



# All is not lost: Organized crime and social capital formation<sup>☆</sup>

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## ABSTRACT

We investigate how institutional quality influences social capital by exploiting a policy designed to fight organized crime in Italy: the dismissal of city councils following criminal infiltration into local governments. To measure social capital, we employ a novel, fine-grained indicator based on Italy's *5 per Mille* provision, which allows taxpayers to allocate a portion of their income tax to non-profit organizations. Using a difference-in-differences strategy, we find that city council dismissals lead to a significant increase in social capital. We document that the perceived strengthening of law enforcement is the primary mechanism through which city council dismissals enhance social capital.

## 1. Introduction

Social capital, characterized by networks, norms, and trust that facilitate coordination and cooperation for mutual benefit, is a pivotal element in economic development. It affects various dimensions of economic and social life, from fostering entrepreneurship and innovation to enhancing public service delivery and governance.<sup>1</sup> While scholars have made considerable progress in uncovering the mechanisms through which social capital operates, the literature on social capital still presents many unanswered questions regarding its formation and evolution over time. How does social capital emerge and develop? What are the underlying factors that shape its formation and accumulation? Understanding the dynamics of social capital formation is crucial for both scholars and policymakers seeking to promote positive social outcomes and economic progress. By understanding the mechanisms

and drivers behind social capital formation, we can identify strategies to enhance its growth and leverage its potential benefits.

This paper aims to shed light on the institutional factors that shape social capital accumulation. While a substantial body of research has focused on the role of social capital in shaping institutions (Putnam et al., 1992; Knack, 2002; Nannicini et al., 2013; Besley, 2020), less attention has been given to exploring to which extent institutions affect social capital formation (Guiso et al., 2016; Borisova et al., 2023). This paper addresses a gap in the literature by examining how the enhancement of institutional quality impacts the formation of social capital in Italian municipalities. To do so, we exploit a unique policy aimed at combating organized crime in Italy: the City Council Dismissal (CCD). This policy seeks to restore legitimacy in areas where corruption is so pervasive that criminal organizations, particularly the Mafia, have infiltrated local governments. It mandates the dissolution of a municipal council upon evidence of criminal infiltration or collusion between

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<sup>1</sup> Studies have shown that social capital plays a significant role in economic growth (Knack and Keefer, 1997; Algan and Cahuc, 2010, 2014), the productivity of firms (Fukuyama, 1996), the promotion of innovation and productivity (Zak and Knack, 2001; Bloom et al., 2012), the development of financial sectors (Guiso et al., 2004), and the expansion of trade (Guiso et al., 2009). Moreover, the provision of public goods (Knack, 2002), the fiscal capacity of a nation (Besley, 2020), and political accountability (Nannicini et al., 2013) are also influenced by the level of social capital.

elected officials and criminal organizations, leading to a significant improvement in the quality of local institutions through strengthened law enforcement (Daniele and Geys, 2015; Fenizia and Saggio, 2024).

We study the impact of CCDs on social capital in Italian municipalities between 2009 and 2021, by comparing dissolved municipalities before and after the dissolution to municipalities that were not dissolved in a difference-in-differences approach. To do so, we introduce a novel and fine-grained measure of social capital based on a tax provision (*5 per Mille* (Eng: 5 per Thousands)) that allows taxpayers to allocate part of their annual income tax to non-profit organizations. This time-varying, tax-based measure of social capital, available at the municipality level, offers a nuanced, behavior-based perspective by capturing local variations in community engagement and support for non-profit organizations.<sup>2</sup> In this respect, our measure is an advancement in the literature, as it addresses recent concerns about the measurement of social capital related to its intrinsically local nature. Durante et al. (2023), for instance, stress the importance of “studying social capital at the appropriate geographical level – i.e., the local community – where most social interactions typically occur, something that has been lacking due to the scarcity of fine-grained data”. Moreover, our measure surpasses traditional attitude-based approaches by focusing on quantifying actual behaviors, leading to a more tangible understanding of social capital dynamics. This approach enables a deeper understanding of the underlying mechanisms that drive community connections and support for non-profit organizations. Finally, our measure is appealing because of its comprehensive coverage, being readily available for all Italian municipalities, and its potential scalability to other countries with similar tax-provision schemes, making it useful for cross-national comparisons and facilitating broader research on social capital.

Our findings show that the dissolution of municipal councils led to a significant and sizable increase in social capital, measured as the share of taxpayers in the municipality allocating 5‰ of their annual income tax to voluntary associations. In our preferred specification, we find that social capital increased by around 30% following the dissolution of a municipal council due to Mafia infiltration. Using an event-study framework, we examine the dynamics of this effect and find a cumulative impact, with social capital gradually increasing over time. This suggests that improvements in the quality of local institutions within a given municipality play a crucial role in the formation and accumulation of social capital.

In conceptualizing the observed effect, several mechanisms may be at play. One significant factor is the perceived strengthening of law enforcement. As highlighted by Daniele and Geys (2015), city council dismissals due to Mafia infiltration reflect an enhanced institutional framework, where strengthened law enforcement diminishes the political influence of organized crime. These dissolutions expose Mafia infiltration within municipalities, potentially heightening the perceived prevalence of this phenomenon and signaling the state's presence and effectiveness. Another potential mechanism is that 5‰ donations may increase as resources are diverted due to declining trust in local institutions, or as a response to perceived governmental effectiveness, regardless of the Mafia's presence.

Although disentangling these mechanisms is challenging, we provide compelling evidence that the first mechanism holds greater influence. Specifically, we analyze the diversion of trust (from local governments to voluntary associations), changes in civic engagement (via the creation of voluntary organizations), the impact of non-Mafia-related municipal dissolutions, and the role of different trajectories of economic growth following CCDs. Overall, our analysis suggests a

genuine increase in social capital stemming from the reinforcement of local institutions.

Our paper mainly contributes to three strands of the literature. First, our results shed light on previous findings in the literature on CCDs and the Mafia. Daniele and Geys (2015) find that dissolutions lead to a higher average education level among newly elected politicians after commissioners step down. This finding is based on the premise that low-quality politicians are more susceptible to pressure from effective interest groups, a relationship that strong institutions can mitigate (Dal Bó et al., 2006). As CCDs represent a strengthening of law enforcement and, by extension, institutions,<sup>3</sup> they provide evidence that one way stronger institutions can diminish organized crime's political influence is by improving the quality of elected officials. Fenizia and Saggio (2024) reach similar conclusions. They demonstrate that CCDs are effective in establishing legitimacy and stimulating economic activity in areas dominated by organized crime. In discussing the mechanisms behind this result, the authors find that while the pool of candidates remains unchanged (Baraldi et al., 2022), elected politicians tend to have traits associated with lower corruption levels<sup>4</sup>: they are younger, more educated, and more likely to be first-time politicians and women. Collectively, these studies point to a societal impact of CCDs through a shift in voter preferences. We believe our findings of increased social capital post-CCDs help interpret these previous results. Higher social capital fosters an environment where voters are more informed, engaged, and demanding of their political representatives, leading to the election of politicians who are better equipped to serve the public interest effectively.

Second, it contributes to the recent literature on the definition and empirical measurement of social capital. Durante et al. (2023) emphasize that, despite the significant volume of research dedicated to social capital in economics, a universally accepted definition of social capital remains elusive. The multidimensionality of social capital and the relevant geographical level at which social interactions occur are crucial aspects to be considered when measuring social capital. Unlike most of the measures commonly used in the literature, our tax-based variable offers a granular view of social capital across Italy, with annual observations and a behavior-based approach. These attributes make it a valuable tool for studying civic engagement, community involvement, and the distribution of social capital in different municipalities.

Third, we explore which factors may foster or depress the formation and accumulation of social capital. A limited body of research explores the impact of organized crime on social and human capital. Previous literature has shown how the presence of organized crime hinders human capital accumulation (Coniglio et al., 2010; Acemoglu et al., 2019; Caglayan et al., 2021) and reduces political participation, institutional and interpersonal trust (Rolla and Justino, 2022).

Calamunci and Frattini (2023) show a negative relationship between a Mafia-news-based indicator and a local TV tax compliance rate.<sup>5</sup> Another body of research studies the effect of institutions on social capital. For instance, Guiso et al. (2016) show that a positive institutional shock has very long-term positive effects on civic capital today. Pulejo (2023) uses data from close municipal elections in Italy,

<sup>3</sup> See for instance (Cingano and Tonello, 2020) and Baraldi et al. (2023), who show a reduction in petty crimes and violence after a city council dismissal, and Galletta (2017), who finds evidence of law enforcement spillovers that reduce misconduct in neighboring municipalities.

<sup>4</sup> See for instance (Decarolis et al., 2020).

<sup>5</sup> The authors also exploit a granular measure, based on a local TV tax compliance rate, that should capture civic awareness. We believe both papers offer a novel and complementary perspective on a topic that has been neglected for a long time, namely the time varying nature of social capital. While Calamunci and Frattini (2023) study the effect of organized crime presence on social capital, we exploit a sharp shock in the quality of local institutions that restores legitimacy upon discovery of organized crime infiltration in the local government.

<sup>2</sup> The possibility of allocating 5‰ of annual income tax without any additional cost was introduced in 2006. Additional details are provided below in Section 2.1.

to estimate the impact of far-right victories on the formation of local volunteering associations. More closely related to our paper, using data from a lab experiment (Banerjee, 2016) provides evidence of a negative spillover effect of corruption on trust, while Campedelli et al. (2023) show the potential role of media narratives on shaping trust towards institutions and state performance. We contribute to this literature by providing causal evidence on an institutional shock that reveals the presence of the Mafia in the municipality and restores legitimacy. Our setting, combined with our social capital data, allows us to test potential mechanisms in a causal framework.

This research aims to shed light on the specific mechanisms through which quality of institutions influences social capital formation. By doing so, we hope to contribute to the existing knowledge base and provide valuable insights into the factors that shape social capital accumulation. Such insights can inform evidence-based policies and interventions that promote social cohesion, economic development, and the strengthening of societal bonds.

The paper proceeds as follows. Section 2 provides institutional details. Section 3 and Section 4 describe the data and the empirical strategy, respectively. Section 5 presents our main findings while Section 6 explores and discusses the potential mechanisms at play. Section 7 concludes.

## 2. Institutional background

### 2.1. 5 per mille

The Italian *5 per Mille* (Eng: 5 per Thousand) (henceforth 5‰) is a tax provision that allows taxpayers to allocate 5‰ of their annual income tax (IRPEF — the Italian personal income tax) to a qualified non-profit organization of their choice without incurring any additional costs. It provides taxpayers with the opportunity to directly participate in supporting social organizations that engage in charitable activities in fields such as culture, scientific research, health, social assistance, environmental protection and education. Under this scheme, taxpayers can choose to donate 5‰ of their IRPEF to a non-profit organization of their choice, and the government will redirect that portion of taxes to that organization. The 5‰ scheme is designed to encourage citizens to get involved in supporting social causes that align with their values and interests, and to provide a source of funding for non-profit organizations that work towards social welfare (Banca Etica, 2020).<sup>6</sup>

The 5‰ scheme represents a fine-grained measure of social capital for several reasons. It captures the conscious decisions made by individuals to contribute to the well-being of their community, a fundamental aspect of social capital. Through their support for non-profit organizations, individuals indirectly bolster community welfare and foster cohesion. Notably, this scheme provides a remarkably detailed breakdown at a granular geographical level over time, facilitating the study of social capital dynamics and evolution.

In Italy, the 5‰ was introduced in 2006. Taxpayers are free to choose any organization that meets the requirements for participation in the scheme, and they can change their choice every year. The donation does not entail any additional cost for the taxpayer, as it is simply a redirection of a portion of their taxes. Not only private organizations but also municipalities can be beneficiaries. However, municipalities are bound to allocate the resources to their own social activities. All

<sup>6</sup> More generally, the regulation allowing to allocate part of one's personal taxes directly to a non-profit beneficiary is known as the "one percent law" since Hungary – the first European country to introduce such a law in 1996 – allowed their citizens to allocate exactly 1% of their taxes. Several other countries followed the Hungarian model, which exists today in very similar forms in several countries. Eastern European countries were the forerunner (besides Hungary, Slovakia, Lithuania, Poland, Romania), followed by several other European countries (Italy, Estonia, Germany, Czech Republic, Portugal, Spain), as well as Japan.

beneficiary organizations, regardless of their field of activity, have a reporting obligation: the obligation is considered fulfilled by compiling a statement describing the use of the sums received and an illustrative report that details the activities carried out with them.

Taxpayers can participate in the 5‰ scheme by signing one of the designated boxes provided on the tax declaration form (see Figure A1).<sup>7</sup> Taxpayers can choose to allocate a portion of their taxes to different categories of non-profit associations. More specifically, they can allocate funds to support local volunteering and other non-profit organizations that serve a social purpose, social promotion associations, to support recognized local amateur sports associations, for funding scientific and health research or universities, and to support social activities carried out by the local government in their municipality of residence. It is important to note that only one organization can be chosen, and failure to make a choice means that the 5‰ of one's personal income tax will go to the state instead of being allocated to a non-profit organization. Taxpayers can donate their 5‰ to a voluntary association located anywhere on Italian territory, provided the organization meets the eligibility criteria for participation in the scheme.

To allocate funds, taxpayers have two options. They can either sign one of the boxes or they can add the fiscal ID number of the non-profit organization. If a taxpayer only signs one of the boxes, they will participate in the 5‰ scheme and part of their taxes will be redistributed to all non-profit organizations that belong to the specific category. If the taxpayer also indicates the fiscal ID number of a specific non-profit organization, the funds will go directly to that organization. One exception is the 5‰ allocated to the social activities of municipalities, which is automatically attributed to the taxpayer's municipality of residence if they sign the corresponding box.

In 2020, almost 500 million € were allocated through the 5‰ program thanks to the choices of over 14.2 million taxpayers (an average of about 35 € per taxpayer).<sup>89</sup> The number of non-profit organizations eligible within the 5‰ program was over 64,000. The overwhelming majority of eligible entities are volunteer organizations and amateur sports associations (approximately 86% of beneficiaries), followed by municipalities (approximately 9%), while the number of beneficiaries among health and scientific foundations is relatively small (approximately 5%).

The distribution of eligible beneficiaries does not correspond to the distribution of allocated funds. While volunteer organizations and amateur sports associations are also the largest beneficiaries of the 5‰ funds (about 59% of funds), a significant portion of the funds is allocated to health and scientific foundations (about 38% of funds), with only a small portion allocated to municipalities (about 3% of funds).

Because foundations receive a large share of the funds, despite being a small number of organizations, they receive the highest average annual amounts: for instance, foundations dealing with medical research receive an average of 1.4 million € per year. In comparison, volunteer associations and amateur sports associations receive just under 10,000 € on average, while the average amount allocated to municipalities is

<sup>7</sup> At the time of the income tax declaration, taxpayers have the option to donate a portion of their tax payment by signing in one of the appropriate boxes found on the tax forms. For self-employed individuals, this is the *Unico* model, while employees and retirees with a relatively simple tax situation typically use the *730* model. Taxpayers must file their tax return every year, and there are two different deadlines: the *730* model must be filed by September 30th of the year following the tax year. However, taxpayers who have not submitted their *730* model by the deadline may still file their tax return using the *Unico* Model, which must be filed by November 30th of the same year.

<sup>8</sup> Statistics drawn from Banca Etica (2020).

<sup>9</sup> In Italy, 41.5 million individuals submitted their income tax declarations in 2020, declaring a total of 884 billion €.

less than 3000 €. This difference reflects the different nature of the various entities: while scientific foundations have a national relevance (a small number of them exist, and they are concentrated in a few urban centers), the other entities have a strong local component and are widespread throughout the territory.

## 2.2. City council dismissals

Our goal is to study how social capital evolves after the dissolution of city councils upon evidence of Mafia infiltration. This was made possible by an Italian law introduced in 1991 (National Law 164/1991),<sup>10</sup> which was arguably the result of increased Mafia infiltration into public administration during the 1980s, particularly at the local level (Acconcia et al., 2014; Di Cataldo and Mastrorocco, 2022).

The law states that elected local public officials can be removed upon evidence of collusion with criminal organizations. Evidence of such activities is gathered by a commission established by the provincial prefect, who then sends a report to the Ministry of Interior, which decides whether there are grounds to dismiss the council. The dissolution proposal is finally decreed by the President of the Republic, after approval by the Cabinet.

After the infiltrated local officials are removed, the central government appoints a team of three external commissioners. The commissioners can only take care of the ordinary management and are appointed for a period lasting 12 to 18 months, with the possibility of extension to a maximum of 24 months in exceptional cases, followed by regular elections. The aim of the compulsory administration is to promptly remove the anomalies that might be prejudicial to the public interest and to ensure the regular functioning of the administration. Galletta (2017) investigates how compulsory administration affects local spending and finds no significant effect on total expenditure in a three-year period.<sup>11</sup>

As for the main causes behind dissolutions, Di Cataldo and Mastrorocco (2022) identify a set of recurring reasons from the investigative reports of infiltration cases. The authors find that in about 27% of the cases there were direct infiltrations, meaning that elected officials turned out to be organized crime affiliates. The rest of cases are a heterogeneous group of indirect infiltrations, whereby criminal organizations exert their influence on the composition and strategic decisions of local government without directly placing any of their members (Di Cataldo and Mastrorocco, 2022).

## 3. Data

In the sections below we introduce our tax-based social capital measure, obtained from 5‰ data, the construction of our main explanatory variable, which is based on records of municipality dissolutions due to Mafia infiltration, and other sources of data. This leads to a novel panel dataset at the municipality and year level. The baseline yearly dataset covers 7969 municipalities in Italy over the period 2009–2021.

### 3.1. Tax-based social capital from 5‰ data

We collect information on 5‰ from the Italian Revenue Agency (it: *Agenzia delle Entrate*). These data contain information on all registered beneficiary organizations, the region, province, and municipality where they are fiscally registered, their category (voluntary associations, amateur sport associations, scientific research, health research,

<sup>10</sup> Since 2000, the law is part of the more general set of laws regulating the activities of local jurisdictions (Testo Unico Enti Locali, Decreto Legislativo 18 agosto 2000, n. 267 art 143).

<sup>11</sup> The author also finds a reduction in investment spending in the first year of compulsory administration, which is in line with previous research showing that corruption can lead to inefficient over-investment in the public sector (Galletta, 2017).

municipalities),<sup>12</sup> the number of taxpayers who donated (i.e., the number of taxpayers that indicated the specific entity in their tax returns), and the total monetary amount of taxes allocated through the direct choices of taxpayers. Data on the 5‰ tax provision are provided for the year 2006 and all years between 2009 and 2021. To have a fully balanced sample, we consider the time-window 2009–2021 as our sample period. We will use the information available for the year 2006 as the “pre-sample period” data.<sup>13</sup>

Using the number of taxpayers who have specified the fiscal ID number of a particular non-profit organization located in a given municipality in a given year, we construct our primary dependent variable of interest, named *Tax-based Social Capital<sub>it</sub>*.<sup>14</sup> This measure is computed as the proportion of taxpayers who allocate 5‰ of their annual income tax to voluntary associations in municipality *i* in year *t*, with respect to the total number of taxpayers in that municipality. The distribution of our tax-based social capital indicator across Italian municipalities (as observed in 2009) is displayed in Fig. 1. Consistent with previous research (e.g., Putnam et al. 1992, Guiso et al. 2004, and Durante et al. 2023), there is significant variation in the level of social capital across different regions of Italy.

Since we only observe the number of taxpayers who allocate 5‰ of their income tax to each association but do not have information on the taxpayers' actual residence, our measure of social capital is based on associations characterized by a strong local component. We identify these associations using both threshold-based and definition-based criteria.<sup>15</sup> Firstly, to accurately capture local social capital, we consider only those associations receiving less than 50,000 euro in donations. This threshold-based rule is intended to focus our attention on smaller, community-oriented organizations. By setting this monetary limit, we aim to ensure that our measure of social capital accurately reflects support for organizations that are integral to their local communities. Secondly, we specifically focus on voluntary associations and amateur sports associations. These organizations, due to their localized nature and scope of activities, are more likely to receive donations from residents in the same municipalities where the associations are based. In contrast, scientific and health research organizations typically attract donations from across Italy, rather than exclusively from the municipality where their headquarters are located.<sup>16</sup>

#### 3.1.1. Validation of 5‰ as measure of social capital

In order to validate our tax-based measure of social capital, we leverage various measures of social capital that have been commonly used in the literature.

<sup>12</sup> Over the years, other categories were added, like cultural heritage and environmental organizations, but their group size is marginal.

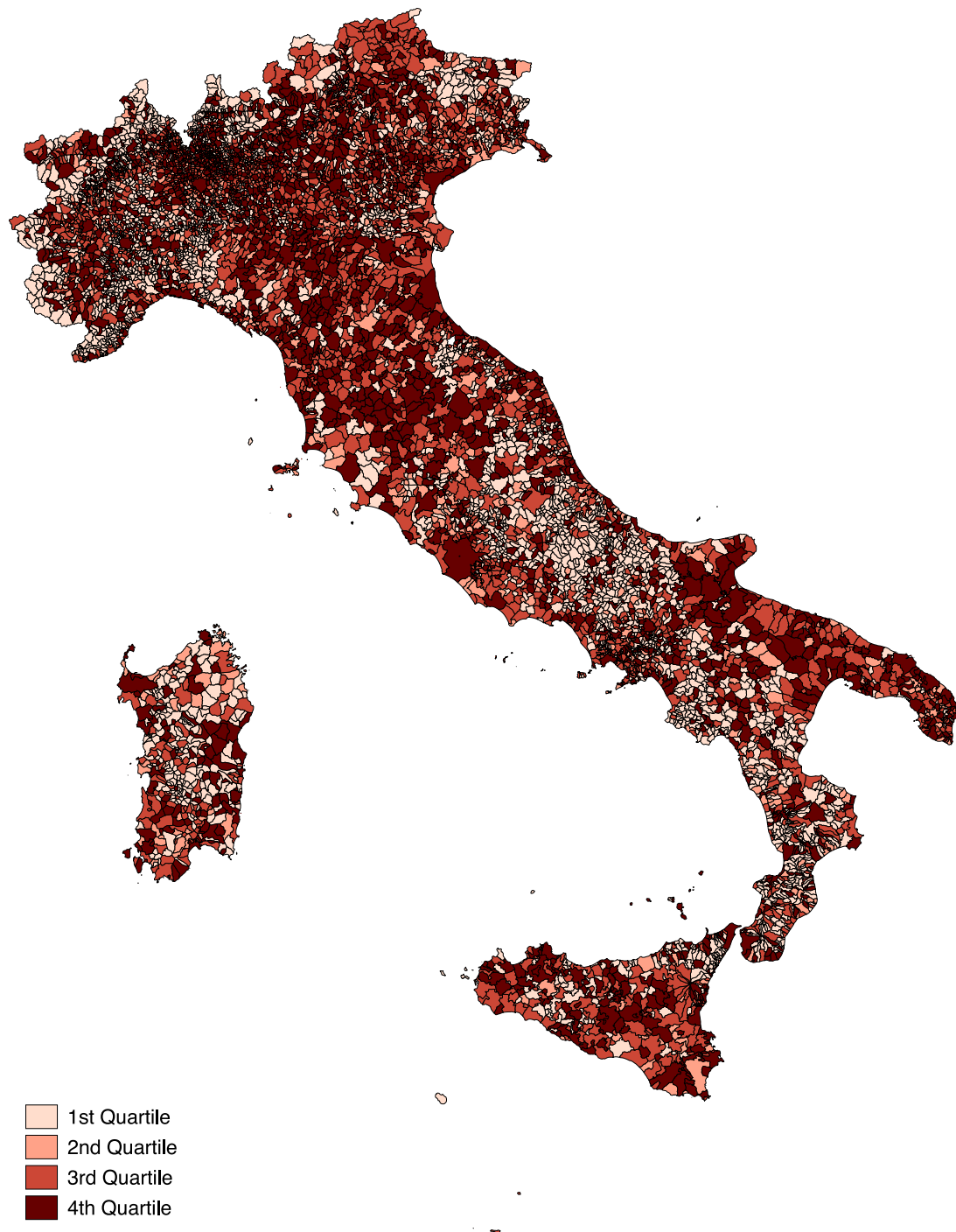
<sup>13</sup> For the years 2007 and 2008, data are provided with different granularity, which makes them not fully comparable. On the other hand, data for 2006 and from 2009–2021 are fully comparable.

<sup>14</sup> We assign each municipality-year to the corresponding year of the tax declaration. In Italy, taxes are generally paid in arrears, meaning that the taxes for a particular year are paid the following year. For instance, the 730 tax form paid in 2020 would typically pertain to the income earned by the taxpayer in 2019.

<sup>15</sup> We conduct robustness checks to examine the sensitivity of our findings to the definition of these criteria.

<sup>16</sup> Ideally, we would like to directly measure donations to organizations such as Libera (one of the most prominent NGOs dedicated to combating the influence of the Mafia in Italy) and be able to observe and geolocate the number of donations to each association across all Italian municipalities. Unfortunately, due to the structure of the data, we are unable to geolocalize donations made to specific organizations. However, while donations to a large nationwide organization—such as Libera—might reflect an effort to deploy resources to counter the rise of criminal organizations, focusing on smaller, local organizations is more likely to reflect support for those that play an active role within their local communities.





**Fig. 1.** Tax-based social capital - spatial distribution.

*Note:* The figure shows the distribution of our tax-based social capital indicators in Italian municipalities for the year 2009. The Tax-based Social Capital measure is the share of taxpayers allocating 5% of their annual income tax to voluntary associations, relative to the total number of taxpayers in the municipality. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

First, we use the variables identified by [Guiso et al. \(2016\)](#) to measure civic capital. These variables include the number of non-profit organizations per capita, the presence of an organ donation organization, the frequency of cheating in a national exam taken by children, and a historical measure of civic capital, specifically whether cities were awarded a medal of honor for heroism during World War II. Second, we use variables measuring turnout in referendums, turnout in national elections, and turnout in municipal elections. Finally, we exploit the information on social capital collected in the survey “*Aspects of Daily Life*” (ADL). This survey is conducted by the Italian National

Institute of Statistics (ISTAT) as part of an integrated system of social surveys – the Multipurpose Survey on Families – and collects fundamental information regarding the daily life of individuals, their habits and their attitudes towards (among others) social life, political and social participation (see Section A.5 for further details).<sup>17</sup>

<sup>17</sup> The survey is conducted annually and uses a sample of approximately 20,000 households and 50,000 individuals distributed across around 800 Italian municipalities of varying demographic sizes (source: [ISTAT](#)).

From the ADL, we derive information on newspapers readership. Additionally, we follow Durante et al. (2023), who use the same data to provide guidance on the measurement and use of social capital indicators in empirical work.<sup>18</sup> In particular, we apply a principal component analysis (PCA) to the 20 survey questions and construct four measures corresponding to four distinct components of social capital – (i) social participation, (ii) political participation, (iii) trust in others, and (iv) trust in institutions. To validate our tax-based social capital measure, we utilize variables from the ADL survey at the municipal level, with the caveat that the ADL survey is designed to provide representative data at the regional level, not the municipal level.

As a first exercise to validate our tax-based social capital measure (defined as the share of taxpayers who allocate the 5% of their annual income tax to local non-profit association in the municipality), we show its correlation to each of the social capital measures listed above. Since many of these variables are not available on an annual basis, either due to the way they are constructed or because they are only observed periodically (e.g., during election years), we first present pairwise correlations between all social capital-related outcomes using averages at the municipality level.

Results in Figure A3 show that our tax-based social capital measure is positively and significantly correlated with most proxies of social capital, including the presence of organ donation organizations, having received the medal of honor in World War II, honesty in mathematics tests, electoral turnout in referendums and national elections, newspaper readership, social participation, and general trust.

In Figure A4, we replicate the analysis from Figure A3, but this time we individually examine each variable from the ADL survey utilized by Durante et al. (2023) in their PCA analysis observed in each municipality-year. Our findings indicate that our tax-based social capital measure is positively correlated with the two variables associated with the “social participation” component of social capital, specifically those related to voluntary associations (gives money to and does unpaid activity for voluntary associations). Additionally, this measure shows a positive correlation with most variables defining the “general trust” and “institutional trust” components of social capital. Notably, however, it is negatively correlated with trust in municipal government, suggesting a potential substitution effect in trust towards civic and political local institutions.

In Table A4 in the Appendix we more formally regress the survey-based measures of social participation on our tax-based social capital measure, augmenting the model by gradually including a number of control variables. In Panel A, the dependent variable is the “social participation” measure derived from PCA analysis (see Durante et al. 2023). In Panels B, C, and D, the dependent variables are each of the individual variables from the ADL survey used to define the social participation component (giving money to voluntary associations, doing unpaid activity for voluntary associations, doing unpaid activity for non-voluntary associations). The coefficients of interest reveal a positive and statistically significant association between our tax-based social capital measure and the survey-based social participation measure. This association is primarily driven by the two variables directly related to voluntary associations. Overall, these findings support our method of measuring social capital using a tax-based outcome.

<sup>18</sup> Our data is slightly different from the data used by Durante et al. (2023) along two dimensions. Firstly, our sample covers more recent years (from 2009 to 2019) (overlapping with 5% data), while their sample covers the years between 2000 and 2015. Secondly, in our version of ADL data, we have only 20 of the 24 survey questions about participation in and support for associations that Durante et al. (2023) use to compute their social capital measures. We do not have the four variables measuring whether individuals attended any meetings of (i) voluntary associations, (ii) environmental or civil rights associations, (iii) cultural or recreational associations, (iv) party and trade unions.

We believe that the tax-based variable measuring the allocation of 5% of annual income tax to local non-profit associations offers several advantages for the study of social capital. Firstly, it provides a granular perspective as it covers all of Italy, allowing for a comprehensive analysis of social capital patterns across municipalities. Moreover, in contrast to the sampling design used in national surveys, such as the one employed by ISTAT in their ADL survey, which does not provide sufficient representativeness at a sub-regional level, our measure offers greater geographical granularity. This enables us to more effectively capture local variations in social capital, thereby revealing deeper insights into community engagement and support for non-profit organizations.<sup>19</sup>

Secondly, the tax-based variable is observed annually, providing a longitudinal dimension to the study of social capital. In contrast, most social capital-related variables commonly used in the literature are not available on a yearly basis. The only notable exception is the survey-based measure introduced by Durante et al. (2023). However, like most national surveys, the ADL faces logistical and budget constraints that prevent comprehensive coverage over extended time periods. For instance, in the period from 2009 to 2019, only 3667 (out of approximately 8000) municipalities were covered by ISTAT in their ADL survey. Of these, most (1859) were included in the survey only once during this period, and a majority (2984 municipalities) had observations for less than three years. In fact, only 152 municipalities, less than 2% of all Italian municipalities, were observed in all years. In contrast, our tax-based measure offers full longitudinal coverage. By analyzing changes in tax allocations over time, researchers can explore trends and fluctuations in social capital within and across municipalities. This longitudinal perspective is crucial for examining the factors that influence the formation and distribution of social capital. Additionally, it is important to consider the volatility in the ADL survey's sample sizes, which vary significantly across different years within the same municipality. Such fluctuations can lead to discrepancies caused by uneven numbers of individuals surveyed annually, potentially diminishing the dataset's stability and representativeness at a sub-regional level.

Finally, the tax-based variable is based on actual behavior rather than self-reported attitudes from surveys. This behavior-based measurement provides an objective perspective, reflecting individuals' tangible actions in supporting local non-profit associations through their income tax allocation. By focusing on behavior, the tax-based variable bypasses potential biases and reporting errors associated with survey-based measures, enhancing its reliability and validity as a proxy for social capital.

In summary, the tax-based variable offers a granular view of social capital across Italy, with annual observations and a behavior-based approach. Although measures based on the ADL survey have the potential to measure various aspects of social capital (as shown by Durante et al. 2023), they do not allow to capture variations across municipalities and years effectively. Therefore, we believe our tax-based social capital measure provides a novel and valuable tool for studying civic engagement, community involvement, and the distribution of social capital in different municipalities and across time.

### 3.2. Municipalities dissolved for mafia infiltration

We collect information on the municipalities that were dissolved for Mafia infiltration pursuant to a decree of application of Law 164/1991 from the Presidency of the Republic, including the date of the dissolution. We consider dissolutions from the year 2010 to 2021 (this choice is driven by the availability of 5% data, see Section 3.1.1,

<sup>19</sup> Furthermore, this tax-based approach to identify social capital has the potential for scalability to other countries that have similar 5% schemes. By adapting the methodology to the tax systems of other countries, researchers could potentially utilize this variable to analyze social capital in a broader international context.

and by the requirements of our difference-in-differences estimator). In our sample, 127 municipalities have been dissolved because of Mafia infiltration. Figure A2 shows the geographic distribution of dissolved municipalities. As expected, the majority of them are located in the southern regions, where the influence of criminal organization is the strongest: Sicily, Calabria, Apulia, and Campania. Nevertheless, several northern regions also witnessed some municipality dissolutions, which speaks to Mafia's geographic pervasiveness.

Our main explanatory variable is an indicator variable that takes a value of 1 after the city council of municipality  $i$  has been dissolved due to Mafia infiltration, and 0 otherwise. Note that some municipalities may have been dissolved multiple times.<sup>20</sup> If all dissolutions for a given municipality occurred during our sample period, our indicator variable is based only on the year of the first dissolution. However, if dissolutions occurred both before and after our estimation window, we adopt a conservative approach that retains the relevant information. In our baseline sample, we only include municipalities that were dissolved at least 10 years before our sample window. For instance, if a municipality was dissolved in 2007 and in 2010, it is excluded from our sample, but if a municipality was dissolved in 1998 and in 2015, it is included in the sample and the indicator variable takes a value of 1 from 2015 onwards. We conduct robustness checks to examine the sensitivity of our findings to this selection rule. Finally, we remove municipalities that experienced a dissolution in 2009 – the first year of our sample – because the estimation method by Borusyak et al. (2024), which we employ in our empirical strategy, requires at least one pre-treatment panel observation (see Section 4).

### 3.3. Other data

The baseline and robustness specifications use a series of municipal-level time-varying characteristic variables. Specifically, we include the population variable from the ISTAT. We also include economic-related variables such as the total taxable base, number of taxpayers, average income per capita, and income inequality, which are obtained from data provided by the Italian Ministry of Economy and Finance - Department of the Treasury.

## 4. Empirical design

Our goal is to estimate the impact of municipality's dissolution for Mafia on social capital between 2009 and 2021 at the municipal level. A natural starting point for the empirical design is a two-way fixed effects (FE) estimation, controlling for municipality and time fixed effects. Hence, our generic approach consists in estimating the treatment effect (i.e., the coefficient  $\beta_1$ ) of the binary variable *Municipality dissolved for Mafia* in the following econometric equation:

$$\text{Tax-based Social Capital}_{it} = \beta_0 + \beta_1 \text{Municipality dissolved for Mafia}_{it} + FE_i + FE_t + \epsilon_{it} \quad (1)$$

The unit of observation is a municipality  $i$  in year  $t$ , the variable *Municipality dissolved for Mafia* <sub>$it$</sub>  is an indicator variable that takes a value of 1 after the city council of municipality  $i$  has been dissolved for Mafia infiltration and 0 otherwise.  $FE_i$  and  $FE_t$  are municipality and time fixed effects. The outcome variable, *Tax-based Social Capital* <sub>$it$</sub> , corresponds to the number of taxpayers allocating 5% of their annual income tax to voluntary associations over the total number of taxpayers observed in municipality. Using a per capita (per taxpayer) measure allows for a simple interpretation of the estimated effect. In the baseline

<sup>20</sup> We exclude from our sample cases where the dismissal was subsequently revoked. Specifically, we have excluded from our sample all observations related to municipalities where the dismissal was revoked. It is important to highlight that the revocation of dismissals is a rare occurrence. During our period of interest, only five dismissals were revoked.

analysis, standard errors are clustered at the municipality level, which corresponds to the (relevant) aggregation level of our treatment.

Recent advances in econometrics have highlighted the limitations of using two-way fixed effects (FE) models to estimate treatment effects in staggered treatment adoption settings with more than two periods and units treated at different times. Specifically, the two-way FE dynamic specification can produce misleading estimates of dynamic causal effects when there are heterogeneous treatment effects across adoption cohorts. This issue arises because the specification includes “forbidden comparisons” between sets of units that have already been treated. However, in our setting, this should raise limited concerns due to the very small proportion of treated units (1.6%). Consequently, the influence of these comparisons on the overall estimated effect is minimal, making it unlikely that they will bias the estimated average treatment effect (Goodman-Bacon, 2021).<sup>21</sup>

Nevertheless, we also estimate the model proposed by Borusyak et al. (2024), who developed a method to obtain unbiased estimates in difference-in-differences designs with staggered treatment adoption and heterogeneous effects. Their estimator employs an imputation procedure that follows these steps. First, unit and time fixed effects are estimated using untreated observations only. Second, these fixed effects are used to impute the potential untreated outcome. Based on this, the estimated treatment effect for each treated observation is computed. In the last step, the average treatment effect is obtained as a weighted sum of the treatment effect estimates.

## 5. Main results

Table 1 displays the main results, where the outcome of interest is the tax-based social capital measure. Panel A displays results obtained with the two-way FE model. In Column (1), we regress our social capital variable on the indicator of dissolution due to Mafia infiltration. We include municipality fixed effects and year dummies, which makes this specification a classic difference-in-differences setting. We find a sizeable effect of municipality dissolution in boosting social capital, which is statistically significant at conventional level.

In Column (2), we include *Tax-based Social Capital* <sub>$i,2006$</sub> , which measures the tax-based social capital observed in the pre-sample period, interacted with year fixed effects. This model allows for the tax-based social capital to flexibly evolve over time based on the municipality's initial (measured in 2006) tax-based social capital. This interaction term captures the potential time-varying effects related to the baseline values of social capital and provides additional flexibility in modeling the dynamics of tax-based social capital. In Column (3), we include in our model *Province X Year* fixed effects to account for time-varying confounders that operate at the province level.<sup>22</sup>

In Panel B we replicate the analysis using the Borusyak et al. (2024) estimator. It turns out that the coefficient magnitude remains very large and the statistical significance high across all columns. Quantitatively, with our preferred specification presented in Column 3, we find that following the dissolution of a municipal government due to Mafia infiltration, donations to local voluntary associations increase by 2.3 percentage points, or 29%.<sup>23</sup> When using the Borusyak et al. (2024) estimator, we observe that social capital increases by about 22% following the dissolution of a municipal government because of Mafia infiltration.

<sup>21</sup> This conclusion is supported by a Bacon decomposition of the estimated coefficient, which identifies all two-group/two-period difference-in-differences estimators in the data and their relative weights (Goodman-Bacon, 2021). In our setting, the relative weight of comparisons of treated units with never treated units exceeds 99%.

<sup>22</sup> Provinces in Italy are the second-level administrative divisions of the Italian Republic, on an intermediate level between a municipality and a region. To maintain spatial consistency of the unit of observation over time, we consider 107 provinces, defined by the borders as they were in 2009, the first year of our sample.

<sup>23</sup> The sample mean is 7.8 percentage points.

**Table 1**  
Effect of CCDs on social capital - Main table.

| Dep. Variable: Tax-based Social Capital          | Panel A: TWFE      |                    |                    |
|--------------------------------------------------|--------------------|--------------------|--------------------|
|                                                  | (1)                | (2)                | (3)                |
| Municipality dissolved for Mafia                 | 0.021**<br>(0.009) | 0.021**<br>(0.009) | 0.023**<br>(0.009) |
| Panel B: Borusyak et al. (2024)                  |                    |                    |                    |
|                                                  | (1)                | (2)                | (3)                |
| Municipality dissolved for Mafia                 | 0.016**<br>(0.007) | 0.016**<br>(0.007) | 0.017**<br>(0.007) |
| Municipality FEs                                 | Yes                | Yes                | Yes                |
| Year FEs                                         | Yes                | Yes                | Yes                |
| Tax-based Social Capital [Pre-period] * Year FEs | No                 | Yes                | Yes                |
| Province-Year FEs                                | No                 | No                 | Yes                |
| Sample Mean                                      | 0.078              | 0.078              | 0.078              |
| Observations                                     | 103,506            | 103,506            | 103,506            |

NOTE: The table reports estimates of the effect of CCDs on Tax-based Social Capital. The dependent variable is computed as the share of number of taxpayers allocating 5% of their annual income tax to voluntary associations over the total number of taxpayers observed in municipality  $i$  in year  $t$ . The sample includes all years between 2009 and 2021. See Sections 2.1 and 3 for further details. In Panel A we present estimates based on a two-way FE model (see Eq. (1)). In Panel B we present estimates based on Borusyak et al. (2024). The unit of observation is the municipality  $i$  in a particular year  $t$ . *Municipality dissolved for Mafia* is an indicator variable that takes a value of 1 after the city council of a municipality has been dissolved for Mafia infiltration and 0 otherwise (see Sections 3 and 2.2 for details). Column (2) includes a variable corresponding to the share allocating 5% of their annual income tax to voluntary associations in municipality  $i$  in year 2006, *Tax-based Social Capital [Pre-Period]<sub>i,2006</sub>*, interacted with year FEs. Column (3) includes province-year FEs. Standard errors are clustered at the municipality level. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

### 5.1. Timing of the effect

In this section, we analyze in an event-study framework the dynamics of the effect we found in the previous section. The reason for this is twofold. First, the event-study results in a clear presentation of the municipalities' dissolution dynamic impact, which will allow us to understand whether the effect is persistent or it soon fades away. This is particularly interesting in our institutional context, where municipalities that are dissolved for Mafia infiltration are administered for up to 24 months by three external commissioners, before new regular elections are held. The question therefore arises whether the effect is tied to the presence of the compulsory administration, or instead it builds over time and it is long-lasting. Second, event-time models allow us to transparently test the parallel trend assumption underlying our econometric framework strategy.

A natural way to document the change of the effect over time is to estimate an augmented model with richer dynamics of lags and leads. We therefore estimate a variant of Borusyak et al. (2024) that embeds a set of 4 yearly leads and lags of the treatment effect.<sup>24</sup> The estimated coefficients are reported in Fig. 2. We find a cumulative impact of municipalities' dissolution on our tax-based social capital measure, as the estimated effect is gradually increasing over time. Importantly, the data do not seem to reject the parallel trend assumption, as a visual inspection of the figure reveals the absence of different pre-treatment dynamics.

### 5.2. Robustness

We perform a battery of sensitivity checks to test for the robustness of the baseline estimates reported in Table 1. In this subsection, we briefly list the main robustness tests performed. In the interest of space, corresponding tables and a more extensive description of the tests have been relegated to the Online Appendix B.

**Alternative definitions of tax-based social capital** We check the robustness of the definition of our main outcome variable by proposing several alternative constructions of the dependent variable.

We replicate the analysis when we (i) remove threshold-based criterion (Table A6), (ii) use a higher threshold to identify community-oriented organizations (Table A7), (iii) use a taxpayer-based rule that excludes observations where the number of taxpayers donating 5% is exceptionally large (Table A8). Overall, we find that for all alternative definitions of the main dependent variable the estimates are statistically significant and of similar order of magnitude as in our main baseline results in Table 1.

Finally, in Table A9 we replicate the main analysis using as dependent variable the income amount allocated to 5% over the total taxable income in the municipality. The results are statistically significant and, in our preferred specification, imply a 30% increase in the share of income allocated to 5% following the dissolution of a municipal government (this corresponds to about 3500 euro).

**Alternative estimators** To reflect the count data structure of our main dependent variable, we use a Poisson model as an alternative to the linear model. The dependent variable of interest is the number of taxpayers allocating 5% of their annual income tax to non-profit local entities in municipality  $i$  in year  $t$ . Corresponding results are displayed in Table A.10.<sup>25</sup>

**Confounding factors** A valid concern regarding our tax-based social capital measurement is the lack of detailed information on taxpayers' actual places of residence, which could potentially lead to misinterpretations of social capital levels. For instance, individuals who were born in one municipality but now reside in another might still choose to contribute to non-profits in their municipality of origin. This highlights the complex relationship between social capital and internal migration. As people move between municipalities, they may maintain strong ties to their previous communities, often reflected in their continued support for local non-profits. Consider a taxpayer who, despite relocating, retains a deep connection to their original municipality and chooses to direct their contributions there, perhaps

<sup>25</sup> To compare the Poisson estimates to our main results, we follow Wooldridge (2023) and obtain the average treatment effect on the treated from the marginal effect of the interaction term (equal to 149 using our preferred specification). This is comparable to the interaction term coefficient in the linear two-way FE model and corresponds to a 16.3% effect when compared to the sample mean.

<sup>24</sup> Variations of the lags/leads structure leave the results unaffected.



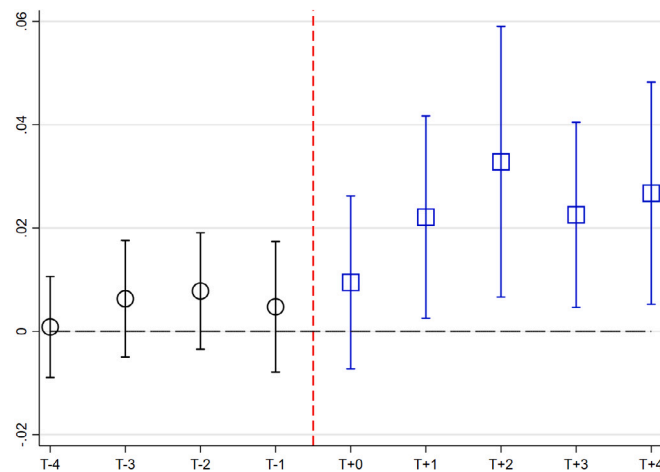


Fig. 2. Effect of CCDs on social capital — leads and lags.

Note: The figure plots estimates of the effect on the variable *Tax-based Social Capital* of 4 of lags and 4 leads (yearly increments) of the variable *Municipality dissolved for Mafia*. Estimates are obtained using the model used in Column (3) of Table 1 following the methodology by Borusyak et al. (2024). The dependent variable is the tax-based social capital measure calculated as the share of the number of taxpayers allocating 5% of their annual income tax to voluntary associations over the total number of taxpayers observed in the municipality.

influenced by ongoing community challenges. If this scenario is common, the positive effects observed in Table 1 could be partly due to a decrease in the number of 5% allocations in the municipalities where individuals relocated. To address these concerns, we have performed a series of robustness exercises using alternative samples. First, utilizing province-level data on internal migrations, we exclude provinces with the highest inflow of migrants from provinces that have at least one municipality dissolved due to Mafia presence. This approach aims to reduce the potential influence of between-province migration on our social capital measure and helps isolate the impact of local engagement from cross-migration effects. Second, we remove all municipalities belonging to provinces where at least one municipality was dissolved due to Mafia presence, to account for the potential confounding role of within-province migration. Lastly, since migration data is not available at the municipality level, we use the distribution of surnames from the national telephone directory of the year 1993 at the municipal level.<sup>26</sup> Utilizing this telephone directory data, we exclude municipalities whose top ten list of most common surnames includes any of the top three most common surnames in Mafia-affected municipalities. This exclusion allows for a more refined and granular analysis of potential migration patterns. Corresponding results, reported in Appendix B.6, show that our estimates are of a similar order of magnitude as in our main baseline results in Table 1 and suggest that confounding factors related to migration patterns are negligible.

**Alternative controls** We investigate the sensitivity of the baseline findings when using additional control variables. We replicate our results using (i) time-varying demographic and economic variables and (ii) pre-measured variables linearly interacted with year FEs, to flexibly control for the potential different evolution of the outcome variable over time depending on these pre-measured variables. The results from this alternative approach are reported in Tables A12 and A13, and we find that our findings are robust to these sensitivity checks.

**Alternative definitions of dissolution** As explained in Section 3.2, we consider the dissolution for Mafia as an absorbing state, meaning that our explanatory variable, *Municipality dissolved for Mafia*, is an indicator variable that turns on after the dissolution and never turns off. One potential concern is that some municipalities have been dissolved multiple times. For this reason, the sample on which our main results

in Table 1 is based excludes treated municipalities that were already dissolved due to Mafia between 1998 and 2009, which is the first year of our sample.<sup>27</sup>

We test the sensitivity of our results to alternative sample definitions that exclude already-treated municipalities if they do not meet certain criteria. Results are presented in Tables A21 and A22. In Column 1, we show the result based on the baseline sample described above. In Column 2, we exclude all municipalities that were ever dissolved before 2009. From Column 3 to Column 10, we modify the minimum required distance between the last dissolution year before 2009 and the dissolution year after 2009 (specifically, municipalities must not have been dissolved later than a year ranging from 1991 to 2005). For instance, in Column 3, we exclude municipalities that were already dissolved due to Mafia between 1991 and 2009. Results are robust across all these different definitions of municipal dissolution.

Finally, as explained in Section 2.1, taxpayers must file their tax returns every year, and there are two different deadlines (September 30th and November 30th).<sup>28</sup> It could be that the dissolution of the municipal council occurs after the filing of tax returns. We address this concern by coding the year after the actual dissolution as the first year of the post-dissolution period if it occurs after September, which is the first deadline to file tax returns. The corresponding results are presented in Appendix B.9, and this set of estimates is very similar to the one reported in the main text.

**Alternative samples** City councils can be dismissed due to reasons other than Mafia infiltration, for instance due to financial difficulties or political instability. In our baseline results, these municipalities are included in the sample. One concern could be that these municipalities are not proper control observations, especially if there is a direct effect of a municipality's dissolution on social capital. We exclude this possibility in our discussion of potential alternative mechanisms in Section 6.3 below. Here instead we test the robustness of our main results by excluding from the sample the municipalities whose city council has been dismissed *not* due to Mafia infiltration in our period of interest. As shown in Table A19, if anything the magnitude of the coefficients becomes larger.

<sup>26</sup> Telephone data is retrieved from the directory of SEAT — *Società Elenchi Abbonati al Telefono*. Additional details about the underlying data are provided in Buonanno and Vanin (2017).

<sup>27</sup> As explained in Section 3.2, if a municipality was dissolved in 2005 and in 2010, that municipality is excluded from the sample, while a municipality that was dissolved in 1994 and then again in 2010 is included in the sample.

<sup>28</sup> For additional details, see Footnote 7.

In our analysis, the control group includes municipalities that might be categorized as false negatives – those potentially infiltrated by criminal elements but not officially exposed – that could introduce biases into our estimates. Our approach to mitigate this concern involves removing areas that are in closer proximity to the infiltrated municipalities. We have already shown above that our results are robust to the exclusion of provinces where any municipality has been infiltrated (see Table A17). To mitigate this issue further, we have conducted another robustness exercise which involves excluding municipalities from regions with at least one identified infiltrated municipality. Corresponding results reported in Table A20 show that estimates are consistent with the results detailed in the main text, providing further support for our findings.

**Alternative clusters** As a final robustness check, we test the reliability of our main results to different levels of clustering of the standard errors. In Table A14, we allow standard errors to be clustered at the level of the 107 Italian provinces (as per 2009).

**Spillover effects** We empirically investigate the presence of spillover effects of dissolution for Mafia infiltration on social capital in neighboring municipalities. Corresponding results (displayed in Table A15 in the Appendix) show that dissolution does not affect social capital in municipalities nearby.

## 6. Mechanisms

After having scrutinized our results for a broad range of robustness checks in the previous section, we now study the underlying mechanisms and channels at work. In particular, we focus on the following four potential mechanisms through which the dissolution of municipal council due to Mafia infiltration potentially increases the level of social capital in the municipality: (i) a reduction of trust in local governments, (ii) an increase in the number of voluntary associations after the dissolution, (iii) a direct effect of dissolutions, not related to the presence of Mafia infiltration, and (iv) an increase in economic growth after the city council's dissolution.

### 6.1. Trust diversion or a boost to citizens' engagement?

In this section, we investigate whether the effect we observed on social capital is simply a result of a diversion of resources due to a reduction in trust in local governments or a genuine increase in the level of social capital in the municipality. It is important to disentangle the two potential effects, as they could coexist.

The dissolution of a municipality due to Mafia infiltration can have a significant impact on trust in local institutions. When a municipality is dissolved, the government takes control of its administration and implements measures to combat organized crime and restore the rule of law. However, this can lead to a loss of trust among local residents in the municipality's elected officials and institutions, as the government is seen as taking over the administration due to serious problems like corruption and infiltration by organized crime.

In this section, we leverage on 5‰ data to present a novel and granular measure of trust in local institutions. As we explained in the previous section, taxpayers in Italy can choose to allocate a portion of their taxes to various non-profit associations, including social activities carried out by the local government in their municipality of residence. We therefore use the share of taxpayers who choose to allocate their 5‰ to their municipality as a measure of trust in local institutions. In Appendix A.5.2 we conduct a validation exercise of this measure of trust, similar to the one in Section 3.1.1. First, in Figure A6 we show that the tax-based trust measure shows the strongest positive correlation with a survey measure of trust in local institutions retrieved from the ADL.<sup>29</sup> Second, in Table A5, we regress municipality-year level

<sup>29</sup> The question we use asks: "Using a score from 0 to 10, please indicate how much you trust the municipal government" (*it: Utilizzando un punteggio da 0 a 10 indichi quanto si fida del governo comunale*).

trust in local institutions from the ADL survey on the tax-based trust measure. The coefficients of interest indicate a positive and statistically significant association between our measure and survey data. Overall, these results provide support for our method of measuring trust in local institutions using tax-based information.

Using as outcome of interest our tax-based measures of trust, Table 2 displays the effect of municipalities' dissolution for Mafia on our tax-based measure of trust in local institutions, using the same specifications as in Table 1. Overall, we do not find strong evidence of a reduction in trust. Only the coefficient in Column (3) of Panel A is statistically significant at the 10% level (equal to 0.002 percentage points or a decrease of -9%).

Potentially, a negative impact on our trust measurement could be consistent with the possibility of resources being diverted from public institutions to private non-profit organizations. It would be plausible that citizens, instead of allocating their funds to the local government through their tax form, could choose to allocate them to local non-profit associations. However, we do not find strong evidence of this underlying mechanism being at play.

There are other reasons that lead us to believe we currently lack supporting evidence to consider choice diversion as the sole driving factor. Firstly, it is important to note that the negative coefficient observed in Table 2 is smaller than the positive coefficients found in Table 1. This suggests that the effect on social capital cannot be solely attributed to a diversion of choices. Secondly, the structure of the tax form itself addresses this concern. Allocating a portion of taxes to the municipality of residence is as simple as checking a box on the form. Conversely, to allocate funds to a specific local non-profit association, taxpayers must provide the unique fiscal ID number of the particular non-profit organization for a specific year and municipality. Consequently, directing funds to a non-profit organization requires a more proactive approach from taxpayers, as they need to possess the ID number prior to completing the tax form. Finally, if this mechanical explanation were the sole driver of our results, the overall impact on the total choices made under the 5‰ scheme due to dissolution would be zero. However, in Table A24 in the Appendix, we present the effects of municipalities' dissolution on the combined number of taxpayers who donate part of their income tax to voluntary associations or municipalities. The coefficients remain consistent in magnitude with our main findings, indicating a positive net effect on choices directed towards voluntary associations.

The findings outlined in this Section, in conjunction with the estimates from Section 5, offer compelling evidence of the generation of social capital following a municipality's dissolution prompted by Mafia infiltration.

### 6.2. Increase in the number of voluntary associations

Another potential mechanism, consistent with the results presented in Section 5, is that the increase in the number of taxpayers allocating part of their taxes to local associations is driven by an increase in the number of associations that register on the list of beneficiaries. It is possible that, after the dissolution of the municipal council due to Mafia infiltration, more associations emerge in the municipality as a result of improved institutional quality. To investigate this, we repeat our main analysis, using the number of registered voluntary associations (over the total number of taxpayers) as outcome variable of interest.

Before presenting the corresponding results, it is crucial to highlight some limitations of our data, in order to accurately interpret the results presented in this section. Our data does not contain the complete number of existing non-profit associations in each municipality for a given year. Instead, we only observe the subset of associations that are eligible to receive the 5‰ funds.<sup>30</sup>

<sup>30</sup> Importantly, however, we clarify that our dataset includes all eligible non-profit associations, rather than just the subset of associations that actually receive the funds.

**Table 2**  
Effect of CCDs on trust in local institutions.

| Dep. Variable: Tax-based Trust in Local Institutions | Panel A: TWFE     |                   |                                |
|------------------------------------------------------|-------------------|-------------------|--------------------------------|
|                                                      | (1)               | (2)               | (3)                            |
| Municipality dissolved for Mafia                     | −0.001<br>(0.001) | −0.001<br>(0.001) | −0.002 <sup>*</sup><br>(0.001) |
| Panel B: Borusyak et al. (2024)                      |                   |                   |                                |
|                                                      | (1)               | (2)               | (3)                            |
| Municipality dissolved for Mafia                     | −0.002<br>(0.002) | −0.002<br>(0.002) | −0.002<br>(0.002)              |
| Municipality FEs                                     | Yes               | Yes               | Yes                            |
| Year FEs                                             | Yes               | Yes               | Yes                            |
| Tax-based Trust [Pre-period] * Year FEs              | No                | Yes               | Yes                            |
| Province-Year FEs                                    | No                | No                | Yes                            |
| Sample Mean                                          | 0.022             | 0.022             | 0.022                          |
| Observations                                         | 103,506           | 103,506           | 103,506                        |

NOTE: The table reports estimates of the effect of CCDs on Tax-based Trust in Local Institutions. The dependent variable is computed as the share of number of taxpayers allocating 5% of their annual income tax to social activities carried out by municipality  $i$  in year  $t$  over the total number of taxpayers observed in municipality  $i$  in year  $t$ . The sample includes all years between 2009 and 2021. See Sections 2.1 and 3 for further details. In Panel A we present estimates based on a two-way FE model (see Eq. (1)). In Panel B we present estimates based on Borusyak et al. (2024). The unit of observation is the municipality  $i$  in a particular year  $t$ . *Municipality dissolved for Mafia* is an indicator variable that takes a value of 1 after the city council of a municipality has been dissolved for Mafia infiltration and 0 otherwise (see Sections 3 and 2.2 for details). Column (2) includes a variable corresponding to the share allocating 5% of their annual income tax to social activities carried out by municipality  $i$  in year 2006, *Tax-based Trust in Local Institutions [Pre-Period]<sub>i,2006</sub>*, interacted with year FEs. Column (3) includes province-year FEs. Standard errors are clustered at the municipality level. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

As a consequence, an increase in the number of observed associations receiving the 5% funds can be attributed to two potential explanations. First, it could reflect a de-facto increase in the number of non-profit associations in the municipality. This mechanism is not inconsistent with an increase in social capital; rather, it represents a potential channel of the effect we detected. Second, it may indicate an increase in the number of (already existing) entities, now legally registered to receive taxpayers' funds. In this case, it suggests a strategic behavior of non-profit associations that aim to expand the pool of entities eligible to receive funds within the 5% scheme.

However, it is important to note that having more non-profit entities in the municipalities does not automatically translate into more choices for taxpayers when filling out their tax returns. Taxpayers need to have a proactive attitude and know the specific ID number of the non-profit organization they wish to allocate funds to before filling in the tax form.

We replicate our baseline specification using as variable of interest the share of non-profit associations observed over time in a given municipality. Estimates presented in Table 3 show that after the dissolution of the municipal council due to Mafia infiltration, we do observe an increase in the number of registered non-profit associations.

The results presented in this section are not inconsistent with an increase in social capital; rather, they represent a potential channel of the effect we detect. Nevertheless, we are interested in understanding whether our main results are entirely driven by the increase in the number of registered associations. To explore this, we replicate our analysis by including in our preferred specification a set of control variables aimed at capturing different potential trends in the number of non-profit organization in the municipality. Corresponding results, presented in Tables A25 and Table A26, show that our main estimates are virtually unaffected by the inclusion of controls for the number of registered associations. This suggest that our main effect is primarily driven by an increase in the number of taxpayers choosing to allocate part of their taxes to local associations.

6.3. Direct effect of dissolution

Another potential mechanism that could be compatible with our main findings is related to the direct effect of municipality dissolution. In our empirical setting, we exploit the fact that the dissolution of a municipality due to Mafia infiltration results in an enhanced institutional

framework and this may inspire community members to take action and strengthen social ties through increased civic engagement, with a shared goal of building a better community.

However, it could be that the trigger for social capital is not the enhanced institutional framework that restores legitimacy following the emergence of criminal infiltration by organized crime, but rather the complete disbandment of the governing body of the municipality, with the administration being placed under the control of another authority. In other words, the increase in the number of taxpayers allocating their 5% to local non-profit associations could be entirely driven by the fact that the local government (i.e., city council) has proven to be ineffective, leading citizens to step up and actively contribute to the social fabric of their municipality.

We exploit the fact that municipalities in Italy can also be dissolved due to reasons such as financial difficulties and political instability, for instance following a vote of no confidence where councillors express their lack of confidence in the mayor or government. It is important to note that, in these cases, the municipality is dissolved for reasons completely unrelated to Mafia infiltration.

To investigate whether our findings are driven by the direct effect of municipality dissolution, we therefore examine the impact of municipalities dissolved due to administrative or political causes on social capital. Corresponding results are displayed in Table 4. The variable of interest is *Municipality dissolved due to adm. or pol. causes*, an indicator variable that takes a value of 1 after the town council of municipality has been dissolved because of administrative or political reasons.<sup>31</sup> Corresponding estimates suggest no effect of the dissolution of an elected government body because of administrative or political reasons on social capital — which provides support to our empirical design. This finding reassures us that our main results are indeed driven by the dissolution of a municipality due to Mafia infiltration, which

<sup>31</sup> We identify municipalities that have been dissolved because of administrative or political reasons as those municipalities that in a given year have a special commissioner (*it: commissario straordinario*). The special commissioner is appointed by the national or regional government. Their role entails administering the municipality until the election of the new municipal council and mayor, which takes place in the earliest available electoral round as mandated by law.

**Table 3**  
Effect of CCDs on voluntary associations.

| Dep. Variable: Voluntary Associations (over 1,000 taxpayers) | Panel A: TWFE    |                  |                    |
|--------------------------------------------------------------|------------------|------------------|--------------------|
|                                                              | (1)              | (2)              | (3)                |
| Municipality dissolved for Mafia                             | 0.005<br>(0.003) | 0.005<br>(0.003) | 0.007*<br>(0.004)  |
| Panel B: Borusyak et al. (2024)                              |                  |                  |                    |
|                                                              | (1)              | (2)              | (3)                |
| Municipality dissolved for Mafia                             | 0.004<br>(0.003) | 0.004<br>(0.003) | 0.009**<br>(0.004) |
| Municipality FEs                                             | Yes              | Yes              | Yes                |
| Year FEs                                                     | Yes              | Yes              | Yes                |
| Voluntary Associations [Pre-period] * Year FEs               | No               | Yes              | Yes                |
| Province-Year FEs                                            | No               | No               | Yes                |
| Sample Mean                                                  | 0.098            | 0.098            | 0.098              |
| Observations                                                 | 103,506          | 103,506          | 103,506            |

NOTE: The table reports estimates of the effect of CCDs on voluntary associations. The dependent variable is computed as the share of number of registered voluntary associations over the total number of taxpayers observed in municipality  $i$  in year  $t$ . The sample includes all years between 2009 and 2021. See Sections 2.1 and 3 for further details. In Panel A we present estimates based on a two-way FE model (see Eq. (1)). In Panel B we present estimates based on Borusyak et al. (2024). The unit of observation is the municipality  $i$  in a particular year  $t$ . *Municipality dissolved for Mafia* is an indicator variable that takes a value of 1 after the city council of a municipality has been dissolved for Mafia infiltration and 0 otherwise (see Sections 3 and 2.2 for details). Column (2) includes a variable corresponding to the share of registered voluntary associations in municipality  $i$  in year 2006, *Voluntary Associations [Pre-Period]<sub>i,2006</sub>*, interacted with year FEs. Column (3) includes province-year FEs. Standard errors are clustered at the municipality level. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 4**  
Dissolution for administrative or political causes and social capital.

| Dep. Variable: Tax-based Social Capital           | Panel A: TWFE     |                   |                   |
|---------------------------------------------------|-------------------|-------------------|-------------------|
|                                                   | (1)               | (2)               | (3)               |
| Municipality dissolved due to adm. or pol. causes | -0.002<br>(0.003) | -0.002<br>(0.003) | -0.001<br>(0.003) |
| Panel B: Borusyak et al. (2024)                   |                   |                   |                   |
|                                                   | (1)               | (2)               | (3)               |
| Municipality dissolved due to adm. or pol. causes | -0.001<br>(0.003) | -0.001<br>(0.003) | -0.000<br>(0.003) |
| Municipality FEs                                  | Yes               | Yes               | Yes               |
| Year FEs                                          | Yes               | Yes               | Yes               |
| Tax-based Social Capital [Pre-period] * Year FEs  | No                | Yes               | Yes               |
| Province-Year FEs                                 | No                | No                | Yes               |
| Sample Mean                                       | 0.078             | 0.078             | 0.078             |
| Observations                                      | 101,465           | 101,465           | 101,465           |

NOTE: The table reports estimates of the effect of dissolution for administrative or political causes on Tax-based Social Capital. The dependent variable is computed as the share of number of taxpayers allocating 5% of their annual income tax to voluntary associations over the total number of taxpayers observed in municipality  $i$  in year  $t$ . The sample includes all years between 2009 and 2021. See Sections 2.1 and 3 for further details. Municipalities that are dissolved due to Mafia infiltration are excluded from the sample. In Panel A we present estimates based on a two-way FE model (see Eq. (1)). In Panel B we present estimates based on Borusyak et al. (2024). The unit of observation is the municipality  $i$  in a particular year  $t$ . *Municipality dissolved due to adm. or pol. causes* is an indicator variable that takes a value of 1 after the city council of a municipality has been dissolved for reasons other than Mafia infiltration and 0 otherwise. Column (2) includes a variable corresponding to the share allocating 5% of their annual income tax to voluntary associations in municipality  $i$  in year 2006, *Tax-based Social Capital [Pre-Period]<sub>i,2006</sub>*, interacted with year FEs. Column (3) includes province-year FEs. Standard errors are clustered at the municipality level. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

restores legitimacy following the emergence of criminal infiltration by organized crime in the community, fostering the collective efforts of citizens and the development of social capital.

#### 6.4. Income effects

It is possible that the dissolution of the municipality contributed to an increase in its overall wealth, potentially leading to a rise in both the number of taxpayers and their incomes. Previous research by Fenizia and Saggio (2024) supports this notion, suggesting that dissolving municipalities can spur economic growth, as reflected in indicators like employment rates, the number of businesses, and industrial real estate values.

Fenizia and Saggio (2024), however, observe that these positive effects typically manifest in the long run, emerging several years after the dissolution. In contrast, our analysis identifies more immediate

effects by focusing on a shorter period of time due to data limitations. Additionally, our results are robust to the inclusion of an extensive set of controls for income and population characteristics, which should alleviate concerns that income effects alone are driving the results discussed in Section 5.

## 7. Conclusion

This paper studies how the quality of institutions shapes social capital by exploiting the dismissal of city councils following the emergence of criminal infiltration in Italian municipalities. To do so, we introduce a novel, fine-grained measure of social capital based on the 5% provision, which allows taxpayers to allocate part of their annual income tax to non-profit organizations.

Our analysis reveals that city council dismissals have a sizable positive impact on social capital. We show that this result is not driven



by the dissolution of the municipality per se, or by a reduction of trust in local institutions, and that it coexists with an increase in the number of voluntary organizations. We therefore argue that the perceived strengthening of law enforcement, which restores legitimacy following the emergence of criminal infiltration by organized crime in local governments, is the primary mechanism through which city council dismissals enhance social capital.

The implications of our findings are substantial, suggesting that policy measures against organized crime, such as dissolving municipal councils due to Mafia infiltration, are crucial not only for maintaining law and order but also for fostering societal resilience and economic prosperity. Policymakers should therefore consider the potential benefits to social capital when designing and implementing strategies to combat organized crime.

Our analysis is subject to several caveats. First, within our empirical framework, we can only estimate the aggregate impact of CCDs on social capital, without the ability to examine heterogeneous individual responses. Second, due to data limitations, we are unable to document the long-term effects of the exogenous shock. Lastly, by focusing on the exogenous variation introduced by the dissolution of municipal councils, our study does not explore alternative drivers of social capital, which we leave for future research.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Appendix A. Supplementary data

Supplementary material with additional empirical analysis and robustness exercises related to this article can be found online at <https://doi.org/10.1016/j.jpubeco.2024.105257>.

### Data availability

Data will be made available on request.

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