Internet Access and Electoral Participation in Colombia: Voter Apathy at the Polls.

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Internet Access and Electoral Participation in Colombia: Voter Apathy at the Polls. *

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Abstract

Over the last two decades internet access has reduced the cost of acquiring political information. This paper studies the effect of expanding internet access on electoral outcomes at the municipality level in Colombia. I use a difference-in-differences strategy that compares electoral outcomes in municipalities that received internet right before the presidential election, with those that received it afterwards. I find that internet access reduced political participation at the polls. This behavior is reflected in a decrease in voter turnout, a decrease in the amount of votes for candidates and an increase in blank votes. The reduction on turnout comes from people who live around the internet in high populated places.

JEL Classification: D72, L82, L86, N46, N76

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1 Introduction

Internet has changed the mass media market. News can be found on social networks and *online* newspapers at high speed and low cost. Political economic literature on mass media shows that additional information sources affect electoral and political behavior (Strömberg, 2004; Besley and Prat, 2006), nevertheless the analogous might not be drawn for internet. Political information may increase or decrease with internet access depending on internet users' choices; it depends on whether they choose to read political information or another kind of content. There are some empirical papers that study the effects of internet access on electoral participation (Czernich, 2012; Larcinese, Miner, et al., 2012; Jaber, 2013; Campante, Durante, and Sobbrio, 2013; Falck, Gold, and Heblich, 2014), but they do not provide an analysis on the type of electoral decisions taken at the polls. In this paper, I show that internet access led to a decrease in voter turnout, a decrease in the share of votes for candidates and an increase in the share of blank votes.

This paper studies the relationship between electoral participation and internet access through a national public policy called 'Puntos Vive Digital'[1] in Colombia. To do this I use electoral data at municipal level from the last three presidential elections (2006-2014) and detailed information about the internet points. Using a difference-in-differences strategy with a window selection, I assess the effect of internet access on electoral results. The internet points that began in 2012 are used as a proxy for internet access and I exploit the difference between municipalities that received the internet point before and after the national election of 2014.

The identification of the effect of internet access on electoral behavior is challenging by endogeneity concerns. People that use internet as an information provider are richer and more educated than the average population, which are socioeconomic factors that are correlated with voting behavior (Sondheimer and Green, 2010). My identification strategy attenuates these concerns, because the timing provides as good as a randomization of the internet points allocation. Thus, I exploit the timing of the policy, comparing municipalities that received internet access just before the national election of 2014 with those that

[1]These 'Vive Digital Points' are internet cafes that provide unlimited internet access at no cost. Henceforth internet points or its acronym IPs.

obtained it right after, and the variation of the municipal results of three electoral periods (two before the policy and one during it).

My results suggest that municipalities that received internet access before the election reduced voter turnout and increased their apathetic electoral participation. For this, I divided up the electoral participation by type of vote, and I find a decrease in the share of votes for candidates and an increase in share of blank votes. This result is similar to Chong, De La O, Karlan, and Wantchekon (2014) that found detachment effects from the electorate that get informed about political context, they prefer to mark the protest vote which represents their dissatisfaction with the set of candidates.

These results are economically significant. I estimate that the reduction on turnout comes from people who live around the internet point in high populated places. Also, the number of internet points affect proportionally the results in terms of turnout, candidates and blank vote shares. Then, municipalities with more points show a greater effect that those with less internet points. Additionally, I estimate the persuasion rate of the internet access on apathetic behavior (Enikolopov, Petrova, and Zhuravskaya, 2011), and this rate in this context corresponds to the percentage of voters that were exposed to internet before the 2014 national elections and were persuaded to vote in blank. I calculate a persuasion rate of 14.5 percent, an estimate greater than previous results in the literature.

To the best of my knowledge, this is the first paper to investigate the relationship between electoral outcomes and internet access in Colombia; using a quasi-experimental design based on a public program of internet diffusion. Also, the document contributes to the literature that studies the determinants of the blank of votes (Driscoll and Nelson, 2014; Kouba and Lysek, 2016), suggesting a causal relationship between internet access and apathetic behaviors at the polls. Moreover, the document moves away from the literature that studies this relationship with surveys.[2] Nevertheless, my results using individual-level data, suggest that people who inform with social media reduce their probability to report vote in presidential elections. These individual results support the municipal-level

[2]The documents that use this kind of data are biased by problems of self-report (Selb and Munzert, 2013; Sciarini and Goldberg, 2016). In the Colombian context, the Politics Culture Survey of 2015 question about whether people goes to the polls in presidential election of 2014. The 72% of respondents report go to vote meanwhile the turnout of first round in the presidential elections was of 35%.

results in the sense that they make aggregation of the individual behaviors.

This paper contributes to the empirical literature that studies the political effects of media. Specially to the studies that evaluate the effect on electoral participation[3] of the entry of newspapers (George and Waldfogel, 2006; Snyder and Strömberg, 2010; Gentzkow, Shapiro, and Sinkinson, 2011), radio (Strömberg, 2004; Adena, Enikolopov, Petrova, Santarosa, and Zhuravskaya, 2015) and television (Gentzkow, 2006; DellaVigna and Kaplan, 2007; Enikolopov et al., 2011; González and Prem, 2017). Closely related to my paper are Czernich (2012); Larcinese et al. (2012); Jaber (2013); Miner (2015) which estimate the effects of internet access on electoral participation. My findings on electoral participation are similar to Campante et al. (2013); Falck et al. (2014), who made similar analyses, using panel data and causal estimations, to the cases of Italy and Germany, respectively. Moreover, the literature shows a positive and strong correlation between internet access and young political participation (Steinberg, 2015; McAllister, 2016; Feezell, Conroy, and Guerrero, 2016).

The rest of this article is organized as follows. The next section describes the context of political behavior, summarizes the history of internet in Colombia and gives a description of the policy. Section 3 presents data for municipalities divided into political participation, 'Vive Digital' policy and municipal characteristics. Section 4 shows the identification strategy. Section 5 summarizes the main results. Section 6 presents robustness checks and interpretation of my estimates, and the final section concludes.

2 Background

2.1 The Internet and Vive Digital Plan in Colombia

Broadband access was brought to Colombia in 1998 by the National Ministry of Technology and Information (MinTIC). Internet penetration grew until 2007 but slowed down when the Congress approved a law that regulated the broadband market. This law demanded

[3]My study is closely related to political economy literature that study the effect of mass media on political participation. DellaVigna and Gentzkow (2010); Prat and Strömberg (2013) provide an overview of this literature.

a minimum internet speed from service providers throughout Colombia, producing perverse incentives for firms. Due to this law, internet providers started to avoid infrastructure construction in remote places of Colombia because of high transportation costs (Becerra, 2013). As a result there was a reduction in the growth of internet penetration for approximately five years.

After the effort to spread internet in Colombia failed, the MinTIC created the 'Vive Digital' policy that began in 2012 using different strategies, with which they wanted to increase the supply of broadband access in Colombia by four times and expand internet penetration from 27% to 50% (MinTIC, 2012). A key component of this policy is its social impact, as it aims to reach low income households located in remote areas. It aims to connect isolated places with the internet digital network. Colombia has been recognized globally for these efforts as the fourth country that has significantly closed its digital gap (OECD, 2014).

The 'Vive Digital' policy promotes the creation of community centers with internet access in different municipalities of the country, where the demand and penetration of internet services was very low (MinTIC, 2012). These internet points are located in municipalities where local government has shown interest (with initiatives such as providing a physical space),[4] and where there is an established terrestrial broadband nearby. Today, the country has 888 internet points; 64% of them are standard IPs and 36% are IPs Plus (IPs+). The difference between them is that with a IPs+ the government provides free internet access as well as training sessions for the population, in order to create new technical and technological skills. Meanwhile, in the standard internet points the government just offers free internet access (MinTIC, 2012). Approximately half of the country's municipalities[5] have been included in the policy and some of them have more than one internet point[6].

Vive Digital Plan has been developed in four phases. Phase 0 was built on a supply model, where the main objective was to provide internet at municipalities with high population density. This phase was a pilot to study the operation of the internet points in

[4]The MinTIC assumes the cost of hardware provision, software and maintenance services of the internet point, while local government either pays for or provides the physical space for the internet point.

[5]532 from 1116 municipalities

[6]See Figure 6 refer to appendix A to see the precise location of IPs in Colombia

Table 1: Numbers of internet points installed by phase

	Phase 0		Phase 1		Phase 2		Phase 3	
	May 2012	Apr. 2013	Apr. 2013	Jun. 2015	Jun. 2015	May 2016	May 2016	Jul. 2018
# of Municipalities	68		317		147		-	
# of Internet Points	71		495		322		-	

Notes: Table shows the number of municipalities that received internet points and the number of installed internet points by phase. Table constructed with information from MinTIC (2018) section *Proyecto de Acceso a las TIC en zonas urbanas - Puntos Vive Digital, Fases 0, 1, 2 y 3*

order to learn about the implementation of the program. In this phase, 68 municipalities were selected between 2012 and 2013, to test and understand the acceptance of the internet points. Phase 1 was built on a demand model, where there was a public announcement to the local authorities of the municipalities that wanted to receive at least one internet point. This call resulted in 886[7] proposals from municipalities that were interested in gaining access to the policy, only 317 municipalities with low internet penetration were selected to receive the internet point between 2013 and mid 2015. Phase 2 had the same objectives of the previous two phases but it included the IPs+ in the policy, in order to engage a greater amount of the population with the technology. In this phase 322 internet points were awarded at 147 municipalities from mid 2015 to mid 2016. Finally, Phase 3 had the purpose of continuity of the policy until July 2018, providing maintenance to the installed internet points from the previous phases (MinTIC, 2018).

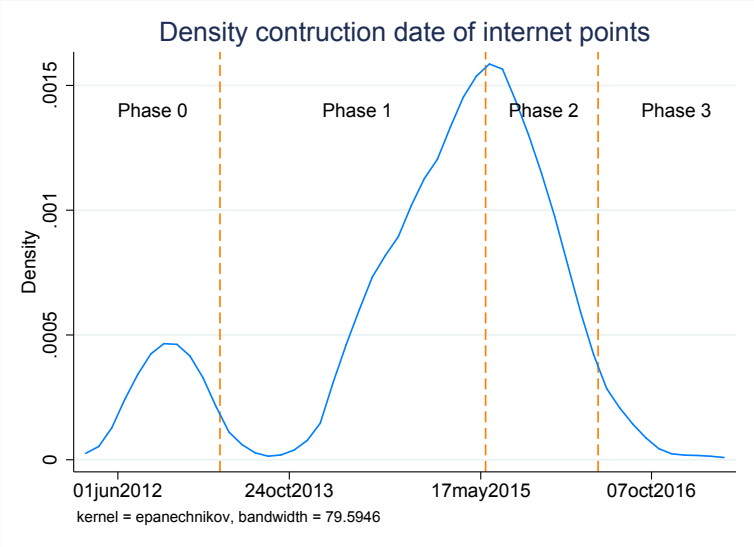
Figure 1 shows the density of the construction date of the internet points. The distribution has two peaks that overlaps with the first phase and the next two phases of the project. The phase 0 aims to determine the acceptance of the internet points in densely populated municipalities. The phases 1 and 2 deploy the internet points throughout the country, the difference between the phases is that phase 2 installed internet points with additional characteristics. Nevertheless, the analysis will use mainly the internet points installed in the phase 1 of the project, and exploits the difference in the municipalities that received the internet points just before and just after the presidential election.[8]

This analysis uses the internet points installed in the end of the Phase0 and beginning of

[7] About eighty percent of the country

[8] Following Cattaneo, Jansson, and Ma (2016), the figure 9 shows the test based on density discontinuity after and before 2014 presidential elections

Figure 1: Construction of internet points



Notes: Chart shows the density of the construction date of internet points. The dashed orange line represents the end and begin of the phases.

the Phase 2 of the project. I chose this interval because the public policy is not random, and the time frame of these phases provides a quasi experimental design to the installation of the internet points. The analysis use only the internet points installed at municipal areas, I exclude the department capitals because there are more internet access facilities that could harm the identification strategy.

The internet points allocation provide me an exogenous variation in municipalities that have access to the internet. Then, in order to estimate the effect of the internet access on electoral outcomes, one needs to know if the population where the internet points are available really use the internet. Using data from the impact evaluation of the DNP (2015) about the internet points in the Colombian municipalities. They asked about whether the respondent reports go the the internet point. The linear probability model estimated in the table 2, indicates a statistically significant difference in the use of the internet points in the municipalities where there are at least one internet point available.[9]

[9]See Appendix C for more details about the use of the internet points

Table 2: Effect of internet point availability on internet usage: survey evidence

	Indicator for survey respondent who reports go to the internet point	
	(1)	(2)
At least one internet point available	0.441***	0.431***
	(0.009)	(0.011)
Constant	-7.77e-16	0.219***
	(2.0e-9)	(0.026)
N. of obs.	5,129	5,098
R-squared	0.26	0.31
Controls		✓

Notes: Based on the DNP (2015) data, using survey weights. Control variables include age, gender, occupation and education level. Robust standard errors in parentheses. Significance level: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

2.2 Political participation in Colombia

The Colombian political system is constructed as a representative democracy, where the president is elected each four years. The presidential election takes place in two rounds, unless in the first round one candidate obtains more than fifty percent of the total votes. In this paper, I focus on the first rounds of each election for comparability across years, and my outcome variables are voter turnout and vote shares defined as percentage of candidates and blank votes.[10]

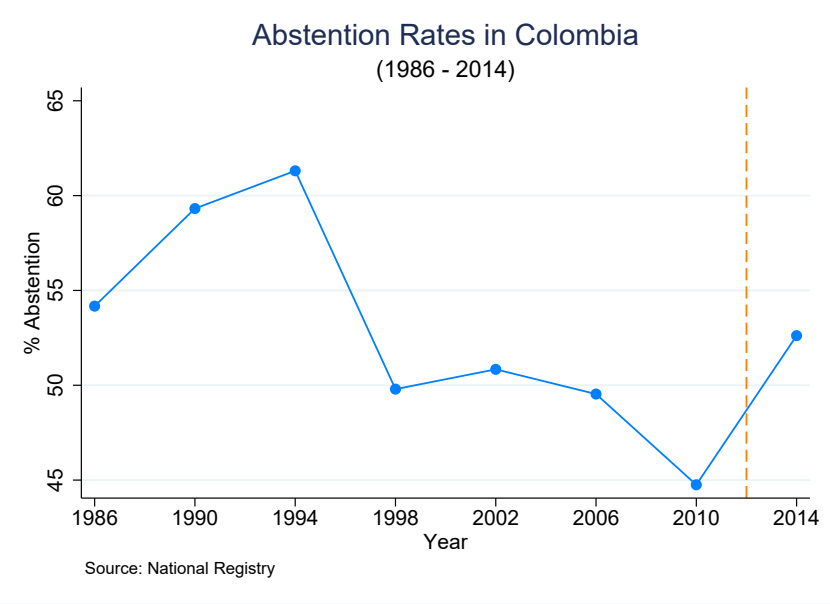
In the last forty years, Colombia has experienced a fall in the abstention rates from the nineties until the first decade of the 21st century elections, with slight increases in the presidential elections of 2002 and 2006. Although Colombia improved its participation rates compared to other Latin American countries, it is still one of the worst performers when it comes to participate in national elections (Barrero, Liendo, Mejía, and Orjuela, 2013). Abstention is motivated by corruption scandals, that have made voters think their vote does not have any impact on the electoral results and that politics is not important.[11]

Figure 2 represents the abstention rates of the first round of the presidential elections in Colombia since 1986. In the national elections from 1986 to 1994 the abstention rate was very high, on average almost 58% of the Colombians qualified to vote did not vote.

[10]See Appendix B for a detailed explanation about vote counting in Colombia.

[11]See `http://www.eltiempo.com/elecciones-colombia-2018/jurados-y-votantes/abstencion-de-jovenes-en-elecciones-de-colombia-182088`

Figure 2: Historical abstention rates in presidential elections



Notes: Chart shows historical abstention rates in first round elections from 1986 to 2014 in Colombia. The dashed orange line represent the beginning of the Vive Digital policy in 2012. Abstention rate was defined as the number of people that did not vote over total population.

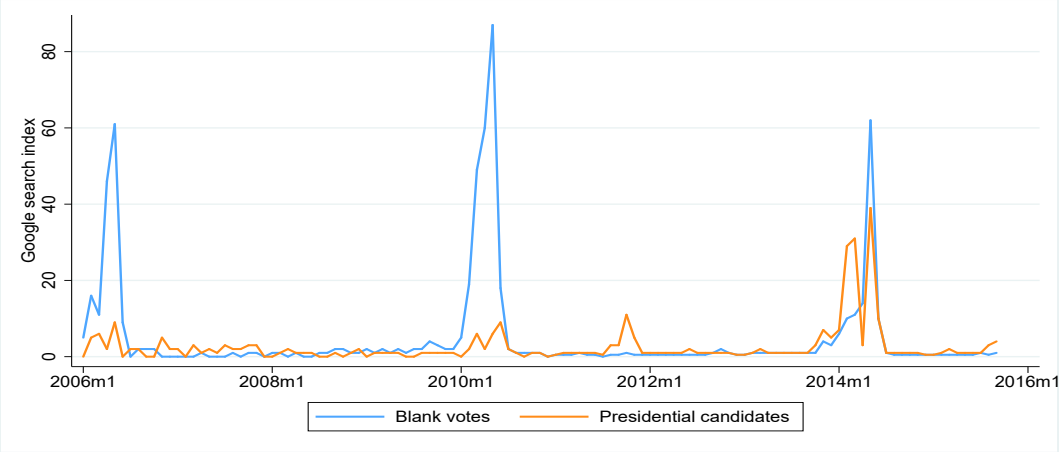
In the presidential elections between 1998 to 2010 the abstention rates had decreased considerably. This decrease was around 10pp when comparing the average between the two periods. Nevertheless, in 2014 the abstention increased considerably compared to the electoral results of the 2000s.

Moreover, the Colombian case is interesting it self because the blank votes are counted as another candidate. This variation generates competence between candidates and blank votes, giving rise to find effects of an internet access policy over different electoral outcomes. Also, this question contributes to the literature that study the determinants of the protest votes (Power and Garand, 2007; Uggla, 2008; Driscoll and Nelson, 2014; Kouba and Lysek, 2016).

On the other hand, the political information consumed by the electorate, could be separated between the candidates advertising campaigns. In Colombia, blank votes are counted as an independent candidate, then I will consider the blank vote as an opposition candidate that runs for the national elections. The Figure 3 plots the evolution of the number of Google searches for the presidential candidates and blank votes. The plot clearly shows the seasonly in the election periods, peaking in March, the month of first

round presidential elections. The proportion of searches for candidates in 2014 is lower than 2010 presidential election, and proportion of blank votes searches is greater than in the last presidential election.

Figure 3: Google searches for presidential candidates and blank votes in Colombia



Notes: Chart present the number of Google hits for the phrases *voto en blanco* and *candidatos presidenciales* in Colombia. There are monthly data scaled in a range from 0 to 100, where 100 is the highest possible amount of searches.

3 Data

This paper uses four data sources for the analysis. The first source is a political participation panel by municipality about the presidential elections (first rounds) of 2006 to 2014 from the National Registry of Colombia (Registraduria Nacional del Estado Civil). The second source of data comes from MinTIC with detailed information about the internet points such as the municipality where internet point is located, its address and its opening date. The third data source is a density population panel by age groups per pixel from 2006 to 2014. I use the population rasters per pixel of 100x100m constructed by the Worldpop project (Sorichetta, Hornby, Stevens, Gaughan, Linard, and Tatem, 2015). This source allows me to identify the number of people per pixel by age groups, in contrast to the national projections of population by age groups[12] at the municipal level. Finally, I use the municipal panel from the CEDE[13] (Acevedo, Bornacelly, et al., 2014) with information on

[12]Available data in National Statistics Bureau of Colombia (DANE)
[13]Center for Studies of Economic Development of Universidad de los Andes

rurality, literacy rate, infant mortality rate, unmet basic needs, total population, guerrilla presence and geographical municipal characteristics.

Figure 4 summarize in a timeline the data used in this paper. Three presidential elections where two of them are pre-treatment periods (2006, 2010) and the last one in 2014 while the policy was implemented. The strategy should compare electoral outcomes from 2006 to 2014 in municipalities that did not receive the internet point before national election of 2014, with the electoral outcomes from 2006 to 2014 in municipalities that received before 2014. Nevertheless, the statistical comparison of the municipal characteristics indicates that there are differences between the two groups.[14] Then, the best approach was to choose a window around the 2014 election to select and compare similar municipalities that received the internet point just before and just after the national election. This window was defined between February 2013 and August 2015.[15]

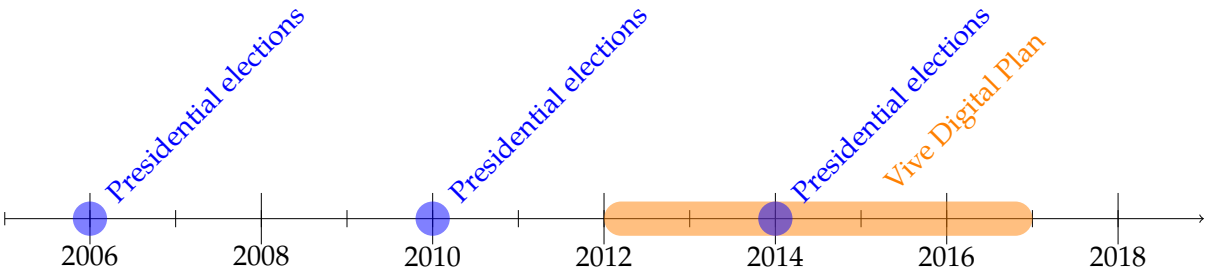


Figure 4: The data in a timeline

Table 3 presents summary statistics of the municipalities used in the analysis; municipalities that received the internet point before the national election of 2014 compared to those that received internet later. Panel A summarizes the electoral outcomes such as turnout and vote shares in the pre-treatment period. Panel B shows characteristics of the internet points, 'Vive Digital' policy and the share of people who live around the internet points; shares of population were defined as the ratio of people who live around the internet point divided by the municipal population. Ratios around 400m and 600m were defined as the total population who live in the middle of the buffers[16]. Panel C and D shows the balance in terms of the political characteristics for the mayoral elections in

[14]The statistical difference was explained with the selection criteria used by MinTIC.
[15]The results are robust to different bandwidths. See Figure 8.
[16]See Figure 7 from the Appendix A for a graphical explanation.

2011 and presidential elections in 2014, respectively. Panel E summarizes characteristics of the municipalities such as population, literacy rate, poverty rate, conflict presence and geographical characteristics.

The electoral participation is on average 46%, and voter statistics indicate that the majority of the votes were for the candidates and only 2% of the votes are marked as blank votes. Also, the table suggests that turnout, candidates, and blank vote shares (before internet policy) are similar between treated and control municipalities. In terms of the 'Vive Digital' policy, the municipalities receive on average the same number of internet points after and before the 2014 presidential election. Shares of population around the internet point between 200m-600m are similar within municipalities, and the average of people living near internet points is almost 5%. In terms of remoteness, the distance between the internet points and the department capital suggest that the internet points installed before presidential election are nearer than those installed later, difference that does not affect directly the electoral outcomes. However, this difference disappear computing the distance from the internet points to the nearest cities.

The municipal political characteristics such as the number of mayoral candidates, electoral competition, effective number of parties and mayors affiliated with the president party, were balanced within the groups. Additionally, the electoral competition in the 2014 presidential elections is statistically similar between groups. Finally, the municipal characteristics from Panel E shows that municipalities are balanced in all characteristics. This table supports the random assignment of the internet points in the window around presidential election.

The table 14 shows summary statistics between the municipalities that are in the sample and rest of Colombia. This comparison will let to check whether the municipalities chosen for the analysis are representative of the country. Column 5 reports the estimated coefficient from regress the reported variable with a dummy that identifies stay in the analysis sample, including department fixed effect, and in column 6 its p-value. Unfortunately, in some characteristics, the municipalities in the sample are similar but others are different, making it difficult to extrapolate the results.

Table 3: Summary statistics for municipalities used in the analysis

	Received point **before** elections	Received point **after** elections	Difference	t-stat
Panel A: Outcome variables in 2006				
Voter Turnout	45.72	45.80	0.08	0.06
Share of Candidates votes	96.18	96.00	-0.18	-1.05
Share of Blank votes	1.87	1.90	0.04	0.38
Panel B: Vive Digital Policy				
# of Internet Points	1.41	1.28	-0.13	-1.67
Share pop. around IP 200m	1.57	1.04	-0.54	-1.14
Share pop. around IP 400m	2.05	2.62	0.58	1.00
Share pop. around IP 600m	4.32	4.28	-0.04	-0.04
Dist. from the IP to deparment capital (km)	41.22	51.18	9.97	2.79**
Dist. from the IP to two nearest cities (km)	129.83	138.79	8.96	1.19
Dist. from the IP to three nearest cities (km)	249.70	260.73	11.03	0.88
Mean dist. from the IP to the capitals (km)	494.56	484.77	-9.80	-0.95
Panel C: Municipal political characteristics, mayoral elections in 2011				
# of mayoral candidates	4.21	4.15	-0.06	-0.28
Political competition (1-HHI)	0.37	0.35	-0.01	-0.93
Effective number of parties (Laakso et al, 1979)	2.98	3.03	0.05	0.38
Effective number of parties (Golosov et al, 2010)	1.56	1.55	-0.01	-0.12
Mayor belongs to the president party	0.26	0.23	-0.03	-0.53
Panel D: Municipal political characteristics, presidential elections in 2014				
Political competition (1-HHI)	0.30	0.29	-0.01	-0.61
Effective number of parties (Laakso et al, 1979)	3.65	3.71	0.05	0.43
Effective number of parties (Golosov et al, 2010)	2.32	2.38	0.07	0.63
Panel E: Municipality characteristics				
Rurality index †	0.53	0.51	-0.02	-0.55
Literacy rate 2005	87.53	86.33	-1.20	-1.58
Infant mortality rate	19.05	20.20	1.14	1.66
Unmet basic needs	33.82	35.17	1.36	0.66
Guerilla FARC presence	0.13	0.15	0.02	0.51
# of detentions	1.71	1.64	-0.07	-0.13
# of guerilla attacks	0.44	0.59	0.16	0.86
Log total population	9.85	9.77	-0.08	-0.71
Log urban population	8.96	8.88	-0.08	-0.49
Log total literate people 2005	9.26	9.16	-0.10	-0.87
Municipality area (km^2)	363.28	484.29	121.01	1.44
Municipality altitude (MASL)	1,305.24	1,502.91	197.67	0.84
Observations	107	123		

Notes:† Rurality index=rural population/total population. The table reports differences of municipalities that received internet before and after of the national election of 2014. The treated are municipalities which receive after of February of 2013 and before the national elections, and the control are municipalities that receive after of the national elections and before of August of 2015. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

4 Identification strategies

I want to exploit the difference on electoral results across years between municipalities that received internet access before and after 2014 national election. In an ideal experiment, I would identify municipalities randomly exposed to the internet points with a total coverage of internet, and observe their voting behavior over time. Also, I will compare them with the electoral results of municipalities non-exposed to the internet points. However, the installation of the internet points were limited to a few points per municipality and did not follow that scheme, then I will assume that municipalities get informed from IPs.

I will estimate two difference-in-differences models using municipality electoral results in communities exposed to internet through the internet points compared with those non-exposed.[17] The first equation to estimate is the following:

$$E_{mt} = \theta NumberInternetPoints_m * Post_{mt} + X'_m\phi * Post_{mt} + \gamma_m + \alpha_t + \varepsilon_{mt} \qquad (1)$$

where E_{mt} is the electoral outcome in municipality m in the period of election t. $Post_{mt}$ is a dummy that indicates if municipality m received internet point before t. $NumberInternetPoints_m$ measures the total number of internet points that are in the municipality m before the presidential election. The matrix $X'_m\phi * Post_{mt}$ includes the control variables, that are not balanced in the municipalities, interacted with $Post_{mt}$ to have controls that vary on time. γ_m is a vector of municipality-fixed effects which captures specific determinants of electoral outcomes at the municipalities. The vector α_t represents the election fixed effect that capture the effect of specific characteristics of the election t.

The identification strategy includes the total number of internet points, because the quantity of points in a municipality is a proxy of internet access. More points of access increase the probability of people to surf on the net, which could increase their political information. Moreover, an additional internet point change the share of eligible voters exposed to internet access. Thus the number of access points at the municipality could affect directly the electoral statistics. The number of internet points was interacted with

[17] Similar identification strategies are performed in Ferraz and Finan (2008); Bobonis, Cámara Fuertes, and Schwabe (2016); Avis, Ferraz, and Finan (2018); Lichand, Lopes, and Medeiros (2016)

the period after each municipality received the internet point. This interaction will capture the effects of the internet points after the start of the policy in the municipality.

$$E_{mt} = \sum_{b \in B} \theta_b Ring\_Ratio(pop)_{mtb} * Post_{mt} + X'_m \phi * Post_{mt} + \gamma_m + \alpha_t + \varepsilon_{mt} \quad (2)$$

$$\text{where } b = \{0m \ (200) \ 600m\}$$

Equation (2) follows the same structure that equation (1), but with the difference that explanatory variable change from number of internet points per municipality to the share of population which live around the point. $Ring\_Ratio(pop)_{mtb}$ measures the share of population in the vicinity b of the internet point at the municipality m in the period of election t. The neighborhood b was defined as a circle around the internet point with radius 200m, 400m and 600m. The first neighborhood is a circle and the others are rings to avoid double counting. These buffers allow to identify the effect of the internet point considering the proportion of population who live around the internet points, the relationship should be considered as the effect of the internet points when they are located in densely populated sites.

The coefficients θ and θ_b identify changes in the electoral outcomes after the internet policy begins at the municipality, weighting with the number of internet points and population who lives in the neighborhoods around the points, respectively. This result should be compared with municipalities that was treated just after the presidential election of 2014 in the window specified in the previous section. This strategy allows me to identify the effect of internet access on electoral outcomes.

$$E_{mt} - E_{m(t-1)} = \theta \ InternetPoint + \gamma_d + \varepsilon_m \quad (3)$$

The results of the empirical strategy will be valid if there is not an effect of the treatment before the national election of 2014. To explore difference in pre-trends periods between municipalities with internet points right before the national election of 2014 with those that did not received. The equation (3) regress the change from the electoral outcome in the national elections from 2006 to 2010, on the treatment and department fixed effects.[18] The table 4 shows that there are no effects of the treatment in the difference of the outcome variables in the pre-trends periods.

[18]This strategy was taken from Hornbeck and Naidu (2014).

Table 4: Parallel trends assumption

	Δ Voter Turnout		Δ Share Candidates		Δ Share Blank	
	(1)	(2)	(3)	(4)	(5)	(6)
Mun. receive before 2014 the Internet Point	0.79		-0.023		0.089	
	(0.62)		(0.16)		(0.099)	
# Internet Points		-0.0097		-0.90		0.19
		(3.73)		(1.04)		(0.58)
N. of obs.	230	230	230	230	230	230
Mean of Dep. Var.	3.68	3.68	0.56	0.56	-0.34	-0.34
SD of Dep. Var.	4.06	4.06	0.92	0.92	0.52	0.52
R-squared	0.33	0.33	0.27	0.27	0.22	0.22

Notes: The variation of turnout was defined as the difference between 2010 minus 2006, only first round of presidential elections. All estimations include department fixed effects and municipality characteristics as controls such as population, population squared, distances from the IP to the department capital, rurality index and poverty index, with dummies included for missing data. Robust standard errors in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

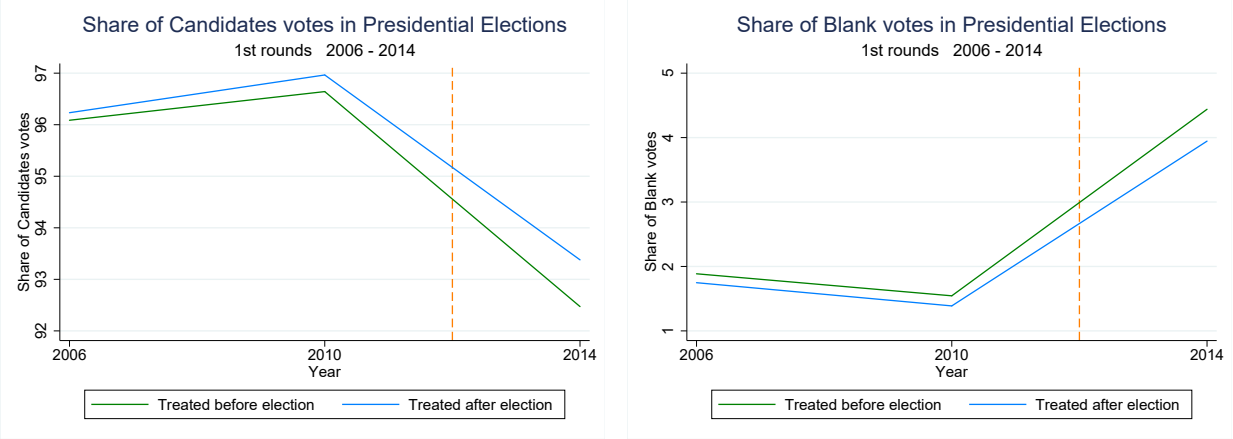
5 Results

5.1 Effects of internet availability on electoral participation

The main findings are plotted in Figure 5. The charts plot the electoral behavior of municipalities in the study sample. In chart (a) municipalities that receive access to internet right before the national election, show a smaller trend in the share of candidates votes than those that received later. Chart (b) compares the same group of municipalities and shows a slight increase in the share of blank votes than those that received later.

The results of estimating the effect of the internet access point on different electoral outcomes are presented in Table 5. This table presents the estimated coefficient of Equation 1 with three different outcomes; voter turnout, share of votes for candidates and share of blank votes. Columns 1 and 4 show the negative effects of the internet point availability on those electoral outcomes, however the coefficients are not significant because one access point only covers a small share of population that did not change their electoral participation. Nevertheless, the measurement of internet access as the total number of internet points at municipality, presents negative and significant effects on the voter

Figure 5: Evolution of electoral behavior at the polls



(a) (b)

Notes: Chart (a) presents the share of votes for candidates in first rounds of presidential elections from 2006 to 2014. Chart (b) presents the share of blank votes with the same time frame that chart (a). The dashed orange line represents the beginning of the Vive Digital policy in 2012.

turnout and the share of candidates votes. The number of internet points was standardized to facilitate the interpretation. The decrease of voter turnout and share of candidates votes is 0.67 and 0.40 per an increase in one SD on the number of internet points, in the difference-in-differences estimator, using the municipalities without internet point before the national elections as the control group. Also the results are robust controlling for relevant municipalities' socioeconomic characteristics.

The last three columns of the table 5 shows effects over the share of blank votes. They show a positive relationship between the internet point availability and an increase in the number of blank votes. Although column 7 does not present a significant result, columns 8 and 9 present a significant effect and an increase of 0.22 in the blank votes, per an increase in one SD on the number of internet points.

The previous findings suggest that the internet points motivate apathetic behavior from the electorate expressed as reduction of voter turnout and share of votes for candidates. Furthermore, the increase in the number of blank votes suggest that the internet points lead to detachment from the electorate with politics. There are two possible mechanisms that can explain the negative relationship between internet access and electoral outcomes. First, internet access points provide information to the electorate about the government issues, candidates' characteristics and government plans. This information could moti-

Table 5: Effect of the presence of internet point in the electoral outcomes

	Voter			Share					
	Turnout			Candidates			Blank		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
IP × Post	-0.30			-0.076			0.22		
	(0.57)			(0.25)			(0.19)		
# IPs × Post		-0.78***	-0.67**		-0.46***	-0.40**		0.24**	0.22*
		(0.26)	(0.33)		(0.14)	(0.16)		(0.11)	(0.12)
N. of obs.	690	690	690	690	690	690	690	690	690
Mean of Dep. Var.	45.5	45.5	45.5	95.1	95.1	95.1	2.62	2.62	2.62
SD of Dep. Var.	9.17	9.17	9.17	2.61	2.61	2.61	1.74	1.74	1.74
R-squared	0.62	0.63	0.63	0.78	0.79	0.79	0.78	0.78	0.78
Controls			✓			✓			✓

Notes: Time period is 2006–2014 only first round of presidential elections. All estimations include municipality and election fixed effects. Moreover, columns 3,6,9 include municipal characteristics as controls such as population, population squared, distances from the IP to the department capital, rurality index and poverty index, with dummies included for missing data. Clustered standard errors, by municipality, are in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

vate community to reduce their electoral participation (Chong et al., 2014). Second, in this context, internet access induced substitution away from conventional media such as newspapers, radio and television; because it offers a greater variety of content. Thus, internet consumers might be less informed and that could lead to a decrease in the electoral participation (Gentzkow, 2006; Falck et al., 2014).

In addition to the previous results, using individual self-reported votes based on DANE (2015) data. The table 6 shows that individuals which inquire information with internet especially through social media, reduced the probability to report vote in the presidential election of 2014. This relationship is robust controlling for different individual characteristics. Nevertheless, the survey design did not include all municipalities used in the analysis, then results are less precise and the coefficient is smaller than the previous one. But these individual results also support the previous municipal-level results in the sense that they dismiss the possibility of ecological bias.

Table 6: Individual votes reduced with internet access

	Report go to the polls in 2014 presidential elections					
	(1)	(2)	(3)	(4)	(5)	(6)
Informed with internet (Social media)	-0.02***	-0.02***	-0.02***	-0.02**	-0.02**	-0.02**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
# of public utilities services		-0.006	-0.006	-0.004	-0.004	-0.004
		(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Women			0.02***	0.02***	0.02***	0.02***
			(0.007)	(0.007)	(0.007)	(0.007)
Education level				0.01***	0.01***	0.01***
				(0.002)	(0.002)	(0.002)
Literate					-0.02	-0.03
					(0.08)	(0.08)
Opposition index						-0.001***
						(0.0001)
N. of obs.	18,673	18,673	18,673	18,215	18,215	18,215
Mean of Dep. Var.	0.78	0.78	0.78	0.78	0.78	0.78
SD of Dep. Var.	0.41	0.41	0.41	0.41	0.41	0.41
R-squared	0.018	0.018	0.018	0.021	0.021	0.028

Notes: Based on the DANE (2015), using survey weights. All estimations include region fixed effects and controls for other sources of information such as TV, radio and newspapers. Robust standard errors are in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

5.2 Effects by closeness to the internet point

Another way to analyze the effects is to examine the share of population which live near the internet points. Table 7 presents the results of estimating equation (2), the population shares was interacted with the $Post_{mt}$ variable that indicates the period after each municipality received the internet point. The coefficients should be considered as an effect over electoral outcomes from the internet points located in densely populated sites. The unique coefficient which present a significant effect is the turnout coefficient, showing a reduction from the voter turnout in the nearest densely places. Moreover, the effect is larger than in the Table 5 because the coefficient is capturing the effect of the people who has an easy access to the internet points.

Table 7: Effects on electoral outcomes, counting population around the internet points

	Voter	Share	
	Turnout	Candidates	Blank
	(1)	(2)	(3)
Municipality has around internet point:			
% of pop. around 200m	-1.63*	0.016	0.18
	(0.87)	(0.70)	(0.48)
% of pop. around 400m	-0.69	-0.35	0.34
	(1.21)	(0.40)	(0.30)
% of pop. around 600m	0.12	0.18	-0.14
	(0.50)	(0.21)	(0.17)
N. of obs.	549	549	549
Mean of Dep. Var.	45.1	95.1	2.59
SD of Dep. Var.	9.25	2.54	1.71
R-squared	0.64	0.81	0.80
Controls			

Notes: Time period is 2006–2014 only first round of presidential elections. All estimations include municipality, election fixed effects and municipal characteristics as controls such as population, population squared, distances from the IP to the department capital, rurality index and poverty index, with dummies included for missing data. Clustered standard errors, by municipality, are in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

5.3 Effects by the number of internet points in the municipality

Table 8 shows that estimated effects vary with the extent of internet access in the municipality. The model follow the same structure that in the previous tables with a different set of independent variables, these are interactions with the number of internet points and the variable that indicates the period after each municipality received the internet point. The estimation allows to differentiate the effects from less to more internet access through the internet points. Thus, if the running variable $NumberInternetPoints_m$ from the main results make sense, the electoral outcomes should change proportionally to the number of internet points at the municipalities.

Table 8 shows that one internet point at the municipality does not affect any of the electoral outcomes, whereas municipalities with more than two internet points change their electoral participation. Column 1 presents the result from testing whether the number of internet points affect the voter turnout. As expected, these results match with those presented in Tables 5-7 and the size effect increase with the number of internet points.

Columns 2-3 show the relationship between the number of internet points, candidates and blank vote shares, but the increasing effect only persist at municipalities that have more than two internet points.

Table 8: Effect by number of internet points in the municipality

	Voter	Share	
	Turnout	Candidates	Blank
	(1)	(2)	(3)
Municipality has:			
1 Internet Points	0.30	0.19	0.10
	(0.69)	(0.29)	(0.22)
2 Internet Points	-1.49**	-0.36	0.28
	(0.68)	(0.33)	(0.26)
3 Internet Points	-1.61**	-1.30**	0.98**
	(0.72)	(0.60)	(0.46)
4 Internet Points	-2.84***	-3.27***	1.96***
	(0.40)	(0.17)	(0.12)
N. of obs.	690	690	690
$H_0 : 3\ IPs = 4\ IPs$	.007	.001	.028
Mean of Dep. Var.	45.5	95.1	2.62
SD of Dep. Var.	9.17	2.61	1.74
R-squared	0.63	0.79	0.78

Notes: Time period is 2006–2014 only first round of presidential elections. All estimations include municipality and election fixed effects. Clustered standard errors, by municipality, are in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

Additionally, the change on the electoral outcomes due to additional internet points is a consequence from more internet availability. These estimates are statistically different from each other. The comparison between coefficients of municipalities that have three to four internet points, show a differential effect over all electoral outcomes. Then, the hypothesis that an additional internet point increased the electorate internet access, affect proportionally the voter turnout and share of votes for candidates and blank votes.

5.4 Electoral participation by age groups

The research to date has tended to focus on the positive correlation between internet access and young political participation, the main findings conclude that young population increase differentially, compared to adult population, their electoral behavior; this is a consequence from larger use and adoption rates. Table 9 presents the results from estimating how the electoral outcomes changes after the internet point arrived. I divided up the explanatory variable by age groups and closeness to the internet point.

Table 9: Effects of population by age groups around the internet point

	Voter	Share	
	Turnout	Candidates	Blank
	(1)	(2)	(3)
% of young pop. around 200m	-3.09	0.43	-0.28
	(1.98)	(1.02)	(0.68)
% of adult pop. around 200m	2.23	-0.18	0.15
	(1.41)	(0.83)	(0.53)
% of young pop. around 400m	-2.00	0.87	0.16
	(7.66)	(2.72)	(1.78)
% of adult pop. around 400m	1.82	-1.11	0.19
	(5.95)	(2.26)	(1.48)
% of young pop. around 600m	-7.04	1.17	-1.27
	(4.91)	(1.41)	(1.02)
% of adult pop. around 600m	6.01	-0.97	1.03
	(4.07)	(1.20)	(0.88)
N. of obs.	690	690	690
Mean of Dep. Var.	45.5	95.1	2.62
SD of Dep. Var.	9.17	2.61	1.74
R-squared	0.63	0.79	0.78

Notes:Time period is 2006–2014 only first round of presidential elections. Young population was defined as the total population at the municipality over 20 years old and under 34 years old. Adult population was defined as the total population from 35 until 64 years old. All estimations include municipality and election fixed effects. Clustered standard errors, by municipality, are in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

Table 9 suggest that there is not an effect of the internet access point on the electoral participation, in this scenario the positive correlation did not hold. A possible explanation is because internet access points only covers a small share of young population around

them and young population not participate in the Colombian electoral decisions (Barrero et al., 2013; Berthin, 2013).

6 Interpretation and robustness checks

6.1 Persuasion rate

The main finding of the document is that the turnout, share of candidates votes was reduced and the share of blank votes increased. To improve my understanding of the previous results and the economic magnitude of my estimates in the context of the existing literature, I estimate the effect of the internet on the persuasion rate for blank votes.

The magnitudes of the effect of internet access on apathetic electoral behavior can be interpreted in terms of persuasion rate. Following DellaVigna and Kaplan (2007) the people who voted in blank can be wrote as:

$$y = y_0 + (1 - y_0) \times e \times p \tag{4}$$

where y_0 is the number of people who would have voted blank in the absence of internet, e is the exposure to the internet access through the internet point and p is the persuasion rate. In this case, the persuasion rate is the percentage of people that were persuaded to vote in blank due to internet access.

$$p = \frac{1}{1 - v_0 t_0}\left(t\frac{dv}{de} + v\frac{dt}{de}\right) \tag{5}$$

To obtain the expression p, I differentiate with respect to the exposure e and expressed the number of people who would voted in blank y_0 as a function of turnout t_0 and share of blank votes v_0. The analogues equation in the discrete case can be expressed as:

$$p = \frac{t(v_t - v_c) + v(t_t - t_c)}{(1 - v_0 t_0)(e_t - e_c)} \tag{6}$$

where v_t and v_c are the votes in blank in municipalities with and without an internet point, respectively, e_t and e_c are the exposures of internet point in municipalities with

and without internet point, as well t_t and t_c are the turnout in municipalities with and without internet access. The internet access point affect the voter turnout and is equal to $\hat{t}_t - \hat{t}_c = -0.67$ (Column (3) Table 5). The exposure of internet point is estimated from DNP (2015) survey data and is equal to $\hat{e}_t - \hat{e}_c = 0.431$ (Column (2) Table 2). The effect of the internet access on blank votes equals to $v_t - v_c = 0.22$ (Column (9) Table 5) The predicted share of blank votes and turnout in the absence internet point is $v_c = v_0 = v = 0.043$ and $t_c = t_0 = t = 0.41$, respectively; since no one in the control municipalities was affected with the internet point. Thus, the persuasion rate of the internet point is equal to 14.5 percent: $p = [(0.41 \times 0.22) + (0.043 \times -0.67)]/[(1 - (0.41 \times 0.043)) \times 0.431] = 14.5$ percent.

Our estimates suggest that 14.5 percent of registered voters who were exposed to the internet point were persuaded to vote in blank. This persuasion rate of the internet is similar to the one found in the literature by González and Prem (2017) 13 percent, larger than DellaVigna, Enikolopov, Mironova, Petrova, and Zhuravskaya (2014) 4.3 percent, Enikolopov et al. (2011) 7.7 percent and DellaVigna and Kaplan (2007) 8.3 percent, but smaller than Gerber, Karlan, and Bergan (2009) 20 percent.

6.2 Electoral strategic behavior in the municipalities

The previous findings suggest an apathetic behavior at the municipalities with internet access. Nevertheless, one need to understand if the municipalities where the internet point is available, the results were not driven by a strategic electoral behavior in the presidential elections before the treatment. In order to test this hypothesis, I perform a triple differences empirical strategy interacting the previous interaction with variables of electoral competition. The variables that measures electoral competition in the presidential election of 2010, are the share of Santos[19] votes and the inverse of the Herfindahl-Hirschman Index[20]. This coefficient will capture the differences between electoral periods in municipalities with the internet point and the differences in electoral competition at the municipalities. Also, the result test whether the incumbent promises construct internet points to signal that he is

[19]Santos is the president elected in the 2010 elections

[20]In political science literature, the inverse of the HHI had been used to calculate the effective number of parties (Taagepera and Shugart, 1989; Persson, 2004), also this variable is used as a proxy for political competition.

providing public goods, and maximize the share of votes in the future election.

The table 10 shows the triple interaction with the share of Santos votes in 2010, these coefficients are zeros and did not present a significant relationship between the interaction and the electoral outcomes. Also, the table 11 shows the triple interaction but this time with the inverse of the HHI. Similarly, these coefficients did not present a significant effect of the electoral competition, in the municipalities with the internet point, on the electoral outcomes. These findings support the previous municipal-level results because they make strategical electoral behavior unlikely to be a concern.

Table 10: Effect of the internet point and strategical behavior in the electoral outcomes

	Voter		Share			
	Turnout		Candidates		Blank	
	(1)	(2)	(3)	(4)	(5)	(6)
# IPs × Post × Share Santos votes$_{2010}$	0.092	0.073	-0.053	-0.039	0.047	0.055
	(0.43)	(0.44)	(0.21)	(0.19)	(0.15)	(0.15)
Post × Share Santos votes$_{2010}$	0.56	0.55	0.24	0.19	-0.26*	-0.27*
	(0.42)	(0.45)	(0.19)	(0.19)	(0.13)	(0.15)
# IPs × Post	-0.68***	-0.67**	-0.42***	-0.39**	0.20*	0.21
	(0.25)	(0.31)	(0.16)	(0.16)	(0.12)	(0.13)
N. of obs.	690	690	690	690	690	690
Mean of Dep. Var.	45.5	45.5	95.1	95.1	2.62	2.62
SD of Dep. Var.	9.17	9.17	2.61	2.61	1.74	1.74
R-squared	0.63	0.63	0.79	0.79	0.79	0.79
Controls		✓		✓		✓

Notes: Time period is 2006–2014. All estimations include municipality and election fixed effects, and municipality characteristics as controls such as population, population squared, distances from the IP to the department capital, rurality index and poverty index. Clustered standard errors, by municipality, are in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

Table 11: Effect of the internet point and strategical behavior in the electoral outcomes

	Voter		Share			
	Turnout		Candidates		Blank	
	(1)	(2)	(3)	(4)	(5)	(6)
# IPs × Post × HHI^{-1}_{2010}	-0.34	-0.21	-0.83	-0.89	1.10	1.02
	(3.77)	(3.89)	(1.72)	(1.63)	(1.32)	(1.30)
Post × HHI^{-1}_{2010}	0.23	0.95	0.28	0.014	0.097	-0.090
	(1.37)	(1.79)	(0.56)	(1.18)	(0.42)	(0.88)
# IPs × Post	-0.65	-0.57	-0.14	-0.055	-0.18	-0.17
	(1.38)	(1.54)	(0.66)	(0.64)	(0.51)	(0.52)
N. of obs.	690	690	690	690	690	690
Mean of Dep. Var.	45.5	45.5	95.1	95.1	2.62	2.62
SD of Dep. Var.	9.17	9.17	2.61	2.61	1.74	1.74
R-squared	0.63	0.63	0.79	0.79	0.78	0.78
Controls		✓		✓		✓

Notes: Time period is 2006–2014. All estimations include municipality and election fixed effects, and municipality characteristics as controls such as population, population squared, distances from the IP to the department capital, rurality index and poverty index. Clustered standard errors, by municipality, are in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

6.3 Effects in legislative and mayoral elections

In the analysis period were conducted the congressional elections, on average two months before the presidential elections. Then, possibly the internet points could affect the electoral outcomes in this kind of elections. Using the same identification strategy that in the last section, table 12 presents the effects of the internet access point on the main electoral outcomes of the document. There, I find a statistically insignificant relationship between entry of the internet points and electoral results in the municipalities. These findings are consistent in the way that campaign resources are allocated in Colombia for publicity purposes. García-Sánchez and Arciniegas (2017) finds that in the period of study, the internet publicity about electoral campaigns was focused in presidential candidates and not other electoral candidates (senate and mayoral candidates).

On the other hand, the mayoral elections take place one year after presidential elections in Colombia. To get effects of the internet access on political participation, the previous identification strategy should change the window selection around 2015 mayoral elections.

Table 12: Effect of the presence of internet point in the legislative elections

	Voter		Share			
	Turnout		Candidates		Blank	
	(1)	(2)	(3)	(4)	(5)	(6)
IP × Post	-2.77		1.10		-0.68	
	(2.65)		(1.94)		(1.19)	
# IPs × Post		-0.44		0.21		-0.10
		(0.41)		(0.48)		(0.26)
N. of obs.	690	690	690	690	690	690
Mean of Dep. Var.	45.9	45.9	80.4	80.4	3.43	3.43
SD of Dep. Var.	8.72	8.72	5.26	5.26	2.44	2.44
R-squared	0.38	0.38	0.27	0.27	0.46	0.46

Notes: Time period is 2006–2014. All estimations include municipality and election fixed effects, and municipality characteristics as controls such as population, population squared, distances from the IP to the department capital, rurality index and poverty index. Clustered standard errors, by municipality, are in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

In this case, the window was defined between April 2015 and March 2016 because preserve the balance within groups. Table 13 shows the effect of internet access points in the intensive and extensive margin. None coefficient presents a significant relationship, and again I find consistent results with the political advertising through internet in Colombia (García-Sánchez and Arciniegas, 2017).

Table 13: Effect of the presence of internet point in the mayoral elections

	Voter		Share			
	Turnout		Candidates		Blank	
	(1)	(2)	(3)	(4)	(5)	(6)
IP × Post	-3.52		-1.54		-0.16	
	(3.10)		(0.96)		(0.36)	
# IPs × Post		0.24		0.28		-0.16
		(0.48)		(0.22)		(0.13)
N. of obs.	651	651	651	651	651	651
Mean of Dep. Var.	62.9	62.9	93.9	93.9	1.44	1.44
SD of Dep. Var.	10.1	10.1	3.08	3.08	1.34	1.34
R-squared	0.24	0.24	0.17	0.17	0.023	0.027

Notes: Time period is 2003–2015. All estimations include municipality and election fixed effects, and municipality characteristics as controls such as population, population squared, distances from the IP to the department capital, rurality index and poverty index. Clustered standard errors, by municipality, are in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

7 Conclusions

This paper studies the effect of internet access over different electoral outcomes. I exploit a quasi-natural experiment introduced at some municipalities by the timing of 2014 presidential elections. I find a significant and negative effect of the exposure to the internet access on voting. Municipalities with an internet point before the presidential election of 2014 reduced their electoral participation, also the reduction of turnout comes from more populated densely places near the internet point. In addition to this reduction from the electoral participation, the share of candidates votes was reduced and the share of blank votes increased. Moreover, the effect depends on the total number of internet points that are in the municipality, those with more internet points have a greater impact over the electoral outcomes.

The results of this paper are consistent with the literature that studies the effect of internet access over electoral participation. Results suggest that internet access reduce the participation motivating apathetic behaviors in the electorate. These findings indicate that the effect could be explained in two ways. First, reducing the electoral participation and second increasing the political detachment.

This paper open the doors for new research insights. First, while I analyze the availability of internet I am not considering what kind of information motivates the electorate to not vote or vote in blank. This kind of information can help to construct the full story of why the electorate decide not participate or participate apathetically. Thus further research is needed to estimate and understand in a better way how the internet affect national elections of a country.

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Appendix A Additional tables and figures

Table 14: Summary statistics of treated and rest of Colombia municipalities

	In sample	Rest of Colombia	Difference	t-stat	Beta $X_m = \beta\ InSample_m + \gamma_d$	P-value
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Outcome variables in 2006						
Voter Turnout	45.76	43.13	-2.63	-3.01**	1.681	0.007
Share of Candidates votes	96.09	96.23	0.15	1.13	0.037	0.700
Share of Blank votes	1.89	1.75	-0.14	-1.70	-0.008	0.898
Panel B: Municipal political characteristics, mayoral elections in 2011						
# of mayoral candidates	4.18	3.99	-0.19	-1.51	0.225	0.095
Political competition (1-HHI)	0.29	0.34	0.05	5.73***	-0.027	0.000
Effective number of parties (Laakso et al, 1979)	3.68	3.28	-0.41	-5.48***	0.204	0.003
Effective number of parties (Golosov et al, 2010)	2.35	2.02	-0.34	-5.24***	0.167	0.007
Mayor belongs to the president party	0.25	0.24	-0.00	-0.04	-0.018	0.616
Panel C: Municipal political characteristics, presidential elections in 2014						
Political competition (1-HHI)	0.39	0.41	0.02	2.12*	-0.012	0.203
Effective number of parties (Laakso et al, 1979)	2.89	2.76	-0.13	-1.79	0.075	0.274
Effective number of parties (Golosov et al, 2010)	1.68	1.59	-0.09	-1.45	0.056	0.327
Panel D: Municipality characteristics						
Rurality index †	0.52	0.60	0.09	4.86***	-0.066	0.000
Literacy rate 2005	86.88	83.09	-3.79	-6.11***	1.733	0.000
Infant mortality rate	19.66	25.01	5.35	7.49***	-1.668	0.000
Unmet basic needs	34.54	47.98	13.44	8.96***	-5.442	0.000
Guerilla FARC presence	0.14	0.17	0.02	0.86	-0.016	0.533
# of detentions	1.67	2.38	0.70	1.40	-0.780	0.100
# of guerilla attacks	0.52	1.12	0.61	2.34*	-0.678	0.010
Distance to the deparment capital (km)	71.68	83.76	12.08	2.71**	-3.344	0.359
Log total population	9.81	9.46	-0.35	-4.30***	-62.431	0.276
Log urban population	8.92	8.41	-0.51	-4.70***	139.237	0.304
Log total literate people 2005	9.21	8.70	-0.51	-5.68***	0.204	0.005
Municipality area (km^2)	428.00	1,154.45	726.45	3.10**	0.366	0.000
Municipality altitude (MASL)	1,410.95	1,077.23	-333.72	-3.93***	0.256	0.001
Observations	230	886				

Notes: † Rurality index=rural population/total population. Table reports differences of municipalities that receive the Vive Digital policy compared with the rest of Colombia. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

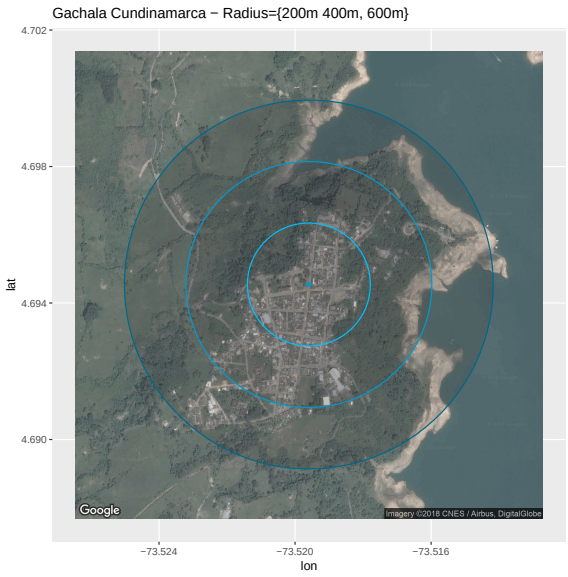
Table 15 presents the same table of main results, but the outcomes are divided by municipal population. All the results did not hold for new outcomes, the coefficients have the expected sign but only the share of candidates votes are significant.

Table 15: Effect of internet point in the electoral outcomes dividing by population

	Voter			Share					
	Turnout			Candidates			Blank		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
IP × Post	0.13			0.034			0.13*		
	(0.54)			(0.51)			(0.077)		
# IPs × Post		-0.53	-0.66		-0.63**	-0.58**		0.048	0.062
		(0.33)	(0.41)		(0.29)	(0.29)		(0.054)	(0.060)
N. of obs.	690	690	690	690	690	690	690	690	690
Mean of Dep. Var.	32.7	32.7	32.7	31.1	31.1	31.1	0.84	0.84	0.84
SD of Dep. Var.	8.34	8.34	8.34	8.07	8.07	8.07	0.61	0.61	0.61
R-squared	0.46	0.47	0.47	0.54	0.54	0.55	0.69	0.68	0.69
Controls			✓			✓			✓

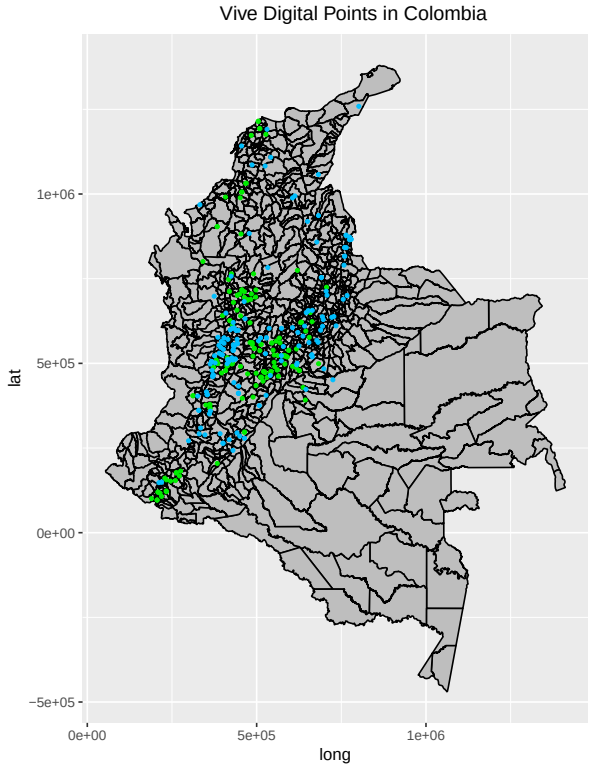
Notes: Time period is 2006–2014 only first round of presidential elections. All estimations include municipality and election fixed effects. Moreover, columns 3,6,9 include municipal characteristics as controls such as population, population squared, distances from the IP to the department capital, rurality index and poverty index, using dummies for missing data. Clustered standard errors, by municipality, are in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$

Figure 7: Example with rings of population



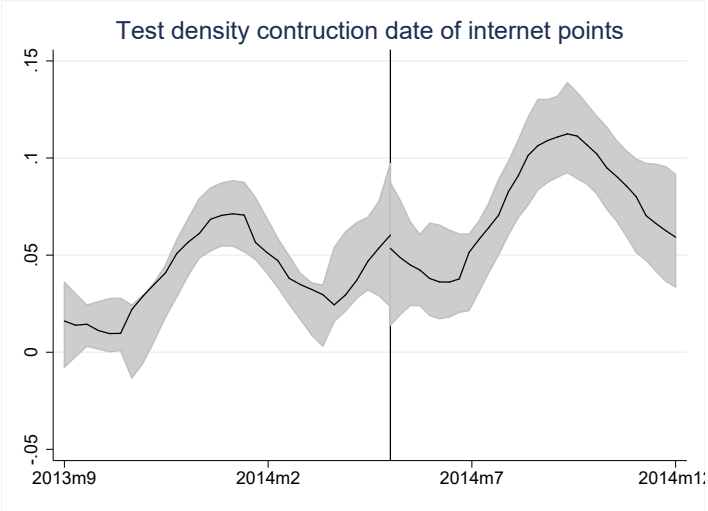
Notes: Map presents the specific location of the internet point at Gachala Cundinamarca. The circles are the buffers where I count the total population. They are in scale of 200m, 400m and 600m around the internet point.

Figure 6: Internet points in Colombia



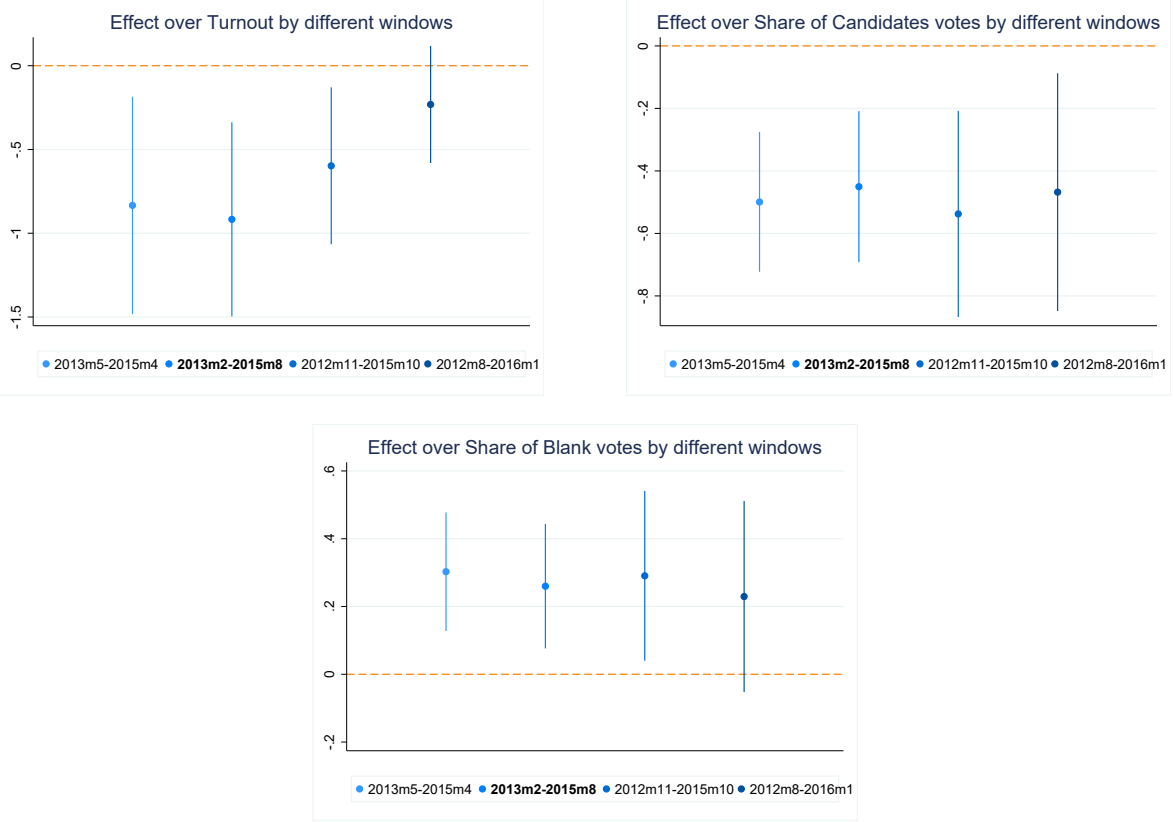
Notes: Map shows the location of the internet points used in the analysis; green dots represent internet points created before the 2014 presidential election, and blue dots represent internet points created right after presidential election. Source: Author georeferenced the internet points with MinTIC information

Figure 9: Discontinuity test in 2014 presidential election



Notes: Chart shows the Cattaneo et al. (2016) test based on density discontinuity on 2014 presidential elections. The black line represents the first round of 2014 presidential election.

Figure 8: Point estimates with different windows



Notes: Charts present the main results to different windows. In the x-axis was plotted the width of the window, from the left to the right, are the smallest to the biggest window. The bold interval is the window used in the document, because maximize the power and preserve the balance between treated and control municipalities.

Appendix B The definitions of turnout

In the literature, there are different ways of measure turnout (Geys, 2006). The most common one is to measure turnout as the total number of votes over registered people eligible to vote. Presidential elections in Colombia are conducted by the National Registry. They used six definitions of votes in the national election; valid, total, candidates, blank, null and non marked votes. The following list explain the definitions:

- The valid votes are votes not marked more than one time, and they mark one of the candidates or the blank vote space. Thus, the valid votes are the sum of votes for the candidates and blank votes.
- The blank votes are votes that were only marked in the blank space.
- The candidates votes are votes that were only marked for one of the eligible candi-

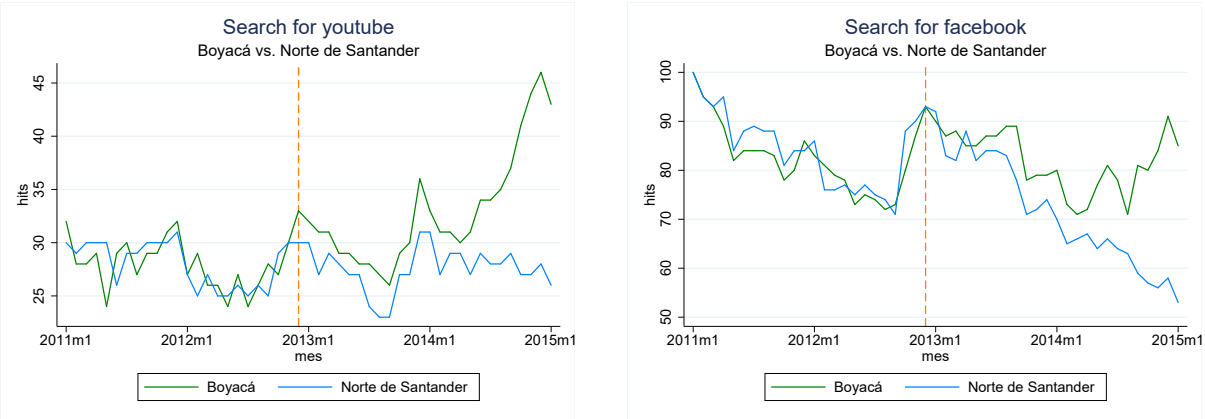
dates.

- The null votes are votes that were marked more than one time. They could not be counted for any candidate.
- The non marked votes are votes that did not mark
- The total votes are the sum of candidates, blank, null and non marked votes.

Appendix C The usege of the internet points

A study from DNP (2015) of the Vive Digital Plan and internet points in Colombia shows that people that live in the vicinity of the internet points had conferences and received training in computational tools to improve their job skills, and their adoption and usage of the internet increased slightly. However, the study shows no evidence that the internet points cause users to read more information in general. The research shows that users used the internet points for a variety of reasons (e.g. The use of internet for entertainment purposes, use of social networks and reading *online* newspapers). One thing that ought to be noted is that the previous research measures their outcomes with different treated and control groups at the baseline. Thus, their results should be used with caution to avoid wrong conclusions drawn from the information received about internet points users.

Figure 10: Number of Google hits



(a) (b)

Notes: Charts present the number of Google hits for the words *youtube* and *facebook* in Colombia. They compare departments that received internet points before the national election. There are monthly data scaled in a range from 0 to 100, where 100 is the highest possible amount of searches. The dashed orange line represent the the beginning of the policy.

It is important to understand the usage of internet points to gather of political information. Unfortunately, there is no information at MinTIC to study use of internet points. One good approach to identify the real usage, is to know the number of Google[21] searches that occur in one municipality. Unfortunately, the level of desegregation of *Google Trends* data is at department level, but I wish to compare at municipal level, however some comparisons can be done based on this resources. In the main sample of the document, Boyacá was the department that received the internet points first, later was Norte de Santander. The charts below show that the amount of searches for the words *youtube* and *facebook* were higher in Boyacá than in Norte de Santander before the national election. I hypothesise that this higher number is partially explained by the entry of the internet points in Boyacá's municipalities.

Appendix D Electoral promises with the internet points

The table 16 shows the effect of the internet point on the difference of votes between the winner and the runner up of mayoral elections. This relationship should be considered as an electoral promise to receive the internet point. If the relationship is statistically significant among the municipalities, thus the bandwidth that has been chosen not solve the problem of non-randomness in the policy. The first column of the table compares differences in all Colombian municipalities that received at least one internet point.[22] Second column estimates with municipalities in the bandwidth sample. Third column do the same regression of column (2) but uses the electoral outcomes between 2003 and 2012. Nevertheless, none results presents a significant difference between treated and control municipalities.

[21] Google is the most used search engine in Colombia. See `https://goo.gl/FWkGvH`

[22] There are not all Colombian municipalities because my analysis exclude department capital cities and mayoral electoral data was incomplete.

Table 16: Predicting internet point with electoral promises

	Winner votes difference		
	(1)	(2)	(3)
Municipality receive:			
Internet Point	-1.22		
	(0.94)		
IP before elections		5.70	2.15
		(3.19)	(2.00)
N. of obs.	982	218	654
Mean of Dep. Var.	14.0	17.1	14.3
R-squared	0.75	0.015	0.58

Notes: The winner votes difference was defined as the winner votes minus the runner up votes. All estimations include municipality controls such as population, population squared, rurality index and poverty index. Robust standard errors in parentheses. Significance level: *$p < 0.10$, ** $p < 0.05$, ***$p < 0.01$