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Mafia Wears Out Women in Power: Evidence from Italian Municipalities

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Abstract

We test a neglected implication of women's higher risk aversion: i.e., organized crime infiltration, increasing the perceived risk of entering politics, can prove more effective in discouraging highly qualified women to run for election compared to men. We constructed a data set based on yearly observations of 1,608 Italian municipalities in the 1985–2016 period. Exploiting the exogenous shock of municipal government dissolution for mafia infiltration, we robustly identify a stronger negative effect of organized crime activity on female politicians than on male.

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1 Introduction

Economic literature, by means of experimental analysis, provides robust evidence that women are more risk averse than men (Croson and Gneezy, 2009, Filippin and Crosetto, 2016). This female characteristic, probably shaped by culture (Booth and Nolen, 2012, Gneezy et al., 2009), has far-reaching implications in the social sciences. Indeed, women are found to be more prudent than men in the labor market, and in making economic and financial decisions (Blau and Kahn, 2000, Charness and Gneezy, 2012)[1]. Further evidence indicates that women are less likely than men to engage in risky corruption activities (Chaudhuri, 2012). Finally, due to their higher aversion to risk, women are less willing than men to enter elections (Pate and Fox, 2018).

In this paper, we analyze a neglected implication of women's higher risk aversion: i.e., organized crime infiltration, increasing the perceived risk of entering politics, can prove more effective in discouraging highly qualified women from running for election compared to men.

As explained in Dal Bó et al. (2006), organized crime infiltration lowers public officials' wage, thereby making a political career more attractive to lower qualified individuals, whose wage in various jobs tends to be low. Since women are more risk averse than men, when organized crime is active, all things being equal, women are more likely than men to choose jobs less risky than a political career: i.e., women perceive higher benefits of avoiding the risks of a political career than men. This means that highly educated women are more likely than highly educated men to avoid the risks of a political career in infiltrated municipalities. Hence, *ceteris paribus* a marginal woman accepting the risk of a political career has a lower education level than the corresponding marginal man. Due to this gender difference in attitudes to risk, crime infiltration should induce a stronger negative effect on the quality of female public officials than of male.

However, in Dal Bó et al. (2006)'s model, the activities of pressure groups are profitable conditioned by the level of law enforcement and by public officials' discretionary power over public resources. Indeed, a strengthening in law enforcement would increase the costs of corruption, lowering a pressure group's activity and increasing the public officials' wage. Moreover, pressure groups target public officials who have discretionary power over public resources of higher value than the costs of corruption, and remain inactive otherwise. In this regard, a relevant implication is that, due to women's higher risk aversion, we should detect a stronger effect of organized crime infiltration on the quality of women compared to men conditional on them holding *same* discretionary power over public resources.

To investigate this issue, we focus on Italian municipalities in Calabria, Campania, Puglia, and Sicilia, which are regions where organized crime has traditionally been concentrated. We constructed a data set that included yearly observations for 1,608 Italian municipalities from

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[1]Interestingly, in contexts where risky decisions affect others' well-being, women demand more redistribution than men because inequality reducing policies are seen as insurance against future negative economic shocks (Gärtner et al., 2017).

1985–2016. To measure the presence of organized crime in local administrations, we exploited the enforcement of Law 164/1991, which states that the national government can decree the dissolution of a city council if there is evidence of a link between members of local government and criminal organizations. This exogenous variation in the involvement of organized crime in local politics allows us to implement a difference-in-differences analysis comparing the quality of male and female politicians between municipal governments with (the treatment group) and without (the control group) organized crime infiltration both before and after the treatment has occurred.

Our analysis of the whole municipal body (mayors, councillors, and aldermen) does not provide supportive evidence for our hypothesis as the infiltration of pressure groups negatively affects *only* the quality of male public officials. Indeed, the education level of male politicians in the period preceding the dissolution of the council is, on average, 3-4 months lower compared to the counterfactual scenario without the infiltration of the pressure group. The negative result showing no effect of crime infiltration on the quality of female public officials could be due to their lower number within the municipal body (about 12% on average). Indeed, since women are a minority in the municipal body, there is a low probability that they have high discretionary power in areas of interest to organized crime.

To test this hypothesis, we compare the negative effect of mafia infiltration on male and female politicians holding *same* positions of power by focusing the analysis on mayors, the public officials with the greatest power over public resources within the municipal body. We provide robust evidence that the infiltration of pressure groups has a stronger negative effect on female mayors than male. We show specifically that female mayors' average education level in the period preceding the dissolution of the city council is about 3 years lower than what it would have been without the infiltration of pressure groups. Instead, organized crime reduces the quality of male mayors by approximately 11 months compared to the counterfactual without crime infiltration.[2]

The rest of the paper is organized as follows. In Section 2, we describe the Italian institutional framework and the data. In Section 3, we describe the econometric framework and discuss the conditions under which this design identifies a parameter of interest. In Section 4, we present the main results. In Section 5, we undertake a set of robustness checks on our findings. We conclude with Section 6.

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[2]Besides contributing to the literature studying the far-reaching implications of women's higher risk aversion, our paper also relates to the literature that emphasizes how women's higher sense of fairness plays a key role in improving political institutions. See for instance (Goertzel, 1983, Alesina and Giuliano, 2011, Duflo et al., 2004, Dollar et al., 2001, Swamy et al., 2001, Kudva 2003, Goetz, 2007, Jha and Sarangi, 2018, Baraldi and Ronza, 2019).

2 The institutional framework, variables, and data

The subnational levels of government in Italy include 20 regions, 110 provinces and about 8,000 municipalities. This paper focuses on the lowest administrative unit of government: municipalities. The political structure of a municipality comprises three bodies: the major, the municipal council (*Consiglio comunale*), and the municipal executive (*Giunta comunale*). The municipal council issues municipal laws and is elected (along with the mayor) by citizens every 5 years. The mayor has a 2-term limit and chooses the members of the executive branch.

The municipal executive cooperates in municipal management and carries out all the tasks not directly attributed by law to the municipal council or the mayor.[3] Municipal governments cannot affect the electoral schedule.

2.1 Law 164/1991

Beginning in the 1980s, Italy experienced a rise in mafia infiltration into politics, particularly at the local level. Mafia organizations attempted to influence civil servants' decisions concerning public procurements, public works, urban plants, and housing. For decades, Italian organized crime has drained public resources and interfered in the allocation of public contracts.[4] Several laws were implemented to contrast the resulting economic gain for criminal organizations and society's loss in terms of the inefficient use of public resources.

The most important law was the emergency measure disciplined by Law 164/1991, which states that the national government can decree the dissolution of a municipal administration *"when evidence emerges regarding direct or indirect links between members of the local government and criminal organisations [...] jeopardising the free will of the electoral body and the sound functioning of the municipal administration."*[5]

The municipality suspected of ties with organized crime is dissolved by national government and for the next $12 - 24$ months three commissioners replace the local government. The new commission reviews the dismissed council's budget and decisions, which often involves reassigning contracts with mafia-infiltrated firms to other businesses or directly providing services through various municipal departments. New municipal elections are held at the

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[3]The municipal administration manages the registry of births and deaths and the registry of deeds. It is responsible for several aspects of local service provision: environment (e.g., water and waste management, pollution monitoring, regulation and preservation of urban green spaces), education (e.g., kindergarten, supplementary services for primary school), transportation (e.g., road maintenance, public transportation), welfare (e.g., social housing, aid to needy people) and culture (e.g., libraries, museums). It is also responsible for maintaining public order, civil defence, and electoral offices.

[4]Mafia organizations use different practices according to the phase of the process. In the public procurement phase, the mafia is able to corrupt local administrators in favor of firms owned by or connected to criminal organizations. In the tender phase, the mafia often uses threats or violence to deter competitors. Finally, the execution of contracts often involves firms connected to criminal groups as well as "clean" firms which must transfer a portion of the revenue to them (Caneppele and Martocchia, 2014).

[5]http://www.gazzettaufficiale.it/eli/id/1991/07/25/091A3362/sg.

end of the period of compulsory administration.[6] The enforcement of this law within a given municipality can present a sudden shock to the local political establishment as well as for organized crime.

2.2 Data

We focus on Italian municipalities in Calabria, Campania, Puglia, and Sicilia, four southern Italian regions where organized crime (in the form of, respectively, 'ndrangheta, camorra, sacra corona unita, and mafia) has traditionally been concentrated. This allows us to study a sample of municipalities with similar unobserved characteristics (e.g., political culture or social capital) that can affect the estimations.

We construct a data set including yearly observations for 1,608 Italian municipalities from 1985–2016. Between 1991 and 2016, 239 local governments were dismissed for suspected mafia infiltration.[7] To observe the outcome of interest in the treatment group before and after the treatment — as the difference-in-differences approach we use in the empirical framework implies (see Section 3) — we exclude from the sample 14 municipalities that were dissolved due to mafia infiltration in 2015 and 2016.

In the sample of municipalities, 39 experienced more than one dissolution of their administrations. Most of these dissolutions occurred in the provinces of Reggio Calabria (43), Napoli (40), Caserta (30) and Palermo (28). No dissolution occurred in the provinces of Barletta-Andria-Trani, Enna, Foggia, Ragusa and Taranto.

Looking at the distribution of dissolution among the four southern regions from 1991 to 2016, Campania accounted for 82 dissolutions, Calabria 67, Sicilia 62, and Puglia 8. As suggested by Pinotti (2015), the relatively low number of municipal governments dissolved in Puglia is due to the fact that in this region organized criminal activities only began in recent decades, while they date back more than 150 years in Sicilia, Calabria, and Campania. Between 1991 and 2015, only 10 municipalities were dissolved in the rest of the Italy beyond the regions examined.

We measure the quality of politicians (the dependent variable) by their years of education, widely recognized as a good proxy for the level of human capital (Dal Bó et al., 2006, Fortunato and Panizza, 2015, Galasso and Nannicini, 2011, Glaeser et al., 2004, Kotakorpi and Poutvaara, 2011). Data on local administrators is made available by the Italian Ministry of Interior.[8] For each year, the databases provide information about politicians' education level (i.e., the highest degree attained), together with information such as their identity, gender, age, regional function, and previous job. Following the approach of De Paola et al.

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[6]Data referring to the municipal dissolution for mafia infiltration according to Law 164/1991 are publicly available on the Italian Parliament's "Commissione Parlamentare Antimafia" website. http://www.camera.it/_bicamerali/leg15/commbicantimafia/documentazionetematica/23/schedabase.asp.

[7]Figure 1 in Appendix shows the number of government dissolutions for presumed mafia infiltration by year and by province in the 1991–2016 time-frame.

[8]https://dati.interno.gov.it/elezioni.

(2010), Baltrunaite et al. (2014), we translated the qualitative information on politicians' highest degree into the number of years required to achieve it.[9]

For the purpose of our analysis, we first refer to the average education of the whole municipal body formed by councilors, aldermen, and the mayor (according to Decree 267/2000 (Art. 77)). Next, we restrict the sample to mayors to focus the analysis on the most powerful public officials in the municipalities. Different sub-samples of public officials would have been unsuitable for our analysis. Indeed, within the sample of councilors and aldermen, it would have been difficult to identify those with the highest discretionary power such as, for instance, those delegated by the mayor to deal with public tenders (traditionally an object of interest to the mafia).[10]

In our sample, women in the whole municipal body present a higher education level than men.[11] Similarly, the average education level of female mayors exceeds that of male mayors by more than 1 year.[12] Female mayors occur approximately 4% of the time in our sample.

As further controls, we used yearly data on the share of female and male population residents in the municipality (as the ratio between the female/male population over the whole population in the municipality). Moreover, we used the 1991, 2001, and 2011 Italian Census of Population to obtain data on female and male average educational attainment at the municipality level (i.e., the population share of tertiary education degree holders) and on the female and male unemployment rate.[13]

3 Empirical strategy

We exploit a national government enforcement against organized crime infiltration (introduced by Law 164/1991) as a source of exogenous variation in the involvement of mafia in local politics to implement a difference-in-differences (DiD) analysis.[14] To this end, we run a number of municipal-level regressions and compare the average years of education of male and female local politicians in municipalities with and without mafia infiltration, before and after the infiltration is terminated.

Dissolution did not take place at the same time for each municipality;[15] the panel structure of our database allows us to consider these differences and separate the effect of the

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[9]See Table 6 in Appendix.

[10]Our difference-in-differences analysis can be better implemented on the sample of elected public officials rather than on the sample of candidates. In the latter case, due to the proportional electoral system at the municipal level, candidates for mayor could end up holding the position of councilor or aldermen. Thus, we would not be able to rank the perspective public officials among the sample of candidates in terms of their discretionary power over public resources.

[11]Figure 2 in Appendix plots the trend in the level of education of female and male politicians).

[12]Table 7 in Appendix shows the descriptive statistics of the education level of politicians in city councils.

[13]Descriptive statistics are in Table 8 in Appendix.

[14]National Law 164/1991 has previously been employed in empirical studies by Acconcia et al. (2014), Daniele and Geys (2015), Galletta (2017) and Mastrorocco et al. (2020)

[15]See Figure 1a in Appendix.

dissolution from possibly unobserved time-specific events, thus strengthening the identification assumption (Angrist and Pischke, 2008).

The key identifying assumption of the DiD approach is that, in the absence of any treatment, there exists a common temporal trend for each municipality. The treatment is staggered across municipalities; therefore, we include municipality-specific linear time trends to account for the possible deviation from the key identifying assumption.

Moreover, we include further controls to assess the relative size of the omitted variable bias and the stability of the coefficient of interest across model specifications. The baseline specification is as follows (with subscript i referring to municipalities and t to time).

$$Y_{it} = \beta_1 Infilfrom_{it} + \beta_2 Year_t + \beta_3 Trend_{it} + \beta_4 X_{it} + \delta_i + \epsilon_{it}$$

Y_{it} is the variable measuring the average number of years of education in municipal council i at time t, for male and female politicians in the full political body (mayor, councilors and aldermen) and in the sub-sample of mayors. The variable of interest that proxies the presence of criminal organizations in Italian municipalities is the dummy *Infil from*. *Year* and *Trend* are, respectively, the complete set of year fixed effect and municipality-specific time trend. X_{it} is the set of controls for characteristics of municipality i at time t, that are the share of female and male population (*Female_pop* and *Male_pop*), the female and male average education level (*Female_edu* and *Male_edu*) and the female and male rate of unemployment (*Female_unemp* and *Male_unemp*). δ_i is the vector of dummies for each province and accounts for the time-invariant characteristics that are common to municipalities in the same province. ϵ_{i_t} is the idiosyncratic error term.

In the baseline analysis, we adopt a flexible definition of the treatment variable *Infil from* that allows for administration-by-administration variation in the estimated effect of organized crime infiltration on the quality of politicians. That is, we made two different assumptions concerning the involvement of organized crime in local government.

Although Law 164/1991 prescribes dissolving the municipalities if the local administrators *in force* have direct or indirect links with criminal organizations, it is most likely that criminal infiltration is already present before the election of the dissolved administration. To proxy the presence of pressure groups within local administrations, we date their infiltration back to a moment preceding the appointment of the dissolved government. Specifically, as the first baseline definition, the variable of interest is a dummy taking a value of 1 from the year of the last regular election before the dissolved administration until the year when the municipal government is dissolved, and 0 otherwise (thereafter *Infil from 2 Adm*). As the second baseline definition, we date the pressure groups infiltration back to the two administrations preceding the dissolved one. Thus, the variable of interest is a dummy taking a value of 1 from the year of the second to last regular election before the dissolved administration until the year when the municipal government is dissolved, and 0 otherwise (thereafter *Infil*

from 3 Adm). As a robustness check, we propose further definitions of the variable of interest according to different hypotheses on the timing of organized crime infiltration in Section 5.

A further assumption concerns the definition of the control group, which is composed by never-dissolved municipalities and by municipalities having experienced a dissolution after the dissolution occurred and a new government was elected. The rationale lies in the fact that local governments formed after a dissolution may be considered "clean" precisely because of enforcement of the law; thus, in the control group we take only the administrations elected after the dissolution, excluding all the administrations appointed before those supposed to be infiltrated.[16]

These data raise a concern for the identification of treatment and control groups (Daniele and Geys, 2015). Indeed, municipal dissolution due to Law 164 provides an imperfect measure of mafia infiltration because it refers to the detection of the phenomenon. Therefore, not all local administrations infiltrated by organized crime are detected and dissolved. Moreover, local administrations can be erroneously dissolved. These problems, however, do not invalidate our identification. In the first case, infiltrated municipalities will be erroneously part of the control group; this will create a bias toward zero of the estimated effect of the enforcement of the law on the average quality of female public officials in dissolved municipalities. In the second case, municipalities will erroneously belong to the treatment group, thereby contributing to bias estimates toward zero.[17] Hence, the estimated results will represent a lower bound of the true effect.[18] Finally, the possible measurement errors are due to the *Commissione Parlamentare Antimafia*; thus, they are not affected by the gender composition of local governments and can be considered as exogenous for the purpose of our analysis.

4 Results

Table 1 reports the results of the baseline OLS estimates without control variables; standard errors are robust to heteroskedasticity and are corrected for clustering at the municipal level. All specifications include province and year fixed effects. The dependent variable is the average number of years of education of female and male politicians elected in locality i for the entire municipal body (mayor, councilors and aldermen) and for the subset of mayors.

Focusing on the whole municipal body, Columns 1, 2, 5 and 6 show that the coefficient of interest is negative and not significant for female politicians, whereas it is significant for

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[16]We replicated the analysis using a definition of control group composed by never-dissolved municipalities and by municipalities having experienced a dissolution, before the infiltration started and after it was ended, with comparable results.

[17]Moreover, no problem arises for dissolved municipalities whose decree of municipal dissolution is canceled because insufficient proof links criminal groups and municipal administrations: these municipalities have been removed from the compulsory administration group and included in the undissolved group.

[18]This means that, excluding the above-mentioned mismatches and using a better measure of organized crime infiltration should result in a stronger estimated effect (see Daniele and Geys, 2015).

male politicians: the activity of organized crime only reduces the quality of male politicians and not of female. Thus, we do not find evidence supporting the hypothesis of a stronger negative effect of mafia infiltration on the quality of women due to their higher risk aversion. According to the two definitions of the treatment variable, the average education level of male politicians is respectively 0.329 years (Column 2) and 0.288 (Column 6) years lower (approximately between 3 and 4 months) than what it would have been in the absence of pressure group infiltration.

Table 1: DiD baseline estimations

Dep. Var.: Education level of	(1) Whole female Body	(2) Whole male Body	(3) Female Mayor	(4) Male Mayor	(5) Whole female Body	(6) Whole male Body	(7) Female Mayor	(8) Male Mayor
Infil from 2 Admin	-0.00250	-0.329***	-3.098**	-0.895***				
	(0.285)	(0.118)	(1.502)	(0.318)				
Infil from 3 Admin					-0.0551	-0.288**	-3.958***	-0.833***
					(0.276)	(0.122)	(0.805)	(0.307)
Constant	15.35***	12.27***	17.39***	16.02***	15.29***	12.25***	17.12***	16.07***
	(0.478)	(0.258)	(1.274)	(0.380)	(0.476)	(0.254)	(1.231)	(0.375)
Observations	34,176	46,206	1,607	42,085	34,514	46,669	1,621	42,509
R-squared	0.375	0.546	0.925	0.310	0.373	0.546	0.925	0.308
Province FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes. The dependent variable is: in (1), (2), (5) and (6), the average number of years of education of all female and male members of the council; in (3), (4), (7) and (8), the average number of years of education of female and male mayors. *Infil from 2 Adm* is a dummy taking a value of 1 from the year of the appointment of the last regular election before the dissolved administration until the year where the municipal government is dissolved, and 0 otherwise. *Infil from 3 Adm* is a dummy taking a value of 1 from the year of the appointment of the last two regular elections before the dissolved administration until the year where the municipal government is dissolved, and 0 otherwise. Coefficients of province and year dummies are not reported. Robust standard errors adjusted for clustering at municipality level are in brackets. Significant coefficients are indicated by * (10% level), ** (5% level) and *** (1% level).

The analysis clearly shows that law enforcement removing or reducing organized crime infiltration from local politics improves the average human capital of subsequently elected male politicians but not of female. This result aligns with the main finding reported in Daniele and Geys (2015) research.[19] The negative result of no effect of the law enforcement on the education level of female public officials could be due to their lower number within the whole municipal body: if women are a minority, there is a low probability that women hold a position of power in sectors of interest for organized crime.

To test this hypothesis, we compare the effect of mafia infiltration on male and female politicians holding *same* positions of power and we focus the analysis on male and female mayors. In Columns 3, 4, 7 and 8 of Table 1 the dependent variable is the average number of years of education of female and male mayors. Consistent with our expectation, we observe a stronger negative effect of organized crime infiltration on female mayors compared to male, indicating that organized crime activity is more effective in reducing the quality of female mayors. Specifically, the size of the estimated effect is of -3.098 for female mayors and of -0.895 for male mayors (see Columns 3 and 4). In other words — compared to the counterfactual scenario without organized crime infiltration — the average education level of female mayors is about 3 years lower in the period preceding the dissolution of the local

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[19]We perform the same baseline analysis as in Table 1 by excluding mayors from the full body of politicians. Thus, the dependent variable is the local elected politicians' years of education averaged over councilors, aldermen, and (vice)mayor. The results replicate those in Columns 1, 2, 5 and 6.

government, while it is almost 11 months lower for male mayors. The magnitude of the estimated coefficient for mayors tells us that where mafia-type organization is active, the education level of female mayors is reduced by 18.23% of their actual average education level (16.992) while the education level of male mayors is reduced by 5.63%. In terms of one standard deviation effect of the average education level of mayors (2.143 and 2.913 respectively for female and male mayors), the law enforcement increases the ability of female mayors of almost 1.2 of a s.d., while that of male mayors of more than 1/3. When a longer period of mafia infiltration is assumed (as in Column 7), the education level of female mayors reduces by about 4 years.

This evidence is consistent with the hypothesis that women are higher risk averse than men. This suggests that, all things being equal, in a municipality where organized crime is active, women are more likely than men to choose jobs less risky than a political career: i.e., women perceive a higher benefit to avoiding the risk of a political career than men. This means that highly educated women are more likely than highly educated men to avoid the risk of politics in infiltrated municipalities. Hence, *ceteris paribus* the marginal woman accepting the risk of politics has a lower educational level than the corresponding marginal man. This gender difference in attitude to risk most likely is the reason for the greater gap in the educational level for female mayors compared to their male counterparts after law enforcement.

Moreover, law enforcement — freeing a municipality from the actions of organized crime — increases not only the quality but also the number of female mayors. Indeed, we find that law enforcement increases the probability of having a female mayor by about 5% with respect to the counterfactual scenario with no dissolution.[20] Thus, law enforcement induces more women to enter politics by reducing the risk of organized crime infiltration.

We obtain the same results when we hypothesize a longer period of organized crime infiltration (see Columns 7 and 8), confirming that organized crime infiltration has a stronger negative effect on female mayors compared to male.[21]

In the first 4 columns of Table 2, we estimate the same specifications as in Table 1 but controlling for some municipal characteristics, such as the female and male population size, the female and male average education level, and the female and male rate of unemployment. The inclusion of controls does not change the effect of mafia infiltration on the quality of mayors. Nonetheless, the limited impact of including controls on the size of the coefficient

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[20]We run DiD estimates where the dependent variable is a dummy variable taking the value of 1 if the mayor is a woman and 0 if the mayor is a man. We use as treatment variable of both *Infil from 2 Adm* and *Infil from 3 Adm*.

[21]A further way to identify crime infiltration (besides municipality dissolution) within the municipal body exploits the data on the attacks against local politicians collected from *Avviso Pubblico* (Daniele and Dipoppa, 2017). The evidence resulting from our analysis in the four regions under study corroborates our main finding (see the Online Appendix for details). Indeed, looking at the whole municipal body, the majority of violent attacks (57%) are directed toward mayors, while 15% and 28% are directed toward aldermen and councillors respectively. The analysis of the gender composition confirms this pattern, as 52% of attacks are directed against female mayors, 19% against aldermen, and 29% against councilors.

of interest supports the causal interpretation of our results.[22]

We also provide an alternative estimation strategy, which controls for municipality fixed effects, in Columns 5-8 of Table 2. Again we find that the coefficient of interest is negative and statistically significant, no matter the definition of the treatment variable we adopt. Its size increases to more than 4 years of education less for female mayors.

Table 2: DiD estimates controlling for municipal characteristics

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Education level of	Female Mayor	Male Mayor	Female Mayor	Male Mayor	Female Mayor	Male Mayor	Female Mayor	Male Mayor
Infil from 2 Adm	-2.851*	-0.901***			-4.333***	-0.823**		
	(1.507)	(0.318)			(0.476)	(0.349)		
Infil from 3 Adm			-3.906***	-0.841***			-4.254***	-0.841**
			(0.833)	(0.307)			(0.548)	(0.343)
Female_pop	-14.43		-15.45		15.20		14.77	
	(17.74)		(17.64)		(17.42)		(17.42)	
Female_edu	2.763		3.129		-2.976		-2.318	
	(5.508)		(5.395)		(3.585)		(3.091)	
Female_unemp	3.694		3.299		2.709		2.147	
	(2.659)		(2.284)		(2.242)		(1.806)	
Male_pop		1.119		0.672		3.561		3.208
		(5.080)		(5.067)		(5.199)		(5.179)
Male_edu		2.205		2.375		-2.015		-1.909
		(1.520)		(1.516)		(2.453)		(2.439)
Male_unemp		-0.907		-1.008		-0.618		-0.667
		(0.845)		(0.842)		(0.907)		(0.901)
Constant	21.08**	14.18***	21.27**	14.36***	11.04	15.31***	10.99	15.43***
	(10.36)	(2.883)	(10.27)	(2.875)	(8.470)	(3.272)	(8.612)	(3.258)
Observations	1,607	42,072	1,621	42,496	1,607	42,072	1,621	42,496
R-squared	0.927	0.311	0.927	0.309	0.758	0.278	0.770	0.276
Province FE	YES	YES	YES	YES				
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of id					317	1,594	318	1,594
Municipality FE					YES	YES	YES	YES

Notes. The dependent variable is: in (1), (2), (5) and (6), the average number the years of education of, respectively, all female and male members of the council; in (3), (4), (7) and (8), the average number of years of education of female and male mayors. *Infil from 2 Adm* is a dummy taking a value of 1 from the year of the appointment of the last regular election before the dissolved administration until the year where the municipal government is dissolved, and 0 otherwise. *Infil from 3 Adm* is a dummy taking a value of 1 from the year of the appointment of the last two regular elections before the dissolved administration until the year where the municipal government is dissolved, and 0 otherwise. Coefficients of province and year dummies are not reported. Robust standard errors adjusted for clustering at municipality level are in brackets. Significant coefficients are indicated by * (10% level), ** (5% level) and *** (1% level).

To sum up, looking at the full body of politicians within the city council, there emerges no effect of mafia infiltration on the quality of female politicians, while mafia involvement reduces the ability of male politicians. However, when we focus the analysis on mayors, we find that crime infiltration has a stronger negative effect on the quality of female mayors compared to male.

4.1 Discussion

In this subsection, we provide further evidence to support our identifying assumptions. Specifically, we control for possible selection bias due to the definition of the treatment variable and implement a placebo test on municipalities dissolved for reasons unrelated to crime infiltration.

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[22]On the issue of causality running from mafia activity to politicians' human capital, Daniele and Geys (2015) performed Granger causality tests showing that mafia homicides cause, in the Granger sense, a decrease in politicians' human capital but the reverse is not true.

Early termination and selection bias. An important concern with the previous analysis is the early termination of municipal councils that resulted in a staggered pattern in Italian local elections. Early termination may be associated with the definition of the treatment and control groups and can generate selection bias. City councils can be dismissed for a number of reasons unrelated to mafia infiltration, such as (a) resignation by elected officials (resignation of the mayor or resignation of more than 50% of council members), (b) failure to organize elections, (c) special cases of ineligibility of the mayor, (d) failure to pass the annual budget, and (e) political crisis in ruling coalitions. Such kinds of dissolution are fairly common (51% of the entire sample) and many municipalities witness at least one dissolution of their local government unrelated to mafia infiltration.

One can argue that early termination could reduce the probability for an infiltrated municipality to be detected, thus resulting in the infiltrated municipality being included in the control group rather than in the treatment group. We address this issue by running the baseline OLS estimation after excluding early dissolved local governments from the sample for reasons unrelated to mafia infiltration. Results are reported in Columns 1-4 of Table 3. Our findings are robust to the sample restriction; thus, a preexisting relationship between early termination and the probability of dissolution for mafia infiltration is not likely to generate selection into the two groups.

Table 3: DiD estimates: early termination and once dissolved municipalities

| Dep. Var. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
Education level of	Female Mayor	Male Mayor	Female Mayor	Male Mayor	Female Mayor	Male Mayor	Female Mayor	Male Mayor
Infil from 2 Adm	-3.333**	-0.916***			-3.375**	-0.861**		
	(1.479)	(0.325)			(1.377)	(0.364)		
Infil from 3 Adm			-4.125***	-0.869***			-4.051***	-0.812**
			(0.857)	(0.313)			(0.693)	(0.350)
Constant	17.97***	16.01***	17.52***	16.06***	17.40***	16.02***	17.36***	16.06***
	(1.644)	(0.381)	(1.547)	(0.376)	(1.284)	(0.379)	(1.268)	(0.373)
Observations	1,441	38,479	1,455	38,878	1,592	41,392	1,602	41,692
R-squared	0.925	0.326	0.924	0.324	0.925	0.309	0.925	0.308
Province FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes. The dependent variable is: in (1), (2), (5) and (6), the average number the years of education of, respectively, all female and male members of the council; in (3), (4), (7) and (8), the average number the years of education of female and male mayors. *Infil from 2 Adm* is a dummy taking a value of 1 from the year of the appointment of the last regular election before the dissolved administration until the year where the municipal government is dissolved, and 0 otherwise. *Infil from 3 Adm* is a dummy taking a value of 1 from the year of the appointment of the last two regular elections before the dissolved administration until the year where the municipal government is dissolved, and 0 otherwise. We restrict the sample of no compulsory administrations to local governments that have never experienced early termination. Coefficients of province and year dummies are not reported. Robust standard errors adjusted for clustering at municipality level are in brackets. Significant coefficients are indicated by * (10% level), ** (5% level) and *** (1% level).

Only once dissolved municipalities. Previous estimations ignore that early dissolution of local governments might not always be effective in breaking the ties between criminal organizations and local politicians. In our sample, 39 municipalities experienced more than one dissolution for mafia infiltration since 1991. We might suspect that the mafia continued to be active in the municipality even after the further dissolution. We take this possible bias into account by excluding from the sample those municipalities that witnessed repeated dissolution due to mafia infiltration. The results reported in Columns 5-8 of Table 3 confirm a significant and stronger negative effect of crime infiltration on the human capital of female

mayors compared to male when both the definitions of the treatment variable are employed. The size of the estimated effect is aligned with that of the baseline estimations.

Dissolution for reasons unrelated to mafia infiltration.   As mentioned above, Italian local governments may also be dissolved for reasons unrelated to mafia infiltration. Following Daniele and Geys (2015), we perform a placebo test on the local government that experienced dissolution for reasons unrelated to mafia reasons. This test allows us to disentangle the effect of mafia infiltration on the quality of politicians from the effect of dissolution of a local government *per sé*. If our results were the consequence of the dissolution of a local government rather than a consequence of mafia infiltration, we should expect an increase in female and male education level after any type of government dissolution.

Indeed, Gagliarducci and Paserman (2012) found that city councils led by female mayors have a higher probability of early termination than governments with male mayors. The greater frequency of elections that follows should increase both the share of women in newly elected local governments and the probability of having a more educated female mayor due to the increasing trend in female political participation (see Figure 3 in Appendix) and the general increase in the level of education (see Figure 2 in Appendix). Thus, all types of dissolution should imply an upward shift in human capital.

We perform an estimation where the independent variable is a dummy taking a value of 1 in the entire legislature of the local government dissolved for reasons unrelated to mafia infiltration and 0 otherwise. The results indicate that not all types of dissolution imply an upward shift in human capital. Indeed, the average education level of female mayors is approximately 6 months *higher* in the period preceding the dissolution of the local government for reason unrelated to mafia compared to that in the absence of government termination.[23] The education level of male mayors is unaffected by this kind of dissolution. The results from this placebo test support our main finding that the education level of politicians in positions of power is reduced where organized crime is active and that this effect is mitigated by the strengthening of law enforcement.

5   Robustness analysis

In this section, we undertake a set of robustness checks. First of all, we focus on more a homogeneous treatment and control groups by excluding provinces with no dismissed municipalities from the sample and by comparing the municipalities included in the treatment group with their neighboring municipalities. Second, we estimate our baseline model controlling for the effect of the two gender electoral reforms that occurred in Italy during the period under study. Third, we use further definitions of the treatment variables.

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[23]Estimation results are presented in Table 9 in Appendix.

Sample restriction to more homogeneous units. In this subsection, we restrict the sample to more homogeneous municipalities to control for other factors that might confound the impact of law enforcement on the quality of politicians. First, we exclude from the sample provinces where no dissolution for mafia infiltration took place (these are Barletta-Andria-Trani, Enna, Foggia, Ragusa and Taranto). The results in columns 1-4 of Table 4 remain substantially unchanged.

Secondly, we restrict the undissolved group of municipalities to those in the neighborhoods of municipalities included in the treatment group. We did this by taking the data from the National Institute of Statistics (ISTAT) on neighboring municipalities.[24] We constructed a new data set made of 568 municipalities. Our results (see columns 5-8 of Table 4) confirm the baseline results with slightly lower estimated coefficients for the treatment variables.

The restriction of the sample to neighboring municipalities results in the loss of a large number of observations; however, the impact of law enforcement is still significant, and the size of the effect is only slightly smaller compared to that estimated under the full sample. We conclude that the magnitude of results is not driven by comparing groups of municipalities that are more or less heterogeneous.

Table 4: DiD estimates: excluding provinces with no dissolution and restricting sample to neighborhoods

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Education level of	Female Mayor	Male Mayor	Female Mayor	Male Mayor	Female Mayor	Male Mayor	Female Mayor	Male Mayor
Infil from 2 Adm	-3.204**	-0.890***			-3.370**	-0.852***		
	(1.540)	(0.320)			(1.439)	(0.320)		
Infil from 3 Adm			-4.018***	-0.827***			-3.739***	-0.797***
			(0.816)	(0.308)			(0.785)	(0.308)
Constant	17.34***	15.96***	17.04***	16.02***	16.31***	16.89***	15.66***	17.03***
	(1.325)	(0.382)	(1.281)	(0.377)	(2.407)	(0.606)	(2.264)	(0.585)
Observations	1,505	38,790	1,519	39,214	519	13,801	533	14,225
R-squared	0.924	0.309	0.924	0.307	0.943	0.355	0.943	0.347
Province FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes. The dependent variable is: in (1), (2), (5) and (6), the average number of years of education of, respectively, all female and male members of the council; in (3), (4), (7) and (8), the average number of years of education of female and male mayors. *Infil from 2 Adm* is a dummy taking a value of 1 from the year of the appointment of the last regular election before the dissolved administration until the year where the municipal government is dissolved, and 0 otherwise. *Infil from 3 Adm* is a dummy taking a value of 1 from the year of the appointment of the last two regular elections before the dissolved administration until the year when the municipal government is dissolved, and 0 otherwise. In columns 1-4, we exclude from the sample the provinces of Barletta-Andria-Trani, Enna, Foggia, Ragusa, and Taranto. Coefficients of province and year dummies are not reported. Robust standard errors adjusted for clustering at municipality level are in brackets. Significant coefficients are indicated by * (10% level), ** (5% level) and *** (1% level).

Gender quota reforms. During the time frame of our study, two institutional reforms involving municipal administrations largely affected the presence of women in municipal political bodies.

Law 81/1993 established in Art. 5 (subsequently modified by Law 15/10/1993, no. 415, Art. 2) that no more than 2/3 of the candidates on an electoral list could be of the same sex in municipalities with more than 15,000 inhabitants. This threshold was fixed at 3/4 for municipalities with less than 15,000 inhabitants. The law was only enforced during municipal elections between March 25, 1993 and September 12, 1995 because the Constitutional Court

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[24]ISTAT, "Matrici di contiguità", https://www.istat.it/it/archivio/137333.

(Sentence no. 422) declared the gender quota unconstitutional. In the four regions of interest, about 90% of municipalities voted during the enforcement of the gender quota reforms.

De Paola et al. (2010) documented that women's representation in politics after the reform also increased significantly in municipalities unaffected by the gender quota law. Although the law was only enforced between March 25, 1993 and September 12, 1995, the effects of the gender quota legislation persisted after its abrogation. Baltrunaite et al. (2014) found that the introduction of gender quotas in candidate lists increased the average education level of elected politicians, primarily by increasing the number of elected women — who are on average more educated than men — and reducing the number of low-educated men. This effect has persisted in the long run.

The second reform, Law 215/2012, introduced in municipal council elections the double preference voting conditioned on gender, whereby voters can express two preferences rather than one if they vote for candidates of a different gender. Baltrunaite et al. (2019) estimated that this policy led to an increase of 18 percentage points in the share of elected female politicians.[25]

Given the high growth rate of female political participation in Italian local governments and the related positive effect on politicians' human capital, we take these gender reforms into account by controlling for two dummies in the baseline specifications. The first takes a value of 1 for all municipalities affected by gender quota Law 81/1993 during the years where the law was in force and 0 otherwise (thereafter *Law 81/93*). The secondtakes a value of 1 for municipalities voting under Law 215/2012 in the years of elected administrations (thereafter *Law 215/12*). The findings are presented in columns 1-4 of Table 5.

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[25]Figure 3 in Appendix presents the effect of the aforementioned reforms on both the presence of female mayors leading local governments and the percentage of women within the city council. The line sharply increases in 1993 and after 2012. Although gender electoral reforms undoubtedly increased female participation in local politics, the percentage of female mayors remains low, around 4.2%, and the participation of women in the council is not more than 12% on average.

Table 5: DiD estimates controlling for the gender quota reforms and with other treatment definition

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Education level of	Female Mayor	Male Mayor	Female Mayor	Male Mayor	Female Mayor	Male Mayor	Female Mayor	Male Mayor
Infil from 2 Adm	-3.380**	-0.842***						
	(1.479)	(0.318)						
Infil from 3 Adm			-3.873***	-0.727**				
			(0.735)	(0.312)				
Law 81/93	0.213	0.316***	0.266	0.326***				
	(0.256)	(0.0948)	(0.258)	(0.0945)				
Law 215/12	0.371	-0.383**	0.465	-0.385**				
	(0.796)	(0.173)	(0.826)	(0.172)				
Infil from 5 Years					-3.273**	-0.832***		
					(1.458)	(0.317)		
Infil from 1985							-3.969***	-0.724**
							(0.721)	(0.315)
Constant	17.33***	16.00***	17.06***	16.05***	17.39***	16.02***	16.97***	16.05***
	(1.216)	(0.380)	(1.148)	(0.375)	(1.277)	(0.380)	(1.174)	(0.356)
Observations	1,607	42,085	1,621	42,509	1,607	41,800	1,632	43,247
R-squared	0.925	0.311	0.925	0.309	0.925	0.310	0.925	0.304
Province FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes. The dependent variable is: in (1), (2), (5) and (6), the average number of years of education of, respectively, all female and male members of the council; in (3), (4), (7) and (8), the average number of years of education of female and male mayors. *Infil from 2 Adm* is a dummy taking a value of 1 from the year of the appointment of the last regular election before the dissolved administration until the year where the municipal government is dissolved, and 0 otherwise. *Infil from 3 Adm* is a dummy taking a value of 1 from the year of the appointment of the last two regular elections before the dissolved administration until the year where the municipal government is dissolved, and 0 otherwise. *Infil from 5 Years* is a dummy taking a value of 1 in the year of dissolution and in the 5 years preceding the dissolution of the government, and 0 otherwise. *Infil from 1985* is a dummy taking a value of 1 from 1985 to the year of dissolution and 0 otherwise. Coefficients of province and year dummies are not reported. Robust standard errors adjusted for clustering at municipality level are in brackets. Significant coefficients are indicated by * (10% level), ** (5% level) and *** (1% level).

The results replicate the findings of our baseline estimation. Moreover, *Law 81/93* is positive and significant for male mayors (confirming the analysis of Baltrunaite et al. 2014) while *Law 215/12* negatively affects only the years of education of male mayors.

Further definitions of the treatment variable. In the baseline analysis, the two variables measuring the treatment effect hypothesized that organized crime infiltration in a municipality dates back to one and two administrations before the one dissolved. Those definitions of the treatment variables imply an asymmetry in mafia infiltration across municipalities as well as a determined period of suspected infiltration. We use two further definitions of the variable of interest already adopted by Daniele and Geys (2015) to address these issues and to assess the robustness of our results. The first operationalization corrects for the problem of asymmetry, so the variable *Infil from 5 Years* is a dummy taking a value of 1 in the year of dissolution and in the 5 years preceding the dissolution of the government, and 0 otherwise. The second assumes a longer period of mafia infiltration, so the variable *Infil from 1985* is a dummy taking a value of 1 from 1985 to the year of dissolution and 0 otherwise. Columns 5-8 of Table 5 report the relevant results. The findings replicate the analysis in Table 1.

6 Conclusions

Using a large sample of southern Italian Municipalities in Calabria, Campania, Puglia, and Sicilia, we exploited Law 164/1991 as a source of exogenous variation of the involvement

of mafia in local politics to implement a DiD analysis. We provided robust evidence of a neglected implication of women's higher risk aversion: that is, organized crime infiltration can prove more effective in discouraging highly qualified women to run for an election compared to men.

The scaring effect of organized crime on highly qualified women recorded in our study is detrimental for the whole of society because women's economic policy choices could significantly improve institutions. Indeed, a significant strand of literature shows that women, compared to men, tend to vote according to social issues (Goertzel, 1983), are more prore-distribution (Alesina and Giuliano, 2011), finance more public goods (Duflo et al., 2004), and prevent government corruption (Dollar et al., 2001, Swamy et al., 2001, Kudva, 2003, Goetz, 2007, Jha and Sarangi, 2018, Baraldi and Ronza, 2019).[26]

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[26]Interestingly, women also affect the composition of public spending by allocating a greater budget to projects that meet women's needs such as childcare, healthcare, and educational institutions (Chattopadhyay and Duflo, 2004; Marit, 2007; Funk and Gathmann, 2015; Clots-Figueras, 2011).

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Appendix

Figure 1: Municipal governments dissolution by year and province

(a)

(b)
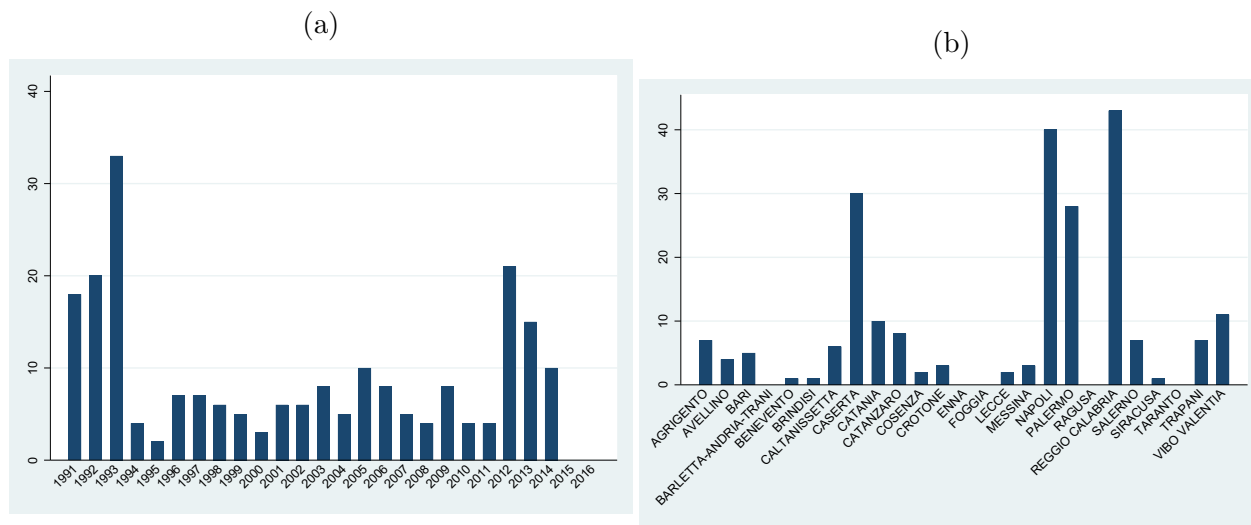
Notes. In Figures 1a and 1b, the vertical axis shows the number of government dissolutions because of mafia infiltration. Years from 1991 to 2016. We exclude from the sample municipalities experiencing a dissolution for mafia infiltration in 2015 and 2016, as shown in Figures 1a.

Table 6: Table of conversion of the level of education into years of education

Degrees	Years of education
University Researcher, Phd, Other post-graduate's degree, Other qualifications officially recognised as equivalent	21
Bachelor of Medicine, Bachelor of Surgery. Master Degree, Other qualifications officially recognised as equivalent	19
Bachelor Degree, Other qualifications officially recognised as equivalent	18
High School Degree, Professional Diploma, Other qualifications officially recognised as equivalent	13
Middle School Degree, Other qualifications officially recognised as equivalent	8
Elementary School Diploma	5
No Diploma/Degree	0

Notes: Where no education level is specified, we use the variables "job" to derive an estimation of years of education according to the minimum level of education that the Italian law prescribes to attain that job. Where it is not possible to infer directly the years of education from the variable "job", we assign an average value. The latter is equal to 15.5 years of education if the job of the politician can be exercised with both a university degree and a high school degree. Moreover, we assign a value of 10.5 when the job requires either a high school degree or a middle school degree. Time span 1985-2016.

Table 7: Descriptive analysis on the average years of education

	Obs	Mean	Std.Dev.	Min	Max
Female in the full body	34975	14.703	2.609	0	21
Male in the full body	47486	13.136	1.792	5	18
Female Mayor	1632	16.992	2.143	8	21
Male Mayor	43247	15.873	2.913	0	21

Notes: average years of education of local politicians. Time-span: 1985-2016.

Table 8: Descriptive statistics of controls

Variable	Obs	Mean	Std.Dev.	Min	Max
Female pop	50971	0.511	0.011	0.413	0.599
Male pop	50971	0.488	0.011	0.401	0.586
Female education	51001	0.791	0.074	0.454	0.941
Male education	51001	0.849	0.057	0.554	0.965
Female unemployment	51001	0.297	0.12	0.014	0.8
Male unemployment	51001	0.198	0.088	0	0.635

Figure 2: Average years of education of female/male politician
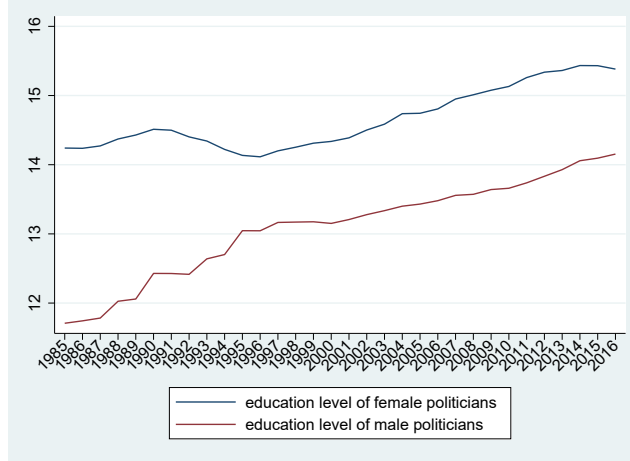

Note. We calculate the mean, over years, of the number of years of education of female/male politicians in the full body of municipality (mayor, councillors and aldermen).

Table 9: DiD estimates: Dissolution for reasons unrelated to mafia infiltration

Dep. Var	(1)	(2)
Education level of	Female Mayor	Male Mayor
No Mafia Infil	0.554**	0.0421
	(0.255)	(0.0963)
Constant	17.49***	15.92***
	(1.395)	(0.384)
Observations	1,495	38,963
R-squared	0.917	0.304
Province FE	YES	YES
Year FE	YES	YES

Notes. OLS regressions. *No Mafia Infil* is a dummy taking a value of 1 in the entire legislature of the local government dissolved for reasons unrelated to mafia infiltration and 0 otherwise All estimations include Province and Year FE. The following symbols indicate different significance levels: *** - significant at 1 percent, ** - significant at 5 percent, * - significant at 10 percent.

Figure 3: Percentage of female in city council and percentage of the female mayor. 1985–2016
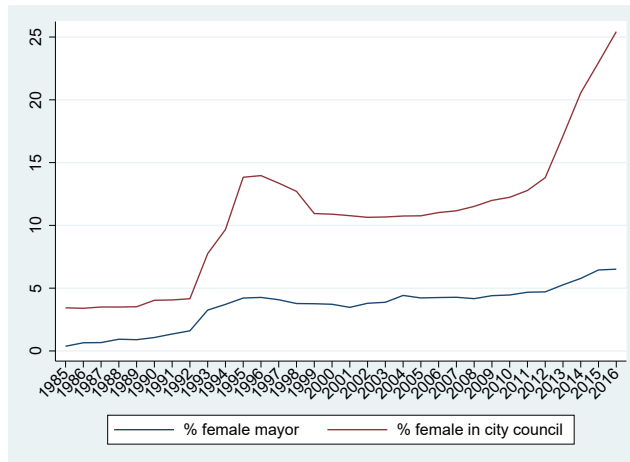
Data on violence toward municipal-level politicians. We collected data that details violence against politicians in Italy from 2010 to 2019. The dataset includes the kind of politicians that are the victims of attacks and the types of attacks (i.e., the arson of cars and the City Hall or its structures, threatening letters, physical attacks, the arson of politicians' houses, bombings of politicians' houses and City Hall and homicides). We extract data on such attacks from Avviso Pubblico, an Italian-governmental organization that yearly collects local news and primary sources on threats and attacks directed at Italian politicians and publishes an annual report. The Avviso Pubblio began collecting data in 2010.[27] From the data it emerges that in the four regions under analysis (Campania, Calabria, Sicilia, and Puglia) between 2010 and 2019 there were 1,563 attacks against local politicians (councillors, aldermen and mayors). 57% of them were directed toward mayors, 15% toward aldermen, and the remaining 28% toward councillors. Looking at the gender composition, 112 victims of attacks were female local politicians, 52% of them were mayors, 19% aldermen, and the 29% councillors. Moreover, the 58% of the 1,451 attacks directed at male local politicians were toward mayors, the remaining 14% and 28% toward aldermen and councillors, respectively.

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[27]https://www.avvisopubblico.it/home/home/cosa-facciamo/pubblicazioni/amministratori-sotto-tiro/.