

Weak States: Causes and Consequences of the Sicilian Mafia*

Daron Acemoglu
MIT

Giuseppe De Feo
University of Strathclyde

Giacomo De Luca
University of York

August 2017

Abstract

We document that the spread of the Mafia in Sicily at the end of the 19th century was in part shaped by the rise of socialist Peasant Fasci organizations. In an environment with weak state presence, this socialist threat triggered landholders, estate managers and local politicians to turn to the Mafia to resist and combat peasant demands. We show that the location of the Peasant Fasci is significantly affected by an exceptionally severe drought in 1893, and using information on rainfall, we establish the causal effect of the Peasant Fasci on the location of the Mafia in 1900. We provide extensive evidence that rainfall before and after this critical period has no effect on the spread of the Mafia or various economic and political outcomes. In the second part of the paper, we use the source of variation in the location of the Mafia in 1900 to estimate its medium-term and long-term effects. We find significant and quantitatively large negative impacts of the Mafia on literacy and various public goods in the 1910s and 20s. We also show a sizable impact of the Mafia on political competition, which could be one of the channels via which it affected local economic outcomes. We document negative effects of the Mafia on longer-term outcomes (in the 1960s, 70s and 80s) as well, but these are in general weaker and often only marginally significant. One exception is its persistent and strong impact on political competition.

Keywords: criminal organizations, economic development, Mafia, political competition, weak states.

JEL Classification: P16, K42, H11, H75.

Work in Progress. Comments Welcome.

*We thank Isaiah Andrews, Melissa Dell, Alfredo Del Monte, John Dickie, Salvatore Lupo, Nicola Persico, Shanker Satyanath, and seminar and conference participants at the American Economic Association, the Canadian Institute for Advanced Research, the Association for the Study of Modern Italy, the Petralia Applied Economic Workshop, and the Universities of Napoli, Milano and Luxembourg for useful comments and suggestions. Stefano Presti, Luca Pennacchio and Sara Moccia provided assistance in data collection, while Mateo Montenegro provided exceptional research assistance for various parts of the project. Financial support from the Bradley Foundation, the Carnegie Foundation and the Army Research Office, ARO MURI W911NF-12-1-0509, is gratefully acknowledged.

1 Introduction

The criminal syndicate known as the Mafia has played a defining role in the Sicilian economy and politics over the last 150 years, and has often been proffered as one of the prime reasons why Sicily has lagged behind the rest of Italy in economic and social development.¹ Though the Sicilian Mafia has significantly weakened after the Maxi trials of the 1980s and its further confrontation with the Italian state in the 1990s, it is still active in many Sicilian municipalities; between 2001 and 2014, 43 municipalities were put under external administration to weed out the extensive involvement of the Mafia in local governments and public procurements (Ministero dell'Interno, 2015).

Though many aspects of the Sicilian Mafia are unique to the economic and social conditions of the island and its particular history, there are also several commonalities between the Sicilian Mafia and other organized crime syndicates in Italy (such as the Camorra in Naples and 'Ndrangheta in Calabria) and the various drug gangs in Mexico, Colombia and Central America. All of these organizations appear to have partly filled the void created by a weak state, and may have contributed to the continued weakness of state institutions and to economic underdevelopment. In this paper, we seek to contribute to the literature on the causes and consequences of the Sicilian Mafia and other criminal organizations.

The first part of the paper proposes a new theory of how the Mafia spread throughout Sicily in the second half of the 19th century. Though the Mafia's roots extend back to the 1860s and the organization was certainly well established by 1885 in the capital Palermo and its rich suburbs as well as some mining areas such as Favara and Grotte in the Girgenti province, its major expansion did not take place until the early 1890s. This was preceded by the rise of the Fasci (*Fasci dei Lavoratori*), the first mass socialist movement in Italy, which articulated demands for better pay, greater security (longer-term contracts), and lower local indirect taxes for staples.² The Fasci gained significant momentum following the very severe droughts of 1893, which caused massive drops in agricultural output and amplified the hardships of peasants. In the absence of a strong state capable of countering the rise of the socialist movement and its demands, landowners and the managers of large agricultural estates turned to the Mafia. The involvement of the Mafia in the suppression of peasants was not a new phenomenon in Sicily. As the former chief prosecutor at the Palermo Court of Appeal, Diego Tajani, noted in a parliamentary debate in 1875, "The Mafia in Sicily is not dangerous or invincible in itself. It is dangerous and invincible because it is an instrument of local government." (Quoted in Dickie, 2004, p.73). But this role of the Mafia grew beyond recognition around 1893. John Dickie (2004, p. 136) describes this as

“Over the 60 years and more that followed the flowering of the Fasci movement,

¹In 2015 GDP *per capita* in Sicily was €17,100 compared to €27,000 for Italy as a whole. Child mortality in Sicily was 0.48% compared to a national average of 0.35% ISTAT (2016).

²Despite their common etymological root, which comes from the word *fascio* meaning bundle, there is no link between the Peasant Fasci movement and the subsequent fascist movement.

mafiosi would intimidate and murder countless socialists, Communists and trade union leaders — so many, in fact, that it came to seem as if the Mafia’s very purpose was to batter the organized working class in the countryside into submission.”

In line with this theory, we document that the Peasant Fasci were much more likely to emerge in parts of Sicily where the 1893 drought was more severe, and crucially the Mafia was much more likely to spread to municipalities with more severe drought in 1893 as well. This relationship is robust to controlling for various determinants of the Fasci movement, other potential causes of the Mafia (such as its previous locations, the presence of sulfur mines or citrus groves) and various geographic factors. More importantly, we show that weather conditions before 1892 and after 1893 do not have a similar effect on either the Fasci’s location or on the Mafia, bolstering the case that it was the effect of the severe drought of 1893 in the midst of the ongoing mobilization of the Fasci that prepared the conditions for the spread of the Mafia throughout Sicily.

The second part of the paper exploits the relationship between the drought of 1893 and the spread of the Mafia to estimate this crime syndicate’s effects on local economic development and other economic and political outcomes. Formally, we estimate medium-run and long-run effects of the Mafia in a two-stage least squares (2SLS) setup using drought in 1893 as an excluded instrument. We verify that economic and social indicators before 1893 are not correlated with drought in 1893 and rainfall in other years is not related to various subsequent economic and political outcomes, increasing our confidence in this instrumental-variables strategy.

We find fairly large effects of the Mafia on economic outcomes in the early 20th century such as literacy rates in the 1920s and 30s. These negative effects could be, in part, reflecting the lower capacity of the local states to provide public goods. We also identify one of the potential mechanisms via which the Mafia impacts both the local state’s capacity and other economic outcomes — the Mafia’s dominance over politics. Specifically, we find a striking increase in the concentration of votes across candidates in parliamentary elections. These results suggest that the Mafia became heavily involved in politics, and either prevented some candidates from campaigning in the municipality, or directly or indirectly manipulated which parties would capture the great majority of the votes in their districts.

We estimate similar, though somewhat smaller and less precise, negative effects of the Mafia on long-term economic outcomes as well: municipalities with the heaviest presence of the Mafia have lower rates of high school education and lower coverage of various public goods in the 1970s. Moreover, we also see the effects of the Mafia on political competition persist strongly to the later decades of the 20th century.

Our paper is related to a few literatures. First, a small theoretical literature models lawlessness and the economics of private protection. In addition to general treatments in Dixit (2004), Fiorentini and Pelzman (1995), and Abadinsky (2012), particularly relevant to our context is the seminal contribution

of Gambetta (1993) who emphasizes the importance of the Mafia as provider of private protection to landowners and businesses with specific investments in an otherwise lawless environment.

Second, several recent papers investigate the origins of the Sicilian Mafia. Following Gambetta (1993), several studies identified specific features or economic activities whose characteristics and potential profitability may have attracted the Mafia, shaping its early geographic distribution in Sicily. For example, Bandiera (2003) argues that land fragmentation increases the demand for private protection, and provides evidence consistent with this prediction from the three Western Sicilian provinces. Del Monte and Pennacchio (2012) document greater presence of the Mafia in areas with greater land productivity and rich mines, which they interpret as reflecting the greater willingness to pay of more productive landowners for private protection. In a similar vein, Dimico et al. (2012) show that areas where citrus is the main crop are more likely to fall prey to the Mafia, which reflects not just the productivity of citrus farming but its greater vulnerability to vandalism and disruptions of litigation. Buonanno et al. (2015), on the other hand, link the development of the Mafia to sulfur mines. As explained in the next section, our theory for the spread of the Mafia at the end of the 19th century and our evidence on the economic consequences of the Mafia are new relative to this literature.

Third, a growing literature is investigating the economic consequences of the weakness of local state institutions, focusing on several of the same outcomes as in our paper, such as literacy and the provision of various public goods (e.g., Gennaioli and Rainer, 2007; Dell, 2010; Bandyopadhyay and Green, 2012; Michalopoulos and Papaioannou, 2013; Acemoglu et al., 2015), but has not focused on the role of organized crime.³

Finally, and partly related to the origins of state weakness, a recent nascent literature investigates linkages between criminal organizations and political actors (Hess, 1973; Pezzino, 1990; Acemoglu et al., 2013). In the Italian context, De Feo and De Luca (2017) document that between 1946 and 1992, the Mafia supported the Christian Democratic Party, and in return obtained economic advantages in the construction sector. Buonanno et al. (2016) extend this analysis to the 1992-2013 period and show that after the collapse of the Christian Democratic Party, Silvio Berlusconi's party, Forza Italia, obtained a larger share of votes in Mafia-ridden municipalities. Alesina et al. (2016) provide evidence that Italian regions with a strong presence of criminal organizations experience an increase of murders in the pre-electoral year. For Sicily in particular, they show that the killing of politicians has a negative effect on leftist parties' vote share and on the anti-Mafia activities of elected officials. Daniele and Geys (2015) and Di Cataldo and Mastroiocco (2016) look at the infiltration of criminal organization into local councils and provide evidence of its negative effect on local tax collection, quality of local government expenditure and education level of elected officials in southern Italy. Similarly, Daniele and Marani

³There are also several papers using fluctuations in rainfall as a source of variation in their analysis of civil wars, democratic transitions, revolutions, protests and other political economy outcomes. See, among others, Brückner and Ciccone (2011); Dell (2012); Dell et al. (2014); Madestam et al. (2013); Miguel et al. (2004); Bonnier et al. (2015); Hsiang et al. (2013, 2011).

(2011) show that organized crime appears to reduce the flow of foreign direct investments towards the Italian provinces most affected by this phenomenon. Relatedly, Pinotti (2015) uses synthetic control methods to estimate the negative effects of organized crime on GDP per capita into southern Italian regions. None of these papers focus on the historical evolution of the Mafia, which is our main focus and source of variation in this paper.

The rest of the paper is organized as follows. Section 2 provides a brief historical overview of the situation in Sicily and the development of the Peasant Fasci and the Mafia at the end of the 19th century. Section 3 describes our data sources and provides descriptive statistics on our main variables. Section 4 presents our results on the effect of the Peasant Fasci on the spread of the Mafia after 1893. Section 5 presents our analysis of the effect of the Mafia on economic and political outcomes in the early 20th century, while Section 6 focuses on longer-term outcomes. Section 7 includes concluding comments. Additional results and robustness checks are presented in our online Appendix A.

2 Historical Context

In this section, we provide a brief historical context on the Sicilian Mafia, the state of agriculture in Sicily at the end of the 19th century and the Peasant Fasci.

2.1 The Origins of the Mafia

There is a large historical literature on the origins of the Mafia, starting with the important accounts of contemporaries such as Villari (1878), Franchetti (1877), Alongi (1887, 1904) and Cutrera (1900). The consensus view today (e.g., Gambetta, 1993; Dickie, 2004; Lupo, 1996) places the Mafia's origins in the context of the tumultuous process of the fall of the Bourbon Kingdom (which had included much of southern Italy and Sicily) and Italian unification. The faraway Italian state was weak and largely incapable of enforcing the law in the aftermath of the unification, and this void was partially filled by the private protection provided by the Mafia.

Early works (e.g., Romano, 1966; Mack Smith, 1968; Brancato, 1976) emphasized the role of the abolition of feudal land relations and identified the origins of the Mafia in the rural areas of Sicily, where a new class of landowners, managers and public administrators used criminal methods to grab land that should have been distributed to the peasants and developed coercive labor relations in latifundia specializing in wheat production. Recent scholarship has, instead, concluded that, despite its archaic rituals, the origins of the Mafia lie in the more urban, richer and export-oriented areas around the former capital, Palermo (e.g., Lupo, 1984; Pezzino, 1985, 1987; Catanzaro, 1988), where the vacuum of law enforcement created demand for protection, especially from smallholders specializing in citrus (lemon and orange trees, which required investment several years before the trees bear fruit,

uninterrupted irrigation and extensive protection). Dickie (2004, pp. 38–39) summarizes this recent view as

“The Mafia emerged in an area that is still its heartland; it was developed where Sicily’s wealth was concentrated, in the dark green coastal strip, among modern capitalist export businesses based in the idyllic orange and lemon groves just outside Palermo.”

The Mafia was also highly visible in areas with sulfur mines, such as Favara and Grotte in the Girgenti province. The earliest trial against the Mafia was held in 1885 in Girgenti, and involved the Favara brotherhood, which mainly consisted of sulfur miners.

The recent important work by Benigno (2015), instead, emphasizes the systematic use of crime syndicates in both Sicily and Naples by local politicians and government against political opponents.⁴ Echoing our quotation from Dickie (2004) in the Introduction, he highlights the common practice of using the Mafia against republicans and then socialists. Indeed, police reports and contemporary observers leave no doubt that the Mafia was not only active in much of Sicily, but had become part of the social and political order by the early 20th century.

In this context, it is useful to note that our work can be viewed as bridging the gap between the three schools of thought mentioned above. We document that the Mafia spread from its original urban mining surroundings to the more rural parts of the island in the 1890s, and this was in large part because of more intensive use of the Mafia’s coercive capacity by landowners and politicians against the nascent Peasant Fasci movement, which we describe below.

The Mafia’s role in Sicily declined considerably during Mussolini’s fascist dictatorship, especially after the administration of Prefect Mori starting in 1925. But it did not disappear, and after the American invasion, former members of the Mafia once again exploited the turbulent environment to reconfigure their crime syndicate. After the war, the Mafia also formed close relations with the Christian Democrats, which became the dominant party in Italy (e.g., De Feo and De Luca, 2017). Arguably, its power started declining after the Maxi trials of 1986-87, and the subsequent confrontation with the Italian state following its murder of two judges in the Maxi trial, Falcone and Borsellino.

Though information about how the Mafia functioned in the 19th and early 20th centuries is patchy, we have fairly extensive evidence about the Mafia’s practices in recent periods. Besides the highly profitable business around illicit drug production and trafficking, the Mafia has traditionally focussed on private protection and racketeering, and on private and public construction.⁵ The well-established reputation of the Mafia for damaging vineyards or orchards and stealing livestock in the past and for burning down or placing bombs in shops or industrial plants more recently guarantees a high rate of

⁴This point was already made by Mosca (1900).

⁵The discussion in Alongi (1887) suggests that the Mafia’s practices in the second half of the 19th century were not much different.

compliance from local businesses (Lorenzoni, 1910a; Pezzino, 1990). A vivid account of a Sicilian citizen, reported by Lorenzoni (1910a, p.649–650), describes the extent of the problems faced by the agricultural sector in the province of Trapani at the end of the 19th century:

“If you care about understanding the conditions of our agriculture in order to improve it, then start by this social plague, the Maffia, which is an unsurmountable barrier on the way to agricultural development. You can introduce new policies aiming at improving economically agriculture. But what will be the use of them, if farmers, constantly scratched by the powerful nails of the maffia, won’t be able to farm their land, as their draught animals are stolen or their harvest burned, because they refused to pay the money asked by the maffia?”

Construction activities require close connections with local authorities for obtaining permissions and overcoming regulations, which is a well documented feature of the Mafia (e.g., Pezzino, 1990). In return, as we already mentioned in the Introduction, the Mafia appears to have offered political support and services to some politicians.⁶ As Lorenzoni (1910a) puts it, the Mafia started acting early on as “electoral canvasser, supporting its protector, or a candidate friend of its protector, or whoever paid for its backing”. The reasoning reported by Franchetti (1877, p.190) exemplifies how the illicit deal may come about: “Let’s imagine a man, whose name and wealth allow reaching a high position among his citizens. [...] He’s got the chance to acquire authority and reputation through administrative, political or other elections. An individual with a known influence on the local population offers him his services; he knows that others exploit similar connections, and that the public opinions does not condemn this. He knows that the man committed some killings, [...] but those homicides only increased the respectability and reputation of its perpetrator.[...] Why not using the tool commonly used by others? So, he accepts the support offered.”

There is also evidence that a similar relationship has long existed between the Mafia and the central Italian government, which has had tenuous control in Sicily since unification (Pezzino, 1990, p. 59). Pezzino (1990, p. 74) discusses the range of activities the organization used for manipulating elections:

“Mafia bosses controlling packages of votes, manipulated electoral lists, stuffed with individuals who do not have the right to be included or conversely precluded to political opponents, rigged municipality elections, implemented without the very creation of an electoral office, or with falsified reports, harsh contests between factions or families leading to assassinations and violence.”

⁶Hess (1973) describes in detail (e.g., pp. 144-150) the various methods used by the Mafia for controlling elections.

Voters intimidation becomes more widespread whenever direct ballot stuffing is not viable.⁷ Hess (1973, p.148) describes this as: “Time and again we read that *uomini di rispetto* loiter around the polling box, that some of them are even armed, that men known as violent criminals and employees of a mafioso form the so-called *posto del blocco* outside of the polling station or in front of the polling box itself, that they stop the voters, talk to them menacingly, sometimes beat them up and accompany them right to the booth.”

Lorenzoni (1910a, p.677) anticipated some of the most pernicious effects of the Mafia’s involvement in the economy and local politics when he stated:

“In a State in which citizens for any reason do not trust justice and do not trust their own force, it is the evil ones who manage to impose themselves, and the ones who did not want to bow to justice are then forced to bow to them and be enslaved by them. So the Mafia emerges.”

2.2 The State of Sicilian Agriculture and the Drought of 1893

Sicily provides ideal conditions for various crops, including lemon and oranges mentioned above, grapes, and olive oil. But the crop that has played the most important role has always been wheat, and in the 19th century, most Sicilian latifundia specialized in wheat production. As US exports of wheat to Europe declined during the American Civil War, prices increased and wheat production spread further throughout Sicily. In 1885, grains occupied 44% of the total area of Sicily.

The main wheat variety cultivated in Sicily is the durum, sowed in November and harvested in late June. Production relied on cheap labor and made little use of capital or fertilizers. This made yields heavily dependent on rainfall during the mid-season of the crop, which is between early March and late May.⁸ A Parliamentary inquiry on the condition of agriculture in Sicily summarize the situation as “the level of production depends on the rain that, in order to ensure an excellent harvest have to occur up to the month of May. But if it stops before April the harvest is poor” (Jacini, 1884, p.26).

The 1880s brought several difficulties for Sicilian agriculture. Spain became the major exporter of oranges to France and the UK, and huge investments in the cultivation of oranges in Florida reduced the demand for the Sicilian export to the United States, which was previously the main market for

⁷Violence appears to become particularly important when various factions compete for the local control. In the words of Franchetti (1877, p.14): “Each one of the contending factions tries to strengthen by extending its alliance in the endless reservoir of bullies, criminals, and assassins. [...] The fight gets harsher, it spreads, it lights up throughout the municipality, and sometimes to neighbouring ones. It then starts the war of tricks, gunshots, ambushes, which sometimes degenerate into actual skirmishes.”The electoral involvement of the Mafia, however, comes at a high cost. Lorenzoni denounced how public authorities were “tolerating that well known mafiosi steered municipalities, acted as petitioners in public offices, and become intermediaries between the authorities and the public.” (Lorenzoni, 1910a, p.682)

⁸Brouwer and Heibloem (1986, chapter 3) identify the crop water needs as the product of a crop-specific coefficient, which varies according to the crop season, and an evapotranspiration coefficient that depends on the climate and temperature. Their calculations indicate that for wheat, the rainfall between March and May is most critical.

Sicilian citrus fruits. The same decade also witnessed a steady decline in the price of wheat because of increased competition from the United States and Russia. The demand for Sicilian agricultural products further declined as a result of the protectionist policies adopted in other key markets, including a commercial war with France starting in 1888, which led to the complete shutdown of the largest export market for Sicilian wine.

The conditions of agricultural workers and peasants in Sicily were generally quite bad. Several visitors in the 19th century commented on the extent of poverty of Sicilian peasants (e.g., Franchetti and Sonnino, 1877; Rossi, 1894; Paton, 1898). These workers were either day laborers, recruited on the day according to the need in the farm, or farmers renting small plots of land from the managers of the large estates. Day laborers were the largest class of rural workers in Sicily and small farmers also engaged in occasional day work to supplement their income.

Both groups experienced worsening conditions starting in the 1880s as Sicilian agriculture started facing various adverse trends. By this point, sharecropping arrangements had been replaced by short-term fixed rent contracts (of typically one or two years), leaving farmers more exposed to the risk of bad harvests. Day laborers were also vulnerable to bad harvests because of the reduced demand during the harvest season (Franchetti and Sonnino, 1877, p.32).

It was against this background that the severe droughts of 1893 hit. The severity of the drought was quite unprecedented.⁹ Extensive cultivation of grains throughout Sicily and their aforementioned dependence on weather conditions made the consequences of the drought even more severe. di San Giuliano (1894) reports that the yield in 1893 was about half of the usual yield, and this came following the already bad harvest in 1892, accentuating the hardship. Wheat was not the only crop that was adversely affected. Olive oil, wine and barley also experienced bad harvests (di San Giuliano, 1894). Using district-level data from Direzione Generale dell'Agricoltura (1891-1895), Figure A1 in the Appendix shows the drop in production in 1893 relative to 1890-1894 across Sicily, and indicates that some areas experienced a more than 65% drop in agricultural production.

Peasants and agricultural laborers felt the full force of the drought of 1893. The newspaper *Il*

⁹In some areas it was so severe that the popular reaction impressed observers, and was described by the famous Scottish anthropologist James George Frazer as “By the end of April 1893 there was great distress in Sicily for lack of water. The drought had lasted six months. Every day the sun rose and set in a sky of cloudless blue. The gardens of the Conca d’Oro, which surround Palermo with magnificent belt of verdure, were withering. Food was becoming scarce. The people were in great alarm. All the most approved methods of procuring water had been tried without effect. Processions had traversed the streets and the fields. Men, women, and children, telling their beads, had lain whole nights before the holy images. [...] Even the great St Francis of Paola himself, who annually performs the miracle of the rain and is carried every spring through the market-gardens, either could not or would not help. Masses, vespers, concerts, illuminations, fire-works – nothing could move him. At last the peasants began to lose patience. Most of the saints were banished. At Palermo they dumped St. Joseph in a garden to see the state of things for himself, as they swore to leave him there in the sun till rain fell. Other saints were, like naughty children, with their faces against the wall. Others, stripped of their beautiful robes, were exiled far from their parishes, threatened, grossly insulted, ducked in horse-ponds. [...] At Licata the patron saint, St. Angelo, fared even worse, for he was left without any garments at all; he was reviled, he was put in irons, he was threatened with drowning or hanging. ‘Rain or the rope!’ roared the angry people at him, as they shook their fists in his face.” (Frazer, 1920, pp.299-300)

Giornale di Sicilia described the situation in Carlentini in October 1893 as

“The state of the countryside is disheartening: the olives fall dried and drenched from the trees, lemon and orange tree are suffering, pasture is most rare, and the poor peasants are unemployed and bear more than anyone else the effect of such calamity. Misery is immense here, as all over the island.”

These harsh conditions provided an ideal environment for the Peasant Fasci movement, which started spreading throughout much of Sicily in the early 1890s.

2.3 The Peasant Fasci and the Spread of the Mafia

The Peasant Fasci was the first popular socialist movement in Italy. The first leagues were founded in 1891 and organized mainly industrial workers and artisans in the largest cities.

The first peasants’ organization emerged late in 1892 but it was the drought of 1893 that, by significantly worsening the conditions of Sicilian peasants, acted as a major impetus to the Fasci movement. The Fasci articulated many of the grievances of peasants and the day laborers of Sicily. Chief among their demands were higher wages, land redistribution, better working conditions, longer-term contracts for land leases, the return to sharecropping arrangements, and the reduction in indirect taxes which fell heavily on peasants (Romano, 1959; Renda, 1977; Casarrubea, 1978b).

The indirect taxation was a longstanding battleground in Sicily and a symptom of the deeper problem of taxation without representation.¹⁰ The Sicilian local elites, who controlled the councils, made a disproportionate use of such taxes in order to reduce the fiscal burden on their properties. This made the burden of indirect taxes on staple consumption in Sicily twice as large as in the rest of Italy, while the tax on land and buildings on the island was a third of the Italian average (*Siculus* (Antonio De Viti De Marco), 1894, p. 132). The situation for the peasantry got worst during the drought of 1893, when many Sicilian municipalities obtained the authorization from the central government to further raise indirect taxes above the national statutory upper bound (Romano, 1959, p. 320).

From its headquarters in the Palermo province, the Fasci movement quickly spread to provinces most affected by the drought, including Girgenti, Trapani, Caltanissetta. By the end of 1893, there were hundreds of thousands of members of the 177 Fasci organizations in 158 municipalities, and the majority of these organizations were affiliated with the Socialist Party. At the first National Congress of the Italian Socialist Party in 1893, half of the party members were from Sicily (Degl’Innocenti, 1984, p.8).

¹⁰De Viti De Marco(1894) describes this problem, as perceived by contemporaries, as: “If a class of citizens who do not pay taxes does not have political representation [in the councils] is something I understand and, as a matter of principle, I consider desirable. But that the class that bears the heaviest burden of local taxes [is not enfranchised and] is at the mercy of a greedy and sectarian minority is intolerable.” (*Siculus* (Antonio De Viti De Marco), 1894, p. 135)

Though Sicily was no stranger to peasant revolts, the scale and organization of the Peasant Fasci were completely unprecedented, and the threats to landowners and rural estate managers were amplified by the fact that the Fasci were part of the nascent Socialist Party.

The Fasci's demands for better working conditions and lower consumption taxes faced fierce the resistance of the aristocratic landlords and the rural middle class in control of the local administrations. They sought the intervention of the Italian army to suppress the uprisings. But there was no decisive action from the central government, reflecting its weakness in Sicily and its initial ambiguous attitude towards the Socialist Party. As Clark (2014, p. 125) puts it

“These novel organizations, and the successful strikes over agricultural contracts, naturally alarmed the landowners and larger tenants.[...] The Giolitti government showed little sympathy. Strikes were not illegal, and Giolitti was well aware of the state of local government on the island.”

In this context, landowners and the rural bourgeoisie turned to the rural guards, “whom we recognize as manifestations of Mafia power” (Lupo, 1996, pp. 183).¹¹ From this point onwards, the Mafia became heavily involved in violently suppressing peasant uprisings and organizations (Brancato, 1976; Dickie, 2004, p. 232).¹²

The first documented case of Mafia involvement in the repression of peasant uprising is probably the bloodshed in Caltavuturo in January 1893 when a rally of peasants demanding redistribution of the common (municipality-owned) land encroached by some of local administrators was met with violence. The incidents were provoked by mafiosi, who started the shooting and prompted the intervention of the military force, which than indiscriminately fired into the crowd, causing 11 deaths and 40 injured among the peasants (Romano, 1959, pp. 168-177, Lupo, 1996, p. 183).

A few months later, in the central square of Giardinello, a small rural center of the Palermo province, the peasants demonstrated against local taxes, the administration and the rural guards. As the demonstrators were leaving at the end of the rally, shots from the mayor's house overlooking the square killed five peasants (Siragusa, 2007). The subsequent intervention of the military force led to the death of two more demonstrators (Romano, 1959, p.448-454).

In Lercara, a large agro-town in the Palermo province with rich sulfur mines, on 25 December 1893, and in Gibellina in the Trapani province on 2 January 1894, rallies against local administrators and taxes were a violently suppressed by the rural guards. In both cases armed guards hidden in the bell tower overlooking the central square shot on the crowd and then the successive intervention of

¹¹For the role of rural guards in the Mafia organization see also Romano (1966, pp.175–177)

¹²Lupo (1996) also discusses a handful of cases of members of the Fasci who also joined the Mafia, but this seems to have been not a general pattern, and in many cases, it was short lived.

the army increased the death toll.¹³ Similar events were reported in Belmonte Mezzagno where two peasants were killed and several were injured (Siragusa, 2007).

After months of strikes and rallies, in which many peasants lost their lives in the hands of the mafiosi and the army, in early January 1894 the Fasci were declared illegal, their leaders were arrested, and a state of emergency and curfew were declared. In the words of Santino, “The Fasci movement was bloodily repressed by the joint action of the Institutions and the Mafia” (Santino, 2000, p. 24).

3 Data and Descriptive Statistics

Our database comprises data from 333 municipalities for which the Sicilian cadastre of 1853 provide information.¹⁴ These municipalities belong to 24 districts in seven provinces. Data for subsequent periods, which are at times more disaggregated, are aggregated back to the 333 original municipalities.

The data on the presence of the *Fasci dei Lavoratori* are taken from Renda (1977, p.339-344) who lists all the *Fasci* organizations established in Sicily between 1891 and January 1894. Renda provides information about 177 organizations active in 161 municipalities. Using several additional historical sources, we also distinguish the Peasant Fasci and industrial workers’ organizations.¹⁵ Overall, we identify 106 municipalities that had leftist Peasant Fasci in 1891-94, and 58 municipalities with Fasci of industrial workers. In Figure 1 we map the presence of Peasant Fasci organizations in the period 1893-1894.

The information on historical rainfall are from Eredia (1918), who compiled data from several sources including the weather stations of public institutions like the Ministry of Agriculture, and the Ministry of Public works, as well as from private sources such as the Electric Society of Eastern Sicily, the Society of the Palermo Aqueduct, and the Marquise Casses Eaton. These data include the coordinates and altitude of the weather stations and the monthly rainfall in millimeters. We use 39 stations which were active in Sicily in the early 1890s that could be matched with the data provided in the *Annali Idrologici* for the Sicilian Hydrological Basins 1916-1941.¹⁶ We use the standard interpolation method in the literature (following the Climatic Research Unite at the University of East Anglia). In particular, we calculate relative rainfall (the percentage difference from mean rainfall between 1881

¹³See Romano (1959, p.454) on the events in Lercara, and Colajanni (1895, p. 181–183) for an account of the massacre in Gibellina and the role of the rural guards.

¹⁴In 1853 there were 348 municipalities in Sicily; however, the data from the Bourbon Cadastre in Mortillaro (1854) were aggregated for several municipalities, while the data for two of them went lost. Other municipalities lost their autonomy in the aftermath of the Italian unification, reducing the number of municipalities by 15.

¹⁵In addition to Romano (1959), these additional sources include Colajanni (1895), for the provinces of Enna and Catania, Amato and Battaglia (1976) for the province of Messina, Casarrubea (1978a,b) for the Palermo province, Costanza (1993) for the Trapani province, Miccichè (1981) on Ragusa and Siracusa provinces, Barnabà (1981) for the province of Caltanissetta, Rossi (1894) and Giannone (2014) on the Girgenti province.

¹⁶These publications are available from the website of the ISPRA, Agency of Environmental Protection and Research of the Italian Environment Ministry.

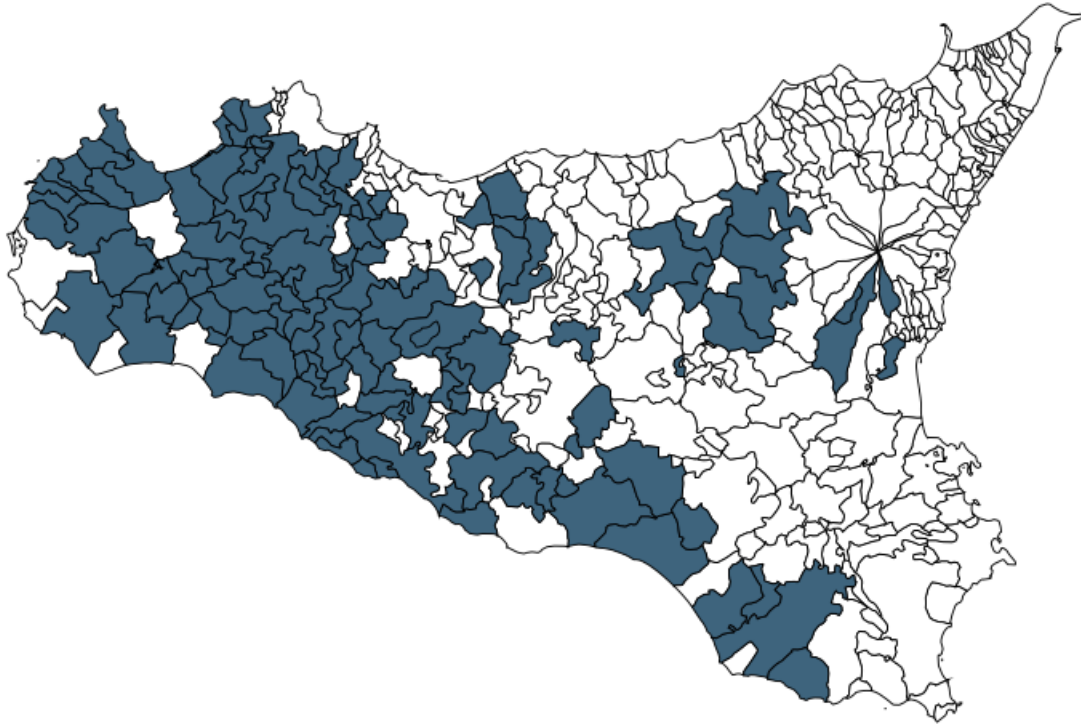


Figure 1: Presence of Peasant Fasci organizations in Sicily in the period 1891-4. Source: Renda (1977).

and 1940) for each weather station, and then interpolate from these weather stations using weights inversely proportional to distance to obtain municipality-level (relative) rainfall.¹⁷ We exclude any weather stations more than 30 km away from the municipality. (In our robustness checks, we also exclude weather stations 25 km or 35 km away or exclude municipalities that do not have at least two weather stations within a 30 km radius). In Figure 2 we report the interpolated relative rainfall for the Spring 1893 and the locations of the weather stations. We also compute the variance of our relative rainfall measure and average absolute rainfall, which we use as controls for climate characteristics in our regressions.

Our measure of Mafia prevalence by municipality in 1900, a few years after the rise of the Fasci movement, is derived by Cutrera (1900). Cutrera was a police inspector in Sicily and derived this information from his own experience and research, and emphasizes that this information is not based on the number of crimes or any other criminal statistics “because I am convinced that the Mafia density cannot be represented with numbers [of crimes]. We have already seen that the Mafia does not always commit crimes, and that the crimes perpetrated by them are not exclusive of the Mafia.[...] For this

¹⁷See, for example New et al. (1999, 2000, 2002).

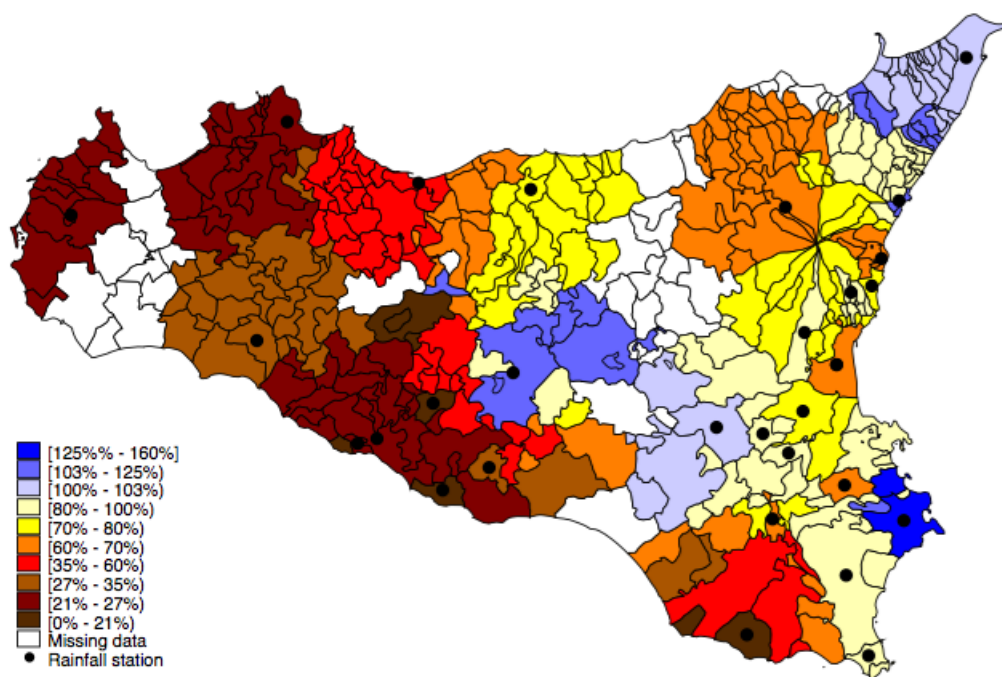


Figure 2: Drought intensity in spring 1893. Ratio of the rainfall in spring 1893 to long-run average spring rainfall.

reason we drew this map using our personal appraisal of the different density of the Mafia from town to town” (Cutrera, 1900, pp.114–115). We create the variable *Mafia*1900 with values ranging from 0 (no Mafia), to 3 (strong Mafia presence). In 1900 Sicily had 357 municipalities organized in 7 provinces. Cutrera identified 84 municipalities where there was no Mafia, 66 where there was little presence, 70 where the Mafia was of minor importance, and 69 municipalities with a major presence of the Mafia (68 municipalities were left unclassified). 38% of the municipalities in the Palermo province had a major presence of the Mafia, while this was the case in 44% of the municipalities in the Trapani province, 41% in the Girgenti (the old name of Agrigento) province, 29% in the Caltanissetta province, 15% in the Catania province, and 7% in the Messina province. No municipality was classified as having a major Mafia presence in the Siracusa province. We believe that this is a reliable source for the Mafia intensity. The source is widely acknowledged in the historical literature. The geographic distribution of the Mafia intensity according to Cutrera (1900) is depicted in Figure 3.

To control for the presence of the Mafia before the Fasci movement, we use the information reported in the 1880-85 parliamentary inquest on the Italian agriculture (Jacini, 1885). Jacini requested information about the presence of the Mafia from local state officials in each of the 162 Sicilian judicial districts. We follow Buonanno et al. (2015) and classify all the municipalities in the judicial district according to the intensity of the Mafia. In Figure 4 we depict the resulting variable, *Mafia*1885.

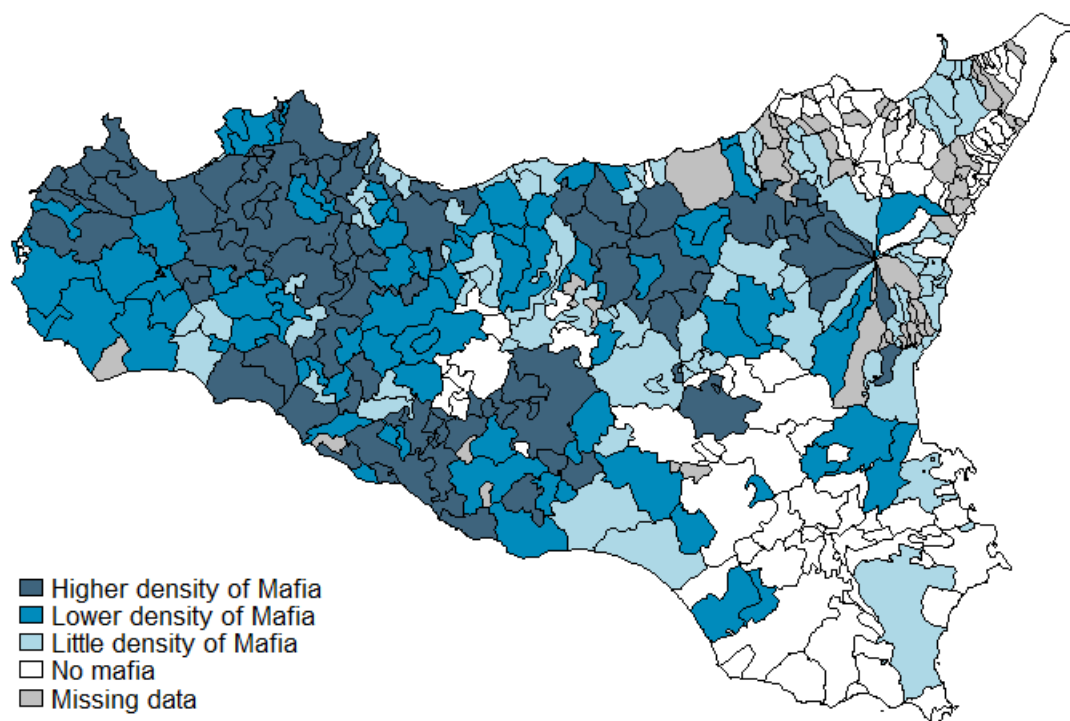


Figure 3: Mafia intensity in 1900 according to the Police inspector Cutrera. Source: Cutrera (1900).

As for our controls, we collected data about the agricultural use of land and rents at municipality level from Sicily's Bourbon Cadastre compiled by Mortillaro (1854). The agricultural use of land is based on the *riveli*, declarations made by the landowners to the Royal commission in 1815 and updated in the 1830s.¹⁸ particularly relevant because it pertains to a period before the Italian unification and therefore before the emergence of the Sicilian Mafia. From this source we obtain the average agricultural rent per hectare and the urban rent per hectare (for municipalities with more than 3000 residents). We also compute from the same source the share of the total area devoted to cereal cultivation, citrus groves, vineyard, olive groves, the share of agricultural land, and the total area of the municipality.

From the first Italian census in 1861 we gather information on total population as well as of the existence of agro-towns (rural centers) where peasants and farmers were concentrated. These towns are a peculiar characteristic of the Sicilian countryside, often linked to a concentrated land ownership structure, which induced landless peasants to concentrate in rural town centers where they could get seasonal or other work in large estates specializing in cereals. The presence of such towns is thus both an indication of the pattern of land ownership and a potential direct determinant of peasant organizations, since as emphasized by Hobsbawm (1971), the presence of so many peasants agglomerated

¹⁸Information about rents obtained from landowners were updated using market price data by the commission, but their work was interrupted several times and only completed in 1853. This dataset is

in agro-towns “gave them the opportunity to discuss grievances, formulate unified strategies and act collectively” (Kaplan, 1977, p. 5). We define agro-towns as municipalities that have a center with an agglomerated population of at least 4,000 residents and with more than 40% of the agricultural land devoted to cereal cultivation.

As highlighted in the historical background, another important determinant of the development of the Sicilian Mafia has been the presence of sulfur mines. We use data reported in Parodi (1873) to compute the average production of sulfur in each municipality between 1868 and 1870.

We use further geographical variables to control for the distance from the capital, Palermo, and from the closest port using the postal distance as reported by Lo Jacono (1856) which takes into account the availability of roads. The dummy variable for direct access to one of the postal roads is coded from the detailed maps compiled by Cary (1799) and digitalized by Buonanno et al. (2015). Information on the coordinates and altitude of the city center, the maximum altitude and the average altitude are provided by the 1929 Agrarian Cadastre. Finally, the average temperature is from the website climate-data.org.

Data on political competition in 1865 and 1909 are obtained from the database provided by Corbetta and Piretti (2009). The parliamentary elections in 1865 and 1909 were held under a first-past-the-post system in 55 electoral districts in Sicily. For each municipality we compute the Herfindahl

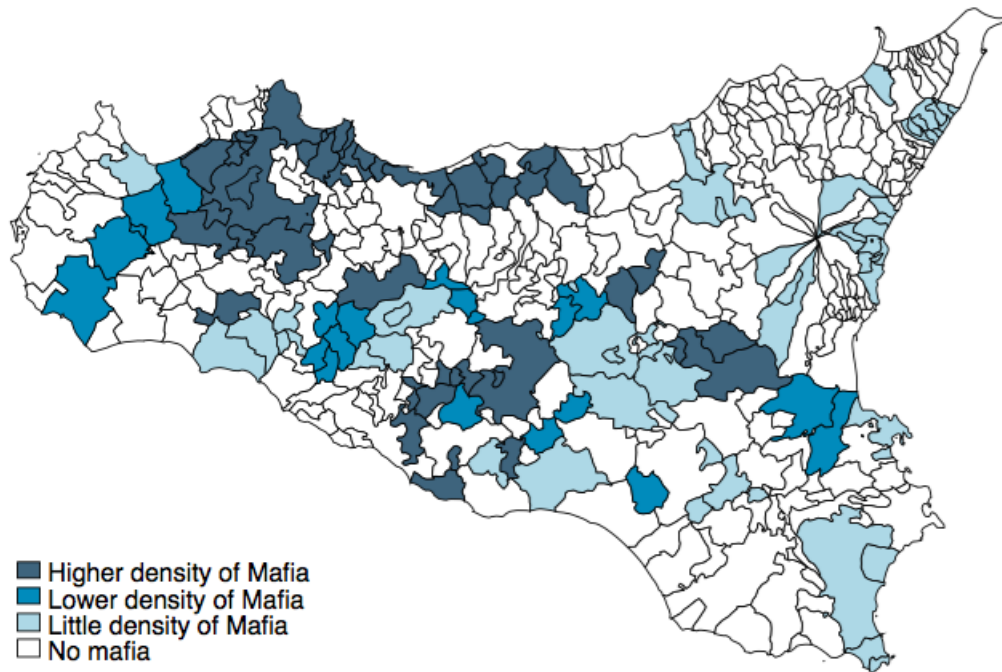


Figure 4: Spatial distribution of the Mafia presence according to its intensity as reported in Jacini (1885).

concentration index (or HHI as an abbreviation for Hirschman-Herfindahl index) by looking at the share of votes of each candidate. Using data from the 1913 parliamentary elections, which were the first under universal manhood suffrage, we also compute the share of votes of socialist candidates (from one of Official Socialist Party, Reformist Socialist Party, and Independent Socialist Party).¹⁹ We also collect the data for the lower chamber of the Italian parliament for the years 1963, 1972 and 1983 from the Election Historical Archive of the Interior Ministry website. These elections were held under a proportional system with a single national constituency and we compute the Herfindahl from vote shares of all the parties in each municipality.

We measure human capital, our main proxy for the overall level of economic development, using data on literacy in the earlier part of our sample and high school completion rates of the population and later parts. We compute literacy rates for the population above the age of six and the high school completion rate from the population censuses for the years 1911, 1921, 1931, 1961, 1971 and 1981.

To measure state capacity, we computed the average infant mortality rate for 1869-70 and 1908-9 for each municipality, using primary sources. We counted the number of deaths of residents below the age of one from the death registers of each municipality for 1869, 1870, 1908 and 1909.²⁰ We then collected data on number of births for the corresponding years and computed the infant mortality rate as the average ratio of deaths below the age of one over the number of births for the years 1869 and 1870, and 1908 and 1909 by municipality of residence.²¹ We also compute the infant mortality rates for the years 1969-1970 and 1982 using data provided by ISTAT on deaths by age and sex by municipality. We compute the mortality rate in the earlier years using the births by municipality of residence.²²

We also computed a measure of per capita development expenditure (in logs) from the 1884, 1912, and 1957 municipality budgets. This measure, which aggregates all spending for development or improvement of local infrastructure, education, security and justice (e.g. building or upgrading of roads and schools), captures the share of spending for which the local administration retained some discretionary power (though the 1957 data do not distinguish between discretionary development spending and other discretionary spending). The data have been collected from official government publications (Direzione Generale della Statistica, 1887; Direzione Generale della Statistica e del Lavoro, 1914; Direzione Generale dell'Amministrazione Civile, 1958).

¹⁹As an alternative measure of the presence of socialist organizations we use data on peasant league membership reported in Lorenzoni (1910b).

²⁰In case one of the registries was not available, we used data from the subsequent year.

²¹The data for the number of births by municipality are from the publications of the Ministry of Agriculture, Industry and Commerce "Movimento dello Stato Civile" for the years 1869 and 1870 while for the years 1908 and 1909 we used the data provided by Somogyi (1979).

²²The data for the years 1969-70 report the deaths by municipality of the event and not of residence. There is therefore a mismatch between the numerator (deaths by municipality) and denominator (births by municipality of residence) which may bias the result, increasing the mortality rate for municipalities with hospitals or a health centers.

Information on the quantity and quality of drinking water in 1885 is from Direzione Generale della Statistica (1886), data on aqueducts in 1909 are from Lorenzoni (1910b, pp.564-586), and data on aqueducts in 1961, 1971 and 1981 are from the Population and Housing Censuses.

Tables 1A and 1B provide descriptive statistics for all of the variables used in our analysis.

4 The Origins of the 19th-Century Expansion of the Mafia

This section empirically investigates the effect of the drought of 1893 and the Peasant Fasci movement on the spread of the Sicilian Mafia. It provides evidence that the drought of 1893 had a major effect on the presence of Peasant Fasci and also on the spread of the Sicilian Mafia.

4.1 First Stage

We start with the following cross-sectional relationship linking the presence of the Peasant Fasci to the drought of 1893:

$$\text{Fasci}_i = \gamma^{\text{Fasci}} \cdot \text{relative rain}_i^{1893} + X_i' \beta^{\text{Fasci}} + \varepsilon_i^{\text{Fasci}}, \quad (1)$$

where Fasci_i denotes our dummy variable designating the presence of the Peasant Fasci in municipality i , $\text{relative rain}_i^{1893}$ is the (relative) rainfall variable capturing the severity of the drought of 1893,²³ also described above, X_i is a vector of covariates which will be discussed in greater detail below, and $\varepsilon_i^{\text{Fasci}}$ is the random error term, capturing all omitted factors. Equation (1) will be our first stage when estimating the impact of the Peasant Fasci on the development of the Mafia.

Estimates of equation (1) on our sample of 245 municipalities are reported in Table 2. In column 1, Panel A, we show the raw correlation between our Peasant Fasci variable and relative rainfall (without controlling for any covariates). Unless stated otherwise, we report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. These standard errors take into account the fact that rainfall in a municipality, as well as many of our other variables, might exhibit significant correlation with neighboring municipalities. Moreover, as described in the previous section, and further discussed next in our robustness checks, the fact that rainfall data for many municipalities is interpolated from neighboring weather stations creates additional correlation across observations; the two-way clustering is a simple method to remove this correlation. Since we have 24 districts and 30 stations,²⁴ we compute the standard errors using a bootstrap procedure (Cameron et al., 2008, 2011). As we will see below, maximum likelihood estimation taking the exact structure of the error term resulting from

²³Clearly, our relative rain_i^{1893} variable is an inverse measure of drought.

²⁴For 1893, we have data from 30 of our 39 stations.

interpolation leads to standard errors very similar to the two-way clustered errors.²⁵ Throughout, we include *, **and *** next to the coefficient to designate that, with the specified standard error, the coefficient estimate is significant at 10%, 5% or 1% respectively. In column 1, we see a coefficient of -1.003 that is significant at 1%.

Column 1, Panel B adds province fixed effects to this specification so that the comparison is between municipalities in the same province (as noted above, we have 7 provinces in the data). The relationship is quite similar and somewhat smaller with province fixed effects; -0.763 (with a two-way clustered standard error of 0.208).

The remaining columns add successively more of the covariates we use throughout the paper — both with and without province fixed effects in the two panels. In column 2, we include various determinants of the presence of the Peasant Fasci, which include: a dummy for the municipality being a rural center (“agrotown”), the levels of rural rents and urban rents, the share of total cultivated land, and the share of land devoted to grains. These variables are expected to affect the presence of the Fasci, which were more likely to organize in places where grain production was important. The inclusion of these covariates has very little effect on the relationship between our drought variable and the presence of the Peasant Fasci, and the estimates of γ^{Fasci} are now -0.952 and -0.838, respectively without or with province fixed effects. Column 3 includes, in addition, various determinants of the presence of the Mafia: sulfur production in 1868-70 (emphasized by Buonanno et al. (2015)), citrus groves in 1830s (emphasized by Del Monte and Pennacchio (2012) and Dimico et al. (2012)), olives and vineyards (discussed by Bandiera (2003)) and Jacini’s measure of the strength of the Mafia in 1885. These variables also have very little effect on the coefficient estimates of interest, which now stand at -0.939 and -0.772 without or with province fixed effects. Column 4 adds a range of geographic controls, in particular, log population in 1861, log area of the municipality, elevation, distance to Palermo, distance to the closest port, access to postal roads, average temperature, average rainfall and variance of our (relative) rainfall measure, all of these computed over the period 1881-1941. The results are again similar.

Quantitatively, the coefficient estimate in column 4, Panel B, -0.755, implies that experiencing a very severe drought (corresponding to the 25th percentile of the rainfall distribution across municipalities in the 1893 drought) increases the likelihood for a municipality to witness the organization of the Peasant Fasci by 37 percentage points with respect to a municipality with essentially no drought (at the 75th percentile of the distribution).

Figure 5 shows the residual plot corresponding to column 4, Panel B. In addition to depicting the negative relationship it also shows that this relationship, is not driven by any outliers.²⁶

²⁵Many of our variables are likely to be spatially correlated. The clustering at the district level partially corrects for spatial correlation as well. We have also computed spatially-corrected standard errors following Conley’s procedure, and in all cases, the standard errors are smaller than the ones we report.

²⁶We also verified that outliers are not responsible for our results by estimating a robust regression that downweights

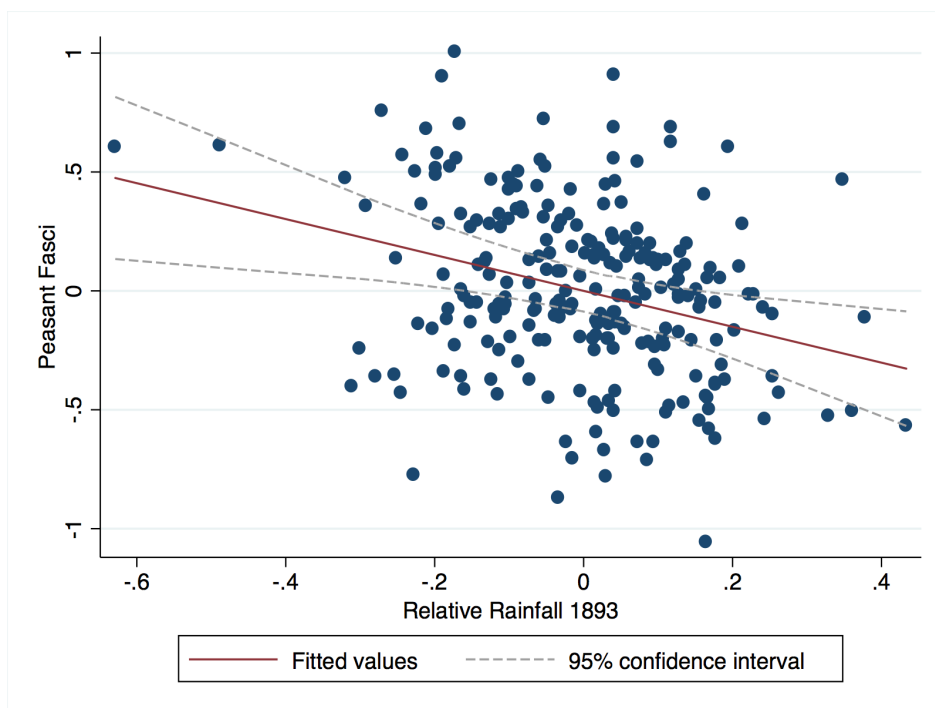


Figure 5: Residual plot of Relative Rainfall against Peasant Fasci.

4.2 The Impact of Peasant Fasci on the Mafia

We now turn to the main focus of this section, the impact of the Peasant Fasci on the expansion of the Mafia. As explained in the Introduction and in Section 2, our hypothesis is that the Mafia spread to parts of Sicily where the Peasant Fasci was strong, because landowners and rural estate managers turned to the Mafia to combat and limit the influence of the Fasci. Econometrically this hypothesis can be investigated by estimating the following simple cross-sectional relationship

$$\text{Mafia}_i = \alpha^{\text{Mafia}} \cdot \text{Fasci}_i + X_i' \beta^{\text{Mafia}} + \varepsilon_i^{\text{Mafia}}, \quad (2)$$

where Mafia_i is the index of strength of the Mafia in municipality i from Cutrera (1900), described previously. Recall that this variable takes a value of 0, 1, 2 or 3, progressively indicating stronger Mafia presence in the municipality. The coefficient of interest is α^{Mafia} , which represents the causal effect of the Fasci on the Mafia.

Though equation (2) can be estimated by OLS, this is unlikely to lead to consistent estimates of the impact of the Fasci on the Mafia, since despite our detailed controls, areas in which the peasant

outliers following Li's (1985) procedure. This leads to a coefficient estimate of -0.865 that is significant at less than 1%, thus very comparable to the OLS estimate in column 4.

organizations were more successful in taking root might also be particularly vulnerable to the Mafia, leading to an upward bias in α^{Mafia} . Conversely, if the Mafia makes it less likely for the Fasci to successfully organize (as we are essentially hypothesizing), then factors that facilitate the expansion of the Mafia will also make it less likely that the Peasant Fasci are present, potentially leading to a downward bias in α^{Mafia} .

To partially overcome these problems, we will use an instrumental-variables (IV) strategy with (1) corresponding to the first stage for the Peasant Fasci. This IV strategy is valid if the error term in (2), $\varepsilon_i^{\text{Mafia}}$, is orthogonal to the excluded instrument, relative rainfall¹⁸⁹³. We have already motivated this exclusion restriction in the Introduction and in Section 2. Here we simply note that even though the drought of 1893 was very severe in many parts of Sicily, what made it more consequential was its juxtaposition with the rise of the nascent Fasci movement. We document below that other similar droughts (before or after 1893) did not have any impact on future Mafia or socio-economic outcomes. Our causal channel is thus confined to this specific historical juncture where the drought strengthened the Peasant Fasci and induced landowners to turn to the Mafia as a counterweight to the Fasci's demands.

Table 3 provides two-stage least squares (2SLS) estimates of equation (2). This table has an identical structure to Table 2, except that we also report first-stage F statistics (for our excluded instrument, relative rainfall), and in Panels B and C we report in addition OLS estimates of the coefficient α^{Mafia} for comparison. In column 1, Panel A, we see a large and very significant estimate of α^{Mafia} , 2.051 with the two-way clustered standard error of 0.428. As in the other specifications, the first-stage F-statistic is quite large and indicates that there are no weak instrument concerns. In column 1 of Panel B, we now see a considerably smaller coefficient, 0.867, which is still statistically significant at 10%. The difference between these two estimates likely reflects the fact that comparing the presence of the Mafia across different provinces of Sicily is not as informative as within-province comparisons, in part because the success of the Mafia to take root in some provinces. Motivated by this reasoning, in what follows we put more emphasis on the specifications that include province fixed effects. In columns 2-4, we again include the same set of covariates as in Table 2. In Panel B, which includes province fixed effects, the estimates of α^{Mafia} are fairly stable, ranging between 1.031 and 1.510, and are always significant at less than 1%, though the first-stage F-statistic falls to 7.72 in column 4.²⁷

Quantitatively, our estimate from column 4, Panel B indicates that the presence of the Peasant Fasci in a municipality increases the Mafia index in that municipality by 1.5. To put this in perspective, recall that an increase in the Mafia index from 1 to 2 corresponds to a change from little presence of the Mafia in a municipality to significant presence. This quantitative magnitude implies that as much as 37% of the strength of the Mafia in 1900 throughout Sicily may have been due to its deployment against the Peasant Fasci, thus suggesting that the episode we are focusing on may have played a pivotal role in

²⁷We also estimate highly significant effects in Panel A, though these are larger and somewhat less stable.

the Mafia’s dominant position on the island.

Table 3 also shows that the OLS relationship between the Peasant Fasci and the Mafia is considerably weaker than the 2SLS relationship. We believe this reflects the fact that, as noted above, the Mafia made it difficult for the Fasci to organize in the first place. In Table A1 in the Appendix, we report the coefficients of the prior existence of the Mafia (Mafia 1885) on the emergence of the Peasant Fasci. These coefficients are always negative and always significant at less than 10%.

4.3 The Drought and the Mafia

In our investigation of the effect of the Mafia on medium-term and long-term outcomes, we will bypass the causal channel working through the Peasant Fasci, and instead directly use our rainfall variable as a source of variation in the presence of the Mafia at the beginning of the 20th century. To prepare for these specifications, we now show the relationship between our drought variable and the Mafia directly, estimating the regression equation

$$\text{Mafia}_i = \gamma^{\text{Mafia}} \cdot \text{relative rainfall}_i^{1893} + X_i' \beta^{\text{Mafia}} + \varepsilon_i^{\text{Mafia}}. \quad (3)$$

Estimates of this equation are reported in Table 4, which has an identical structure to Table 2, but also reports the F-statistic for our instrument. Though this F-statistic is small in the first column of Panel B, in columns 2-4, which are the main specifications we will use in our 2SLS estimates, they are between 8 and 11.²⁸

Unsurprisingly given the results in Table 3, we see a strong, stable and highly significant relationship in Table 4. Panel A is once again without province fixed effects and is included for completeness; as already noted, we put more emphasis on the estimates including province fixed effects, which are in Panel B. In Panel B, column 1, γ^{Mafia} is estimated as -0.661 (with a two-way clustered standard error of 0.339). As the same covariates as in Tables 2 and 3 are added, this coefficient increases to -1.140 in column 4, and is always significant at less than 1%.

4.4 Alternative Correction for Standard Errors

Though the two-way clustered standard errors are fairly conservative, they do not explicitly take into account the fact that measurement error in the rainfall from a weather station will affect the (relative) rainfall variable for several municipalities. In this subsection, we explicitly correct for this potential correlation by developing a maximum likelihood estimation strategy.

²⁸We should also note that the exclusion restriction when we directly use equation (3) is slightly weaker than when we use (1) and (2). In the former case, we require that the drought has no direct impact on medium-term and long-term economic and political outcomes, while in the latter case, we would additionally require that any effect of the drought on the Mafia works entirely through the Peasant Fasci.

Let us denote the number of municipalities by n and the number of weather stations by $k < n$. Suppose that true rainfall is given by the k -dimensional vector R , but in practice, instead of observing this true rainfall vector, our measurement is subject to error, and we observe

$$\tilde{R} = R + \xi,$$

where ξ is a vector of weather station-level measurement error terms.

As described in Section 3, we construct municipality-level rainfall (or relative rainfall) by using the $n \times k$ weights matrix, W . This matrix specifies how rainfall in a municipality is related to rainfall measured at the various weather stations across Sicily. Thus our instrument at the municipality level is constructed as

$$\tilde{Z} = W\tilde{R} = Z + W\xi,$$

where

$$Z = WR$$

is the true vector of (relative) rainfall across municipalities.

Thus, once again using vector notation, the relationships of interest for us can be represented as

$$\begin{aligned} y &= X'\beta + \gamma\tilde{Z} + \tilde{\varepsilon} \\ &= X'\beta + \gamma Z + \varepsilon + \gamma W\xi, \end{aligned} \tag{4}$$

where y is one of our left-hand side variables (e.g., Peasant Fasci or Mafia).

In this model, there are k additional random effects that need to be estimated. These random effects create additional correlation between the residuals of different municipalities, and if they are ignored, this could lead to standard errors that are understated.

To estimate (4), we assume that both ε and ξ are normally distributed (with variance-covariance matrices that allow for arbitrary heteroscedasticity, Σ and Λ). This enables us to specify the likelihood function explicitly and estimate the relevant parameters by maximum likelihood. Notice, in particular, that because the coefficient of interest, γ , is part of the error term, maximum likelihood estimation can lead to different estimates of this parameter than OLS. (In practice, the estimates will be very similar).

The log-likelihood function of this model is

$$L = -\frac{1}{2} [\ln(\det V) + (y - X'\beta - \gamma Z)'V^{-1}(y - X'\beta - \gamma Z) + n \ln(2\pi)],$$

where $V = \Sigma + W\Lambda W'\gamma^2$. Using this log-likelihood function, we estimate the relevant parameters by maximum likelihood, and then compute the standard errors using a bootstrap, allowing for additional correlation within a district.

The results are reported in Table 5. We see throughout that the estimates of the relevant parameters are very similar to those reported in Tables 2-4. More importantly, the standard errors are also very similar to those reported so far when we allow for two-way clustering conditional on district and the closest weather station. This congruence makes us more confident that our standard errors are not understated. In what follows, we focus on the two-way clustered standard errors in the text, but also show maximum likelihood estimates for our main outcome variables in the Appendix.

4.5 Robustness

Tables A2 and A3 in the Appendix investigate the robustness of the results reported so far to different specifications of the relative rain variable. For brevity, we focus on equations (1) and (3), and as in the rest of the paper, on the specification with province fixed effects.

In Table A2, we verify that it is (relative) rainfall in the spring of 1893 that matters. In column 1, we show that there is no similar relationship between (relative) rainfall in the spring of 1892 and Peasant Fasci or the Mafia in 1900. In column 2 we include spring rainfall in 1892 and 1893 together. For both Peasant Fasci and Mafia, it is the rainfall in 1893 that is statistically significant at 10% and 5% respectively. In column 3, we include (relative) rainfall in the spring, winter, summer and fall 1893, and we see that it is indeed the spring rainfall that is statistically significant, while rainfall in other seasons has no effect. This is reassuring; since, as explained above, spring is the growing season, it should be rainfall in spring that impacts agricultural yield.²⁹

In Table A3 we show that different measures of rainfall lead to very similar results. Recall that our relative rainfall variable measures the rainfall in the spring of 1893 relative to the average spring rainfall between 1881 and 1941 of the same municipality. In this table, we show similar results using log of relative rainfall and relative rainfall capped at 1 (so that variation coming from some municipalities getting more rain in the spring of 1893 than their historical average does not feature the right-hand side). We also investigate whether the interpolation of rainfall from the weather stations, described in Section 3, could be responsible for our results. We do this by limiting the sample to municipalities where the interpolation uses at least two weather stations, where we only use weather stations within 25 km of the municipality, or where we only use weather stations within 35 km of the municipality. The results are very similar in all cases.

4.6 Falsification

The plausibility of our empirical strategy depends on the presumption that weather conditions should not impact the spread of the Mafia absent the rise of the Peasant Fasci. Similarly, for our later results,

²⁹Indeed, we show in the Appendix that the district-level production per hectare of 11 crops in 1893 is predicted only by spring rainfall in 1893 (and not by rainfall in automating 92, winter 1892-3 as summer 1893).

it should not affect economic and political variables except through the Mafia. In this subsection, we provide evidence to support this presumption using several falsification exercises.

First, we show that weather conditions in 1893 have no impact on pre-1893 variables. In Table 6, we report the relationship between (relative) rainfall in the spring of 1893 and Mafia in 1885, infant mortality in 1869, the quality and quantity of drinking water in 1885, and the Herfindahl index of the concentration of votes in the 1865 parliamentary elections. We focus on the specification from column 4 of Tables 2-5, and we estimate these relationships both with and without province fixed effects.³⁰ The interpretation of most of the variables in this table is straightforward.

Overall, this table shows no statistically significant relationship between our rainfall measure and any one of these variables that either measured the presence of the Mafia in the municipality or the economic or political conditions of the municipality. This lack of significant relationship bolsters our interpretation that rainfall in 1893 is not systematically related to other characteristics of the municipality that could explain the patterns shown so far.

Our second falsification exercise checks whether relative rainfall before 1892 had a systematic effect on the emergence of the Peasant Fasci or the Mafia. This might be the case, for example, if weather conditions impacted the emergence of the Mafia through other channels (such as having an impact on economic conditions, which could then translate into an effect on the Mafia). In Table 7, we look at the potential effects of relative rainfall (spring) between 1882 and 1891 on the Peasant Fasci (in Panel A) and on the Mafia (in Panel B). The results are encouraging for our hypothesis. Only one out of 20 coefficients is weakly significant, which is compatible with it being significant by pure chance.³¹

Third, in the first two rows of Table A5 in the Appendix, we replicate this exercise by looking at the relationship between spring rainfall for the period 1900-1941 and our Peasant Fasci and Mafia variables in the three specifications in columns 2-4 of Tables 2-5.³² We report the fraction of coefficient estimates that are statistically significant at 10%, separately for negative and positive estimates. As right-hand side variables, we use our baseline rainfall variable, log rainfall and capped rainfall (as used in Table A3). A spurious relationship between rainfall and the Mafia would lead to over-rejection in this table, meaning numbers that are systematically above 0.05. The numbers are typically less than 0.05 and when they are not, as in the case of the Peasant Fasci, the sign is opposite to the one of our first stage regression. These results further increase our confidence in the exclusion restriction used so far.

Finally, we will report more extensive falsification exercises using contemporary variables when we turn to the effects of the Mafia on medium-term and long-term economic and political outcomes. All of these falsification exercises also support our exclusion restriction.

³⁰The number of observations varies across columns due to data availability.

³¹In Table A4 in the Appendix we report the same falsification exercise with maximum likelihood estimates.

³²We do not use rainfall between 1894 and 1900, since further droughts during this window for a similar exercise could have acted as an additional trigger for peasant organizations and thus the Mafia.

5 The Medium-Term Effects of the Mafia

Having established a plausible source of variation in the Mafia at the turn of the 20th century, we now investigate the effects of the Mafia on various economic outcomes in the early 20th century. We turn to longer-term outcomes in the next section.

5.1 Economic Outcomes

Throughout the rest of the paper, we estimate cross-sectional models of the form

$$y_i = \alpha^y \cdot \text{Mafia}_i + X' \beta^y + \varepsilon_i^y.$$

Our main specifications will be estimated by 2SLS using equation (3) as the first stage (with relative rainfall in the spring of 1893 as the excluded instrument). The first stages are identical to those reported in Table 4. In addition to the 2SLS estimates reported in Panel A, we also show OLS estimates in Panel B for comparison. In what follows, we focus on specifications with province fixed effects (especially since there are some notable differences in economic outcomes across provinces).³³

In Table 8, we investigate the effect of the Mafia on human capital, proxied by literacy. As noted in Section 3, we have literacy data from the censuses of 1911, 1921 and 1931 (for the population above the age of six).

In columns 1-3 we report the results for literacy in 1911, which show no significant effect of the Mafia on this variable, with the exception of column 3 which is weakly significant. This is not surprising in view of the fact that literacy is a stock variable, and thus even if the Mafia influences human capital investments, this would be unlikely to exhibit itself in literacy in 1911.

In columns 4-6 we turn to literacy in 1921. For this variable, we already see a statistically significant negative relationship in all three specifications. For example, in the specification including all controls in column 6, we have an estimate of -0.098.

Finally, in columns 7-9 we see a similar relationship for literacy in 1931. For the same specification, the coefficient estimate is -0.078.

Quantitatively, the effects are large. For example, increasing the Mafia in 1900 variable from 1 to 2 (corresponding to an increase from little presence of the Mafia to significant presence) will lead to about 10 percentage points decline in literacy in 1921 (about 20% of its mean).

It is noteworthy that the OLS estimates, reported in Panel B, are close to zero. We believe that this reflects the selection of the Mafia to municipalities with better economic prospects. Though what would be relevant for the difference between the 2SLS and OLS is selection conditional on unobserved

³³We report maximum likelihood estimates for all of the medium-term and long-term outcome variables discussed in the text in Tables A6 and A7 in the Appendix.

heterogeneity, we verify that there is a similar selection conditional on observables. Specifically, using the parameter estimates for all the covariates from column 4, we compute predicted values of the dependent variable (say literacy in 1921 or in 1931), denoted by \hat{y}_i . We then check the correlation between \hat{y}_i and Mafia_i . A positive correlation indicates that at the beginning of the 20th century, the Mafia was more likely to be present in municipalities that had better economic prospects on the basis of observable covariates (particular those included in column 4). In all cases we find a substantial positive correlation. For example, for literacy this correlation is 0.41 in 1911, 0.40 in 1921, and 0.17 in 1931. On the basis of this pattern, we interpret the absence of a relationship between Mafia and our various economic outcomes in the OLS as reflecting an upward bias due to this type of selection.

Overall, we interpret these results as showing a significant negative effect of the Mafia on medium-term economic outcomes.

5.2 State Capacity

We conjecture that a proximate reason for the negative effect of the Mafia on economic outcomes is that the Mafia reduces the capacity of the local state to provide public goods and protects its citizens. Though we are not able to establish that this is the main proximate channel, we provide evidence that the Mafia has a negative impact on state capacity in Table 9, where we look at three measures of the local state's performance: infant mortality, presence of an aqueduct in 1909 and per capita development expenditure in 1912 (in logs).

Table 9 shows that the relationship between the Mafia and all three of these measures is negative, though with varying degrees of significance. In columns 1-3, the estimates of the effect of the Mafia on infant mortality are statistically and quantitatively significant. Quantitatively, an increase in Mafia presence from 1 to 2 (little presence to significant presence of the Mafia) leads to about 5.5 percentage points increase in infant mortality (about 35% of its mean). In columns 4-6, the estimates of the effect of the Mafia on the presence of an aqueduct in 1909 are consistently negative, but not significant. Since the presence of aqueducts in the municipalities in 1909 is a stock variable, reflecting investments in several decades, the fact that the Mafia in 1900 does not have a statistically significant effect on this variable may not be entirely surprising. Finally, in columns 7-9 we report the estimates of the effect of the Mafia on per capita development expenditure in 1912. The impact is negative and statistically significant, suggesting a considerable reduction in public spending directed to developmental outcomes in municipalities in which the Mafia was operating.

On the basis of these results, it appears that part of the effects of the Mafia, in line with our discussion in Section 2, is working through reduced capacity of the local state to provide public services.

5.3 Mafia and Politics

While the results in the previous subsection suggest that part of the effects of the Mafia might be working through reduced local state capacity, how the Mafia affects local state capacity and other social and economic outcomes is still an open question. In this subsection, we provide evidence on another channel of influence of the Mafia — its impact on politics. Our discussion in Section 2 suggests that the Mafia has typically been involved in politics (see Buonanno et al., 2016; De Feo and De Luca, 2017). One of the ways in which the Mafia might impact the political equilibrium in the municipality is by discouraging certain parties from campaigning or competing in elections (and perhaps also by influencing voters directly by threats and coercion, see Alesina et al. (2016)).

Motivated by this expectation, in Table 10 we look at the effects of the Mafia on the distribution of votes across candidates in the 1909 parliamentary elections.³⁴ Specifically, we focus on the Herfindahl index of vote shares in the selection. (We saw in Table 6 that the Mafia in 1900 is unrelated to the same variable measured in 1865). With all three specifications, we estimate a statistically significant and quantitatively very large impact of the Mafia on political competition as measured in 1909. For example, an increase from little presence of the Mafia to significant presence (from 1 to 2) is associated with a 30 percentage points increase in the Herfindahl index of vote shares (about 38% of its mean). This very large impact suggests a substantial link between the presence of the Mafia and local politics. Historical evidence suggests that the major channels for this relationship is the inability of political candidates to campaign in areas dominated by the Mafia, though there may also be other forms of voter intimidation and fraud (see for example Salvemini, 1910; Hess, 1973; Schneider and Schneider, 1976; Alesina et al., 2016).

5.4 Further Falsification Exercises

To further reinforce our confidence on the validity of our exclusion restriction, we investigate whether rainfall could be systematically related to outcome variables through other channels. These tests are concerned with a similar set of issues as our previous falsification checks, and in particular would show significant effects if rainfall shocks have a direct impact on various social-economic outcomes (and perhaps also on Mafia presence via these channels).

Table 11 shows the relationship between relative rainfall (again in the spring) in the 10 years preceding the 1893 drought and our mid-term socio-economic variable. We report the coefficients of (relative) spring rain in the most demanding specification for all variables considered so far, with each column testing the relationship for each consecutive year starting with 1882. The results are reassuring. Out of 70 coefficients, only four are statistically significant at 10% or less, and there is no clear pattern of systematic negative or positive correlation between relative rainfall and development outcomes.

³⁴Unfortunately, we have not been able to find data on local elections from this time.

Table A5, whose first two rows were discussed in the previous section, again directly investigates whether there is any relationship between current rainfall and various economic outcomes. It reports the fraction of coefficient estimates that are statistically significant at 10% (separately for negative and positive estimates) when we look at the relationship between our outcome variables and rainfall in the years between 1900 and 1941. The results are encouraging, and show very few numbers above 5% (all of the opposite sign with respect to the one implied by the reduced form of our main results, reported in Table A8 in the Appendix for completeness). These results further bolster our confidence in the exclusion restriction undergirding our approach.

The strategy in Table A5 is to look at rainfall in all years. This deals with the most salient concern about rainfall having a direct effect on economic or political variables. A variant of this concern, however, is that only very severe drought experiences would have such effects, and if so, by pooling all data between 1900 and 1941, we might be diluting the possibility of detecting such a problem. To deal with this concern, we focus on the only year, 1906, where there was a drought similar to that of 1893 (in particular, more than 40% of municipalities experienced in spring 1906 less than 50% of their long term average rainfall). Table A9 shows the effects of the 1906 (relative) rainfall on our outcome variables. In this case, we can directly look at whether there is a correlation between this rainfall measure and outcomes, and we do this in all three specifications we use throughout our analysis. The results are once again encouraging for our exclusion restriction. With the exception of two estimates (out of 39 estimates when we take both medium-term and long-term outcomes together), we find no statistically significant relationship. Out of these two estimates, all of them have the opposite sign to that implied by the reduced form of our main results. We therefore interpret these results as further support for our exclusion restriction that the effect of the 1893 rainfall is working through the organization of the Peasant Fasci and the spread of the Mafia which was a response to this.

5.5 Other Concerns

Another concern is that our economic outcomes are partly confounded by the endogenous migration response of locals to the drought, the rise of the Peasant Fasci or the strengthening of the Mafia. For example, if some of the most educated inhabitants leave the municipality because of these factors, this could affect both our literacy results and some of our other economic outcomes.

We investigate this issue in Panel A of Table 12 by looking at the change in population between 1881 (before the Peasant Fasci and the spread of the Mafia in response) and 1901. The estimates show no significant effects of (relative) rainfall in 1883 on the change in population during this time period, suggesting that there has not been a major migration response to the economic and social forces leading to the rise of the Mafia (and the Peasant Fasci).

Another related concern may be that as well as (or instead of) the impact of the Mafia, we are

capturing the lingering effects of the rise of socialist mass politics, triggered by the drought of 1893. Panel B of Table 12 investigates this question and looks at the effect of the (relative) rainfall in the spring of 1893 on the membership of the Peasant Leagues in 1908 (relative to population) and the share of the socialist parties in the parliamentary elections in 1913. There is no relationship between the severity of the drought and the strength of these left-wing groups.

6 Long-Term Outcomes

In this section, we investigate the effects of the Mafia on long-term outcomes, focusing on variables from the 1960s, 70s and 80s.

6.1 Persistence of the Mafia

The spread of the Mafia at the end of the 19th century can have long-term effects through two complementary channels. First, the differential presence of the Mafia at the turn-of-the-century could put different municipalities onto different trajectories for economic and political development, with important implications for late 20th-century outcomes. Second, the local presence of the Mafia could persist from 1900 to later decades, and the presence of the Mafia in the second half of the century could impact contemporary economic and political outcomes. Though we do not have a way of distinguishing between these two channels, we can check whether there is persistence of the Mafia in a municipality from 1900 to later parts of the century.³⁵ This is done in Table 13, which provides mixed evidence for the second channel—there is a positive relationship between the Mafia in 1900 and the Mafia in 1987, but this is nowhere significant in the 2SLS specification (it is smaller but significant in the OLS shown in Panel B). This weak persistence might reflect the fact that the Mafia spread further in the intervening 87 years and/or the impact of fascist repression against the organization, which may have reshaped its subsequent distribution. In light of this pattern, we may expect any effects of the Mafia on long-term outcomes to be attenuated relative to its medium-term effects. Our results are consistent with this expectation, though we do find significant correlations between the exogenous variation in the Mafia in 1900 and some long-term outcomes (especially in the political realm), and we interpret these as capturing the persistent effects of early Mafia presence.

³⁵The information about the Mafia presence in 1980s is taken from a report by the military police (*Carabinieri*) submitted in 1987 to a parliamentary committee (CG *Carabinieri*, 1987). The report analyzes the activities of organized crime in Italy and lists the *main* Mafia families, providing for each of them the name of the boss and the town in which it was based. We create a dummy variable *Mafia*1987, which takes the value one when the municipality is listed in the report as the stronghold of a Mafia family.

6.2 Economic Outcomes

We next turn to economic outcomes, which we are going to proxy with human capital variables as before. We look at both literacy and the fraction of the population with high school education (completion rate) in 1961, 1971 and 1981. Table 14 shows that Mafia in 1900 is negatively correlated with both of these variables in all specifications, though the significance of the estimates disappears after 1971 for literacy and in 1981 for high school education. Quantitatively, the effects are again substantial. For example, an increase in the Mafia index in 1900 from 1 to 2 reduces high school education by 34%.

6.3 State Capacity

In the first nine columns of Table 15, we look at the same three measures of state capacity (aqueduct availability, infant mortality, and development expenditures) we studied for the medium term in Table 9 for the three decades from 1950s to 1980s. The point estimates for all three variables are again negative in all specifications, but now the estimates for infant mortality and development expenditures are almost never significant, while aqueduct coverage is significant at 10% or less in all specifications in 1971 and in most specifications in 1961. The reason why our results for aqueduct coverage were not significant in 1909 but are significant for the 1960s and 70s may be related to our observation above that aqueduct coverage is a slowly-varying stock variable, and thus it may have changed significantly only after several decades of Mafia presence.

6.4 Mafia and Politics

In the last three columns of Table 15, we turn to the effect of the Mafia on political competition in the longer term, proxied by the Herfindahl index of votes in parliamentary elections of 1963, 1972 and 1983. We find, once again, that the presence of the Mafia in 1900 leads to a significantly greater concentration of votes. These estimates are significant in all specifications for all the elections. Quantitatively, an increase in the Mafia index in 1900 from 1 to 2 is associated with a 6% percent increase in the Herfindahl index of concentration in 1972, for example. These effects are therefore considerably smaller than the impact of the Mafia on medium-term political competition, which is again consistent with the attenuation of the effects of presence of the Mafia in 1900 in the municipality.

6.5 Falsification and Other Concerns

Table A10 in the Appendix shows the relationship between relative rainfall in the 10 years preceding the 1893 drought and our long-term outcome variables. (This is similar to the falsification exercises for medium-term outcomes reported in Table 11). We report the coefficients of (relative) spring rain in

the most demanding specification for all long-term variables, with each column testing the relationship for the effect of rainfall for a separate tier starting with 1882. The results are again reassuring. Out of 150 coefficients, only nine are statistically significant at 10% or less, and there is no clear pattern of systematic negative or positive correlation between relative rainfall and development outcomes. Recall also that Tables A5 and A9 already showed falsification exercises using (relative rainfall) in each year between 1900 and 1941 for the long-term outcomes as well, verifying the lack of any significant relationship between rainfall and contemporary or subsequent outcomes for any year other than the critical period for the rise of the Peasant Fasci, 1893.

Recall also that in Table 12 discussed previously, we also looked at the effect of the Mafia in 1900 on longer-term population changes, and showed that migration cannot account for the effect of the Mafia considered in the previous sections.

Thus, overall, we find no evidence indicating that our exclusion restrictions are violated for the longer-term outcomes, even though our results for longer-term outcomes are somewhat weaker, most likely because the distribution of the Mafia across Sicily has changed significantly since 1900 and some of the persistent effects of the Mafia have attenuated since the beginning of the 20th century.

7 Conclusion

There is growing evidence that state weakness and the lack of state capacity are important roadblocks on public good provision and economic development (e.g., Gennaioli and Rainer, 2007; Besley and Persson, 2011; Bandyopadhyay and Green, 2012; Michalopoulos and Papaioannou, 2013; Acemoglu et al., 2015). One of the many factors holding back the development of local state capacity is the role played by various criminal organizations. None is perhaps as famous as the Sicilian Mafia, which has played an outsized role in the island's history since the middle of the 19th century. Though anecdotal evidence showing how racketeering by the Mafia has impacted the provision of various local public goods is plentiful (e.g., Mosca, 1900; Salvemini, 1910; Pezzino, 1990; Tranfaglia, 2008; Sacco, 2010) and recent work has documented how the Mafia and other criminal organizations have often played an important role in local politics (e.g., Daniele and Geys, 2015; Buonanno et al., 2016; Di Cataldo and Mastroiocco, 2016; De Feo and De Luca, 2017), there is little direct evidence of the Mafia's (or other criminal organizations') impact on local economic development.

In this paper, we proposed a new theory of the spread of the Mafia at the end of the 19th century and exploited the source of variation generated by this theory to estimate its medium-term and long-term effects on economics and politics on the island. Though the origins of the Mafia are well studied and emphasize the turbulence created by the collapse of the Kingdom of Two Sicilies and Italian unification, the role of local elites turning to the Mafia in response to the rising socialist threat at the end of the 19th century has been largely overlooked. The first mass socialist movement in Italy,

the Peasant Fasci, emerged in Sicily, in part because of the extremely harsh working conditions of the island's peasants. The Peasant Fasci movement received a huge boost because of an exceptional drought in 1893, which may have cut production of grains by as much as 50% throughout Sicily. We start by documenting that this drought — and no other past or future weather event — has a strong predictive power for the location of the Peasant Fasci. We then estimate the causal effect of the rise of the Peasant Fasci on the spread of the Mafia circa 1900. Our results indicate that as much as 37 percent of the strength of the Mafia in 1900 may be related to its involvement in the suppression of the Peasant Fasci.

In the second part of the paper, we use the severity of the drought across Sicily as an instrument for the presence of the Mafia in 1900 and estimate its impact on local economic and political outcomes. We further substantiate the validity of this instrumental-variables strategy by showing that the rainfall or drought in other years has no predictive power for economic outcomes — it was only the drought of 1893, in the critical juncture created by the rise of mass socialist politics that triggered the rise of the Mafia and hence medium-term and long-term effects on various economic and political outcomes.

Indeed, our empirical work shows fairly large negative effects of the Mafia in the next two decades, significantly reducing literacy, increasing infant mortality and curtailing provision of local public goods. We also find a sizable effect of the Mafia on local politics. In places where the Mafia took root, the distribution of votes in parliamentary elections is highly concentrated. This suggests that the Mafia, in part by preventing parties and politicians not allied with itself from campaigning or even appearing in the municipality, significantly reduced political competition. We conjecture that this might be one of the channels via which the Mafia impacts local economic development (see Besley et al. (2010) for empirical evidence from the United States consistent with such an effect of political competition).

We also document some longer-term effects of the Mafia, though these are weaker, in part because there are significant changes in the local strength of the Mafia in the 20th century, associated with the rise and decline of fascism, and then the subsequent rise of the Christian Democratic Party, which often worked with the Mafia in Sicily. Nevertheless, the impact of the Mafia in 1900 on local political concentration appears to be very persistent and robust.

We view our paper to be part of a growing literature on the economic and political consequences of local criminal activities.³⁶ Future work in this area investigating the exact mechanisms via which different criminal organizations impact the organization of local government, local corruption and local politics would be particularly informative. For instance, our strategy does not reveal whether the Mafia may have reduced local economic development because of local corruption, other effects of local criminal activity, or because of its impact on local political competition.

³⁶See, in addition to the references already mentioned in the Introduction, Dal Bó et al. (2006); Acemoglu et al. (2013); Dell (2015)

References

- Abadinsky, H. (2012). *Organized crime*. Wadsworth, Belmont, CA.
- Acemoglu, D., García-Jimeno, C., and Robinson, J. A. (2015). State capacity and economic development: A network approach. *American Economic Review*, 105(8):2364–2409.
- Acemoglu, D., Robinson, J. A., and Santos, R. J. (2013). The monopoly of violence: Evidence from colombia. *Journal of the European Economic Association*, 11:5–44.
- Alesina, A., Piccolo, S., and Pinotti, P. (2016). Organized crime, violence and politics.
- Alongi, G. (1887). *La Maffia nei suoi fattori e nelle sue manifestazioni*. Fratelli Bocca, Torino: Italy.
- Alongi, G. (1904). *La mafia. Fattori, Manifestazioni, Rimedi*. Sandron Editore, Milano: Italy.
- Amato, P. and Battaglia, R. (1976). Messina e i fasci siciliani. In *I Fasci Siciliani. La crisi Italiana di fine secolo*, volume 2. De Donato Editore, Bari, IT.
- Bandiera, O. (2003). Land reform, the market for protection, and the origins of the sicilian mafia: Theory and evidence. *Journal of Law, Economics, and Organization*, 19(1):218–244.
- Bandyopadhyay, S. and Green, E. (2012). The reversal of fortune thesis reconsidered. *The Journal of Development Studies*, 48(7):817–831.
- Barnabà, E. (1981). *I fasci siciliani a Valguarnera*. Teti Editore, Milano, IT.
- Benigno, F. (2015). *La Mala Setta. Alle origini di mafia e camorra. 1859-1878*. Einaudi.
- Besley, T. and Persson, T. (2011). The logic of political violence. *The Quarterly Journal of Economics*, 126(3):1411–1445.
- Besley, T., Persson, T., and Sturm, D. M. (2010). Political competition, policy and growth: Theory and evidence from the us. *The Review of Economic Studies*, 77(4):1329–1352.
- Bonnier, E., Poulsen, J., Rogall, T., and Stryjan, M. (2015). Preparing for genocide: Quasi-experimental evidence from rwanda. Uppsala Universitet, Department of Economics Working Paper 2015-1.
- Brancato, F. (1976). Genesi e caratteristiche della mafia. In *Relazione Conclusiva della Commissione Parlamentare d’Inchiesta sul Fenomeno della Mafia in Sicilia*. Senato della Repubblica.
- Brouwer, C. and Heibloem, M. (1986). *Irrigation Water Management: Irrigation Water Needs*, volume 3. FAO.

- Brückner, M. and Ciccone, A. (2011). Rain and the democratic window of opportunity. *Econometrica*, 79(3):923–947.
- Buonanno, P., Durante, R., Prarolo, G., and Vanin, P. (2015). Poor institutions, rich mines: Resource curse in the origins of the sicilian mafia. *The Economic Journal*, 125(586):F175–F202.
- Buonanno, P., Prarolo, G., and Vanin, P. (2016). Organized crime and electoral outcomes. evidence from sicily at the turn of the xxi century. *European Journal of Political Economy*, 41:61–74.
- Cameron, A. C., Gelbach, J. B., and Miller, D. L. (2008). Bootstrap-based improvements for inference with clustered errors. *The Review of Economics and Statistics*, 90(3):414–427.
- Cameron, A. C., Gelbach, J. B., and Miller, D. L. (2011). Robust inference with multiway clustering. *Journal of Business & Economic Statistics*, 29(2):238–249.
- Cary, J. (1799). *A New Map of Italy, Including the Islands of Sicily, Sardinia and Corsica with the Post Roads from the Latest Authorities*. Cary Engraver and Map-seller.
- Casarrubea, G. (1978a). *I Fasci Contadini e le Origini delle Sezioni Socialiste della Provincia di Palermo. Fisionomie locali e lotte contadine*, volume 2. S.F. Flaccovio Editore.
- Casarrubea, G. (1978b). *I Fasci Contadini e le Origini delle Sezioni Socialiste della Provincia di Palermo. I fasci della Provincia nel Contesto Siciliano*, volume 1. S.F. Flaccovio Editore.
- Catanzaro, R. (1988). *Il delitto come impresa: Storia Sociale della Mafia*. Liviana, Padova, IT.
- CG Carabinieri - Comando Generale dell'Arma dei Carabinieri (1987). Relazione del comandante generale dell'arma dei carabinieri alla commissione parlamentare sul fenomeno della mafia.
- Clark, M. (2014). *Modern Italy. 1871 to the Present*. Routledge, Oxon, UK & New York, NY, 3rd edition.
- Colajanni, N. (1895). *Gli avvenimenti di Sicilia e le loro cause*. Sandron, Palermo, IT.
- Corbetta, P. and Piretti, M. (2009). *Atlante storico-elettorale d'Italia (1861-2008)*. Zanichelli, Bologna, IT.
- Costanza, S. (1993). *I Fasci dei Lavoratori. L'esperienza trapanese 1892-1894*. Trapani Tipografica, Trapani, IT, 2nd edition.
- Cutrerà, A. (1900). *La mafia e i mafiosi*. Reber, Palermo, IT.
- Dal Bó, E., Dal Bó, P., and Di Tella, R. (2006). “plata o plomo?”: Bribe and punishment in a theory of political influence. *The American Political Science Review*, 100(1):41–53.

- Daniele, G. and Geys, B. (2015). Organised crime, institutions and political quality: Empirical evidence from Italian municipalities. *The Economic Journal*, 125(586):F233–F255.
- Daniele, V. and Marani, U. (2011). Organized crime, the quality of local institutions and FDI in Italy: A panel data analysis. *European Journal of Political Economy*, 27(1):132–142.
- De Feo, G. and De Luca, G. (2017). Mafia in the ballot box. *American Economic Journal: Economic Policy*.
- Degl’Innocenti, M. (1984). *Geografia e istituzioni del socialismo italiano*. Guida Editori, Napoli, IT.
- Del Monte, A. and Pennacchio, L. (2012). Agricultural productivity, banditry and criminal organisations in post-unification Italy. *Rivista Italiana degli Economisti*, 17(3):347–378.
- Dell, M. (2010). The persistent effects of Peru’s mining mita. *Econometrica*, 78(6):1863–1903.
- Dell, M. (2012). Path dependence in development: Evidence from the Mexican revolution.
- Dell, M. (2015). Trafficking networks and the Mexican drug war. *American Economic Review*, 105(6):1738–1779. .
- Dell, M., Jones, B. F., and Olken, B. A. (2014). What do we learn from the weather? The new climate–economy literature. *Journal of Economic Literature*, 52(3):740–798.
- Di Cataldo, M. and Mastroiocco, N. (2016). Organised crime, captured politicians and the allocation of public resources. Technical report.
- di San Giuliano, A. (1894). *Le condizioni presenti della Sicilia. Studii e proposte*. Fratelli Treves Editori, Milano, IT, 2nd edition.
- Dickie, J. (2004). *Cosa Nostra: A History of the Sicilian Mafia*. Palgrave Macmillan, New York, NJ.
- Dimico, A., Isopi, A., and Olsson, O. (2012). Origins of the Sicilian mafia: The market for lemons. Working Papers in Economics 532, University of Gothenburg, Department of Economics.
- Direzione Generale della Statistica (1886). *Risultati dell’Inchiesta sulle Condizioni Igieniche e Sanitarie nei Comuni del Regno*, volume 2. Ministero Agricoltura, Industria e Commercio, Roma, IT.
- Direzione Generale della Statistica (1887). *Bilanci Comunali per l’anno 1884*, volume Parte II. Ministero Agricoltura, Industria e Commercio, Roma, IT.
- Direzione Generale della Statistica e del Lavoro (1914). *Bilanci Comunali per l’anno 1912*. Ministero Agricoltura, Industria e Commercio, Roma, IT.

- Direzione Generale dell'Agricoltura (1891-1895). *Bollettino di Notizie Agrarie*. Ministero Agricoltura, Industria e Commercio.
- Direzione Generale dell'Amministrazione Civile (1958). *Situazione della Finanza Locale*, volume Parte V. Ministero dell'Interno, Roma, IT.
- Dixit, A. K. (2004). *Lawlessness and Economics: Alternative Modes of Governance*. Princeton University Press, Princeton, NJ.
- Eredia, F. (1918). *Osservazioni Pluviometriche raccolte a tutto l'anno 1915. Sicilia*. Ministero dei Lavori Pubblici, Roma, IT.
- Florentini, G. and Pelzman, S., editors (1995). *The Economics of Organized Crime*. Cambridge University Press.
- Franchetti, L. (1877). *Condizioni Politiche e Amministrative della Sicilia*. Barbera, Firenze, IT.
- Franchetti, L. and Sonnino, S. (1877). *La Sicilia nel 1876*. Collezione di studi meridionali. Vallecchi, Firenze: IT, 2nd edition.
- Frazer, J. G. (1920). *The Golden Bough. A study in Magic and Religion*. MacMillan and Co, London, UK, 3rd edition.
- Gambetta, D. (1993). *The Sicilian Mafia: The Business of private protection*. Harvard University Press, Cambridge, MA.
- Gennaioli, N. and Rainer, I. (2007). The modern impact of precolonial centralization in africa. *Journal of Economic Growth*, 12(3):185–234.
- Giannone, E. (2014). I fasci dei lavoratori nei paesi dell'unione dei comuni platani-quisquina-magazzolo (1893-94). Cianciana, IT.
- Hess, H. (1973). *Mafia and Mafiosi: The structure of Power*. Saxon House, London, UK.
- Hobsbawm, E. J. (1971). *Primitive rebels: studies in archaic forms of social movement in the 19th and 20th centuries*. Manchester University Press, Manchester.
- Hsiang, S. M., Burke, M., and Miguel, E. (2013). Quantifying the influence of climate on human conflict. *Science*, 341(6151).
- Hsiang, S. M., Meng, K. C., and Cane, M. A. (2011). Civil conflicts are associated with the global climate. *Nature*, 476(7361):438–441.

- ISTAT (2016). *Annuario Statistico Italiano*.
- Jacini, S. (1884). *Atti della Giunta per la Inchiesta Agraria e sulle Condizioni della Classe Agricola. Relazione del Commissario Abele Damiani, Deputato al Parlamento, sulla I circoscrizione (province di Caltanissetta, Catania, Girgenti, Messina, Palermo, Siracusa e Trapani). Volume XIII, Tomo I, Fascicolo III, Relazione Generale*. Forzani e C., Tipografi del Senato, Roma.
- Jacini, S. (1885). *Atti della Giunta per la Inchiesta Agraria e sulle Condizioni della Classe Agricola. Volume XIII, Tomo II, Fascicolo IV*. Forzani e C., Tipografi del Senato, Roma.
- Kaplan, T. (1977). *Anarchists of Andalusia, 1868-1903*. Princeton University Press, Princeton, N.J.
- Li, G. (1985). Robust regression. In *Exploring Data Tables, Trends, and Shapes*, pages 281–343. John Wiley & Sons, Inc.
- Lo Jacono, V. (1856). *Indice Generale dei Comuni, Sottocomuni, Casali, Villaggi e Borgate della Sicilia con la indicazione delle distanze dalla Capitale, dal Capoluogo della Provincia e del Distretto*. Tipografia del Commercio, Palermo, IT.
- Lorenzoni, G. (1910a). *Inchiesta Parlamentare sulle Condizioni dei Contadini Nelle Provincie Meridionali e nella Sicilia*, volume VI - Sicilia, Tomo I.
- Lorenzoni, G. (1910b). *Inchiesta Parlamentare sulle Condizioni dei Contadini Nelle Provincie Meridionali e nella Sicilia*, volume VI - Sicilia, Tomo II.
- Lupo, S. (1984). *Agricoltura ricca e sottosviluppo: Storia e mito della Sicilia agrumaria (1060-1950)*. Idoneo.
- Lupo, S. (1996). *Storia della Mafia*. Donzelli Editore, Roma, IT.
- Mack Smith, D. (1968). *A History of Sicily: Modern Sicily*. Chatto and Windus, London, UK.
- Madestam, A., Shoag, D., Veuger, S., and Yanagizawa-Drott, D. (2013). Do political protests matter? evidence from the tea party movement*. *The Quarterly Journal of Economics*, 128(4):1633–1685.
- Miccichè, G. (1981). *I Fasci dei lavoratori nella Sicilia Sud-Orientale*. Zuleima edizioni, Ragusa, IT.
- Michalopoulos, S. and Papaioannou, E. (2013). Pre-colonial ethnic institutions and contemporary african development. *Econometrica*, 81(1):113–152.
- Miguel, E., Satyanath, S., and Sergenti, E. (2004). Economic shocks and civil conflict: An instrumental variables approach. *Journal of Political Economy*, 112(4):725–753.

- Ministero dell'Interno (2015). *Annuario delle Statistiche Ufficiali dell'Amministrazione dell'Interno*.
- Mortillaro, V. (1854). *Notizie Economico-Statistiche Ricavate sui Catasti di Sicilia*. Stamperia Pensante, Palermo: IT.
- Mosca, G. (1900). Che cosa è la mafia. *Giornale degli Economisti*, 20:236–262.
- New, M., Hulme, M., and Jones, P. (1999). Representing twentieth-century space–time climate variability. part i: Development of a 1961–90 mean monthly terrestrial climatology. *Journal of Climate*, 12(3):829–856.
- New, M., Hulme, M., and Jones, P. (2000). Representing twentieth-century space–time climate variability. part ii: Development of 1901–96 monthly grids of terrestrial surface climate. *Journal of Climate*, 13(13):2217–2238.
- New, M., Lister, D., Hulme, M., and Makin, I. (2002). A high-resolution data set of surface climate over global land areas. *Climate Research*, 21(1):1–25.
- Parodi, L. (1873). Sull'estrazione dello zolfo in sicilia e sugli usi industriali del medesimo. In *Atti del Comitato d'inchiesta industriale : relazioni diverse*, volume 1. Barbera, Firenze, IT.
- Paton, W. A. (1898). *Picturesque Sicily*. Harper & Brothers, New York and London.
- Pezzino, P. (1985). Alle origine del potere mafioso: Stato e società in sicilia nella seconda metà dell'ottocento. *Passato e Presente*, 8:33–69.
- Pezzino, P. (1987). Stato violenza società: Nascita e sviluppo del paradigma mafioso. In *La Sicilia*. Einaudi, Torino, IT.
- Pezzino, P. (1990). *Una certa reciprocità di favori. Mafia e modernizzazione violenta nella Sicilia post-unitaria*. Angeli, Milano: IT.
- Pinotti, P. (2015). The economic costs of organised crime: Evidence from southern italy. *The Economic Journal*, 125(586):F203–F232.
- Renda, F. (1977). *I fasci siciliani (1892-1894)*. Einaudi, Torino, IT.
- Romano, S. F. (1959). *Storia dei Fasci Siciliani*. Laterza, Bari: IT.
- Romano, S. F. (1966). *Storia della Mafia*. Mondadori, Milano: IT.
- Rossi, A. (1894). *L'agitazione in Sicilia. A proposito delle ultime condanne*. Kantorowicz, Milano, IT.
- Sacco, S. (2010). *La mafia in cantiere*. Centro Studi Pio La Torre, Palermo, IT.

- Salvemini, G. (1910). *Il ministro della malavita: notizie e documenti sulle elezioni giolittiane nell'Italia meridionale*. Edizioni della Voce, Firenze, IT.
- Santino, U. (2000). *Storia del movimento antimafia*. Editori Riuniti.
- Schneider, J. and Schneider, P. (1976). *Culture and Political Economy in Western Sicily*. Academic Press, New York, NJ.
- Siculus (Antonio De Viti De Marco) (1894). L'insurrezione siciliana (cause, errori, rimedi). *Giornale degli Economisti*, 8:124–141.
- Siragusa, M. (2007). Stragi e stragismo nell'età dei fasci siciliani. In Marino, G. C., editor, *La Sicilia delle Stragi*. Newton Compton.
- Somogyi, S. (1979). *Storia Demografica dei Comuni Siciliani dal 1862 al 1971*. Collana di Studi Demografici. Università di Palermo, Istituto di scienze demografiche, Palermo, IT.
- Tranfaglia, N. (2008). *Mafia, politica e affari 1943-2008*. Laterza.
- Villari, P. (1878). *Lettere Meridionali*. Successori Le Monnier, Firenze, IT.

TABLES

Table 1A: Descriptive Statistics

Variable	Obs	Mean	SD	Min	Max
Mafia 1900	273	1.43	1.15	0	3
Peasant Fasci	333	0.31	0.46	0	1
Relative Rainfall 1893	297	0.64	0.28	0.06	1.28
<i>Determinants of Fasci:</i>					
Rural centre in 1861	333	0.37	0.48	0	1
Rural rent per hectare in 1853	333	6.85	4.75	1.17	35.15
Urban rent per hectare in 1853	333	1.56	4.30	0	69.99
Grains (share in 1830s)	333	0.50	0.23	0.015	0.99
Share cultivated land in 1853	333	0.97	0.08	0.17	1
<i>Determinants of Mafia:</i>					
Sulfur production 1868-70	333	5.59	23.50	0	210
Citrus groves (share in 1830s)	333	0.01	0.02	0	0.16
Mafia 1885	333	0.57	1.01	0	3
Olives (share in 1830s)	333	0.04	0.06	0	0.46
Vineyards (share in 1830s)	333	0.10	0.12	0	0.74
<i>Geographic controls:</i>					
Population in 1861	333	8.37	0.95	5.88	12.19
Area	333	8.194	1.25	4.41	11.19
Altitude of the town centre	333	411.40	276.60	3	1265
Maximum altitude	333	944.20	591.70	48.00	3274
Average altitude	333	392.10	274.90	10	1627
Distance from Palermo	333	109.02	58.91	0	229
Distance from closest port	333	32.49	20.13	0	90
Average temperature	333	15.93	1.54	11.00	18.45
Long run average rainfall (1881-1941)	307	156.30	29.18	70.15	253.10
Long run variance of relative rainfall	307	0.21	0.07	0.12	0.47
Roads in 1799	333	0.51	0.50	0	1

Table 1B: Descriptive Statistics (continued)

Variable	Obs	Mean	SD	Min	Max
<i>Economic and state capacity outcomes:</i>					
Development Expenditure 1884	333	0.82	0.85	-2.15	3.28
Development Expenditure 1912	333	-1.58	2.46	-10.03	5.23
Development Expenditure 1957	333	0.20	0.93	-2.76	3.56
Infant mortality 1869	237	0.20	0.07	0.01	0.67
Infant mortality 1909	273	0.15	0.05	0.02	0.33
Infant mortality 1969-70	333	0.03	0.02	0	0.11
Infant mortality 1982	333	0.02	0.02	0	0.11
Literacy rate 1911	333	0.37	0.10	0.11	0.73
Literacy rate 1921	333	0.48	0.09	0.23	0.80
Literacy rate 1931	333	0.59	0.08	0.37	0.79
Literacy rate 1961	333	0.83	0.04	0.69	0.93
Literacy rate 1971	333	0.88	0.04	0.74	0.99
Literacy rate 1981	333	0.93	0.03	0.81	0.99
High school rate 1961	333	0.03	0.02	0.01	0.10
High school rate 1971	333	0.06	0.03	0.02	0.22
High school rate 1981	333	0.09	0.04	0.03	0.30
Drink water quantity in 1885	333	1.69	0.51	1	3
Drink water quality in 1885	333	2.75	0.59	1	3
Aqueduct in 1909 (dummy)	333	0.054	0.23	0	1
Aqueduct coverage 1961	333	0.66	0.24	0.01	0.99
Aqueduct coverage 1971	330	0.77	0.12	0.11	1
Aqueduct coverage 1981	333	0.67	0.14	0.01	0.99
<i>Political competition:</i>					
HHI 1865	289	0.77	0.20	0.45	1
HHI 1909	317	0.78	0.22	0.34	1
HHI 1963	333	0.31	0.07	0.17	0.59
HHI 1972	333	0.31	0.07	0.18	0.65
HHI 1983	333	0.30	0.07	0.16	0.57

Table 2: The Impact of Relative Rainfall 1893 on Peasant Fasci

Dependent variable: Peasant Fasci				
	(1)	(2)	(3)	(4)
Panel A: without province fixed effects				
Relative Rainfall 1893	-1.003*** (0.133)	-0.952*** (0.132)	-0.939*** (0.141)	-0.788*** (0.216)
Panel B: with province fixed effects				
Relative Rainfall 1893	-0.763*** (0.208)	-0.838*** (0.250)	-0.772*** (0.263)	-0.755*** (0.272)
Determinants of Fasci		✓	✓	✓
Determinants of Mafia			✓	✓
Geographic controls				✓
Observations	245	245	245	245

Notes: OLS estimates of the impact of relative rainfall in 1893 on the emergence of Peasant Fasci organizations. Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The dependent variable is a dummy indicating the presence in the municipality of a Peasant Fasci organization. Panel A does not include the provincial dummies which are included in all the specifications of Panel B. The specifications in column 1 include only relative rainfall in 1893. The specifications in column 2 also include other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in column 3 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in column 4 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 3: The Impact of Peasant Fasci on Mafia

Dependent variable: Mafia 1900				
	(1)	(2)	(3)	(4)
Panel A: IV without province fixed effects				
Peasant Fasci	2.051*** (0.428)	2.093*** (0.425)	1.955*** (0.405)	1.677*** (0.483)
First-stage F-statistic	57.13	52.02	44.32	13.27
Panel B: IV with province fixed effects				
Peasant Fasci	0.867* (0.491)	1.031*** (0.309)	1.312*** (0.385)	1.510*** (0.525)
First-stage F-statistic	13.43	11.26	8.61	7.72
Panel C: OLS without province fixed effects				
Peasant Fasci	0.992*** (0.286)	0.890*** (0.327)	0.917*** (0.263)	0.468*** (0.178)
Panel D: OLS with province fixed effects				
Peasant Fasci	0.266 (0.264)	0.219 (0.245)	0.399** (0.180)	0.365** (0.163)
Determinants of Fasci		✓	✓	✓
Determinants of Mafia			✓	✓
Geographic controls				✓
Observations	245	245	245	245

Notes: Estimates of the impact of the Peasant Fasci organizations on the presence of the Mafia in 1900. The dependent variable is an index that takes a value of 0, 1, 2, or 3, progressively indicating the strength of the Mafia in a municipality with 0 denoting no presence of Mafia organizations and 3 highest density of the Mafia according to Cutrera (1900). Panels A and B report the IV estimates where the Peasant Fasci variable is instrumented by relative rainfall in 1893. Relative rainfall is measured as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The first stage is therefore reported in Table 2. Panel A does not include the provincial dummies which are included in all the specifications of Panel B. Panels C and D report the OLS estimates of the impact of the Peasant Fasci on the Mafia presence in 1900. Panel C does not include the provincial dummies which are included in all the specifications of Panel D. The specifications in column 1 include only relative rainfall in 1893. The specifications in column 2 also include other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in column 3 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in column 4 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 4: Relative Rainfall 1893 and Mafia

Dependent variable: Mafia 1900				
	(1)	(2)	(3)	(4)
Panel A: without province fixed effects				
Relative Rainfall 1893	-2.057*** (0.452)	-1.993*** (0.401)	-1.835*** (0.365)	-1.322*** (0.353)
F-statistic	20.72	24.74	25.23	14.06
Panel B: with province fixed effects				
Relative Rainfall 1893	-0.661* (0.339)	-0.865*** (0.285)	-1.012*** (0.298)	-1.140*** (0.386)
F-statistic	3.798	9.212	11.54	8.73
Determinants of Fasci		✓	✓	✓
Determinants of Mafia			✓	✓
Geographic controls				✓
Observations	245	245	245	245

Notes: OLS estimates of the impact of relative rainfall in 1893 on the presence of the Mafia in 1900. The dependent variable is an index that takes a value of 0, 1, 2, or 3, progressively indicating the strength of the Mafia in a municipality with 0 denoting no presence of Mafia organizations and 3 highest density of the Mafia according to Cutrera (1900). Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. Panel A does not include the provincial dummies which are included in all the specifications of Panel B. The specifications in column 1 include only relative rainfall in 1893. The specifications in column 2 also include other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in column 3 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in column 4 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 5: Relative Rainfall 1893 and Mafia. Maximum Likelihood Estimates

Dependent variable: Mafia 1900				
	(1)	(2)	(3)	(4)
Panel A: without province fixed effects				
Relative Rainfall 1893	-1.94*** (0.596)	-1.87*** (0.578)	-1.63*** (0.558)	-1.32*** (0.508)
Panel B: with province fixed effects				
Relative Rainfall 1893	-0.664** (0.313)	-0.865** (0.354)	-1.012*** (0.372)	-1.140** (0.457)
Determinants of Fasci		✓	✓	✓
Determinants of Mafia			✓	✓
Geographic controls				✓
Observations	245	245	245	245

Notes: Maximum Likelihood estimates of the impact of relative rainfall in 1893 on the presence of the Mafia in 1900 taking into account the correlation induced by the interpolation of rainfall data. The dependent variable is an index that takes a value of 0, 1, 2, or 3, progressively indicating the strength of the Mafia in a municipality with 0 denoting no presence of Mafia organizations and 3 highest density of the Mafia according to Cutrera (1900). Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. Panel A does not include the provincial dummies which are included in all the specifications of Panel B. The specifications in column 1 include only relative rainfall in 1893. The specifications in column 2 also include other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in column 3 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in column 4 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 6: Falsification Exercise: Relative Rainfall 1893 and Pre-1893 Outcomes

Dependent variable:	the Mafia 1885 (1)	Infant mortality 1869 (2)	Drink water quantity 1885 (3)	Drink water quality 1885 (4)	Development expenditure 1884 (5)	HHI 1865 (6)
Panel A: no province fixed effects						
Relative Rainfall 1893	0.239 (0.457)	-0.00248 (0.0399)	-0.236 (0.230)	-0.154 (0.243)	-0.1165 (0.441)	0.104 (0.0899)
Panel B: province fixed effects						
Relative Rainfall 1893	0.484 (0.338)	-0.0129 (0.0577)	-0.270 (0.209)	-0.263 (0.329)	-0.00509 (0.552)	0.136 (0.137)
Full set of controls	✓	✓	✓	✓	✓	✓
Observations	297	217	245	245	245	227

Notes: OLS estimates of the impact of relative rainfall in 1893 on the pre-1893 variables. Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. All the specifications in the present table include the full set of controls (Determinants of Fasci, Determinants of Mafia, and Geographic controls). Panel A does not include the provincial dummies which are included in all the specifications of Panel B. The dependent variable in column 1 is the index of Mafia presence in 1885 derived from Jacini (1885) and, as in Buonanno et al. (2015), takes a value of 0, 1, 2, or 3, progressively indicating the strength of the Mafia in a municipality with 0 denoting no presence of Mafia organizations and 3 highest density of the Mafia. The dependent variable in column 2 is the infant mortality rate computed for the years 1869 and 1870 as the average ratio of the of deaths below the age of one over the number of births for the years 1869 and 1870. The dependent variable in column 3 is the index for water quantity using information provided by Direzione Generale della Statistica (1886). The index takes value of 1 when the quantity is scarce, value of 2 when the quantity is sufficient, and value of 3 when the quantity is plentiful. The dependent variable in column 4 is the index for water quality using again information provided by Direzione Generale della Statistica (1886). The index takes value of 1 when the quality is poor, value of 2 when the quality is passable, and value of 3 when the quality is good. The dependent variable in column 5 is the per-capita development expenditure in logs of municipalities in 1884, which aggregates all spending for development or improvement of local infrastructure, education, security and justice (e.g. building or upgrading of roads and schools). The Dependent variable in column 5 is the concentration index (HHI) computed at municipality level for the 1865 parliamentary elections by looking at the share of votes of each candidate. We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 7: Falsification Exercise: Relative Rainfall 1882-1891, Peasant Fasci and Mafia

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A:										
Dependent variable: Peasant Fasci										
Relative Rainfall 18XX	0.0013 (0.238)	0.0812 (0.219)	-0.238 (0.227)	0.270 (0.372)	0.164 (0.318)	-0.0391 (0.242)	-0.812 (0.441)*	0.0793 (0.206)	-0.161 (0.317)	-0.159 (0.361)
Panel B:										
Dependent variable: Mafia 1900										
Relative Rainfall 18XX	-0.534 (0.768)	0.228 (0.750)	0.101 (0.793)	0.328 (0.713)	0.536 (0.674)	-0.195 (0.462)	-0.928 (0.675)	0.216 (0.599)	0.077 (0.551)	0.605 (0.665)
Year	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891
Full set of controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	197	181	222	204	224	208	224	225	241	244

Notes: OLS estimates of the impact of relative rainfall in the years between 1882 and 1891 on the Peasant Fasci and the Mafia in 1900. Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. All the specifications in the present table include the full set of controls (Determinants of Fasci, Determinants of Mafia, and Geographic controls) and provincial dummies. The coefficients of the impact of relative rainfall on the Peasant Fasci are reported in panel A, while the coefficients of the effect on Mafia 1900 is in panel B. We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 8: The Impact of Mafia on Human Capital

Dependent variable:	Literacy in 1911			Literacy in 1921			Literacy in 1931		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: IV results									
Mafia 1900	-0.060 (0.043)	-0.052 (0.044)	-0.087* (0.052)	-0.092** (0.046)	-0.080* (0.047)	-0.098** (0.048)	-0.068* (0.039)	-0.060* (0.032)	-0.078** (0.037)
Panel B: OLS results									
Mafia 1900	0.001 (0.008)	-0.001 (0.008)	-0.00006 (0.008)	0.00632** (0.003)	0.00469 (0.005)	0.00483 (0.005)	-0.004 (0.008)	-0.0057 (0.007)	-0.0016 (0.007)
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Determinants of Fasci	✓	✓	✓	✓	✓	✓	✓	✓	✓
Determinants of Mafia		✓	✓		✓	✓		✓	✓
Geographic controls			✓			✓			✓
Observations	245	245	245	245	245	245	245	245	245

Notes: Estimates of the impact of Mafia on literacy rates in the years 1911, 1921, and 1931. The dependent variable is the literacy rate of the resident population older than 6 years of age and is computed using data at municipality level reported in the three censuses of 1911, 1921, and 1931. Panel A reports the IV estimates of the effect of Mafia 1900 on literacy rates, where Mafia 1900 is instrumented by relative rainfall in 1893. Relative rainfall is measured as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The first stage is therefore reported in Table 4. Panel B reports the OLS estimates of the impact of the Mafia in 1900 on the literacy rates. Columns 1-3 report the coefficient estimates of the effect of the Mafia on the literacy rate in 1911; columns 4-6 report the same estimates for literacy rate in 1921, while columns 7-9 report the estimates for literacy rate in 1931. The specifications in column 1, 4, and 7 include province dummies and other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in columns 2, 5, and 8 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in columns 3, 6, and 9 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 9: The Impact of Mafia on State Capacity

Dependent variable:	Infant mortality in 1909			Aqueduct in 1909			Development Expenditure 1912		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: IV results									
Mafia 1900	0.0566** (0.0238)	0.0539** (0.0211)	0.0569** (0.0248)	-0.0568 (0.0956)	-0.0501 (0.0465)	-0.120 (0.126)	-2.312** (1.096)	-2.024** (0.960)	-1.443* (0.861)
Panel B: OLS results									
Mafia 1900	0.00707** (0.0029)	0.00735** (0.0032)	0.00499 (0.0031)	0.0100 (0.0209)	0.0023 (0.0204)	0.0074 (0.0205)	0.0468 (0.163)	0.0101 (0.165)	0.0214 (0.143)
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Determinants of Fasci	✓	✓	✓	✓	✓	✓	✓	✓	✓
Determinants of Mafia		✓	✓		✓	✓		✓	✓
Geographic controls			✓			✓			✓
Observations	239	239	239	245	245	245	245	245	245

Notes: Estimates of the impact of the Mafia on various measures of state capacity. Panel A reports the IV estimates of the effect of Mafia 1900 on the different measures of state capacity, where Mafia 1900 is instrumented by relative rainfall in 1893. Relative rainfall is measured as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The first stage is therefore reported in Table 4. Panel B reports the OLS estimates of the impact of the Mafia in 1900 on the different measures of state capacity. The dependent variable in columns 1-3 is infant mortality, computed for the years 1908 and 1909 as the average ratio of the of deaths below the age of one over the number of births for the years 1908 and 1909. The dependent variable in columns 4-6 is aqueduct availability, which is a dummy that takes value 1 if the municipality had an aqueduct in 1909 as reported by Lorenzoni1910b. The dependent variable in columns 7-9 is the per-capita development expenditure in logs of municipalities in 1912, which aggregates all spending for development or improvement of local infrastructure, education, security and justice (e.g. building or upgrading of roads and schools). The specifications in column 1, 4, and 7 include province dummies and other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in columns 2, 5, and 8 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in columns 3, 6, and 9 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 10: The Impact of Mafia on Political Competition

Dependent variable:	HHI in 1909		
	(1)	(2)	(3)
Panel A: IV results			
Mafia 1900	0.397** (0.174)	0.322** (0.139)	0.301** (0.128)
Panel B: OLS results			
Mafia 1900	0.0328 (0.0208)	0.0349 (0.0212)	0.0277 (0.0219)
Province FE	✓	✓	✓
Determinants of Fasci	✓	✓	✓
Determinants of Mafia		✓	✓
Geographic controls			✓
Observations	242	242	242

Notes: Estimates of the impact of the Mafia on political competition in 1909. Political competition is measured by the concentration index (HHI) computed at municipality level for the 1909 parliamentary elections using the share of votes of each candidate. Panel A reports the IV estimates of the effect of Mafia 1900 on political competition in 1909, where Mafia 1900 is instrumented by relative rainfall in 1893. Relative rainfall is measured as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The first stage is therefore reported in Table 4. Panel B reports the OLS estimates of the impact of the Mafia in 1900 on political competition in 1909. The specifications in column 1 include province dummies and other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agrotown, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in column 2 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in column 3 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 11: Falsification Exercise: Relative Rainfall 1882-1891 and Medium-Term Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Literacy 1911	0.0398 (0.0848)	-0.0446 (0.120)	0.00133 (0.0929)	0.158** (0.0704)	0.0381 (0.0721)	0.0439 (0.0542)	0.0345 (0.112)	-0.0505 (0.0751)	-0.0844* (0.0443)	-0.0308 (0.0802)
Literacy 1921	-0.0686 (0.0533)	-0.0429 (0.109)	-0.0291 (0.0926)	0.0375 (0.0706)	0.0103 (0.0722)	0.0552 (0.0491)	0.0243 (0.113)	-0.0502 (0.0545)	-0.0316 (0.0481)	-0.0245 (0.0732)
Literacy 1931	0.00602 (0.0639)	-0.0425 (0.0630)	-0.0270 (0.0750)	0.0929 (0.0612)	0.0182 (0.0481)	0.0516 (0.0454)	-0.0201 (0.0786)	-0.0508 (0.0602)	-0.0800** (0.0362)	-0.0814 (0.0523)
Development Expenditure 1912	-1.749 (1.209)	-0.0168 (1.533)	-1.091 (1.108)	-1.017 (1.336)	-0.059 (1.076)	0.437 (0.902)	-0.937 (1.750)	-0.177 (1.007)	0.064 (0.828)	0.843 (1.346)
Infant mortality 1909	0.0387 (0.0297)	0.0201 (0.0282)	0.0073 (0.0336)	0.0430 (0.0436)	0.0084 (0.0304)	-0.0192 (0.0241)	-0.0095 (0.0371)	-0.0037 (0.0309)	0.0136 (0.0310)	-0.0114 (0.0435)
Aqueduct 1911	-0.117 (0.141)	-0.123 (0.184)	-0.0659 (0.114)	-0.0756 (0.117)	-0.151 (0.165)	-0.0965 (0.128)	-0.0026 (0.123)	-0.0396 (0.0990)	-0.0422 (0.0965)	-0.101 (0.185)
HHI 1909	0.0703 (0.144)	0.0725 (0.136)	0.0002 (0.185)	0.132 (0.237)	0.407** (0.164)	-0.0321 (0.111)	-0.224 (0.222)	0.0744 (0.125)	0.0341 (0.149)	0.0575 (0.223)
Year	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891
Full set of controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: OLS estimates of the impact of relative rainfall in the years between 1882 and 1891 on medium-term economic outcomes, state capacity measures, and political competition. Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. All the specifications in the present table include the full set of controls (Determinants of Fasci, Determinants of Mafia, and Geographic controls) and provincial dummies. We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 12: Migration and Persistence of Socialist Support

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Migration						
Dependent variable:	Δ population 1881-1901			Δ population 1881-1971		
Relative Rainfall 1893	0.00823 (0.0837)	-0.00215 (0.0860)	-0.0700 (0.0891)	0.111 (0.261)	0.0903 (0.270)	-0.0366 (0.291)
Panel B: Socialist Support						
Dependent variable:	Peasant Leagues in 1908			Socialist vote share in 1913		
Relative Rainfall 1893	-0.00106 (0.0138)	-0.00230 (0.0155)	-0.00808 (0.0234)	0.308 (0.242)	0.302 (0.251)	0.168 (0.256)
Province FE	✓	✓	✓	✓	✓	✓
Determinants of Fasci	✓	✓	✓	✓	✓	✓
Determinants of Mafia		✓	✓		✓	✓
Geographic controls			✓			✓
Observations	245	245	245	245	245	245

Notes: OLS estimates of the impact of relative rainfall in 1893 on medium- and long-term migration, and on the medium-term persistence of peasant organizations and socialist parties. Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. In panel A we report the impact on migration. The dependent variable in columns 1-3 is the change in population between 1881 and 1901 computed using census data. The dependent variable in columns 4-6 is the change in population between 1881 and 1971 again computed using census data. In panel B we report the impact on the persistence of peasant and socialist organizations. The dependent variable in columns 1-3 is membership rate of the peasants' leagues in 1908. It is computed using the number of members of peasant leagues reported in Lorenzoni 1910b divided by the population in the previous census of 1901. The dependent variable in columns 4-6 is the vote share for candidates belonging to one of the socialist parties (Official Socialist Party, Reformist Socialist Party, Independent Socialist Party) in the parliamentary elections in 1913. The specifications in column 1 and 4 include province dummies and other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in column 2 and 5 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in columns 3 and 6 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 13: The Persistence of Mafia

Dependent variable: Mafia 1987				
	(1)	(2)	(3)	(4)
Panel A: IV results				
Mafia 1900	0.368 (0.437)	0.336 (0.272)	0.291 (0.238)	0.258 (0.208)
Panel B: OLS results				
Mafia 1900	0.108** (0.0420)	0.0858** (0.0372)	0.0838* (0.0436)	0.0910** (0.0437)
Province FE	✓	✓	✓	✓
Determinants of Fasci		✓	✓	✓
Determinants of Mafia			✓	✓
Geographic controls				✓
Observations	245	245	245	245

Notes: Estimates of the impact of persistence of the Mafia from 1900 to 1987. The information about the Mafia presence in 1980s is taken from a report by the military police (*Carabinieri*) submitted in 1987 to a parliamentary committee (CG *Carabinieri*, 1987). The dependent variable is a dummy that takes the value of 1 for the municipality which is considered in the report a stronghold of the Mafia. Panel A reports the IV estimates of the persistence of Mafia presence in 1900 on the 1987 measure, where Mafia 1900 is instrumented by relative rainfall in 1893. Relative rainfall is measured as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The first stage is therefore reported in Table 4. Panel B reports the OLS estimates of the persistence of Mafia presence in 1900 on the 1987 measure. The specifications in column 1 include only Mafia 1900 and provincial dummies. The specifications in column 2 include also other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in column 3 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in column 4 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 14: The Long-Term Impact of Mafia on Human Capital

Dependent variable:	High school			Literacy		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Census 1961						
Mafia 1900	-0.0165* (0.0096)	-0.0154** (0.0076)	-0.0106* (0.0061)	-0.0374* (0.0227)	-0.0304* (0.0156)	-0.0374* (0.0221)
Panel B: Census 1971						
Mafia 1900	-0.0268* (0.0143)	-0.0248** (0.0115)	-0.0190** (0.009)	-0.0258 (0.0162)	-0.0196 (0.0134)	-0.0272* (0.0150)
Panel C: Census 1981						
Mafia 1900	-0.0369 (0.0228)	-0.0331* (0.0198)	-0.0176 (0.0162)	-0.0163 (0.0126)	-0.0126 (0.0101)	-0.0114 (0.0120)
Province FE	✓	✓	✓	✓	✓	✓
Determinants of Fasci	✓	✓	✓	✓	✓	✓
Determinants of Mafia		✓	✓		✓	✓
Geographic controls			✓			✓
Observations	245	245	245	245	245	245

Notes: IV estimates of the impact of the Mafia in 1900 on high school completion rate and literacy rates in the years 1961, 1971, and 1981. Mafia 1900 is instrumented by relative rainfall in 1893. Relative rainfall is measured as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The first stage is therefore reported in Table 4. The dependent variable in columns 1-3 is the share of the population older than 6 years of age with a high school degree computed using census data at municipality level. The dependent variable in columns 4-6 is the literacy rate of the resident population older than 6 years of age and is computed using the same census data. Panel A reports the IV estimates of the impact of the Mafia in 1900 on high school and literacy rates in 1961, while panel B and C report the same estimations for the years 1971 and 1981 respectively. The specifications in column 1 and 4 include province dummies and other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in columns 2 and 5 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in columns 3 and 6 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table 15: The Long-Term Impact of Mafia on State Capacity and Politics

Dependent variable:	Aqueduct availability			Infant mortality			Development Expenditure			HHI		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: 1961												
Mafia 1900	-0.130 (0.0957)	-0.129* (0.0775)	-0.177* (0.0906)				-0.558 (0.351)	-0.509* (0.301)	-0.0482 (0.342)	0.0940*** (0.0319)	0.0819*** (0.0310)	0.0900*** (0.0222)
Panel B: 1971												
Mafia 1900	-0.125** (0.0609)	-0.0997* (0.0600)	-0.0669* (0.0404)	0.00216 (0.00862)	0.00135 (0.00758)	0.00170 (0.0108)				0.0784** (0.0337)	0.0661** (0.0305)	0.0626** (0.0259)
Panel C: 1981												
Mafia 1900	-0.139* (0.0796)	-0.117 (0.0719)	-0.0872 (0.0734)	-0.0035 (0.0067)	-0.0038 (0.0063)	-0.0041 (0.0080)				0.0818*** (0.0295)	0.0660** (0.0273)	0.0531* (0.0284)
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Determinants of Fasci	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Determinants of Mafia		✓	✓		✓	✓		✓	✓		✓	✓
Geographic controls			✓			✓			✓			✓
Observations	245	245	245	245	245	245	245	245	245	245	245	245

Notes: IV estimates of the impact of the Mafia in 1900 on state capacity measures and politics in the years 1961, 1971, and 1981. Mafia 1900 is instrumented by relative rainfall in 1893. Relative rainfall is measured as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The first stage is therefore reported in Table 4. The dependent variable in columns 1-3 is the share of the households receiving drinking water from an aqueduct using census data at municipality level. The dependent variable in columns 4-6 is the infant mortality rate computed as the ratio between the deaths below the age of one over the number of births in the same years using data provided by ISTAT at municipality level on deaths by age and sex and on population change. The dependent variable in columns 7-9 is the per-capita development expenditure in logs of municipalities, which aggregates all spending for development or improvement of local infrastructure, education, security and justice (e.g. building or upgrading of roads and schools) The dependent variable in columns 10-12 is the concentration index (HHI) computed at municipality level for parliamentary elections using the share of votes of each party. Panel A reports the coefficients of the effect of Mafia 1900 on the dependent variables for the year 1961 (1957 for development expenditure, and 1963 for HHI). Panel B reports the coefficients of the effect of Mafia 1900 on the dependent variables for the year 1971 (1969-70 for infant mortality, and 1972 for HHI). Panel c reports the coefficients of the effect of Mafia 1900 on the dependent variables for the year 1981 (1982 for infant mortality, and 1983 for HHI). The specifications in column 1, 4, 7, and 10 include province dummies and other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in columns 2, 5, 8, and 11 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in columns 3, 6, 9, and 12 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

APPENDIX

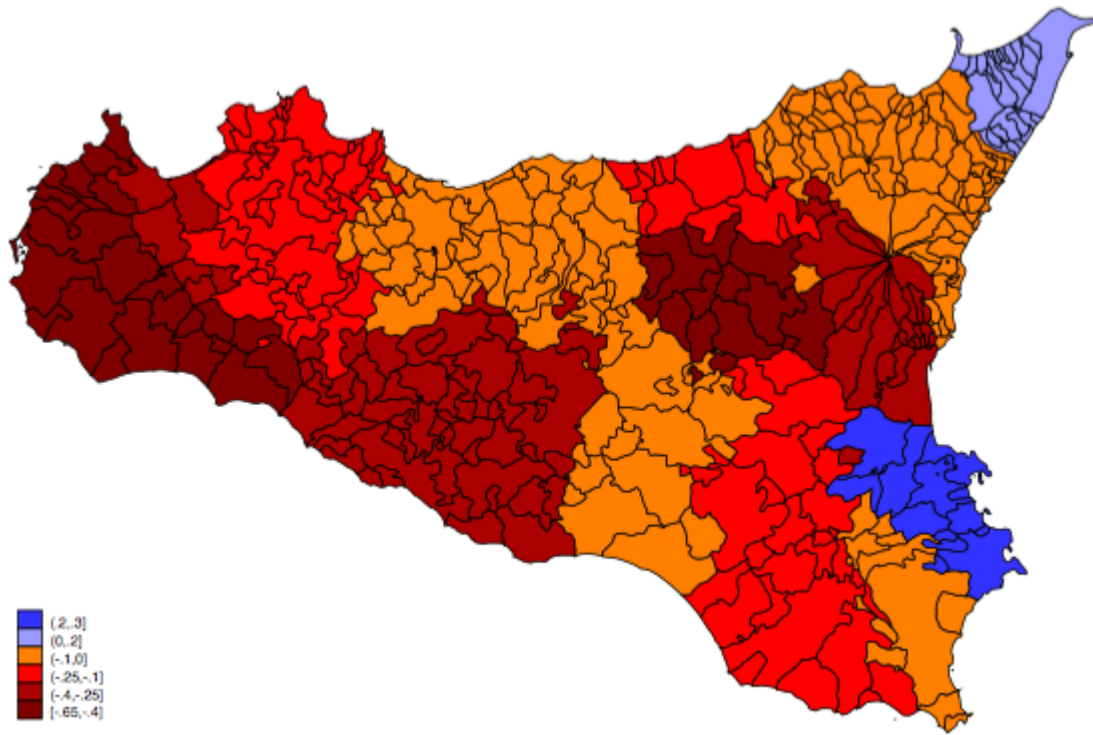


Figure A1: Average change in agricultural production for 11 crops in 1893 with respect to the average of the 1890-94 period in each of the 24 districts. Weighted average using the size of the area devoted to each crop in every district. The crops are barley, beans, broad beans, corn, flax, oat, olive oil, potatoes, rye, wheat, wine.

Table A1: Peasant Fasci and Mafia in 1885

Dependent variable:	Peasant Fasci			
	(1)	(2)	(3)	(4)
Mafia 1885	-0.0536*** (0.0153)	-0.0452*** (0.0174)	-0.0339* (0.0187)	-0.0427* (0.0237)
Province FE	✓	✓	✓	✓
Determinants of Fasci		✓	✓	✓
Determinants of Mafia			✓	✓
Geographic controls				✓
Observations	245	245	245	245

Notes: OLS estimates of the impact of the Mafia presence in 1885 on the emergence of Peasant Fasci organizations. Mafia presence is derived from Jacini (1885) and, as in Buonanno et al. (2015), takes a value of 0, 1, 2, or 3, progressively indicating the strength of the Mafia in a municipality with 0 denoting no presence of Mafia organizations and 3 highest density of the Mafia. The dependent variable is a dummy indicating the presence in the municipality of a Peasant Fasci organization. Panel A does not include which are included in all the specifications of Panel B. The specification in column 1 includes only Mafia strength in 1885 and the provincial dummies. The specification in column 2 also include other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specification in column 3 also includes various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in column 4 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table A2: Robustness Tests on Relative Rainfall

	(1)	(2)	(3)
Panel A: Dependent variable: Peasant Fasci			
Relative Rainfall 1892	-0.258 (0.178)	-0.225 (0.171)	
Relative Spring Rainfall 1893		-0.537* (0.268)	-0.650* (0.388)
Relative Winter Rainfall 1893			0.037 (0.244)
Relative Summer Rainfall 1893			0.021 (0.085)
Relative Fall Rainfall 1893			0.289 (0.370)
Panel B: Dependent variable: Mafia 1900			
Relative Rainfall 1892	-0.156 (0.412)	0.0133 (0.509)	
Relative Spring Rainfall 1893		-1.122** (0.566)	-1.334*** (0.489)
Relative Winter Rainfall 1893			-0.728 (0.708)
Relative Summer Rainfall 1893			-0.021 (0.163)
Relative Fall Rainfall 1893			-0.106 (0.823)
Full set of controls	✓	✓	✓
Observations	210	205	213

Notes: Estimates of the impact of rainfall on the Peasant Fasci and the Mafia in 1900. Relative rainfall is measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. In panel A we report the estimates of the effects on the Peasant Fasci while in panel B the effect on the Mafia. All the specifications in the present table include the full set of controls (Determinants of Fasci, Determinants of Mafia, and Geographic controls) and provincial dummies. The specifications in column 1 control for relative spring rainfall in 1892. The specifications in column 2 also include spring rainfall in 1893. In the specifications in column 3 winter 1892-3, summer 1893, and fall 1893 relative rainfall are also taken into account. We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table A3: Alternative Measures for Relative Rainfall 1893

	(1)	(2)	(3)	(4)	(5)
Panel A:					
Dependent variable: Peasant Fasci					
Relative Rainfall 1893	-0.396 (0.194)**	-0.991 (0.419)**	-1.175 (0.554)**	-0.766 (0.394)*	-0.875 (0.369)**
Panel B:					
Dependent variable: Mafia 1900					
Relative Rainfall 1893	-0.472 (0.230)**	-1.177 (0.500)**	-1.454 (0.419)***	-0.943 (0.519)*	-1.003 (0.371)***
Measure of Relative Rainfall 1893:					
Log of relative rainfall	✓				
Relative rainfall capped at 1		✓			
Interpolation using:					
Minimum two stations			✓		
Stations within 25 km				✓	
Stations within 35 km					✓
Full set of controls	✓	✓	✓	✓	✓
Observations	245	245	155	216	251

Notes: Estimates of the impact of alternative rainfall measures on the Peasant Fasci and the Mafia in 1900. In panel A we report the estimates of the effects on the Peasant Fasci while in panel B the effect on the Mafia. All the specifications in the present table include the full set of controls (Determinants of Fasci, Determinants of Mafia, and Geographic controls) and provincial dummies. The specifications in column 1 include the natural logarithm of relative spring rainfall in 1893 measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The specifications in column 2 includes instead the relative spring rainfall in 1893 interpolated as above, but capped at 1. The specifications in column 3 include instead the relative rainfall in spring 1893 for the municipalities where at least two weather stations were used to compute the interpolated measure of relative rainfall within the 30km cutoff. The specifications in column 4 include the relative rainfall in spring 1893 interpolated at municipality level using the inverse of the distance as weights with a cutoff of 25km. Finally, the specifications in column 5 include the relative rainfall in spring 1893 interpolated at municipality level using the inverse of the distance as weights with a cutoff of 35km. We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table A4: Falsification Exercise: Relative Rainfall 1882-1891, Peasant Fasci and Mafia. Maximum Likelihood Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A:										
Dependent variable: Peasant Fasci										
Relative Rainfall 18XX	0.00198 (0.176)	0.0988 (0.129)	-0.127 (0.0996)	0.0833 (0.249)	0.118 (0.259)	-0.0508 (0.126)	-0.609** (0.275)	0.0004 (0.145)	-0.0418 (0.164)	-0.0003 (0.269)
Panel B:										
Dependent variable: Mafia 1900										
Relative Rainfall 18XX	-0.534 (0.433)	0.228 (0.401)	0.101 (0.287)	0.328 (0.46)	0.536 (0.36)	-0.195 (0.24)	-0.928* (0.485)	0.216 (0.368)	0.0767 (0.248)	0.605 (0.426)
Year	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891
Full set of controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	197	181	222	204	224	208	224	225	241	244

Notes: Maximum likelihood estimates of the impact of relative rainfall in the years between 1882 and 1891 on the Peasant Fasci and the Mafia in 1900. Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. All the specifications in the present table include the full set of controls (Determinants of Fasci, Determinants of Mafia, and Geographic controls) and provincial dummies. The coefficients of the impact of relative rainfall on the Peasant Fasci are reported in panel A, while the coefficients of the effect on Mafia 1900 is in panel B. We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table A5: Falsification Exercise: Relative Rainfall 1900-41

Drought variable: relative rainfall 19XX: Share of coefficients significant at 10%	original		logged		censored	
	+	-	+	-	+	-
Dependent variables:						
Mafia 1900	0.04	0.01	0.02	0.01	0.04	0.02
Peasant Fasci	0.12	0.04	0.11	0.04	0.10	0.04
Literacy 1911	0.01	0.04	0.01	0.07	0.01	0.08
Literacy 1921	0	0.07	0.01	0.10	0.02	0.09
Literacy 1931	0.04	0.07	0.04	0.10	0.03	0.06
Literacy 1961	0.02	0.06	0.02	0.09	0.02	0.06
Literacy 1971	0.02	0.05	0.02	0.05	0.02	0.02
Literacy 1981	0.02	0	0.02	0.02	0.02	0.08
High school 1961	0.02	0.09	0.02	0.12	0.02	0.08
High school 1971	0.02	0.10	0.02	0.10	0.03	0.07
High school 1981	0.03	0.09	0.02	0.09	0.03	0.06
Development Expenditure 1912	0.02	0.06	0.02	0.04	0.04	0
Development Expenditure 1957	0.02	0.03	0	0.02	0	0.02
Infant mortality 1909	0.07	0.00	0.10	0.01	0.07	0.01
Infant mortality 1969-70	0.05	0.01	0.06	0	0.04	0.03
Infant mortality 1982	0.03	0.02	0.05	0.02	0.05	0.01
Aqueduct 1911	0	0.02	0	0.02	0	0.03
Aqueduct coverage 1961	0.05	0.02	0.06	0.01	0.03	0.02
Aqueduct coverage 1971	0.03	0.06	0.04	0.04	0.04	0.05
Aqueduct coverage 1981	0.04	0.02	0.04	0.02	0.06	0.02
HHI 1909	0.07	0.06	0.06	0.07	0.06	0.02
HHI 1963	0.02	0.02	0.06	0.03	0.03	0.03
HHI 1972	0.03	0.05	0.02	0.05	0.02	0.07
HHI 1983	0.01	0.04	0.02	0	0.02	0.02

Notes: Relationship between relative spring rainfall in the years 1900-1941, the Peasant Fasci, the Mafia in 1900, economic outcomes, and state capacity measures. We report the share of positive and negative coefficients for relative rainfall in the years 1900-1941 which are significant at 10% in the three specifications in columns 2-4 of Tables 2-5 including provincial fixed effects. As in the main specifications, we consider bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. In the first and second columns we report the share of positive and negative coefficients for the baseline rainfall variable which are significant at 10%. In the third and fourth columns we report the share of positive and negative coefficients for the log relative rainfall (as used in column 1 of Table A3) which are significant at 10%. Finally in columns 5 and 6 we report the share of positive and negative coefficients for the capped rainfall variable (as used in column 2 of Table A3) which are significant at 10%.

Table A6: The Impact of Mafia on Medium-Term Outcomes. Maximum Likelihood Estimates

Dependent variable:	Literacy in 1911 (1)	Literacy in 1921 (2)	Literacy in 1931 (3)	Infant Mortality in 1909 (4)	Aqueduct in 1909 (5)	Development expenditure in 1912 (6)	HHI in 1909 (7)
Panel A: IV results							
Mafia 1900	-0.0874** (0.0363)	-0.0982*** (0.0344)	-0.078*** (0.0295)	0.0569** (0.0240)	-0.120* (0.0619)	-1.443** (0.6432)	0.3823*** (0.1348)
Panel B: OLS results							
Mafia 1900	-0.00006 (0.005)	0.0049 (0.0049)	-0.0016 (0.0058)	0.005 (0.0021)	0.0074 (0.0198)	0.0213 (0.1282)	0.0207 (0.019)
Full set of controls	✓	✓	✓	✓	✓	✓	✓
Observations	245	245	245	239	245	245	242

Notes: Maximum likelihood estimates of the impact of the Mafia on medium-term economic outcomes, state capacity, and politics. Panel A reports the IV estimates of the effect of Mafia 1900 on the different dependent variables, where Mafia 1900 is instrumented by relative rainfall in 1893. Relative rainfall is measured as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The first stage is therefore reported in Table 5. Panel B reports the OLS estimates of the impact of the Mafia in 1900 on the different dependent variables. All the specifications in the present table include the full set of controls (Determinants of Fasci, Determinants of Mafia, and Geographic controls) and provincial dummies. We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table A7: Long-Term Impact of Mafia on Human Capital, State Capacity and Politics. Maximum Likelihood Estimates

Dependent variable:	High School (1)	Literacy (2)	Aqueduct Availability (3)	Infant Mortality (4)	Development Expenditure (5)	HHI (6)
Panel A: 1961						
Mafia 1900						
Panel B: 1971						
Mafia 1900	-0.0190** (0.0086)	-0.0272*** (0.0101)	-0.0669** (0.0317)	0.0017 (0.0081)		0.0626** (0.029)
Panel C: 1981						
Mafia 1900						0.053* (0.0291)
Full set of controls	✓	✓	✓	✓	✓	✓

Notes: Maximum likelihood estimates of the impact of the Mafia in 1900 on state capacity measures and politics in the years 1961, 1971, and 1981. Mafia 1900 is instrumented by relative rainfall in 1893. Relative rainfall is measured as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The first stage is therefore reported in Table 5. The dependent variable in column 1 is the share of the population older than 6 years of age with a high school degree computed using census data at municipality level. The dependent variable in column 2 is the literacy rate of the resident population older than 6 years of age and is computed using the same census data. The dependent variable in column 3 is the share of the households receiving drinking water from an aqueduct using census data at municipality level. The dependent variable in column 4 is the infant mortality rate computed as the ratio between the deaths below the age of one over the number of births in the same years using data provided by ISTAT at municipality level on deaths by age and sex and on population change. The dependent variable in column 5 is the per-capita development expenditure in logs of municipalities, which aggregates all spending for development or improvement of local infrastructure, education, security and justice (e.g. building or upgrading of roads and schools) The dependent variable in column 6 is the concentration index (HHI) computed at municipality level for parliamentary elections using the share of votes of each party. Panel A reports the coefficients of the effect of Mafia 1900 on the dependent variables for the year 1961 (1957 for development expenditure, and 1963 for HHI). Panel B reports the coefficients of the effect of Mafia 1900 on the dependent variables for the year 1971 (1969-70 for infant mortality, and 1972 for HHI). Panel c reports the coefficients of the effect of Mafia 1900 on the dependent variables for the year 1981 (1982 for infant mortality, and 1983 for HHI). All the specifications in the present table include the full set of controls (Determinants of Fasci, Determinants of Mafia, and Geographic controls) and provincial dummies. We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table A8: Reduced Form with Relative Rainfall 1893

Coefficient of Relative Rainfall 1893	(1)	(2)	(3)
Dependent variables:			
Literacy 1911	0.0528 (0.0416)	0.0530 (0.0467)	0.0995* (0.0533)
Literacy 1921	0.0792** (0.0372)	0.0807* (0.0473)	0.112** (0.0558)
Literacy 1931	0.0588* (0.0334)	0.0605* (0.0345)	0.0888*** (0.0340)
Literacy 1961	0.0324* (0.0187)	0.0308* (0.0163)	0.0426* (0.0255)
Literacy 1971	0.0223* (0.0132)	0.0198 (0.0135)	0.0310* (0.0183)
Literacy 1981	0.0141 (0.0103)	0.0127 (0.00913)	0.0130 (0.0140)
High school 1961	0.0142* (0.00731)	0.0156** (0.00714)	0.0121 (0.00768)
High school 1971	0.0231* (0.0122)	0.0251** (0.0126)	0.0216* (0.0114)
High school 1981	0.0319 (0.0197)	0.0335* (0.0196)	0.0201 (0.0205)
Development Expenditure 1912	1.998** (0.971)	2.049** (0.923)	1.644* (0.982)
Development Expenditure 1957	0.482 (0.320)	0.515 (0.317)	0.0550 (0.368)
Infant mortality 1909	-0.0505** (0.0230)	-0.0566** (0.0230)	-0.0658** (0.0261)
Infant mortality 1969-70	-0.00186 (0.00737)	-0.00137 (0.00793)	-0.00194 (0.0122)
Infant mortality 1982	0.00309 (0.00675)	0.00391 (0.00682)	0.00474 (0.0100)
Aqueduct 1911	0.0491 (0.0664)	0.0507 (0.0378)	0.136 (0.143)
Aqueduct coverage 1961	0.112 (0.0794)	0.130 (0.0830)	0.202* (0.107)
Aqueduct coverage 1971	0.111* (0.0600)	0.103* (0.0557)	0.0795 (0.0515)
Aqueduct coverage 1981	0.120 (0.0730)	0.118* (0.0708)	0.0994 (0.0840)
HHI 1909	-0.341** (0.149)	-0.334** (0.141)	-0.331** (0.132)
HHI 1963	-0.0813*** (0.0294)	-0.0829*** (0.0308)	-0.103*** (0.0206)
HHI 1972	-0.0678* (0.0348)	-0.0669** (0.0317)	-0.0713** (0.0324)
HHI 1983	-0.0708*** (0.0253)	-0.0668** (0.0274)	-0.0605* (0.0329)
Province FE	✓	✓	✓
Determinants of Fasci	✓	✓	✓
Determinants of Mafia		✓	✓
Geographic controls			✓

Notes: OLS estimates of the impact of relative rainfall in 1893 on medium- and long-term economic outcomes, state capacity, and politics. The dependent variables are listed on the left of the Table. We report only the coefficient of relative spring rainfall in 1893. Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The specifications in column 1 include province dummies and other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in column 2 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in column 3 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table A9: Falsification Exercise: Reduced Form with Relative Rainfall 1906

Coefficient of Relative Rainfall 1906	(1)	(2)	(3)
Dependent variables:			
Literacy 1911	-0.115 (0.0905)	-0.0953 (0.0963)	-0.103 (0.132)
Literacy 1921	-0.0595 (0.100)	-0.0490 (0.0901)	-0.0951 (0.110)
Literacy 1931	-0.0856 (0.0915)	-0.0801 (0.0872)	-0.0820 (0.0799)
Literacy 1961	-0.00634 (0.0561)	-0.00275 (0.0503)	0.00324 (0.0514)
Literacy 1971	0.00671 (0.0367)	0.0104 (0.0318)	0.0170 (0.0389)
Literacy 1981	0.0172 (0.0287)	0.0218 (0.0259)	0.0333 (0.0312)
High school 1961	-0.00359 (0.0163)	-0.00235 (0.0149)	-0.00410 (0.0172)
High school 1971	-0.00708 (0.0254)	-0.00521 (0.0234)	-0.00798 (0.0286)
High school 1981	0.00820 (0.0383)	0.0123 (0.0307)	0.0117 (0.0405)
Per capita Development Expenditure 1912	1.656 (1.505)	1.1615 (1.438)	-2.130 (1.544)
Per capita Development Expenditure 1957	0.188 (0.787)	0.286 (0.836)	0.732 (0.999)
Infant mortality 1909	0.0502 (0.0479)	0.0722 (0.0449)	0.154*** (0.0521)
Infant mortality 1969-70	-0.00516 (0.00977)	-0.00598 (0.0121)	-0.00428 (0.0180)
Infant mortality 1982	-0.00255 (0.0141)	-0.00376 (0.0161)	-0.00792 (0.0276)
Aqueduct 1911	-0.290 (0.302)	-0.282 (0.290)	0.0932 (0.224)
Aqueduct coverage 1961	-0.100 (0.171)	-0.143 (0.169)	-0.152 (0.250)
Aqueduct coverage 1971	0.0214 (0.0970)	0.0276 (0.0868)	-0.0689 (0.126)
Aqueduct coverage 1981	-0.123 (0.0909)	-0.118 (0.0758)	-0.222 (0.174)
HHI 1909	0.253 (0.221)	0.270 (0.206)	0.338 (0.209)
HHI 1963	0.142*** (0.0479)	0.149*** (0.0465)	0.206*** (0.0673)
HHI 1972	0.0927 (0.0629)	0.0898 (0.0563)	0.149* (0.0889)
HHI 1983	-0.00164 (0.0440)	-0.00748 (0.0423)	0.0166 (0.0639)
Province FE	✓	✓	✓
Determinants of Fasci	✓	✓	✓
Determinants of Mafia		✓	✓
Geographic controls			✓

Notes: OLS estimates of the impact of relative rainfall in 1906 on medium- and long-term economic outcomes, state capacity, and politics. The dependent variables are listed on the left of the Table. We report only the coefficient of relative spring rainfall in 1906. Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. The specifications in column 1 include province dummies and other determinants of the presence of the Peasant Fasci (a dummy for the municipality being an agro-town, the levels of rural rents and urban rents in 1853, the share of total cultivated land, and the share of land devoted to grains). The specifications in column 2 also include various determinants of the presence of the Mafia (sulfur production in 1868-70, the share of land devoted to citrus groves, vineyards and olive trees, and a measure of the presence of the Mafia in 1885). Finally, in column 3 we include a range of geographic controls (log population in 1861, log area of the municipality, elevation of the town centre, maximum altitude, average altitude, distance to Palermo, distance to the closest port, the access to a postal road, average temperature, average rainfall and variance of relative rainfall). We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.

Table A10: Falsification Exercise: Relative Rainfall 1882-1891 and Long-Term Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Literacy 1961	-0.0231 (0.0318)	-0.0195 (0.0483)	-0.0208 (0.0452)	0.0389 (0.0361)	0.0282 (0.0291)	0.0172 (0.0264)	-0.0395 (0.0482)	-0.0218 (0.0281)	-0.0368 (0.0251)	-0.00560 (0.0349)
Literacy 1971	-0.0124 (0.0213)	-0.0124 (0.0384)	-0.0150 (0.0346)	0.0408 (0.0286)	0.0258 (0.0229)	0.0147 (0.0195)	-0.0262 (0.0412)	-0.0259 (0.0215)	-0.0237 (0.0147)	-0.0082 (0.0194)
Literacy 1981	-0.0165 (0.0181)	-0.00257 (0.0306)	-0.0162 (0.0212)	0.0191 (0.0223)	0.0148 (0.0156)	-0.000731 (0.0137)	-0.0364 (0.0256)	-0.00983 (0.0176)	-0.0111 (0.0157)	-0.00553 (0.0130)
High school 1961	-0.00224 (0.00842)	0.000972 (0.00990)	0.00359 (0.0101)	0.0108 (0.0108)	0.0162** (0.00758)	0.0108* (0.00570)	-0.000362 (0.00941)	-0.0134** (0.00634)	-0.00365 (0.00662)	0.00215 (0.00976)
High school 1971	-0.0074 (0.0114)	-0.0036 (0.0152)	0.0004 (0.0160)	0.0187 (0.0166)	0.0288** (0.0112)	0.0178** (0.0080)	0.0028 (0.0157)	-0.0183** (0.0078)	0.0082 (0.0103)	-0.0025 (0.0142)
High school 1981	-0.0114 (0.0217)	-0.00212 (0.0267)	-0.00427 (0.0252)	0.0219 (0.0265)	0.0497*** (0.0172)	0.0189 (0.0151)	-0.0206 (0.0241)	-0.0226 (0.0147)	-0.0112 (0.0170)	-0.0110 (0.0235)
Infant mortality 1969-70	-0.0046 (0.0073)	-0.0144 (0.0103)	-0.0076 (0.0107)	0.0007 (0.0123)	-0.0011 (0.0107)	0.0044 (0.0084)	-0.0002 (0.0152)	0.0044 (0.0095)	0.00002 (0.0093)	-0.0046 (0.0151)
Infant mortality 1982	-0.0162 (0.0130)	0.00106 (0.00928)	-0.00336 (0.0143)	0.00539 (0.0133)	0.00476 (0.0114)	0.00522 (0.00960)	0.00396 (0.0103)	-0.00574 (0.0105)	-0.00624 (0.00797)	0.00378 (0.0155)
Aqueduct coverage 1961	0.102 (0.155)	-0.118 (0.208)	0.0480 (0.149)	-0.00616 (0.164)	-0.0870 (0.171)	0.0733 (0.0683)	0.227* (0.125)	0.0343 (0.0943)	-0.0547 (0.111)	-0.00742 (0.171)
Aqueduct coverage 1971	-0.0216 (0.0625)	0.0316 (0.0656)	0.0101 (0.0840)	0.0626 (0.0840)	-0.0176 (0.0591)	0.0075 (0.0618)	0.0762 (0.0710)	-0.0276 (0.0592)	-0.0726 (0.0451)	-0.0679 (0.0846)
Aqueduct coverage 1981	-0.0747 (0.102)	-0.0114 (0.0984)	-0.0388 (0.101)	0.00551 (0.136)	-0.0428 (0.0942)	-0.00545 (0.0915)	0.0621 (0.146)	0.0135 (0.0771)	-0.116* (0.0647)	-0.0960 (0.0877)
Development Expenditure 1957	-0.149 (0.562)	-0.336 (0.605)	0.203 (0.654)	0.337 (0.672)	-0.192 (0.427)	-0.450 (0.356)	-0.774 (0.642)	0.277 (0.469)	-0.372 (0.408)	-0.261 (0.659)
HHI 1963	0.0386 (0.0399)	-0.0143 (0.0558)	-0.00527 (0.0504)	0.0239 (0.0514)	0.00983 (0.0417)	-0.0179 (0.0200)	-0.0741 (0.0535)	0.0217 (0.0394)	0.0215 (0.0308)	-0.00150 (0.0554)
HHI 1972	0.0280 (0.0396)	-0.0205 (0.0644)	0.0102 (0.0461)	0.0010 (0.0534)	-0.0210 (0.0360)	0.0004 (0.0305)	-0.0717 (0.0538)	-0.0082 (0.0307)	0.0429 (0.0277)	-0.0130 (0.0546)
HHI 1983	0.0041 (0.0219)	0.0192 (0.0620)	0.0144 (0.0348)	0.0040 (0.0457)	-0.0051 (0.0413)	-0.0075 (0.0263)	-0.0182 (0.0494)	0.0108 (0.0349)	0.0071 (0.0297)	-0.0498 (0.0470)
Year	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891
Full set of controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: OLS estimates of the impact of relative rainfall in the years between 1882 and 1891 on long-term economic outcomes, state capacity measures, and political competition. Relative rainfall is computed as the relative spring rainfall measured at weather station level and interpolated at municipality level using the inverse of the distance as weights with a cutoff of 30km. All the specifications in the present table include the full set of controls (Determinants of Fasci, Determinants of Mafia, and Geographic controls) and provincial dummies. We report bootstrapped standard errors allowing for two-way clustering conditional on the district in which the municipality is located and the closest weather station to the municipality. The coefficients with *** are significant at the 1% confidence level; with ** are significant at the 5% confidence level; and with * are significant at the 10% confidence level.