I Z A Institute
of Labor Economics
Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 11491

News Media and Crime Perceptions: Evidence from a Natural Experiment

Nicola Mastrorocco
Luigi Minale

APRIL 2018

I Z A Institute
of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 11491

News Media and Crime Perceptions: Evidence from a Natural Experiment

Nicola Mastrorocco
Trinity College Dublin

Luigi Minale
Universidad Carlos III de Madrid, CReAM and IZA

APRIL 2018

IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

News Media and Crime Perceptions: Evidence from a Natural Experiment*

In democracies voters rely on media outlets to learn about politically salient issues. This raises an important question: how strongly can media affect public perceptions? This paper uses a natural experiment – the staggered introduction of the Digital TV signal in Italy – to measure the effect of media persuasion on the perceptions individuals hold. We focus on crime perceptions and, combining channel-specific viewership and content data, we show that the reduced exposure to channels characterized by high levels of crime reporting decreases individual concerns about crime. The effect is driven by individuals aged 50 and over, who turn out to be more exposed to television while using other sources of information less frequently. Finally, we provide some evidence about the effect of the digital introduction on public policies closely related to crime perceptions and on voting behavior.

JEL Classification: D72, D83, K42, L82

Keywords: information, news media, persuasion, crime perceptions

Corresponding author:
Luigi Minale
Department of Economics
Universidad Carlos III de Madrid
Calle Madrid 126
28903 Getafe
Spain
E-Mail: lminale@eco.uc3m.es

* We thank Christian Dustmann, Francesco Fasani, Simon Hix, Valentino Larcinese, Italo Lopez Garcia, Tommaso Nannicini, Jan Stuhler and Uta Schoenberg for their useful comments, as well as seminar participants at Bocconi University, CReAM, Erasmus School of Economics, Instituto Autonomo Tecnologico de Mexico, LSE, Navarra Center for International Development, NIESR, University of Nottingham, Universidad Carlos III de Madrid, Universidad de Los Andes, Universidad del Rosario and UCL. We are particularly grateful to Jim Snyder, Riccardo Puglisi and The Pavia Observatory for sharing with us data about the content of prime-time news programs of Italian TV channels. Finally, we thank Nicola Polli at MCS Consultancy for the help provided in gathering Auditel data on TV viewing shares. Luigi Minale gratefully acknowledges support from the Ministerio de Economía y Competitividad (Spain, Maria de Maeztu Grant) and Comunidad de Madrid (MadEco-CM S2015/HUM-3444).

1. Introduction

A recent body of empirical literature suggests that media have a significant impact on political and public policy outcomes (see, among others: Della Vigna and Kaplan, 2007; Gerber et al., 2009; Enikolopov et al., 2011; Barone et al., 2015). Yet, little is known about the mechanisms through which media concretely manage to influence collective decisions and policies. In this paper, we explore one possible channel: influencing individuals' perceptions about topics that are salient in the political debate. More specifically, this paper argues that understanding the role of information provided by the media on the formation of beliefs and attitudes is crucial. As Della Vigna and Gentzkow (2010) posit, the efficiency of democratic and economic systems ultimately depends on the accuracy of individual beliefs. One potential threat to the accuracy of perceptions steams from the fact that, although people base their beliefs partly on direct observation, a large share of information is provided by intermediaries - such as television, newspapers, or Internet - who might themselves have some interest in the behaviour of the receivers.[1] In this paper, we investigate the influence of news media on beliefs and perceptions individuals have about crime.

We focus on perceptions about crime for a number of reasons. First, crime is at the top of people's concerns in many countries. For instance, in the Eurobarometer survey, crime ranks consistently among the first five (out of 15) most important perceived problems in several European countries (see Appendix Figure A1). Being crime such a central issue, crime perceptions, have been proven to be relevant for several economic outcomes such as mental health (Dustmann and Fasani, 2015), daily routines and behaviours (Braakman, 2012), as well as house prices (Buonanno et al., 2013). Other disciplines (such as criminology and sociology) have dedicated much attention to the consequences of the so called "*fear of crime"*, which is believed to potentially undermine the quality of community life and to lead to adverse societal outcomes (Larsen and Olsen, 2018), as for example lower levels of social trust (see Gainey et al., 2011 and Hale, 1996, for a review). Moreover, individuals' beliefs about crime are a fascinating topic to study because it exists a puzzling mismatch between individual perceptions and actual data when it comes to crime rates. Figure 1 provides evidence of such mismatch

[1] In these cases communication is defined as persuasive (Della Vigna and Gentzkow, 2010) and its effect on the receiver is uncertain.

for Italy, where despite a decreasing (or if anything stable) trend in actual crime rates over the period considered (left panel), about 80% of respondents believe that crime is on the rise (right panel).[2]

We study the influence of news media on crime perceptions in the context of Italy, a country where, for over a decade, a relevant share of traditional analogue TV channels has been under the influence of Mr Silvio Berlusconi in his dual role of media tycoon and Prime Minister.[3] We analyse whether and to what extent individuals revise their perceptions once exposure to news provided by this group of channels is reduced. Obviously, estimating the causal effect of the exposure to specific media on individuals' perceptions poses difficult identification issues, as people self-select into news media according to their news content (see Gentzkow and Shapiro, 2010 and Durante and Knight, 2012). Similarly to Barone et al (2015), we identify causal effects by exploiting the introduction of digital TV signal in Italy. We exploit the staggered introduction of the policy to extend the design to all Italian regions and complement it with detailed channel-specific viewership and news content data.[4]

Between 2008 and 2012, Italy has gradually shifted from analogue to digital TV transmission: on specific dates, which varied by region, the analogue signal was switched off and substituted with the digital one. Around the digital switchover dates, the number of nationally available free TV channels increased from about 7 to more than 50 within days. Such a supply shock was accompanied by a drastic drop in the viewing shares of the six main traditional analogue channels (Rai and Mediaset) from 82% in June 2008 to 60% in June 2012, mostly in favour of the newly available digital channels.[5] We exploit

[2] "The famous line, '*If it bleeds, it leads*,' is a well-known maxim for what determines newsworthiness of crime. In fact, this gap between actual crime rates and people's perceptions is a feature common to other countries as well. Indeed, while crime levels have been decreasing in many western countries during the last decade (see for example "The curious case of falling crime" in The Economist, July 20th, 2013) a surprisingly large share of the population believes that crime is actually increasing. Dustmann and Fasani (2014) provide similar evidence for the UK. For an interesting review: Emanuelsson and Mele (2010). Misperception of crime has indeed been documented for other countries as well. For instance, in England (Office for National Statistics, 2017); Denmark (Fugslang, 2017) and the United States (Gallup, 2017).

[3] As we will describe in details later on, of the 6 main TV channels holding about 85% of viewing shares up until year 2007, three channels – Rai1, Rai2 and Rai3 - constituted the bulk of the Italian public broadcasting system, which has a long tradition of alignment with the parties in government (Larcinese, 2008) while other three channels – Rete4, Canale5 and Italia1 – were privately owned by Berlusconi through his media conglomerate Mediaset.

[4] Barone et al (2015) have been the first to use the introduction of digital TV signal in Italy within the literature. They exploit, in particular, the case of Piedmont region where some provinces introduced the digital TV signal before 2010 regional elections and some after. They thus compare voting outcomes for municipalities on either side of such provincial boundaries in a regression discontinuity design setting.

[5] Source: AUDITEL data. http://www.auditel.it

the exogenous shift in viewing shares described above to study if and to what extent individuals revise their perceptions about crime when exposure to potentially biased news is reduced. In particular, for identification we rely on a specific feature of digital introduction in Italy: the fact that deadlines at which the signal switched from analogue to digital varied across regions and did so for plausibly exogenous reasons.

In the first part of the paper, we document how a specific group of traditional TV channels seem to systematically over-represent crime news compared to others. We then test if individuals revise their perceptions about crime when exposure to news programs broadcast by such specific group of channels is reduced. We find that the increase in the number of available TV channels - and the consequent lower exposure to crime news - led individuals to revise downward their perceptions about crime. Estimated negative effects on crime concern are larger for individuals who spend more time watching television while using less frequently other media such as internet, radio and newspapers. These individuals, by gathering information mainly through TV and placing high weight to information coming from it, were likely to be more exposed to the potential pre-reform bias, thus responded more to changes in TV content. Older individuals turn out to spend more time watching TV and have much less frequent access to other media than their younger counterpart. In fact, individuals aged 50 and above drive most of our estimated effect. For them, the probability of mentioning crime as among the three priority problems in the country drops with the introduction of the digital signal by about 8.3 percent. The decrease in crime concerns materialises already during the very first months after the digital switchover and continues building up over time.

After performing a battery of robustness tests and documenting that the main effect is not due to decline in overall interest for politics and public issues, we show that the perceptions about crime seem to follow more closely movement in actual crime rates after the reform. In the last part of the paper, we explore the effect of the digital reform on public policies and voting behaviour. We find that local expenditure in police decreases after the switchover, consistently with local policy makers responding to the decreased concerns about crime. Finally, we detect a negative effect on the share of votes for the centre-right coalition in the 2010 elections; this is not is consistent with our main effect since we concerns about crime is an issue owned by the centre right party in Italy.

Given its nature, this paper speaks to two very important literature in economics and political economy. First, this paper belongs to the growing literature of the economics of crime that has studied why and how crime decrease (Draca, 2013), policies to tackle violence and criminal activities (Marie, 2010), criminal behavior (Galbiati, 2012), voters responses to crime related policies (Drago et al., 2017) and the effect of media on criminal justice decisions (Philippe and Ouss, 2016). We contribute to this literature by shedding light of an unexplored angle, i.e. how individuals' beliefs about crime are formed, changed, and affected. Secondly, this paper contributes to the literature that focuses on the effect of news media on political outcomes.[6] Among them, Della Vigna and Kaplan (2007) find that the introduction of Fox News has led to a significant increase in the share of votes for the Republican Party in the U.S. 2000 election, while Enikopolov et al. (2011) show that Russian voters with access to an independent TV channel were less likely to vote for Putin during the 1999 national election. Moving to the Italian case, Durante and Knight (2012) provides evidence of the bias in favour of the Berlusconi's coalition (centre-right) while he was Prime Minister on five out of six of the above TV channels. Closest to our paper, Barone et. al (2015) convincingly document the impact of such media bias in favour of Berlusconi on his electoral support. Exploiting for the first time the policy change used in this paper, they show how the availability of new digital channels caused a drop in Berlusconi's voting shares in the 2010 regional elections.[7] We contribute to this literature by studying another aspect of partisan media, their influence on attitudes and perceptions with respect to politically salient topics. Importantly, by producing causal evidence of the impact of news media on individual perceptions we start shading light over one of the possible mechanisms through which media ultimately affect voting outcomes.[8]

[6] See Pratt and Stromberg (2011) and Sobbrio (2014) for a review of the literature on media and electoral outcomes. A number of studies have also looked at the effect of persuasive communication in other context such as: advertisement (Simester et al., 2007); non-profits organisations (Landry et al., 2006) and non-informative communication provided by leaders (Bassi and Rasul, 2015).

[7] Another paper, Durante et al. (2015), investigates the effect of Berlusconi's TV on voting behaviour, yet from a different perspective. They analyse the long-term impact of early exposure to Berlusconi's commercial TV (Mediaset) and find that municipalities with a longer history of exposure to it did show greater electoral support for Berlusconi's party. They argue in favour of this effect being motivated by the decline in social capital and the diffusion of a culture of individualism promoted by Berlusconi's TV, and against the exposure to partisan news bias story from the moment that during the period they focus on, prior to 1985, news programs were not broadcast on Mediaset channels.

[8] The research on individual beliefs and perceptions is mostly theoretical with Bayesian beliefs model (Eyester and Rabin, 2009) and Bayesian preference models (Nelson, 1970, Mullainathan et al. 2005). Closer to our empirical approach, Chiang and Knight (2011) study whether newspaper endorsements have an effect on

Finally, there is a broader literature on the relationship between media (mainly television) and beliefs, attitudes and behaviours. Among the earlier attempts, and closely related to our paper, is the work from Gentzkow and Shapiro (2004) who study the effect of exposure to different news outlet on anti-American sentiment in the Muslim world. They find that increased exposure to information from the media is not necessarily correlated with more accurate perceptions of world events. Some of the other relevant papers are Jensen and Oster (2009); Chong et al. (2012); Della Vigna et al. (2014); Rizzica and Tonello (2015); and Lim et al. (2015).[9] Our paper belongs to this growing research cluster and it complements it by providing a new field of evidence about the impact of media: the one on crime perceptions.

The rest of the paper is organized as follows: section 2 presents the institutional background on Italian television market and the Digital Reform; section 3 discusses our data and empirical strategy; section 4 presents our main results; in section 5 we test their robustness; section 6 provides an interpretation of our results; in section 7 we present additional results and in section 8 we conclude.

2. Background: Crime News Reporting and the Digital Reform

2.1. The Italian TV market

Up until 2007 - the year before the switch from analogue to digital TV signal transmission started - Italy presented a particularly concentrated television market, with only about seven national channels freely available to viewers through the analogue signal and the six main channels holding about 85% of total TV viewing shares. Three channels – Rai1, Rai2 and Rai3 - constituted the bulk of the Italian public broadcasting system (Rai), which has a long tradition of alignment with the parties in

individual voting intention. Schroeder and Stone (2015) explore another possible mechanism, the effect of partisan media on political knowledge. They find that Fox News increased knowledge for issues it covered more often, and negative effects for issues it neglected. In our case, although suggestive of the potential role of crime perceptions on voting in the Italian setting, quantitatively assessing the role of changes in crime perceptions on voting vis-à-vis that of other possible channels is beyond the scope of this paper.

[9] Jensen and Oster (2009) study the effect of cable TV and women's status in rural India; Chong et al. (2012) study the role of soap operas in reducing fertility in Brazil while Della Vigna et al. (2014) the effect of propaganda channeled through the radio on violence in Serbia; Rizzica and Tonello (2015) study the relation between exposure to corruption news and corruption perceptions in Italy; Finally, Lim et al. (2015) reveal that active newspapers coverage significantly magnifies the influence of voters' preferences on court decisions when judges are elected.

government (Larcinese, 2008).[10] Other three channels – Rete4, Canale5 and Italia1 – were privately owned by Mr Berlusconi through his media conglomerate Mediaset. Finally, there was a seventh channel - LA7 - that is private and can be considered independent from political influences.[11] Mr. Silvio Berlusconi, in his double role of media tycoon and Prime Minister, was in the position to influence five out of seven national channels while in government - the 3 privately owned (Mediaset) plus Rai1 and Rai2 – during the periods 2001 to 2006 and 2008 to 2011. Indeed, Durante and Knight (2012) provide evidence of the news being biased in favour of Mr. Berlusconi's centre-right coalition while he was Prime Minister on the above five TV channels.[12]

2.2. Crime news reporting

In this section, we study the intensity of crime news reporting in Italian TV and the evolution of viewing shares for traditional channels during the digital reform. News programs in Italy (called *telegiornali*) are usually broadcast between 6:00 and 8:30PM, the time slot labelled as prime-time and last about 30 minutes. We have data on the monthly number of crime news items (stories) broadcast by each TV channel during such 30-mins news programs. In Figure 2 we compare, for the years from 2007 to 2013, the monthly averages of such crime related news for the six main traditional channels with the same statistic for the only independent TV channel nationally transmitted through the analogue signal (LA7). The figure shows large differences in crime reporting intensity between the two groups, with the Rai and Mediaset channels reporting a number of crime related news which is on average double that reported by the independent channel LA7. Such conjecture is confirmed by Appendix

[10] Larcinese (2008) well explains the historical background. Initially there were two main public channels and, only later on, a third one was added. This created the so call "*lottizzazione"* for which the two main channels went to the government coalition (which at the time was a coalition formed by *Democrazia Cristiana* and *Partito Socialista*) and the third one went to the communist opposition.

[11] LA7, previously called TeleMontecarlo, was owned since 1999 by Telecom Italia Media Spa, a telecommunication company specialized in television production and broadcasting, advertising and other multimedia activities.

[12] Durante and Knight (2012) find evidence of bias toward the centre-right coalition in Berlusconi privately owned channels. When it comes to the three public channels, Rai 1 and Rai 2 exhibit bias toward the centre-right while that coalition is at the government, whereas Rai 3 is generally closer to the opposition. As Larcinese (2008) points out "*….for having the owner of a vast broadcasting corporation as the leader of one of the electoral coalitions, Italy is probably a unique example in having such extreme selective exposure to television news*" (Larcinese, 2008, p.4). Importantly, in the rest of the paper we will refer to the analogue channels, i.e. those available before the Digital reform, as traditional channels. However, it cannot be considered as a unitary block. In particular, Durante and Knight (2012) has shown as one of these channels, i.e. RAI3, is close to left-wing positions. We take this into account by replicating our analysis without RAI3 when necessary.

Figure A2 where we compare monthly averages of crime related news broadcast by the main Italian public channel (Rai 1) with that of the main TV channel in a selected number of European countries. The figure shows how the difference in the amount of attention dedicated to crime by news programs on specific Italian channels does not seem to be justified by existing differences in crime rates (measured as murder rate) across countries.

Figure 3 plots the crime news intensity by traditional channel, both measured as average number of crime news per month, and as share of crime news on the total. As expected, there is substantial heterogeneity between traditional channels in the intensity of crime news broadcast. Mediaset channels (directly owned by Mr. Berlusconi) tend to broadcast more crime news than Rai ones. It is worth noticing that the ranking of channels from the most to the least crime news intensive closely matches the equivalent provided by Durante et al. (2012) from the most to the least biased in favour of the centre-right coalition.[13] In addition to the heterogeneity in crime reporting, these two platforms also differed in the quantity of news vs entertainment programmes broadcast. Data for year 2008 reveal how Rai channels covered 42,3% of its on-air hours with news programmes while 37,1% with entertainment. Differently, for Mediaset 62,5% of on air hours are dedicated to entertainment shows while only 19,5% to news programmes. [14]

Heterogeneity is not simply a peculiarity of media channels; it is also present among media consumers. Appendix Table A1 reports a set of individual characteristics to describe the demand side of media outlets, i.e. consumers. Two main patters emerge. First, when focusing on the extensive margin, we note how less educated, less employed and older individuals tend a) to watch more television and b) to use less other sources of information. Secondly, consistently with Durante et al. (2017), Mediaset users tend to be on average less educated and with lower share of males than Rai watchers. On the other two individual dimensions, age and employment, Rai and Mediaset users are fairly balanced.

[13] Also, in line with results in Table 2 of Durante and Knight (2012) is the fact that Rai3 - the channel usually granted to the opposition when the centre-right coalition is in government - presents the lowest value of crime news intensity and is the only one with a lower crime news intensity than LA7. Similarly, they find Rai 3 being the only channel with a negative bias toward the centre-right coalition.

[14] The source of this data is the *Statistiche Culturali* published by ISTAT. We use information for year 2008.

2.3. The treatment induced by the Digital Reform

It is in this peculiar media landscape that the digital technology is introduced between year 2008 and 2012. The switch from analogue to digital TV signal caused an unprecedented increase in the supply of channels. Such increase was accompanied by a drastic drop in the viewing shares of the six traditional channels (Rai + Mediaset) mainly in favor of the newly available digital ones. The viewing shares during prime-time[15] of the six main traditional channels went down from about 82% in June 2008 to 60% in June 2012 (see Figure 4 and, for a replication without Rai3, Appendix Figure A3). Since the two platforms are characterised by different crime news reporting intensities such shift generates arguably exogenous variations in the exposure to crime news.[16] Furthermore, even within traditional channels, those characterized by higher crime news reporting intensity *before* the switchover lost relatively more viewing shares during the digital reform period (see Figure 5). Thus, even the group of individuals who keep watching traditional channels after the reform, are on average exposed to lower crime news intensity.

The effect induced by the Digital Reform is not simply exemplified by the loss of share of the traditional channels, but also by the entrance of new ones. Hence, it is equally important to describe the characteristics of the newly introduced digital channels. This is what we do in Appendix Figure A4, where we plot the increase in the viewing share of new digital channels, split into those that broadcast some news programs (News Channels) and those that are full-entertainment (Other Channels). About 95% of the viewing shares of new digital channels are of channels that do not broadcast news at all. As Appendix Figure A5 shows the most common programs broadcasted by digital channels are TV-shows, movies and programs for kids, and to a lower extent sport programs, educational/history programs and life-style programs. Hence, after the Digital Reform viewers

[15] The period between 6:00 and 8:30 pm when most news programs are aired. We focus on prime-time, as we are interested in capturing the time of the day when most news programs are aired but, as we will show later, the drop in the viewing shares of traditional channels shares is relatively homogeneous across all time slots during the day.

[16] As shown above, five out of six of the main traditional channels broadcast higher number of crime related news than that broadcast by independent Italian TV channel and by most important channels in main European countries.

received less information about crime by news programs, not just because of the loss in shares of the traditional channels, but also because of the characteristics of the newly introduced Digital channels.

2.4. Descriptive evidence of the relationship between crime news exposure and crime perceptions

In this section, we provide some pieces of descriptive evidence about the relationship between crime news exposure, crime perceptions, and voting behaviour, which serve as motivation for our study. First, we show in Figure 6 that individuals who watch TV channels characterised by higher level of crime news reporting are more likely to consider crime as major problem in the country. To do so we make use of the ITANES survey and regress an indicator equal to one if an individual reports crime as the most important problem in the country on a set of dummy for the TV channel he declares to watch most regularly. We then plot in the estimated coefficients against the level of crime news reporting of each channel (measured as the monthly amount of crime-related news reported during prime-time news programs). [17] In the same fashion, we then estimate the probability of voting for the centre-right coalition on a dummy indicating the most watched TV channel reported by the individual and plot estimated coefficients against channel-specific crime reporting intensity in Figure 7.[18] The figure shows a strong and positive correlation: individuals more exposed to crime news are also more likely to vote for the centre-right (CR) coalition. Finally, we regress an indicator for the individual reporting having voted for the centre-right coalition (*CR_Vote*) on a dummy equal one if the person reports *crime* as the most important problem in the country (*Crime_Concern*). Table 1 shows that individuals who consider crime as the most important problem are almost 25 percentage point more likely to vote for the CR coalition that those who do not think so. Estimates of the coefficient are stable to the inclusion of individual characteristics and region fixed effects.

[17] In this sub-section, we make use of the ITANES survey, a survey similar in content to the American National Election Study Survey in the US and representative of the entire Italian population, see section 4 for further details. We use the wave collected before the 2008 national elections. In the regression, the reference category is LA7, the main channel not referring to either Rai or Mediaset. Estimates of the coefficients are stable to the inclusion of individual characteristics and region fixed effects.

[18] The reference category is La7 the main independent channel before the reform. Crime reporting intensity is measured as the monthly average of crime-related news reported during prime-time news programs. Estimates of the coefficients are stable to the inclusion of individual characteristics and region fixed effects.

The results presented here point in the direction of a relationship in the Italian context between crime news exposure, being concerned about crime and security, and behavioural outcomes such as voting. However, this evidence cannot be interpreted as causal because individuals tend to self-select into news media with an ideological leaning closer to their own, as shown by Gentzkow and Shapiro (2010) for the US and by Durante and Knight (2012) for Italy.[19] In fact, we exploit the drastic supply shock and the consequent shift in viewing shares induced by the introduction of the digital TV precisely to tackle such identification issue and to study the effect of an exogenous reduction in the exposure to crime news on crime perceptions.

3. Data and Empirical Strategy

3.1. Data

Individual perceptions of crime. Our primary data source is the Multipurpose Household Survey, by the Italian National Statistical Agency (ISTAT). One of its several modules, named Aspects of Daily Life (simply ADL from here onward), gathers information about individual and household daily life.[20] The survey is carried out yearly (around March) and is a repeated-cross section representative at the regional level of the entire Italian population. In addition to the usual demographic, labour market, and education information, the survey asks a set of questions about the use of TV, Internet and radio, as well as about beliefs and perceptions regarding a number of issues. Most importantly the survey contains the answer to the question that asks "*What do you think are the priority problems of the country*?".[21] We use such answer to construct a measure of perception about crime, i.e. an indicator variable for the individuals reporting crime as one of the three priority problems in Italy that we name *Crime_Concern*. The variable is available until year 2010, so in most of the analysis we use four survey years, i.e. from 2007 to 2010. The variable captures individuals' concern about crime, or, in other

[19] Gentzkow and Shapiro (2010) investigate whether ideological bias is driven by audience or owner preferences and find that readers have a significant preference for like-minded news. Durante and Knight (2012) show, in the Italian context, that viewers respond by switching to a channels with an ideological leaning closer to their own in response to changes in content of such channels.

[20] The module is called Aspects of Daily Life. http://siqual.istat.it/SIQual/visualizza.do?id=0058000

[21] Respondents can choose three topics from the following list of ten: unemployment, crime, tax evasion, environment/pollution, public debt, inefficiency of health sector, inefficiency of school sector, inefficiency of judicial sector, immigration, poverty, others. Individuals are free to mention fewer than, but no more than three topics.

words, the level of salience of crime as a priority problem to be tackled at the national level. In our estimating sample 57% of individuals report crime as being among the three priority problems in Italy, making crime the second most reported problem after unemployment (mentioned by 72% of individuals) throughout the entire period. The average of *Crime_Concern* by sub-group of population, alongside other descriptive statistics for our main estimating sample, is reported in Appendix Table A2. The survey also contains a second measure of crime perception that is reported only at the household level and which we explore in Appendix D.[22]

TV viewing shares. To measure the shift in audience shares induced by the Digital Reform we gathered unique data about monthly, region-specific, viewing shares for each TV channel available from year 2007 until 2013. The data have been extracted from the official Auditel dataset.[23] We have information about viewing shares for five different time slots during the day including prime-time going from 18:00 to 21:30.[24] Such data are used in the analysis carried out in section 6.

Crime related TV news items. To measure the number of crime news items reported by each TV channel we use data on prime-time newscasts collected by the "Pavia Observatory", an independent research institute specializing in media analysis that works in collaboration with the University of Pavia. We obtained data on the monthly number of crime-related news items broadcast during prime-time news programs for each one of the main traditional TV channels and some others, from 2007 until 2013. Such data are used in the analysis in section 6.

[22] The survey also contains a second measure of crime perception that is reported only at the household level making impossible to explore heterogeneous effects across individual characteristics, something particularly relevant in our context. It derives from the question "*What level of crime risk does your area of residence present?".* Respondents can choose from four categories that range from "absent" to "very high". This variable, named *Crime_Risk_Local*, is less suited to our purpose, however, we explore it in Appendix D in order to study the medium-run effect of the policy.

[23] Auditel is an independent third party agency responsible for television audience measurement in Italy. Viewing shares data are based on a sample of about 5200 households and 14000 individuals that is representative at the regional level of the entire Italian population. Auditel has selected a sample of 20000 households. Every year they conduct a face to face interview with each of them to check the type of technology they use (Satellite, DG, DVD, etc) and they install the so-called *people meter*. The *meter* is based on the advanced technology Unitam / CTS (content tracking system) and collects data everyday on the number of TV minutes watching per all the existing channels. More information on Auditel procedure is available at http://www.auditel.it/come-lavora/.

[24] Slot1, from 07:00 to 11:59; slot2, from 12:00 to 14:59; slot3, from 15:00 to 17:59; slot4 (prime-time) from 18:00 to 21:30 and slot5, from 20:31 to 23:59.

Individual level self-reported voting and TV watching behavior. We further use data from the 2008 ITANES Survey[25], a survey similar in content to the American National Election Study Survey in the US and representative of the entire Italian population. It includes individual level information about the most watched news-program, perceptions about crime, and voting behaviour.

3.2. Empirical Strategy: The Digital Reform as Natural Experiment

Italy started introducing terrestrial digital TV in 2008. On specific deadline dates, which varied by region, the analogue signal was switched-off and substituted by the digital one. Terrestrial digital TV technology enhances transmission efficiency and allowed Italian households to freely receive more than 50 new channels previously not available through the analogue signal.[26] Terrestrial digital TV has a low set-up cost (lower than cable or satellite TV) as it uses existing analogue infrastructures. In order to receive the newly available digital channels people needed a specific *decoder* (similar to a modem). The price of such decoders was 50 euros, and its cost was 100% subsidized by the government through vouchers. The switch over was initiated in 2006 by the centre-left government as per a compulsory European Union Directive (2007/65/EC). Indeed, many other European countries have gone through the same technological change, and switch over from analogue to digital TV signal during the last decade. Importantly, in Italy the deadlines to switch-off analogue signal differed across regions, allowing us to analyse the effect of the policy using a difference-in-difference type of strategy. Identification will rely on the exogeneity of such switch-off deadlines, after conditioning on region fixed effects, time fixed effects and time varying region characteristics.

Specific deadlines were based on similarity of 1950s infrastructures and could not be manipulated by local politicians or interest groups once set.[27] Italy was divided into sixteen areas, to each of which a precise date for the analogue switch-off was assigned. The digital switchover for the entire country was completed over 4 years, from November 2008 to June 2012 (Appendix Figure A6).[28] To test the

[25] The 2008 ITANES Survey was collected right after the 2008 national election.
[26] The cost of the Decoder was entirely subsidized by the Government. For more information see E-Media Institute, DGTVi.
[27]For more information please refer here for the EU directive legislation summary and here for the official Italian Law on the introduction of digital TV signal.
[28] The switch over has been implemented gradually with patchwork pattern, alternating one region from the South and one from the North. The first region was Sardinia in the South, the second one was Trentino in the North.

orthogonality of switch-off deadlines to regional characteristics we perform a balancing test and compare two groups of regions: *early* switchers (those switching to digital before or at December 2009) and *late* switchers (those switching to digital from January 2010 onwards). Table 2 shows that *late* and *early* switcher regions are similar in dimensions such as unemployment and employment rates, GDP per capita, share of tertiary educated, of immigrant residents and of internet users, persons cited for crimes and murder rates per 100,000 people, suggesting that area-specific deadlines seem to be largely idiosyncratic to the purpose of our analysis.

In the next paragraphs we will show how the shift in viewing shares is clearly triggered by the new technology introduction and takes place precisely in correspondence of the region-specific switch-off deadlines, thus providing evidence of its exogeneity.

Descriptive evidence. To further support the effectiveness of our identification strategy, we would like to observe jumps in the region-specific shares of the six main traditional in correspondence with the region-specific switch-off deadlines. Figure 8 plots the evolution of prime-time viewing shares in an exemplificative group of four regions around switch-off dates (the same plot for all regions is provided in Appendix Figure A7)[29]. For all of them it is possible to observe a large and sudden decrease (increase) in the viewing shares of traditional analogue channels (new digital channels) in correspondence with the analogue switch-off deadlines (indicated by the vertical dashed lines). To better show the variation we exploit in our empirical analysis, Figure 9 plots the evolution of the prime-time viewing shares of new digital channels in two pairs of neighboring regions that switched-off the analogue signal at different times. In Panel A we compare Campania with Calabria (in the south) while in panel B Emilia Romagna with Tuscany (in the center-north). Focusing on Panel A, the trend in digital channels viewing shares is quite similar before November 2009, when none of the two regions had switched off yet, and after May 2012, when both regions have already switched to the digital signal. In between switch-off deadlines (indicated by the dashed vertical lines) individuals who happened to live in either of the two neighbouring regions have been exposed to a different mix of TV channels. We exploit precisely such differential exposure, which we argue is as good as random.

[29] The plotted regions are Campania (switch-off deadline December 2009), Lombardy (switch-off deadline October 2010), Umbria (switch-off deadline November 2011) and Sicily (switch-off deadline June 2012).

Evidence from regression analysis. In order to provide a more systematic evidence of the effect of the digital switchover on TV watching behaviour, we estimate the TV viewing share during prime-time for various groups of channels (labelled as *c*) in region *r* and month *t* as a function of the digital switchover as follows:

$$Share_{rt}^{c} = \gamma_0 + \gamma_1 Digital\_Switch_{rt} + \gamma_r + \lambda_t + u_{rt} \qquad (Eq.1)$$

We estimate this equation separately for five groups of channels: Main Traditional Channels (RAI + Mediaset), Traditional Channels excluding Rai3, New Digital Channels, Satellite Channels and Residual Channels.[30] In equation (1) above $Digital\_Switch_{rt}$ is an indicator for the region having switched over to digital signal in month *t* or before, while γ_r and λ_t are region and time fixed effects respectively[31]. Panel A of Table 3Table 3 reports estimates from equation (1) for the group of Main Traditional Channels. The switch-over induces a decrease in the viewing shares of these channels between 8.1 and 8.7 percentage points, depending on the specification. This corresponds to more than a 10% decrease on the baseline value. In Panel A1, we replicate the previous analysis (Panel A) excluding Rai3 from the analysis and the estimates do not change in their substance: the digital reform leads to a decrease between 6.7 and 7.2 percentage points in viewing shares. In Panel B, C and D we look at viewing shares of New Digital, Satellite, and Residual Channels respectively. The switch-over is associated with an increase in the viewing shares of New Digital Channels that ranges between 6.2 and 7.2 percentage points depending on the specification, while, as expected, has only a tiny positive effect on the viewing shares of Satellite and Residual Channels. In the table we deal in different ways with the potential confounding effect due to time trends by including linear time trends (column 1), year fixed effects (column 2), month*year fixed effects (column 3) and month*year plus region-specific linear trends (column 4). The digital switchover is very powerful in predicting values of TV viewing shares with an F-stat equal to 89.9 and 110.8 in our most restrictive specification (column 4)

[30] Satellite Channels are pay-per-view ones to which terrestrial digital TV does not automatically provide access. The forth group, Residual Channels, include other digital and satellite channels whose viewing shares are not recorded individually, as well as some minor local channels.

[31] We here exclude, as in the following of the paper the region of Piedmont from the analysis, from the moment that some provinces switched over before others.

for respectively viewing shares of main traditional and new digital channels.[32] In the Appendix B we study the effect of the switchover on the average exposure of individuals to crime news.

4. Main Results

4.1. Estimating equation

In order to identify the effect of the switchover from analogue to digital TV signal (and of the subsequent increase in number of available channels) on crime perceptions we exploit region specific idiosyncratic deadlines to switch and implement a stacked difference-in-difference design that compares crime perceptions of individuals within the same region, before and after the analogue switch-off occurred. More formally, we estimate various versions of the following linear probability model:

$$Crime\_Concern_{irt} = \alpha_0 + \alpha_1 Digital\_Switch_{rt} + \boldsymbol{X}'_{irt}\delta + \boldsymbol{Z}'_{rt} + \gamma_r + \lambda_t + \varepsilon_{irt} \quad (Eq.2)$$

where *i* indexes individuals, *r* regions and *t* time periods. The variable *Crime_Concern*$_{irt}$ is an indicator for the individual mentioning crime among the three priority problems in the country. *Digital_Switch*$_{rt}$ is a dummy that equals 1 if region r experienced the switch-off to digital signal at time (year) t or before. The coefficient of interest is α_1, which captures the impact of the increase in available TV channels on individual crime perceptions. Vector $\mathbf{X}'_{irt}$ denotes a set of individual and household level characteristics including gender, age, marital status, education, set of dummies for occupational status, family size, family structure, and major source of household income. Vector $\mathrm{Z}'_{\mathrm{rt}}$ includes a series of region time-varying covariates that might affect crime perception directly or indirectly, such crime rates and unemployment rate. For our purpose, it is crucial to control for region-specific crime rates that are likely to be an important determinant of crime perceptions. We measure it as the (log) crime

[32] Although most of the news programs are aired during prime-time (between 6:00 and 8:30pm), some news are also broadcast during other time of the day, for example at lunch-time: between 12:00 and 15:00. One concern is that people might watch fewer news programs on traditional analogue channels during prime-time, but more of them during other times of the day. Such substitution across time-slots could potentially offset the decrease in crime news exposure measured during prime-time In Appendix Table A3 we test whether viewing shares responses were homogeneous across different times of the day. Reassuringly, the switchover effect on the viewing shares of traditional analogue channels (negative) and on new digital ones (positive) goes in the same direction in all and every time slot and estimates are very similar across the board. Finally, Appendix Table A4 reports estimates separately for each traditional channel.

rate, defined as number of crimes over 10'000 population, in region *r* during the calendar year previous to the collection of year *t* survey. The coefficient on crime rates is of interest on its own as it will tell us whether, and to what extent, crime perceptions respond to actual crime rates. The γ_r are region fixed effects meant to capture any unobserved time-invariant characteristics that affect crime perceptions and may also be correlated with the timing of the switch-over to digital TV. The λ_t are year fixed effects meant to allow for very flexible trend in crime perception common to all regions. Finally, ε_{irt} is an idiosyncratic error term. Our identifying assumption is that, conditional on region and year fixed effects and on the time-varying controls, the timing of the digital switchover is orthogonal to the error term. Finally, throughout the empirical analysis, we cluster standard errors at the region level to allow for an arbitrary correlation of residuals within regions. However, in Appendix C, we check the robustness of our main estimates while using wild cluster bootstrapped standard errors.

4.2. Baseline estimates and heterogeneity

Overall effect. Here we discuss results from the estimation of the reduced form effect of the digital switchover on individual crime perceptions. Table **4** summarizes the results from our estimation of equation (2): a linear probability model of *Crime_Concern* on a post switch-over indicator *Digital_Switch* and controls. *Crime_Concern* is an indicator for the individual reporting crime as being among the three priority problems in the country at the moment of the survey. The coefficient on *Digital_Switch*, an indicator taking value 1 if the region has switched-off in period t or before, captures the effect of the increase in the number of available TV channels on crime perceptions. When we look at the effect on the overall population (column 1) we find a negative coefficient, suggesting that the Digital Reform induced a lower concern about crime. The coefficient is not statistically significant though. However, we do not expect all groups of the population to a) be exposed in the same way to the pre-existing bias, and b) to respond in the same way to the partial removal of it. Indeed, individuals of different cohorts are likely to gather information from different combinations of media; for example, older individuals are likely to rely more on television and less on new technologies such as internet, as we will show in more detail later.

Heterogeneity of the effect across age groups. We therefore turn and study the heterogeneous effect of the Digital Reform for four different age groups of the population (results reported from column 2

onward). We do so by interacting *Digital_Switch* with a set of four age group indicators. While estimates for individuals below age 50 are close to zero, they are negative for older individuals. Estimates get larger as we move from younger to older groups and are significantly different from zero at conventional levels for the groups of individuals aged 50-65 and those aged above 65. These results suggest that elderly individuals' crime perceptions respond more to the decreased exposure to potentially biased news programs broadcast by the six main traditional TV channels. The stronger response among older individuals is consistent with findings from Barone et al., 2015 that detect a stronger effect of media on voting in municipalities with higher share of elderly individuals. One potential reason for such regularity might be higher amount of time elderly individuals are likely to spend watching TV and the relatively lower use they make of alternative sources of information. We will directly investigate these potential explanations. The coefficients are very stable across specifications, suggesting that the introduction of digital TV is not correlated with any individual characteristic (included from column 3) or region time-varying characteristics (included from column 4). In particular, in column 5 and 6, we add region-specific crime rates that do not affect the estimates on the *Digital_Switch*. Crime perceptions respond to actual crime rates, but only to specific categories: column 5 shows that individuals become more concerned about crime only when violent and drug related crimes increase, while property crimes and other crimes do not seem to affect individual concerns in any significant way. In our most complete specification the increase in TV channels, or better, having access for the entire pre-survey period to an increased number of TV channels, is associated with a statistically significant decrease in crime concern for the two older groups of individuals, those aged 50-65 and those aged above 65.

Accounting for treatment intensity. From column 6 onward we employ a different version of *Digital_Switch* that takes the heterogeneity in treatment intensity into account. Indeed, the switch-off might occur at any point in time during the year previous to the annual household survey collected in March, and switching to digital TV just one month before the survey is likely to induce different treatment than switching 11 months before it, as the fraction of time between two surveys during which individuals have access to more TV channels differs. Thus, we also consider an alternative measure for *Digital_Switch*, which is the fraction of months (over the 8 previous to each annual survey) after the switch-off occurred. Columns 6-10 report results from specifications where we sequentially enrich

the model mimicking the specifications in columns 1-5 but with the new treatment measure. Estimates for the two younger age groups remain close to zero, while those for the two older age groups get sensibly larger, and are significant at least at the 5% level throughout. The fact that accounting for treatment intensity makes the estimated effects larger suggests that we are not likely to be picking up just some spurious correlation between year of switch-off and changes in crime perceptions. Although the qualitative results are consistent between the two measures of treatment, we consider the latter specification more appropriate to the purpose of our analysis and will use it for most of the paper from this point onward.

Quantification. The estimated effect of the Digital Reform on crime perceptions is economically relevant. For instance, the digital reform is associated with a decrease in the probability of reporting crime as one of three priority problems of 4.6 and 5.2 percentage points, for individuals aged 50-65 and above 65 respectively, i.e. about 7 and 8.4 percent change with respect to the average probability in each of the two groups[33]. While for individuals between 50 and 65 years old, a coefficient of 4.6 percentage points is associated with a change of about 7 percent with respect to the average probability for that specific age group. These results are consistent with the increase in the number of channels available - and the induced lower exposure to traditional ones over-reporting crime news - leading individuals to revise their crime perceptions downward. To facilitate comparison with some of the regressions below we also estimate the effect of the Digital Reform on only two groups of individuals, those aged below 50 and those aged 50 or more. Appendix Table A5 shows that the effect for those aged 50 or above is negative and significant across specifications. The coefficients in our most restrictive specifications indicates that the Digital Reform induced a reduction in crime perception for those aged 50 and above ranging between 5.3 percent (column 4) and 8.3 percent (column 8), depending on whether we employ the indicator or the share of months as treatment measure. In Appendix Figure A8, we also report estimates from regressions of the type in Table 4 in column 10 but estimated separately for males and females[34], while Appendix Table A6 reports results estimated at the regional level.

[33] The average probability to report crime as a major concern is 0.57, 0.62 and 0.59 for, respectively, individuals aged 50-65, above 65, and 50 or above.

[34] The effect is generally larger for females. In addition, along the age distribution, the effect becomes negative earlier for females than for males. This probably reflects the relatively low female occupation rate observed in

4.3. Dynamics

We now investigate more in detail the dynamics of the effect on crime perceptions, i.e. how long does it take before crime perceptions respond to the switchover. To do so we construct a continuous variable equal to the total number of months elapsed since switchover to the date of the survey. In columns 1-2 of Table 5 we regress the usual crime concern indicator on such continuous treatment and detect a negative and significant effect, suggesting that each extra month elapsed since the switchover is associated with a 0.2 percentage points decrease in the crime concern dummy. To study whether the effect increases linearly with time, we categories the total number of months elapsed into three groups (1 to 5 months, 6-12 months, and more than 12 months since the switchover occurred) and regress crime concern on this set of indicators. Results from the most complete specification (column 4) suggest that the effect of digital TV increases with the time elapsed since switchover. It is close to zero during the first 5 months, about 2 percentage points and marginally significant between 6 and 12 months after, and increases to 4 percentage points and highly significant for individuals exposed for more than 12 months to the new TV diet. In the last two columns of the table we run similar regressions but now differentiating between individuals aged less than 50 and aged 50 or more. Column 6 shows that the effect of digital reform on older individuals materialize already during the very first months after it (coefficients for the first months category is at the margin of significance) and constantly increase in size and significance over time. The results are consistent with the decision to switch TV channels in response to switchover, as well as the change in crime perceptions might take some time to occur. Interestingly, we also find that the effect for younger individuals (those aged less than 50) is around zero if measured during the first 12 months, but gets negative and significant after 12 months, suggesting some spillover effects between age groups.

5. Robustness

In this section, we provide further evidence of the plausibility of our identifying assumptions as well as of the robustness our main estimates.

Italy, which is almost 20 percentage points lower than that of males in the same age group (0.46 vs 0.64 for individuals aged 40-65, ISTAT).

5.1. Testing identifying assumptions: placebo effect of *future* switchover

The balancing test presented in sub-section 3.2 shows that the year of switchover does not correlate with regional characteristics in levels. In this section, we test for the presence of differential trends before the switchover in our outcome variable of interest. First, we perform a placebo test based on the region-specific timing of switchover to test whether the decline in crime concerns occurs as a consequence of the Digital Switch or if it precedes it. We estimate similar regressions to the baseline ones, but instead of looking only at the effect of the contemporaneous/past access to digital TV, we also look at the effect of *future* access. We regress crime perceptions on both the usual treatment indicator *Digital_Switch* and on an indicator *Digital_Switch t+1*, i.e. equal one if the region will switch to digital in year t+1. The coefficient on this variable captures the effect of future access for individuals in regions that have not switched to digital TV at time t yet. The hypothesis for this placebo experiment is that crime perceptions should not be affected by the fact that switchover might occur in the next year. Table 6 shows results for each of the groups of individuals for whom we find significant effect in the baseline analysis: those aged 50 or above (columns 1-2), aged 50-65 (columns 3-4) and aged above 65 (columns 5-6). The coefficients for *Digital_Switch* in t+1 are relatively small in size and never significantly different from zero, suggesting that the effect of digital reform does not occur before the actual switchover and is unlikely to be driven by differential trends in unobservables across regions that have switched at different deadlines.[35] Although this is a more demanding specification than the baseline one, the coefficients on *Digital_Switch,* are all significant and almost identical in size to the respective ones in the main results tables.

Further, we can also use the categorized version of the number of months elapsed since switchover introduced in subsection 4.3 to conduct another test on the timing of the effect of the digital reform around switchover deadlines. To do so we regress crime perceptions on a richer pre and post reform set of dummies: in particular three post-switchover indicators for 1 to 5 months, 6-12 months, and more than 12 months since the switchover occurred, as well as on other three before-switchover dummies indicating 13-24 months, 7-12 months, and 1-6 months *before* the switchover date. The estimated

[35] The small negative coefficients in the year before switchover might be motivated by the fact that, already before the official deadlines, individuals could buy a decoder and access new digital channels.

effects (together with 90 percent confidence intervals) are displayed in Figure 10. Estimates for the effect of switchover *before* its actual introduction are relatively small in size and stable over time, as well as never significantly different from zero. The negative effect of digital TV on crime perceptions starts realizing after the switchover occurs and get larger over time. All the above results increase the confidence in the validity of our identification strategy.

5.2. Other robustness tests

Effect on individuals not watching TV. A fraction of individuals in our sample (about 5% of the total) does not watch TV at all, and we should expect not to find any effect of the digital switchover on them. As a falsification exercise, we thus estimate the effect of the digital switch separately for those who *do* vs *do not* watch it, via interacting the treatment variable with indicators for the individual belonging to either of the two groups. Table 7 reports results for individuals aged 50 or above where we experiment with both the indicator measure of treatment (columns 1-2) and with the share of months (columns 3-4). While estimates on *Digital_Switch* are negative and highly significant for individuals who do watch TV, coefficients for those who do not watch TV are virtually zero when we experiment with the digital switch indicator (columns 1-2) and negative but small and insignificant when using the share of months treatment (columns 3-4). These results reassure us that the effect of the digital introduction does pass through television. However, the fact that when using the share of months treatment measure, which better incorporates the time elapsed since the switchover, we find a small negative coefficient (less than half the size of the coefficients for the TV watchers) is compatible with a spillover mechanisms (potentially through social interaction) between treated individuals and those who do not usually watch TV.

Effect on TV watching time. The Digital Reform could also induce individuals to increase/decrease the total amount of time devoted to watch TV, and, consequently, to vary the time devoted to other activities. Appendix Table A7 investigates whether the digital switchover induced any change in the propensity to watch TV (columns 1-2) or in the average viewing time per day, conditional on watching some TV (columns 3-4). Results suggest that the Digital Reform might have slightly reduced the probability of watching TV for individuals aged below 50, although the estimates are significant only for the youngest group. Further, coefficients for the effect on the average daily TV watching time (in

10 minutes) are positive for individuals aged 15-29 and 50-65 and negative for those aged 30-49 and above 65, yet are never statistically significant. Thus, although with some exceptions, there not seem to be a clear pattern of response to the Digital Reform in terms of the propensity to watch TV at all, or of the amount hours spent watching it.

Effect on crime and unemployment. We next test if, in correspondence with the switch-off deadlines, regions have experienced changes in economic outcomes that are themselves relevant for crime perceptions. We test such hypothesis by estimating the effect of the Digital Reform on unemployment and crime rates where the unit of observation is the region*year. Results presented in Appendix Table A8 suggest that the Digital Reform is not statistically significantly associated with any change in unemployment or crime rates at the regional level. Estimates for crime rate are negative, the coefficients would indicate a reduction of 1.9-2.2 percent in crime rate depending on the specification, but are not statistically different from zero (columns 3-4). In the case of unemployment share estimates even change signs when adopting the share of months as explanatory variable.

Strategic editorial response. Here we explore whether the editors of news programs responded to the change in the television market's structure by strategically increasing or decreasing the amount of crime stories reported. In Appendix Figure A9 we plot the average number of crime news reported on channels directly owned by Berlusconi (Mediaset) against the viewing shares of new digital channels, from 2007 until the end of 2012. Despite the significant increase in digital channels viewing shares (dashed blue line), the amount of crime news reported in Berlusconi's channels (red line) fluctuates around an average of about 100, and does not show any clear trend during the period. In particular, the number of crime news reported does not seem to change in any systematic way in correspondence with the various waves when the digital signal is introduced (grey shaded areas).

6. Interpretation

6.1. TV watching time, other media usage, and crime news exposure

TV watching time. Why are elderly individuals more responsive to the increase in TV channels availability? One potential reason might be related to different amount of time spent watching TV. Indeed, it is reasonable to expect that the effect of a reduced exposure to news content on traditional

TV channels is larger for those individuals who, on the one side, watch more television, and on the other one have smaller access to alternative sources of information, such as the internet, the radio and newspapers. Our survey provides information about the daily amount of time spent watching television, as well as how frequently other information sources are used. In our setting, TV watching time might be affected by the Digital Reform itself, introducing a bias in the estimates of an interaction term between Digital Reform and actual watching time.[36] To overcome this problem, we use supposedly pre-determined individual characteristics to predict the average amount of time individuals spend watching TV. More precisely, we use data from pre-reform waves of the ADL Survey on age, gender, educational level, occupational status, marital status and household size, to calculate group-specific averages of TV watching time. Groups are generated by each possible combination of the variables above. Finally, we predict TV watching time for individuals in our estimating sample based on the obtained group-specific values.[37] Columns 1 and 2 of Table 8 reports results from regressing our usual outcome on *Digital_Switch*, *TV_time (*measured in 10 minutes and de-meaned) the *interaction* between them, and the usual set of controls. Because the variables we interact with Digital_Switch are de-meaned, the coefficients in the first line always indicate the effect of the digital reform on the likelihood to report crime as a problem for the individual with an average value of the interacted variable. In the case of individuals watching an average amount of TV the effect of digital reform is negative and significant at the 10% level confirming the coefficient in column 6 of Table 4. The interaction term is negative and highly statistically significant, suggesting that the negative effect of the digital reform is stronger for individuals watching relatively more TV. Precisely, the probability of reporting crime as a problem decreases by an extra 1.5 p.p. for every extra half hour spent watching TV. Individuals who watch a lot of television were more likely to be exposed to news programs in traditional channels before the introduction of the digital signal and this is likely to be a reason why they revise perceptions to a larger extent. In column 2 we test the linearity of the interaction effect and although the coefficient on the interaction with *TV_time squared* is positive we fail to reject linearity.

[36] Indeed, in the previous section we show that we cannot rule out that some groups of individuals have responded to the Digital Reform by modifying the total amount of time spent watching TV.

[37] The variable used are: age (5-years age groups dummies), household size, an indicator for male, an indicator for having tertiary education, an indicator for being employed, an indicator for married. The method is equivalent to running a regression on a fully interacted model including all the variables above.

Usage of other sources of information. Television is not the only source of information individuals use. Access to other media is equally important. Individuals form their beliefs about the actual levels of crime through two main different sources: direct observation of the reality and indirect channels, such as television, the internet, newspapers and the radio. Hence, according to simple Bayes Rule, an individual would update his perceptions every time a new piece of information is received, and do so according to the weight attributed to the specific information source. If many sources of information are available each one will have little weight and contribute only marginally to the update of perceptions. Hence, we would expect the weight attached to information coming from television to be higher for individuals who have only limited access to other information sources. To explore this hypothesis, we run regressions where we interact *Digital_Switch* with an indicator variable equal 1 for individuals not using, respectively, the internet, the radio, and newspapers.[38] Similarly to above, we predict the likelihood of (not) using internet, radio and newspapers, using the same individual characteristics used in the case of television. Results (reported in columns 3-5 of Table 8) indicate that the effect of the Digital Reform is stronger - more negative - for individuals who do not use the internet (54% of the sample) or do not listen to the radio (37% of the sample). In both cases the coefficients are negative, sizable, and highly significant. The interaction with the dummy as for not reading newspapers (40% of the sample) turns out negative but is not statistically different from zero. Thus, the effect of the change in the information content provided through television appears to be larger for individuals with a less diversified set of sources from which gathering information, consistently with the simple updating mechanism suggested above.

Exposure to crime news reporting. Ultimately, the effect of the Digital Reform on crime perceptions might also be affected by how much individuals have been exposed to crime related news before the reform. That is, individuals that used to watch channels characterised by high coverage of crime stories - i.e. mainly Mediaset channels - might respond more to the reform either because more likely to switch channel (we showed before that high crime reporting channel have lost relatively more viewing shares during the reform) or because exposed to a larger drop in crime news exposure. In order to test this hypothesis, we use the same methodology of section 6.1 (TV watching time and other media usage),

[38] Also in the case of internet, radio and newspapers, because of the reasons above we predict values using characteristics not affected by the reform in the same way we did for *TV_time*.

i.e. employing a similar set of individual characteristics to predict the amount of crime news individuals are exposed to before the switchover.[39] Column 6 of Table 8 presents results from the interaction between the usual Digital_Switch variable and such predicted pre-reform exposure to crime news (as usual de-meaned). The effect of the digital reform on the likelihood of reporting crime as a problem for the individual watching an average amount of crime news is negative and significant at 5%. The coefficient on the interaction term is negative, confirming our conjectures. It indeed suggest that individuals who were used to watch TV channels characterized by higher crime news reporting reduce their crime perceptions relatively more with the digital reform. The coefficient, though, is not precisely estimated (the t-statistic is equal to 1.4). That is probably also due to the smaller sample size of the ITANES Survey used to calculate cell-specific averages. We do not find any evidence of the effect being nonlinear.

6.2. Interest and engagement in politics and public issues

Appendix Figure A5 shows that less than 5% of the newly introduced channel feature news; that is, almost all the new available digital channels are full entertainment. Thus, viewers might not just being exposed to less news about crime, but to less news in general. We might thus be worried that those viewers who switch to full entertainment become generally less informed, less engaged, and less interested in all public issues - not just crime. We tackle this concern by estimating the effect of the digital reform on some measures of interest and engagement in politics and in public issues available in the ADL Survey, for the groups of individuals aged 50 or above. Results are reported in Table 9 and they do not provide evidence in favor of the interest and engagement in public issues having decreased because of the digital reform. In particular, although estimates on the likelihood to get informed about politics at least once a week are negative, they are not statistically significant (columns 1-2). On the other hand, the coefficients on the likelihood to be funding a political party are virtually zero (columns 3-4). Next, when looking at the number of priorities individuals report when asked

[39] Because our main ADL Survey does not contain data about channel preferences we proceed in two steps. First, we use information contained in the 2008 ITANES Survey about individuals' most watched news program and their individual characteristics, and combine it with the number of crime news reported by each TV channel (Pavia Observatory data) to calculate group-specific crime news exposure. Finally, we use such cell-specific averages to predict the amount of crime news individuals in our ADL estimating sample are exposed to before the switchover.

"*which is the most important problem in Italy*", we find a negative but not significant coefficient (column 5-6). Finally, the coefficients on the probability to take part of voluntary associations are positive, but once again small and not significant. Overall these results seem to suggest that the Digital Reform did not cause a general decrease in interest and public engagement.

6.3. Concern about other issues

The introduction of digital TV has decreased people's perceptions about crime. Did it cause the same effect on individuals' concerns about topics other than crime?[40] To provide an answer to this question, we look at the effect of the digital introduction on the likelihood of mentioning any of the other problems suggested by the question *"What do you think are the 3 priority problems of the country?"*. Table 10 reports estimates for individuals aged 50 or above – those for whom we find significant impact on crime perceptions - of the effect of the digital switchover for each of the other topics plus crime. In the table problems are ranked from left to right from the most (unemployment) to the least mentioned (inefficiency of education system). The lower concerns about crime seem to be compensated for by slightly higher concerns about most of the other problems, such as poverty, inefficiency of health sector, tax evasion, environmental issues, inefficiency of judicial system, public debt and inefficiency of the educational system. However, estimates are statistically significant at conventional level only for inefficiency of health sector. The introduction of digital TV is also associated with lower concern about immigration and unemployment, but in the case of immigration estimates are close to zero while for unemployment standard errors are quite large.

One interpretation to understand why individual perceptions about these topics did not change with the reform might have to do with the coverage on mainstream channels of such topics as well as with the imbalance of such coverage between traditional and new channels. To study these aspects, we conduct a content analysis similar to the one for crime, on other three most important topics in the previous Table: unemployment/jobs, immigration, and welfare. Figure 11 shows that the features characterizing crime news reporting on Italian television are not common to other topics. Indeed, the amount of news

[40] Our outcome variable is a relative measure of concern as people are asked to report the three priority problems. Given such relative nature we are not able to test whether the increase in TV channels, and the consequent lower exposure to Berlusconi-influenced news programs, induced a lower general concern about every problem.

(as share on the total) dedicated to immigration, unemployment/jobs and welfare is relatively similar between traditional channels (red bars) and the new channel La7 (grey bars). Traditional channels seem to report slightly more news about immigration and less news about unemployment/jobs than the new channel, but such differences are small compared to the one detected for crime news. So, not only crime receives more coverage *in general* than other topics, but also it receives much more coverage on traditional channels relatively to the new one in comparison with the same statistic for other topics.[41]

7. Further Results

7.1. Elasticity to actual crime rates

One interesting question is how crime news reporting mediates the way crime rates are translated into crime perceptions. In other words, do perceptions follow more closely movements in actual crime rates after the exposure to traditional channels decreases? To address this question, we regress crime perceptions on *Digital_Switch*, on the usual regional measure of crime rate (differentiating between violent and drug, property, and other crimes), and on an interaction between the two. Columns 1-4 of Table 11 presents results from different specifications for violent and drug crime, while columns 5 and 6 refer to, respectively, property and other crimes. In column 1, the coefficient on Digital_Switch indicate the effect of the switchover estimated at the average value of crime rates for violent and drug crimes (because such variable is de-meaned). As in previous tables, the coefficient on "violent and drug" crime rate is positive, suggesting that individuals respond to an increase (decrease) in crime rates by becoming more (less) concerned about crime. Interestingly, the coefficient on the interaction term turns out to be positive and statistically significant, suggesting that the switchover makes the relationship between changes in actual crime and perceptions about crime stronger. We interpret these results as suggestive that, once the exposure to traditional channels drops, individuals tend to believe, to a larger extent than before, that crime is (less of) an issue when crime rates are increasing (decreasing). In column 2 we include as controls the crime rates for property crimes and for other

[41] One explanation for this evidence is that in the period we focus on (2007-2010) crime and security were the biggest issues. It was indeed the period following the 2006 pardon provided by the centre-left coalition and the centre-right coalition pushed the security issue during the 2008 and the following electoral campaigns (Drago et al., 2017).

crimes, while columns 3-4 replicate specifications in 1-2 but using the indicator of Digital_Switch, instead of the share of months one. Results remain robust. Results for the interactions with property crimes and other crimes do not show any clear pattern (in column 5-6). In fact, as shown already above, none of those two types of crimes appeared to influence crime perceptions, such result persists after the switchover. Results in this section suggest that beliefs about crime follow more closely movements in actual crime rates after the reform, at least as long as violent and drug crime are concerned.[42]

7.2. Effect on police expenditure

The objective of this section is to evaluate whether the digital reform has an effect on tangible outcomes such as policies closely related to crime perceptions.[43] More precisely, we test whether the public resources allocated to police spending at the provincial level decreased in regions exposed to the digital technology compared to regions where the reform has not taken place yet. In order to do this, we gathered annual police spending data, both capital and current expenditure, at the provincial level for a sub-sample of regions, for the period from year 2007 and year 2013.[44] In Table 12, we implement our usual stacked DiD design by comparing police spending within and across provinces, before and after the switchover occurred. Estimates reveal that police spending decreases after the reforms. Estimates on the Digital Switch treatment for both of capital and current log annual expenditure are negative and significant when we control for only province fixed effects (column 1 and 4). Capital expenditure remain negative and significant also when including year fixed effects (column 2) and in the most completed specification, where we further control for some province time varying characteristics including actual level of crime (column 3). Estimates in current expenditures keep being negative also in our more complete specifications (columns 5-6), although it loses significance.[45] The results in Table 12 seems to suggest a possible behavioural response from policy makers after the

[42] This might represent an improvement with the pre-reform situation, although any further judgements would presuppose to know the socially optimal elasticity of crime concerns to actual crime.
[43] Drago et al. (2017) studies voters' response to crime control policies and, by exploiting the Italian 2006 collective pardon, indicate that voters keep incumbents politicians accountable by conditioning their vote on the observed effects of their policies.
[44] We have data for a total of 25 provinces in the following regions: Campania, Calabria and Sicily. Capital expenditures in police accounts for investments in equipment (cars, technology, weapons etc) whereas current expenditure includes investments in salaries and personnel.
[45] This should not come as a surprise because this line item include spending for salaries which are decided at the national level. Provinces have autonomy in hiring and firing, but we do not think the Digital Reform might affect these decisions.

Digital Reform. One plausible story would indeed be that local policy makers, in light of the decrease in crime concerns among citizens, might decide to reduce the amount of resources spent on policing.

7.3. Issue ownership and effects on voting behaviour

If the previous section has focused on the effect of the digital reform on policies, this section will explore its impact on behaviour. In particular, we analyse individual voting behaviour during the 2010 Italian regional elections. We gathered voting data at the province level for the 2009 European election and for the 2010 regional elections.[46] Exploiting the fact that some regions have switched to digital TV in between the 2009 and the 2010 elections, we estimate the effect of switchover by comparing changes in the vote shares of the centre-right coalition (from here simply CR coalition) , between provinces that did and did not switched to digital TV during the period. Results are presented in Table 13 and the estimates reveal a negative and significant effect. In particular, when conditioning on both province and on election fixed effects (column 3) we estimate a negative and significant coefficient suggesting a decrease in CR vote share of 8.8 percentage points. These results are in line with the results of Barone et al., (2015) who, by looking at one single region, find a 7.7 percentage points drop. We complement their analysis, by looking at the entire country and confirm a strong and significant effect of the digital reform on CR vote share. Of course, the digital reform might have affected voting in several ways and it would be difficult to isolate one single channel. However, we argue that the induced decrease in crime perceptions (and more generally concerns over crime) is plausibly one of the channels through which such effect takes place. One reason to support such conjecture is that crime is an issue typically *owned* by centre-right parties, since they are the ones perceived by voters as the most competent in managing it (Petrocik, 1996; Puglisi, 2011). Indeed, when asked about "What coalition would be better able to face the problem: crime?" 51% of the Italian respondents report the centre-right coalition, only 20% the centre-left and the remaining 29% say that is indifferent (Itanes, 2008). Accordingly, the CR coalition was the one most likely to lose from the documented decrease in the salience of crime induced by the digital TV introduction.

[46] The 2010 regional elections took place in 13 of the 20 Italian regions, which constitute our sample for this analysis.

8. Concluding Remarks

In modern democracies voters rely on media outlets to learn about politically salient issues. This raises an important question: how strongly can media affect public opinion? In this paper, we address this question by investigating the influence on news media on beliefs and perceptions individuals hold, with a focus on crime perceptions. We do so by focusing on the case of Italy, a country where the majority of TV channels have been under the influence of the former Prime Minister Silvio Berlusconi for more than a decade. In the first part of the paper, we document how a specific group of traditional TV channels seem to systematically over-represent crime news compared to others. We then test if individuals revise their perceptions about crime once exposure to these channels is reduced. In order to identify the causal effect, we exploit a natural experiment in the Italian television: the introduction of the digital TV signal, which led to a drastic and sudden drop in the viewing shares of traditional channels. Exploiting the staggered timing of such introduction, we find that the increase in the number of available TV channels - and the consequent lower exposure to crime news - led individuals to revise downward their perceptions about crime. Estimated negative effects on crime concern are larger for individuals who spend more time watching television while using less frequently other media such as internet, radio and newspapers. We then show that the digital reform had an effect on individual behaviors, by decreasing the vote share for the centre-right coalition, and on public policies, by reducing the amount of resources local governments allocate to police.

Our paper contributes to the literature on persuasive communication by producing causal evidence of the impact of information provided by motivated agents (partisan media) on the beliefs and perceptions individuals hold. Our findings also indicate that manipulating people's perceptions is more difficult when individuals acquire information from a variety of sources. We also contribute to the economics of crime literature by shedding light of how individuals' beliefs about crime are formed, and affected. Finally, this paper adds to the growing literature on the effects of news media on voting, by starting shading light over one of the possible mechanisms through which media ultimately affect voting outcomes: influencing their beliefs and perceptions about topics that are relevant in the political debate.

References

Barone G., D'Acunto F. and Narciso G. (2015). "Telecracy: Testing for Channels of Persuasion". *American Economic Journal: Economic Policy.*

Bassi V. and Rasul I. (2015). "Persuasion: a Case Study of Papal Influences on Fertility Preferences and Behaviours". Mimeo UCL.

Becker, G. (1969). "Crime and Punishment: an economic approach". *The Economics Dimension of Crime, Springer*

Bertrand, M., Duo, E. and Mullainathan, S. (2004), "How Much Should We Trust Differences-In-Differences Estimates?", *The Quarterly Journal of Economics* 119(1), 249{275.

Braakmann N. (2012). "How do Individuals Deal with Victimization and Victimization Risk? Longitudinal evidence from Mexico". *Journal of Economic Behavior and Organization* 84(1).

Buonanno, P., Montolio, D. and Raya-Vílchez, J.M., (2013). "Housing prices and crime perception". *Empirical Economics*, *45*(1), pp.305-321.

Cameron, A. C., Gelbach, J. B. and Miller, D. L. (2008), "Bootstrap-Based Improvements for Inference with Clustered Errors", *The Review of Economics and Statistics* 90(3), 414{427.

Cameron, A. C. and Miller, D. L. (2015), "A practitioner's guide to cluster-robust inference", *Journal of Human Resources* 50(2), 317{373.

Carlsson, M., Dahl, G.B. and Rooth, D.O., (2015). "Do politicians change public attitudes?". (No. w21062). National Bureau of Economic Research.

Chiang, C., F., and Knight, B., G. (2011). "Media Bias and Influence: Evidence from Newspaper Endorsements." *The Review of Economic Studies*, 78(3): 795-820.

Chong, A., S. Duryea, and La Ferrara, E. (2012). "Soap Operas and Fertility: Evidence from Brazil". *American Economic Journal: Applied Economics*, 4(4): 1-31.

Della Vigna, S. and Kaplan, E. (2007). "The Fox News Effect: Media Bias and Voting". *The Quarterly Journal of Economics*, 122(3): 1187-1234.

DellaVigna, S. and Gentzkow, G. (2010). "Persuasion: Empirical Evidence". *Annual Review of Economics*, 2: 643–69.

DellaVigna, S., Enikolopov, R., Mironova, V., Petrova, M., and Zhuravskaya, E. (2014). "Cross-Border Media and Nationalism: Evidence from Serbian Radio in Croatia". *American Economic Journal: Applied Economics*.

Draca, M. (2013). " The UKs riddle of peacefulness: what explains falling crime?" CentrePiece - The Magazine for Economic Performance 392, Centre for Economic Performance, LSE.

Drago, F., Galbiati, R. (2012). " Indirect Effects of a Policy Altering Criminal Behaviour: Evidence from the Italian Prison Experiment". *American Economic Journal, Applied Economics Vol 4, No. 2*

Drago, F., Galbiati R., Sobbrio F., (2017) The Political Cost of Being Soft on Crime: Evidence from a Natural Experiment. *Iza Discussion Paper No. 10858*

Durante R. and Knight B. (2012). "Partisan Control, Media Bias, and Viewer Responses: Evidence from Berlusconi's Italy". *Journal of the European Economic Association*, 10(3): 451-481.

Durante R., Pinotti, P., and Tesei, A. (2017). "The Political Legacy of News-Free Television: Evidence from the Rise of Berlusconi". CEPR *Discussion Paper N.19029.*

Dustmann C. and Fasani F., (2015). "The Effect of Local Area Crime on Mental Health". *Economic Journal*.

Eyster E., Rabin M. (2009). "Naïve Herding in Rich Information Setting". *American Economic Journal: Microeconomics*. 221–243

Enikolopov, R., Petrova, M., and Zhuravskaya, E. (2011). "Media and Political Persuasion: Evidence from Russia". *American Economic Review*, 101(7): 3253–85.

Gainey, R., Alper,M., Chappel, A., (2011). "Fear of Crime Revisited: Examining the Direct and Indirect Effects of Disorder, Risk Perception, and Social Capital". *American Journal of Criminal Justice* 36:120-137

Gentzkow M. and Shapiro J. (2004). "Media, education, and anti-Americanism in the Muslim world.". *Journal of Economics Perspectives*.

Gentzkow M., and Shapiro J. (2010). "What Drives Media Slant? Evidence from U.S. Daily Newspapers". *Econometrica*, 78(1): 35-71.

Gerber, A.S., Karlan, D. and Bergan, D., 2009. “Does the media matter? A field experiment measuring the effect of newspapers on voting behavior and political opinions”. *American Economic Journal: Applied Economics*, *1*(2), pp.35-52.

Hale, C. (1996) “Fear of Crime: a Review of the Literature.”. *International Review of Victimology*

Jensen, R. and Oster, E. (2009). “The Power of TV: Cable Television and Women’s Status in India”. *The Quarterly Journal of Economics* 124(3): 1057-1094.

Landry CE, Lange A, List JA, Price MK, Rupp NG. (2006). “Towards an Understanding of the Economics of Charity: Evidence from a Field Experiment”. *Quaterly Journal of Economics.* 121 (2): 747-82

Larcinese, V., Puglisi, R., and Snyder, Jr., J. M. (2011). “Partisan Bias in Economic News: Evidence on the Agenda-Setting Behavior of U.S. Newspapers.” *Journal of Public Economics*, 95(9-10): 1178-1189.

Larcinese V. (2008). “The Channelled Italian Voters”, in *Fabio Padovano & Roberto Ricciuti (eds.) Institutional Reforms in Italy: a Public Choice Perspective*, pp 221-24.

Larsen,M., Olsen, A. (2018). “Reducing Bias in Citizens’ Perception of Crime Rates: Evidence From a Field Experiment on Burglary Prevalence”. Mimeo

Lim C, Snyder JM, Stromberg D. (2015). "The Judge, the Politician and the Press: Newspaper Coverage and Criminal Sentencing Across Electoral Systems". *American Economic Journal: Applied Economics* (4) :103-15.

Lippman, W. (1922). Public opinion.

Machin, S. , Maine, O., Vukic, S. (2011). “The Crime Reducing Effect of Education”. *The Economic Journal, Volume 121, Issue 552 May 2011 , Pages 463–484*

Mullainathan S., and Shleifer A. (2005). “The Market for News”. *American Economic Review*, 95(4): 1031-1053.

Nelson, P. (1970). “Information and Consumer Behaviour”. *Journal of Political Economy*. Vol 78, No. 2.

Olken, B., A. (2009). “Do Television and Radio Destroy Social Capital? Evidence from Indonesian Villages”. *American Economic Journal: Applied Economics*, 1(4): 1–33.

Petrocik, J. (1996). " Issue Ownership in Presidential Elections, with a 1980 Case Study". *American Journal of Political Science*, Vol. 40, No. 3, pp. 825-850

Prat, A., and Stromberg, D. (2011). "The Political Economy of Mass Media." *Working paper, LSE and IIES.*

Puglisi R., Larcinese, V., (2011). "Partisan bias in economic news: Evidence on the agenda-setting behavior of U.S. newspapers". *Journal of Public Economics*, Volume 95, Issues 9–10

Rizzica L., Tonello M. (2015). "Exposure to Media and corruption perceptions". Temi di discussione (Economic working papers) 1043, Bank of Italy, Economic Research and International Relations Area.

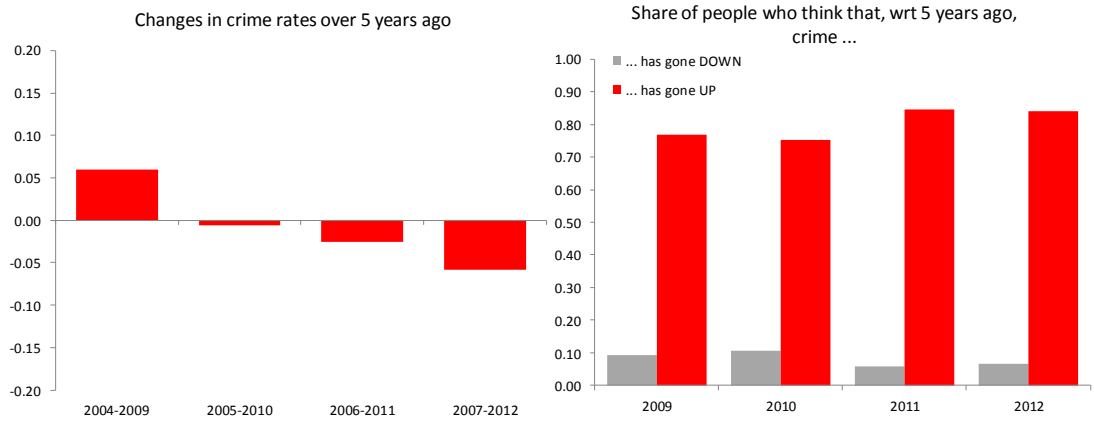
Schroeder, E. Stone, D. (2015). "Fox News and Political Knowledge". *Journal of Public Economics*. 126, pp. 52-63.

Simester, D Hu J, Brynjolfsson E, Anderson E. (2007). "Dynamics of Retail Advertising: Evidence from a Field Experiment". *Economic Inquiry* 47, 482-499

Sobbrio, F. (2014). "The Political Economy of News Media: Theory, Evidence and Open Issues". A Handbook of Alternative Theories of Public Economics. Edward Elgar Press.

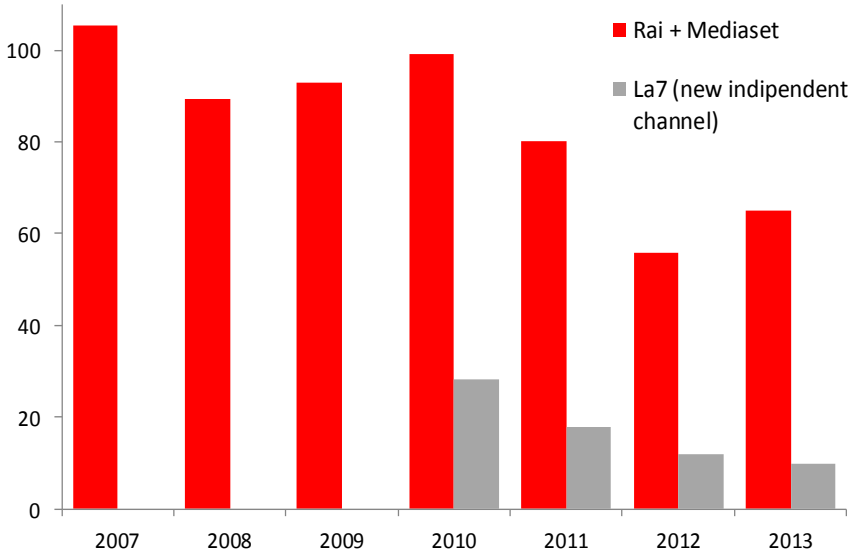
FIGURES

Figure 1 - Actual crime vs crime perceptions in Italy: 2004-2012



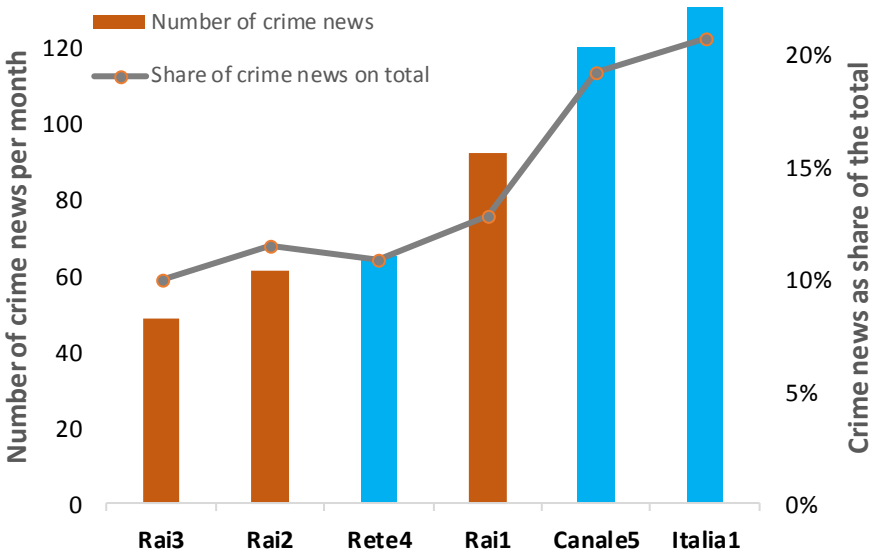
Note. The left panel of the figure reports changes in crime rates between 2004 and 2012. Source: Authors' elaboration on Italian Home Office Data. The right panel reports the share of people by answer to the question "Do you think that, with respect to five years ago, crime has gone up/gone down/ stayed the same/ do not know" from 2009 to 2012. The shares referring to the answers "stayed the same" and "do not know" are not reported.
Source: Eurostat (left panel) and UNIPOLIS Foundation (right panel).

Figure 2 - Intensity of crime news reporting: Main Traditional Channels (Rai + Mediaset) vs New Independent Channel (La7)



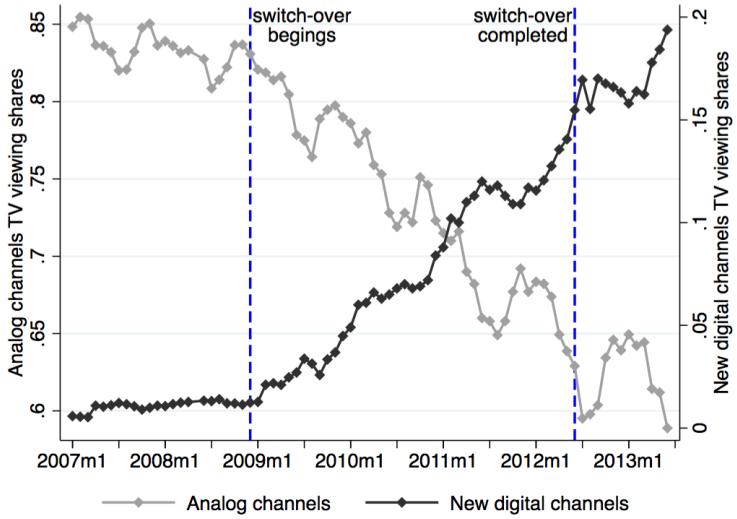
Note. The graph shows the differences in crime news reporting between Traditional Channels (Rai+Mediaset) and the new independent channel (La7). The chart exhibits the *average monthly number* of crime news for Rai and Mediaset and for La7. Data for LA7 channel are available only from year 2010 onwards.
Source: Authors' elaboration from Pavia Observatory data.

Figure 3 - Intensity of crime news reporting: by traditional channel



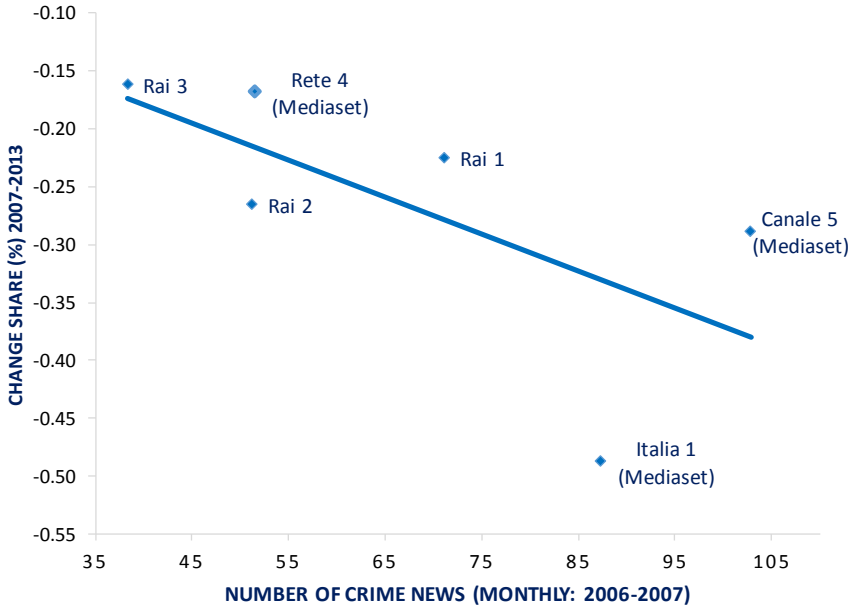
Note. This figure presents the monthly average number of crime news as count (axis on the left) as well as share on the total number of news (axis on the right), separately for each of the six traditional channels. Blue bars represent Mediaset channels, while red bars represent Rai channels. Data are from 2007 to 2013.
Source: Authors' elaboration from Pavia Observatory data.

Figure 4 – Prime time viewing shares: main traditional analogue channels (Rai + Mediaset) vs new digital channels



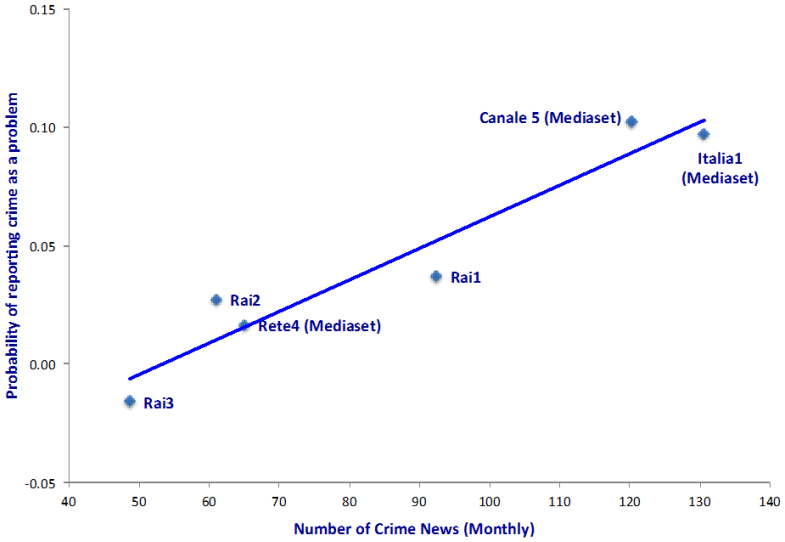
Note. The figure plots monthly TV viewing shares during prime-time (18:00-20:30) for main traditional analogue channels (Rai and Mediaset) and new digital channels between 2007 and 2013. *Source*: authors' elaboration on AUDITEL data.

Figure 5 – Crime news reporting intensity and viewing share drop during Digital Reform



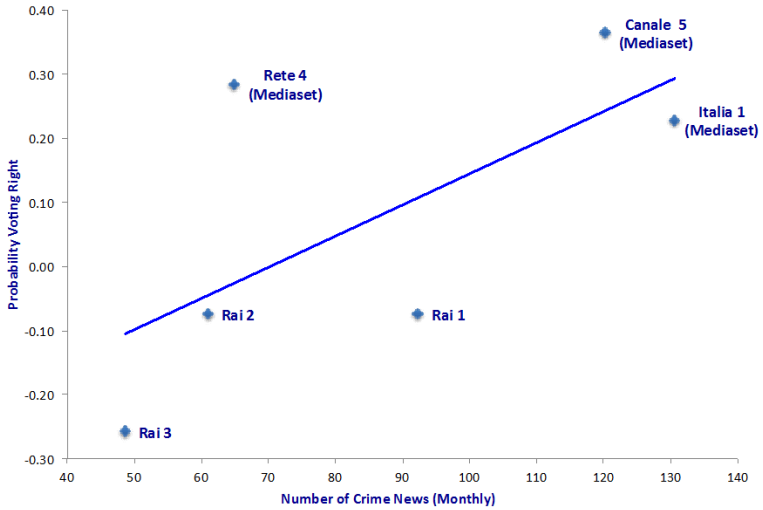
Note. The figure plots, for each of the six traditional channels, the monthly average number of crime news (pre-reform, i.e. 2006-2007) against the change in TV viewing shares during the reform (2007-2013.
Source: authors' elaboration on AUDITEL data.

Figure 6 – Crime news exposure and concerns about crime



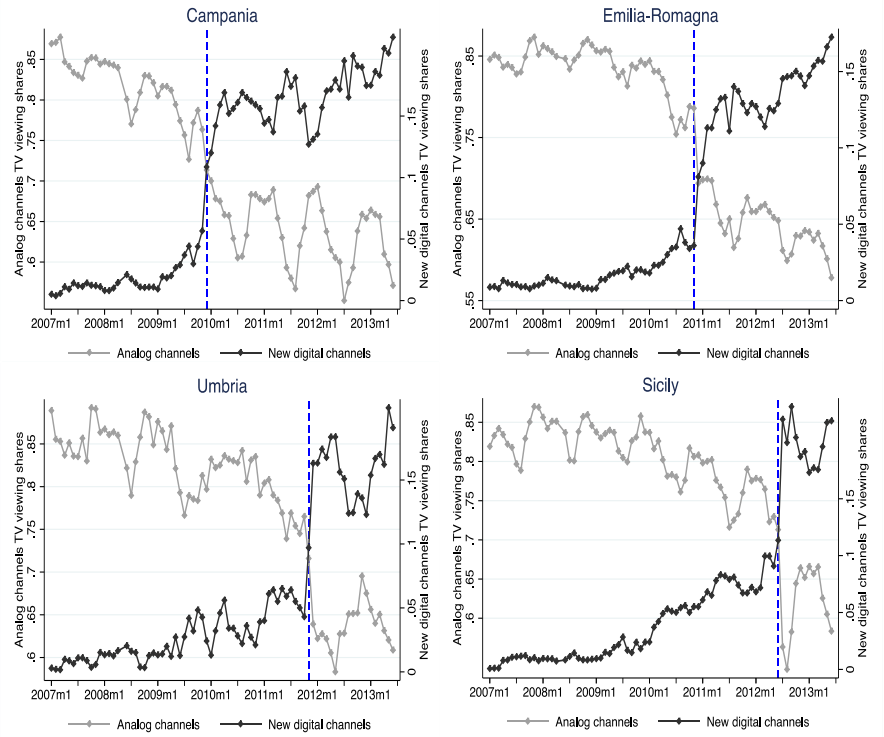
Note. The figure reports estimates from a LPM where we regress an indicator equal to one if an individual reports crime as the most important problem in the country on set of dummies for which of the 7 main analog TV channel the individual declares to watch most regularly. We then plot the estimated coefficients together with the monthly amount of crime-related news items reported by each TV channel during prime-time news programs. Estimated coefficients are interpreted with respected to the TV channel LA7, which is excluded from the regression. The regression includes age, male dummy, level of education, dummy for married, a set of dummies of occupational status and region fixed effects. *Sources:* Pavia Observatory (crime news data) and ITANES (Crime Perception Data) Year: 2008. Crime Perception measure with a pre-electoral survey using the question "*Which is the most important problem in Italy at the moment?"*

Figure 7 – Crime news exposure and voting for the centre-right coalition



The figure reports estimates from a LPM where we regress an indicator equal to one if an individual has voted Centre right in the last national elections on set of dummies for which of the 7 main analog TV channel the individual declares to watch most regularly. We then plot the estimated coefficients together with the monthly amount of crime-related news items reported by each TV channel during prime-time news programs. Estimated coefficients are interpreted with respected to the TV channel LA7, which is excluded from the regression. The regression includes age, male dummy, level of education, dummy for married, a set of dummies of occupational status and region fixed effects. *Sources:* Pavia Observatory (crime news data) and ITANES (Voting Data) Year: 2008. Voting measure with a post-electoral survey using the question "*Which party/coalition did you vote in the last general elections?"*

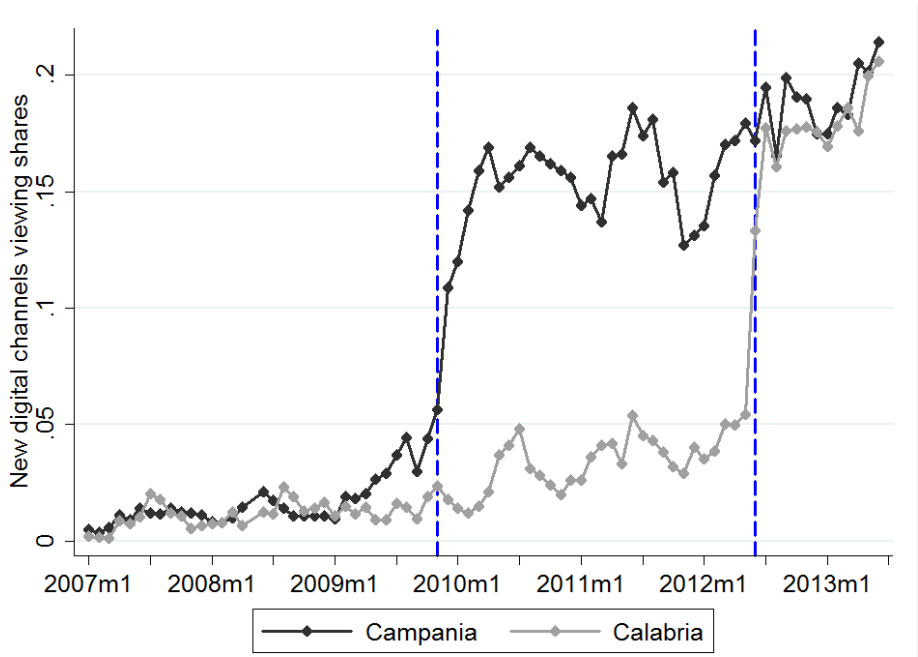
Figure 8 – Prime time viewing shares around switch-off deadlines (selected regions)



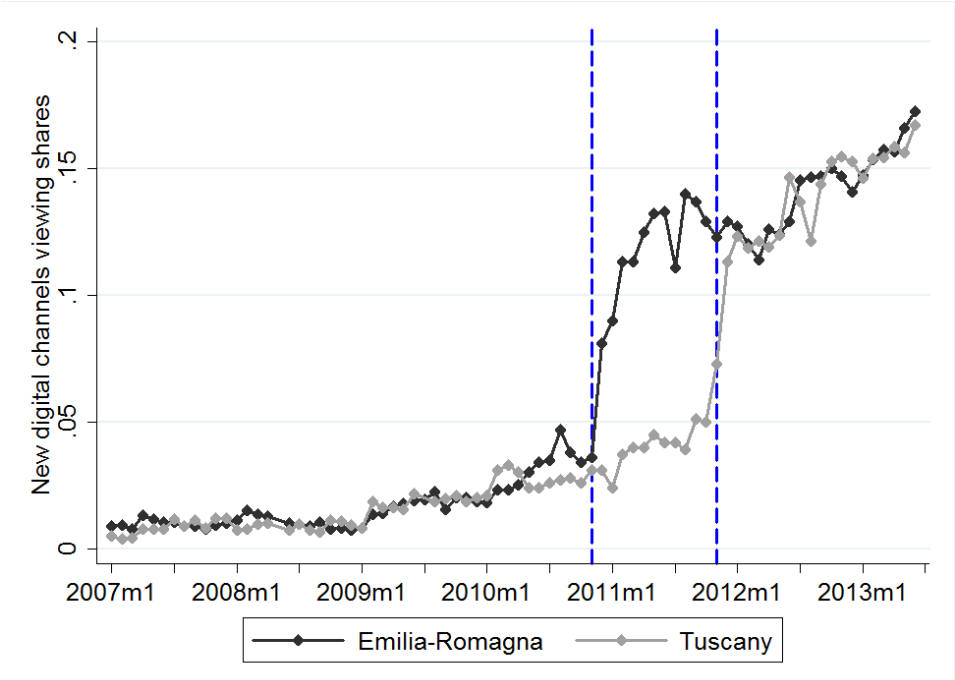
Note. The figure reports the evolution of monthly viewing shares (prime-time) before and after the switch-over to digital TV signal in 4 selected regions. The light grey lines indicate viewing shares of main traditional analogue channels while the dark grey ones indicate those of new digital channels. The dashed vertical lines indicate switch-off dates for each specific region. *Source*: authors' elaboration on AUDITEL data.

Figure 9 - Discontinuity in digital channels viewing shares (prime-time) around switch-off deadlines (selected pairs of neighboring regions)

Panel A

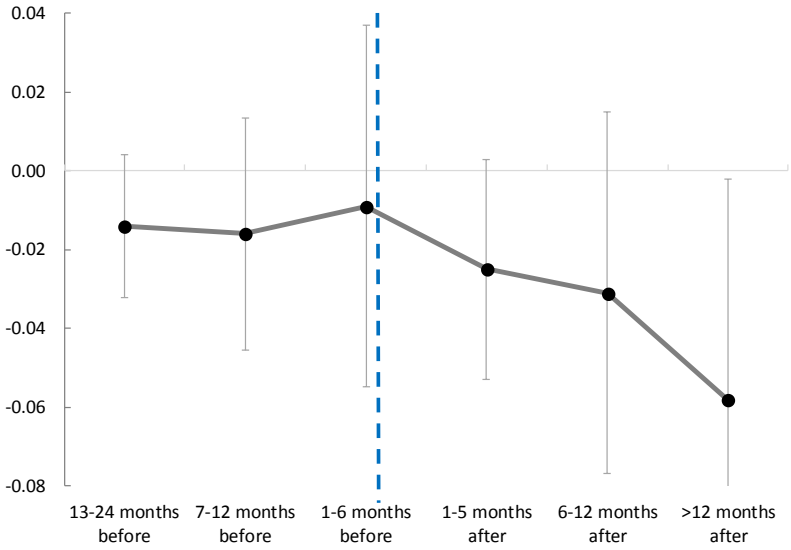


Panel B



Note. The figures show the evolution of monthly TV viewing shares (prime-time) of new digital channels in 2 pairs of neighboring regions, before, during, and after the switch to digital signal. The dashed vertical lines indicate switch-off dates. In particular in Panel A the first line corresponds to the deadline in region Campania (12/2009) while the second to the deadline in region Calabria (06/2012). In Panel B the first line corresponds to the deadline in region Emilia-Romagna (11/2010) while the second to the deadline in region Tuscany (11/2011). *Source:* authors' elaboration on AUDITEL data.

Figure 10: Timing of the effect around the digital switchover



Note. The figure plots estimated coefficients and 90% confidence intervals from regression of crime concern (*Crime_Concern*) on a set of dummies from 13-24 months, 7-12 months and 1-6 months *before* the switchover date, as well as on dummies for 1-5 months, 6-12 months, and more than 12 months *since* the switchover occurred. The regression includes individual and family controls: gender, age group dummies, marital status, education, set of dummies for occupational status, family size, family structure, and major source of household income. The regression include year and region fixed effects, as well as region time-varying controls (unemployment rate and crime rate). 90% confidence intervals based on robust standard errors clustered by region.

TABLES

Table 1: Crime concerns and voting for the centre-right coalition

	Voted for the centre-right coalition		
	(1)	(2)	(3)
Crime Concern	0.249***	0.248***	0.246***
	(0.028)	(0.030)	(0.029)
Individual controls		X	X
Region fixed effects			X
Observations	1,652	1,637	1,637
R-squared	0.030	0.071	0.098

Note. The table reports estimates from a linear probability model of an indicator for the individual having voted for the centre-right coalition in 2008 election on a dummy for reporting crime as most important problem in the country at the moment of the elections. Individual controls include: age, male dummy, level of education, dummy for married and a set of dummies of occupational status. Sample: ITANES Survey (2008)
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 2: Balancing test: *early* vs *late* switcher regions

	Early Switchers	***Late Switchers***	**Difference**	**p-value**
Unemployment rate	0.063	0.064	-0.002	0.923
Employment rate	0.636	0.629	0.008	0.866
Share of tertiary educated	0.084	0.085	-0.001	0.121
Share of immigrant residents	0.039	0.042	-0.004	0.756
Share of internet users	0.388	0.355	0.033	0.213
GDP per capita (euros)	25,900	23,976	1924	0.550
Population density (people by square km)	186.3	182.9	-3.4	0.950
Persons cited for crimes (per 100,000 people)	1,149	1,137	-13	0.933
Murder rate (per 100,000 people)	1.010	0.881	0.129	0.546

Note. The table reports means of various characteristics for two groups of regions: those that switched to digital before or at December 2009 (*early switchers*) and those that switched to digital from January 2010 onwards (*late switchers*). Column 4 reports the p-values for tests of the difference between means in the two groups.

Table 3: Effect of the Digital Reform on TV viewing shares

	(1)	(2)	(3)	(4)
	Panel A: Traditional Channels			
Digital Switch	-0.087***	-0.086***	-0.085***	-0.081***
	(0.010)	(0.010)	(0.010)	(0.008)
F-stat: Digital Switch	79.25	74.09	73.42	89.93
	Panel A1: Traditional Channels excluding Rai3			
Digital Switch	-0.072***	-0.075***	-0.072***	-0.067***
	(0.010)	(0.011)	(0.011)	(0.009)
F-stat: Digital Switch	51.09	50.31	47.30	52.41
	Panel B: New Digital Channels			
Digital Switch	0.072***	0.067***	0.064***	0.065***
	(0.007)	(0.006)	(0.007)	(0.006)
F-stat: Digital Switch	103.4	116.5	94.45	110.8
	Panel C: Satellite Channels			
Digital Switch	0.007	0.009**	0.009*	0.007
	(0.004)	(0.004)	(0.005)	(0.005)
F-stat: Digital Switch	2.732	4.559	3.473	2.370
	Panel D: Other Channels			
Digital Switch	0.012***	0.012***	0.014***	0.012**
	(0.004)	(0.004)	(0.004)	(0.004)
F-stat: Digital Switch	8.728	9.352	11.83	7.513
Region fixed effects	X	X	X	X
Linear time trend	X			
Year fixed effects		X		
Month*Year fixed effects			X	X
Region-specific linear trends				X
Observations	1,519	1,519	1,519	1,519

Note. The table reports estimates from regressions of TV viewing shares (during prime-time) on *Digital_Switch* The level of observation is the viewing share by channel*month*region. *Digital_Switch* equals one if the region r experienced the switch-over to digital signal at time (month) t or before. Each panel reports estimates of the TV viewing shares (prime-time) of a different group of channels. Rai and Mediaset channels are indicated as Traditional Channels. Robust standard errors clustered at the region level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Effect of the Digital Reform on crime perceptions

	Digital: indicator of switch-off occurred					Digital: share of months after switch-off				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Digital Switch	-0.014					-0.024*				
	(0.011)					(0.014)				
Digital Switch * Aged 15-29		-0.000	-0.002	-0.001	0.000		-0.006	-0.008	-0.008	-0.008
		(0.015)	(0.016)	(0.014)	(0.018)		(0.020)	(0.020)	(0.018)	(0.022)
Digital Switch * Aged 30-49		0.001	0.001	0.002	0.002		-0.004	-0.004	-0.004	-0.005
		(0.012)	(0.011)	(0.011)	(0.012)		(0.018)	(0.017)	(0.018)	(0.015)
Digital Switch * Aged 50-65		-0.030*	-0.029*	-0.028**	-0.028*		-0.045**	-0.045**	-0.045***	-0.046**
		(0.014)	(0.014)	(0.012)	(0.015)		(0.018)	(0.018)	(0.015)	(0.016)
Digital Switch * Aged >65		-0.035***	-0.036***	-0.035***	-0.034**		-0.050***	-0.051***	-0.051***	-0.052**
		(0.012)	(0.011)	(0.011)	(0.015)		(0.012)	(0.011)	(0.011)	(0.018)
Crime rate: all crimes				0.091					0.098	
				(0.092)					(0.091)	
Crime rate: violent & drug					0.200**					0.204**
					(0.072)					(0.075)
Crime rate: property					0.031					0.036
					(0.082)					(0.081)
Crime rate: other					-0.026					-0.025
					(0.059)					(0.057)
Individual and family controls			X	X	X			X	X	X
Region time-varying controls				X	X				X	X
Region fixed effects	X	X	X	X	X	X	X	X	X	X
Year fixed effects	X	X	X	X	X	X	X	X	X	X
Observations	139,165	139,165	139,165	139,165	139,165	139,165	139,165	139,165	139,165	139,165

Note. The table reports estimates of the reduced-form effect of the digital switchover on perceptions about crime. Estimates are from a linear probability model of *Crime_Concern* on a post switch-over variable (*Digital_Switch)*. *Crime_Concern* is an indicator for the individual reporting crime as one of the 3 priority problems in Italy. In order to take into account the effective time passed since the region has switched to the digital signal we employ two alternative versions of the variable *Digital_Switch.* The first, which we employ in columns 1-5, is a dummy that equals one if the region r experienced the switch-over to digital signal at time t or before. The second, which we employ from column 6 to 10, is the number of months (as fraction of the 8 before each survey) elapsed since region *r* experienced the switch to digital signal. Crime rates are calculated as logs of crimes per 10'000 individuals. Individual and family controls include: gender, age group dummies, marital status, education, family size, and set of dummies for occupational status, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. The regressions include year and region fixed effects.
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Dynamic effect on crime perceptions

		(1)	(2)	(3)	(4)	(5)	(6)
Total months since switchover		-0.002**	-0.002**				
		(0.001)	(0.001)				
1-5 months				-0.012	-0.005		
				(0.014)	(0.015)		
6-12 months				-0.013	-0.019*		
				(0.009)	(0.011)		
>12 months				-0.034***	-0.040***		
				(0.009)	(0.014)		
aged 50+ and...	**1-5 months**					-0.030*	-0.023
						(0.016)	(0.016)
	6-12 months					-0.033***	-0.039***
						(0.009)	(0.011)
	>12 months					-0.044***	-0.050***
						(0.008)	(0.013)
aged <50 and..	***1-5 months***					0.002	0.009
						(0.013)	(0.013)
	6-12 months					0.003	-0.003
						(0.009)	(0.011)
	>12 months					-0.025**	-0.031**
						(0.010)	(0.014)
Individual and family controls		X	X	X	X	X	X
Regional time-varying controls			X		X		X
Time and region fixed effects		X	X	X	X	X	X
Observations		139,165	139,165	139,165	139,165	139,165	139,165

Note. The table reports estimates of the effect of switchover on Crime_Concern. In columns 1-2 we use as the total number of months elapsed since the switchover as treatment measure. In the following columns we categorise the number of months elapsed into three indicators: 1 to 5 months, 6-12 months, and more than 12 months since the switchover occurred. In columns 5-6 we further interact the three indicators described above with 2 age groups: aged 15-49 and aged 50 and above. Individual and family controls include: gender, age group dummies, marital status, education, family size, and set of dummies for occupational status, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. The regressions include year and region fixed effects.
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Placebo: testing for pre-reform differential trends

	Aged 50 and above		Aged 50-65		Aged >65	
	(1)	(2)	(3)	(4)	(5)	(6)
Digital Switch	-0.036**	-0.032**	-0.032*	-0.029**	-0.039***	-0.036***
	(0.013)	(0.011)	(0.016)	(0.014)	(0.012)	(0.012)
Digital Switch at time t+1	-0.015	-0.012	-0.014	-0.011	-0.016	-0.012
	(0.011)	(0.012)	(0.012)	(0.013)	(0.014)	(0.015)
Indinvidual & family controls	X	X	X	X	X	X
Regional time-varying controls		X		X		X
Time and region fixed effects	X	X	X	X	X	X
Observations	139,165	139,165	139,165	139,165	139,165	139,165

Note. In this table we investigate whether there is any effect of the digital reform *before* its introduction. We regress Crime_Concern on both the usual treatment indicator Digital_Switch (dummy that equals one if the region r experienced the switch-over to digital signal at time t or before) and on an indicator Digital_Switch t+1 which is equal one if the region will switch to digital in year t+1. The coefficient on the latter variable captures the effect of future access for individuals in regions that have not switched to digital TV at time t yet. The table shows estimates for the groups of individuals we find significant effect in the baseline analysis: those aged 50 or above (columns 1-2), aged 50-65 (columns 3-4) and aged above 65 (columns 5-6). The coefficients in columns 3 and 5 (as well as in columns 4 and 6) come from the same regression in which we estimate the effect for the usual 4 age groups (the coefficients on the other 2 groups are not reported).
Individual and family controls include: gender, age group dummies, marital status, education, family size, and set of dummies for occupational status, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. The regressions include year and region fixed effects.
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Effect on individuals who do not watch TV

	Digital: indicator		Digital: share of months	
	(1)	(2)	(3)	(4)
Effect of DigitalSwitch on aged 50+ who…				
…do watch TV	-0.033***	-0.032***	-0.048***	-0.048***
	(0.011)	(0.010)	(0.012)	(0.011)
…do not watch TV	-0.001	-0.000	-0.020	-0.020
	(0.050)	(0.050)	(0.057)	(0.056)
Individual and family controls	X	X	X	X
Region time-varying controls		X		X
Time and region fixed effects	X	X	X	X
Observations	139,165	139,165	139,165	139,165

Note. The table investigates the effect of the Digital Reform on those individuals who do not watch TV. It reports estimates from a linear probability model of an indicator for the individual reporting crime as one of the 3 main problems in Italy (*Crime_Concern*) on the usual treatment indicator (columns1-2) and the share of months treatment (columns 3-4). Via interactions, coefficients are estimated for 2 age groups (15-49 and 50+) and for those watching vs not watching TV. Coefficients for individuals aged 15-49 are not reported. Individual and family controls include: gender, age group dummies, marital status, education, set of dummies for occupational status, family size, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. The regressions include year and region fixed effects.
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: TV watching time, other media access, and crime news exposure

	Television	Television	Internet	Radio	Newspapers	Crime News
	(1)	(2)	(3)	(4)	(5)	(6)
DigitalSwitch	-0.026*	-0.028**	-0.026*	-0.026*	-0.026*	-0.033**
	(0.014)	(0.012)	(0.014)	(0.014)	(0.014)	(0.012)
DigitalSwitch * TV watching time	-0.005**	-0.005**				
	(0.002)	(0.002)				
DigitalSwitch * Tv watching time2		0.0001				
		(0.0003)				
DigitalSwitch * No internet			-0.065**			
			(0.023)			
DigitalSwitch * No radio				-0.115***		
				(0.019)		
DigitalSwitch * No newspapers					-0.045	
					(0.045)	
DigitalSwitch * CrimeNews						-0.013
						(0.009)
DigitalSwitch * CrimeNews2						0.0008
						(0.001)
Individual and family controls	X	X	X	X	X	X
Regional time-varying controls	X	X	X	X	X	X
Time and region fixed effects	X	X	X	X	X	X
Observations	139,067	139,067	139,061	139,067	139,067	110,350

Note. The table investigates whether the effect of the digital switchover on the probability to report crime as one of the main problems depends on the time spent watching TV (columns 1-2), the use of other media (columns 3-5) and the exposure to crime news (column 6). *DigitalSwitch* is the number of months (as fraction of the 8 before each survey) elapsed since region *r* experienced the switch to digital signal. *TV watching time* is the de-meaned daily amount of time spent watching TV (in 10 of mins). *No_Internet*, *No_Radio* and *No_Newspapers* are de-meaned probabilities for not using, respectively, Internet, the radio, and newspapers. For *TV watching time*, we predict values for our estimating sample using cell-specific pre-reform averages of the variables above, where the cells are formed by all interactions of the following variables: age (5-years age groups), gender, married indicator, household size, an indicator for tertiary education, and an indicator for employed. *CrimeNews* is the predicted (de-meaned and divided by 100) monthly average of crime news to which individuals were exposed to prior the reform. It is predicted combining Itanes data on the most watched news program with the monthly number of crime news by channels. Similarly, to the *TV watching* variable, we predict values for our estimating sample using cell-specific pre-reform averages using all the combinations of the following variables: age, gender, marital status, an indicator for tertiary education. Individual and family controls include: gender, age, marital status, education, set of dummies for occupational status, family size, family structure, and major source of household income. Coefficients of the predicted explanatory variables alone are not reported. Region time-varying controls include unemployment rate and crime rate. The regressions include year and region fixed effects.

Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Interest and engagement in politics and public issues

	Inform politics		Funding political parties		Number of priority reported		Membership of voluntary associations	
Digital Switch measure:	**Indicator**	**Share**	**Indicator**	**Share**	**Indicator**	**Share**	**Indicator**	**Share**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Digital Switch * Aged 50+	-0.104	-0.046	0.005	0.004	-0.019	-0.018	0.009	0.007
	(0.085)	(0.067)	(0.005)	(0.004)	(0.016)	(0.013)	(0.014)	(0.010)
Individual and Family controls	X	X	X	X	X	X	X	X
Region time-varying controls	X	X	X	X	X	X	X	X
Time and region fixed effects	X	X	X	X	X	X	X	X
Observations	139,532	139,532	103,296	103,296	139,165	139,165	102,931	102,931

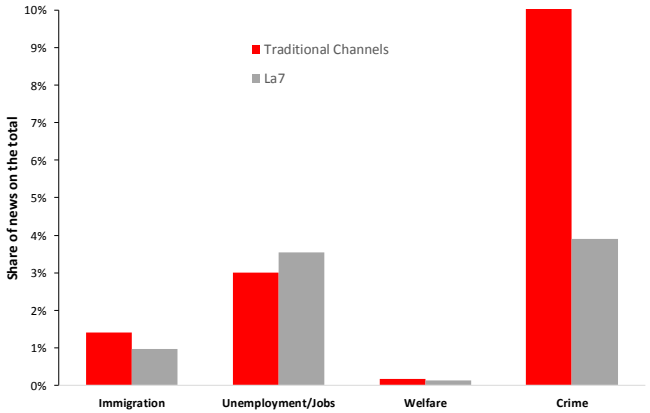
Note. The table investigates the effect of the digital switch, for individuals aged 50 or above, on political and social engagement, interest in politics, and the number of priority reported. *Inform Politics* (columns 1-2) is a dummy variable equal to 1 if individuals report to get information about politics at least on a weekly basis. Similarly, *Funding Political Parties* (columns 3-4) is an indicator equal to 1 if respondents declare to provide financial support to political parties. The *Number of Priority Reported* (columns 5-6) is an indicator equal to 1 if individuals consistently use all the three options allowed to answer the question "*Which are the most important problems in your country?".* The "*Number of Priority Reported"* takes values zero if individuals mention just one or two problems instead of three. Finally, *Membership of Voluntary Associations* (columns 7-8) takes value 1 if respondents declare to be part of a voluntary associations. For each measure of political and social engagement we report estimates with both *DigitalSwitch* as dummy variable and as the number of months (as fraction of the 8 before each survey) elapsed since region *r* experienced the switch to digital signal. Individual and family controls include: gender, age group dummies, marital status, education, set of dummies for occupational status, family size, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. The regressions include year and region fixed effects.
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Concerns about other issues

	Unemployment	Crime	Poverty	Immigration	Inefficiency of health sector	Tax evasion	Environment/ Pollution	Inefficiency of judicial system	Public debt	Inefficiency of education sector	Others
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Effect of DR on aged 50+	-0.090	-0.048***	0.026	-0.001	0.062***	-0.000	0.002	0.022	0.002	0.005	-0.003
	(0.073)	(0.011)	(0.018)	(0.016)	(0.021)	(0.011)	(0.027)	(0.014)	(0.015)	(0.004)	(0.005)
Individual and family controls	X	X	X	X	X	X	X	X	X	X	X
Region time-varying controls	X	X	X	X	X	X	X	X	X	X	X
Region & year fixed effects	X	X	X	X	X	X	X	X	X	X	X
Mean of outcome	0.73	0.57	0.30	0.27	0.22	0.22	0.16	0.15	0.14	0.07	0.02
Observations	139,165	139,165	139,165	139,165	139,165	139,165	139,165	139,165	139,165	139,165	139,165

Note. The table investigates the effect of the switch to digital signal on the likelihood for individuals aged 50 or above of mentioning each of the other problem suggested by the question *"What do you think are the 3 priority problems of the country?"*. Suggested problems are ordered from left to right from the most to the least mentioned. The independent variable is the number of months (as fraction of the 8 before each survey) elapsed since region *r* experienced the switch to digital signal. Individual and family controls include: gender, age group dummies, marital status, education, set of dummies for occupational status, family size, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. The regressions include year and region fixed effects.
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure 11: Share of news on total: other issues



Note. Years 2011-2012. Figures report the monthly share of news over the total for the following 4 topics: *immigration, unemployment/jobs, welfare and crime.* Traditional channels (Rai + Mediaset) include Rai3. *Source:* Authors' elaboration from Pavia Observatory data.

Table 11: Elasticity of crime perceptions to actual crime

	(1)	(2)	(3)	(4)	(5)	(6)
Digital Switch	-0.024**	-0.022*	-0.015**	-0.013*	-0.036*	-0.023
	(0.010)	(0.012)	(0.007)	(0.007)	(0.017)	(0.016)
Violent&drug crimes	0.258**	0.264**	0.261**	0.270**		
	(0.096)	(0.101)	(0.092)	(0.097)		
Digital Switch * Violent&drug crimes	0.176**	0.184*	0.134***	0.144**		
	(0.083)	(0.100)	(0.043)	(0.052)		
Property crimes		0.024		0.019	0.026	
		(0.088)		(0.090)	(0.095)	
Digital Switch * Property crimes					-0.047	
					(0.049)	
Other crimes		-0.041		-0.048		-0.019
		(0.063)		(0.066)		(0.067)
Digital Switch * Other crimes						0.039
						(0.086)
Individual and family controls	X	X	X	X	X	X
Regional time-varying controls	X	X	X	X	X	X
Time and region fixed effects	X	X	X	X	X	X
Observations	139,165	139,165	139,165	139,165	139,165	139,165

Notes. The table investigates the whether the relationship between crime rates and crime perceptions changes after the digital reform. The table report estimates from regressions of Crime_Concern on the Digital_Switch, on the usual regional measure of crime rate (differentiating between violent and drug, property, and other crimes), and on an interaction between the two. In columns 1, 2, 5 and 6 we employ as treatment the number of months elapsed since the switchover (as share of the last 8 before each survey). Columns 3-4 replicate specifications in 1-2 but using the post switchover indicator of Digital_Switch. All crime rate variables are de-meaned in order to facilitate interpretation of coefficients. Individual and family controls include: gender, age group dummies, marital status, education, set of dummies for occupational status, family size, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. The regressions include year and region fixed effects.
Robust standard errors clustered by region are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 12: Effect on expenditure in policing

	Expenditure in Police (capital account)			Expenditure in Police (current account)		
	(1)	(2)	(3)	(4)	(5)	(6)
Digital Switch	-0.067***	-0.050*	-0.050*	-0.078***	-0.037	-0.044
	(0.012)	(0.025)	(0.027)	(0.027)	(0.027)	(0.029)
Province Fixed Effects	X	X	X	X	X	X
Year Fixed Effects		X	X		X	X
Province time-varying controls			X			X
Observations	133	133	133	133	133	133

Note. The table studies the effect of the Digital Reform on Police Spending. We use municipal level data on current and capital expenditure for police spending and we aggregate them at the provincial level. We have data for a total of 25 provinces from year 2007 to year 2013, in the following regions: Campania, Calabria and Sicily. Capital expenditures in police (Columns 1-3) accounts for investments in equipment (cars, technology, weapons etc) whereas current expenditure (Columns 4-6) includes investments in salaries and personnel. Both *Capital Expenditure in Police* and *Current Expenditure in Police* are expressed in logarithmic. *DigitalSwitch* is the number of months (as fraction of the 8 before each survey) elapsed since region *r* experienced the switch to digital signal.
Robust standard errors are clustered by province and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 13: Effect on voting behavior

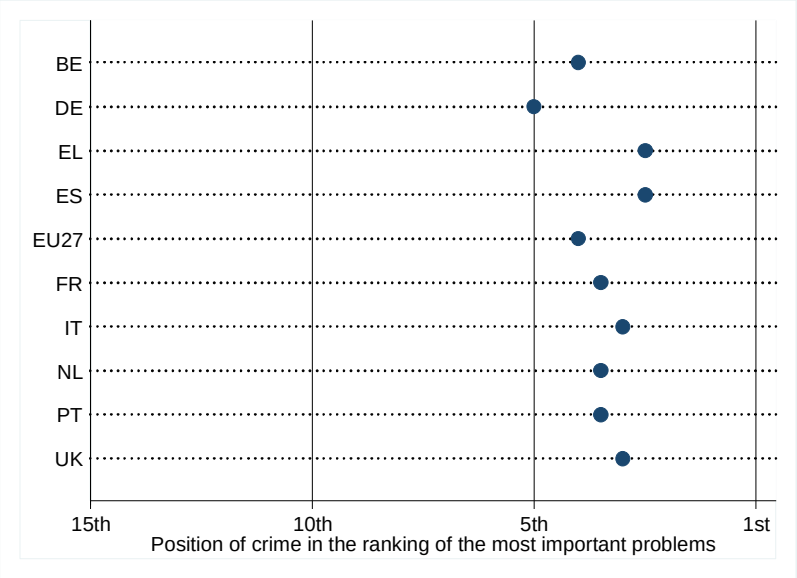
	Centre-right coalition vote share (1)	Centre-right coalition vote share (2)	Centre-right coalition vote share (3)
Digital Switch	0.054*	-0.089**	-0.088*
	(0.030)	(0.028)	(0.049)
Year fixed effects	X	X	X
Region fixed effects		X	
Province fixed effects			X
Observations	186	186	186

Note. The Table studies the effect of the Digital Reform on individual voting behaviour. *Centre-Right* represents the vote share for the centre right coalition at the provincial level. We use data from the 2009 European Elections and the 2010 Regional Elections. The 2010 regional elections took place in 13 of the 20 Italian regions, which constitute our sample for this analysis. *DigitalSwitch* is the number of months (as fraction of the 8 before each survey) elapsed since region r experienced the switch to digital signal.
Robust standard errors are clustered by province and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Online Appendix

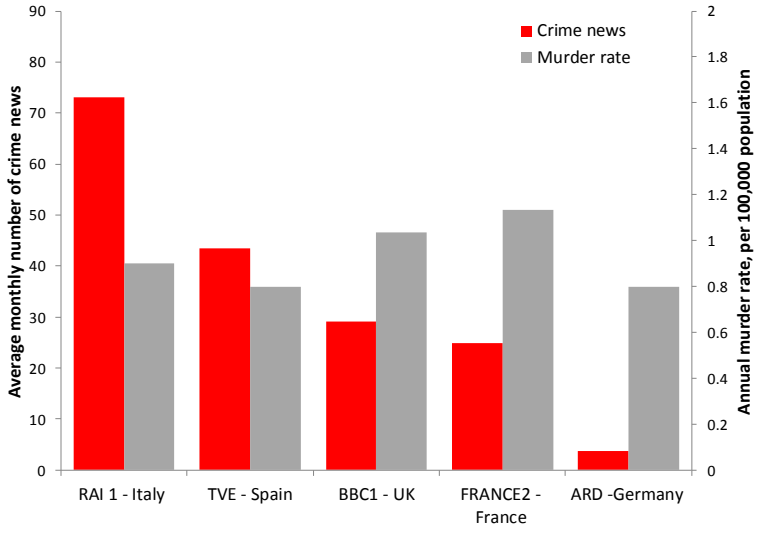
Appendix A: Tables and Figures

Figure A1: Crime concerns in selected European countries (2008-2010)



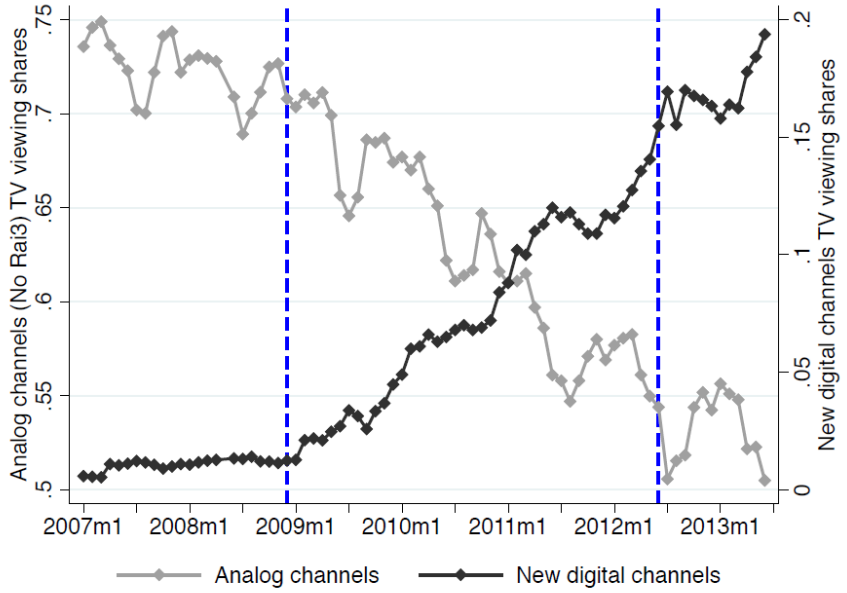
Note. This figure presents how crime is ranked, from 1st to 15th, among a list of major problems in selected European countries. The ranking goes from 15th, indicating the least mentioned topic, to 1st, indicating the most mentioned topic.
Source: Authors elaboration from the 2008 and 2010 waves (pooled) of the Eurobarometer Survey.

Figure A2: Intensity of crime news reporting and murder rates: selected countries



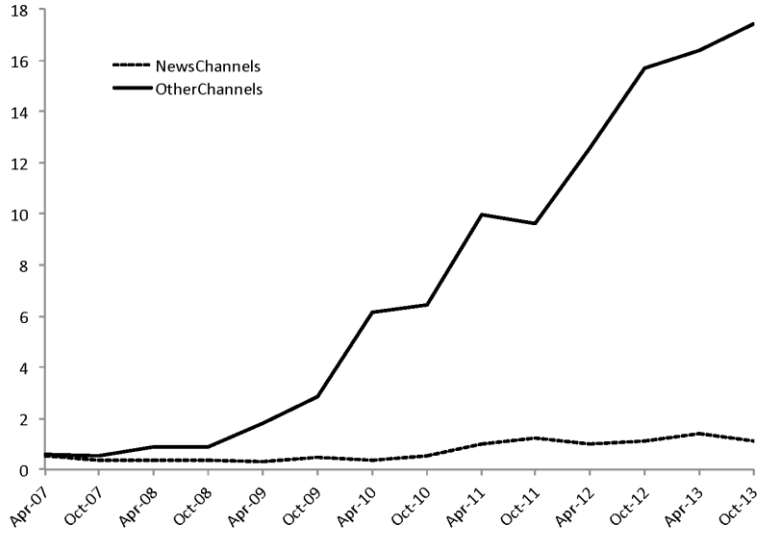
Note. The graph compares the average monthly number of crime news broadcast during prime-time news programs by the main public TV channel with the annual murder rate in a selected number of European countries.
The main public Italian channel (Rai1) broadcast an average of 73 crime related news per month during the period 2010 to 2013. The number is larger for a factor that ranges between 1.7 (Spain) to 18 (Germany) with respect to the same metric in the other European countries considered. Importantly, this difference in the amount of attention dedicated to crime by news programs on specific Italian channels does not seem to be justified by existing differences in crime rates (measured as murder rate) across countries.
Sources: Pavia Observatory (crime news data) and Eurostat (murder rates). Years: 2010-2012.

Figure A3: Prime time viewing shares: main traditional analogue channels (excluding Rai 3) vs new digital channels



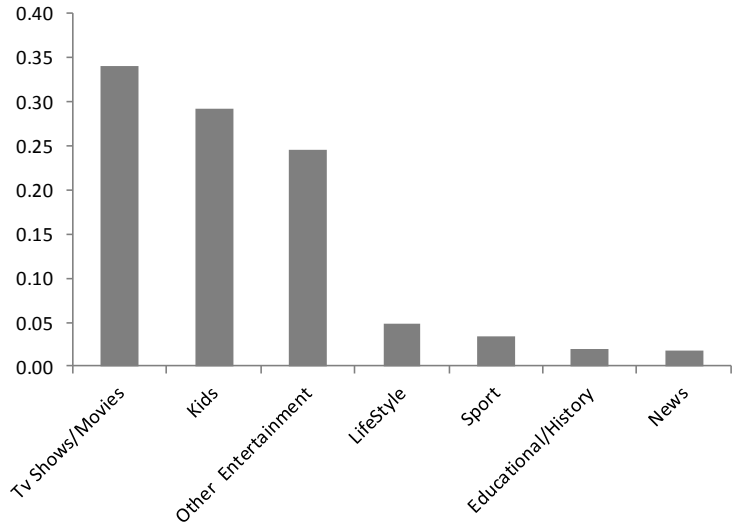
Note. The figure plots monthly TV viewing shares during prime-time (18:00-20:30) for main traditional analogue channels excluding Rai3 (and new digital channels between 2007 and 2013. *Source*: authors' elaboration on AUDITEL data.

Figure A4 - Viewing shares: new digital channels also broadcasting news programs vs full-entertainment digital channels



Note. The figure shows the evolution of viewing shares (prime-time) for new digital channels split into channels also broadcasting news programs (news digital) and full-entertainment (other digital channels). *Source*: authors' elaboration on AUDITEL data.

Figure A5 - Content of new digital channels: composition of total viewing shares

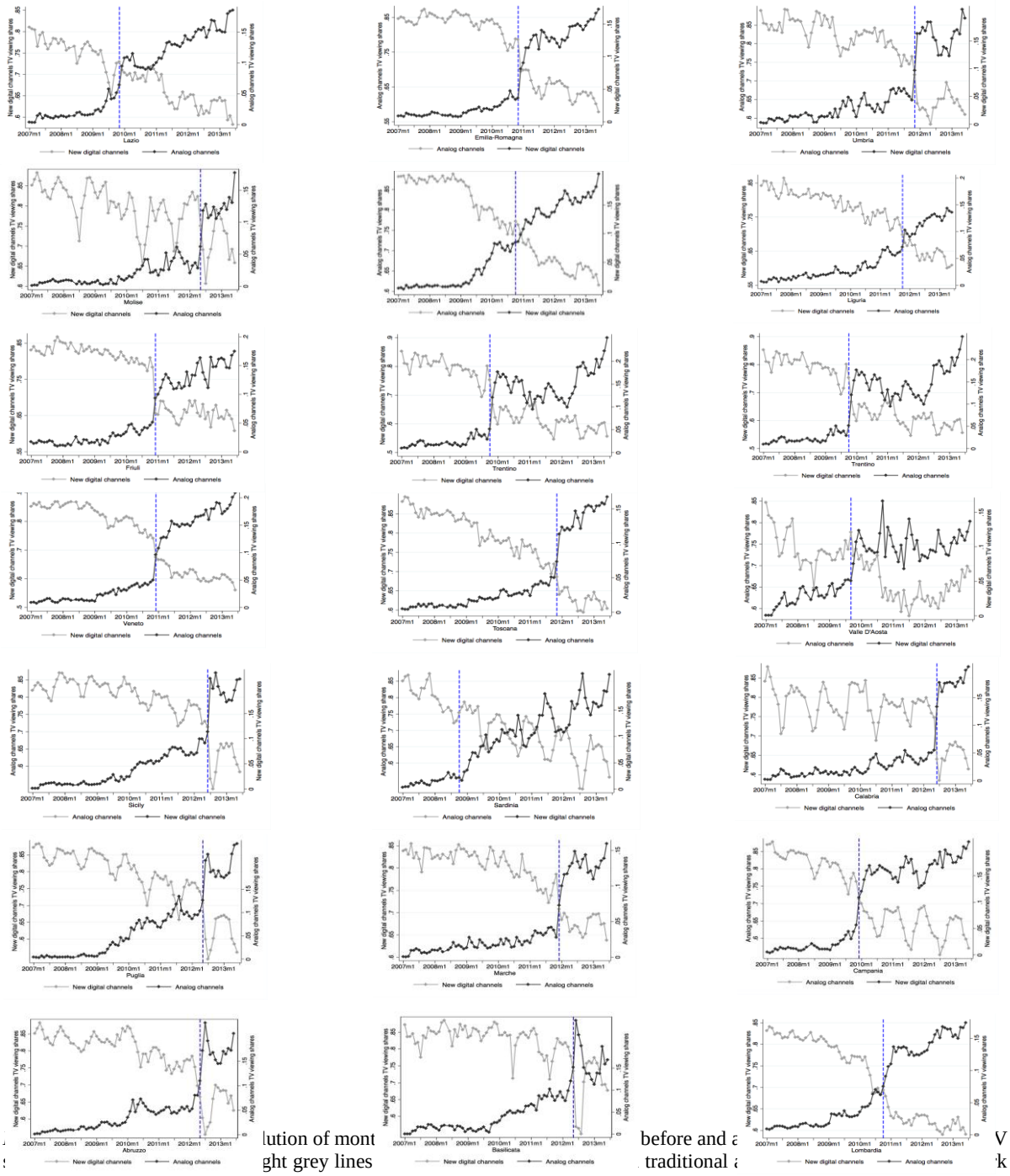


Note. The figure reports the total viewing of new digital channels divided by type of channel, for year 2010. The interpretation of the y axis scale is that, for example, almost 35% of the entire digital viewing share during year 2010 refers to digital channels broadcasting TV shows or movies.

Figure A6: Timing switch-off across Italian regions

Source: Italian Ministry of Communication.

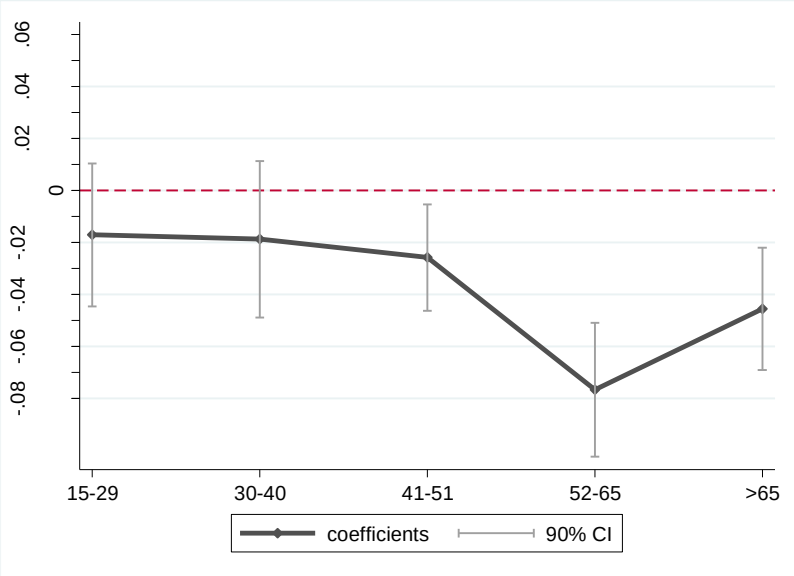
Figure A7: Prime time viewing shares around switch-off deadlines: all regions



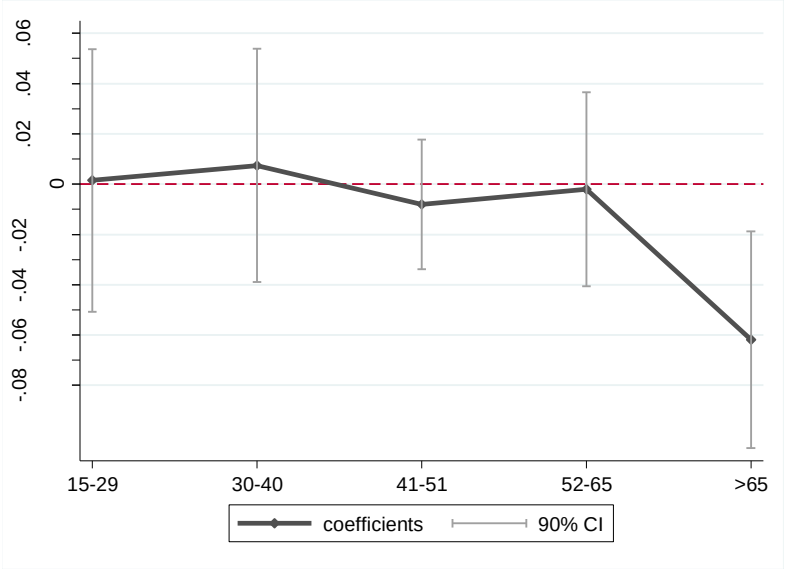
lution of mont before and a V
ght grey lines traditional a k
grey ones indicate those of new digital channels. The dashed vertical lines indicate switch-off dates for each specific region.
Source: authors' elaboration on AUDITEL data.

Figure A8 - Effect of the Digital Reform on crime perceptions: heterogeneity by gender and age groups

Panel A: Females

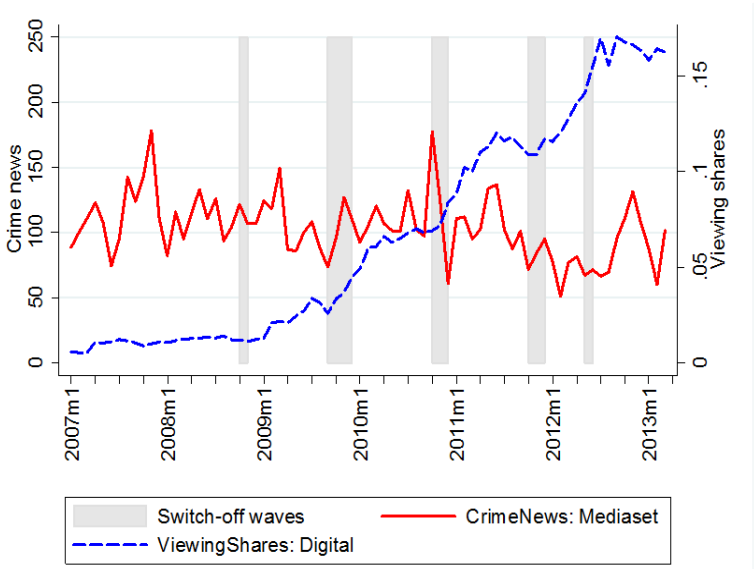


Panel B: Males



Note. The figure plots estimates and 90% confidence intervals by gender and age groups from a LPM regression of *Crime_Concern* on a post switch-over variable (*Digital_Switch)* and controls. *Crime_Concern* is an indicator for the individual reporting crime as one of the 3 priority problems in Italy. *Digital_Switch* equals the number of months (as fraction of the 8 before each survey) elapsed since region *r* experienced the switch to digital signal. The controls included are the same as those in column 10 of Table 4. In particular. Individual and family controls include: gender, age group dummies, marital status, education, set of dummies for occupational status, family size, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. The regressions include year and region fixed effects.
90% confidence intervals based on robust standard errors clustered by region are reported.

Figure A9: Crime news reporting in Berlusconi-owned channels and viewing shares of new digital channels



Note. The figure plots the average number of crime news (per month) on TV channels owned by Berlusconi (Mediaset) against the viewing shares (prime-time) of new digital channels, from 2007 to 2013. The grey shaded areas indicate different waves of switch from analogue to digital signal.
Source: authors' elaboration on AUDITEL data and Pavia Observatory data.

Table A1: Individual characteristics and TV and other media usage

	Age	Share of males	Share of tertiary educated	Share of employed
Watch TV	48.2	0.48	0.09	0.44
Never watch TV	46.4	0.50	0.14	0.54
TV watching time above mean	50.4	0.44	0.07	0.36
TV watching time below mean	45.3	0.53	0.13	0.56
Watch Rai channels	53.4	0.48	0.11	0.41
Watch Mediaset channels	44.4	0.41	0.07	0.42
Never use internet	56.3	0.43	0.03	0.31
Use internet	36.6	0.55	0.19	0.65
Never listen to the radio	56.3	0.46	0.07	0.31
Listen to the radio	43.7	0.49	0.11	0.52
Never read newspapers	49.9	0.39	0.04	0.32
Read newspapers	47.1	0.53	0.13	0.52

Note. Statistics are calculated on pre-Digital Reform sample (ADL Survey, year 2007). The other variables are indicators for individuals not using, respectively, internet, the radio and newspapers. *Watch Rai* and *Watch Mediaset* channels are indicators equal to 1 if individual's declared most watched channel is, respectively, a Rai or a Mediaset one. These two indicator variables are taken from the 2008 wave of ITANES survey.

Table A2: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max	Obs
	Individuals				
Male	0.48	0.50	0	1	139,165
Age	49	19	15	87	139,165
Married	0.60	0.49	0	1	139,165
Tertiary education or more	0.10	0.30	0	1	139,165
Employed dummy	0.43	0.49	0	1	139,165
Retired dummy	0.22	0.41	0	1	139,165
Dummy for not watching TV at all	0.05	0.21	0	1	139,165
Average daily TV watching time (minutes)	165	114	0	930	136,382
Family size	2.98	1.30	1	12	139,165
***Crime_Concern:* dummy for reporting crime as one of 3 main problems in the country**	0.57	0.49	0	1	139,165
Individuals aged <= 65	0.55				
Individuals aged > 65	0.62				
Females	0.57				
Males	0.56				
***Crime_Risk_Local:* perception of crime level in the local area**	2.01	0.90	1	4	201,923

Note. Descriptive statistics of the main estimating sample from the ADL Survey (ISTAT) for the years 2007 to 2010. The variable *Crime_Risk_Local* is available also for the years 2011 and 2012.

Table A3: Effect of Digital Reform on TV viewing shares: all time-slots

Time slot:	18:00-20:30 Prime-time news	All day	12:00-14:59 Lunch-time news	7:00-11:59	15:00-17:59	20:31-23:59
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Traditional Channels						
Digital_Switch	-0.085***	-0.085***	-0.064***	-0.120***	-0.103***	-0.078***
	(0.010)	(0.010)	(0.010)	(0.019)	(0.014)	(0.010)
F-stat: Digital Switch	73.42	68.97	43.92	41.06	52.13	62.04
Panel B: New Digital Channels						
Digital_Switch	0.064***	0.068***	0.057***	0.094***	0.086***	0.062***
	(0.007)	(0.005)	(0.005)	(0.010)	(0.006)	(0.006)
F-stat: Digital Switch	94.45	154.1	140.5	90.33	179.1	110.3
Panel C: Satellite Channels						
Digital_Switch	0.009*	0.010*	0.010*	0.009	0.009	0.009
	(0.005)	(0.006)	(0.005)	(0.008)	(0.008)	(0.008)
F-stat: Digital Switch	3.473	3.177	3.613	1.406	1.401	1.222
Panel D: Other Channels						
Digital_Switch	0.014***	0.013***	0.006	0.025**	0.020***	0.011**
	(0.004)	(0.004)	(0.004)	(0.010)	(0.006)	(0.004)
F-stat: Digital Switch	11.83	9.460	1.677	6.504	10.77	7.251
Month*year fixed effects	X	X	X	X	X	X
Region fixed effects	X	X	X	X	X	X
Observations	1,519	1,519	1,519	1,519	1,519	1,519

Note. The table reports estimates from regressions of TV viewing shares on *Digital_Switch* for different time slots during the day. The level of observation is the viewing share by channel*month*region. *Digital_Switch* equals one if the region r experienced the switch-over to digital signal at time (month) t or before. In each panel the TV viewing shares of a different group of channel is adopted as outcome variable. Month-by-year and region fixed effects are included in all regressions, as in column 3 of Table 2. Rai and Mediaset channels are indicated as Traditional channels. Robust standard errors clustered at the region level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A4: Effect of Digital Reform on TV viewing shares: by traditional channel

	(1)	(2)	(3)
Rai 1 (mean 0.23)	-0.015**	-0.013*	-0.009
	(0.006)	(0.007)	(0.006)
Rai 2 (mean 0.10)	-0.013**	-0.014**	-0.015***
	(0.005)	(0.005)	(0.005)
Rai 3 (mean 0.09)	-0.012***	-0.012***	-0.014***
	(0.003)	(0.003)	(0.003)
Rete 4 (mean 0.08)	-0.014***	-0.013***	-0.013***
	(0.003)	(0.003)	(0.002)
Canale 5 (mean 0.18)	-0.019***	-0.018***	-0.015***
	(0.005)	(0.005)	(0.005)
Italia 1 (mean 0.10)	-0.015*	-0.014	-0.014
	(0.007)	(0.008)	(0.008)
Region and Year FE	X		
Region and months*year FE		X	X
Region specific linear time trends			X
Observations	1,577	1,577	1,577

Note. The table estimates the effect of the Digital Reform on each specific channel viewing shares. Estimates are obtained from 6 separated regressions. The level of observation is the viewing share by channel*month*region. *Digital_Switch* equals one if the region r experienced the switch-over to digital signal at time *t* or before. In each panel the TV viewing shares of a different channel is adopted as outcome variable. Column 1 includes region and year fixed effects. Column 2 presents estimates conditional on region and months*year fixed effects. Column 3 also controls for region specific linear time trends. Robust standard errors clustered at the region level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A5 - Effect of Digital Reform on crime perceptions: 2 age groups

	Digital: indicator of switch-off occurred				Digital: share of months after switch-off			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Digital Switch * Aged <50	0.001	-0.000	0.001	0.001	-0.004	-0.005	-0.005	-0.006
	(0.010)	(0.010)	(0.009)	(0.012)	(0.015)	(0.015)	(0.014)	(0.014)
Digital Switch * Aged 50+	-0.033**	-0.032**	-0.031***	-0.031**	-0.048***	-0.048***	-0.048***	-0.049***
	(0.011)	(0.011)	(0.010)	(0.014)	(0.013)	(0.013)	(0.011)	(0.015)
Crime rate: all crimes			0.090				0.097	
			(0.092)				(0.091)	
Crime rate: violent & drug				0.199**				0.203**
				(0.072)				(0.075)
Crime rate: property				0.030				0.036
				(0.082)				(0.081)
Crime rate: other				-0.025				-0.024
				(0.058)				(0.057)
Individual & family controls		X	X	X		X	X	X
Region controls			X	X			X	X
Region & time fixed effects	X	X	X	X	X	X	X	X
Observations	139,165	139,165	139,165	139,165	139,165	139,165	139,165	139,165

Note. The table reports estimates of the effect of the digital switchover on perceptions about crime for two groups of individuals: those aged 15-49 and those aged 50 or above. Estimates are from a linear probability model of *Crime_Concern* on a post switchover variable (*Digital_Switch*). *Crime_Concern* is an indicator for the individual reporting crime as one of the 3 priority problems in Italy. As in Table 4, we use *Digital Switch* both as indicator (columns 1-4) and as share of months elapsed since region r switched to the digital (columns 5-8). Crime rates are calculated as logs of crimes per 10'000 individuals. Individual and family controls include: gender, age group dummies, marital status, education, family size, and set of dummies for occupational status, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. All regressions include year and region fixed effects.
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A6: Effect of Digital Reform estimated at the region level

	Digital: indicator of switch-off occurred			Digital: share of months after switch-off		
	(1)	(2)	(3)	(4)	(5)	(6)
Digital Switch	-0.020**	-0.035**	-0.030**	-0.031**	-0.038**	-0.040**
	(0.009)	(0.012)	(0.011)	(0.013)	(0.014)	(0.016)
Digital Switch * % aged 50+		-0.006*			-0.003	
		(0.003)			(0.005)	
Digital Switch * % aged >65			-0.004*			-0.005
			(0.002)			(0.004)
% aged 50+		-0.008**			-0.007**	
		(0.003)			(0.003)	
% aged >65			-0.006			-0.006
			(0.004)			(0.004)
Region time-varying controls	X	X	X	X	X	X
Region & time fixed effects	X	X	X	X	X	X
Observations	76	76	76	76	76	76

Note. The table reports results of the effect of the digital switchover on perceptions estimated at the region-year level. The outcome is the share of individuals in region r at time t reporting crime as one of the 3 priority problems. We use *Digital Switch* both as indicator (columns 1-3) and as share of months elapsed since region r switched to the digital (columns 4-6). The sample is formed by 19 regions (the number of regions in Italy minus one because in the ADL Survey the Aosta region is recorded together with Piemonte) from year 2007 to 2010. In the same table we explore the heterogeneity across age groups by interacting the Digital Switch variable with the percentage of individuals aged 50 or above (or more than 65) in region *r* at time *t*. Region time-varying controls include unemployment rate and crime rate. All regressions include year and region fixed effects.

Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A7: Effect of Digital Reform on total TV watching time

	Indicator for watching TV		TV viewing time per day (in 10 mins)	
	(1)	(2)	(3)	(4)
DigitalSwitch * Aged 15-29	-0.018**	-0.017*	0.246	0.298
	(0.006)	(0.009)	(0.342)	(0.375)
DigitalSwitch * Aged 30-49	-0.017	-0.016	-0.324	-0.272
	(0.010)	(0.011)	(0.342)	(0.351)
DigitalSwitch * Aged 50-65	-0.004	-0.003	-0.000	0.053
	(0.005)	(0.006)	(0.423)	(0.410)
DigitalSwitch * Aged >65	0.003	0.003	-0.279	-0.225
	(0.007)	(0.008)	(0.551)	(0.553)
Individual & family controls	X	X	X	X
Region time-varying controls		X		X
Region & year fixed effects	X	X	X	X
Observations	113,214	113,214	107,392	107,392

Note. The table investigates whether the switch to digital signal induced any change in the total amount of time people spend watching TV on the sample of individuals in the survey who actually report such variable. *DigitalSwitch* is the number of months (as fraction of the 8 before each survey) elapsed since region *r* experienced the switch to digital signal. Column 1 and 2 report estimates from regressions where the outcome is an indicator for the individual watching at least some TV, while columns 3 and 4 report estimates where the outcome is the average daily TV viewing time (in 10 mins) for those who watch at least some TV. Individual and family controls include: gender, age group dummies, marital status, education, set of dummies for occupational status, family size, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. The regressions include year and region fixed effects.
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A8: Effect of Digital Reform on crime and unemployment

	Unemployment share (*100)		log (Crime rate)	
	(1)	(2)	(3)	(4)
Digital Switch (indicator)	-0.245		-0.019	
	(0.340)		(0.016)	
Digital Switch (fraction)		0.118		-0.022
		(0.302)		(0.018)
Region fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Observations	114	114	114	114

Note. The table investigates whether the timing of the switch to digital signal is associated with any changes in economic variables that might themselves explain crime perceptions. We regress the unemployment rate (multiplied by 100) and the crime rate in a specific region and year on *Digital_Switch.* Crime rates are calculate as logs of crimes per 10'000 individuals. We use two versions of the variable *Digital_Switch:* a dummy that equals one if the region r experienced the switch-over to digital signal at year t or before (columns 1 and 3); the number of months (as fraction) in the calendar year to which the outcomes refers, elapsed since region *r* experienced the switch to digital signal. Observations are at the region by (calendar) year level. The regressions include year and region fixed effects.
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix B: Measuring and estimating changes in crime news exposure

Our estimates indicate that individuals tend to revise their concern about crime downward once less exposed to traditional TV channels. Because traditional channels that reported relatively more crime news were more penalized by the digital introduction we interpret our results on crime perceptions as caused by a decreased exposure to crime news. In this appendix we measure and estimate such decrease in crime news exposure. To do so we combine unique data on: a) region-specific monthly viewing shares of each TV channel during prime-time news programs; and b) the monthly amount of crime-related news items reported by each TV channel during prime-time news programs. With these two pieces of information we construct the following region*time specific measure of *exposure to crime news*:

$$Crime\_News\_Exposure_{rt} = \sum_{c=1}^{C} CrimeNews_t^c * Share_{rt}^c \quad (Eq.B1)$$

where $\mathrm{CrimeNews}_t^c$ represents the number of crime news items reported during prime-time news programs on channel c during period t; while Share_{rt}^c is the prime-time viewing share of channel c in region r during period t.[47] This weighted average delivers us the actual number of crime news items the average individual who lives in region r is exposed to at each point in time (during each month or year). Between two months, the exposure to crime news of individuals living in a specific region can vary either because the average amount of crime news broadcast changes or because of some viewing shares reallocation across TV channels characterised by different crime news reporting intensity. Next, in order to measure the effect of the Digital Reform on individuals' *exposure to crime news* we estimate the following first-stage equation:

$$\left(\sum_{c=1}^{C} CrimeNews_t^c * Share_{rt}^c\right) = \gamma_0 + \gamma_1 Digital_{Switch_{rt}} + \boldsymbol{Z}'_{rt}\theta + \gamma_r + \lambda_t + v_{rt} \quad (Eq.B2)$$

Where *t* can be either month or year and Digital_Switch is an indicator for the regions having switched to digital at time t or before.[48] Estimates are reported in Table B1. While we always include region fixed effects, from columns 1 to 4 we account for possible confounding factors due to the time

[47] The measure is the summation, over all TV channels, of the number of crime news items broadcast during the period t weighted by the region-specific viewing share in the region r during the period t.

[48] In this part of the analysis, because we often work with monthly level observations, we use the dummy measure of the digital switch rather than the fraction of months after the switch-off occurred.

dimension in different ways. More precisely, in column 1 we only include a linear time trend; in columns 2 year fixed effects; in column 3 year*month fixed effects to allow for maximum flexibility in the (common) time trend; finally, in column 4, we estimate our tighter specification by including both year*month fixed effects and region-specific linear time trends. The variation in *Crime_News_Exposure* is generated by the digital switch has to do with the reallocation of viewing shares away from traditional analogue channels and in favour of those with fewer or no crime news. [49]

Estimates in Table B1 suggest that the digital switchover induced a decrease in the exposure of individuals to crime news. The coefficients on the *Digital_Switch* indicator are always negative, remarkably stable across specifications, and very powerful in predicting changes in *Crime_News_Exposure*. They are all significant at the 1% level and the F-statistic associated with *Digital_Switch* always scores above 35 in our most complete specifications, from column 4 onward. According to these results (see column 3) the digital switchover caused a reduction in the exposure to crime news equal to 8.4 crime news items per month. This number corresponds to about 12% of the average amount of crime news individuals are exposed to during a month, thus a sizable reduction.

Table B1 - Effect of Digital Reform on crime news exposure

					No residual channels	**Yearly data**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Digital Switch	-15.895***	-8.306***	-8.436***	-8.130***	-7.783***	-8.154***
	(4.515)	(1.632)	(1.388)	(1.172)	(1.083)	(1.319)
F-stat: Digital Switch	12.39	25.92	36.92	48.16	51.64	38.23
Region fixed effects	X	X	X	X	X	X
Linear time trend	X					
Year fixed effects		X				X
Month*Year fixed effects			X	X	X	
Region-specific lin. trends				X	X	X
Observations	1,406	1,406	1,406	1,406	1,406	133

Note. The table reports estimates of the effect of the switch to digital signal on the exposure to crime news. Estimates are from regressions of *Crime_News_Exposure* on a post switch-over indicator *Digital_Switch*. The unit of observation is the TV viewing share by TV channel, month (year in column 6) and region. *Crime_News_Exposure* is the summation, over all TV channels, of the number of crime news items broadcast during period t weighted by the region-specific viewing share in the region r during period t. *Digital_Switch* is a dummy that equals one if the region r experienced the switch-over to digital signal at month (or year) t or before. F-stats of the excluded instrument are reported.
Robust standard errors are clustered by region and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

[49] In our context TV news programs are broadcast nationally, so any change over time in the amount of crime news reported is absorbed by time fixed effects.

Appendix C. Bootstrapping standard errors

Throughout our empirical analysis, we cluster the standard errors at the regional level. While allowing for intra-region serial correlation in shocks seems the most sensible approach to get correct inference in our setting, one may worry that the small number of clusters may lead to a downward bias in estimating the standard errors (Bertrand et al., 2004). We employ 19 clusters, the number of regions in Italy minus one because in the ADL Survey the Aosta region is recorded together with Piemonte. Cameron et al. (2008) recommend using the cluster-robust (Huber-White) variance estimator but prescribe using bootstrap when there are few clusters. In particular, they suggest using wild cluster bootstrap to improve finite-sample inference (see Cameron and Miller, 2015). In Appendix Table C1, we report estimates of the *Digital_Switch* treatment for individuals aged 50 years or more corresponding to columns 5-8 of Appendix Table A5. We compare the p-values obtained by clustering the standard errors with those produced by implementing wild cluster bootstrap (using an increasing number of bootstrapping repetitions: 1000, 1500 and 2000). Bootstrapped p-values are not systematically larger than those obtained from clustering and are indeed of equal size in 5 cases out of 12. The level of significance, regardless of the specification and of the number of repetitions employed, is the same between clustered and wild bootstrapped standard errors. These results suggest that in our setting the relatively low number of clusters does not seem to affect the correctness of our inference.

Table C1 – Bootstrapped standard errors

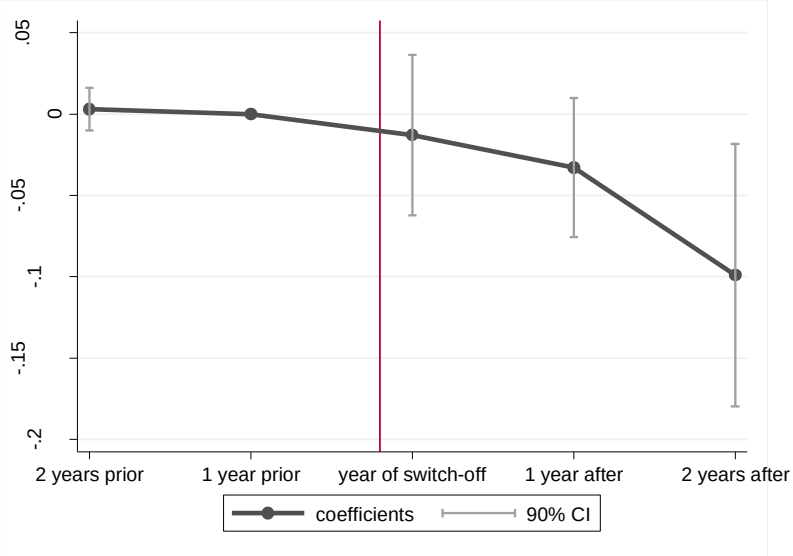
		(1)	(2)	(3)	(4)
Digital Switch * Aged 50+		-0.048	-0.048	-0.048	-0.049
		(0.013)	(0.013)	(0.011)	(0.015)
Individual & family controls			X	X	X
Region time varying controls				X	X
Region & time fixed effects		X	X	X	X
p-values clustered standard errors		0.001***	0.001***	0.000***	0.004***
p-values wild cluster bootstrap	**# replications**				
	1000	0.002***	0.002***	0.002***	0.004***
	1500	0.001***	0.001***	0.001***	0.005***
	2000	0.001***	0.001***	0.001***	0.005***
Observations		139,165	139,165	139,165	139,165

Notes. The Table replicates estimates from columns 5-8 from Appendix Table A5. P-values clustered errors are obtained by clustering the standard errors at the regional level. P-values wild cluster bootstrap are obtained by implementing wild cluster bootstrap with an increasing number of bootstrapping repetitions: 1000, 1500, 2000 (STATA command cgmwildboot is used).

Appendix D. Perceptions about local level of crime

The questionnaire asks to rate the risk of crime in the local area of residence on a scale from 1 to 4 (highest level of crime) and we use answers to such question to construct a measure of perception of the level of crime in the local area called Crime_Risk_Local. Such variable is only reported at the household level, therefore does not allow to study heterogeneous effects across individual characteristics, but is available until year 2012 enabling us to look at effects also 1, 2 and 3 years after the switchover. The estimated leads and lags effects running from two years prior to two years after the switch-off are plotted in Appendix Figure D1. Estimates show no effect of the switch-off before it actually occurred, they start to become negative right after the switch-off, and keep decreasing with time (becoming statistically significant two years after it). Perceptions about local level crime seem to take longer to respond to the change in TV diet One reason might be because individuals put larger weight on direct information when forming such perceptions while rely relatively more on secondary sources of information, i.e. news media, when forming perceptions at the national level.

Figure D1 - Timing of the effect on perceptions about local area crime



Note. The figure plots estimated coefficients and 90% confidence intervals from regression of the perception of crime level in the local area (*Crime_Risk_Local*) on a set of dummies from t-2 to t+2, where t=0 is the year when the switch-over to digital signal has occurred. The outcome variable ranges from 1 (crime absent) to 4 (crime level very high) and is collected at the household level. Individual and family controls include: gender, age group dummies, marital status, education, set of dummies for occupational status, family size, family structure, and major source of household income. Region time-varying controls include unemployment rate and crime rate. The regression include year and region fixed effects. 90% confidence intervals based on robust standard errors clustered by region are reported.