

# Media and Political Participation in North Africa

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## Abstract

We examine the role of new decentralized media (the internet) vs old media (television) on individuals' political engagement in North Africa. Drawing our data from the Afrobarometer round 5 survey, we tackle issues of endogeneity by resorting first to a propensity score matching method to identify the effect of media on political participation. We then address endogeneity by relying to a bivariate probit model while using lightning activity as an instrument for media. The analysis evidences the political power of the internet and TV. Getting news from internet reduces voting but increases protests, while TV watching induces more vote and less protest. This effect is channeled through the impact of media on the perception about political institutions, which differs across the different media.

**Keywords :** Media, Political Participation, North Africa.

**JEL codes:** D74; D74; F50; O55; L96

**The authors gratefully acknowledge support from the FERDI (Fondation pour les études et recherches sur le développement international). They are grateful to Jaime de Melo for his careful reading and numerous suggestions.**



## 1. Introduction

The role of media has been highlighted in the academic debates of recent years. There is a growing evidence that media as a vehicle of information and political awareness, plays a significant role in enhancing the demand for accountability and better governance and in raising the motivation for political participation. Our paper analyses the consequences of media on political participation measured through the following variables: *“Attend a demonstration or protest march, Voter turnout in national elections, Attend a campaign meeting, Work for a candidate or party”*. We focus on two different media, namely computer and television, the former is globalized and gives access to a more diversified source of information, while the latter is more nationally-located and more exposed to home-biased information and governmental manipulation. Relying on contemporary individual-level data, in a sample of North African countries, we find that those two different media do not have the same impact on political participation: Controlling for individual and district characteristics, we find that watching TV is not related to protest activities, it increases instead the probability of voting, while the opposite results hold for internet. Getting information is crucial for the well-functioning of the democracy or any other political system. By influencing individuals’ *satisfaction with democracy*, perception of the quality of the *economy management*, and of the *freeness and fairness of elections*, it influences the way people is engaging in political activities.

We address the sensitive question of the complex link between information and democracy by providing evidence that the vehicle of information is not neutral. Changes in individuals’ political participation depend on the media, which is used, and on the informational content individuals receive through it. It appears that TV watchers and internet users have not the same *satisfaction with democracy*, nor the same perception of the quality of the *economy management*, of the *freeness and fairness of elections*. Our work contributes therefore to the political economy on how information can affect political outcomes. We show that media, specially TV and internet, have the potential to shape political preferences. Section 2 reviews the related literature. Section 3 introduces the Afrobarometer round 5 dataset and presents our methodological approach. We present our econometric results with some robustness checks in Section 4. Finally, Section 5 draws the main conclusions.

## 2. Literature review

The literature on media economics can be categorized in three strands. The first strand (2.1) illustrates the link between media diffusion and the intensification of political participation; the second one (2.2) establishes that politicians are sensitive to the presence of information: depending on the circumstances, they can react by being more reliable, accountable, they can also provide gifts and increase spending before an election to be re-elected. Finally the content of information matters (2.3), and can be a used for manipulating the voting behaviors of citizens. The media vehicle is not neutral, and shape political preferences differently.

## **2.1. Voter turnout is higher where individuals have access to the media**

Newspapers have always been perceived as a way of strengthening democracy and political participation. From that respect, most papers in the empirical literature focus on the impact of media on voters' turnout as the main expression of political participation.

For instance Della Vigna and Kaplan (2007) find that the bigger coverage of Fox New in the U.S. increased the likelihood of voting Republican in 2000. This effect seems to be permanent, which suggest that voters are subject to media persuasion instead of being rational. From a policy-making perspective, this result has obviously consequences in terms of media market regulation. The demonstration is based upon a natural experiment of the introduction of the Fox New Channel, which induced substantial geographical variation, allowing to identifying its effect.

According to Stromberg (2004), the introduction of the radio in the 1920s led to more people voting in gubernatorial races. The radio was the first mass media introduced between 1920-1940, at the time when the New Deal was launched, and this introduction created dramatic changes in people's access to the new media (allowing to identifying its effect).

Hispanic citizens having more access to Spanish-language local television channels in the United States are more akin to participate and vote (Oberholzer-Gee and Waldfogel, 2009).

Schulhofer-Wohl and Garrido(2009) offers a case study of the consequences of closing a newspaper, the Cincinnati Post, which published its last edition December 31, 2007. Using a difference-in-difference approach, the authors show that the consequences in terms of falling voters turnout was particularly important in the suburbs where the Cincinnati dominated circulation.

Gentzkow, Shapiro, and Sinkinson (2011) demonstrate that the emergence of the first newspaper in the market increases significantly turnout at national election. They focus on US daily newspapers introduction from 1869 to 2004, and highlight that the effect is weaker after the introduction of radio and television. As in other empirical studies the identification strategy is based upon the precise scheduling of the introduction.

Close to our paper, Manacordi and Tesei (2016) show that the growing use of mobile phones in Africa leads to more political protests during recessions and periods of national crisis. They demonstrate that the mobilizing potential of digital technologies is more pronounced in autocratic countries and those where the traditional media are under state control, suggesting that this technology may play a key role in fostering political freedom.

## **2.2. Political participation, access to free media and government spending**

Besley and Burgess (2002) show that the media can provide politicians with incentives to be more reliable in areas where voters have access to the media. They find that Indian state governments' provision of public food and calamity relief expenditure reacts more to a decline in food production and crop flood damages where newspaper diffusion is higher.

Voters' manipulation through the political business cycle might be dampened if media inform voters prior to the election about the consequences of the fiscal gifts which will have to be repaid. Using a panel of developing countries over two decades, Shi and Svensson (2002) find more manipulation in countries with a smaller radio's coverage.

In Stromberg (2004), the emphasis is put on the effect of voters having access to information, including whether their elected representatives have done something for them. The results provide evidence that politicians are less likely to neglect more informed citizens and they spend more where information is widespread. This result holds in the African context as well, as emphasized in Reinikka and Svensson (2011), who show how a newspaper campaign in Uganda succeeded in reducing capture of public funds by making parents aware of the large funds local officials were handling.

## **2.3. Media content and quality of information**

Media content and quality is key indeed to understand the link between access to information and the effect of information on government policy. Brunetti and Weder (2003) and Ahrend (2002) show that press freedom is negatively correlated with corruption. Cagé (2013) adds to the debate by showing that turnout may decrease with media competition, if there is a race to the bottom in terms of media quality. Similarly, Mullainathan and Shleifer (2002) argue that greater competition could induce newspapers to publish articles confirming readers' prior opinions rather than the fact. The fact that TV is often owned by the State and monopoly, while computer is more likely to provide with a broader access to a more diversified and independent set of information sources, may explain this. Independence – and conversely dependence to State Ownerships - is also underlined in Enikolopov, Petrova, and Zhuravskaya (2011) who demonstrate that access to the independent national TV channel in Russia increased the probability of voting for opposition parties. In the same vein, Djankov et al. (2003) find state ownership of the media to be negatively correlated with a number of measures of good governance in 97 countries.

The emergence of Internet in the 90ies has provoked concerns about falling political participation (Sam Schulhofer-Wohl and Miguel Garrido, 2009), increasing ideological polarization (Cass R. Sunstein, 2007), and eliminating a check on government corruption (Paul Starr 2009). According to *cyber pessimists*, the main caveats with Internet is that it favors a way of getting news that induces polarization in the sense that the reader is not exposed neither to a diversified source of information nor to a large set of opinions and ideologies, he/she can "privatize" ("personalize"

according to Cass Sunstein, 2007) the information by switching to the sources fitting more his/her *ex ante* ideological preferences; Furthermore, no online enterprise is able to generate a stream of revenue sufficient to provide the consumer with a quality - in terms of rigorous fact-checking or editorial scrutiny - comparable to the quality of the old historical newspapers. A similar concern about television is put forward by Putnam (2000): television makes leisure time more private, it reduces social interactions, voter turnout and social capital. *Cyber optimists* have been pitted against those pessimistic views, having argued that there are positive relationships between the use of digital media and political participation and knowledge. Internet indeed offers multiple opportunities for political engagement, like participating in online pools, debates, blogging, social networks; it provides access to a wider range of informational sources, across the national frontiers; finally it allows direct contact with politicians and instantaneous feedbacks. Aouragh and Alexander (2011) who focus on the Egyptian case, make the same distinction between the 'utopian' and 'dystopian' perspectives. Techno-utopian scholars view the internet's expansion, broader access to information and more exchange of idea as enhancing political participation, civil society and democracy, while techno-dystopians stress that governments can manipulate internet which constitutes a threat to democracy.

The African world is an interesting case to study the link between the media and political participation, in particular it includes countries where the Arab Spring led to political changes, governmental reforms and a range of political changes that continue to reverberate today. The use of cell phones, internet, and social media has been documented in Iran and in Egypt during the 2004-2005 Kafaya movement and again during the 2010-11 awakening protests. Empirical studies try to disentangle whether the internet media do cause political outcomes or whether the latter are simply magnified by the internet. For instance, Costello and al. (2015) ask whether the facebook revolution caused the wave of protests or whether more fundamental economic and political grievances explain it. They argue that the spread of cell phones and access to the Internet undermined the media monopoly of several African States, which empowered citizens and allowed protestors to organize, coordinate, and circulate their messages. Wolfsfeld et al. (2013) show that protests during the Arab Spring preceded changes in the use of social media and did not follow them, implying that "politics come first", or in economic terms that the causality is running from political roots to internet. This question, which arises with particular intensity in times of revolution, can be asked under more normal circumstances as in Cagé and Rueda (2015), who investigate the role of newspaper in the promotion of democracy in Sub Saharan countries. We use the same dataset, which is the Afrobarometer. We face the same methodological concern: being interested in politics and searching for information through either TV or internet are likely to be driven by the same non-observed variables. While Cagé and Rueda (2015) use the proximity to historical missionary settlement with a printing press to instrument contemporary newspaper readerships, we borrow our identification strategy from Andersen et al. (2011, 2012), who instrument IT diffusion with the intensity of lightning. Our data set and methodology are described in the subsequent sections.

### 3. Data and Empirical Strategy

#### 3.1. Data and Variables measurement

Our data at hand is an individual level data from the new round 5 Afrobarometer survey.<sup>1</sup> Afrobarometer is an independent research project that collects demographic and public opinion data on political, economic, and social conditions within the region's major electoral democracies. The Round 5 survey data we employ covers 34 African countries but we focus our attention on four North African Arab countries, namely Algeria, Egypt, Morocco and Tunisia.<sup>2</sup> Surveys and Data for these countries were conducted and collected over the course of January-March 2013 through nationally representative samples. Each sample was designed according to a random, multistage, stratified, clustering procedure with a size of around 1200 individuals aged 18 years or older. Collectively, our sample provides us with data on approximately 6000 individuals across the 5 countries.

The primary objective of this paper is to investigate the political behavior/involvement of North Africa Arab citizens with respect to the use and access of new decentralized media. We focus our attention on the use of advanced communications such as computers, the internet or cellphones and accessing the news/getting the information *via* television and the internet to explore their effect on different types/modes of political participation. According to Verba et al. (1978), political participation refers to activities by citizens that are aimed at influencing the selection and decisions of government personnel such as voting in elections, as well as more informal modes of engagement, such as meeting with community members, contacting political representatives, or involvement in collective action. We focus on four key elements of political participation in this study: protest activities, partisan attachments, contacting political representatives and voter turnout in national elections. Protest activities tend to occur when people want policymakers to address pressing social, economic, or political concerns in a more timely fashion than other modes of participation might allow. Partisan attachments, or how closely someone feels to a particular party, indicate whether parties express concerns meaningful to voters and often provide predictable indicators of future voting behavior. Voter turnout captures whether an individual views elections as a meaningful way of expressing preferences with respect to how his/her country is managed. In order to measure our outcome variables as well as the control variable of interest we rely on specific questions asked in the round 5 Afrobarometer survey allowing us to construct a binary variable for each of the above mentioned variable. Table 1 below describes the questions used and the corresponding coding of the outcome and control variables of interest.

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<sup>1</sup>The round 5 dataset has been released in July 2015 and is available at <http://www.afrobarometer.org/>

<sup>2</sup>The remaining counties surveyed in the round 5 Afrobarometer are Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Cote d'Ivoire, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Swaziland, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

**Table 1. Definition/Description of Variables**

<b>Variables</b>	<b>Questions</b>	<b>Coding</b>
<b>Dependent variables</b>		
<b>Attend a demonstration or protest march</b>	Did you attend a demonstration or protest march during the past year? 0=No, would never do this, 1=No, but would do if had the chance, 2=Yes, once or twice, 3=Yes, several times, 4=Yes, often	Dummy = 1 if individual attended at least one demonstration or protest march, 0 otherwise
<b>Voter turnout in national elections</b>	With regard to the most recent national election, which statement is true for you? 0=You were not registered to vote, 1=You voted in the elections, 2=You decided not to vote, 3=You could not find the polling station, 4=You were prevented from voting, 5=You did not have time to vote, 6= You did not vote because you could not find your name in the voters' register, 7=Did not vote for some other reason	Dummy = 1 if individual reports having voted in the most recent national election, 0 otherwise
<b>Attend a campaign meeting</b>	Did you attend a campaign meeting or rally in last national election?	Dummy = 1 if individual attended campaign meeting in the last national election, 0 otherwise
<b>Work for a candidate or party</b>	Did you work for a candidate or party in last national election?	Dummy = 1 if individual worked for a candidate or party in the last national election, 0 otherwise
<b>Control Variables of interest</b>		
<b>Television news</b>	How often do you get news from Television? 0=Never, 1=Less than once a month, 2=A few times a month, 3=A few times a week, 4=Every day	Dummy = 1 if individual reports getting news from television at least few times a month, 0 otherwise
<b>Internet news</b>	How often do you get news from the internet? 0=Never, 1=Less than once a month, 2=A few times a month, 3=A few times a week, 4=Every day	Dummy = 1 if individual reports getting news from internet at least few times a month, 0 otherwise



### Other control variables

<b>Wealth</b>	Which of these things do you personally own: A radio? A television? A motor vehicle, car or motorcycle? Responses to these questions are binary (0=don't own; 1=own)	Index created from the responses to the three questions, divided by three.
<b>Poverty</b>	How often, if ever, have you or anyone in your family gone without: Food? Clean water? Medicines or medical treatment? Fuel for cooking? Cash income? 0=Never, 1=Just once or twice, 2=Several times, 3=Many times, 4=Always	Index created from these responses equal 0 if individual reports having never gone without food, clean water, medicines, fuel for cooking or cash income and 0 otherwise.
<b>Employment status</b>	Do you have a job that pays a cash income? If yes, is it full-time or part-time? If no, are you presently looking for a job? 0=No (not looking), 1=No (looking), 2=Yes, part time, 3=Yes, full time	Dummy = 1 if individual reports having a job and 0 otherwise
<b>Education</b>	What is the highest level of education you have completed? 0=No formal schooling, 1=Informal schooling only (including Koranic schooling), 2=Some primary schooling, 3=Primary school completed, 4=Some secondary school/ high school, 5=Secondary school completed/high school completed, 6=Post-secondary qualifications, other than university e.g. a diploma or degree from polytechnic or college, 7=Some university, 8=University completed, 9=Post-graduate	Values are kept as labelled in the question
<b>Age</b>	How old are you?	Age varies from 18 to 105
<b>Gender</b>	Respondent's gender: 1=Male, 2=Female	Dummy = 1 if individual is male and 0 if he is female
<b>Urban</b>	Do you come from a rural or urban area? 1=urban, 2=rural	Dummy = 1 if individual comes from urban area and 0 for rural area

### Transmission Mechanism Variables

<b>Satisfaction With Democracy</b>	Overall, how satisfied are you with the way democracy works in the country? Are you: 0=the country is not a democracy, 1=Not at all satisfied, 2=Not very satisfied, 3=Fairly satisfied, 4=Very satisfied	Dummy = 1 if individual reports very satisfied or fairly satisfied, 0 otherwise
<b>Economy Management</b>	How well or badly would you say the government is managing the economy: 1=Very badly, 2=Fairly badly, 3=Fairly well, 4=Very well	Dummy = 1 if individual reports that the government is handling the economy very well of fairly well, 0 otherwise
<b>Freeness and Fairness of Election</b>	How would you rate the freeness and fairness of the last national election: 4=Completely free and fair, 3=Free and fair, but with minor problems, 2=Free and fair, with major problems, 1=Not free and fair	Dummy = 1 if individual rates the election completely free and fair or free and fair with minor problems, 0 otherwise

### 3.2. Descriptive statistics

Table 2 and 3 provide descriptive statistics by comparing the political behavior (demonstrations, vote, campaign meeting, working for a party) of individuals with greater access to media through the internet and television and those with fewer access.<sup>3</sup>

Table 2 shows how logging on more often to get information online affect individual political engagement. People logging on more often seem to engage more in politics as they depict higher propensity to protest, attend campaign or work for a candidate or a party. But fewer part of them go to the poll suggesting that they may believe that voting is futile due to dissatisfactions and hence deliberately disengage. We investigate the mechanisms underpinning this deliberate disengagement hypothesis with respect to voting later on. However, television (table 3) as a source of information seem to not have any effect on people political participation as the ttest statistics are insignificant.

**Table 2: Summary statistics of individual characteristics by level of internet use to get news**

Variable (%)	Never or less than once a month	Few times a month, few times a week or every day	t-statistics
<b>Demonstrations</b>	17.58	39.51	18.9144
<b>Vote</b>	85.84	78.55	-6.1485
<b>Campaign Meeting</b>	13.53	21.67	8.1429
<b>Work for Party</b>	6.12	11.48	6.552

**Table 3: Summary statistics of individual characteristics by level of Television use to get news**

Variable (%)	Never or less than once a month	Few times a month, few times a week or every day	t-statistics
<b>Demonstrations</b>	22.68	25.63	1.1256
<b>Vote</b>	82.11	83.46	0.4926
<b>Campaign Meeting</b>	17.97	16.40	-0.705
<b>Work for Party</b>	9.89	8.11	-1.0185

<sup>3</sup>The corresponding figures are in appendix

### 3.3. Empirical strategy

The main challenges for estimating the causal effect of media on individual political participation are the issues of reverse causality and missing variables. In this section, we motivate and describe our empirical strategy for addressing these difficulties.

#### Threats to identification

The type and the degree of use of media might be associated with higher or less political participation. But this correlation does not prove the existence of a causal relationship as the type and intensity of media use are likely endogenous and individuals inclined to be non randomly selected in observable and unobservable characteristics which also correlate with the probability of engaging in politics. Many of the factors that determine individuals' level of use of media could also determine the level of their implication in politics. Thus, media access and individual political engagement could be simultaneously determined. Individuals may change the type and the level of use of media because they plan to change the actual political system. If the two decisions are simultaneously determined, then use of advanced communications and new media can be seen as a part of a broader strategy to change and improve the political landscape. This gives rise to an endogeneity problem and hence the relationship between media and political participation might be spurious. To assess the effects of media on individual political participation, we first have to deal with the threats to identification posed by the endogeneity of the type and intensity of use of media. We resort to a propensity score matching techniques and instrumental variable strategy to tackle the issue of endogeneity.

#### Propensity score matching

In a first attempt to control for the endogeneity, we use propensity score matching techniques to construct a counter-factual group of individuals with very low levels of use of media but otherwise similar in observable characteristics to those with higher levels (Heckman et al. 1997, 1998). This procedure helps us to control for the endogeneity of the degree of use media and ICT to a large extent on the basis of observable characteristics of the individuals.

Assuming that individuals in a sample can be either subject to a treatment,  $z_i = 1$ , or not,  $z_i = 0$ , we denote  $T$  the sub-sample of treated units, and  $\bar{T}$  the sub-sample of untreated units. If  $y$  represents an outcome variable, it can be influenced by the assignment to treatment; specifically,  $y_{i1}$  is the value of the outcome variable  $y$  when  $z_i = 1$ , and  $y_{i0}$  represents its value when  $z_i = 0$ . The true value (observed value) of the outcome variable,  $z_i$  is linked to its potential outcomes through the following equation:

$$y_i = z_i y_{i1} + (1 - z_i) y_{i0}$$

The treatment effect on the individual  $i$ ,  $\theta_i$  is defined as the difference between the observed value when treated  $y_{i1}$  and the value when untreated  $y_{i0}$  ( $\theta_i = y_{i1} - y_{i0}$ ). The average impact of the treatment on the subsample  $T$  of treated units,  $ATE_T$ , can be defined as:

$$ATE_T = E_T(\theta_i | z_i = 1) = E_T(y_{i1} | z_i = 1) - E_T(y_{i0} | z_i = 1) \quad (1)$$

where  $E_T$  denotes the average on treated units only. The observational rule for  $y_i$  precludes the estimation of the  $ATE_T$ , as  $y_{i0}$  is not observed when  $z_i = 1$ . In an experimental setting, where randomization ensures that there is no systematic difference between treated and untreated units, we have that  $E_T(y_{i0} | z_i = 0) = E_T(y_{i0} | z_i = 1)$ , so that observed outcomes for the untreated units can substitute for the unobserved outcomes  $y_0$  for treated units. With non-experimental data, this does not hold true because the assignment to the treatment can be influenced by a vector  $x$  of covariates that also have an impact on the outcome variable  $y$ . Assume that the vector  $x$  includes all covariates that have a simultaneous influence on the treatment and on the outcome, so that the potential outcome  $y_0$  is independent from the assignment to treatment conditional upon  $x$ . Formally:

$$y_0 \perp\!\!\!\perp z | x \quad (2)$$

where the symbol  $\perp\!\!\!\perp$  denotes statistical independence. Condition (2) implies that assignment to treatment is random conditional upon the vector of covariates. Let  $f(x)$  represent the probability of assignment to treatment, i.e.  $f(x) = \Pr(z = 1 | x)$  which is also called the propensity score. The seminal contribution by Rosenbaum and Rubin (1983) demonstrates that if the probability of assignment is bounded away from zero,  $f(x) \in (0, 1]$  so that all units in the sample can be exposed to treatment with a positive probability, and (2) holds, then we also have that:

$$y_0 \perp\!\!\!\perp z | f(x) \quad (3)$$

The outcome  $y_0$  is independent from the assignment to treatment  $z$  conditional upon  $f(x)$ , as  $f(x)$  represents a balancing score that ensures that  $x \perp\!\!\!\perp z | f(x)$  (Rosenbaum and Rubin, 1983). This, in turn, implies that the expected value of the unobserved outcome  $y_0$  for treated units conditional upon  $f(x)$  coincides with the expected value of the observed outcome  $y_0$  for untreated units, that is:

$$E_T(y_{i0} | z_i = 1, f(x) = p) = E_T(y_{i0} | z_i = 0, f(x) = p)$$

Hence, the  $ATE_T$  can be estimated through an iterative averaging as follows:

$$\widehat{ATE}_T(\theta_i | z_i = 1) = \int_0^1 [E_T(y_{i1} | z_i = 1, f(x) = p) - E_T(y_{i0} | z_i = 0, f(x) = p)] g(p) \quad (4)$$

where  $g(p)$  denotes the distribution of the propensity score  $f(x)$  in the subsample  $T$  of treated units. The expression in (4) implies that (i) the average outcome for treated and untreated units is estimated at each value of the propensity score, and then (ii) the difference between the two average outcomes is again averaged over the distribution  $g(p)$  of the propensity score.

#### IV strategy: Recursive bivariate probit model

Our second attempt to control for endogeneity relies on an IV strategy. As our outcomes of interest and endogenous regressors are transformed into dichotomous variables, the situation suggests using a recursive bivariate probit model, where the probability of our dependent variables and the probability of the endogenous regressors of interest are simultaneously determined (Greene, 1998, 2003; Maddala, 1983).

We model the political behavior of individuals getting news through television as follows :

$$P_i = \alpha' X_i + \beta TV_i + \varepsilon_i \quad (5)$$

$$TV_i = \delta' X_i + \gamma L_d + \eta_i \quad (6)$$

and those accessing news via the internet as follow:

$$P_i = \alpha' X_i + \beta I_i + \varepsilon_i' \quad (7)$$

$$I_i = \delta' X_i + \gamma L_d \cdot C_i + \eta_i' \quad (8)$$

Equations (5) and (7) are the second stage of our 2SLS systems while equations (6) and (8) are the first stage. The dependent variables (attending to protest marches/demonstrations, campaign meeting, working for a party, voting) are represented by  $P_i$  and the endogenous variables of interest: news from television and the internet respectively by  $TV_i$  and  $I_i$ .  $X_i$  is a vector of individual characteristics. The variables are defined and constructed as shown in table 1.

The stochastic terms in each system above are correlated and i.i.d.  $N(0, \sigma^2)$ .<sup>4</sup>  $L_d$  measures lightning activity in the residential area (district  $d$  of residence) of individuals. Following Andersen et al. (2012), we employ lightning density as an instrument to predict the probability of accessing to media. The rationale behind resorting to this instrument is the following: by causing voltage spikes and dips, a higher frequency of ground strikes leads to damaged digital equipment and thus higher IT user costs (Anderson et al. 2012). Accordingly, the flash density (strikes per square kilometer per year) should adversely affect digital equipment (television and computers) and hence accessing news from such equipment. But higher frequency of lightning strikes could be associated with higher media use as people may rely on them to inform about potential damaging effects of climate-related phenomenon.<sup>5</sup> Hence the correlation between lightning activity and media use may be negative as well as positive depending on the relative strength of the factors driving media use.

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<sup>4</sup>Wilde (2000) demonstrates that identification in such a model is achieved if both equations contain at least one varying exogenous regressor; Monfardini and Radice (2008) demonstrate that the availability of an instrument allows to relax the assumption of bivariate normality of the errors.

<sup>5</sup>We believe lightning density to be a valid instrument as it certainly is external and may correlate with media related variables. We also believe the instrument fulfills the exclusion restriction assumption required for instrument validity as there is no reason to believe the existence of any other potential link with unobserved determinants of our outcomes of interest.

The second stage specification in the first and the second system of equations is slightly different. In the first system we use the instrument in level while in the second system we interact the instrument with the variable  $C_i$  which captures individual propensity to use a computer. We could have also exercised the interaction procedure in the second stage specification of the first system. But in the absence of suitable variable as  $C_i$  in the data for the second system, we are constrained to leave our instrument uninteracted in the first system. The rationale of interacting  $C_i$  with our instrument is inspired from Nunn and Qian (2014). Using a computer increases the likelihood of getting information from the internet. By exploiting this second source of variation of individual propensity to access news *via* the internet and interact it with lightning activity (which varies across districts of residence) we are able to construct an instrument that varies across individuals which may improve the strength and quality of fit of the first stage estimation in the second system. This identification strategy relies on the interaction term being exogenous conditional on the baseline controls. The strategy follows the same logic as a difference-in-differences estimator. To see this, consider the reduced-form estimates, which compare the difference in political behavior of individuals using quite often computers in high lightning density districts to those who never or rarely use computers in low lightning density districts. The first stage estimates make similar comparison but with the probability of getting through the internet being the dependent variable. Causal inference using the interacted instrumental variable relies on the assumption that, conditional on the controls, the interaction between individuals' computer frequency use and the lightning activity of their area of residence only affects their political behavior through the degree of accessing news via the internet.

Using ground-based lightning detection sensors as well as global satellite data, we construct lightning density data and associate to each individual in our sample the mean annual flash rate (flashes/km<sup>2</sup>/year) of their district/region of residence.

The correlation coefficient between the stochastic terms in system of equations above and hence the binary outcomes is measured by  $\rho$ . Under the null hypothesis of no endogeneity (exogeneity), if  $\rho$  turns out insignificant, it means that the binary regressor is not in fact endogenous and we can just estimate a regular probit model.

The coefficient of interest  $\beta$  is the estimated effect of accessing news from television or the internet on individual political participation. A positive coefficient,  $\hat{\beta} > 0$ , indicates that, on average, getting news quite often from television or the internet increases engagement in politics.

## 4. Econometric Results

### 4.1. Propensity Score Estimates

In this section, we assess the differential political behavior of North Africa Arab citizens with respect to their level of media access. The treatment variable  $z$  and the outcome variable  $y$  are represented by binary variables that capture the level of access to information and political engagement and participation. The treatment variables labeled “Internet news”, “Television news” and the outcome variables labeled “Demonstration or “Protest march”, “Vote”, “Campaign meeting”, “Work for party”, are defined and coded as in table 1. We retain the following individual characteristics in the vector  $x$  of covariates that is used to estimate the propensity score  $f(x)$ <sup>6</sup>: a set of demographic variables, i.e age, gender, urban or rural residence and education<sup>7</sup>. Individual resource endowments captured by their labor market status and their household’s socio-economic status may also explain the differential access to media. The former captures individual’s labor market status *via* a simple dichotomy of employed/not employed. We rely on two index measures to capture the latter. The first is an index created from questions of Afrobarometer round 5 survey that ask about household assets. The survey asks respondents: “Which of these things do you personally own: A radio? A television? A motor vehicle, car or motorcycle?” Responses to these questions are binary (0=don’t own; 1=own). The asset-based variable labeled “Wealth” is a sum of responses to the three questions, divided by three. The second index labeled “Poverty” is a Lived Poverty Index (LPI) drawn from Bratton (2008), which mixes objective and subjective approaches to measuring poverty. The index captures whether anyone in the individual’s household had gone without enough food, clean water for home use, medicines or medical treatment, fuel for cooking, or a cash income over the previous year. We also include dummies for the 4 countries of the data, to control for all unobservable factors that can simultaneously influence access to media and ICT and political participation. The propensity score  $f(x)$  is estimated through a logit model, so that the probability of assignment to the treatment is estimated as:

$$f(x) = \frac{e^{x'\beta}}{1 + e^{x'\beta}}$$

The estimated propensity score acts as a balancing score of the covariates and the estimated coefficients do not have a behavioral interpretation (Dehejia and Wahba, 2002). Therefore they should not be interpreted as reflecting the effect of the elements in the vector  $x$  upon the probability of accessing to media. The estimation of the logit model is also done without using sampling weights as data for treated and untreated units are drawn from the same survey. This represents a more general necessary condition for a sound application of matching estimators (Heckman et al., 1997) as we do not seek to support inferences about the whole population from

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<sup>6</sup>The choice of the individual-level variables was informed by the extensive literature that exists on access to media and ICT.

<sup>7</sup>Education is captured as a nine-level index ranging from no formal schooling to postgraduate education.

which the sample has been drawn (Zanutto, 2006). The model has an overall goodness of fit, measured by the pseudo- $R^2$ , which lies between 0.2637 and 0.0950, and Table 4 reports the coefficients that are used to estimate the propensity score for each of our endogenous regressors of interest.

**Table 4: Estimation of the propensity score, logit model**

<b>Dependent variable</b>	<b>Internet news</b>	<b>Television news</b>
<b>Wealth</b>	0.208*** (0.0443)	0.421*** (0.0621)
<b>Poverty</b>	-0.160*** (0.0407)	0.0147 (0.0656)
<b>Employment status</b>	0.105** (0.0422)	0.203*** (0.0681)
<b>Education</b>	1.080*** (0.0425)	0.159** (0.0662)
<b>Age</b>	-0.0316*** (0.00161)	-0.00419** (0.00211)
<b>Gender</b>	0.233*** (0.0412)	-0.0755 (0.0629)
<b>Urban</b>	0.408*** (0.0406)	0.174*** (0.0612)
<b>Country dummy</b>	Yes	Yes
<b><math>\chi^2(11)</math></b>	2010.96	219.44
<b>Pseudo-R2</b>	0.2637	0.0950
<b>Observations</b>	5,836	5,875

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1;  $\chi^2(11)$  test performed on the null hypothesis that the country dummies are jointly equal to zero

Source: Authors’ elaboration on Afrobarometer round 5.

The estimated propensity score is then used to define the subsample of individuals with very low degree of media access that form the control group, and to estimate the average treatment effect on the treated.

Tables 5 and 6 present the results of the impact of media use on political participation. Each column of the tables reports results for a different form of participation, i.e., joining protests, voting, attending campaign meeting and working for a party. The upper part of the tables which report the findings for North Africa Arab countries on the differences in political behavior for individuals who frequently use media (internet and television) and other individuals. They are only suggestive and do not attempt to control for endogeneity. The lower part of the tables do tackle



the endogeneity issue and report the results obtained through various matching methods namely with nearest neighbor matching, Kernel matching and stratification matching to ensure the robustness of our results.

Table 5 reports the impact of the internet used as a source of information. Without controlling for the endogeneity, we show that individuals with greater internet use to get news are more likely to attend demonstrations (21.93 percentage points), campaign meeting / rally (8.14 pp). They are also more inclined to work for a party / candidate (5.36 pp), but less inclined to vote (7.29 pp). After controlling for endogeneity of the internet, the figures stand substantially below in absolute term suggesting that differences in observable characteristics, which are controlled for through the matching procedure, can account for a relevant part of the lower estimates among the North African Arab citizen. Depending on the matching methods, the probability of demonstrating, voting, attending a campaign meeting or working for a party is lower in absolute value once we control for the endogeneity respectively between 6.1 pp and 9.7pp; 4.3 pp and 4.5 pp; 4.1 pp and 5.1 pp; 3.1 pp and 5.6 pp. The null hypothesis that the true impact of the internet on political engagement is actually equal to zero can be rejected for all the estimates except the nearest neighbor matching estimate on voting.

**Table 5 : Impact of getting news from the internet on political participation**

<b>Non-matched sample</b>				
<b>Dependent variable</b>	<b>Protests</b>	<b>Vote</b>	<b>Campaign meeting</b>	<b>Work for Party</b>
<b>Difference in outcome variable</b>	0.2193*** (.0115961)	-0.0729*** (.0118452)	0.0814*** (.0099975)	0.0536*** (.0081711)
<b>Matched samples (ATT estimation )</b>				
<b>Nearest Neighbor Matching</b>	0.061** (0.029)	-0.027 (0.022)	0.042* (0.024)	0.031* ( 0.016)
<b>Kernel matching</b>	0.097*** (0.020)	-0.045** (0.018)	0.051*** (0.018)	0.052*** ( 0.017)
<b>Stratification matching</b>	0.089*** (0.016)	-0.043** (0.021)	0.041** (0.020)	0.056*** (0.0518)

standard errors obtained through bootstrapping, 50 replications

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 6 sums up the estimation results of the impact of using television as a source of information. As the table shows, neither the top part of the table nor the bottom part depict any statistical significant effect of getting news from television on political participation. Television does not seem to have any appreciable effect on individuals’ political behavior even after correcting for endogeneity.

**Table 6 : Impact of getting news from television on political participation**

<b>Non-matched sample</b>				
<b>Dependent variable</b>	<b>Protests</b>	<b>Vote</b>	<b>Campaign meeting</b>	<b>Work for Party</b>
<b>Difference in outcome variable</b>	0.0295 (.0262126)	0.0135 (.0276021)	-0.0157 (.0221618)	-0.0178 (.0174197)
<b>Matched samples (ATT estimation )</b>				
<b>Nearest Neighbor Matching</b>	0.013 (0.059)	0.024 (0.036)	0.008 (0.058)	-0.011 (0.047)
<b>Kernel matching</b>	-0.021 (0.048)	0.059 (0.046)	-0.019 (0.034)	-0.014 (0.032)
<b>Stratification matching</b>	-0.016 (0.045)	0.025 (0.041)	-0.009 (0.056)	-0.003 (0.030)

standard errors obtained through bootstrapping, 50 replications

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### 4.2. Recursive bivariate probit model

We present in this section the estimates of the recursive bivariate probit models described earlier. The bivariate model estimates individual behaviors that are interrelated as opposed to independent. It is a joint model for two binary outcomes, which may be correlated, with correlation  $\rho$ . If the correlation coefficient turns out insignificant, then we can estimate a simple probit model.

Tables 7 to 10 show the differential effect of the type of media used to get news namely the internet and television on individual propensity to demonstrate, vote, attend a campaign meeting or work for a party respectively. In table 7, the correlation coefficient is insignificant in the 2SLS estimates of the internet on demonstrations which means that there is no need to perform a bivariate. Hence the simple probit estimate implies that an individual who regularly gets news through the internet is 14.2% more likely to demonstrate or attend protest marches compared to an individual who barely inform online. Shifting our attention to the effect of television, the bivariate model turns out to fit the data well as the correlation coefficient is significantly different from zero. The positive sign of  $\rho$  entails that the unobserved factors that increase the probability of getting news from television increase the probability of demonstrating or attending protest marches. Lightning density is negatively correlated with internet use which corroborate Anderson et al. 2012. In contrast to the internet, individuals who get news through television are less likely to protest (up to 35.8 %) compared to individuals that do not.

**Table 7 : Effects of Media on Demonstrations in North Africa, Probit and 2SLS Regression**

VARIABLES	Internet News		Television News	
	Probit	2SLS	Probit	2SLS
<b>Panel A</b>				
<b>lightning density X internet use</b>		0.309*** (0.0190)		
<b>Lightning density</b>				-0.0492*** (0.0144)
<b>Constant</b>		-0.962*** (0.113)		2.284*** (0.194)
<b>Panel B</b>				
<b>internet news</b>	0.540*** (0.0537)	0.636*** (0.0945)		
<b>Television news</b>			0.263** (0.129)	-1.321*** (0.482)
<b>wealth</b>	0.187*** (0.0516)	0.185*** (0.0523)	0.195*** (0.0509)	0.218*** (0.0511)
<b>poverty</b>	0.332*** (0.0458)	0.340*** (0.0458)	0.300*** (0.0451)	0.296*** (0.0445)
<b>Employment status</b>	0.0497 (0.0478)	0.0526 (0.0482)	0.0489 (0.0474)	0.0633 (0.0473)
<b>education</b>	0.192*** (0.0528)	0.158*** (0.0608)	0.389*** (0.0477)	0.390*** (0.0470)
<b>age</b>	-0.00766*** (0.00173)	-0.00683*** (0.00186)	-0.0127*** (0.00166)	-0.0127*** (0.00169)
<b>gender</b>	0.423*** (0.0477)	0.410*** (0.0484)	0.448*** (0.0472)	0.429*** (0.0474)
<b>urban</b>	0.100** (0.0468)	0.0879* (0.0477)	0.162*** (0.0456)	0.181*** (0.0451)
<b>Constant</b>	-1.609*** (0.103)	-1.652*** (0.108)	-1.573*** (0.159)	-0.0148 (0.482)
<b>Country dummies</b>	Yes	Yes	Yes	Yes
<b>Observations</b>	4,641	4,626	4,664	4,664
<b>p</b>		-0,0744047		.6549096
<b>Wald test, Ho: p = 0</b>		1,48846		6.93669***

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 8 compares individuals' voting pattern with respect to the two types of media. In both cases, the 2SLS estimates are more consistent than the probit estimates. The 2SLS estimates suggest that internet media (online news, political party web sites, social media) reduce the likelihood to vote while traditional mass media (namely television) increase the probability to vote. Digital media use decreases the propensity to vote by 4.5% points while traditional media increase it (people getting news via television are 58.7 % more inclined to vote than those who do not).

**Table 8 : Effects of Media on Voting in North Africa, Probit and 2SLS Regression**

VARIABLES	Internet News		Television News	
	Probit	2SLS	Probit	2SLS
<b>Panel A</b>				
<b>lightning density X internet use</b>		0.338*** (0.0248)		
<b>Lightning density</b>				-0.0497*** (0.0161)
<b>Constant</b>		-0.893*** (0.138)		2.449*** (0.202)
<b>Panel B</b>				
<b>internet news</b>	-0.0535 (0.0678)	-0.202* (0.119)		
<b>Television news</b>			0.306** (0.146)	2.706*** (0.205)
<b>wealth</b>	0.124** (0.0617)	0.136** (0.0623)	0.104* (0.0615)	0.0564 (0.0619)
<b>poverty</b>	-0.295*** (0.0560)	-0.303*** (0.0561)	-0.289*** (0.0558)	-0.288*** (0.0537)
<b>Employment status</b>	0.169*** (0.0602)	0.171*** (0.0600)	0.164*** (0.0602)	0.148** (0.0586)
<b>education</b>	0.00471 (0.0647)	0.0614 (0.0765)	-0.0216 (0.0593)	-0.0366 (0.0599)
<b>age</b>	0.0171*** (0.00218)	0.0158*** (0.00238)	0.0176*** (0.00210)	0.0174*** (0.00205)
<b>gender</b>	-0.0161 (0.0587)	-0.00816 (0.0591)	-0.0235 (0.0585)	-0.00155 (0.0572)
<b>urban</b>	-0.342*** (0.0577)	-0.320*** (0.0602)	-0.358*** (0.0571)	-0.375*** (0.0561)
<b>Constant</b>	0.130 (0.123)	0.192 (0.131)	-0.175 (0.186)	-2.517*** (0.217)
<b>Country dummies</b>	Yes	Yes	Yes	Yes
<b>Observations</b>	3,585	3,574	3,604	3,604
<b>p</b>		0,1225995		-9293573
<b>Wald test, Ho: <math>\rho = 0</math></b>		2.33459*		18.8418***

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0

As can be seen in table 9, higher frequency of use of internet media, would lead to increased campaign attendance while television lead to lower campaign meeting. The 2SLS performs better in both regressions (internet and television). Online activities, including following the news increase the probability to attend campaign meeting by 9.4% points. But this probability decreases by 19.8% points when people get news *via* television.

**Table 9 : Effects of Media on Campaign Meeting in North Africa, Probit and 2SLS Regression**

VARIABLES	Internet News		Television News	
	Probit	2SLS	Probit	2SLS
<b>Panel A</b>				
<b>lightning density X internet use</b>		0.310*** (0.0189)		
<b>Lightning density</b>				-0.0400*** (0.0143)
<b>Constant</b>		-0.971*** (0.113)		2.166*** (0.187)
<b>Panel B</b>				
<b>internet news</b>	0.353*** (0.0617)	0.479*** (0.105)		
<b>Television news</b>			0.217*** (0.0585)	-0.984* (0.639)
<b>wealth</b>	0.207*** (0.0588)	0.201*** (0.0597)	0.0762 (0.0497)	0.232*** (0.0581)
<b>poverty</b>	0.0903* (0.0500)	0.0963* (0.0500)	0.241*** (0.0526)	0.0775 (0.0492)
<b>Employment status</b>	0.244*** (0.0528)	0.245*** (0.0539)	0.270*** (0.0545)	0.250*** (0.0538)
<b>education</b>	0.125** (0.0606)	0.0776 (0.0662)	0.00435** (0.00180)	0.273*** (0.0536)
<b>age</b>	0.00740*** (0.00188)	0.00836*** (0.00197)	0.482*** (0.0541)	0.00402** (0.00176)
<b>gender</b>	0.468*** (0.0544)	0.457*** (0.0560)	-0.158*** (0.0506)	0.468*** (0.0556)
<b>urban</b>	-0.204*** (0.0516)	-0.220*** (0.0528)	-1.699*** (0.173)	-0.141*** (0.0508)
<b>Constant</b>	-1.784*** (0.114)	-1.832*** (0.115)	2.166*** (0.187)	-0.643 (0.654)
<b>Country dummies</b>	Yes	Yes	Yes	Yes
<b>Observations</b>	4,715	4,700	4,739	4,739
<b>ρ</b>		-0,09983		.4516555
<b>Wald test, Ho: ρ = 0</b>		2.15199*		2.64792*

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 10 suggests that consuming online news has a significant positive effect on individual likelihood to work for a candidate or a party while news from television has a negative effect. The simple probit is preferable to the 2SLS estimates when determining the effect of news from the internet while the 2SLS performs better in analyzing the effect of news from television. People are

3.5% more likely to work for a candidate or a party when using digital media such as reading online news, visiting political party web sites, blogging or using social media. Instead they are 19.2% less inclined to work for a candidate or a party when solely using traditional media such as television.

**Table 10 : Effects of Media on Working for a Party in North Africa, Probit and 2SLS Regression**

VARIABLES	Internet News		Television News	
	Probit	2SLS	Probit	2SLS
<b>Panel A</b>				
<b>lightning density X internet use</b>		0.301*** (0.0181)		
<b>Lightning density</b>				-0.0368** (0.0150)
<b>Constant</b>		-0.800*** (0.128)		2.262*** (0.191)
<b>Panel B</b>				
<b>internet news</b>	0.350*** (0.0914)	0.313** (0.150)		
<b>Television news</b>			-0.140 (0.189)	-1.762** (0.837)
<b>wealth</b>	0.201** (0.100)	0.221** (0.0996)	0.216** (0.0997)	0.230** (0.0934)
<b>poverty</b>	-0.0716 (0.0750)	-0.0788 (0.0736)	-0.0818 (0.0743)	-0.0790 (0.0716)
<b>Employment status</b>	0.228*** (0.0784)	0.230*** (0.0804)	0.237*** (0.0781)	0.242*** (0.0789)
<b>education</b>	0.218** (0.0919)	0.238** (0.105)	0.373*** (0.0826)	0.372*** (0.0831)
<b>age</b>	0.00260 (0.00298)	0.00208 (0.00327)	-0.000469 (0.00286)	-0.000538 (0.00279)
<b>gender</b>	0.176** (0.0803)	0.183** (0.0806)	0.189** (0.0799)	0.176** (0.0793)
<b>urban</b>	-0.00385 (0.0820)	-0.00654 (0.0796)	0.0356 (0.0804)	0.0545 (0.0773)
<b>Constant</b>	-2.182*** (0.176)	-2.181*** (0.188)	-1.880*** (0.246)	-0.278 (0.841)
<b>Country dummies</b>	Yes	Yes	Yes	Yes
<b>Observations</b>	4,544	3,535	3,559	3,559
<b>ρ</b>		0,0324918		.6339676
<b>Wald test, Ho: ρ = 0</b>		0,117141		3.08991*

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 5. Mechanisms

Previous tables show that media have the capacity to shape political behaviors: internet induces a bias towards protesting more and voting less, while for television the opposite holds. In the vast majority of cases, people boycott election because they believe that the system inherently and unfairly benefits the ruling party and the goal of the boycotting is either to get the ruling party to level the electoral playing field or to focus the international community's attention on the unfair or fraudulent practices of the ruling regime. We test in the following tables that the type of information individuals have access to modify their perception of the legitimacy and well-functioning of the political institutions in their country, which explain why they vote less and protest more. If citizens are not satisfied with the way democracy is working, if they consider that the quality of economic management is poor, and that elections are not fair, they are more likely to express their dissatisfaction by participating into protest marches and by voting less. Frankle (2010) discusses for instance the option of boycotting elections, which became a way in certain countries to express her/his discontent, reaching 15% by 2002. "The electoral boycott has become a regular tool for political opposition parties to use, especially since the end of the Cold War", although in most cases (Iraq and the post-Saddam era, Ethiopia and the 1994 parliamentary elections boycotted by the opposition parties, Ghana and the 1992 parliamentary elections, Mali and the 1997 elections) the payoff of boycotting elections is very low and even negative.

Our interpretation of the result in tables 11 to 13 is that the information provided through internet has a higher probability of being exempted from governmental influences, which results in less satisfaction with democracy (table 11), a more skeptical perception about the quality of economic management (table 12), and about the fairness of elections (table 13). This bias towards more negative opinions translates into different political behaviors, a higher tendency to protest and not go to vote. Table 11 shows that overall internet users are 10.68 % points less likely to be satisfied with the way democracy works in their country whereas people who inform through television are 17.55% points more likely to be satisfied with democracy within their country. Table 12 suggests that the internet induces a lower propensity to rate fairly or very well the way the current government is handling the management of the economy (-8.5% points). It also induces to rate poorly the freeness and fairness of the last national election (-17.67% points) as table 13 suggests. The opposite occurs for television in these tables. News from television induce higher probability to rate well the economy management (9.79% points) or the electoral process (73.55% points).

**Table 11 : Effects of Media on Satisfaction with Democracy in North Africa, Probit and 2SLS Regression**

VARIABLES	Internet News		Television News	
	Probit	2SLS	Probit	2SLS
<b>Panel A</b>				
<b>lightning density X internet use</b>		0.311*** (0.0193)		
<b>lightningdensity</b>				-0.0683*** (0.0197)
<b>Constant</b>		-0.898*** (0.116)		2.601*** (0.246)
<b>Panel B</b>				
<b>internet news</b>	-0.0887* (0.0498)	-0.287*** (0.0894)		
<b>Television news</b>			0.440*** (0.116)	1.159** (0.608)
<b>wealth</b>	0.121*** (0.0458)	0.127*** (0.0459)	0.101** (0.0456)	0.0826* (0.0485)
<b>poverty</b>	-0.314*** (0.0402)	-0.322*** (0.0402)	-0.304*** (0.0401)	-0.305*** (0.0397)
<b>employmentstatus</b>	-0.00330 (0.0442)	-0.00341 (0.0443)	-0.0119 (0.0442)	-0.0216 (0.0451)
<b>education</b>	-0.0211 (0.0476)	0.0553 (0.0551)	-0.0584 (0.0438)	-0.0648 (0.0441)
<b>age</b>	0.00156 (0.00153)	9.55e-05 (0.00165)	0.00243* (0.00147)	0.00264* (0.00148)
<b>gender</b>	-0.0888** (0.0432)	-0.0752* (0.0436)	-0.0925** (0.0431)	-0.0817* (0.0443)
<b>urban</b>	-0.118*** (0.0420)	-0.0907** (0.0434)	-0.142*** (0.0415)	-0.156*** (0.0432)
<b>Constant</b>	0.569*** (0.0891)	0.646*** (0.0946)	0.108 (0.142)	-0.592 (0.601)
<b>Country dummies</b>	Yes	Yes	Yes	Yes
<b>Observations</b>	4,319	4,311	4,340	4,340
<b>ρ</b>		0,1579372		-0,3575545
<b>Wald test, Ho: ρ = 0</b>		6.92374***		1.22454

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table 12 : Effects of Media on Economy Management in North Africa, Probit and 2SLS Regression**

VARIABLES	Internet News		Television News	
	Probit	2SLS	Probit	2SLS
<b>Panel A</b>				
<b>lightning density X internet use</b>		0.310*** (0.0197)		
<b>lightning density</b>				-0.0662*** (0.0168)
<b>Constant</b>		-0.960*** (0.116)		2.341*** (0.206)
<b>Panel B</b>				
<b>internet news</b>	-0.0265 (0.0549)	-0.292*** (0.0951)		
<b>Television news</b>			0.298** (0.128)	1.184*** (0.453)
<b>wealth</b>	0.187*** (0.0514)	0.204*** (0.0524)	0.155*** (0.0510)	0.122** -0,0565
<b>poverty</b>	-0.338*** (0.0440)	-0.345*** (0.0439)	-0.332*** (0.0439)	-0.326*** (0.0439)
<b>employmentstatus</b>	0.115** (0.0487)	0.115** (0.0484)	0.106** (0.0487)	0.0897* (0.0487)
<b>education</b>	-0.0660 (0.0525)	0.0406 (0.0622)	-0.0847* (0.0479)	-0.0981** (0.0480)
<b>age</b>	0.00286* (0.00168)	0.000702 (0.00178)	0.00301* (0.00162)	0.00328** (0.00160)
<b>gender</b>	-0.0492 (0.0478)	-0.0312 (0.0476)	-0.0610 (0.0476)	-0.0497 (0.0471)
<b>urban</b>	-0.0992** (0.0465)	-0.0652 (0.0475)	-0.119*** (0.0458)	-0.140*** (0.0467)
<b>Constant</b>	0.233** (0.0971)	0.340*** (0.100)	-0.0286 (0.156)	-0.879** (0.444)
<b>Country dummies</b>	Yes	Yes	Yes	Yes
<b>Observations</b>	4,346	4,332	4,372	4,372
<b>ρ</b>		0,2114194		-4348918
<b>Wald test, Ho: ρ = 0</b>		11.3837***		2.85977

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 13 : Effects of Media on Fairness of Election in North Africa, Probit and 2SLS Regression**

VARIABLES	Internet News		Television News	
	Probit	2SLS	Probit	2SLS
<b>Panel A</b>				
lightning density X internet use		0.307*** (0.0202)		
Lightning density				-0.0837*** (0.0148)
Constant		-0.906*** (0.123)		2.559*** (0.228)
<b>Panel B</b>				
internet news	-0.0829 (0.0538)	-0.495*** (0.0944)		
Television news			0.0799 (0.121)	2.090*** (0.154)
wealth	0.0330 (0.0486)	0.0491 (0.0486)	0.0154 (0.0484)	-0.00466 (0.0477)
poverty	-0.366*** (0.0433)	-0.383*** (0.0433)	-0.358*** (0.0431)	-0.350*** (0.0423)
Employment status	0.0191 (0.0473)	0.0169 (0.0471)	0.0154 (0.0473)	-0.00558 (0.0463)
education	0.0376 (0.0512)	0.191*** (0.0585)	0.00298 (0.0467)	-0.0116 (0.0458)
age	0.00857*** (0.00164)	0.00506*** (0.00178)	0.00920*** (0.00157)	0.00907*** (0.00157)
gender	-0.106** (0.0465)	-0.0762 (0.0468)	-0.113** (0.0463)	-0.0959** (0.0457)
urban	-0.249*** (0.0449)	-0.193*** (0.0464)	-0.266*** (0.0443)	-0.283*** (0.0436)
Constant	0.361*** (0.0962)	0.541*** (0.102)	0.264* (0.149)	-1.714*** (0.182)
Country dummies	Yes	Yes	Yes	Yes
Observations	3,895	3,886	3,916	3,916
$\rho$		0,3228275		-8889947
Wald test, Ho: $\rho = 0$		23.9423***		30.0534***

Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 6. Conclusions

This paper has analyzed the political impact of new versus old media in North Africa. We drew our data from Afrobarometer round 5 and resort to a propensity score matching techniques and instrumental variable strategy to tackle endogeneity issues related to media use. Our paper contributes to the debate of the interaction between the media and politics. The literature has shown that (1) voter turnout is higher in groups where many have access to the media, (2) the interactions between voters and politicians are strengthened in the presence of media: the demand for accountability gets more acute, for instance voters manipulation prior to an election is kept under stricter limits. Moreover, the interaction can be democracy-improving if the media are free and if the competition among them does not induce a race to the bottom. Most empirical studies are based upon evidence occurring or having occurred in the US, and the effect of Internet is relatively under-analysed as compared with newspaper, radio or television, which constitutes the bulk of this literature.

Our contribution adds new evidence at three levels: First we focus on four north-African countries, Tunisia, Egypt, Morocco and Algeria. The cases of Egypt and Tunisia are particularly important in illustrating the link between democracy and the media as the two countries have undergone the well-known Arab Spring, which thanks to the media has been commented and interpreted within the countries borders and over the world. Second we compare different media, and we emphasize the differentiated impacts of television and Internet on the traditional ways of being engaged in politics, like voters turnout, attend a campaign, work for a party, as opposed to demonstration and protest activities. The internet induces a higher propensity to demonstrate (6.1 pp to 14.2 pp), attend campaign meeting (4.1pp to 9.4pp) or work for a candidate (3.1pp to 3.5) while the likelihood to vote is lowered (-4.5pp to -4.3pp). News from television induces opposite political behaviors. Watching television increases the probability to vote (58.7 pp) but decreases the likelihood to attend protest activities (35.8 pp) or campaign meeting (19.8 pp) or work for a candidate (19.2 pp) Finally we are able to disentangle the mechanisms, through which Internet users individuals watching television participate differently. By showing that the perception about the way politics is run is impacted differently, we contribute to the debate about the importance of media content on politics. One key result is that getting news from internet reduces the propensity to go to vote, which is not necessarily a good outcome if it entails a risk of revolution, civil war, or simply if one worries about the cost associated with boycotting (Frankel, 2010). Our paper complements nicely that of Manacordi and Tesei (2016), which stresses the role of mobile phones in fostering political mobilization during recessions through enhanced coordination in protest participation. We focus on different media and we emphasize the provision of information in enhancing political participation.

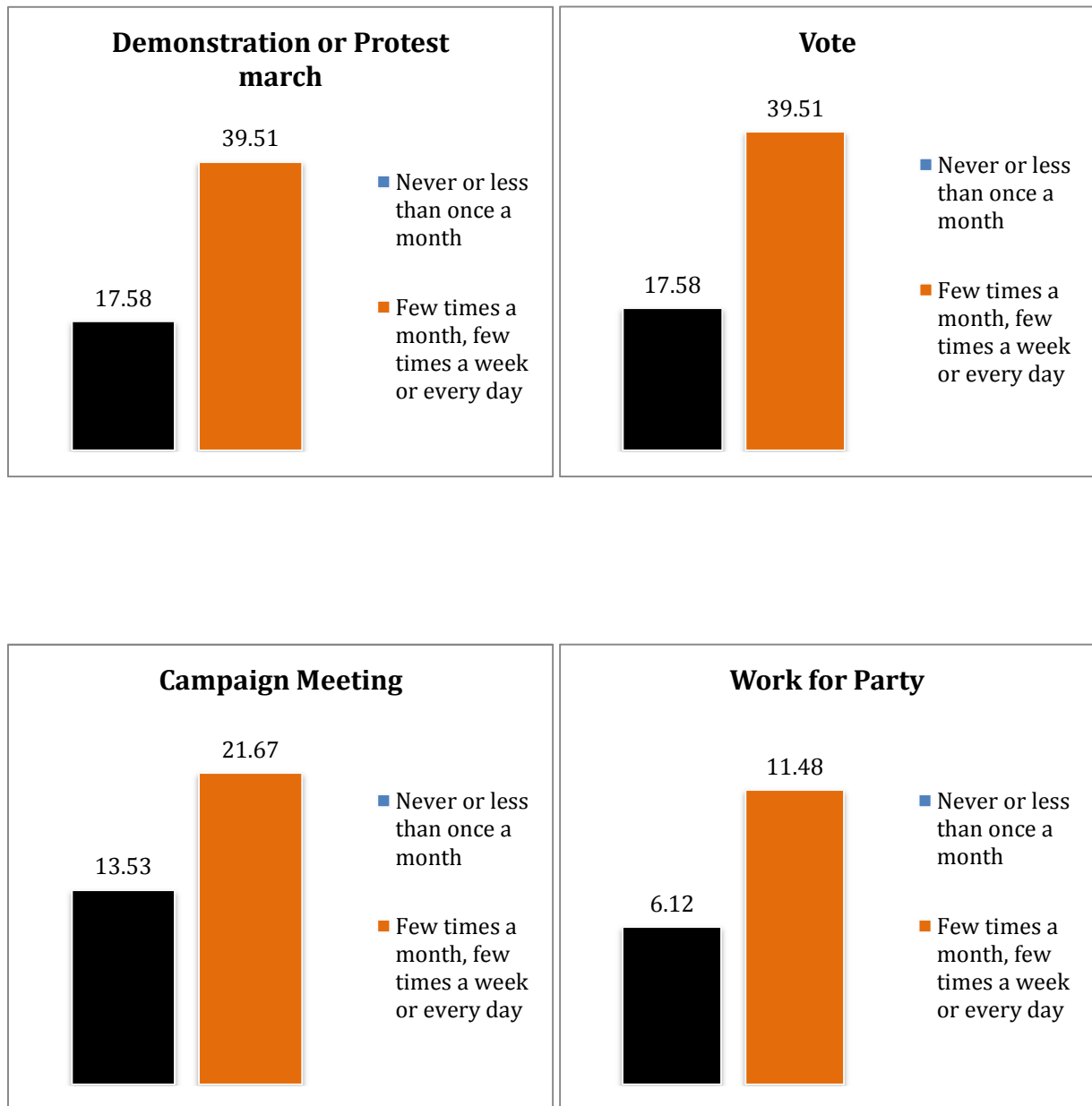
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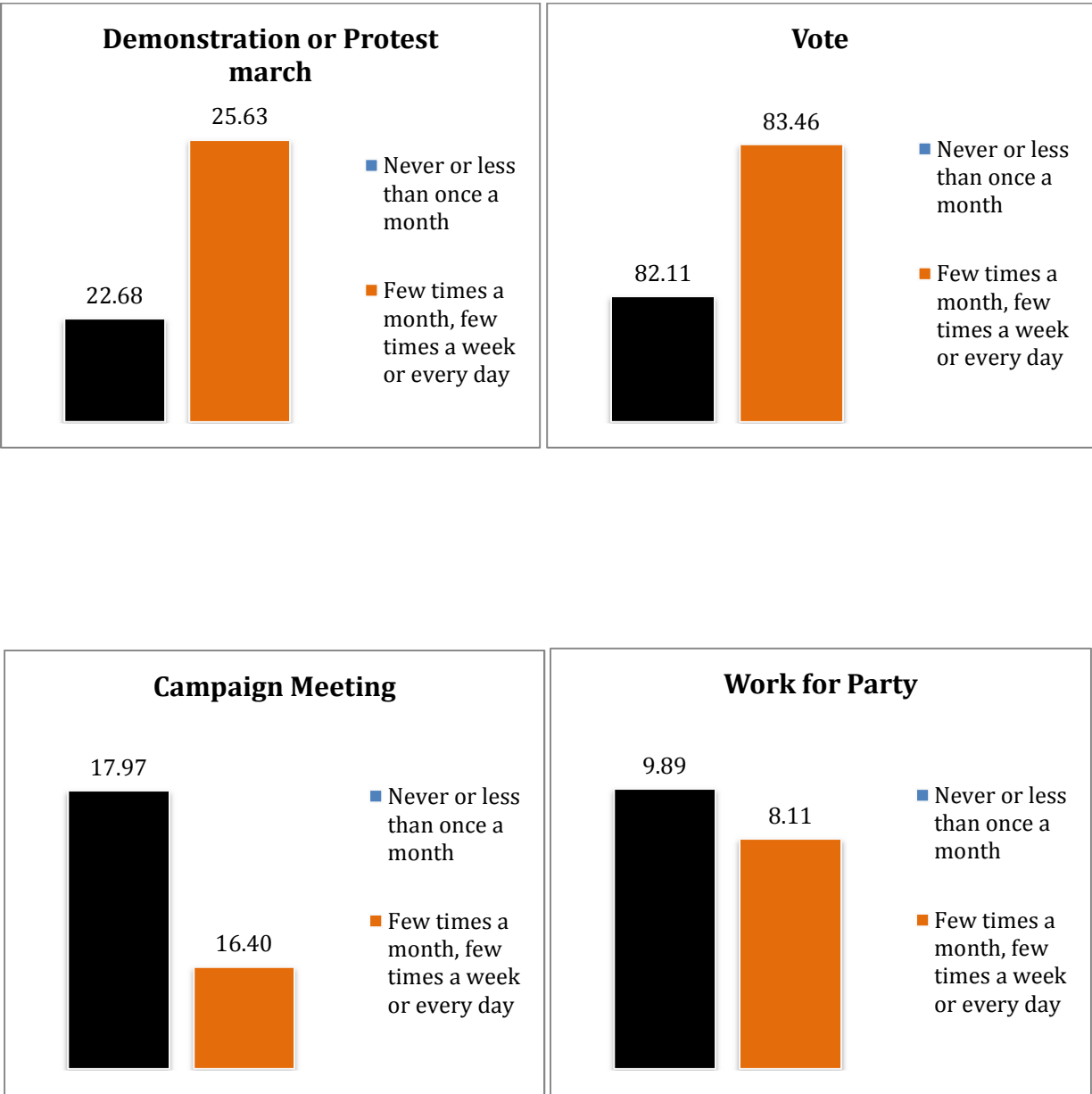
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## Appendix

Figure 1: Individuals' political behavior by level of internet use to get news (%)



**Figure 2: Individuals' political behavior by level of television use to get news (%)**









*“Sur quoi la fondera-t-il l'économie du monde qu'il veut gouverner? Sera-ce sur le caprice de chaque particulier? Quelle confusion! Sera-ce sur la justice? Il l'ignore.”*

Pascal



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