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ABSTRACT

Studying More to Vote Less: Education and Voter Turnout in Italy[*]

We use Italian municipality data on education and voter participation in national elections to estimate the effect of schooling on voter turnout. By adopting a fixed effect instrumental variable identification strategy, we find that education reduces voter turnout, more so in municipalities with higher income, lower social capital, which experienced political misconduct in the past and have low institutional quality. Analysis with individual data confirms these results. We discuss several mechanisms to rationalize our findings ranging from the opportunity cost of time to disaffection and civic protest.

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1 Introduction

Motivated by the classical paradox of voting, social scientists have investigated the reasons for individuals spend time and resources to vote in political elections, despite they know that the probability of being pivotal is negligible. As recent evidences point out that a higher voting participation is associated with more egalitarian income distribution (Mueller and Stratmann, 2003), better governance (Glaeser et al., 2007) and larger spending in welfare (Fumagalli and Narciso, 2012), understanding what pushes individuals to vote becomes even more relevant.

Education has been indicated as a positive determinant of voter turnout because more educated individuals are more aware of the issues at stake in an election, more informed, they better understand voting and registration procedures, and they may have attended courses of civics at school (Milligan et al., 2004, Dee, 2004). In this paper, we question this view and we document that in Italy the effect of schooling on voter turnout is actually negative.

While the empirical literature typically relies on individual self-reported voting, our paper takes a different approach, by exploiting administrative data on voter turnout at the municipal level in two Italian parliamentary elections held more than 10 years apart. We regress voter turnout defined at the municipal level on the average education of the municipal population. To address the problem of confounders, we add municipality fixed effects and adopt an instrumental variable strategy which relies on a series of reforms of compulsory education, akin in spirit to Milligan et al. (2004). Specifically, we instrument average education in a municipality by the average years of compulsory education assigned by law to the municipality residents. In Italy the length of compulsory education varied over time due to three reforms, enacted since the Sixties, which made compulsory education significantly longer for younger cohorts. Our instrument exploits both the variation in the length of compulsory education across cohorts, the variation

in the cohort structure across municipalities and, within municipalities, over time. An analysis with individual-level data from the Italian National Election Studies, which exploits a similar IV strategy, lends support to our central finding that additional schooling adversely affects turnout.

Italy is characterized by marked regional differences in economic development, level of social capital, crime, and quality of local institutions. We explore whether there are heterogeneous effects along these dimensions, and we find that the negative effect of education is stronger in more economically developed areas, but also in areas poorer of social capital, areas which experienced political misconduct, have high levels of crime and poor institutional quality. The latter findings are compatible with a theory according to which the most educated people, who are typically better informed and more aware of the prevailing political practices, abstain from voting as a form of civic protest. The evidence that education is associated with higher proportions of blank and invalid votes supports this conclusion.

The remainder of this paper is organized as follows. Section 2 summarizes the relevant literature. Section 3 briefly describes reforms on compulsory schooling in Italy. Section 4 introduces our data. Section 5 presents our empirical strategy. Section 6 include the main findings. A battery of robustness checks are discussed in Section 7 and the heterogeneity of education effects in Section 8. An analysis with individual data is presented in Section 9. Conclusion follows.

2   Related Literature

The relationship between education and voter participation has been explored both by political scientists and economists. Despite the central role that is commonly attributed to education in enhancing various forms of political participation, lit-

erature attempting to establish a causal relationship is rather small and provides contradictory results. Research on the U.S, (such as Milligan et al., 2004; Dee, 2004), finds that education positively affects voter participation. On the other hand, research on European advanced democracies (Pelkonen, 2012; Siedler, 2010; Milligan et al., 2004) does not find any statistically significant effect. In other institutional settings, like authoritarian regimes, Croke et al. (2016) suggest that education adversely affects political participation.

Similarly to us, Milligan et al. (2004) exploit reforms of compulsory education for identification and find a positive relationship between education and the probability of voting in the US. Interestingly, they do not find any significant effect in the UK. Dee (2004) adopts as instrumental variables the availability of junior and community colleges and changes in teen exposure to child labor laws. He confirms that in the US the link between educational achievement and voting participation is positive. To assess the robustness of the above studies, Tenn (2007) takes a different approach, which compares individuals who are about to obtain a given level of education with individuals one year older who have just attained it. The author finds no statistically significant impact of one more year of education on voting participation. This result is also confirmed by Berinsky and Lenz (2011), who exploit the temporal variation in draft procedures and the rates at which men were called to service during the Vietnam War, to assess the causal impact of higher education on political participation. Evidence with experimental data lend support to the existence of a positive link between schooling and voting in the US. For instance, Sondheimer and Green (2010) track the participants of three experiments aimed to increase educational attainment and, throughout a bivariate probit regression model, suggest that high school graduation favors a higher voter turnout.

Turning to Europe, two papers exploit reforms of compulsory education. Siedler (2010) analyzes Germany and Pelkonen (2012) studies Norway and both do not

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find evidence of a causal link between education and turnout. The latter paper is the closest to ours because the analysis is conducted both at the individual and at the municipality level.

Among developing countries, Parinduri (2016) studies Indonesia and exploits a reform of the school calendar, which increased the length of one particular school year. Also in this case there is no evidence that schooling makes individuals more likely to vote.

Croke et al. (2016) focus on Zimbabwe, an autocratic regime, and conjecture that in such institutional settings, educated citizens intentionally avoid participating in political life. Identification rests on a reform which expanded enrollment in secondary school and results confirm that education decreases the likelihood to vote.

3   Legislation on compulsory schooling

Italy passed various reforms of compulsory education in his history. In this paper, we exploit those enacted since the Sixties. In December 1962, the Law 1852 unified the previous lower secondary schools in a unique middle school and made it compulsory starting from October 1, 1963 (Brandolini and Cipollone, 2002). Accordingly, the number of years of compulsory education increased from 5 to 8.[1] This reform has been widely used as a source of exogenous variation in the literature which studies returns of education in Italy (see, for instance, Brunello et al., 2009 among others). Several papers assume that the pivotal cohort is that of 1949. Instead, according to Checchi (2003, p. 3) the reform affected individuals born after 1952. Overall, it is rather difficult to establish which was the first cohort affected by the Law. We take the stand that the pivotal cohort is 1952, i.e. pupils

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[1]Retained pupils were allowed to drop out at age 15 after at least 8 years of schooling.

aged 11 years old in 1963, who after primary education were eligible to enroll in middle school in October 1963. Two reasons justify this choice. First, individuals of earlier cohorts, who completed primary school between 1960 and 1962, but were below age 15 in 1963, were free to abandon education at the end of primary school, and many did so. Second, according to the art.5 of the Law 1852/1963 individuals aged 12, 13 and 14 in 1963 (cohorts 1951, 1950 and 1949) could be admitted to the second grade, the third grade, or the final exam respectively of the middle school, upon request. This norm implies that completing middle school was an option and not an obligation.

Years of compulsory education increased again in 1999 from 8 to 9. More specifically, students were allowed to quit after completing the second grade of the upper secondary, or at age 15, with at least nine years of schooling. The Law was abrogated in 2003 and compulsory education reverted to 8 years. Accordingly, the reform of 1999 affected only few cohorts. In our empirical strategy, we follow Brilli and Tonello (2014) and Vergolini and Raimondi (2017), who suggest that the affected cohorts were those born between 1985 and 1988.

Three years later, the Law 296/2006 extended compulsory education again, this time to 10 years, and also increased the minimum leaving age to 16 years, starting from the academic year 2007/2008. In this case, the pivotal cohort is that born in 1993, corresponding to students aged 14 in 2007. Figure 1 summarizes how these reforms changed the length of compulsory education across cohorts.

4 Data

We use data on voter turnout in the national parliamentary elections held in 2001 and 2013 by municipality, matched with census data from 2001 and 2011, which provide detailed information on education and the age structure of the resident

population, by municipality.[2] In general elections, Italian citizens vote for both the Chamber of Deputies (lower house) and the Senate of the Republic (upper house). The minimum voting age is 18 for the lower house and 25 for the upper house. In parliamentary elections only Italian citizens have the right to vote, while immigrants who reside in Italy, but who are not citizens, are excluded. Voting by post is not allowed[3] and voters who live in a municipality other than that of legal residence are required to move into the latter to cast their ballot. The electoral rule was majority voting with a proportional correction in 2001 and proportional voting with a majority premium in 2013. Both electoral rules induced parties to form large coalitions and can be roughly assimilated to majority voting.[4]

We focus on the lower house and voter turnout is defined as the share of voters out of all the eligible voters. Data are drawn from the Archivio Storico delle Elezioni of the Ministry of Interior.

Italy has traditionally had high levels of voter turnout, although declining since the Nineties. In our sample, the average turnout declined from 80.9 percent to 75.7 percent between 2001 and 2013. Figure A1 provides a visual description of voter turnout across municipalities and over time.

Since concurrent local elections might alter voter turnout, we identify municipalities in our sample who held local election the same day of the national elections. In 2001, 963 municipalities had municipal elections, while in 2013 the regions of Lombardy, Molise and Lazio had regional elections.

Counts of the population in voting age by level of education and municipality are not publicly available and have kindly been provided by ISTAT. From these data we compute the average years of education of the population aged 18+ by

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[2]Parliamentary elections were also held in 2006 and 2008. We focus on the elections which are closest to the census years.

[3]The only exception are Italian citizens living abroad who vote for reserved parliamentary seats.

[4]Aosta Valley and Trentino Alto Adige regions, which host large linguistic minorities, adopted different rules and therefore are excluded from the analysis.

municipality and year.[5] Unfortunately, such counts are missing when only 3 or less residents attained a given education level.[6] To avoid measurement errors, which are a concern especially for the many small municipalities in the sample, we keep only those municipalities for which we have data for all levels of education attainment. This choice is not without cost as it reduces our sample from about 8000 to 5861 municipalities.

Average education increased significantly from 2001 (average: 8.4 years) to 2011 (average: 9.4 years), as shown in Figure A2. Several reasons explain this variation: 1) older cohorts with lower education were replaced by younger cohorts who are better educated; 2) the size of old and new cohorts is different; 3) a significant proportion of individuals aged between 18 and 25 in 2001 acquired additional education by 2011; 4) mortality varies by cohort, education, and municipality; 5) a small percentage of adult individuals acquired further education between 2001 and 2011; 6) the pattern of selective internal migration, whereby the more educated tend to flow towards more economically advanced areas, may have changed over time.

We also define an alternative measure of education, based on census data, namely the share of individuals aged 19 and over with at least upper secondary education[7] Table A1 in appendix presents in detail data sources and the definition of the main variables. Table 1 provides the main descriptive statistics for the data at use, by year.

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[5]Average education refers to the residing population while voter turnout is calculated over the pool of citizens which excludes most immigrants. Although immigration in Italy is lower than elsewhere, it increased from 2.3 percent in 2001 to 7.4 percent in 2013 and it is much higher in the more developed North and Centre than in the South. Generally, immigration in Italy is low skilled (Bratti and Conti, 2014) so that average education in the residing population is lower than among citizens.

[6]The reported levels of education are: less than primary, primary, lower secondary, short upper secondary programs of 2 or 3 years, long upper secondary programs of 4 or 5 years, three-year tertiary degree, and 4 or 5-year bachelor.

[7]Age 19 is the age at which students are expected to conclude upper secondary school.

5 Empirical strategy

To estimate the impact of schooling on voter turnout, we employ a fixed effect instrumental variable (FE-IV) strategy. Our baseline specification is:

$$T_{mt} = \theta_m + \gamma_{pt} + \alpha_1 Edu_{mt} + \alpha_2 L_{mt} + X_{mt}\beta + \varepsilon_{mt} \tag{1}$$

where T_{mt} is voter turnout at municipality m at time t, Edu_{mt} is average education (either mean years of education or the proportion of individuals with at least an upper secondary degree), and θ_m are municipality fixed effects. Province by time fixed effects are denoted by γ_{pt}, and X_{mt} are municipality-by-time controls, namely the share of females and the presence of concurrent elections. Variable L_{mt} is the proportion of individuals in working age (18-64) and serves to control for the time-varying age structure of the municipal population.[8] Province-by-time fixed effects play an important role in our analysis. First, they flexibly account for the change in electoral rules occurred between 2001 and 2013, which might have altered voter turnout depending on the level of political competition at the local level. Second, they capture the effect of the Great Recession, which was particularly acute in Italy since 2009, and hit stronger the industrial areas. The Great Recession was largely responsible for the rising discontent among Italians and for the support to the anti-establishment Five-Stars Movement, born in 2009. Third, they account for the differential increase in the share of immigrants, much higher in the more economically dynamic North and the Centre than in the South, which has been shown to affect both voter turnout and voting for the extreme right (Barone et al., 2016).[9] Despite all controls, the key explanatory variable Edu_{mt}

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[8]When schooling is measured by the share of individuals aged 19+ with at least an upper secondary degree, all controls refer to the population aged 19 and over.

[9]To address the problem that average education is computed over the residing population while voter turnout is defined over the pool of citizens, we experimented a specification which includes the share of immigrants at the municipal level among the controls, despite this is likely an endogenous variable. Reassuringly, results did not qualitatively change.

can be endogenous if there exist time-varying unobservables at the municipality level, which affect both education and voting. For instance, average cognition may change over time within the same municipality for purely random reasons. Alternatively, shocks on the labour market might have induced more residents to acquire additional education and can have simultaneously altered voting participation. A localized industrial downturn, with mass layoffs and rising unemployment, may induce the younger cohorts to stay longer at school, waiting for better conditions on the labour market and, simultaneously, boost political participation and turnout as a mean of protest or to obtain an intervention from the government (Incantalupo (2015), Aytaç and Stokes (2019, p. 107)). In this case the OLS bias would be positive and large.[10] To address this concern, we instrument Edu_{mt} by $MYCS_{mt}$, the average years of compulsory schooling of the population aged 18 and over in municipality m at time t. Formally:

$$MYCS_{mt} = \sum_{a=18}^{100} CS_{at}\pi_{amt}$$

$$\sum_{a=18}^{100} \pi_{amt} = 1 \text{ for each } t = 2001, 2011$$

where CS_{at} is the number of compulsory years of education for individuals of age a at time t, and π_{amt} is the proportion of municipal population which is aged a at time t, for $a = 18...100$. Jointly the vector of proportions π_{amt} represents the age structure of the municipal population.[11] The latter varies across municipalities, because of differences in fertility and mortality, and over time because the age structure of the population changes. For instance, it is well known that population is aging in most Italian municipalities, implying that population age structure gets more right-skewed. Also CS_{at} varies over time, because age a in 2001 and

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[10]A small increase in municipal average education, due to the educational choice of relatively few young cohorts, is associated with large variations in turnout.

[11]To be consistent, the instrument is defined over the population aged 19+ when the alternative measure of education is analyzed.

in 2011 corresponds to two cohorts 10 years apart. For instance, individuals aged 55 in 2001 belong to cohort 1946 and were expected to stay at school at least 5 years, while individuals aged 55 in 2011 belong to cohort 1956 and had acquired education for at least 8 years. Similarly, compulsory education of individuals aged 18 in 2001 (cohort 1983) was 8 years, while that of their peers in 2011 (cohort 1993) was 10 (see Figure 1).

While the parametrization in terms of age is convenient and it is the one we adopted throughout the paper, because the support of the age distribution remains constant over time, the link between reforms of compulsory education and the instrument can also be appreciated if one reasons in terms of cohorts. At a given point in time, the cohort structure of the population varies across municipalities due to differences in past demographic trends. The cohort structure also varies over time for two reasons: 1) older cohorts disappear while new cohorts enter; 2) relative cohort sizes change over time as older cohorts shrink due to higher mortality. This implies that the effect of each reform on the average years of compulsory education varies across municipalities, depending on the size of the cohorts affected by the reform, and over time, due to variations in the cohort structure of the population.

Two final remarks are worth making. First, given the inclusion of municipality and time fixed effect, it is the municipality-by-time component of the instrument which identifies our IV procedure. Second, in model (1) we parsimoniously control for the age structure of the municipal population by including L_{mt}. This is to neutralize the possible correlation, within-municipality, between instrument and age structure. Specifications which control more finely for age structure are discussed later, but we anticipate that results are unaffected.

6 Results

For reference, we start by estimating model (1) with municipality fixed effects without instrumenting. In Table 2, columns (1) and (3) report results for both measures of municipal education. Fixed effect estimates are positive, but small and only marginally significant at the conventional levels. In particular, results in column (1) suggest that one additional year of average education increases voter turnout by 1.1 percentage points.

The corresponding IV estimates reported in column (2) and (4) contradict these findings. One additional year of average education reduces voter turnout by 7.2 percentage points, while 10 additional percentage points in the proportion of residents with high education reduce voter turnout by 5.3 percentage points.[12]

In interpreting these results we remark two points. First, FE and IV estimates should be compared with care. While the former has the nature of an ATT (average treatment effect on the treated), the interpretation of the latter is that of a LATE effect (local average treatment effect), which captures the effect of education among compliers. We shall return on this point later.

Second, a unitary increase in mean years of education does not (typically) correspond to a uniform unitary increase among all residents. Rather, in most cases, it corresponds to situations where the variation in individual education can be very heterogeneous. Hence the estimates derived from our municipality-level analysis can be compared with the estimates at the individual level discussed in the literature (and below in Section 9) only under the strong hypothesis that the relationship between education and voting turnout is linear over the entire support of education.

Turning to the instrument, the reported F statistics suggest that it is not weak.

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[12]Alternatively, one standard deviation increase in the average years of education decreases voter turnout by 5.7 percentage points, and one standard deviation increase in the share of individuals with at least an upper secondary degree decreases voter turnout by around 4.2 percentage points.

The large figures (162.9 and 139.7) partly reflect the fact that both the endogenous variable and the instrument embodies the municipality age structure. When we weaken this tie (see the following Section 7) the instrument remains strong with F statistics well above 10.

7   Robustness checks

In this section we discuss four robustness checks. First, we replace L_{mt}, the share of working-age population, with the shares of the municipal population in 12 age bins, from 18-25 to 75 and over, average age[13] and the interaction between average age and a time dummy. Formally we estimate the following model:

$$T_{mt} = \theta_m + \gamma_{pt} + \alpha_1 Edu_{mt} + \sum_{b=1}^{12} \delta_b \pi_{bmt} + X_{mt}\beta + \varepsilon_{mt} \tag{2}$$

Where π_{bmt} is the proportion of individuals in the age bin b in the municipality m at time t. In a more detailed specification we replace L_{mt} with the full vector of shares $\pi_{18mt}...\pi_{100mt}$. Estimates are reported in columns (1) and (2) of Table 3 respectively, and are in line with baseline results, although standard errors get larger, likely because the additional controls increase the level of model multi-collinearity. However, it is reassuring that the F-statistic remains largely above the rule of thumb of 10 also in the most fine-grained specification.

Second, to better account for local shocks, we replace province-by-time fixed effects with local labor market-by-time fixed effects. The results of this specification are reported in column (3) of the Table 3 and confirm our central finding.

Third, we address the concern that the age structure of the population used to build the instrument might be correlated with shocks at the municipal level, by using the age structure prevailing in each municipality 5 and 10 years earlier.

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[13]Computed over the population aged 18+

Formally, instrument $MYCS_{mt}$ is now defined as:

$$MYCS_{mt} = \sum_{a=18}^{100} CS_{at}\pi_{am,t-k}$$

$$\sum_{a=18}^{100} \pi_{amt-k} = 1 \text{ for } t = 2001, 2011 \text{ and } k = 5 \text{ or } k = 10$$

In both cases, the F test suggests that the instrument is not weak, and our basic findings are confirmed and actually reinforced (Table 4).

Fourth and last, to ensure that our estimates are not driven by any province in particular, we estimate the baseline model by excluding one province at the time. The results are robust, statistically significant at 1 percent, and the point estimate range from [-0.079, -0.063]. Results are robust also when we omit one electoral district at the time. In this case, point estimates range from [-0.084, -0.0597].

8 Heterogeneous Effects

Italy is characterized by sharp regional differences in income levels, quality of local institutions, and social capital, among others. Disparities are observed also in voter participation. Figure 2 shows voter turnout across Italian municipalities in the parliamentary elections of 2001. Centre-North municipalities have higher levels of voter turnout. In our sample, mean voter turnout of municipalities in the Centre-North is around 85 percent in the elections of 2001 and 79 percent in 2013, compared to 73 percent and 67 percent respectively in the South.

To shed light, on how the relationship between schooling and participation in elections is affected by local characteristics, we extend model (1) by including, in turn, interaction terms between education and a specific pre-determined and time-invariant characteristic, namely social capital, income per capita, political

malfeasance, crime, and quality of local institutions.[14]

8.1 Data and definitions

To explore heterogeneity, we use indicators drawn from various sources. As regards social capital, the literature proposes a variety of proxies. Among them, our preferred are generalized trust and blood donations. Generalized trust is constructed from waves 2 and 3 of the European Values Study conducted in the 1990s (EVS, 2015). Generalized trust is defined as the fraction of the individuals answering "Most people can be trusted", by region. Blood donations correspond to the number of blood bags collected by AVIS per million inhabitants in 1995, by province. Data are from Guiso et al. (2004). Charges of malfeasance refer to the fraction of deputies who received at least one request to remove parliamentary immunity (RAP) between 1948 and 1994 (during the legislatures from I to XI), by electoral district. We derive it from the dataset of Golden (2007).

Crime level is an index derived from a principal component analysis, including the mafia index from Calderoni (2011) and crime rates against the person, the property, and the State, and other crimes per 100,000 inhabitants in year 2000, by province (from ISTAT).

As a proxy for the quality of local institutions, we employ three measures - judicial inefficiency, corruption, and public good provision. Judicial inefficiency data are from Guiso et al. (2004) and refer to the number of years necessary to complete a trial. Corruption is measured through the Golden Picci index (Golden and Picci, 2005), who propose a measure of corruption based "on the difference between the amounts of physically existing public infrastructure and the amounts of money cumulatively allocated by government to create these public works." The larger

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[14]The interaction between education and each local characteristic is instrumented by the interaction between $MYCS$ and the same characteristic. Moreover, we include among the controls interaction terms between the local characteristic and the share of the population in the working-age to increase model flexibility.

this difference, the larger corruption. Finally, public good provision refers to the endowment of economic infrastructures of the Italian provinces in 1997 measured by Ecoter (2000). We normalize all these variables in the unitary interval, where 0 and 1 corresponds, respectively, to the minimum and the maximum observed value.

8.2   Findings

To begin with, we explore possible heterogeneous effects between rural and urban areas and Centre-North vs. South regions. In column (1) of Table 5, we report that one additional year of education decreases voter turnout by 6.4 percentage points in urban areas and by 8.2 percentage points in rural areas. Moreover, the marginal effect of education is negative, but small and not statistically significant in the Centre-North regions, and as high as 16 percentage points in South regions (column (2) of Table 5).

Turning to social capital (Table 6), the effect of education decreases in absolute value as social capital increases. In particular where the level of generalized trust is high, the effect of education disappears (column (1) of Table 6), and surprisingly, it gets even positive in municipalities where blood donations are more frequent (column (2) of Table 6). Column (3) of the Table 6 shows that the marginal effect of education is larger in absolute value in richer municipalities and ranges between -5.4 percentage points in areas with low GDP per capita to -8.7 percentage points in richer areas.

Charges of wrongdoing reinforce the negative effect of education. In particular, as displayed in column (1) of Table 7, when the fraction of deputies subject to a criminal investigation reaches its maximum, the effect of education turns to be as large as -19.8 percentage points. Similarly, education discourages voting more strongly in areas with high criminality (column (2) of Table 7).

The quality of institutions also modifies the effect of education. We find consistent results across the three indicators we consider: the effect of education is stronger (more negative) in municipalities where the judicial system is more inefficient, where corruption is higher and where infrastructures are underdeveloped (Table 8).

Overall, these results suggest several possible explanations for the negative effect of education on voter turnout. On the one hand, in areas where civism is stronger, education counts less for voter turnout. Citizens are pro-social, are engaged in social activities and political participation is widespread, regardless of education. Likely, in these areas, students even learn civism at school. On the other hand, rather unsurprisingly, where returns to education are higher, and so the opportunity cost of time is larger (that is, in areas with higher GDP per capita), the negative effect of education is stronger.

The modifying effects on misbehavior, crime, and institution quality suggest another explanation, that more educated individuals, the ones who are more aware and informed, complain against the political class by not showing up at the polls, a sort of civic protest. They are disaffected with politics, understand that politics is responsible for the poor performance of institutions, and do not want to legitimize the current political class by participating to elections.

We find some indirect support to this conjecture. We test whether there is an effect of education on the proportion of blank ballots and the sum between blank and invalid ballots.[15] Table 9 shows that, as expected, both outcomes increase by respectively 3.3 and 3.4 percentage points for a unitary increase in voters' average education. Relative to an average proportion of blank and invalid votes of about 6.5 percent in the sample, these effects are quite large.

On the other hand, our results do not support an alternative explanation based on internal selective migration. Suppose that many well educated individuals move

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[15]Invalid ballots are often too few to allow for a separate analysis.

to more developed areas, which offer better labour opportunities, without simultaneously changing their legal residence. To them, voting would be costly and time consuming, because they have to return to the municipality where they grew up to be able to cast their vote. Then, in the more disadvantaged areas, we should observe a stronger (not weaker, as we find) effect of education on turnout, because many of the more educated who are listed in the official registry do not actually live there and do not vote.

We mentioned that our IV estimates have the nature of LATE effects, that is of the average effect among the subset of compliers.[16] In our context, compliers are those individuals who acquired more education only because compulsory education expanded, and would not otherwise. In particular, the compliers affected by the reform of 1963 took three additional years of schooling, they attended one hour of civics a week[17] and added relatively advanced notions of Italian literature, maths and history to the basic skills learned at primary school. These notions might have significantly reinforced these citizens' ability to elaborate information, perceive, understand and, eventually, feel anger for politicians' misconduct.

9   Individual level analysis

To make our analysis comparable with earlier research, we turn to individual self-reported data, despite concerns about misreported voting behavior. We rely on the Italian National Election Studies (Itanes), a survey designed as a repeated cross-section, which is carried out soon after any general election, and which includes information on individuals' voting behavior, demographics, educational attainment, and a few other controls. We use data collected after the parliamentary

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[16]There is evidence that, particularly in the South, the reform of 1963 took years to be fully implemented. Hence, we cannot exclude the existence of a group of "never takers".

[17]Introduced since 1958 in all lower and upper secondary schools.

elections of 2001, 2006 and 2008 [18] leaving out the wave collected after the election of 2013 which, according to Itanes itself, is nonrepresentative of the population, especially as regards education and age. Our working sample counts 9322 individuals. Table 10 displays key summary statistics and shows, interestingly, that voter turnout is 92.9 percent, well above the levels of voter participation in Italy in the same period, which, according to official data, were about 82 percent. This fact alone confirms our suspicion that self-reported data suffer from sizable measurement error and that individuals tend to over-report vote participation, likely to please the interviewer.

Interestingly, Figure 3 suggests that self-reported turnout varies little by cohort, both in 2001 and 2008, and we do not observe marked negative cohort trends, as it is the case, for instance, in the UK, where the 18-24 vote systematically less than more senior citizens (Pickard, 2019).

We define a linear probability model defined as:

$$T_{it} = \alpha_0 + \theta_r + \gamma_{rt} + \alpha_1 Edu_{it} + X_{it}\beta + \varepsilon_{it} \tag{3}$$

where T_{it} is a dummy variable equal to 1 if individual i at time t declares of having voted in the national election and zero otherwise. The main explanatory variable Edu_{it} is years of education, θ_r are region dummies, γ_{rt} are region by time fixed effects and X_{it} are individuals specific controls, including gender and a quadratic polynomial in the year of birth, which accounts for possible cohort-effects. We instrument Edu_{it} by the years of compulsory schooling to which individual i was subjected, depending on his or her cohort. Specifically, instrument variation depends on the reforms of 1963 and 1999.

Table 11 shows that the effect of education is positive and very small when estimated by OLS and negative when estimated by IV. These results confirm our

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[18]The electoral rule for the elections of 2006 and 2008 was the same as in 2013, proportional voting with a majority premium.

findings based on municipality data, although estimates based on individual and municipality data may not be fully comparable, as we have remarked above.

10   Conclusions

We have analyzed the effect of education on voter turnout in Italy, a country with low barriers to voting participation, but characterized by a marked political instability, frequent general elections, and sustained political malfeasance in the recent past. We have exploited administrative data at the municipality level, free of measurement error, and have relied on a series of reforms of compulsory education to identify causal effects. We have found a sizable negative effect of education on voter turnout. A one year increase in average municipal education causes voter turnout to decline by 7.2 percentage points. The result passes several robustness tests and is confirmed when the analysis is conducted on self-reported individual data.

With the exception of autocratic countries, our findings contrast both with the positive effects of education documented in the US and the absence of effect in Northern Europe, despite the identification strategies are comparable. Such difference does not seem due to possible measurement errors, which might plague self-reported individual data, because we do find a negative effect of education in Italy even when we replicate the analysis on survey data. We believe instead that our results depend on the specific Italian context, which was rather peculiar during the study period between 2001 and 2013. In Italy there were, and to a large extent there are, widespread negative feelings and mistrust towards politics and politicians, after the scandal of corruption uncovered by the famous "Many Pulite" judicial investigation in the Nineties.

To shed light on the possible mechanisms, we have explored several dimensions of heterogeneity. We have found that the negative effect is stronger in South munic-

ipalities and rural areas, weaker in areas rich of social capital, but stronger again in the more economically developed localities. Moreover, the negative effect of education is reinforced by past records of political misconduct, high levels of crime and poor institutional quality. These results support the hypothesis that more educated people, who are more informed and more aware of the political practice, choose to abstain from voting to express their discontent and protest. By abstaining, they refuse to legitimize the political class. This conclusion is credited by the result that a unitary increase in average education causes the proportion of blank and invalid votes to increase by 3.4 percentage points, which corresponds to an increase of over 50 percent from the sample mean.

The implication of these findings is worrisome. If the more educated withdraw from political participation, contents will be replaced by cheap talk in the political debate, and the democratic institutions might be captured by populisms and easy propaganda.

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Tables

Table 1: Descriptive Statistics - Municipality level data.

	2001		2011(2013)	
	mean	sd	mean	sd
Voter turnout	0.809	0.0974	0.757	0.0709
Mean years of education	8.412	0.621	9.399	0.624
Upper secondary education	0.271	0.0645	0.357	0.0686
Share of female	0.528	0.0312	0.534	0.0294
Concurrent elections	0.164	0.371	0.270	0.444
Working-age population (18-64)	0.763	0.0553	0.744	0.0483
Observations	5861		5861	

Note: Municipality level data. *Voter turnout* is defined as the share of eligible voters who cast a ballot in parliamentary elections of 2001 and 2013 (source: Ministry of Interior). *Concurrent elections* is a dummy which takes 1 if the municipality voted for a local election the same day of national elections (source: Ministry of Interior). *Mean years of education* is the average years of schooling in the population aged 18+. *Upper secondary education* is the proportion of residents with at least an upper secondary degree over the population aged 19+. *Share of females* is the proportion of females aged 18+. *Working-age population* is the share of the population aged 18-64. These variables are based on 2001 and 2011 census data provided by ISTAT.

Table 2: Education and voter turnout

	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
dep. var.: Voter turnout				
Mean years of education	0.0111*	-0.0722***		
	(0.006)	(0.022)		
Upper secondary education			0.0170	-0.533***
			(0.040)	(0.193)
Municipality FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes	Yes
Observations	11722	11722	11722	11722
R^2	0.894	0.885	0.894	0.889
N. clusters	5861	5861	5861	5861
F-Test of Excl. IV		162.9		139.7

Note: The dependent variable is voter turnout. Explanatory variable in column (1) and (2) is mean years of education in the population aged 18+. Explanatory variable in columns (3) and (4) is the share of individuals aged 19+ with at least an upper secondary degree. Other controls include: share of females, concurrent elections and share of the population in working age. In columns (3) and (4) we control for the share of females aged 19+ and the share of the population aged 19-64. Standard errors clustered at the municipality level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Alternative specifications

	IV	IV	IV
	(1)	(2)	(3)
dep. var.: Voter turnout			
Mean years of education	-0.0923*	-0.0738	-0.0416**
	(0.049)	(0.045)	(0.021)
Municipality FE	Yes	Yes	Yes
LLM - Time FE	No	No	Yes
Time FE	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes
Province-Year FE	Yes	Yes	No
Observations	11722	11722	11664
R^2	0.886	0.892	0.924
N. clusters	5861	5861	5832
F-Test of Excl. IV	38.92	35.31	135.6

Note: The dependent variable is voter turnout. In column (1), the share of working-age population is replaced with the population shares in 12 age bins, from 18-25 to 75 and over. In column (2), the share of working-age population is replaced with the population shares for all age years between 18 and 100. In column (3), province-by-time fixed effects are replaced with the finer local labor market by time fixed effects. Others controls are: share of females, concurrent elections, average age of the population 18+, and average age – by – time in columns (1) and (2) only. Standard errors clustered at the municipality level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Robustness checks - alternative definition of the instrument

	IV	IV
	(1)	(2)
dep. var.: Voter turnout		
Mean years of education	-0.132*	-0.0949**
	(0.070)	(0.040)
Municipality FE	Yes	Yes
Time FE	Yes	Yes
Other Controls	Yes	Yes
Province-Year FE	Yes	Yes
Observations	11714	11720
R^2	0.868	0.880
N. clusters	5857	5860
F-Test of Excl. IV	10.35	39.59

Note: The dependent variable is voter turnout. Column (1) reports IV estimates when the population age structure used to defined the instrument is 10 years lagged ($k = 10$). Column (2) reports IV estimates when population age structure is 5 years lagged ($k = 5$). Standard errors clustered at the municipality level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Education, urbanization, and north-south dimension

	IV	IV
	(1)	(2)
dep. var.: Voter turnout		
Mean years of education	-0.0640***	-0.0311
	(0.022)	(0.021)
Mean years of education x rural	-0.0178***	
	(0.003)	
Mean years of education x south		-0.130**
		(0.061)
Municipality FE	Yes	Yes
Time FE	Yes	Yes
Other Controls	Yes	Yes
Province-Year FE	Yes	Yes
Observations	11722	11722
R^2	0.887	0.874
N. clusters	5861	5861
F-Test of Excl. IV Mean years of education	87.31	82.88
F-Test of Excl.IV Mean years of education x rural	5585.6	
F-Test of Excl.IV Mean years of education x south		21.77

Note: The dependent variable is voter turnout; *rural* is a dummy which takes 1 for rural municipalities; *south* is a dummy which takes 1 for municipalities located in South Italy. In column (1) controls include an interaction between share of population in working age and the dummy rural, while in column (2) an interaction between share of population in working age and the dummy South. Other controls are: share of females, concurrent elections and share of the population in working age. Standard errors clustered at the municipality level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Education, voter turnout, social capital and income

	IV	IV	IV
	(1)	(2)	(3)
dep. var.: Voter turnout			
Mean years of education	-0.180***	-0.151***	-0.0543**
	(0.067)	(0.053)	(0.024)
Mean years of education x generalized trust	0.173**		
	(0.081)		
Mean years of education x donation		0.266**	
		(0.110)	
Mean years of education x GDPpc			-0.0326***
			(0.012)
Municipality FE	Yes	Yes	Yes
Time FE	Yes	No	No
Other Controls	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes
Observations	11722	11572	11722
R^2	0.880	0.878	0.887
N. clusters	5861	5786	5861
F-Test of Excl. IV Mean years of education	89.10	99.23	81.65
F-Test of Excl.IV Mean years of education x generalized trust	95.55		
F-Test of Excl.IV Mean years of education x donation		104.6	
F-Test of Excl.IV Mean years of education x GDPc			745.9

Note: The dependent variable is voter turnout. Variables *generalized trust*, *donation* and *GDPpc* have been normalized in the interval [0,1] and interacted with Edu_{mt}. In column (1) controls include an interaction between the share of population in working age and the *generalized trust*; in column (2) an interaction between the share of population in working age and *donation*; in column (3) an interaction between the share of population in working age and *GDPpc*. Other controls are: share of females, concurrent elections and share of the population in working age. Standard errors clustered at the municipality level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Education, voter turnout, charges of malfeasance and crime

	IV	IV
	(1)	(2)
dep. var.: Voter turnout		
Mean years of education	0.0242	0.0263
	(0.037)	(0.045)
Mean years of education x RAP	-0.223**	
	(0.111)	
Mean years of education x Crime		-0.279**
		(0.139)
Municipality FE	Yes	Yes
Time FE	Yes	Yes
Other Controls	Yes	Yes
Province-Year FE	Yes	Yes
Observations	11722	11722
R^2	0.872	0.873
N. clusters	5861	5861
F-Test of Excl. IV Mean years of education	93.84	109.4
F-Test of Excl.IV Mean years of education x RAP	63.53	
F-Test of Excl.IV Mean years of education x crime		90.50

Note: The dependent variable is voter turnout. Variables RAP (request to remove parliamentary immunity) and *crime* (degree of mafia infiltration) have been normalized in the interval [0,1] and interacted with Edu_{mt}. In column (1) controls include an interaction between the share of population in working age and RAP; in column (2) an interaction between the share of population in working age and *crime*. Other controls are: share of females, concurrent elections and share of the population in working age. Standard errors clustered at the municipality level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Education, voter turnout, judicial inefficiency, corruption and infrastructure

	IV	IV	IV
	(1)	(2)	(3)
dep. var.: Voter turnout			
Mean years of education	0.0192	0.0589	-0.256***
	(0.035)	(0.042)	(0.079)
Mean years of education x judicial inefficiency	-0.292**		
	(0.124)		
Mean years of education x corruption index		-0.281**	
		(0.117)	
Mean years of education x infrastructure			0.372***
			(0.122)
Municipality FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes
Observations	11572	11722	11722
R^2	0.869	0.861	0.863
N. clusters	5786	5861	5861
F-Test of Excl. IV Mean years of education	82.66	108.7	102.0
F-Test of Excl.IV Mean years of education x judicial inefficiency	66.68		
F-Test of Excl.IV Mean years of education x corruption index		80.18	
F-Test of Excl.IV Mean years of education x infrastructure			108.0

Note: The dependent variable is voter turnout. Variables *judicial inefficiency, corruption index* and *infrastructure* (endowment of infrastructures) have been normalized in the interval [0,1] and interacted with Edu_{mt}. In column (1) controls include an interaction between the share of population in working age and *judicial inefficiency*; in column (2) an interaction between the share of population in working age and *corruption index*; in column (3) an interaction between the share of population in working age and *infrastructure*. Other controls are: share of females, concurrent elections and share of population in working age. Standard errors clustered at the municipality level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Education, blank and invalid ballots

	Blank ballots	Invalid ballots
	(1)	(2)
Mean years of education	0.0331***	0.0344***
	(0.007)	(0.008)
Municipality FE	Yes	Yes
Time FE	Yes	Yes
Other Controls	Yes	Yes
Mean of outcome	0.0341	0.0659
Province-Year FE	Yes	Yes
Observations	11722	11722
R^2	0.900	0.914
N. clusters	5861	5861
F-Test of Excl. IV	162.9	162.9

Note: IV estimates. The dependent variable in column (1) is the share of voters casting a blank ballot. The dependent variable in column (2) is the share of voters casting a blank or an invalid ballot. Other controls are: share of females, concurrent elections and share of population in working age. Standard errors clustered at the municipality level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Descriptive statistics - Itanes survey

	mean	sd	min	max	p50
Voter turnout	0.929	0.257	0	1	1
Years of education	9.949	3.838	0	17	8
Female	0.503	0.500	0	1	1
Year of birth	57.08	17.37	5	90	58
Year of birth (sq)	35.60	19.68	0.250	81	33.64
Observations	9322				

Note: Descriptive statistics on individual-level data collected by the Italian National Election Studies (Itanes) for the national elections of 2001, 2006, and 2008. Voter turnout is a dummy variable equal to 1 if the respondent declares he/she voted in national election and zero otherwise.

Table 11: Education and voter turnout - individual level analysis

	OLS	IV
	(1)	(2)
dep. var.: Voter turnout		
Years of education	0.00466***	-0.0498***
	(0.001)	(0.018)
Time FE	Yes	Yes
Region FE	Yes	Yes
Other Controls	Yes	Yes
Region-Year FE	Yes	Yes
Observations	9322	9322
N. clusters	85	85
F-Test of Excl. IV		12.93

Note: The dependent variable is voter turnout, a dummy variable equal to 1 if the respondent declares he/she voted in national election and zero otherwise. In column (2) *years of education* is instrumented by the compulsory number of years of education established by law for the cohort the individual belongs to. Other controls are: gender and a second order polynomial in the year of birth. Standard errors clustered by cohort. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
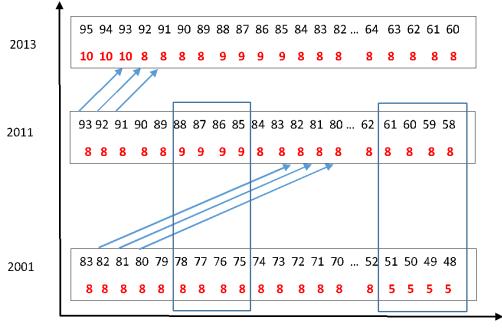
Figures

Figure 1: Reforms of compulsory education

Note: in red is the length of compulsory education and in black the corresponding cohort of birth. The structure by cohort of the population aged 18+, who is eligible to vote for the Lower House, changes over time (2001, 2011, 2013). Arrows highlight how a given cohort "proceeds" in the structure by cohort of the population prevailing at each calendar year. Blue rectangles highlight the age-years for which there is a variation in the length of compulsory education between calendar years
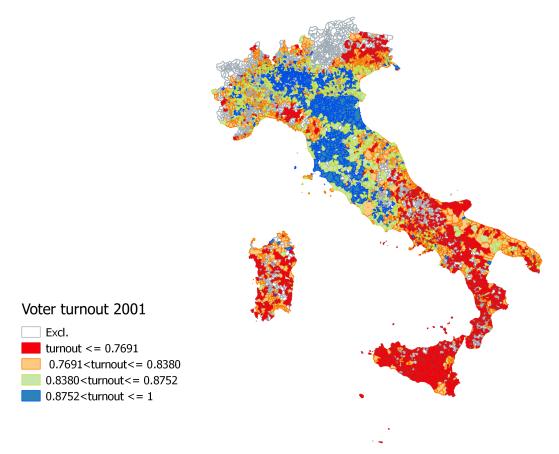
Figure 2: Voter turnout across Italian municipalities

Voter turnout 2001

- ☐ Excl.
- 🟥 turnout <= 0.7691
- 🟧 0.7691<turnout<= 0.8380
- 🟩 0.8380<turnout<= 0.8752
- 🟦 0.8752<turnout <= 1

Note: voter turnout across Italian municipalities in parliamentary elections of 2001 (source: Ministry of Interior).
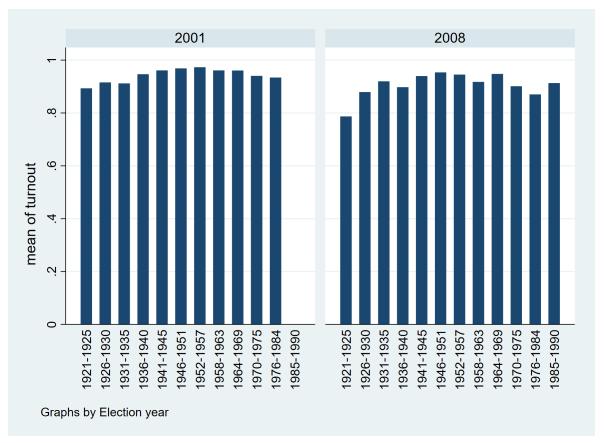
Figure 3: Voter turnout by cohort and election - Itanes survey

Note: Self-reported turnout rate by group of cohorts among the population aged 18+, in 2001 and 2008 (source: Itanes data).
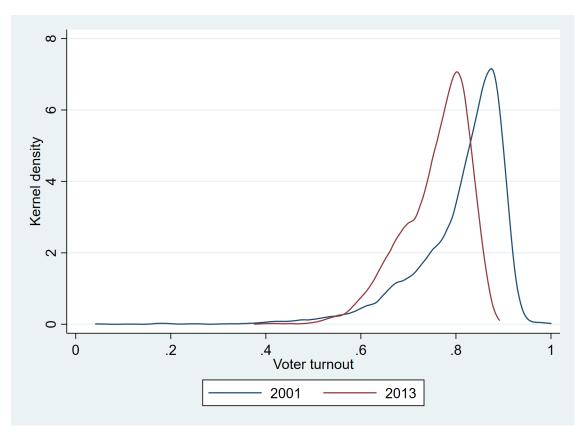
Appendix

Figure A1: Voter Turnout across municipalities. By year

Note: Distribution of turnout rate across municipalities, in 2001 and 2013 (source: Ministry of Interior - Archivio Storico delle elezioni).
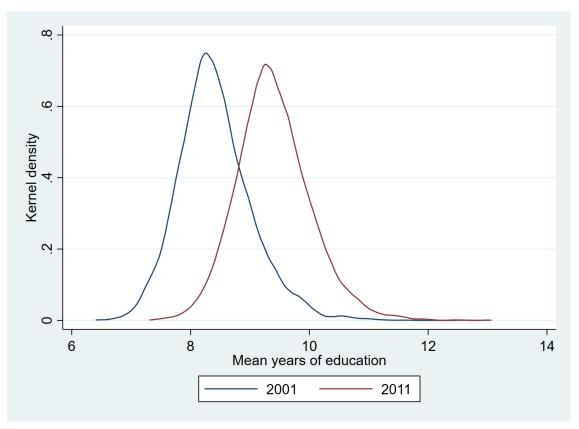
Figure A2: Mean years of education across municipalities. By year

Note: Distribution of mean years of education across municipalities, in 2001 and 2011 (source: our elaboration on census data, ISTAT).

Table A1: Description of Variables

Variable	Definition	Source
Voter turnout	Share of eligible voters who cast a vote	Ministry of Interior, Archivio storico delle elezioni
Blank ballots	Share of voters who cast a blank ballot	Ministry of Interior, Archivio storico delle elezioni
Invalid ballot	Share of voters who cast a invalid ballot	Ministry of Interior, Archivio storico delle elezioni
Mean years of education	Mean Years of education of the population aged 18 and over	ISTAT
Upper secondary education	Index of upper secondary educational rate (19 and over)	ISTAT
Concurrent elections	Binary indicator (=1) if in the municipality were held concurrently local elections	Ministry of Interior, Archivio storico delle elezioni
Share of females	Share of females aged 18 and over	ISTAT
Working-age population (18-64)	Share of population in aged 18-64	ISTAT
Generalized Trust	Fraction of the individuals answering "Most people can be trusted" by region	EVS (2015)
Blood donations	Number of blood bags collected in the province per million inhabitants in 1995	Guiso et al. (2004)
GDP	GDP per capita at the province level in 2001	OECD Regional Economic dataset
South	Binary indicator (=1) if Southern municipality	ISTAT
Urban	Binary indicator (=1) if urban municipality	ISTAT
RAP	Fraction of deputies who have received at least a request to remove parliamentary immunity averaged at the electoral district	Golden (2007)

A1 - Continued - Description of Variables

Variable	Definition	Source
Crime	Principal component of a factor analysis:mafia index, rates of crime against persons, properties, State, and other crimes per 100,000 inhabitants in year 2000 by province	Calderoni (2011), IS-TAT
Judicial Inefficiency	Number of years to complete a trial	Guiso et al. (2004)
Corruption Index	Golden-Picci index	Golden and Picci (2005)
Infrastructure	Endowment of economic infrastructures in 1997, province level	Ecoter (2000)

Table A2: First Stage

	(1) Mean years of education	(2) Upper secondary education
Mean years of compulsory schooling	1.239***	0.131***
	(0.097)	(0.011)
Municipality FE	Yes	Yes
Time FE	Yes	Yes
Other Controls	Yes	Yes
Province-Year FE	Yes	Yes
Observations	11722	11722
R^2	0.985	0.981
N. clusters	5861	5861
F-Test of Excl. IV	162.9	139.7

Note: Other controls are: share of females, concurrent elections and share of the population in the working age. Standard errors clustered at the municipality level. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3: First stage - Individual level analysis

	OLS
	(1)
dep. var.: Years of education	
Years of compulsory schooling	0.259***
	(0.072)
Time FE	Yes
Region FE	Yes
Other Controls	Yes
Region-Year FE	No
Observations	9322
N. clusters	85
F-Test of Excl. IV	12.93

Note: The dependent variable is individual years of education. Other controls are: gender, and a second order polynomial in the year of birth. Standard errors clustered by cohort. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$