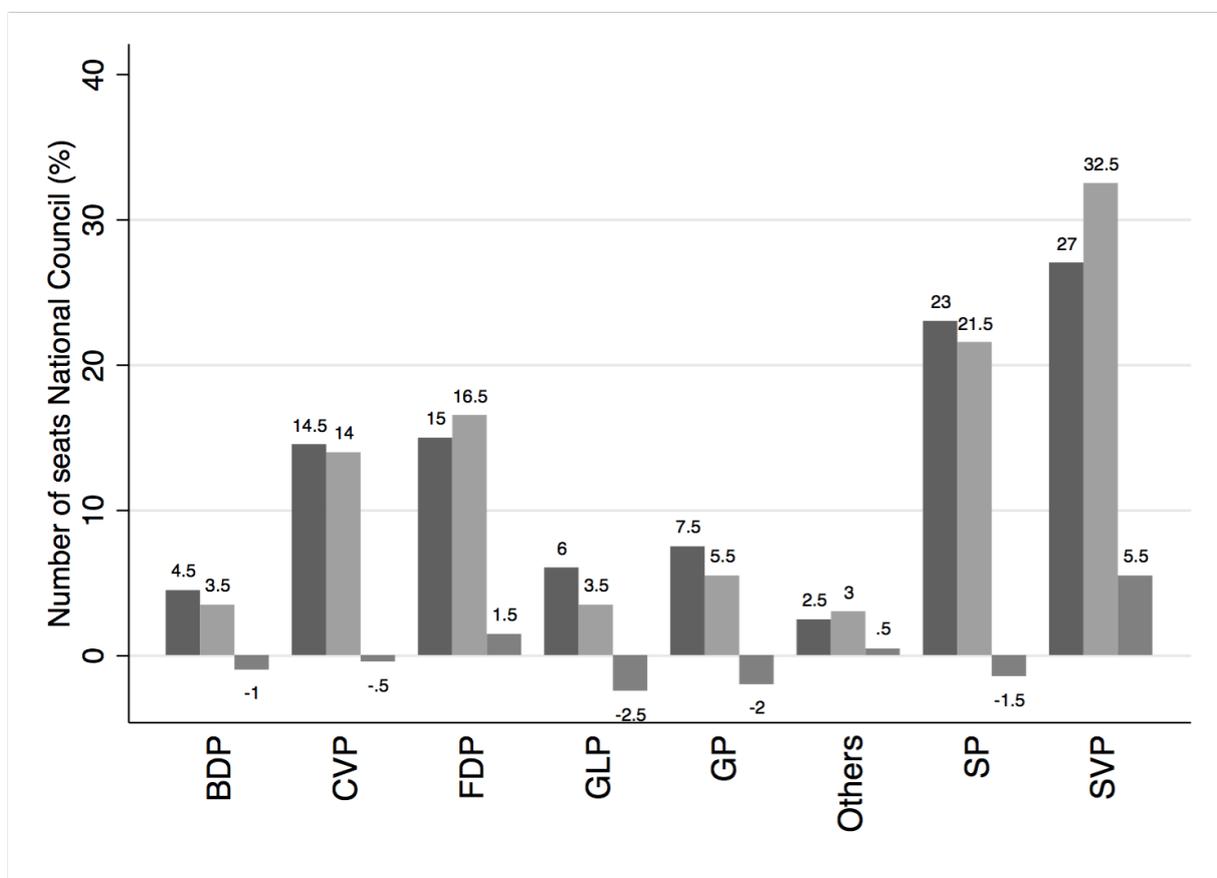
Source: Made by author

Even though no major conclusion comes from descriptive statistics, one important observation is noticeable. We note a large variation in campaign intensity among candidates. Additionally, Appendix 2 brings a graphical approach to our descriptive statistics. It is possible to notice numerous outliers and a large variation in the interquartile range *IQR* (50%). It reinforces our statement about the variation among candidates within both parties and cantons. This declaration brings us close to Bühlmann et al. (2016) conclusion. They argue that Swiss Federal elections stay mainly cantonal or even local affairs. They observe varying campaign intensities and a lack of unitary appearance.

The unique collection of political advertisements in 2011 and 2015 prior to Federal Elections in Switzerland forms the core of our identification strategy. It is then necessary not only to combine these two datasets together but also to bring additional information regarding candidate quality and political trends at the national and cantonal level. Equation (1) explains that two control variables are essential to run a regression of political advertising on vote

share: candidate characteristics and region political preferences. To gather these, we use data from the Swiss Federal Statistical Office (FSO) and data from the Parliament database *Curia Vista*. To recognize national political trend, we observe the distribution of the National Council seats by party for 2011 and 2015. Then, because the goal is to observe a trend at the national level, we calculate the differences between 2011 and 2015 for the political parties. Figure 3 demonstrates the national political trend from 2011 to 2015. Without going into detail, it is interesting to notice the positive evolution of SVP (+5.5%) and FDP (+1.5%) regarding seats at the National Council. Seat wins are at the expense of GLP (-2,5%), GP (-2%), SP (-1,5%), BDP (-1%) and CVP (-0,5%). Our opinion is that there is not much political evolution between 2011 and 2015. The only concrete variation is the boom of 5.5% for the SVP. Even though the Swiss political system is consistent over the years, it will be necessary to take this political evolution into account. National political trend corresponds to one of our control variables to measure the evolution of political preferences.

FIGURE 3. NATIONAL POLITICAL TREND 2011-2015



Source: Made by author

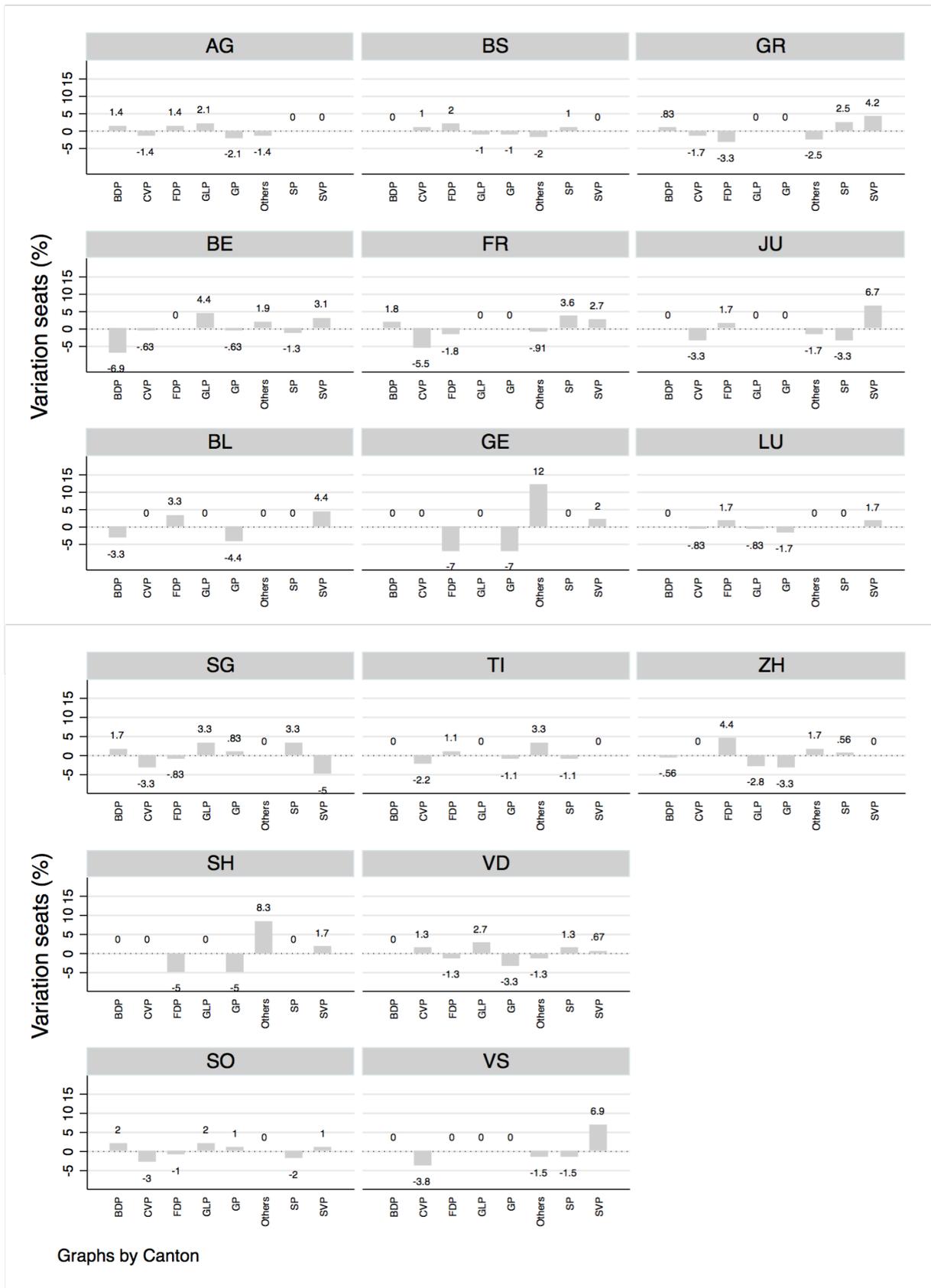
To have a better measurement of political trend we add data at the cantonal level. It is necessary to reinforce our controls. We use election in Cantonal Parliament to quantify the political trend at the cantonal level. The three level organization of Switzerland and the large magnitude of independency of cantons make the collection of data at the cantonal level far more complex than at the national level. Firstly, Cantonal Parliament elections do not occur all the same year. In order to measure the evolution of political forces over the years we had to collect data at two different points in time. On one side, we obtained data prior to 2011. On the other side, we gathered data between 2011 and 2015. Because election year are different among cantons we created ranges. Cantonal elections are ranging from 2007 to 2011 for data prior to National Council election in 2011 and from 2011 to 2015 for data prior to National Council election in 2015. Secondly, Cantonal Parliaments are of different sizes going from 60 to 180 seats. However, it is not a problem because we use percentages. Last but not least, we did not find any national statistical data that covers all cantonal elections. Consequently, we collected data in all of the 17 cantons that we focus on and then merge them in one dataset. We used cantonal government website to obtain these data. Figure 4 gives an overview of cantonal political trend in the cantons. Apart from a few cantons, we do not observe much variation over the years. Most importantly, variation occurred in canton Genève (GE) and Schaffhausen (SH). Still, it is important to incorporate these slight evolutions in our identification strategy.

A large overview of the database is necessary to understand our identification strategy. In addition, it brings important information to enlighten key facts and trends of the Swiss political system.

5.1.2 Methodology 1: Evaluation of candidate's quality

The goal of this section is to develop our first identification strategy. To begin with, it is important to remember that the objective of our contribution is to identify the relationship between political advertising and vote share for political candidates running in an election. Then, to simplify the presentation of our methodology, we assume a linear relationship between political advertising and vote share to introduce our regression model. Our dataset has a panel structure. Swiss citizens vote for candidates in canton c at time t . Nevertheless, if the time dimension is crucial, the geographical indication does not matter for our study. Even though cantons are of different size and with different number of seats at the National Council, we treat them equally. The reason is simple: we are not interested in differences among states.

FIGURE 4. CANTONAL POLITICAL TREND



Source: Made by author

$$VoteShare_{c,t} = \alpha + \beta_1 AdsShare_{c,t} + \beta_2 Quality1_t + \beta_3 Quality2 + \beta_4 NaPolitics_t + \beta_5 CaPolitics_{c,t} + \epsilon_{c,t} \quad (2)$$

Equation (2) is our basic model. Its interpretation is straightforward. Candidate vote share (*VoteShare*) in canton *c* at time *t* (2011 or 2015) is a function of a constant α , the share of ads per candidate (*AdsShare*) in canton *c* at time *t*, the intrinsic quality of each candidate (*Quality1*, *Quality2*), the national political situation (*NaPolitics*) at time *t* and the cantonal political situation (*CaPolitics*) in canton *c* at time *t*. Moreover, we assume that the error term (ϵ) is independently and identically distributed normal. In addition, it is important to specify β_1 is our parameter of interest. It measures the impact of political advertising on vote share. In this paper, we test the hypothesis $\beta_1 = 0$.

It is important to explain in detail how we account for candidate quality. It is crucial to understand that the goal is to measure the individual perception of citizens regarding the candidate's quality. Firstly, we collect data of the motion and postulate at the national level during years 2012, 2013, 2014 and 2015 to evaluate *Quality1*. We collect how many of these political objects were adopted and grouped them by candidate. Consequently, we obtain how many motion/postulate filed by a candidate were adopted. It is necessary to denote that motion and postulate are different. On one side, the two chambers must adopt motions. On the other side, only one chamber has to accept the postulate. Nevertheless, we group them together to simplify the equation. The number of objects adopted per candidate becomes a proxy for candidate intrinsic quality, or at least for the citizen's perception of this quality. The number of objects adopted range from 0 to 9 per candidate. Therefore, we can interpret it as a scale to measure candidate's quality. Secondly, to complete this measure of citizen's perception of candidate's quality, we had a binary variable *Quality2*. The variable is equal to 1 if the candidate is president of one of the seven major political parties in Switzerland, and 0 otherwise. To justify the utilization of this binary variable, it is important to remember that it is the perception of the candidate's quality by Swiss citizens that we want to measure. These two proxies are an attempt to measure the intrinsic quality of each candidate.

In addition, we must specify that we focus only on election 2015 to run the regression. The decision to concentrate on this election is obvious. Our dataset is larger. We have data from 56 instead of 20 newspapers, and from 26 cantons instead of 17. Moreover, the strategy to evaluate candidate quality with the success of their activity in the Parliament reduces our

database. In other words, it restricts the data to incumbent candidate. It means that we focus only on the candidates who have been elected in 2011 and run for a reelection in 2015.

One last problem must be handled before we run our regression (2) of political advertising effect on voting behavior. The dependent variable (*VoteShare*) is a proportion. It is bounded between 0 and 1. Research in political science, including literature on vote and electoral topic, often faces such a dependent variable. Nonetheless, Paolino (2001) explains that scholars tend to rely on the standard OLS approach. He writes that it is an issue as OLS is unable to understand crucial features of proportions. Hence, conclusions may be erroneous. In other words, regressions with proportion as a dependent variable tends to be non-linear. The explanatory powers of variables do not follow a traditional, very academic, linear relationship. To counteract this difficulty, we elaborate various strategies.

Our first solution is to adopt a Generalized Linear Model (GLM). To simplify, we can say that GLM is a flexible generalization of the usual Ordinary Linear Model (OLM). The gain of flexibility is related to the distribution of the error term. In linear models we assume that errors have normal distribution. A least-square approach is the technique that we use. At the opposite, a GLM method allows for non-normal distribution such as binomial distribution (Nelder and Wedderburn, 1972). Authors defined a technique of iterative weighted linear regression to determine maximum likelihood estimates. The specificity of this model is the linking function that enables to connect the non-normal distribution of the dependent variable with a linear model. Secondly, it is possible to employ a beta distribution. Paolino (2011) explains that maximum likelihood estimation of models with dependent variable that follow a beta distribution brings solutions in numerous political science researches. A beta distribution can be interpreted as continuous probabilities that are bounded between 0 and 1. It is defined by two shape parameters. The peculiarity of these shape parameters is that they do not necessarily consist of the mean or the variance of the distribution (Paolino, 2001). Given that the dependent variable is between 0 and 1, it is necessary that the covariates lie in the same interval. Therefore, it is required to use a linking function for the conditional mean. Beta regressions are frequently employed with models with dependent variable in the interval $]0; 1[$ because the predictions remain in the same range. The problem is that observations cannot be equal to 0 or 1. To overcome this potential issue, it is possible to employ a third method. The fractional response regression has the same features as the beta regression but allows for observations equal to 0 or 1. Even though beta regression provides more flexibility than a fractional response regression, the possibility to include 0 or 1 observation is

interesting. Fractional response models are quasilikelihood estimators. Then, to ensure that covariates remain in the $[0; 1]$ interval, it is recommended to use a probit or logit model for them. Papke and Wooldridge (1996) conclude that this technique applies to numerous research settings. The advantage is that it works without any special adjustment for extreme values like 0 and 1. Finally, Buis (2010) offers a last solution. The zero/one inflated beta model applies if dependent variable is a proportion. The author explains that it is composed of two parts: a logistic regression if proportion equal 0 or 1, and a beta regression if the proportion is between 0 and 1.

5.1.3 Empirical results methodology 1

Table 5 displays the results of the regression of equation (2). The different columns illustrate the four strategies that we implement to regress *VoteShare* on *AdsShare*. They take into consideration the fact that both dependent and independent variables are proportions. Column (1) is a beta distribution. It is possible because neither value is 0 or 1. Column (2) employs a fractional response model. Column (3) displays results of a GLM. Finally, column (4) uses the zero-one inflated method of Buis (2010). Columns (1) and (4) are similar. It is the direct proof that there are neither 0 nor 1 value. The zero-one inflated method treats proportion between 0 and 1 with a beta distribution. Moreover, the difference between column (2) and (3) exists because we use two different functions. On one hand, we opt for a probit function with the fractional response. On the other hand, we use a link (logit) for the glm model.

TABLE 5. RESULTS OF REGRESSION WITH QUALITY

	beta (1)	frac (2)	glm (3)	zoib (4)
Variable				
AdsShare	0.534 (0.683)	0.424 (0.421)	0.730 (0.674)	0.534 (0.683)
Quality1	-0.0251 (0.0228)	-0.0190 (0.0141)	-0.0309 (0.0235)	-0.0251 (0.0228)
Quality2	0.626*** (0.0691)	0.396*** (0.0439)	0.630*** (0.0718)	0.626*** (0.0691)
NaPolitics	1.222* (0.502)	0.693* (0.322)	1.202* (0.538)	1.222* (0.502)
CaPolitics	3.263*** (0.576)	1.867*** (0.350)	3.155*** (0.596)	3.263*** (0.576)

Constant	-1.964*** (0.173)	-1.161*** (0.105)	-1.935*** (0.183)	-1.964*** (0.173)
N	76	76	76	76

Note: The dependent variable is the vote share for each candidate in 2015 in each canton. Standard errors are in parentheses. Stars indicate significance levels. A star indicates that the coefficient passes the test for significance different from zero at level 5%, two stars indicate that the coefficient passes the test for significance different from zero at level 1% and three stars indicate that the coefficient passes the test for significance different from zero at level 0.1%. * p<0.05; ** p<0.01; *** p<0.001.

To begin with, it is necessary to explain that the magnitude of the coefficients cannot be directly interpreted. The four strategies that we use do not allow for a direct interpretation of the size of the effects. Only the sign of the coefficients owns some explanatory power. Consequently, the first conclusion is that all variables but the constant and *Quality1* have a positive effect on vote share. In order to obtain size effects that are interpretable we must calculate average marginal effects. Table 6 displays the average marginal effects for the variables *AdsShare*, *Quality2*, *NaPolitics* and *CaPolitics*. Average marginal effect of *AdsShare* is smaller than all the three other variables. In addition, it is highly non-significant. At the opposite, *Quality2* and *CaPolitics* have a positive and significant impact on vote share. It means that being president of a Swiss political party increases vote share. The average marginal effect is 0.13. Similarly, the cantonal political trend has a significant impact on vote share. Moreover, the average marginal impact of *CaPolitics* appears to be even greater than the impact of *Quality2*. To test our main hypothesis we run a Wald test. It is necessary to specify that we run this Wald test on the beta regression (column (1)) because it is more flexible. The conclusion is straightforward. We cannot reject the hypothesis that $\beta_1 = 0$. The variable *AdsShare* is not different from zero (unadjusted p-value = 0.4348). In other words, political advertising has no significant impact on vote share. If any impact may exist, it seems that it is a positive effect. In addition, we use the same test to see if β_2 , β_4 and β_5 are equal to zero. On one hand, we cannot reject the hypothesis that *Quality1* (unadjusted p-value = 0.2720) and *NaPolitics* (unadjusted p-value = 0.0149) are equal to zero. On the other hand, *CaPolitics* seems to have an impact on *VoteShare*. We can reject the hypothesis that β_3 is equal to zero. In addition, the *Quality2* has a significant and positive impact. It appears that being president of a Swiss political party and the cantonal political trend are the two variables that mostly impact the behavior of voters during elections. In summary, related to our variable of interest, we can affirm that political advertising has no effect on voting behavior.

TABLE 6. AVERAGE MARGINAL EFFECTS

	AdsShare	Quality2	NaPolitics	CaPolitics
Average Marginal Effect				
dy/dx	.1046824	.1366794	.2397814	.6400785
Std. Err.	(.1345609)	(.0162513)	(.0977533)	(.1082422)
P> z	0.437	0.00	0.014	0.00

Source: Made by author

Even though these conclusions are interesting, they must be handled very carefully. Numerous elements indicate that our first model may not be correctly specified. Firstly, the necessity to add the variable *Quality1* drastically reduces our dataset. Only 76 observations are now part of the database. This reduction shrinks the precision of our estimates. Secondly, the coefficients of *Quality1* are extremely intriguing. The interpretation that being an intrinsically better candidate reduces the vote share does not match with the logic. This result indicates that our estimation of the perception of quality of a candidate is pointless. The fact that we cannot reject the hypothesis that *Quality1* is equal to zero is problematic. Like we already said, it is contrary to the logic. Last but not least, a highly significant and very large coefficient for constant in all of the different regressions is a bad sign. Without drawing any clear conclusion, it is possible to affirm that our strategy did not cancel the endogeneity issue. The relative size effect of the constant probably indicates that we have some omitted variables.

5.1.4 Methodology 2: First differencing using repeat candidate

Although methodology 1 is interesting, our strategy did not solve the endogeneity problem. It suffers a threat. The problem is obvious: the variable *Quality* is not clearly measurable, or at least it is very complicated to measure it. The proxies that we use in section 5.1.3 solve part of the problem but are not entirely convincing. Without this key variable, efforts to evaluate equation (2) suffer the endogeneity problem presented in section 3.2. To overcome this difficulty, we follow a strategy developed by Levitt (1994). We exploit the panel structure of our dataset. Panel data are useful because they allow relaxing the strict exogeneity assumption. We observe candidate and political advertising in year 2011 and 2015. The cross-sectional unit is the National Council election. We restrict our dataset to candidates that ran for the National Council election in 2011 and 2015. If we assume that candidate's quality is constant over time, our strategy cancels the omitted variable bias. In other words, first

differencing the data drops *Quality* out of the equation. Similarly, all other time-invariant factors disappear. To be precise, the panel dimension of our dataset is the candidate's name and the time dimension is the year (2011 and 2015). Finally, we can assume that our regression is linear. The large cross-sectional dimension and the short time-series dimension speak for it. To sum up, we have a short and balanced panel dataset.

$$\Delta VoteShare_c = \beta_1 \Delta AdsShare_c + \beta_2 \Delta NaPolitics + \beta_3 \Delta CaPolitics_c \quad (3)$$

$$+ \beta_4 Incumbency + \mu_t + \epsilon_c$$

Our identification strategy cancels out the time dimension t . The Δ represents the result of our first differencing. It acts as the difference between the value of the variable at time $t=2015$ and $t=2011$. Precisely, the constant α and the variable *Quality* vanish from our equation of interest. α is time-invariant and we assume that *Quality* remains constant over time as well. Then, it is necessary to define in detail the different variables remaining. Firstly, our dependent variable is $\Delta VoteShare$. Combining vote count and participation data from 2011 and 2015 elections in each canton c , we obtain the difference in vote share for the candidate. Secondly, we utilize the difference in political advertising share for each candidate by canton ($\Delta AdsShare$) to measure our parameter of interest β_1 . It is important to point out that we measure the share of ads per candidate in each canton. In other words, it is a measure relative to other candidate and not the total count of vote that is employed. Then, we add three different control variables to be sure to isolate the impact of political advertising on vote share. $\Delta NaPolitics$ evaluates the national political trend from 2011 to 2015. We use the OFS data to measure the difference in seats at the National Council between 2011 and 2015. We implement the same strategy at the cantonal level. We estimate cantonal political trend ($\Delta CaPolitics_c$) using cantonal data. We measure the difference in seats share in each Cantonal Parliament with elections prior to 2011 and prior to 2015. It is an approximation of the cantonal political trend. Moreover, we augment our number of controls with the variable *Incumbency*. Our literature indicates that incumbency plays a role in campaign spending effect on voting behavior estimation. Consequently, we add this binary variable. It is equal to one if the candidate is a challenger in 2011 but an incumbent in 2015. It means that he got elected in 2011 for the first time. On the contrary, it is equal to zero if the candidate is a challenger in election 2011 and 2015, or an incumbent in election 2011. Moreover, if the candidate is an incumbent in 2011, did not get elected, and ran for the National Council as a challenger in 2015 we give the value 0 too. However, it is important to mention that this case is rare. Still, it is a possibility that we must take into account. In addition, the panel data

structure allows for a year fixed effect μ_t . In conclusion, we include an independently and identically distributed normal error term ϵ . One again, we test the hypothesis $\beta_1 = 0$

Even though this identification strategy cancels out the omitted variable bias, two conditions must hold. At first, it is crucial that the “repeat candidate” subset is representative of the whole National Council election sample. We will check this condition in section 5.1.3. Second, our strategy assumes that candidate’s intrinsic quality remains constant over time. The four years gap between 2011 and 2015 threaten this assumption. Equation (2) uses $Quality_{c,t}$ as a variable. The time dimension indicates that candidate’s quality could possibly fluctuate. In an ideal experiment, we would observe repeat candidates in the shortest time possible. Some exogenous parameters may impact candidate’s quality. For instance, a scandal could strongly modify citizen perception of a candidate’s quality. Such a situation would introduce a bias again. However, it is wise to expect that even in the worst-case scenario, the potential bias of equation (3) would be fundamentally smaller than the bias of equation (2).

5.1.5 Empirical results methodology 2

Table 7 presents the results of equation (3). In our table, we progressively add the entire set of variables to observe the evolution. Even though the restriction of our dataset to repeat candidate relaxes the exogeneity assumption, it is at cost. It reduces our dataset to 118 observations. To begin with, all the variables have a positive impact on the dependent variable. The size of the effect varies widely. If we focus specifically on our variable of interest, it is possible to affirm that the political advertising impact is not significant. We cannot reject the hypothesis that $\Delta AdsShare$ is equal to zero (unadjusted p-value = 0.5525). Moreover, we run an F-test to see if the three variables $\Delta AdsShare$, $\Delta NaPolitics$ and $\Delta CaPolitics$ were altogether significant. We cannot reject the hypothesis that they are together equal to zero. The F-test $F(3, 117)$ is equal to only 7.23. The only coefficient that has a significant effect is β_4 . Incumbency in office increases significantly the vote share for a candidate. Running for a reelection enhances the percentage of vote per candidate of 3%. Given that the average vote share is 18%, it is a non-negligible increase. In conclusion, political advertisement in print media has no impact on voting behavior.

TABLE 7. RESULT OF REGRESSION WITH REPEAT CANDIDATE (POOLED OLS)

Variable	(1)	(2)	(3)	(4)
AdsShare	0.095 (0.164)	0.073 (0.160)	0.078 (0.161)	0.075 (0.126)
NaPolitics		0.508 (0.112)***	0.523 (0.125)***	0.090 (0.130)
CaPolitics			-0.048 (0.206)	0.171 (0.172)
Incumbency				2.965 (0.441)***
R^2	0.01	0.10	0.10	0.35
N	119	118	118	118

Note: The dependent variable is the first differencing of vote share for each candidate between 2011 and 2015 in each canton. Standard errors are in parenthesis. Stars indicate significance levels. A star indicates that the coefficient passes the test for significance different from zero at level 5%, two stars indicate that the coefficient passes the test for significance different from zero at level 1% and three stars indicate that the coefficient passes the test for significance different from zero at level 0.1%. * p<0.05; ** p<0.01; *** p<0.001.

TABLE 8. RESULT OF REGRESSION WITH REPEAT CANDIDATE AND RESTRICTIONS

Variable	(1)	(2)	(3)	(4)	(5)	(6)
AdsShare	0.003 (0.180)	0.183 (0.159)	-0.219 (0.121)	0.227 (0.167)	0.253 (0.079)**	0.026 (0.123)
NaPolitics	-0.027 (0.133)	0.345 (0.346)	0.158 (0.132)	-0.500 (0.516)	0.227 (0.127)	-0.209 (0.176)
CaPolitics	0.105 (0.250)	0.164 (0.259)	0.170 (0.185)	0.687 (0.463)	0.053 (0.212)	0.213 (0.217)
Incumbency	2.675 (0.598)***	2.854 (1.172)*	1.787 (0.402)***	5.536 (1.527)**	0.826 (0.345)*	4.682 (0.686)***
R^2	0.27	0.52	0.33	0.63	0.31	0.48
N	79	39	89	29	41	77

Note: The dependent variable is the first differencing of vote share for each candidate between 2011 and 2015 in each canton. Standard errors are in parenthesis. Stars indicate significance levels. A star indicates that the coefficient passes the test for significance different from zero at level 5%, two stars indicate that the coefficient passes the test for significance different from zero at level 1% and three stars indicate that the coefficient passes the test for significance different from zero at level 0.1%. * p<0.05; ** p<0.01; *** p<0.001.

Table 8 runs a similar equation to that in table 7, but we impose some restrictions. Column (1) restricts the dataset to candidates with less than 15 ads. We interpret this as moderate

campaign intensity. Column (2) is the opposite. We take only candidates with more than 15 ads. We call this strong campaign intensity. Then, column (3) and (4) focus on the percentage of ads relative to total advertisement in the canton (advertisement share). They exhibit only candidates with ads share smaller than 5 percent and candidates with ads share higher than 5 percent respectively. It is a measure of the relative intensity of political communication compare to other candidates. Column (5) displays only candidates with vote share smaller than 15 percent. Finally, column (6) presents candidates with vote share higher than 15 percent.

It is interesting to observe various regressions with different restrictions. Even though it reduces the dataset and therefore shrinks the precisions, it often brings new insights. Firstly, the variable *Incumbency* remains significant in all regressions. However, it is not always significant at level 0.1%. Secondly, we cannot reject the hypothesis that β_1 equals zero in all regression but one. Political advertisement has a significant impact at level 1% when we focus only on candidates with less than 15 percent of vote share in their respective canton. The interpretation of the results is noteworthy. Political advertisement has a significant impact for candidates that are not sure to be elected. Politicians that are likely to absorb only a small part of vote share should invest in political advertisement. Nevertheless, the relative size of the coefficient is very small. An increase of 1% of political advertisement share boosts vote share by only 0.23%. Thirdly, we cannot reject the hypothesis that national and cantonal politics trend have no impact on vote share. Finally, we can notice the sign of the coefficients and the eventual variation of this sign. In the case of our variable of interest $\Delta AdsShare$, the sign of the coefficient becomes negative when we restrict our dataset to candidates with less than 5 percent of political advertisement share. In addition, the coefficient of $\Delta AdsShare$ in column (1) is almost equal to zero as well. We conclude that moderate campaign intensity causes more damage than good. It is possible that it reduces the vote share. Still, this impact is not significant and extremely small.

Finally, it is necessary to check the first condition. To be precise, it is crucial that our dataset of repeat candidate represents adequately the whole dataset of candidates running for 2011 and 2015 elections. Table 9 presents the main descriptive statistics to compare our whole dataset and our restricted dataset. The average number of advertisements per candidate is slightly higher in our whole dataset. However, this difference is not significant. If we combine the average and the standard deviation, we obtain two very similar intervals for 2011 (5; 20.2)

and 2015 (0.6; 19.2). In conclusion, we can assess that our restricted dataset represents adequately our whole dataset. The first condition is fulfilled.

TABLE 9. DESCRIPTIVE STATISTICS COMPARISON

	Numbers of candidates	Total ads per party	Average ads per candidate	Standard deviation	Median	Maximum number of ads per candidate
Year	<i>N</i>	<i>Sum</i>	<i>Mean</i>	<i>Sd</i>	<i>p50</i>	<i>max</i>
Total data						
2011	465	2550	5.5	7.1	3	52
2015	982	7018	7.1	8.1	4	72
Average	723.5	4784	12.6	7.6	3.5	62
Only repeat						
2011	119	843	7.084	7.634	5	48
2015	119	1520	12.77	9.905	10	58
Average	119	1181.5	9.929	9.273	7	58

Source: Made by author

Our second identification strategy exploits the advantages of a panel data structure. It allows relaxing the exogeneity assumption. We restrict our dataset to only repeat candidates. Consequently, the variable *Quality* drops out of the equation. It solves the endogeneity issue. Then, we come to similar conclusion than in section 5.1.3. It is not possible to reject the hypothesis that political advertisement has no impact on voting behavior. The only variable that has a significant impact is *Incumbency*. This incumbency status increases the vote share by almost 3%. Moreover, the variables political advertisement, national political trend and cantonal political trend are altogether non-significant. These conclusion reinforce the doubts that we casted in the previous methodology about the usefulness of political advertisement. Even though candidates invest massively in political advertising, there are no proofs of return on investment. This situation is puzzling. We will discuss about it in detail in section 6.

5.2 Popular vote in Switzerland: 2013-2015

5.2.1 Popular vote data

Switzerland often embodies the best example of direct democracy. This trait is not related to the elections that are common in many representative democracies. It is the direct democratic instruments such as popular initiative, optional referendum, and mandatory referendum (see Figure 2) that remain mostly specific to Switzerland. Our third strategy of identification focuses specifically on popular vote. In Switzerland, popular votes occur up to 4 times a year.

Every time Swiss citizens are called to the ballot to vote on about 2 to 5 political objects. We observe a great variation of topics. It goes from topics related to family policy, immigration policy, economic policy, and even army policy. To run our methodology we concentrate on popular vote from 2013 to 2015. It represents a total of 27 objects. We draw on two main sources of data. On one side, we have (1) political advertisement records for each popular vote. This dataset comes from the *Année Politique Suisse* (APS). On the other side, we gather (2) popular vote statistics at the cantonal and national level. This data comes directly from the Federal Office of Statistics (FSO).

To begin with, we take advantage of the unique dataset collected by the APS over the years. We focus on popular vote from 2013 to June 2015. The APS team collected a total of 11471 ads for the 27 political objects. It is necessary to precise that the data about the votes of the 9th of June 2013 are not available. Data comes from a total of 47 cantonal newspapers. We dropped the data for newspapers with national coverage. The goal is to avoid overlapping political advertisements between cantons. The 26 cantons of Switzerland are linked to one to three newspapers each (see Appendix 1). The collection of data starts 8 weeks prior to the vote day. Moreover, it is important to remember that it is only advertisement in print media. Table 9 displays summary statistics about the political advertisement dataset. In average, 424.9 political advertisements are printed every popular vote. We observe a wide range. The minimum ads for a popular vote are 22. This was in May 2014 with the popular initiative “To ban pedophiles from working with kids”. At the opposite, political advertisements went up to a maximum of 1509 in February 2014. The popular initiative “Against mass migration” generated a very intense political campaign prior to the vote day. Other popular votes breed strong political communication. For example, we count 1237 ads in May 2014 for the popular initiative about the minimum salary. Or, we observe 1265 ads in June 2014 for the popular initiative “To tax inheritance of more than a million to finance AHV”. The range of ads shows a variety of campaign intensity.

TABLE 10. DESCRIPTIVE STATISTICS POPULAR VOTE ADS

	Number of popular votes	Total ads	Average ads per vote	Standard deviation	Median	Minimum	Maximum
	<i>N</i>	<i>Sum</i>	<i>Mean</i>	<i>Sd</i>	<i>p50</i>	<i>min</i>	<i>max</i>
Total	27	11471	424.9	430.8	234	22	1509

Source: Made by author

The second part of our dataset comes from the Swiss governmental statistics. We employ data from FSO to generate our dependent variable. To obtain vote share in each canton, we gather information about registered voters, participation, “yes” vote and “no” vote. To class this data we adopt the *BFS-nummer* classification. The popular vote that we focus on goes from number 567 to 595.

Finally, it is necessary to add control variables to our regression. Firstly, we use the Federal Council vote recommendations. These data are available on the Federal Council website or through the FSO. Secondly, we gather vote recommendations from the 7 major Swiss political parties. These are the same political parties that we use in section 5.1. Then, in order to take into account cantonal variation we combine these recommendations with the repartition of seats in each Cantonal Parliament. We employ the same data that we use in the previous section to observe cantonal political trend.

5.2.2 Methodology 3: First Differencing with similar cantons

In summary, the objective is to find out about the potential effect of political advertising on voting behavior for popular vote. To obtain an answer, the simplest approach is to determine the different variables that impact vote share. Equation (4) presents a standard regression to political advertising effect. It is our basic model in section 5.2.

The dependent variable is $yes_VoteShare_c$. We measure the share of “yes” votes in canton c . Then, our independent variable of interest is the percentage of “yes” political advertisements in canton c ($yes_AdsShare_c$). In addition, equation (4) identifies four control variables. Firstly, $FC_recommendation$ is a binary variable. It takes the value one if the Federal Council suggested to vote “yes” and 0 otherwise. Secondly, we consider Swiss political parties voting advice ($PartyVote$). We concentrate only on the 7 major political parties. We employ a binary system as well. It takes value 1 if the party recommended voting “yes” and 0 otherwise. Then, it is necessary to take into account the cantonal dimension c . We observe various cantonal political trends. Therefore, we multiply the variable $PartyVote$ with $CaPolitics_c$ that measures the percentage of seats per party at the Cantonal Parliament. Thirdly, $Quality$ represents the intrinsic quality of the political object in question. This variable quantifies the positive impact of the object for Switzerland. The idea is simple: if Swiss citizen were to vote “yes”, would it do more good or harm to Switzerland. Fourthly, we believe that the economic situation has an impact on voting behavior. Finally, we assume that the error term (ϵ) is independently and identically distributed normal.

$$\begin{aligned}
yes_VoteShare_c = & \alpha_c + \beta_1 yes_AdsShare_c + \beta_2 FC_recommendation & (4) \\
& + \beta_3 (PartyVote \times CaPolitics_c) + \beta_4 Quality \\
& + \beta_5 Economics + \epsilon_c
\end{aligned}$$

Even though the equation seems straightforward, its application is extremely complicated. One major difficulty is the evaluation of the variable *Quality*. This variable is highly subjective. Since we cannot predict the future, it is almost impossible to correctly estimate the intrinsic *Quality* of a political object. Consequently, equation (4) faces the same omitted variable bias as equation (1). As *Quality* is not measurable, the regression does not fulfill the strict exogeneity assumption. To be precise, it can be said that the relationship between *yes_VoteShare* and *yes_AdsShare* is unclear. For example, it is possible that pro-support committee decided to have intense political communication in cantons where the vote decision is unpredictable and to have a weak political communication in cantons where they are sure to win or to loose. In such case, it is not the share of ads that influences future vote behavior but the opposite. We speak about reverse causality. In conclusion, because of the omitted variable bias, equation (4) cannot be estimated adequately.

In section 5.1, the solution to the endogeneity problem was to do a first differencing with only repeat candidate to cancel the omitted variable bias. This approach was possible because we assume that candidate intrinsic quality did not change much over time and that National Council election 2011 was similar to National Council election 2015. We envisage a similar solution in section 5.2. This new approach to measure the impact of political advertising on voting behavior draws its inspiration on the literature in labor economics (see Card and Krueger, 1994). It exploits spatial media markets' discontinuities to evaluate the effects of political advertising in print media. Therefore, it is first necessary to define pairs of cantons that are as similar as possible. We restrict our attention to only pairs of similar cantons that face different levels of political campaign intensity. We assume that the differences in political advertising are nearly uncorrelated with dissimilarities in the voter characteristics in either canton. In other words, Swiss citizen in canton *a* is indistinguishable to Swiss citizen in canton *b* apart from the fact that they do not encounter the same political advertising intensity. This strategy exploits the segmentation of the media market at the cantonal level in Switzerland. We restrict our database to only cantonal newspapers to avoid overlapping ads in national newspapers. Once we identify pairs of cantons, it is possible to run a first

differencing. The difference occurs for the same vote on two cantons that are as similar as possible. Equation (5) displays the new regression.

$$\begin{aligned} \Delta y_{es_VoteShare}_p = & \alpha + \beta_1 \Delta y_{es_AdsShare}_p \\ & + \beta_3 \Delta(PartyVote \times CaPolitics_p) + \epsilon_p \end{aligned} \quad (5)$$

The first differencing strategy drops all invariant variables out of the equation. It is important to specify that it is not a time invariant situation but instead a canton invariant. Therefore, all variables that have no *c* subscript are no longer relevant. The Δ characterizes the result of our first differencing. It represents the difference between the value of the variable in canton $c=a$ and $c=b$ ⁶. To begin with, our strategy succeeds in cancelling the variable *Quality* out of the equation. This unmeasurable variable was the source of our endogeneity problem. It drops out of the equation because we assume that the positive or negative impact of the political object is the same for the two cantons. Moreover, *FC_recommendation* and *Economics* are also canton invariant variables. On one hand, the Federal Council vote recommendation is the same for all the cantons. On the other hand, the Swiss economic situation is similar for all cantons. Therefore, only one control variable remains in our regression. $\Delta y_{es_VoteShare}$ at the pair *p* level (between canton “a” and “b”) is a function of a constant α , the difference of “yes” political advertisement share in pair *p* ($\Delta y_{es_AdsShare}_p$), the Swiss political party vote recommendation weighted at the cantonal level $\Delta(PartyVote \times CaPolitics_p)$ and an error term ϵ . Finally, the goal of our regression is to test the hypothesis $\beta_1 = 0$. In other words, we test that political advertising has no effect on voting behavior.

The next and probably most important step is to determine the pair of cantons. The goal is to identify cantons that have a similar political trend. We look for two cantons with citizens as politically indistinguishable as possible. It is compulsory to identify these pairs to run our spatial discontinuity strategy. In order to compare the political trend of 26 Swiss cantons, it is possible to observe the popular vote from 2010 to 2015. We count 49 votes. To compare the cantons, we measure the percentage of “yes”. In order to find similar cantons, one must decide which conditions are necessary to speak about “similar”. Firstly, we consider that a geographical condition is not suitable. We argue that because of the small size of Switzerland the variables *Quality* and *Economics* are as close as possible no matter the pair of cantons we choose. In other words, geographical closeness would be a superfluous condition.

⁶ Letters “a” and “b” correspond to the pair of canton of interest.

Secondly, we decide to restrict to only pairs of cantons with a similar language⁷. Languages induce strong cultural differences. These dissimilarities have an impact on political trends. Therefore, it is wise to restrict our pairs of cantons to cantons with similar language. Thirdly, we assume that it is not necessary to evaluate repartition of seats in the Cantonal Parliament. We consider the impact of this variable with the control variable $PartyVote \times CaPolitics_p$. Last and not least, we calculate mean “yes” per canton during popular vote from 2010 to 2015. Our procedure assumes that the means of the two cantons are equal. Therefore, to assess the similarity of means, we run a paired t-test. This two-sample t-test is a solution to test the hypothesis that the political trend in the pair of cantons is similar. We test the null hypothesis that “yes” vote mean of two groups is different. In other words: $H_0: MeanVote\ yes(a) - MeanVote\ yes(b) \neq 0$. We opt for a significance level of 10%. It is a two-tail test. Consequently, we look for p-values that are smaller than 0.05. If $p\text{-value} < 0.05$, we reject the hypothesis that the means of the two cantons are different. Therefore, it implies that cantons follow a similar political trend. Table 11 displays the pair of cantons for which we reject the hypothesis that they have different political trends. Therefore, it forms the pair of cantons that we need to run our spatial discontinuity strategy. In addition, Appendix 3 offers a graphical representation of the cantonal political trend in popular vote from 2013 to 2015. It focuses only on our pair of cantons of interest.

Besides, it is important to specify that we decide to restrict our political advertisement database to only popular vote with more than 200 ads. Consequently, we drop 12 votes out of the dataset. This restricts it to 15 popular votes between 2013 and 2015. Our motivation to remove these votes with weak campaign intensity is obvious. In such a situation, it is possible to count only 1 or 2 ads in a canton. Because our identification strategy is at the cantonal level and because we evaluate the difference in share of ads, this extreme example would deliver ads share of 100 percent. This evaluation does not adequately represent the reality. We cannot argue that printing one advertisement in the cantonal newspaper is equivalent to occupying 100 percent of the political campaign.

Finally, it is worth mentioning one condition that is necessary for our identification strategy. To begin with, it is crucial that the variables *Quality* and *Economics* occur at the national level. It means that the impact of a political object and the economic situation are equivalent across the different cantons. Even though the Swiss federalist system displays a large range of

⁷ In the case of bilingual cantons, they can match any cantons with one of their two languages. This exception works for Fribourg and Valais.

autonomy for the cantons, we consider that the geographically small size of Switzerland is a sufficient argument that sustains our assumption. Moreover, given that the Federal Council obviously delivers only one recommendation at the national level, we can assume that national concerns overstep regional differences.

TABLE 11. PAIRED T-TEST WITH POPULAR VOTE FROM 2010 TO 2015

	Pair of cantons	Number of observations	Mean “yes”	p-value
		<i>N</i>	<i>mean</i>	<i>p</i>
1	Aargau	49	44.14857	0.0326
	Bern	49	44.24959	
2	Aargau	49	44.14857	0.0285
	Luzern	49	44.04020	
3	Aargau	49	44.14857	0.0281
	St-Gallen	49	44.09347	
4	Bern	49	44.24959	0.0477
	St-Gallen	49	44.09347	
5	Appenzell I. Rh.	49	40.95653	0.0460
	Valais	49	40.82694	
6	Jura	49	46.18796	0.0044
	Vaud	49	46.20306	
7	Luzern	49	44.04020	0.0156
	St-Gallen	49	44.09347	
8	Obwald	49	40.81082	0.0068
	Valais	49	40.82694	

Source: Made by author

5.2.3 Empirical results methodology 3

It is important to remember our regression (5) of interest for this third methodology. $\Delta\text{yes_VoteShare}$ is our dependent variable. It is the difference between percentages of “yes” vote in each of our pairs of cantons. It is a function of a constant α , the variable of interest $\Delta\text{yes_AdsShare}$ and one control variable $\Delta\text{PartyVote} \times \text{CaPolitics}$. $\Delta\text{yes_AdsShare}$ is the difference in political advertisement share in each pair of cantons for our 15 popular votes. $\Delta\text{PartyVote} \times \text{CaPolitics}$ corresponds to the Swiss political parties recommendation weighted with repartition of seats in Cantonal Parliament. We take the difference for each pair of similar cantons. We test the hypothesis $\beta_1 = 0$. Table 12 displays the results of the regression (5).

TABLE 12. RESULT OF REGRESSION WITH SIMILAR CANTONS

Variable	(1)	(2)	(3)	(4)	(5)
AdsShare	-0.083 (0.094)	-0.225 (0.133)	0.048 (0.130)	0.171 (0.249)	0.768 (0.223)**
Recommendation	-0.653 (0.175)***	-0.437 (0.248)	-0.799 (0.245)**	-1.364 (0.460)**	-1.315 (0.374)**
Constant	1.520 (1.365)	3.175 (2.481)	0.631 (1.650)	1.418 (3.176)	-7.064 (2.872)*
R^2	0.08	0.09	0.11	0.19	0.27
N	108	34	75	29	22

Note: The dependent variable is the difference of vote share in each pair of cantons. Standard errors are in parenthesis. Stars indicate significance levels. A star indicates that the coefficient passes the test for significance different from zero at level 5%, two stars indicate that the coefficient passes the test for significance different from zero at level 1% and three stars indicate that the coefficient passes the test for significance different from zero at level 0.1%. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Our third identification strategy comes to a similar conclusion as the previous ones. Political advertisement has no impact on voting behavior. A t-test shows that we cannot reject the hypothesis that $\beta_1 = 0$. This is the main conclusion of table 12. In addition, it is interesting to notice the negative significant impact of political recommendation at a 1% level. To understand this relationship, it is necessary to remember how we constructed the variable $\Delta PartyVote \times CaPolitics$. It corresponds to the recommendation of the Swiss political parties weighted at the cantonal level. The obvious conclusion is that national and cantonal politics are two different fields. It is not the same forces at play. Swiss citizens strictly differentiate national and cantonal politics. In other words, it is the highly federalist system of Switzerland that explains this negative relationship.

Then, we imposed some restrictions on our original regression in column (1). Even though it drastically reduces our database and therefore threatens the precision of our model, the trend that we observe is very interesting. Column (2) restricts the database to only campaigns with less than 500 ads. Column (3) shows campaigns with more than 500 ads. Columns (4) and (5) displays the regression in the case of intense campaign advertising in print media. It restricts the dataset to campaigns with more than 1000 and campaigns with more than 1200 respectively. In the case of $\Delta y_{es_AdsShare}$, we notice an increasing path from column (2) to column (5). Not only does it move from a negative impact to a positive impact, but also the impact in column (5) is significant at a 1% level. Moreover, this impact is relatively important. Increasing the difference in advertisement share by 1% in our pair of cantons

increases the difference in vote share by 0.76%. This positive impact is substantial. In summary, we can affirm that the more intense a campaign is, the more likely it will have a positive impact on voting behavior. Otherwise stated, one must invest tremendous amounts of money in political advertising in print media to expect a return on investment.

Furthermore, it is necessary to verify the robustness of our model. To begin with, we control the correct specification. An added-variable plot delivers a proof of the negative and linear relationship between difference in vote share and difference in ads share. Besides, the same plot shows a positive linear relationship for column (5). Then, we run a Ramsey RESET test to check for omitted variables. We cannot reject the hypothesis that the model has no omitted variables. It is an important result for our identification strategy. This implies that the third methodology solves the endogeneity issue. Secondly, it is important to control for influential observations. Appendix 4 is a graphical approach that shows y-outliers. We generate the Cook distance to combine information on both residuals and leverage. It is a technique to check for both y- and x-outliers. The higher the Cook distance, the more influential is the observation. We accept the common cut-off point of 4 divided by the number of observations. Any observation with a Cook distance higher than this cut-off is an influential observation. In our regression, we notice 6 outliers. It was essential to remove them from our equation. Thirdly, it is possible to test for heteroscedasticity. We run a Breusch-Pagan test. We cannot reject the hypothesis that the variance is constant (p-value=0.2177). Therefore, we can assume homoscedasticity. In conclusion, based on these numerous tests, it is possible to affirm that the model is correctly specified. Our third identification strategy solves the endogeneity problem.

6. Discussion

All along in our paper, we tested one major hypothesis: is $\beta_1 = 0$? To be precise, we estimated if political advertising had an impact on voting behavior. Mainly, it is possible to conclude that the impact of political advertising is a positive, minimal, and non significant-effect. Hence, we cannot reject the hypothesis that political advertising has no effect on voting behavior. This contribution extends the literature on political advertising. It joins the academic researcher that defined the “minimal effect” of political advertising on voting behavior. The question related to political advertising effect suffers an important endogeneity issue. It is a consequence of the impossibility to appropriately measure a candidate/object intrinsic quality. This omitted variable bias threatens every econometric approach. Therefore,

we developed three strategies to counteract this issue. It is important to briefly remember each of these approaches and the results that we obtained.

Firstly, we opted for two proxies to measure candidate quality. On one side, we used the number of motions or postulates filed by a candidate at the National council between 2011 and 2015 that were adopted. It gave us a scale from 0 to 9 that approximates candidate's quality. On the other side, we added a binary variable for being a president of a Swiss political party. We obtained a minimal positive but non-significant impact of political advertising. Two control variables absorbed most of the explanatory power. The cantonal political trend and the binary variable for being president of a Swiss political party that was a measure of candidate's quality had both a positive and significant impact. However, the negative effect of our first proxy for intrinsic quality and the large size of the constant questioned the correct specification of our model.

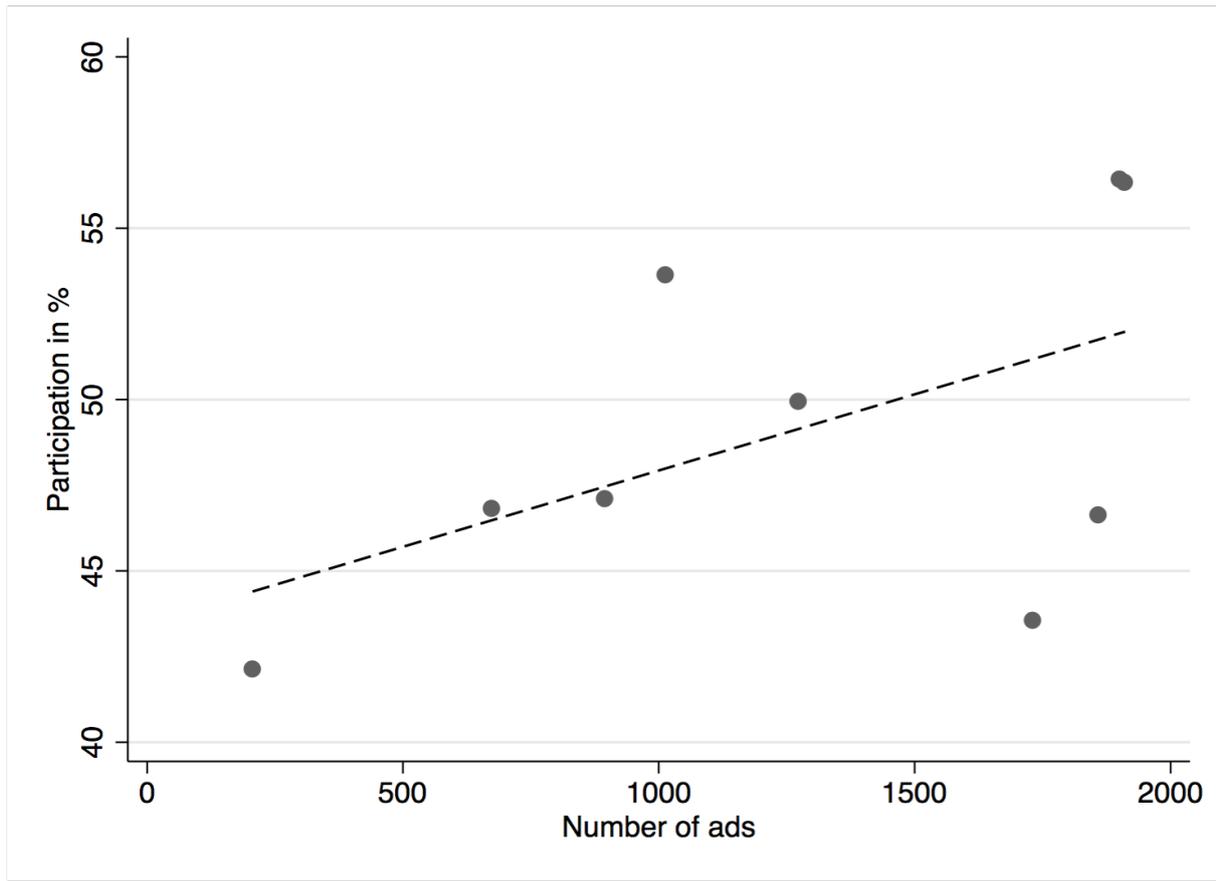
Secondly, we followed a strategy developed by Levitt (1994). We exploited the panel data structure of our dataset to run a first differencing. We restricted the dataset to only repeat candidates. This strategy drops the variable quality out of the equation. Consequently, it solved the endogeneity issue. We captured a similar minimal positive and non-significant effect of political advertising. It is interesting to mention that we find identical results as Levitt (1994). The decisive variable of our regression was the incumbency status. Running for a reelection increased vote share significantly. Besides these general conclusions, we ran numerous regressions with restrictions to observe how the coefficients changed. The main observation is that political advertising has a positive and significant impact for candidates that have a vote share inferior to 15%. Given that the average vote share is 18%, it means that political advertising has an impact for candidates that are not sure to be elected. Our findings show that an increase of 1% of ads share increases vote share by 0.25%. In summary, in close races, political advertising has an impact. However, it is worth mentioning that this impact remains relatively small.

Thirdly, we exploited direct democratic instruments of the Swiss political system to observe the impact of political advertising. We exploited spatial media market discontinuities to evaluate the effects of political advertising in print media. We created pairs of cantons as similar as possible to isolate the effect of political advertising. Not only did this strategy capture a non-significant effect, but it also demonstrated a negative minimal effect. If the conclusion is not the equivalent of our first regression, the direction is the same: political advertising has no or an extremely minimal effect on voting behavior. Moreover, the different

robustness checks that we ran, confirmed that our strategy respects the exogeneity assumption of any OLS model. Therefore, we can conclude that our strategy worked. In addition, we imposed restrictions on our regressions. We obtained powerful results. If we restrict our database to only popular vote with intense campaigns (more than 1200 ads), the impact of political advertising evolves. Not only did we find a positive and significant impact, but also a relatively large impact. A gain of 1% of advertisement share increases vote share by 0.76%. This conclusion is in line with the intuition. Intense campaign occurs when pro- or against-support committees consider that it is a close race. Because they are not sure to win or lose they will invest massively in political advertising. In this condition, although political advertising has a minimal positive effect it can change the final results given it is a winner-takes-all situation. Therefore, the impact of political advertising in popular vote should not be underestimated. For example, we can focus on the controversial popular initiative “Contre l’immigration de masse” from February 2014. In the cantons Bern, Basel-Landschaft and Graubünden the initiative was accepted with less than 51.4% of yes. This means that an increase of 2% of ads share in these cantons would have changed the final results of the vote. In other words, keeping all other variables constant, 6 additional ads in Bern, 2 additional ads in Basel-Landschaft and 2 additional ads in Graubünden would have changed the final results. These numbers must be taken carefully. It is only a theoretical approach.

Our paper contributes to the literature that determines a minimal effect of political advertising. This conclusion is at odds with the common belief that advertisements buy votes. So, the question remains: Why do candidates/committees invest so much in political advertising if there is almost zero effect? Many authors tried to answer this question. For example, Della Vigna and Kaplan (2007) explain that advertising enhances turnout of citizens with latent political orientation. In other words, candidates or political parties expect to bring to the ballot additional citizens with a latent political orientation towards their party that would have not come without the intense advertisement. This argument is related to the idea that political advertisement increases participation (see Milyo (1999); Burton and Settle (2004); Milligan and Rekkas (2008)). Furthermore, we consider that the small opportunity cost of paying for political advertisement is a second argument. In comparison with the value of winning an election or a vote, the cost for obtaining political advertising in print media is small. Therefore, even a small chance of winning may be sufficient to create the impression that political advertising is worth it. From the politician’s opinion, although it is a minimal positive effect, this effect exists.

FIGURE 5. RELATIONSHIP BETWEEN PARTICIPATION AND POLITICAL ADVERTISEMENT



Source: Made by author

Campaign spending and political advertising effects on voting behavior is still an ongoing debate. Numerous political scientists tried to solve this puzzle. It is a hot debate because it generates crucial policy implications. One of the major repercussions is the question related to the necessity to impose a cap. For example, the Federal Election Campaign Act (FECA) embodies restrictions on federal campaign contributions in the USA. The Bipartisan Campaign Reform Act (BRCA) of 2002 is another example. Our findings contribute to the discussion. On one hand, the minimal positive and non-significant effect that we found for the National Council election and popular votes in general contradicts the idea that spending limits are necessary in Switzerland. On the other hand, the specific results linked to intense campaign and therefore close races for popular vote says the opposite. The small positive effect may be decisive in the case of a winner-take-all situation of popular votes in Switzerland. Committees invest more if they consider that the race is close. If the race is close, a small effect is sufficient to change the final result. To sum up, advertising limits are not compulsory for elections. One explanation is that National Council elections remain highly cantonal or local affairs based (Bühlmann et al., 2016). At the opposite, advertising

limits may be desirable in the case of the popular vote in Switzerland. Even though it is a first step, additional research remains vital to confirm this policy implication. However, policymakers face a trade-off. Imposing advertising limits may increase fairness, but could reduce voters' turnout. A fairness-participation trade-off must be taken into consideration. Figure 5 illustrates the positive relationship between participation and political advertisement in the case of Switzerland. One solution is to set limits not in absolute terms but in relative terms. In other words, policymakers should determine a cap in terms of difference between the pro- and against- sides. However, the implementation of such a rule remains complex.

7. Limitations

The three identification strategies that we used solved the endogeneity problem that comes along with research about political advertising effect. Nonetheless, these strategies occur at a cost. We need to briefly mention the limitations of our models. We identify six limitations.

To begin with, it is obvious that we only concentrate on political advertisements in print media. Even though, Sciarini and Tresch (2014) posit that print media is still a popular means for political advertisement in Switzerland, a wider look at all campaigning tools is necessary to set final conclusions. If television advertisement is not big in Switzerland, the development of social media should not be underestimated. Besides, billboards in zones of high audiences such as train stations or roads remain an important instrument for political communication.

Then, our findings apply only to political advertising in print media. It is possible to postulate that ads in print media embody a good proxy for campaign intensity specifically, and an indirect measure for campaign spending in general. However, the absence of concrete statistics regarding campaign spending prevents us from drawing any conclusions regarding the impact of campaign spending on voting behavior. For example, some agreements between politically oriented newspapers and candidates or political parties remain vague. Hence, we must restrict our findings to political advertising in print media and do not extrapolate them.

Thirdly, with a total of 14,021 ads, the original dataset is a treasure. The problem is, the three identification strategies drastically reduce this dataset. Because of the inherent endogeneity problem, we cannot exploit the enormous potential of the dataset. For instance, our repeat candidate methodology restricts the dataset to 118 observations. Therefore, the loss in terms of precision is important. It would be necessary to extend the database over the years or to develop other strategies to exploit the full potential of this dataset.

In addition, it is important to remember how the dataset has been created. Data related to our variable of interest, which is advertisement share, comes from *Année Politique Suisse* (APS). To track data in up to 56 newspapers, APS works with 12 co-workers in charge of 3 to 6 newspapers each. It is not an informatics process. Consequently, measurement errors become possible. Given it would be a measurement error in the independent variable, we face a risk of attenuation bias. It means that β_1 is closer to zero. Nonetheless, in our case, this risk remains small. The large size of the original dataset reduces the risk that a measurement error creates an attenuation bias. To sum up, although measurements error may exist, it is unlikely that it biases our estimates.

At fifth, our model postulates a homogeneous response from Swiss citizens. The hypothesis of an identical impact of political advertising across citizens seems fragile. Marketing researchers know the high importance of permitting heterogeneous responses to advertising actions (Gordon et al., 2011). We can explain that the effect of political advertising is not the same on a young, new voter as on an older citizen who has already politically made up his mind. Treating the effect of advertisement as homogeneous may explain the unresolved debate on the topic. Hence, it is required that future research takes into account the effect of political advertisement at the individual level (see Gerber and Bühlmann (2014)).

In conclusion, one could question the external validity of our findings. Previously, we stated that the quasi-laboratory setting of Switzerland makes it the perfect country for our identification strategies. On one hand, the segmented media markets, the high degree of independence at the cantonal level, and the specific democratic institutions of Switzerland fabricate the ideal environment for our natural experiment. On the other hand, the peculiarity of the Swiss political system challenges the external validity of the findings. For example, the two-party system and the intense television advertisement in the USA casts doubt on a potential extrapolation of the findings. Switzerland's quasi-laboratory setting is a pro for solving endogeneity issue, but a con for external validity. Nevertheless, the policy implications at the Swiss level are not questionable.

8. Conclusion and Future Directions

Our paper contributes to the literature on the impact of political advertising on voting behavior. We join scholars that stated the minimal effect of political advertising. Given that it is almost impossible to measure the intrinsic quality of a candidate or of a political object, any

research on political advertising effect suffers from an omitted variable bias. We developed three different methodologies to face this inherent challenge of endogeneity. Firstly, we exploit two proxies to estimate the quality of candidates. Secondly, we restrict our database to repeat candidates. This strategy cancels out the quality variable out of the equation. Thirdly, we use media markets spatial discontinuities to run a first differencing with similar pairs of cantons. In summary, we cannot reject the hypothesis that advertisement share has zero effect on vote share. We obtain a minimal and non-significant effect for the three strategies. On one side, it implies that advertising caps are not necessary for elections that remain highly cantonal or local affairs. On the other side, we estimate that a small effect may be sufficient to change the result in a close winner-take-all popular vote. Hence, the discussion about advertisement caps is compulsory.

Our contribution is only one more step on the unresolved path of political advertising effect on voting behavior. To conclude, we elaborate four different orientations for future research. Firstly, the peculiar setting of the Swiss political system does not guarantee full external validity. Therefore, it is essential to run similar regressions in different countries. Secondly, future research should consider other channels of political advertising. Our conclusions are only valid for political advertising in print media. Even though print media appears to be a good proxy for campaign intensity and an indirect measure for campaign spending, other channels such as social media, billboard or television advertising should not be underestimated. Thirdly, future identification strategies should allow for heterogeneous response of citizens. A homogenous impact of political advertising seems rather doubtful. This additional complication should be taken into consideration. Finally, not only heterogeneity in the dependent variable side exists, but also heterogeneity in the independent variable side should not be studied. Not all ads are similar. Color, faces, sentences or size differentiate advertisements.

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10. Appendix

APPENDIX 1. PRINT MEDIA SYSTEM – NEWSPAPER IN SWITZERLAND

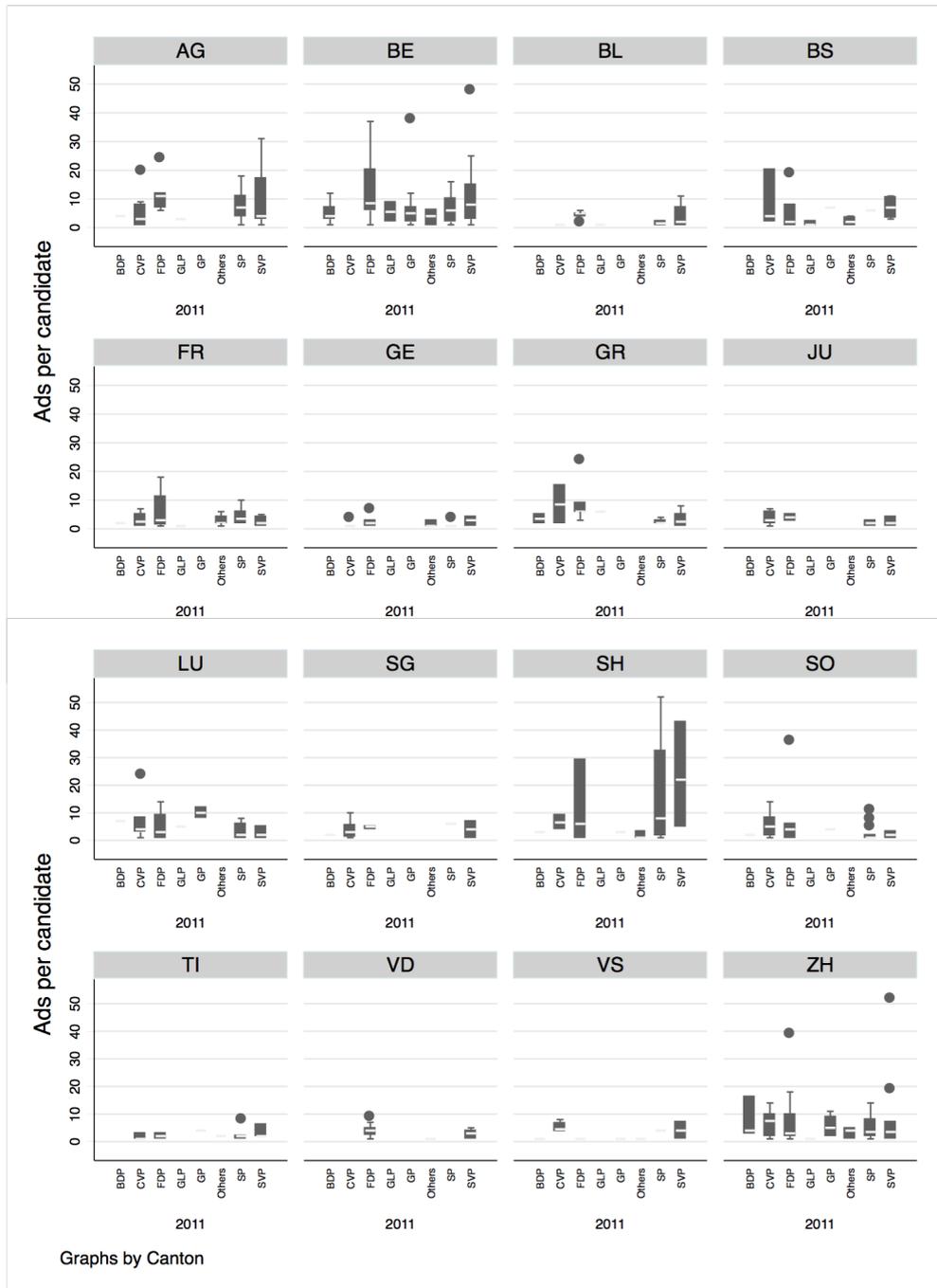


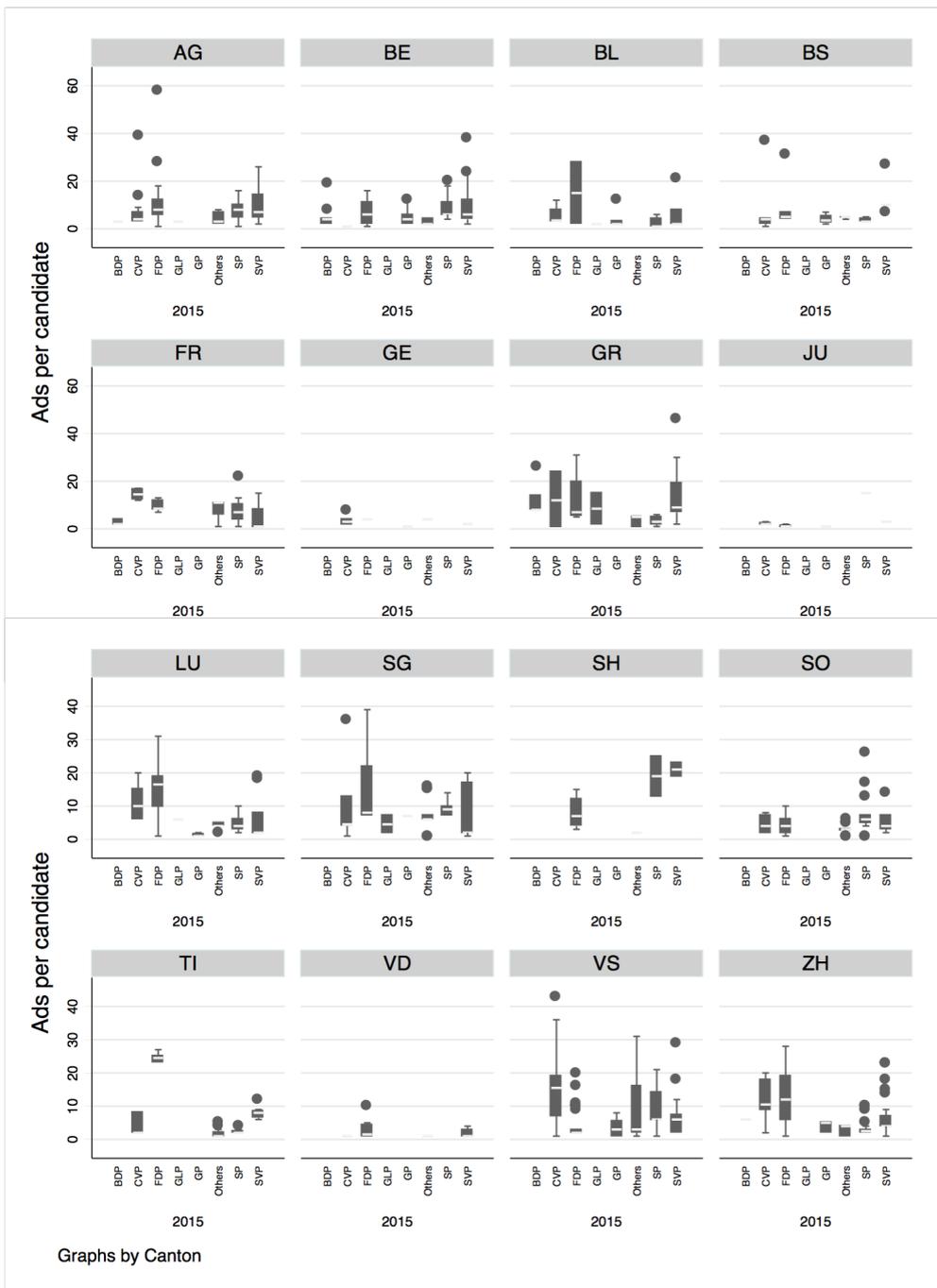
Name of Newspaper	Language region	Canton	Issues per week
Aargauer Zeitung	German	AG	6
Schweiz Am Sonntag (Aargau)	German	AG	1
Appenzeller Volksfreund	German	AI	3
Appenzeller Zeitung	German	AR	6
Berner Zeitung	German	BE	6
20 Minuten (Bern)	German	BE	5
Bund	German	BE	6
Basler Zeitung	German	BS	6
20 Minuten (Basel)	German	BS	5
Basellandschaftliche Zeitung	German	BL	6
Schweiz am Sonntag (Basel-Landschaft)	German	BL	1
Liberté	French	FR	6
Tribune de Genève	French	GE	6
20 Minutes (Genève)	French	GE	5
Südostschweiz (Glarus)	German	GL	6
Schweiz am Sonntag (Glarus)	German	GL	1
Südostschweiz (Graubünden)	German	GR	6
Schweiz am Sonntag (Graubünden)	German	GR	1
Quotidien Jurassien	French	JU	6
Neue Luzerner Zeitung	German	LU	6
20 Minuten (Luzern)	German	LU	5
Zentral Schweiz am Sonntag (Luzern)	German	LU	1
L'Express	French	NE	6
Neue Nidwaldner Zeitung	German	NW	6

Neue Obwalder Zeitung	German	OW	6
St-Galler Tagblatt	German	SG	6
Ostschweiz am Sonntag	German	SG	1
20 Minuten (St. Gallen)	German	SG	1
Schaffhauser Nachrichten	German	SH	6
Solothurner Zeitung	German	SO	6
Schweiz am Sonntag (Solothurn)	German	SO	1
Bote der Urschweiz	German	SZ	6
Thurgauer Zeitung	German	TG	6
Regione Ticino	Italian	TI	6
Caffè	Italian	TI	6
Corriere del Ticino	Italian	TI	6
20 Minuti (Ticino)	Italian	TI	5
Mattino della Domenica	Italian	TI	1
Neue Urner Zeitung	German	UR	6
24 Heures	French	VD	6
20 Minutes (Lausanne)	French	VD	5
Nouvelliste	French	VS	6
Walliser Bote	German	VS	6
Zentralschweiz am Sonntag (Zug)	German	ZG	1
Neue Zuger Zeitung	German	ZG	6
Neue Zürcher Zeitung	German	ZH	6
Tages-Anzeiger	German	ZH	6
Blick	German	Supraregional	6
Blick am Abend	German	Supraregional	5
Matin	French	Supraregional	6
Matin Dimanche	French	Supraregional	1
NZZ am Sonntag	German	Supraregional	1
Schweiz am Sonntag (Supraregional)	German	Supraregional	1
SonntagsBlick	German	Supraregional	1
SonntagsZeitung	German	Supraregional	1
Temps	French	Supraregional	6

Source: Made by author. Based on Bühlmann et al. (2016)

APPENDIX 2. BOX PLOT ADS PER CANDIDATE 2011 AND 2015 (BY CANTON AND PARTY)

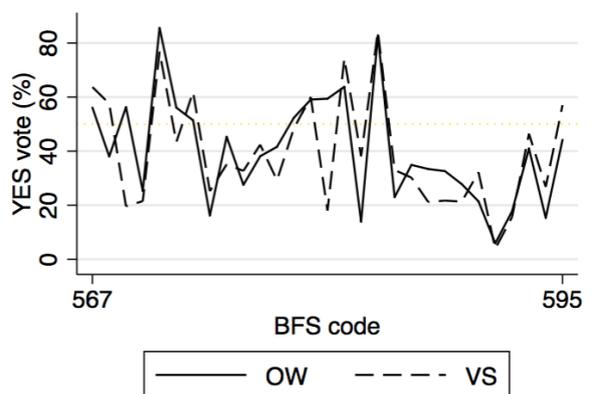
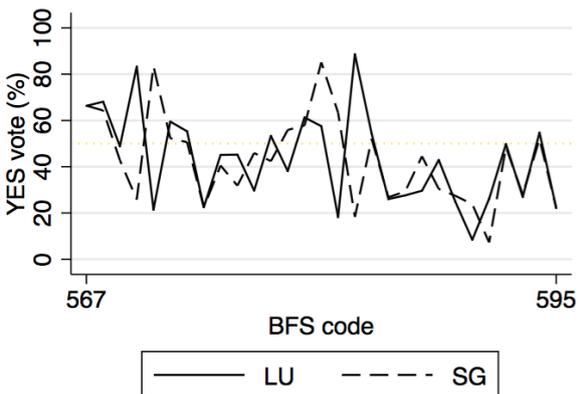
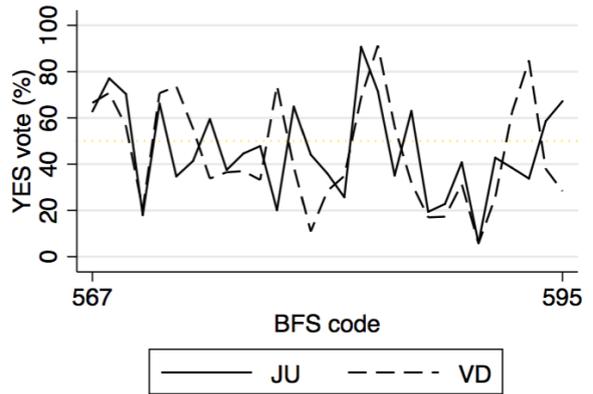
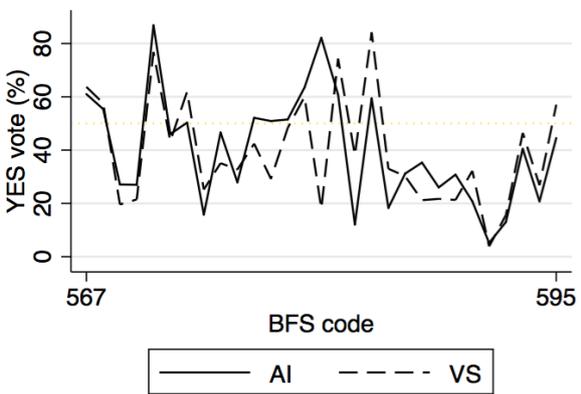
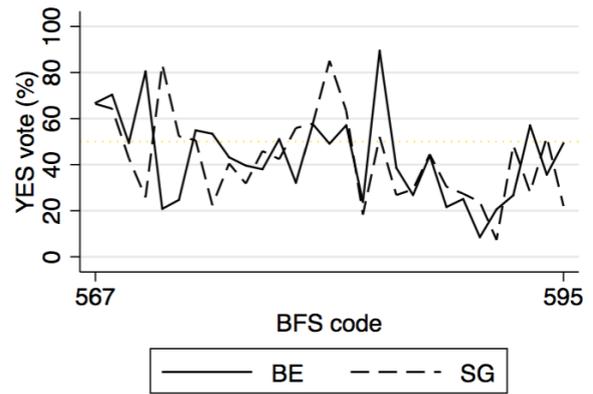
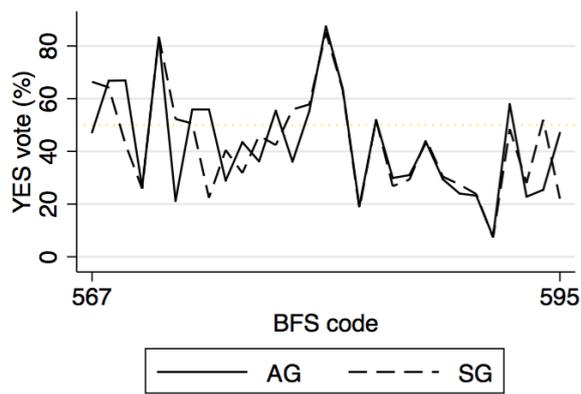
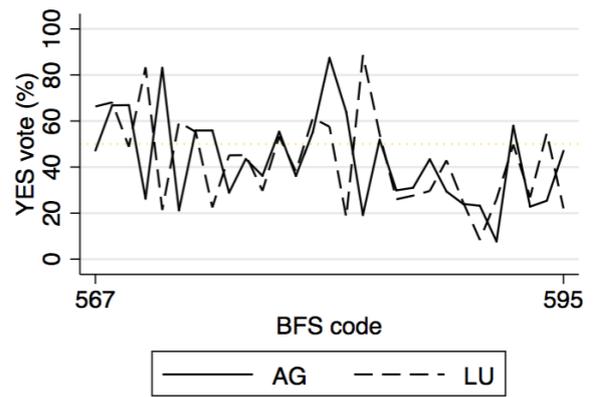
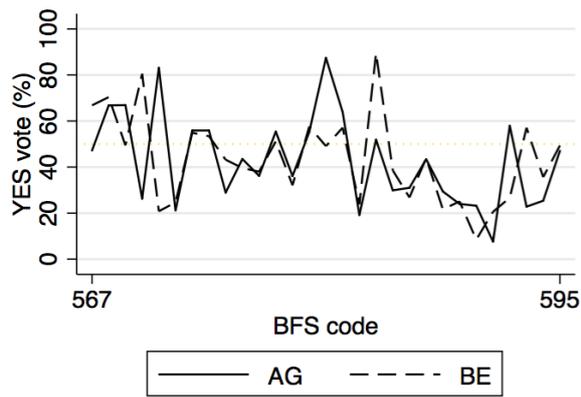




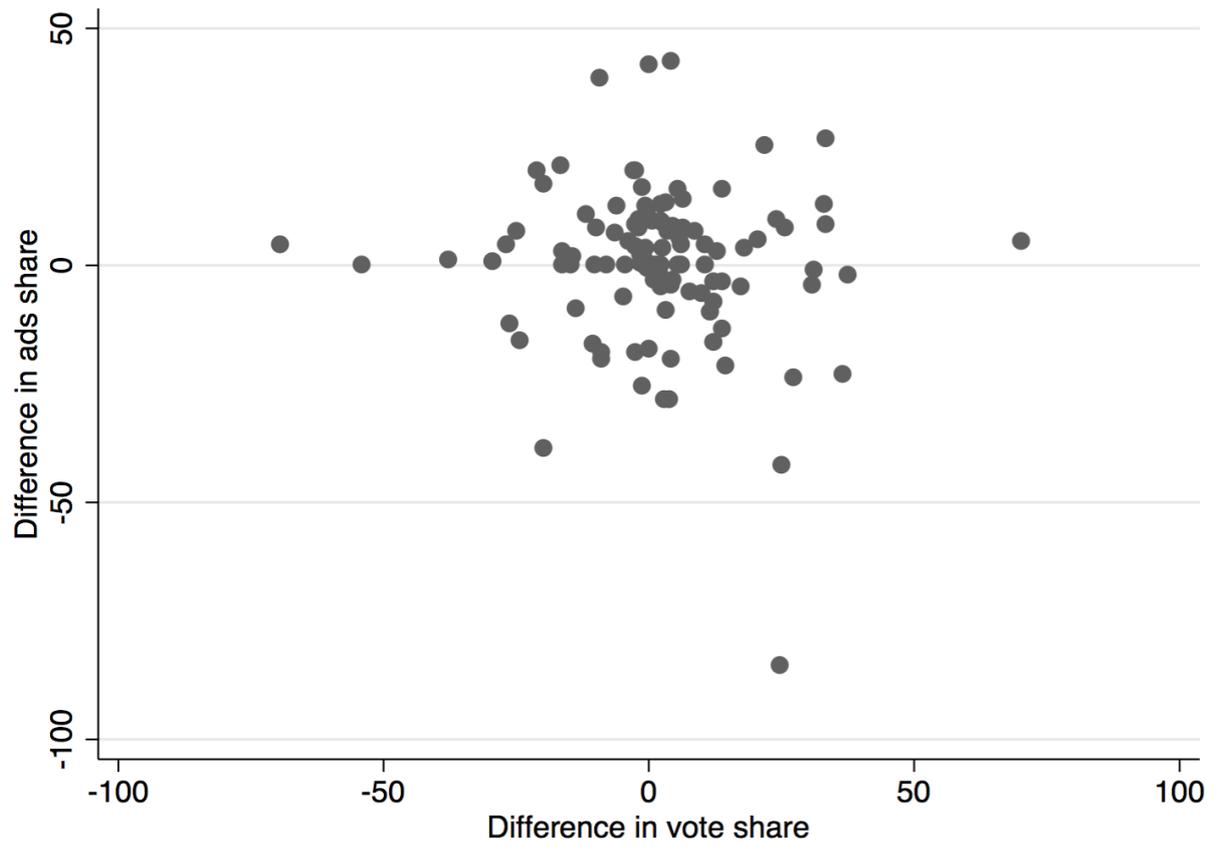
Graphs by Canton

Note: Box plot provide information about the distribution of political advertisements among candidates in 2011 and 2015. We organize data by year, canton and party. It displays the median, the interquartile range IQR (50%) and the upper whisker lines ($1.5 * IQR$). Dots indicate outliers at the upper margin. The figure includes only candidates that ran for the National Council in 2011 or/and 2015. We restricted our dataset to only 16 cantons. We dropped the rural and smaller cantons that were not taken into account in 2011. Moreover, we did not put a box plot for canton Neuchâtel, as there were not enough ads to be interesting.

APPENDIX 3. CANTONAL POLITICAL TREND POPULAR VOTE FROM 2013 TO 2015



APPENDIX 4. OUTLIERS GRAPH (METHODOLOGY 3)



Selbständigkeitserklärung

Ich erkläre hiermit, dass ich diese Arbeit selbstständig verfasst und keine anderen als die angegebenen Quellen benutzt habe. Alle Stellen, die wörtlich oder sinngemäß aus Quellen entnommen wurden, habe ich als solche gekennzeichnet. Mir ist bekannt, dass andernfalls der Senat gemäß Artikel 36 Absatz 1 Buchstabe o des Gesetzes vom 5. September 1996 über die Universität zum Entzug des aufgrund dieser Arbeit verliehenen Titels berechtigt ist.

Bern, 25.04.2016

A handwritten signature in black ink, consisting of several fluid, connected strokes, positioned above a horizontal line.

(Unterschrift)