



UNIVERSITÀ DEGLI STUDI  
DI CATANIA



UNIVERSITÀ DEGLI STUDI  
DI MESSINA

# Essays on the Effects of Non-State Institutions on Economic and Political Outcomes in Italy

**Doctoral Thesis**

by

**Rossana Scebba**

*Ph.D. in Economics, Management and Statistics*

*XXXVI cycle*

*Department of Economics*

SSD SECS-P/02

Under the supervision of

**Prof. Francesco Reito**

University of Catania

Coordinator

**Prof. Fabrizio Cesaroni**

University of Messina

University of Messina

2022/2023

# Contents

|   |           |
|---|-----------|
| <b>Introduction</b>   | <b>1</b>  |
| <b>1 Italy’s Battle Against Organized Crime: A review of Antimafia policies’ empirical assessment</b> | <b>3</b>  |
| <b>2 Closed for Mafia:<br/>Evidence from the removal of mafia firms on commercial property values</b> | <b>4</b>  |
| 2.1 Introduction . . . . .  | 4         |
| 2.2 Theoretical framework . . . . .   | 7         |
| 2.3 Institutional setting . . . . .   | 9         |
| 2.4 Data . . . . .  | 11        |
| 2.5 Empirical strategy . . . . .  | 12        |
| 2.6 Main results . . . . .  | 15        |
| 2.6.1 Alternative estimators . . . . .  | 17        |
| 2.7 Robustness checks . . . . .   | 20        |
| 2.7.1 Population size . . . . .   | 20        |
| 2.7.2 Controlling for other antimafia measures . . . . .  | 20        |
| 2.7.3 Intensity of the mafia presence . . . . .   | 22        |
| 2.7.4 Re-aggregation by local labor market areas . . . . .  | 24        |
| 2.7.5 Impact on other real estate categories . . . . .  | 24        |
| 2.7.6 Transmission mechanisms and effects on other outcomes . . . . .                                 | 25        |
| 2.8 Conclusions . . . . .   | 27        |
| References . . . . .  | 29        |
| <b>3 Mafia doesn’t live here anymore:<br/>Antimafia policies and housing prices</b>                   | <b>37</b> |
| 3.1 Introduction . . . . .  | 37        |
| 3.2 Institutional background . . . . .  | 42        |
| 3.2.1 Antimafia Policies: DC and SR . . . . .   | 42        |
| 3.2.2 The real estate market in Italy . . . . .   | 43        |
| 3.3 Data . . . . .  | 44        |

|          |  |           |
|----------|--|-----------|
| 3.4      | Empirical Strategy . . . . .   | 46        |
| 3.5      | Results . . . . .  | 50        |
| 3.6      | Event study analysis . . . . .   | 50        |
| 3.7      | A focus on the intensity of mafia presence . . . . .   | 52        |
| 3.8      | Potential mechanisms: discussion . . . . .   | 53        |
| 3.9      | Diagnostic tests and alternative estimator . . . . .   | 55        |
| 3.9.1    | Decomposition estimates . . . . .  | 56        |
| 3.9.2    | Alternative estimator . . . . .  | 57        |
| 3.9.3    | Continuous case . . . . .  | 59        |
| 3.10     | Conclusions . . . . .  | 61        |
|          | References . . . . .   | 63        |
| <b>4</b> | <b>Empirical evidence on the impact of the Catholic Church on political participation in Italy</b> | <b>69</b> |
| 4.1      | Introduction . . . . .   | 69        |
| 4.2      | Historical context . . . . .   | 71        |
| 4.3      | Data . . . . .   | 73        |
| 4.3.1    | Data on political participation . . . . .  | 73        |
| 4.3.2    | Religiosity intensity proxies at the provincial level . . . . .                                    | 73        |
| 4.3.3    | Religiosity intensity proxies at the diocesan level . . . . .                                      | 76        |
| 4.4      | Empirical strategy . . . . .   | 77        |
| 4.5      | Results . . . . .  | 79        |
| 4.5.1    | Alternative religiosity proxies . . . . .  | 80        |
| 4.6      | Conclusions . . . . .  | 80        |
|          | References . . . . .   | 87        |

# Introduction

Human societies are intricate systems in which various actors engage in a struggle for dominance. The Latin proverb "Homo homini lupus est" is a testament to that, and still holds up nowadays.

This is evident on multiple dimensions, often beyond the individual scope. At a collective level, countries' sociopolitical and economic outcomes are shaped not only by the actions of the state but also by non-state institutions, such as organizations, interest groups, and social movements, have an inherent ability to influence political decision-making and socioeconomic dynamics.

Over the course of time, history has witnessed an ongoing shift in power from the State to alternative non-political actors with interests in economic profit and influence over the masses - two elements that are crucial to secure a position of power in any society. This complex interplay between state and non-state institutions inevitably ends up affecting several outcomes.

Interest groups may indeed play a significant role in societal dynamics, translating, in some instances, into improvements that may benefit some fractions of the population. Yet, the potential drawbacks of their influence must be carefully examined as well. For instance, while interest groups may advocate for policies that benefit their members, they may also seek to advance their own self-interest at the expense of the common good. Or again, non-state institutions with purely commercial interests may prioritize their own profits over the welfare of citizens or the stability of the economy.

In other cases, the objectives of interest groups may even be illegitimate and their modus operandi, abusive. As a consequence, their impact on the socioeconomic fabric will end up being highly detrimental. In the case of Italy, among the most prominent non-institutional bodies that fit this description there are, arguably, criminal organizations. In the last decades, Italian governments have made considerable efforts to fight mafia infiltration at a local level. Chapter 1 presents a review of the literature on the topic, whereas Chapters 2 and 3 provide the assessment of the effectiveness of two antimafia policies on the Italian housing market.

Another (legitimate) influential non-state institutions in Italy, the Catholic Church, has had a profound impact on the country's socioeconomic and political landscapes, too. As the largest religious institution in Italy, the Catholic Church carries significant leverage in the political arena, often affecting decision-making processes and policy direction.

Unsurprisingly, this massive influence has challenged secularism processes, especially in Italy. Chapter 4 is framed in this context, and it attempts to provide an empirical answer to the extent of Catholic Church's ability to steer believers' civic involvement in a peculiar historical setting.

# Chapter 1

## Italy's Battle Against Organized Crime: A review of Antimafia policies' empirical assessment

# Chapter 2

## Closed for Mafia: Evidence from the removal of mafia firms on commercial property values

Published in *Journal of Regional Science*, 62, 1487—1511.

<https://doi.org/10.1111/jors.12612>

Using a sample of almost 7,000 Italian municipalities from 2002 to 2019, we investigate how the removal of mafia-infiltrated firms affects commercial sale and rental prices. We conjecture that targeting mafia businesses leads to a reduction in local disamenities and an increase in the demand for commercial properties. Applying the latest methodologies based on difference-in-differences approaches, we show that antimafia policies aimed at confiscating and reassigning mafia firms have positive spillover effects on commercial real estate prices, driving values upward by about 4%. This is especially true for small-medium municipalities in mafia-ridden provinces. The evidence we provide supports the enforcement of antimafia policies with an economic content, as they pose a threat to criminal financial interests and curb the mafia influence on the market.

*“It is necessary to break the link between mafia groups and property owned, thereby undermining their economic power, and marking the boundary between the legal and illegal economy”*

*Pio La Torre.*

### 2.1 Introduction

Although organized crime is typically associated with aggression and violence, its underlying ideology is purely profit-oriented (Costa, 2010). Illicit practices such as intimidation, corruption, and fraud are only instrumental to an economic purpose, as shown by the

increasing interest of criminal organizations in legitimate business ventures.<sup>1</sup> This is particularly true for mafia-type groups, whose pernicious infiltration in the legal economy has inflated their economic power, while maintaining an appearance of social legitimacy.

In this perspective, organized crime groups act as lobbies, thereby securing rent-seeking positions and unfair competitive advantages (Tanzi and Davoodi, 2001; Riccardi et al., 2016; Wolton, 2020). They also manage to exert their influence on other aspects of society, such as allocations of public funds, policy decisions and market dynamics.<sup>2</sup> More generally, the literature suggests that organized crime presence has an increasingly harmful impact on local communities, pointing to three avenues that guarantee the acquisition as well as the preservation of mafia's territorial control. First, a distinctive feature of the mafia as a phenomenon that affects the local community consists in protection-extortion practices (Gambetta, 1993; Lavezzi, 2008). As highlighted by Vaccaro and Palazzo (2015), the Sicilian mafia has extorted protection money i.e., the so-called *pizzo*, for more than 150 years, forcibly coercing local business owners to regular illicit payments under the threat of vandalizing their activity if they happened to dare to refuse. Second, the creation of a dense network of relationships allows organized crime groups to sway the local political powers with deleterious repercussions on the socio-economic fabric (Buonanno et al., 2016; De Feo and De Luca, 2017; Alesina et al., 2019). In this case, criminal organizations taint the institutional framework in which they operate, defining a set of accepted values and behaviors that end up prevailing on many levels (Acemoglu et al., 2020). Third, a rising stream of literature investigates the determinants of the expansion of organized crime groups beyond their original territories by infiltrating the legitimate economic activity (Arlacchi, 1983; Savona and Riccardi, 2015; Riccardi et al., 2016). Exploiting the labor market and political brokerage mechanisms, Dipoppa (2021) focuses on the abovementioned three avenues and concludes that criminal groups tend to expand where they can offer informal labor and where the demand for such labor is high.

The vicious cycle between political and economic power has been proved to undermine local development (Pinotti, 2015), and restrict economic growth (Detotto and Otranto, 2010). Governments have made considerable efforts to design legislative measures to deal with this phenomenon, among which the seizure of incomes and assets related to organized crime activities stands out. In this instance, Italy has one of the most advanced antimafia legislative frameworks since it combines a traditional prosecution strategy with a modern finance-related technique of crime control (Kilchling, 2014). The former aims to deter mafia members through strong penal punishment (for example, through a differentiated prison regime ex-art. 41-bis of the Italian Prison Administration Act). The latter consists of patrimonial preventive measures to undermine organized crime profitability and thus

---

<sup>1</sup>Organized crime represents a worldwide socio-economic threat that generates criminal proceeds equivalent to 3.6% of global GDP (UNODC, 2011).

<sup>2</sup>On the topic of organized crime infiltration in Europe, see Savona et al. (2016). Mafia-type groups have also interfered in urban development planning, as evidenced by Chiodelli (2019).



discourage criminal activity itself.

Specifically, the so-called Rognoni–La Torre act (Law 646/1982) represented a milestone in the fight against criminal organizations. It provided for the confiscation and the reassignment of goods, properties, and firms whose owners have been involved in mafia-type associations. In a nutshell, this law establishes that the Court may order the preventive and conservative seizure of assets under reasonable suspicion that they result from illicit activities. Then, those assets - including firms - are reassigned to new purposes, mainly with the aim to restore local communities. This is consistent with Italian judge Giovanni Falcone’s intuition that following the money trail may be the most effective strategy to defeat the mafia and its pernicious impact.<sup>3</sup>

In the present paper, we focus on the reassignment policy of mafia-infiltrated firms,<sup>4</sup> which largely coincides with their exit from the market. More specifically, we empirically investigate the impact of the removal of mafia firms on commercial property values between 2002 and 2019 in a sample of almost 7,000 Italian municipalities. We exploit the extensive dataset provided by ANBSC (National Agency for the Administration and Destination of Seized and Confiscated Assets) on the reassignments of mafia firms as well as Italian Revenue Agency (*Agenzia delle Entrate*) data reporting commercial property sale and rental prices. Using a variety of estimation methods based on traditional as well as innovative difference-in-differences techniques, we show that the removal of a mafia firm produces an increase in commercial real estate values of about 4%.

The contribution of this paper is threefold. First, we relate to the literature on the effect of organized crime infiltration on the economy (Barone and Narciso, 2015; Daniele and Marani, 2011; Galletta, 2017). However, since criminal organizations act illegally and tend to hide their operations, we use an indirect measurement of mafia infiltration proxying its empirical manifestation by removing mafia firms from the market. Our research also adds to the recent literature on the impact of economic oriented anti-mafia policies (Operti, 2018; Calamunci and Drago, 2020; Calamunci et al., 2021; Ferrante et al., 2021a, 2021b). Although it is widely recognized that asset reallocation may be beneficial from a socioeconomic perspective (Esposito and Ricci, 2015), the economic literature has focused primarily on the assessment of antimafia measures with political or punitive content.<sup>5</sup> We conjecture that hitting the mafia through patrimonial measures is an effective way to dismantle its economic power. To the best of our knowledge, this is

---

<sup>3</sup>A key figure in the fight against the mafia, judge Giovanni Falcone led the Maxi Trial that convicted and incarcerated over 300 members of the Sicilian mafia and was murdered along with his wife and bodyguards on May 23, 1992.

<sup>4</sup>For this study, we use the expression mafia-infiltrated firm or mafia firm to indicate a firm connected with criminal organization members.

<sup>5</sup>An extensive strand of research has analyzed the impact of the dissolution of city councils for mafia infiltration (Law 221/1991) on the quality of local politicians (Daniele and Geys, 2015), allocation of municipal spending (Di Cataldo and Mastrorocco, 2021) and public procurement performance (Ravenda et al., 2020). Scognamiglio (2018) examines how the legal practice of mafia members relocation affects crime and employment.

the first paper that explicitly investigates how antimafia policies targeted to infiltrated firms affect commercial property values. Lastly, we contribute to the urban literature concerned with how changes in disamenities (albeit latent ones) can affect inter-city real estate values differentials (Rosen, 1974; Roback, 1982; Sivitanidou, 1995; and Sivitanidou and Sivitanides, 1995a, 1995b; Schmidt and Courant, 2006; Pope and Pope, 2012). Our results complement this literature by proposing a new theoretical framework according to which organized crime infiltration through mafia firms distorts market competition. In this perspective, the enforcement of a policy aimed at removing these criminal actors from the legal economy may influence the demand for business spaces and, thus, commercial property sale and rental prices.

The remainder of the paper is as follows. Sections 2 and 3 outline the theoretical framework and the institutional setting, whereas Section 4 describes the data. Section 5 presents the empirical strategy. We discuss our findings in Section 6 and test their robustness and transmission mechanisms in Sections 7. Section 8 concludes.

## 2.2 Theoretical framework

Building on Rosen (1974) and Roback (1982), Sivitanidou (1995) and Sivitanidou and Sivitanides (1995b) provide a theoretical foundation for the influence of amenities on business rents within cities. More specifically, they extend the Rosen–Roback spatial equilibrium model by considering how supply-side factors (i.e., zoning constraints on commercial development) as well as demand-side ones, such as firm and worker amenities, affect commercial property values. Amenities include a wide array of pleasant attributes of an urban area<sup>6</sup> and can account for differences in property prices and rents across cities and neighborhoods, as predicted in the traditional spatial equilibrium model (Rosen, 1974; Roback, 1982; Sivitanidou and Sivitanides, 1995a). Firm amenities feature easy access to input and output markets, proximity to transportation and business services, whereas worker amenities consist of high public-school quality, and proximity to shopping malls. Low crime rates, on the other hand, can be regarded as an amenity for both workers and firms (Sivitanidou and Sivitanides, 1995a).

More specifically, Sivitanidou (1995) postulates that in a multinodal metropolis setup, firms and workers are free to move across districts that differ in amenity and disamenity stock. Identical firms produce output under constant return to scale technology and incur costs associated with commercial space rent, labor wages, and productivity-enhancing amenities. Provided that perfect labor mobility equalizes wages across nodes, differentials in office-commercial-industrial rents depend on each area's amenity stock. As a result, high-amenity nodes will have higher equilibrium commercial rents than low-amenity urban areas. Estimates on the Greater Los Angeles area further validate this theoretical

---

<sup>6</sup>Following the categorization proposed by Wilkinson (1973), these attributes can be dwelling-specific and location-specific. Firm and worker amenities belong to the latter category.

model, as Sivitanidou and Sivitanides (1995b) find empirical evidence that both firm and worker amenities significantly impact industrial rents with a positive sign. Within this framework, we conjecture that the outreach of organized crime can be interpreted as a latent disamenity that undermines and distorts the local economy, thereby reducing property values.

Most real estate research is limited to crime, without consideration of criminal organizations and their influence.<sup>7</sup> An extensive empirical literature adopts hedonic price techniques to estimate the cost of crime at the estate or neighborhood level, confirming that living in areas characterized by high crime risk implies a detriment to the quality of life and thus negatively affects residential real estate prices (Thaler, 1978; Cohen, 1990; Lynch and Rasmussen, 2001; Linden and Rockoff, 2008; Pope 2008). Housing values appear to be responsive particularly to violent offenses (Gibbons, 2004) and crimes that convey the feeling of declining neighborhood (Ihlanfeldt and Mayock, 2010), and tend to hit low-income areas more severely (Tita et al., 2006). Pope and Pope (2012) slightly differ from this strand of literature, conducting a zip-code level analysis on a national scale, and find that the drop in American crime of the 1990s led to a growth in housing prices.

Following this approach, we focus on organized crime, and more specifically, on how targeting mafia-infiltrated businesses affects commercial real estate values at the municipality level. Except for Battisti et al. (2019), who show that district-level housing prices and rents fall in response to the occurrence of mafia homicides, the urban property literature on the impact of organized crime remains scarce. Besides, to the best of our knowledge, no previous work addresses the influence of criminal organizations on non-residential property values, even though commercial space rents and prices constitute an essential input cost for firms across various industries. Our results closely relate to Lens and Meltzer (2016), who use commercial property sales as a proxy for economic activity and find that crime impairs business prosperity in the New York city area. In our paper, the emphasis is on mafia-type organization in Italy.

Given the ability of criminal organizations to infiltrate legal markets, it is highly implausible for commercial property values to remain unaffected. It is well known that mafia-infiltrated firms engage in rent-seeking behavior and resort to illicit means such as corruption of public officials, procurement fraud, and intimidation, through which they obtain economic advantages - e.g., lower input prices, easier access to capital, wage compression (Arlacchi, 1983, 2010; Caneppele and Martocchia, 2014, Mirenda et al., 2022). Other companies, thus, suffer a burden related to the unfair business advantages of their competitors.<sup>8</sup> For instance, competing firms located in mafia-ridden contexts may

---

<sup>7</sup>For instance, Sivitanidou and Sivitanides (1995a, 1995b) include crime among worker disamenities, as high levels of crime translate into lower commercial property values within a certain urban area.

<sup>8</sup>The existence of these economic advantages is corroborated by the fact that mafia companies are put under a strain when operating within the law, as confirmed by their profitability and efficiency levels deteriorating (Calamunci, 2022), and most of them ending up in foreclosure (Ferrante et al., 2021a).

face a higher average cost of credit (Bonaccorsi di Patti, 2009), fail to obtain foreign direct investments (Daniele and Marani, 2011), and miss productivity growth opportunities related to clustering and cooperation (Ganau and RodríguezPose, 2018).

The removal of mafia businesses may therefore restore favorable market conditions creating a more competitive context. In this instance, Ferrante et al. (2021a) show that the judicial foreclosure of mafia firms leads to lower market concentration in the construction sector in Sicilian municipalities. Operti (2018) finds supporting evidence that the implementation of confiscation orders involving organized crime’s economic assets is positively correlated with the number of new market entrants at the provincial level in Italy. From the arguments above, we conjecture that the removal of mafia firms may imply an increase in the demand for business spaces, translating into higher capital and rental values of commercial buildings in the municipality where the policy is enforced.

## 2.3 Institutional setting

After World War II, the industrial development of the Italian economy saw organized crime groups gradually extending their criminal interests in various business sectors. The Italian legislative framework lacked specific tools to handle the infiltration of criminal organizations in the legal economy until the 1980s. On March 31, 1980, one of the leaders of the Communist party, Pio La Torre, and the then Minister of the Interior, Virginio Rognoni, presented an antimafia bill to the Chamber of Deputies. The law aimed at formally recognizing mafia-type associations and undermining their economic power through patrimonial measures, i.e., the seizure and confiscation of incomes and properties of mafia members.

In retaliation for the tangible blow that this bill posed to their economic interests, *Cosa nostra* orchestrated the killing of Pio La Torre on April 30, 1982. This, however, coupled with another mafia murder, the assassination of the newly appointed prefect of Palermo, General Carlo Alberto Dalla Chiesa, on September 3, ultimately speeded up the bill’s passage. The Rognoni–La Torre act was approved ten days later and came into effect on September 29, 1982.

In the following years, the fragmentation and lack of systematic harmonization have led legislators to implement a complete reorganization of the regulations with the Antimafia Code (Legislative Decree 159) in 2011.<sup>9</sup> Both pieces of legislation establish clear patrimonial measures aimed at the confiscation of properties owned by mafia members when there is evidence that they are the result of illegal activities.

The enforcement of these legislative actions is structured in two steps: (1) judicial, from the issue of the seizure decree to the first-degree confiscation; (2) administrative,

---

<sup>9</sup>The Antimafia Code provides that, in the case of belonging to mafia association, both the procedure for ascertaining the associated crime and the process for the application of the preventive measure must be activated simultaneously (article 2-ter l. 575/65now articles 20-22 Codice Antimafia).

from the first-degree confiscation to the definitive confiscation decree.

The first step is applicable by the Court upon the proposal of the Public Prosecutor's Office or the Police Authority. Authorities distinctively and autonomously decide each preventive measure after investigations prove that the assets are the result of illegal activities. The judge appoints an administrator who manages the assets and tries to transform them into legal entities, preserving their economic value while breaking all previous links with the criminal network.<sup>10</sup> Following this instruction, the administrator manages firms' assets until the confiscation decree at the first level of the jurisdiction (*Decreto di Confisca di primo grado*) is promulgated, leading to the end of the judicial phase.

In the second step, the administration of the assets goes from the judicial authority to the National Agency, which must take care of the custody, preservation, and management of the assets seized during the entire procedure. With the definitive confiscation (*Decreto di Confisca di secondo grado*), assets are acquired as state property, free of charges and burdens. According to the specific procedures indicated in the Code (art. 48), at this stage, the National Agency establishes a new destination for the confiscated assets. In particular, formerly mafia-owned firms that have been seized and confiscated can be (1) offered for rent to private and public companies only if there is a good chance of keeping the business running; (2) reassigned, under a bailment contract, to former employees of the confiscated company; (3) put up for sale to anyone interested in taking over the business; or (4) destined to foreclosure, in which case the proceeds go to the restoration of mafia victims.

Several difficulties prevent the effective implementation of the law. The reallocation of confiscated assets and firms may only appear on paper and not be implemented, at least not for many years or adequately, because of red tape or other forms of bureaucratic inefficiencies. For instance, the process of legal reconversion of mafia firms tends to be unsuccessful in most cases.<sup>11</sup> In fact, almost all the confiscated companies end up being sold or foreclosed (ANBSC, 2019). In this perspective, the policy enforcement can be equated with the removal from the market of mafia-infiltrated firms.

In many instances, the Italian institutional framework has been taken as a reference by other countries (UNODC, 2014; Progetto ICARO, 2016). Legislators around the world have resorted to similar legal instruments including asset freezing, seizure, and confiscation to deal with organized crime activities (UNODC, 2017). The importance of confiscating criminal assets, in line with the Italian model, and the diffusion of an antimafia culture, is spreading not only in Europe (European Commission, 2008, 2012; European Parliament, 2012) but also in Central and Latin America (Global Ini-

---

<sup>10</sup>Once the preventive measure is activated, the formerly mafia-owned firms are not eliminated from the market but continue to exist under legal control. For a comprehensive examination of the legal framework and the economic implications of judicial administration see Donato et al. (2013) and Calamunci (2022).

<sup>11</sup>Cabras and Meli (2017) provide some thriving exceptions of successfully reconverted mafia businesses.

tiative, 2016) to protect the legitimate economy from organized crime infiltration. For example, Directive n. 42/2014/EU set up a process of harmonization of national rules concerning freezing and confiscation of instrumentalities and proceeds of crime, which has been finalized by Regulation n. 1805/2018, providing for the mutual recognition of the abovementioned patrimonial measures. The effort of public authorities, as well as that of grassroots antimafia associations like *Libera*, have translated into awareness campaigns/initiatives to export the Italian model around the world, particularly in Albania, Argentina, and France.<sup>12</sup>

## 2.4 Data

The empirical analysis is based on a panel dataset spanning from the second semester of 2002 to the first semester of 2019 and built using three main sources. First, data on seized and reassigned firms have been extracted from OpenRegio, the open-source online portal of the ANBSC.<sup>13</sup> We use data on firms whose confiscation is final and are thus allocated to new uses (*Aziende destinate*). We focus on the last step of the policy, which mainly coincides with the removal of mafia firms from the market through the selling, the rental, or the foreclosure of business assets.<sup>14</sup> In Figure 1, panel (a) reports the number of mafia-infiltrated firms targeted by the policy between 2002 and 2018, whereas panel (b) summarizes the sectorial distribution of these companies up to 2018, giving an overview of the sectors and markets infiltrated by organized crime. What emerges is that the outreach of organized crime in the legal economy is as widespread in the traditional sectors such as construction, transportation and logistics, retail, and wholesale, as in other industries, such as business services, personal services, hotels and restaurants and healthcare.

Second, we use micro-aggregated level data on commercial property values provided by the Italian Observatory on the Real Estate (*Osservatorio del Mercato Immobiliare* – OMI), published by the Italian Revenue Agency. The Agency releases half-yearly reports on the average maximum and minimum sale and rental prices (€/m<sup>2</sup>) for all micro geographical areas in Italy. More specifically, these areas are referred to as *OMI zones*, i.e., continuous portions of territory at the municipal level, with homogeneous economic

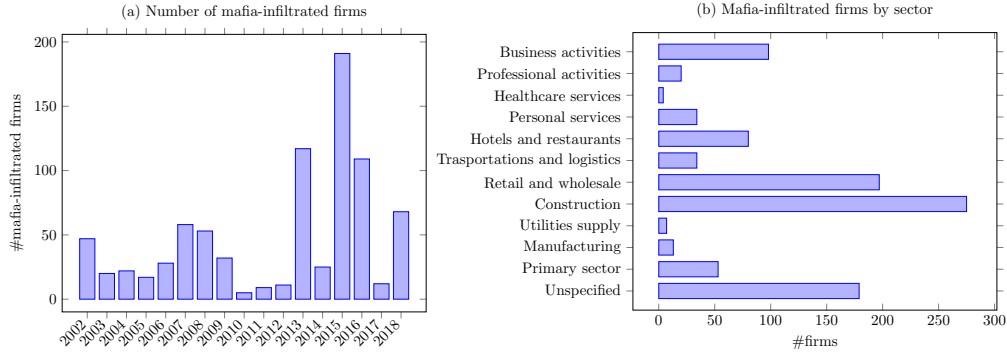
---

<sup>12</sup><https://aap.sk.gov.al/en/cause-project/>  
[https://www.libera.it/schede-1724-argentina\\_il\\_modello\\_italiano\\_per\\_beni\\_confiscati\\_alla\\_criminalita](https://www.libera.it/schede-1724-argentina_il_modello_italiano_per_beni_confiscati_alla_criminalita)  
<https://www.ilfattoquotidiano.it/2021/04/18/ora-anche-la-francia-ha-una-legge-per-luso-sociale-dei-beni-confiscati-alla-mafia-litalia-ci-ha-insegnato-che-cosi-si-cambia-la-mentalita/6164480/>

<sup>13</sup>Unfortunately, the data are disclosed by ANBSC anonymously and do not allow unique identification of companies, thus limiting the possibility of collecting information on the personal and financial profile of companies.

<sup>14</sup>As of July 2021, 1,496 businesses have been confiscated and reassigned. Less than 1% of these firms have been transferred or rented; the remainder is either foreclosed or sold.

Figure 2.1: Number of seized and reassigned mafia firms between 2002–2018 (a) and sectorial distribution up to 2018 (b). Source: our elaboration on ANBSC data.



and socio–environmental conditions, including urban planning, historical characteristics, and provision of services and urban infrastructures. The four main OMI zones we consider are B1, C1, D1 and E1, which refer respectively to the central, semi central, peripheral, and suburban area within each city. OMI sale and rental prices are available for a variety of dwelling types that can be grouped into the following categories: (1) residential, (2) commercial, (3) tertiary, (4) productive, and (5) parking lots. We focus on the second category, and more specifically on free standing shops and stores (*Negozi*). Commercial properties make up a considerable proportion of the urban real estate stock. In Italy, they amount to over 2.5 million units on the national territory and tend to be clustered in small municipalities (Agenzia delle Entrate, 2021). We take the average of the prices of the existing OMI zones that compose each city to obtain property values referring to the entire municipal area.<sup>15</sup>

Figure 2 displays how average prices (a) and rents (b) of retail business spaces varied across Italian municipalities during the first semester of 2019.

Third, we gather yearly municipality–level data from *Unioncamere–Infocamere* on active firms and firms’ employees spanning 2002–2019 to provide further insights on the transmission mechanisms behind our findings (see Section 7).

## 2.5 Empirical strategy

The study exploits the plausibly exogenous shocks generated by the staggered adoption of confiscation and reassignment policies for mafia firms across municipalities to identify their impact on commercial property prices. Several facts support this strategy. As explained in Section 3, a committee of judges evaluates the specific case and enacts each final decree of confiscation; similarly, any provision of reassignment is assessed according

<sup>15</sup>If, on the other hand, the removal of mafia–infiltrated firms also affected the supply of commercial properties, for instance inducing owners to put up business spaces for sale and rental, the positive effect on prices would be underestimated. Thus, the ramifications of our theoretical underpinnings would not change substantially.

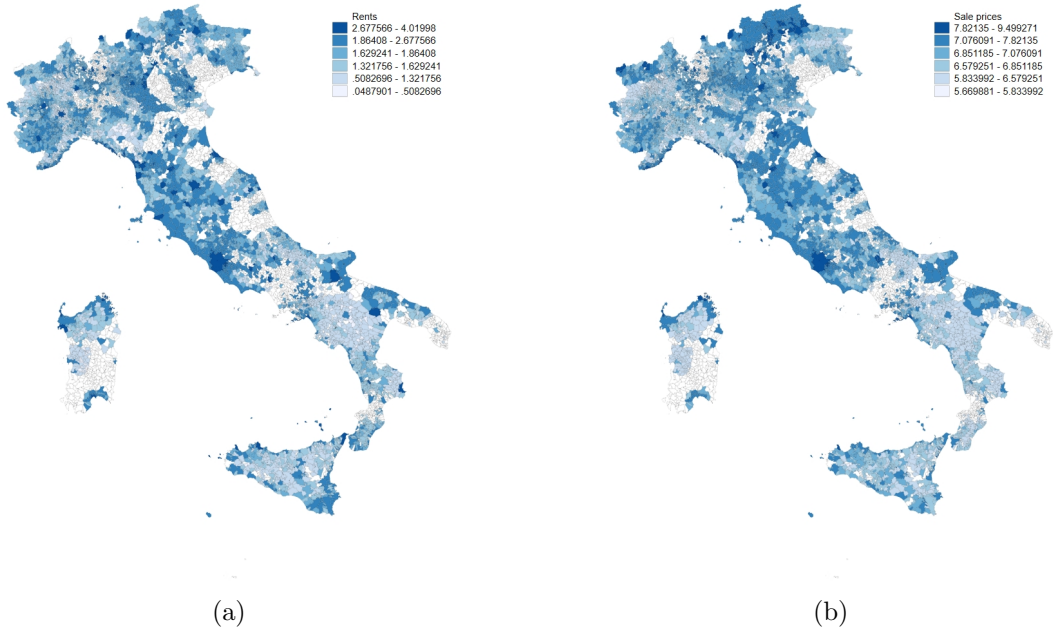


Figure 2.2: Average sale and rental prices of commercial dwellings in Italian municipalities in natural log of €/m<sup>2</sup>. The first semester of 2019. Source: Our elaboration on Italian Revenue Agency data

to the Antimafia Code at different times. Additionally, following the pieces of evidence pointed out by the *Corte dei Conti* (2016), the time span between confiscation and reassignment could vary for every case due to the high variability in the disposition time across and within districts.<sup>16</sup> Because of this high variability in the timing across municipalities (contingent to different judicial offices and judges), treatment timing is plausibly exogenous.

Our empirical design compares municipalities which are treated to municipalities which are not treated. We start estimating the most standard specification,

$$Y_{m,t} = \alpha_m + \beta Treated_{m,t} + \delta_t + \varepsilon_{m,t} \quad (2.1)$$

where:  $Y_{m,t}$  is our dependent variable (either the natural logarithm of the average rent or sale price of commercial buildings), measured at the municipal level  $m$ ;  $Treated_{m,t}$  is an indicator variable that is equal to 1 when  $t > E_m$ , where  $E_m$  is the semester when the municipality is first treated;  $m$  and  $t$  indicate, respectively, municipality and time (at semester level) fixed effects. The parameter  $\beta$  identifies the “treatment effect” on our outcome variables, thus showing whether and how the removal of mafia firms from the market impacts the prices of commercial properties in the municipality where the antimafia policy has been enforced;  $\varepsilon_{m,t}$  is the error term clustered at the municipality level.

We conjecture that the enforcement of the policy affects the economy of the entire mu-

<sup>16</sup>For a complete illustration of the Italian criminal justice system and its disposition time see Ministero della Giustizia and Direzione Generale di Statistica (2003), Coviello et al. (2015) and, in a different framework, Drago et al. (2020) who exploit variation in the disposition times with individual-level data.



nicipality, with a positive externality on the commercial sector as a whole.<sup>17</sup> To account for the same cities experiencing multiple confiscations over time, we only consider the effects of the first policy treatment, dropping all observations from the second reassignment onwards.

However, the implementation of a standard two-way fixed effects (TWFE) specification (eq. 1) may lay down a series of empirical challenges as outlined by a growing econometric literature (among others, Borusyak and Jaravel, 2017; Goodman-Bacon, 2021, de Chaisemartin and d’Haultfoeuille, 2020, Callaway and Sant’Anna, 2021). One of the main econometric issues pertains to the possible presence of bias in the case of heterogeneous treatment effects over time, since TWFE models with staggered adoption summarize the treatment effects in a single coefficient. More specifically, de Chaisemartin and d’Haultfoeuille (2020) show that, in calculating the regression coefficient, which is actually a weighted sum of the average treatment effects (ATEs) in each group and period, some ATEs may be assigned negative weights, leading to a biased coefficient estimate.<sup>18</sup> Similarly, Sun and Abraham (2021) emphasize that, in the dynamic staggered settings, the coefficient on a given lead or lag can also be contaminated by effects from other periods.

In recent years, several alternative DiD estimation techniques have been provided to overcome these econometric challenges. Most of these alternative estimators are based on event study DiD setting that allows for dynamic treatment effects. In doing so, the new estimators modify the set of units that can act as effective comparison units in the estimation process.

Among these several possibilities, we apply the alternative estimator developed by de Chaisemartin and d’Haultfoeuille (2019), which is robust to heterogeneous or dynamic treatment effects, using the *did\_multilegt* Stata command. Accordingly, we compare municipalities not yet treated in a specific time  $t$  and those treated for the first time in the same period. Hence, in a staggered design, the average of simple DiD estimations across all the municipality groups and semesters whose treatment changes from one semester to another outlines the instantaneous treatment effect. Instead, the weighted average cumulative effects of simple DiD estimations define the dynamic treatment effects, namely we compute DiD comparing the evolution of the mean outcome between two consecutive semesters among municipalities whose treatment varies between the two semesters and

---

<sup>17</sup>Although the disamenity generated by a mafia firm may be proportional to its size, ANBSC does not provide any information on it. However, our hypothesis is that any measure against mafia-firms represents a signal of restoration of legality, regardless of the industry where reassigned mafia-firms used to operate. Again, when disentangling the treatment by business sector, no clear pattern seems to emerge, which ultimately confirms that the final effect on commercial property values is due to the policy itself.

<sup>18</sup>Negative weights constitute an econometric issue because they are typically a cause of bias in the DiD regression estimates that could diverge from the true sign of the treatment effects. This is especially true in our setup when ATEs may be heterogeneous across municipalities and over semesters.

municipalities whose treatment does not change.

Furthermore, econometric literature shows how difficult it is to assess the parallel trends assumption with the standard TWFE. In contrast with this one, the de Chaisemartin and d’Haultfoeuille estimator is not based on constant treatment effect assumption, thus defining the testing for the plausibility of the parallel trends assumption, arguing that it leads to a more robust test of common trends. Hence, we test the parallel trends assumption generating “placebo estimators” that compare the outcome evolution of municipalities not treated with those that become treated, before the treatment status of the latter category changes.

## 2.6 Main results

Table (1) shows the main results for the effect of the reassignment policy on commercial sale and rental prices. We start by estimating the static TWFE model outlined in equation (1). The results in columns 1 and 2 provide pieces of evidence that sale and rental prices significantly increase, respectively by about 4.81% and 4.42%. The magnitude of our estimates is in line with that of some contributions on property values and crime. For instance, Tita et al. (2006) show that crime can lower house prices by 3.6% in low-income neighborhood. Lens and Meltzer (2016) find that the negative impact on commercial prices of crimes at very close range may be between 2% and 6%. Furthermore, since criminal firms are key players in the local economy, the scale of the effect of their exit from the market is not surprising. Indeed, it is documented how their removal has significant spillovers as shown by several empirical works (Transcrime, 2013; Calamunci and Drago, 2020; and Mirenda et al., 2022) that support their economic importance on the market as well as anecdotal evidence.<sup>19</sup>

We then estimate the weights attached to each of the average treatments effects (ATTs) to compute the overall  $\widehat{\beta}_{fe}$  estimate.<sup>20</sup> We find that 76% are strictly positive

---

<sup>19</sup>For example, Mirenda et al. (2022) show how criminal firms gain a real dominant market position in the construction sector, while De Simoni (2022) points out infiltrated firms have higher revenues than legal businesses. Moreover, several cases highlight how criminal firms infiltrated key sectors of the local economic context, ranging from wholesale and retail (e.g., huge shopping center), construction empires, service activities (e.g., private clinic) to utility supply (e.g., gas distribution network). <https://www.ilfattoquotidiano.it/2015/03/12/ndrangheta-sequestrato-centro-commerciale-piu-grand-della-calabria/348309/amp/>  
[https://bari.repubblica.it/cronaca/2022/04/23/news/mafia\\_a\\_bitonto\\_confiscato\\_patrimonio\\_da\\_20\\_milioni\\_a\\_54enne\\_legato\\_ai\\_clan\\_aveva\\_creato\\_unimpresa\\_edile-346570542/](https://bari.repubblica.it/cronaca/2022/04/23/news/mafia_a_bitonto_confiscato_patrimonio_da_20_milioni_a_54enne_legato_ai_clan_aveva_creato_unimpresa_edile-346570542/)  
<https://www.hwupgrade.it/forum/archive/index.php/t-1316946.html/>  
<https://www.impress.it/inchiesta/confisca-dei-beni-frutto-degli-investimenti-della-mafia-nelle-societa-del-gas/>

<sup>20</sup>We use the *twowayfweights* command, developed by de Chaisemartin and d’Haultfoeuille (2020) and available in STATA repository.

and 24% are strictly negative (in both outcomes), giving rise to an amount of negative weights equal to  $-0.0026$ . The command also provides two diagnostic measures,  $\underline{\sigma}_{fe}$  and  $\underline{\sigma}_{\widehat{\beta}_{fe}}$ ,<sup>21</sup> to assess the validity of the  $\widehat{\beta}_{fe}$  estimate to treatment heterogeneity across groups and over time. Both tests show how robust the estimator is if there is an unobserved degree of heterogeneity in the treatment effects across treated groups and time periods.

The results from these diagnostic tests are provided in Table 1. They correspond to the minimum value of the standard deviation needed for the real parameter to be zero, despite the presence of a statically significant effect of the reassignment policy. Specifically,  $\underline{\sigma}_{fe}$  suggests that  $\widehat{\beta}_{fe}$  and the ATT may be of different signs if the standard deviation of the average treatment effects of the reassignment policy across treated municipalities and semester is above to 0.0378 and 0.0348 respectively for sale and rental prices; while  $\underline{\sigma}_{\widehat{\beta}_{fe}}$  indicates that  $\widehat{\beta}_{fe}$  may be of an opposite sign than the average treatment effects of the reassignment policy in each municipality if the standard deviations of those effects is above to 6.4008 and 5.5902.

In the final step of the empirical analysis, we draw the results from our DiD design with the dynamic specification. We use the estimators developed by de Chaisemartin and d’Haultfoeuille (2020), which are robust to heterogeneous or dynamic treatment effects. Figure (3), panels (a) and (b), plot the pre-trend estimates obtained from the regression equation and the dynamic treatment effects for 8 semesters before and after the reassignment of firms. The figures validate the empirical design: the pre-trend coefficients are small and not statistically significant. Turning to the dynamic treatment effects estimates, we find that the dynamic effects start to grow directly after the treatment occurs. The panels confirm the increasing pattern.

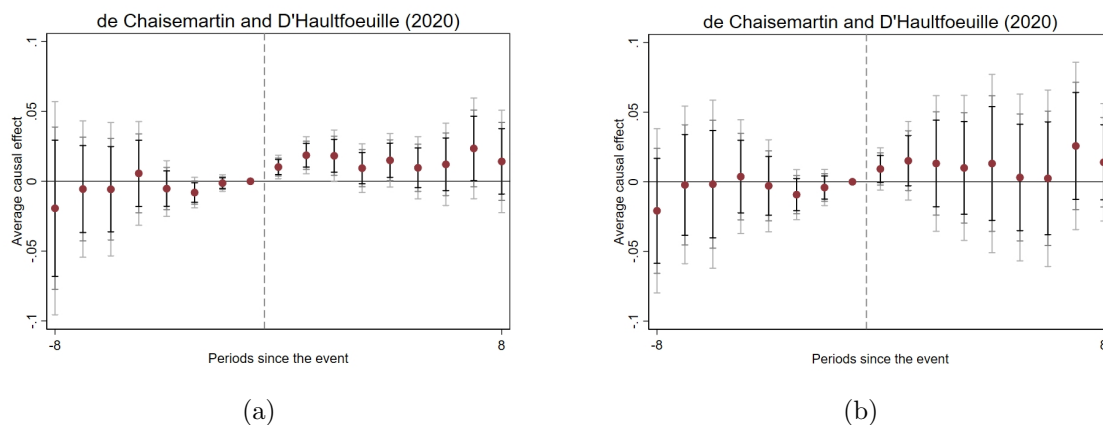


Figure 2.3: Event studies, using de Chaisemartin and d’Haultfoeuille (2020) methodology. The panels show the event study results, implemented through the estimator developed by de Chaisemartin and d’Haultfoeuille (2020). The dependent variables are the natural logarithm of the average commercial property sale (a) and rental (b) price for shops and stores. Coefficient estimates are provided together with the 90% (black), 95% (gray), and 99% (light gray) confidence intervals.

<sup>21</sup>This second measure is determined only if at least one of the weights is negative.

Table 2.1: Estimation results with two-way Fixed Effects (FEs).

|                              | (1)       | (2)       |
|------------------------------|-----------|-----------|
|                              | Sale      | Rent      |
| <i>Treated</i>               | 0.0481*** | 0.0442*** |
|                              | -0.0177   | -0.0167   |
| Time FEs                     | Yes       | Yes       |
| Municipality FEs             | Yes       | Yes       |
| Observations                 | 150,594   | 142,048   |
| No. of municipalities        | 6,917     | 6,555     |
| R-squared                    | 0.9431    | 0.9189    |
| Mean of dep. Var             | 6.8837    | 1.5904    |
| St. dev. of dep. Var         | 0.4134    | 0.4212    |
| % ATTs with negative weights | 24.37     | 24.4      |
| Sum of negative weights      | -0.0026   | -0.0027   |
| $\sigma_{fe}$                | 0.0378    | 0.0348    |
| $\underline{\sigma}_{fe}$    | 6.4008    | 5.5902    |

*Notes:* The dependent variables are the natural logarithm of the average commercial property sale and rental price for shops and stores. Standard errors (corrected for heteroskedasticity and clustered at the municipality level) are reported in parentheses. The symbols \*\*\*, \*\* and \* indicate respectively that coefficients are statistically significant at the 1%, 5% and 10% level. Abbreviation: ATTs, average treatment effects.

## 2.6.1 Alternative estimators

To corroborate our findings, here we check the robustness of our baseline results using alternative estimation methods. We adopt the conventional event study methodology, which involves the estimation of a version of equation (1) via OLS, where a complete set of semester dummies replaces the dummy treatment for each semester before and after the treatment. The semester before the treatment takes place is our reference category.

Figure (4) reports the results. In panel (a), we show the semester-on-semester variation in sale price, i.e., the point estimates of each eight pre/post-treatment semesters with confidence intervals at 90%, 95% and 99%. In the semesters before the treatment, we do not find any statistically significant difference. From the policy entry onwards, the rent price increases for the treated municipalities. The same considerations apply to rental prices (panel b).

Since the specialized literature has not yet agreed on an established method among the new DiD estimator developed, following Baker et al. (2020), we additionally test

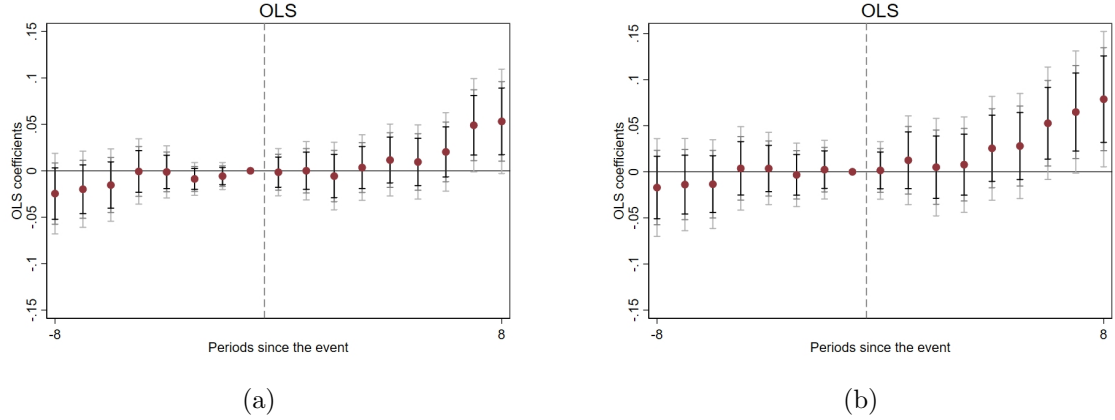


Figure 2.4: Event studies, using TWFE OLS estimation. Notes: The panels show the event study results using TWFE OLS estimation. The dependent variables are the natural logarithm of the average commercial property sale (a) and rental (b) price for shops and stores. Coefficient estimates are provided together with the 90% (black), 95% (gray), and 99% (light gray) confidence intervals. OLS, ordinary least squares; TWFE, twoway fixed effects.

the robustness of inferences through another alternative estimation. We use the Sun and Abraham (2021) method,<sup>22</sup> which investigates the presence of pre-trends and the dynamic evolution of the treatment effect, considering the treatment effects heterogeneity. In contrast with de Chaisemartin and d’Haultfoeuille (2020), in which the control group is defined using all groups not-yet-treated at time  $t$ , Sun and Abraham (2021) use as control group the never-treated groups or the groups treated last if there are no never-treated groups.<sup>23</sup> The Sun and Abraham (2021) estimator, called the “interaction-weighted” (IW) estimator, is based on three steps. Firstly, using an interacted TWFE specification, which involves the inclusion of the interaction between relative time dummies  $D_{mt}^l$  and treatment-cohort indicators  $l\{E_m = e\}$ , they estimate each cohort average treatment effect ( $CATT_{e,l}$ ). This first step in our empirical exercise takes the specification

$$Y_{mt} = \alpha_m + \mu_t + \sum_{e \in C} \sum_{l \neq -1} \varphi_{e,l} (l\{E_m = e\} * D_{mt}^l) + \varepsilon_{mt} \quad (2.2)$$

where:  $m$  is a municipality;  $e$  identifies the “cohort” that is a set of municipalities first treated in a specific semester;  $l$  is a lead or lag relative to event time  $t$ . The expression  $l\{E_m = e\}$  identifies the groups of cohort and captures if the time period ( $E_m$ ) in which the municipality starts the treatment corresponds to a particular semester and if it is in the cohort  $e$ .  $D_{mt}^l$  is a time indicator referring to an observation related to a municipality  $m$  and  $l$  periods relative to the cohort when it was first treated. Lastly,  $\alpha_m$  and  $\mu_t$  are municipal and time fixed effects. In this setting, following Sun and Abraham (2020), as reference period we use the period  $t = - - 1$ , corresponding to the origin for the event

<sup>22</sup>We run the *eventstudyinteract* package written by Sun and Abraham (2020) that implements the interaction weighted estimator for an event study, using a restricted balanced dataset.

<sup>23</sup>In our setting, we use the never-treated groups as control group.

time.

The second step of the IW estimator requires the estimation of the weights  $Pr\{E_m = e|E_m[-l, T-l]\}$ , calculated as the sample share of each cohort in each relative period  $l \in g$ . In the last step, the estimator takes a weighted average of estimates ( $\phi_{e,l}$ ) for  $CATT_{e,l}$  from Step 1 with weight estimates ( $Pr\{E_m = e|E_m[-l, T-l]\}$ ) from Step 2. These weights are then normalized by the size of  $g$ . This step can be formally written as follows:

$$\hat{v}_g = \frac{1}{|g|} \sum_{l \in g} \sum_e \hat{\phi}_{e,l} \hat{Pr}\{E_m = e|E_m[-l, T-l]\} \quad (2.3)$$

Overall, the results are in line with those based on the de Chaisemartin and d’Haultfoeuille method, although less statistically significant and with an upward dynamic effect starting after some periods from the treatment (see Figure 5). This further supports the presence of a common trend before the treatment and the absence of possible anticipatory effects due, for example, to the beginning of the judicial process and/or that of the confiscation procedure, which can even precede the reassignment event by several years.<sup>24</sup>

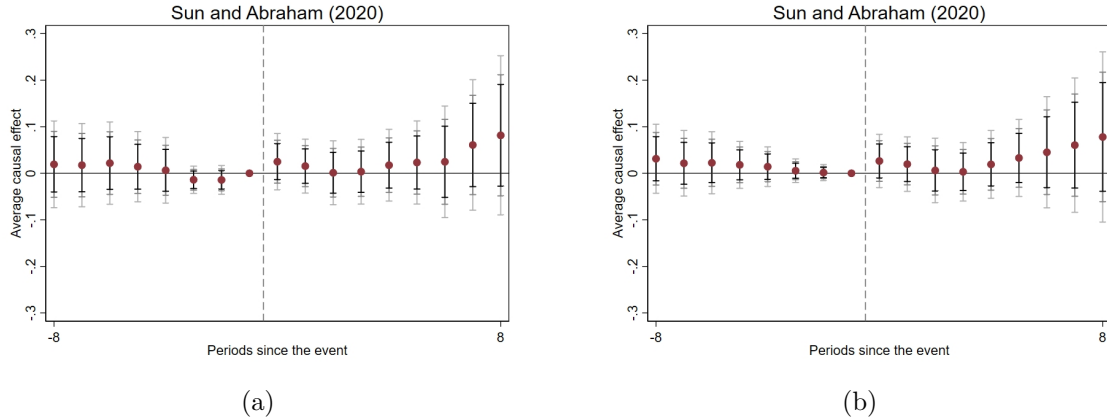


Figure 2.5: Event studies, using Sun and Abraham (2021) methodology. Notes: The panels show the event study results, implemented through the estimator developed by Sun and Abraham (2021). The dependent variables are the natural logarithm of the average commercial property sale (a) and rental (b) price for shops and stores. Coefficient estimates are provided together with the 90% (black), 95% (gray), and 99% (light gray) confidence intervals. OLS, ordinary least squares; TWFE, twoway fixed effects.

<sup>24</sup>The reassignment of mafia-firms comes at the end of a long judicial process (Caramazza, 2014), thus it can be considered a random event with respect to the time of policy enforcement. Unfortunately, detailed records on the judicial process and confiscation timing are not available. Moreover, sometimes seizure and confiscation orders may even be revoked. In any case, the absence of pre-trends in every specification strengthens our identification strategy. We are thankful to the anonymous referee for stressing this point.

Table 2.2: Estimation results stratified by population size.

|                       | (1)       | (2)     | (3)         | (4)         | (5)     | (6)     | (7)       | (8)       |
|-----------------------|-----------|---------|-------------|-------------|---------|---------|-----------|-----------|
|                       | <10000    | <10000  | 10000–50000 | 10000–50000 | >50000  | >50000  | <50000    | <50000    |
|                       | Sale      | Rent    | Sale        | Rent        | Sale    | Rent    | Sale      | Rent      |
| <i>Treated</i>        | 0.0836*** | 0.0547* | 0.0488*     | 0.0522**    | −0.0571 | −0.0214 | 0.0631*** | 0.0483*** |
|                       | −0.0314   | −0.0296 | −0.0256     | −0.0239     | −0.0363 | −0.0412 | −0.0198   | −0.0185   |
| Time FEs              | YES       | YES     | YES         | YES         | YES     | YES     | YES       | YES       |
| Municipality FEs      | YES       | YES     | YES         | YES         | YES     | YES     | YES       | YES       |
| Observations          | 128,068   | 120,442 | 18,889      | 18,069      | 3,637   | 3,537   | 146,957   | 138,511   |
| No. of municipalities | 5,797     | 5,461   | 911         | 890         | 209     | 204     | 6,708     | 6,351     |
| R-squared             | 0.9365    | 0.9068  | 0.9336      | 0.9139      | 0.9373  | 0.9256  | 0.9422    | 0.9167    |

*Notes* : The dependent variables are the natural logarithm of the average commercial property sale and rental price for shops and stores. Standard errors (corrected for heteroskedasticity and clustered at the municipality level) are reported in parentheses. The symbols \*\*\*, \*\* and \* indicate respectively that coefficients are statistically significant at the 1%, 5% and 10% level. Abbreviation: FEs, fixed effects.

## 2.7 Robustness checks

### 2.7.1 Population size

Although we find a significant effect of the reassignment policy on property prices in the municipality in which mafia firms used to operate, it is reasonable to assume that the impact may also depend on the relative extent of the antimafia measure. Unlike large municipalities (i.e., densely populated) where the removal of a mafia business may go unnoticed, in small municipalities, the bond between the local economy and mafia firms is likely to be inevitably stronger. Besides, the economic literature agrees on the major political and economic influence of the mafia in small- and medium-sized municipalities (see, above all, Dalla Chiesa et al., 2014 and Ferrante et al., 2021a). Indeed, we re-estimate our regressions on different samples of municipalities stratified by population size (<10,000, 10,000–50,000, >50,000).

Our results (Table 2) show that the bigger the municipality, the lower the relative impact on commercial property prices, with the coefficient of the variable *Treated* not statistically different from zero in municipalities with more than 50,000 inhabitants. However, it must be noted that large municipalities as such represent less than 3% of our sample. This is consistent with the fact that the Italian territory is made up of small and medium-sized cities. And it is particularly in these smaller local contexts that the removal of mafia firms appears to be effective.

### 2.7.2 Controlling for other antimafia measures

One major concern of our analysis is that the impact of organized crime on commercial price is underestimated since criminal organizations may still operate in the market using other techniques. For example, even without an active participation in legal markets,

criminal organizations presence may still be detrimental to the local communities, particularly by means of extortion rackets. Moreover, another issue may be related to the fact that the removal of mafia firms occurred in the context of other efforts to combat the local mafia presence.

To check if our results are robust, we consider two additional antimafia policies. First, we use the legislative measure disposing of the dismissal of municipal councils when there is concrete, unambiguous, and relevant evidence that local bureaucrats are affiliated to or influenced by criminal organizations (Decree–Law 164/1991 - then Law 221/1991 - and Article 143 of the Consolidated Law of Local Authorities). More specifically, we exploit the enforcement of this policy as an additional exogenous shock that causes a variation in the presence of politically active criminal organizations. Therefore, we identify municipalities in which a dissolution has occurred, and we create a dummy (*Council Dissolution*) that takes value 1 from the starting period of the policy application. The Table (3) shows the results. In columns (1) and (2) we replicate the estimates excluding municipalities that experienced a council dissolution, whereas in columns (3) and (4) we include in the regression the dummy for the dissolution. Then, in columns (5) and (6) we allow the interaction between the two dummy variables corresponding to dissolution and the reassignment policy. Overall, the results show a strong robustness that our findings are driven by economic factors and not by political ones (the coefficient of *Council Dissolution* is never statistically significant at any conventional level), in line with the main purpose of the confiscation and reassignment policies of weakening the economic power of the organization.

Second, we consider the enforcement of administrative or penal procedures involving mafia assets (Law 646/1982 and Decree 159/2011).<sup>25</sup> We create a dummy (*Procedure*) that takes value 1 from the period in which the procedure is enforced at the municipal level. We report our estimates in Table (4). Again, in columns (1) and (2) we use a subsample of observations that did not experience any procedure. Columns (3) and (4) include in the regression the dummy for the procedure, while columns (5) and (6) also consider the interaction between the dummy measuring the procedure and that accounting for the removal of mafia firms. Our results confirm that the removal of mafia–infiltrated businesses alone continues to be strongly associated with increasing rent and sale prices even when excluding the simultaneous enforcement of other antimafia policies such as administrative or penal procedures. Despite *Procedure* shows a positive and significant coefficient on sale prices, our treatment variable overall still displays a large estimated impact of 3.6%, thereby corroborating our baseline estimate. We do not detect any joint effect of the two policies.

The overall results are consistent with the idea that the removal of mafia businesses is more impactful in hindering mafia power than other punitive sanctions toward individuals, such as the arrests and the conviction of mafia bosses and affiliated people (see Slutzky

---

<sup>25</sup>We gather data from ANBSC on *Immobili destinati* using the date of the beginning of the procedure



Table 2.3: Estimation results with the dissolution of local governments.

|                                      | (1)       | (2)      | (3)       | (4)       | (5)       | (6)       |
|--------------------------------------|-----------|----------|-----------|-----------|-----------|-----------|
|                                      | Sale      | Rent     | Sale      | Rent      | Sale      | Rent      |
| <i>Treated</i>                       | 0.0568*** | 0.0487** | 0.0469*** | 0.0445*** | 0.0520*** | 0.0504*** |
|                                      | (0.0203)  | (0.0193) | (0.0178)  | (0.0168)  | (0.0188)  | (0.0180)  |
| <i>Council Dissolution</i>           |           |          | 0.0267    | -0.0073   | 0.0303    | -0.0031   |
|                                      |           |          | (0.0182)  | (0.0229)  | (0.0192)  | (0.0232)  |
| <i>Council Dissolution × Treated</i> |           |          |           |           | -0.0341   | -0.0398   |
|                                      |           |          |           |           | (0.0384)  | (0.0425)  |
| Time FEs                             | YES       | YES      | YES       | YES       | YES       | YES       |
| Municipality FEs                     | YES       | YES      | YES       | YES       | YES       | YES       |
| Observations                         | 146,737   | 138,191  | 150,594   | 142,048   | 150,594   | 142,048   |
| No. of municipalities                | 6,726     | 6,364    | 6,917     | 6,555     | 6,917     | 6,555     |
| R-squared                            | 0.9430    | 0.9196   | 0.9431    | 0.9189    | 0.9431    | 0.9189    |

*Notes* : The dependent variables are the natural logarithm of the average commercial property sale and rental price for shops and stores. Standard errors (corrected for heteroskedasticity and clustered at the municipality level) are reported in parentheses. The symbols \*\*\*, \*\* and \* indicate respectively that coefficients are statistically significant at the 1%, 5% and 10% level. Abbreviation: FEs, fixed effects.

and Zeume, 2022).

### 2.7.3 Intensity of the mafia presence

The proposed theoretical setting, according to which closing a mafia business modifies the local amenity stock, may imply different results depending on the pre-existing mafia intensity presence in the territory. One may argue that if the municipality registers a high level of mafia presence, the removal of a mafia business could be either a strong sign of hitting mafia interests that translates into lower disamenities, or on the contrary it could go unnoticed and hardly modify the local amenity stock. Hence, we exploit the index of organized crime intensity proposed by Calderoni (2011) to classify municipalities as mafia-ridden or not. More in detail, we consider a municipality as mafia-ridden if it is situated in a province lying in the third decile of Calderoni (2011)'s ranking.

The results in Table (5) show that the policy has a more marked effect on municipalities included in mafia-ridden provinces, while it does not affect those located in not mafia-ridden areas.<sup>26</sup> These findings are in line with Ferrante et al. (2021a), who find a positive impact of the reassignment of mafia assets on market competition exclusively in mafia-ridden contexts.

<sup>26</sup>It must be also noted that less than 1% of the municipalities located in non-mafia provinces registered a policy enforcement.

Table 2.4: Estimation results with antimafia administrative or penal procedures.

|                            | (1)      | (2)      | (3)       | (4)      | (5)       | (6)      |
|----------------------------|----------|----------|-----------|----------|-----------|----------|
|                            | Sale     | Rent     | Sale      | Rent     | Sale      | Rent     |
| <i>Treated</i>             | 0.0694** | 0.0508*  | 0.0360**  | 0.0407** | 0.0596**  | 0.0478*  |
|                            | (0.0288) | (0.0295) | (0.0179)  | (0.0162) | (0.0257)  | (0.0291) |
| <i>Procedure</i>           |          |          | 0.0335*** | 0.0059   | 0.0350*** | 0.0064   |
|                            |          |          | (0.0078)  | (0.0092) | (0.0079)  | (0.0093) |
| <i>Procedure × Treated</i> |          |          |           |          | -0.0356   | -0.0106  |
|                            |          |          |           |          | (0.0289)  | (0.0344) |
| Time FEs                   | YES      | YES      | YES       | YES      | YES       | YES      |
| Municipality FEs           | YES      | YES      | YES       | YES      | YES       | YES      |
| Observations               | 135,400  | 127,574  | 144,441   | 136,243  | 144,441   | 136,243  |
| No. of municipalities      | 6,632    | 6,273    | 6,842     | 6,482    | 6,842     | 6,482    |
| R-squared                  | 0.9456   | 0.9290   | 0.9450    | 0.9284   | 0.9450    | 0.9284   |

*Notes:* The dependent variables are the natural logarithm of the average commercial property sale and rental price for shops and stores. In columns (1) and (2) municipalities which experienced an antimafia administrative or penal procedure are removed from the sample. Standard errors (corrected for heteroskedasticity and clustered at the municipality level) are reported in parentheses. The symbols \*\*\*, \*\* and \* indicate respectively that coefficients are statistically significant at the 1%, 5% and 10% level. Abbreviation: FEs, fixed effects.

Table 2.5: Estimation results according to the intensity of mafia presence

|                       | Mafia-ridden municipalities |           | Other municipalities |          |
|-----------------------|-----------------------------|-----------|----------------------|----------|
|                       | (1)                         | (2)       | (3)                  | (4)      |
|                       | Sale                        | Rent      | Sale                 | Rent     |
| <i>Treated</i>        | 0.0364**                    | 0.0529*** | -0.0243              | -0.0214  |
|                       | (0.0187)                    | (0.0186)  | (0.0468)             | (0.0334) |
| Time FEs              | YES                         | YES       | YES                  | YES      |
| Municipality FEs      | YES                         | YES       | YES                  | YES      |
| Observations          | 43,632                      | 43,329    | 106,962              | 98,719   |
| No. of municipalities | 2,276                       | 2,268     | 4,641                | 4,287    |
| R-squared             | 0.9285                      | 0.9069    | 0.9536               | 0.9275   |

*Notes :* The dependent variables are the natural logarithm of the average commercial property sale and rental price for shops and stores. Standard errors (corrected for heteroskedasticity and clustered at the municipality level) are reported in parentheses. The symbols \*\*\*, \*\* and \* indicate respectively that coefficients are statistically significant at the 1%, 5% and 10% level. Abbreviation: FEs, fixed effects.

Table 2.6: Estimation results by local labor market areas.

|                         | (1)       | (2)       |
|-------------------------|-----------|-----------|
|                         | Sale      | Rent      |
| <i>Reassignment_LMA</i> | 0.0938*** | 0.0811*** |
|                         | (0.0210)  | (0.0179)  |
| Time FEs                | Yes       | Yes       |
| Municipality FEs        | Yes       | Yes       |
| Observations            | 150,133   | 141,609   |
| No. of municipalities   | 6,850     | 6,492     |
| R-squared               | 0.9440    | 0.9194    |

*Notes* : The dependent variables are the natural logarithm of the average commercial property sale and rental price for shops and stores. Standard errors (corrected for heteroskedasticity and clustered at the municipality level) are reported in parentheses. The symbols \*\*\*, \*\* and \* indicate respectively that coefficients are statistically significant at the 1%, 5% and 10% level. Abbreviation: FEs, fixed effects.

#### 2.7.4 Re-aggregation by local labor market areas

Firms tend to have an influence on the local economic system that goes beyond city borders. This applies especially to mafia businesses by the power of their territorial control. Thus, to evaluate any potential spillover effects arising from the reassignment of mafia firms, instead of the municipality unit, we consider local labor market areas (*sistemi locali del lavoro*). According to Istat, the local labor market areas are supra-municipal geographical areas defined on the basis of daily commuting flows obtained from the Census. More specifically, we introduce a continuous variable that accounts for the share of reassigned firms over 10,000 inhabitants of each local labor market area (variable *Reassignment\_LMA*). This variable also provides a measure of the intensity of the policy enforcement.

Table (6) displays the results. Once again, the reassignment of mafia businesses leads to an increase in both sale and rental prices with the coefficient of *Reassigned\_LMA* positive and statistically significant at the 1% level. This confirms that our previous findings are robust when taking into account the policy spillover influence on a larger economic area.

#### 2.7.5 Impact on other real estate categories

In our main analysis, we focus on the most representative category of commercial property assets, and specifically, we consider shops and stores prices as our dependent variable. However, to further validate our findings, we extend the estimation to the other key

Table 2.7: Estimation results on other real estate categories.

|                       | (1)      | (2)      | (3)          | (4)          | (5)        | (6)        | (7)      | (8)      |
|-----------------------|----------|----------|--------------|--------------|------------|------------|----------|----------|
|                       | Offices  | Offices  | Laboratories | Laboratories | Warehouses | Warehouses | Houses   | Houses   |
|                       | Sale     | Rent     | Sale         | Rent         | Sale       | Rent       | Sale     | Rent     |
| <i>Treated</i>        | 0.0428** | 0.0345*  | 0.0953***    | 0.0944***    | 0.0600***  | 0.0513**   | 0.0243   | 0.0622*  |
|                       | (0.0209) | (0.0214) | (0.0218)     | (0.0192)     | (0.0181)   | (0.0241)   | (0.0214) | (0.0372) |
| Time FEs              | YES      | YES      | YES          | YES          | YES        | YES        | YES      | YES      |
| Municipality FEs      | YES      | YES      | YES          | YES          | YES        | YES        | YES      | YES      |
| Observations          | 124,435  | 117,011  | 98,992       | 94,849       | 108,000    | 103,678    | 150,296  | 140,815  |
| No. of municipalities | 5,919    | 5,607    | 4,566        | 4,443        | 4,946      | 4,799      | 7,345    | 6,982    |
| R-squared             | 0.9366   | 0.9324   | 0.9501       | 0.9229       | 0.9352     | 0.8937     | 0.9452   | 0.9406   |
| Mean of dep. var      | 6.7715   | 1.3449   | 6.1934       | 0.8551       | 6.0042     | 0.6457     | 6.8440   | 1.1995   |
| St. dev. of dep. Var  | 0.4247   | 0.4280   | 0.4424       | 0.4451       | 0.3929     | 0.4033     | 0.4523   | 0.4535   |

*Notes* : The dependent variables are the natural logarithm of the average commercial property sale and rental price for shops and stores. Standard errors (corrected for heteroskedasticity and clustered at the municipality level) are reported in parentheses. The symbols \*\*\*, \*\* and \* indicate respectively that coefficients are statistically significant at the 1%, 5% and 10% level. Abbreviation: FEs, fixed effects.

commercial dwelling categories, i.e., offices, laboratories, and warehouses. Moreover, we evaluate the impact of the policy on the household sector, since, in line with our theoretical framework, the removal of mafia firms may positively affect residential property values as well. More specifically, we use the sale and rental prices of civil houses in normal state of conservation.

Results are shown in Table 7. The coefficient of *Treated* is positive for all dwelling types (both commercial and residential) and statistically significant at least at the 10% level, except for the sale price of houses. Similarly to what we obtained for shops and stores, the treatment impact on offices - the second main typology of commercial properties - is around 4%. The coefficient of *Treated* is even higher for warehouses and laboratories, while the slighter effect on the household sector could be the result of a more indirect relationship between the eradication of mafia businesses and local amenity stock.

## 2.7.6 Transmission mechanisms and effects on other outcomes

To further support our theoretical underpinnings, we test the demand-side factors that can drive our findings. We exploit two additional channels through which the enforcement of the policy may affect commercial property values. More specifically, we estimate eq. (1) by replacing the price of commercial properties either with the number of active firms or with the number of employees (both expressed in natural log) at municipal level, provided by *Unioncamere-Infocamere*.

Consistently with Operti (2018), who finds that confiscation orders of organized crime's economic assets are positively associated with entrepreneurial entries at the provincial level, we expect the number of firms operating in the market to increase as a

Table 2.8: Alternative transmission mechanism.

|                       | (1)          | (2)       |
|-----------------------|--------------|-----------|
|                       | Active Firms | Employees |
| <i>Treated</i>        | 0.0505***    | 0.1571*** |
|                       | (0.0073)     | (0.0349)  |
| Time FEs              | Yes          | Yes       |
| Municipality FEs      | Yes          | Yes       |
| Observations          | 102,663      | 102,663   |
| No. of municipalities | 6,933        | 6,933     |
| R-squared             | 0.9969       | 0.9791    |
| Mean of dep. var      | 5.4317       | 6.1484    |
| St. dev. of dep. var  | 1.3012       | 1.6242    |

*Notes* : The dependent variables are the natural logarithm of the average commercial property sale and rental price for shops and stores. Standard errors (corrected for heteroskedasticity and clustered at the municipality level) are reported in parentheses. The symbols \*\*\*, \*\* and \* indicate respectively that coefficients are statistically significant at the 1%, 5% and 10% level. Abbreviation: FEs, fixed effects.

response to the reassignment of mafia firms. This growth, *ceteris paribus*, will translate into higher demand for business spaces and thus into higher prices and rents.

The confiscation measures against criminal organizations have also been proved to have spillover effects on their legal counterparts in terms of higher performance, turnover and investments, as highlighted by Calamunci and Drago (2020). Thus, an increase in firms' demand for inputs may involve other factors of production. For this reason, we use the number of employees as a proxy for the labor force demand.

The results are shown in Table (8) and are consistent with our hypotheses. The removal of a mafia firm is positively correlated with both the number of active firms (coefficient equal to 0.0505 and statistically significant at the 1% level) and the number of firms' employees (coefficient equal to 0.1571 and statistically significant at the 1% level).

Moreover, since the scale of our estimated impact of the removal of mafia business is considerable, we expect the effects could be visible elsewhere in the economy. Thus, we provide additional estimates for other outcomes. First, we use the natural logarithm of the average income earned by entrepreneurs at the municipal level (*Income entrepreneurs*) as an indicator of the development of the private sector.<sup>27</sup>

Second, we proxy the quality of the public sector by the Institutional Quality Index

<sup>27</sup>These yearly data are gathered from Istat and are available from 2012 to 2019.

(*IQI*) provided by Nifo and Vecchione (2014). This is a composite measure including the following five pillars: government effectiveness, regulatory quality, rule of law, voice and accountability, and corruption.

Third, we use the natural logarithm of the number of crimes which potentially signal the danger of mafia infiltration (*Crimes signaling mafia*) reported to the Judicial authorities by the State Police, Carabinieri and Guardia di Finanza (Mocetti and Rizzica, 2021).<sup>28</sup> Unfortunately, we were unable to find more granular data for the latter two outcomes, which are available at the provincial level. To account for this limitation, we use as a treatment variable the share of reassigned firms per 10,000 inhabitants at the provincial level.<sup>29</sup>

The results in Table (9) show that, consistently with our baseline findings and preliminary conjectures, the removal of mafia firms is associated with an increase of 2.4% in the average income earned by entrepreneurs. The share of reassigned mafia firms is positively correlated with a growth in the *IQI* and a decrease in the number of crimes signaling mafia infiltration (the coefficients are respectively equal to 0.029 and  $-0.070$ , and statistically significant at the 5% and 10% level).

## 2.8 Conclusions

Several policies aiming at eradicating organized crime have been implemented over the last decades and particularly those targeting the incomes and assets of mafia-type groups. This paper investigates whether the enforcement of the reallocation of mafia-infiltrated firms has had an impact on commercial property values prices between 2002 and 2019 in Italian municipalities. We find a significant and robust increase in rental and sale prices in response to the removal of mafia firms of about 4%. The impact is detected only in small to medium municipalities and in mafia-infested contexts, where the latent disamenity due to organized crime infiltration is prominent. To the best of our knowledge, no other work links the removal of mafia businesses to commercial real estate prices. The present paper represents the first attempt in this direction, and as such, it may benefit from further investigation.

We acknowledge the limitations of our work. The lack of granular data on commercial dwellings characteristics prevents us from using the traditional hedonic price technique and forces us to resort to average property values. Nonetheless, we test the robustness of our results to several alternative specifications. Moreover, we focus on the first policy treatment and do not consider the effect of multiple reassignment orders within the same municipality over time. However, if the first treated firm is a small and irrelevant business

---

<sup>28</sup>Among these crimes, we consider: attacks, robberies, extortions, usury, criminal association, mafia criminal association, money laundering, arson, damage followed by arson, trafficking and drug possession, exploitation and abetting prostitution, smuggling.

<sup>29</sup>The estimates with provincial data use yearly observations covering the period 2010–2019.

Table 2.9: Effects on other outcomes.

|                                 | (1)                  | (2)        | (3)                    |
|---------------------------------|----------------------|------------|------------------------|
|                                 | Income entrepreneurs | <i>IQI</i> | Crimes signaling mafia |
| <i>Treated</i>                  | 0.0239**             | 0.0292**   | -0.0701*               |
|                                 | (0.0094)             | (0.0137)   | (0.0413)               |
| Time FEs                        | Yes                  | Yes        | Yes                    |
| Municipality/provincial FEs     | Yes                  | Yes        | Yes                    |
| Observations                    | 31,566               | 970        | 970                    |
| No. of municipalities/provinces | 5,757                | 97         | 97                     |
| R-squared                       | 0.9969               | 0.9791     | 0.9038                 |
| Mean of dep. var                | 9.8055               | 0.5824     | 2.7476                 |
| St. dev. of dep. var            | 0.3163               | 0.2518     | 0.4010                 |

*Notes* : The dependent variables are the natural logarithm of the average income earned by entrepreneurs at the municipal level (1), the Institution Quality Index (*IQI*) by Nifo and Vecchione (2014) at the provincial level (2), and the natural logarithm of the number of crimes signaling mafia infiltration at the provincial level (3). Standard errors (corrected for heteroskedasticity and clustered at the municipality/province level) are reported in parentheses. The symbols \*\*\*, \*\*, and \* indicate, respectively, that coefficients are statistically significant at the 1%, 5%, and 10% levels. Abbreviation: FEs, fixed effects.

and the big mafia businesses are removed only later on, the true effect of the treatment on the property values might be biased. The unavailability of data on firms' size does not allow us to investigate whether the treatment on the property values depends on the economic relevance of the closed mafia business. Still, we provide a continuous supra-municipal measure of the intensity of treatment that corroborates the positive impact of the policy enforcement. An interesting point may be to expand this issue using a continuous treatment approach.

We study the response of commercial property values, yet the beneficial effects of the removal of mafia firms may not directly involve this economic variable. Nowadays, physical business spaces are becoming dispensable to many entrepreneurial activities. Future research may account for spillover effects on other economic outcomes, as well as other possible transmission mechanisms. Either way, the overall impact of the policy would be underestimated, and the implication of our analysis would not change substantially. Lastly, we do not directly observe the potential response of the mafia, which might reorganize and find new ways to pursue its economic interests thanks to its widespread yet concealed infiltration in the socio-economic fabric. It would be interesting to assess the outcome of the policy to additional measures of the presence of mafia-type organizations.

Our work represents an advance towards a deeper understanding of the impact of or-

ganized crime on the economy and the antimafia policy assessment. Policy implications are straightforward and suggest that antimafia measures turn out to be effective when they hit the core of organized crime activities, that is, their economic interests. However, the fact that a considerable percentage of the firms ends up being either foreclosed or sold at the end of the judicial process signals difficulties in the management of former mafia businesses and their reconversion into legitimate enterprises (see Cabras and Meli, 2017, and Calamunci, 2022 for details). This casts some doubts on the thorough effectiveness of the reassignment policy insofar as it leads to a wasted potential in terms of production and employment opportunities. And it highlights the need to revise the regulatory framework on management and reconversion of criminal assets. In this instance, various motions have been advanced over time at the national level (Commissione Antimafia ARS, 2021), and recently the use of RRP (Recovery and Resilience Plans) funds has been proposed as a source to finance a more efficient implementation of the reassignment process and enhance properties and productive criminal management. Still, our findings support the effectiveness of the policy despite its unlocked potential, and an eventual improvement could only bring about a more prominent impact. The increase in the number of confiscation and reassignment orders in Italy in the last decade represent a step in this direction. Moreover, despite we focus on the Italian context, the infiltration of criminal organization in the economy is a widespread phenomenon all over the world. Its eradication is at the forefront of the international policy agenda, and research contributions that evaluate possible antimafia measures may meaningfully inform the course of action.

## References

- Acemoglu, D., De Feo, G., and De Luca, G. D. (2020). Weak states: Causes and consequences of the Sicilian mafia. *The Review of Economic Studies*, 87(2), 537-581.
- Agenzia delle Entrate. (2021). Rapporto Immobiliare 2021: Immobili a destinazione terziaria, commerciale e produttiva (Technical report). [https://www.agenziaentrate.gov.it/portale/documents/20143/263609/ri\\_2020\\_non\\_res\\_20200528.pdf/d8cf3aaa-a6c6-48e5-54a0-e10d57727de5](https://www.agenziaentrate.gov.it/portale/documents/20143/263609/ri_2020_non_res_20200528.pdf/d8cf3aaa-a6c6-48e5-54a0-e10d57727de5)
- Alesina, A., Piccolo, S., and Pinotti, P. (2019). Organized crime, violence, and politics. *The Review of Economic Studies*, 86(2), 457-499.
- ANBSC. (2019). Agenzia Nazionale per l'amministrazione e la destinazione dei Beni Sequestrati e Confiscati alla criminalità organizzata (Technical report). Relazione sull'attività svolta, Anno 2019. <https://www.benisequestraticonfiscati.it/salastampa/relazioni/relazione-anbsc-2019/>
- Arlacchi, P. (1983). *La mafia imprenditrice: l'etica mafiosa e lo spirito del capitalismo*. Il mulino.



- Arlacchi, P. (2010). *La mafia imprenditrice. Dalla Calabria al centro dell'inferno (Vol. 3)*. Il saggiatore.
- Baker, A., Larcker, D. F., and Wang, C. C. (2021). How much should we trust staggered difference-in-differences estimates? [Working paper]. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3794018](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3794018)
- Barone, G., and Narciso, G. (2015). Organized crime and business subsidies: Where does the money go? *Journal of Urban Economics*, 86, 98-110.
- Battisti, M., Bernardo, G., Lavezzi, A. M., and Maggio, G. (2019). Shooting down the price: Evidence from mafia homicides and housing market volatility [Working paper]. <http://rcea.org/RePEc/pdf/wp19-05.pdf>
- Bonaccorsi di Patti, E. (2009). Weak institutions and credit availability: The impact of crime on bank loans [Working paper]. *Bank of Italy*.
- Borusyak, K., and Jaravel, X. (2017). Revisiting event study designs [Working paper]. [https://scholar.harvard.edu/files/borusyak/files/borusyak\\_jaravel\\_event\\_studies.pdf](https://scholar.harvard.edu/files/borusyak/files/borusyak_jaravel_event_studies.pdf)
- 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.
- Cabras, F., and Meli, I. (2017). La gestione delle imprese confiscate alla criminalità organizzata. Dieci casi di studio a confronto. *Rivista di Studi e Ricerche sulla criminalità organizzata*, 3(2), 46-69.
- Calamunci, F., and Drago, F. (2020). The economic impact of organized crime infiltration in the legal economy: Evidence from the judicial administration of organized crime firms. *Italian Economic Journal*, 6(2), 275-297.
- Calamunci, F., De Benedetto, M., and Silipo, D. (2021). Antimafia law enforcement and lending in mafia lands. Evidence from judicial administration in Italy. *The B.E. Journal of Economic Analysis and Policy*, 21(3), 1067-1106.
- Calamunci, F. M. (2022). What happens in criminal firms after godfather management removal? Judicial administration and firms' performance. *Small Business Economics*, 58, 565-591.
- Calderoni, F. (2011). Where is the mafia in Italy? Measuring the presence of the mafia across Italian provinces. *Global Crime*, 12(1), 41-69.
- Callaway, B., and Sant'Anna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2), 200-230.

- Caneppele, S., and Martocchia, S. (2014). *Italian mafias, public procurement and public works in southern Italy*. In: S. Caneppele and F. Calderoni (Eds.), *Organized crime, corruption and crime prevention* (pp. 293-299). Springer.
- Caramazza, M. (2014). *Le aziende confiscate alla mafia. Perché falliscono e cosa fare per salvarle*. Guerini Next Editore.
- de Chaisemartin, C., and d'Haultfoeuille, X. (2020). Twoway fixed effects estimators with heterogeneous treatment effects. *American Economic Review*, 110(9), 2964-2996.
- de Chaisemartin, C., d'Haultfoeuille, X., and Guyonvarch, Y. (2019). DID\_MULTIPLEGT: Stata module to estimate sharp difference-in-difference designs with multiple groups and periods. Statistical Software Components S458643. Boston College Department of Economics.
- Chioldi, F. (2019). The illicit side of urban development: Corruption and organised crime in the field of urban planning. *Urban Studies*, 56(8), 1611-1627.
- Cohen, M. A. (1990). A note on the cost of crime to victims. *Urban Studies*, 27(1), 139-146.
- Commissione Antimafia ARS. (2021). Relazione sui beni sequestrati e confiscati in Sicilia (Technical report).  
<https://www.avvisopubblico.it/home/wp-content/uploads/2021/02/Relazione-beni-confiscati-commissione-parlamentareantimafia-Regione-Sicilia.pdf>
- Corte dei Conti. (2016). L'amministrazione dei beni sequestrati e confiscati alla criminalità organizzata e l'attività dell'Agenzia Nazionale. Deliberazione 23 giugno 2016, no. 5/2016/G.  
[http://www.rivistacorteconti.it/export/sites/rivistaweb/RepositoryPdf/2016/fascicolo\\_11\\_2016/03\\_Cdc\\_Anbsc.pdf](http://www.rivistacorteconti.it/export/sites/rivistaweb/RepositoryPdf/2016/fascicolo_11_2016/03_Cdc_Anbsc.pdf)
- Costa, A. M. (2010). The economics of crime: A discipline to be invented and a Nobel Prize to be awarded. *Journal of Policy Modeling*, 32(5), 648-661.
- Coviello, D., Ichino, A., and Persico, N. (2015). The inefficiency of worker time use. *Journal of the European Economic Association*, 13(5), 906-947.
- Dalla Chiesa, F. (2014). *Manifesto dell'antimafia* (Vol. 92). Einaudi.
- Daniele, G., and Geys, B. (2015). Organised crime, institutions and political quality: Empirical evidence from Italian municipalities. *Economic Journal*, 125(586), 233-255.
- 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. D. (2017). Mafia in the ballot box. *American Economic Journal: Economic Policy*, 9(3), 134-167.
- De Simoni, M. (2022). Quaderni dell'antiriciclaggio. *Bank of Italy*.
- Detotto, C., and Otranto, E. (2010). Does crime affect economic growth? *Kyklos*, 63(3), 330-345.
- Di Cataldo, M., and Mastrorocco, N. (2021). Organised crime, captured politicians, and the allocation of public resources. *The Journal of Law, Economics, and Organization*. Forthcoming. <https://doi.org/10.1093/jleo/ewab015>
- Dipoppa, G. (2021). How criminal organizations expand to strong states: Migrant exploitation and political brokerage in Northern Italy [Working paper]. <https://preprints.apsanet.org/engage/apsa/article-details/601df8d1ed338ede6b4d16e3>
- Donato, L., Saporito, A., and Scognamiglio, A. (2013). Aziende sequestrate alla criminalità organizzata: le relazioni con il sistema bancario [Working paper]. *Bank of Italy*.
- Drago, F., Galbiati, R., and Sobbrino, F. (2020). The political cost of being soft on crime: Evidence from a natural experiment. *Journal of the European Economic Association*, 18(6), 3305-3336.
- Esposito, P., and Ricci, P. (2015). How to turn public (dis) value into new public value? Evidence from Italy. *Public Money and Management*, 35(3), 227-231.
- European Commission. (2008). Proceeds of organised crime. Ensuring that crime does not pay. <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=com:2008:0766:fin:en:pdf>
- European Commission. (2012). Confiscation and asset recovery: Better tools to fight crime. [http://europa.eu/rapid/pressrelease\\_MEMO-12-179\\_en.htm?locale=FR](http://europa.eu/rapid/pressrelease_MEMO-12-179_en.htm?locale=FR)
- European Parliament. (2012). Proposal for a Directive of the European Parliament and of the Council on the freezing and confiscation of proceeds of crime in the European Union. COM 85, Final. [http://ec.europa.eu/home-affairs/news/intro/docs/20120312/1\\_en\\_act\\_part1\\_v8\\_1.pdf](http://ec.europa.eu/home-affairs/news/intro/docs/20120312/1_en_act_part1_v8_1.pdf)
- Ferrante, L., Fontana, S., and Reito, F. (2021). Mafia and bricks: Unfair competition in local markets and policy interventions. *Small Business Economics*, 56(4), 1461-1484.
- Ferrante, L., Reito, F., Spagano, S., and Torrìsi, G. (2021). Shall we follow the money? Antimafia policies and electoral competition. *Journal of Policy Modeling*, 43(5), 1110-1130.

- Galletta, S. (2017). Law enforcement, municipal budgets and spillover effects: Evidence from a quasiexperiment in Italy. *Journal of Urban Economics*, 101, 90-105.
- Gambetta, D. (1993). *The Sicilian mafia: The business of private protection*. Harvard University Press.
- Ganau, R., and RodríguezPose, A. (2018). Industrial clusters, organized crime, and productivity growth in Italian SMEs. *Journal of Regional Science*, 58(2), 363-385.
- Gibbons, S. (2004). The costs of urban property crime. *Economic Journal*, 114(499), 441-463.
- Global Initiative. (2016). Protecting politics deterring the influence of organized crime on local democracy.  
<https://www.idea.int/sites/default/files/publications/protecting-politics-deterring-the-influence-of-organized-crime-on-localdemocracy.pdf>
- GoodmanBacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, 225(2), 254-277.
- Ihlanfeldt, K., and Mayock, T. (2010). Panel data estimates of the effects of different types of crime on housing prices. *Regional Science and Urban Economics*, 40(2-3), 161-172.
- Kilchling, M. (2014). Finance-oriented strategies of organized crime control. In L. Paoli (Ed.), *The Oxford handbook of organized crime* (pp. 655-673). Oxford University Press.
- Lavezzi, A. M. (2008). Economic structure and vulnerability to organised crime: Evidence from Sicily. *Global Crime*, 9(3), 198-220.
- Lens, M. C., and Meltzer, R. (2016). Is crime bad for business? Crime and commercial property values in New York city. *Journal of Regional Science*, 56(3), 442-470.
- Linden, L., and Rockoff, J. E. (2008). Estimates of the impact of crime risk on property values from Megan's laws. *American Economic Review*, 98(3), 1103-1127.
- Lynch, A. K., and Rasmussen, D. W. (2001). Measuring the impact of crime on house prices. *Applied Economics*, 33(15), 1981-1989.
- Ministero della Giustizia and Direzione Generale di Statistica. (2003). Movimento dei procedimenti civili e penali, rilevazione dei tempi medi di definizione, variazione delle pendenze e capacità di smaltimento delle corti di appello (Technical report). Ministero della Giustizia.

- Mirenda, L., Mocetti, S., and Rizzica, L. (2022). The economic effects of mafia: Firm level evidence. *American Economic Review*. Forthcoming. <https://doi.org/10.1257/aer.20201015>
- Mocetti, S., and Rizzica, L. (2021). Organized crime in Italy: An economic analysis (No. 661) [Working paper]. *Bank of Italy*.
- Nifo, A., and Vecchione, G. (2014). Do institutions play a role in skilled migration? the case of Italy. *Regional Studies*, 48(10), 1628-1649.
- Operti, E. (2018). Tough on criminal wealth? Exploring the link between organized crime's asset confiscation and regional entrepreneurship. *Small Business Economics*, 51(2), 321-335.
- Pinotti, P. (2015). The economic costs of organised crime: Evidence from Southern Italy. *Economic Journal*, 125(586), 203-232.
- Pope, D. G., and Pope, J. C. (2012). Crime and property values: Evidence from the 1990s crime drop. *Regional Science and Urban Economics*, 42(1-2), 177-188.
- Pope, J. C. (2008). Fear of crime and housing prices: Household reactions to sex offender registries. *Journal of Urban Economics*, 64(3), 601-614.
- Progetto ICARO. (2016). Il riuso sociale dei beni e delle aziende sottratte alla criminalità nel panorama europeo. Una ricerca comparativa sulla legislazione comunitaria e sugli ordinamenti nazionali. <https://www.cross.unimi.it/wp-content/uploads/Il-riuso-sociale-aziende-confiscate.pdf>
- Ravenda, D., Giuranno, M. G., Valencia-Silva, M. M., Argiles-Bosch, J. M., and García-Blandón, J. (2020). The effects of mafia infiltration on public procurement performance. *European Journal of Political Economy*, 64(101923), 1-23.
- Riccardi, M., Soriani, C., and Giampietri, V. (2016). *Mafia infiltration in legitimate companies in Italy*. In E. U. Savona, M. Riccardi, and G. Berlusconi (Eds.), *Organised crime in European businesses* (pp. 119-140). Routledge.
- Roback, J. (1982). Wages, rents, and the quality of life. *Journal of Political Economy*, 90(6), 1257-1278.
- Rosen, S. (1974). Hedonic prices and implicit markets: Product differentiation in pure competition. *Journal of Political Economy*, 82(1), 34-55.
- Savona, E. U., and Riccardi, M. (Eds.). (2015). From illegal markets to legitimate businesses: The portfolio of organised crime in Europe. In *Final Report of Project OCP - Organised Crime Portfolio*. Transcrime - Università degli Studi di Trento.

- Savona, E. U., Riccardi, M. and Berlusconi, G., (Eds.). (2016). *Organised crime in European businesses*. Routledge.
- Schmidt, L., and Courant, P. N. (2006). Sometimes close is good enough: The value of nearby environmental amenities. *Journal of Regional Science*, 46(5), 931-951.
- Scognamiglio, A. (2018). When the mafia comes to town. *European Journal of Political Economy*, 55, 573-590.
- Sivitanidou, R. (1995). Urban spatial variations in officecommercial rents: The role of spatial amenities and commercial zoning. *Journal of Urban Economics*, 38(1), 23-49.
- Sivitanidou, R., and Sivitanides, P. (1995a). The intrametropolitan distribution of RandD activities: Theory and empirical evidence. *Journal of Regional Science*, 35(3), 391-416.
- Sivitanidou, R., and Sivitanides, P. (1995b). Industrial rent differentials: The case of Greater Los Angeles. *Environment and Planning A*, 27(7), 1133-1146.
- Slutzky, P., and Zeume, S. (2022). Organized crime and firms: Evidence from antimafia enforcement actions. [Working paper]. Available at SSRN 3242495.
- Sun, L., and Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2), 175-199.
- Tanzi, V., and Davoodi, H. (2001). *Corruption, growth, and public finances*. In A. K. Jain (Ed.), *Political economy of corruption*. Routledge.
- Thaler, R. (1978). A note on the value of crime control: Evidence from the property market. *Journal of Urban Economics*, 5(1), 137-145.
- Tita, G. E., Petras, T. L., and Greenbaum, R. T. (2006). Crime and residential choice: A neighborhood level analysis of the impact of crime on housing prices. *Journal of quantitative criminology*, 22(4), 299-317.
- Transcrime, C. I. (2013). Progetto pon sicurezza 2007-2013. Gli investimenti delle mafie.
- United Nations Office on Drugs and Crime (UNODC). (2011). Estimating illicit financial flows resulting from drug trafficking and other transnational organized crimes (Technical report). [https://www.unodc.org/documents/data-and-analysis/Studies/Illicit\\_financial\\_flows\\_2011\\_web.pdf](https://www.unodc.org/documents/data-and-analysis/Studies/Illicit_financial_flows_2011_web.pdf)
- United Nations Office on Drugs and Crime (UNODC). (2014). The Italian experience in the management, use and disposal of frozen, seized and confiscated assets (Technical report). [https://www.unodc.org/documents/treaties/UNCAC/WorkingGroups/workinggroup2/2014-September-11-12/Combined\\_CacCosp-Wg2-2014-CRP3.pdf](https://www.unodc.org/documents/treaties/UNCAC/WorkingGroups/workinggroup2/2014-September-11-12/Combined_CacCosp-Wg2-2014-CRP3.pdf)

United Nations Office on Drugs and Crime (UNODC). (2017). Effective management and disposal of seized and confiscated assets (Technical report). [https://www.portalbcft.pt/sites/default/files/anexos/unocd\\_administracao\\_e\\_disponibilizacao\\_bens\\_apreendidos\\_e\\_declarados\\_perdidos.pdf](https://www.portalbcft.pt/sites/default/files/anexos/unocd_administracao_e_disponibilizacao_bens_apreendidos_e_declarados_perdidos.pdf)

Vaccaro, A., and Palazzo, G. (2015). Values against violence: Institutional change in societies dominated by organized crime. *Academy of Management Journal*, 58(4), 1075-1101.

Wilkinson, R. K. (1973). House prices and the measurement of externalities. *Economic Journal*, 83(329), 72-86.

Wolton, S. (2020). Lobbying, inside and out: How special interest groups influence policy choices. *Quarterly Journal of Political Science*, 16(4), 467-503.

# Chapter 3

## Mafia doesn't live here anymore: Antimafia policies and housing prices

Published in *Journal of Regional Science*, 63, 1001–1025.

<https://doi.org/10.1111/jors.12647>

It is well known that the value of a house depends both on the physical characteristics and on some features of the neighborhood in which it is located. If so, organized-crime activities can significantly affect urban real estate values. Antimafia policies, in turn, can be intended as a tool to influence those external features. This paper compares the effects on real estate values of the two main antimafia policies implemented in Italy since the 1990s at the municipal level. While we do not find any significant effect of dismissal policies on house prices, we find a statistically significant effect of reassignment policies depending on the specific destination of confiscated property.

### 3.1 Introduction

According to a large body of literature, heterogeneous goods like residential properties have intrinsic (i.e., structural characteristics of a building) and external attributes (i.e., environmental and public amenities) that contribute to determine their final price (Rosen, 1974). Housing values, for instance, reflect the value buyers attach to both the property in itself and the surrounding area. Hedonic pricing models are commonly used in empirical studies to estimate the implicit contribution of each attribute, whose changes are a possible channel of fluctuations in real estate prices.

In this perspective, a robust and long-standing literature has shown that high crime levels tend to depreciate residential property values,<sup>1</sup> yet the impact of organized crime on

---

<sup>1</sup>For instance, Lynch and Rasmussen (2001) report a significant reduction in the average housing prices in areas characterized by high crime rates. Pope and Pope (2012) estimate a substantial increase in house prices during the American crime drop of the 1990s. More in detail, the type of criminal offense



housing prices has notably been neglected. However, it is reasonable to assume that even organized crime and local governments' efforts to eradicate it could affect the housing market value. Bradbury (2022) argues that subsidization policies concerning properties (like stadiums and sport venues) end up affecting that area's real estate values, through the channel of variation in amenity stock. The endemic presence of criminal organizations has been proven to create severe economic distortions in many instances. Apart from curbing the growth path of the regions where they operate (Pinotti, 2015), criminal organizations successfully manage to infiltrate society thereby undermining competitive markets (Calamunci and Drago, 2020; Ferrante et al., 2021a) as well as politics (Daniele and Geys, 2015; De Feo and De Luca, 2017). But improvements in law enforcement and public efficiency may curb the deleterious influence of organized crime on society (Berrittella, 2018).

In accordance with this approach, in this article, we investigate the effects on real estate values of two key antimafia policies implemented in Italy during the 1990s: the dismissal of city councils for mafia infiltration – henceforth, DC policy – and the reassignment of confiscated assets formerly owned by mafia members – SR policy. The DC policy and the SR policy starkly differ in their content: the former has political implications insofar as the dissolution of the municipality imposes new elections, whereas the latter has an economic dimension, in that it reduces mafia wealth and implies a new life for reallocated properties. In this instance, the enactment of SR policies may somehow translate into an urban regeneration measure, and as such have more direct repercussions on the public amenity stock of the urban area depending on the reallocation purpose. Despite measuring a latent phenomenon as organized crime presence poses both technical and conceptual challenges (Costa, 2010), the enforcement of legislative measures intended to fight mafia groups may provide a unique opportunity to isolate their influence on property values.

While the aforementioned technical and conceptual challenges are acknowledged, our empirical analysis does achieve robust findings. More precisely, the main results are as follows. 1) DC policies do not appear to have any significant impact on house prices. 2) The impact of SR policies depends on the specific destination of confiscated property. Among the different types of reassignment policies, those to 2a) public institutions show a negative effect in more mafia-ridden areas, whereas those to 2b) social institutions always display a positive impact. Hence, in accordance with our theoretical underpinnings, we interpret our empirical evidence as a preliminary confirmation that it is the social re-use of formerly mafia-owned properties that drives residential prices up insofar as it implies an increase in public amenities.

---

seems to matter. Crimes that convey the feeling of neighborhood deterioration, such as vandalism and graffiti, have a more robust impact on domestic property values than burglary or theft (Gibbons, 2004). And, as observed by Ihlanfeldt and Mayock (2010), only the most violent offenses, such as robbery and aggravated assault crimes, can influence real estate prices. Besides, violent crimes appear to hit low-income neighborhoods more severely, as shown by Tita et al. (2006).

We argue that the dichotomous result on SR reassignments stems from the peculiar and pervasive nature of mafia-type organizations in Italy. As cogently explained by Judge Giovanni Falcone: “The mafia, system of power, articulation of power, metaphor for power, pathology of power. The mafia that becomes a state where the state is tragically absent (Falcone, 1991 - our translation from Italian). His view was that the mafia not only affects economic and political institutions, but also social capital, moral values, and the sense of trust of entire communities. This is one of the reasons for the strong penetration of mafia organizations into the economic, political, and cultural fabric in Italy.<sup>2</sup> The mafia exploits the weaknesses of the state and, in turn, the state loses its legitimacy and authority over the population.

We deem our empirical results to be closely in line with this reasoning. As for the specific mechanism underlying our empirical evidence, however, we acknowledge that clear-cut evidence is far from being achieved in the current analysis. Having said that, it is worth noticing that the statistical significance of SR policy versus that of the DC policy signals a higher efficiency of policies with apparent economic content. We conjecture some potential mechanisms are compatible with the observed empirical results, based on the reduction of the mafia power in general, as well as on the increase in local investments and urban regeneration process, mainly due to the more efficient (re-)use of seized mafia assets. We further conjecture that antimafia policies alone may not be enough. And, as far as house prices are concerned, SR policies may even be detrimental when something beyond the effort of the state and the judicial system is not done. The reason might be twofold. First, in a territory plagued by criminal activity and degradation, where the high levels of public corruption hinder the quality of public services and social capital (Corrado and Rossetti, 2018), local governments tend to have no political credibility, thus the reallocation of resources to public institutions may be viewed by citizens as a simple change of ownership between criminal and corrupt actors. As stressed by Van Dijk (2007), the mafia has the pernicious ability to erode the integrity and conduct of local public servants. This may explain why the reassignment to public institutions can be perceived not only as an inconclusive arrangement but also as a potential driver of urban degeneration.

The second reason is that the reallocation of confiscated assets may only appear on paper and not be actually implemented, at least not for many years or adequately, because of red tape or other forms of bureaucratic inefficiencies. And this seems to be particularly true whenever properties are reassigned to public purposes. In a survey carried out in Sicily by two local volunteer organizations, *Arci Sicilia* and *Siciliani Giovani*, it is reported that most of the assets confiscated and reassigned (on paper) to public institutions are either abandoned or poorly managed.<sup>3</sup> The presence of underutilized or

---

<sup>2</sup>For instance, one of the most negative economic consequences of the presence of mafia-type organizations is a socio-institutional context unfavorable to foreign direct investments (Daniele and Marani, 2011).

<sup>3</sup><http://www.linformazione.eu/2020/09/sicilia-beni-confiscati-alla-mafia-rischio->

vacant properties may contribute to create an image of urban decay, causing a reduction in the demand from homebuyers.

In contrast, the reassignment of confiscated assets to social institutions, which is directed towards organizations that are already established and active in a territory, makes it more likely for the reassigned resources to be put to their intended use and contribute to urban regeneration and community revitalization, usually followed by an increase in house prices. The main beneficiaries of reallocated assets are non-profit organizations and, in particular, social cooperatives (Law 109/1996). These non-profit associations, through volunteer work, provide a wide array of services and welfare support to citizens, create job opportunities, and promote entrepreneurship. Social cooperatives tend to operate on a local level, but they often engage in trust networks with other non-profit actors in the same geographical area (Thomas, 2004). The emergence of these bottom-up, self-organized social enterprises has proved to be crucial to the success of public policies concerned with the regeneration of real estates (Mangialardo and Micelli, 2016). On a wider scale, despite this extremely difficult context, in recent years, single activists and small civic associations have played a fundamental role in the reaction against the mafia in Italy. The primary objective of such initiatives is to promote the sense of civic consciousness, justice, and rejection of criminal culture, through participatory projects and grassroots movements. In many cases, these antimafia initiatives and associations have achieved considerable success.<sup>4</sup>

Our paper adds to the existing literature in several crucial areas. Firstly, we contribute to the rising stream of literature concerned with the assessment of the measures undertaken to fight organized crime in Italy by providing a comparison of the effectiveness of antimafia policies with different content. Other works investigate the effects of antimafia interventions on several markets or contexts. For example Acconcia et al. (2014) exploit the DC policy to show its enactment affects curbs public spending at the provincial level. Daniele and Geys (2015) find that the implementation of DC policies increases the average education level of local politicians, but they do not consider the possible indirect effect of SR policies. Galletta (2017) shows that in municipalities nearby those subjected to DC policies, there is a lower incidence of crimes involving the mismanagement of public resources. Operti (2018) reports an increase in the number of market entrants after the confiscation orders of economic assets. Di Cataldo and Mastrorocco (2021) provide evidence of a distortion in the allocation of public funds to the advantage of mafia's entrepreneurial interest in municipalities where DC policies are later enacted. Calamunci et al. (2022) find that in mafia-infested municipalities, SR policies targeting firms have

---

flop/

<sup>4</sup>One example of successful civic resistance to *cosa nostra* in Sicily is represented by Addiopizzo, an antimafia organization that offers direct and indirect (political) support to those entrepreneurs who decide not to pay protection money or other forms of extortion. The term *Addiopizzo* can be translated as Goodbye *pizzo*, i.e., a term originating from the Sicilian dialect and referring to the protection money that mafia extorts from local businesses. See Elsenbroich (2017), and Vaccaro and Palazzo (2015).

positive spillover effect on the commercial property market. Fenizia and Saggio (2022) analyze the long-term impact of the DC policy, and show that municipalities whose city council has been dissolved for mafia infiltration experience a decrease in unemployment, as well as an improvement in the management of public funds and tax compliance.

Our paper is also close to Esposito and Ricci (2015), who focus on the social reuse of confiscated assets, and show that it can be a powerful tool for turning public disvalue into public value. The authors however do not consider the different types of reassignment uses, and the potential influence of DC policies. The two papers Ferrante et al. (2021a,b), on the other hand, consider both DC and SR policies and argue that only the latter has a positive impact on the degree of competition, respectively, in the construction industry and in electoral outcomes. Other types of antimafia measures have been introduced in Italy over the years. Some have proven to be rather ineffective or even harmful. For instance, Scognamiglio (2018) studies the effects of Law 1423/1956 that, between 1956 and 1988, forced *mafiosi* to relocate to other cities in Italy, and reports a positive correlation with the employment in the construction industry in the regions of destination, suggesting the creation of new illegal market opportunities.

Second, we contribute to the urban literature by linking house prices with a new context such as organized crime and assets reallocation. With the exception of the abovementioned contribution of Calamunci et al. (2022), as well as that of Battisti et al. (2022), who investigate the impact of mafia-type organized crime on residential property values in the city of Naples and find that Camorra murders involving innocent people drive housing prices down by 2.5% to 3.8%, the existing empirical literature has overlooked the nexus between organized crime and property prices in Italy. In this perspective, we focus on the effects of the SR and DC policies on the economic sphere and at a local level and expand the scope of our analysis to the entire Italian territory. In particular, we analyze the impact of antimafia policies on urban property values using a very large dataset of over 26,000 observations, from 2002 to 2019, and related to all Italian municipalities affected by at least one antimafia intervention. The peculiarity of our contribution consists in showing how only antimafia policies targeting the economic power of organized crime positively affect residential prices. And what is pivotal in determining this final effect is the re-use step of the SR policy, and more specifically, the type of reassignment. Our results indeed suggest that when the confiscated assets are returned to the local community for social purposes, then a process of urban regeneration takes place, restoring the amenity stock and ultimately driving residential prices upwards. On the contrary, in contexts tainted by the mafia, reassignments to public institutions turn out to be unsuccessful, as they lead to a decrease in house prices.

Lastly, another novelty of our paper comes from the use of the latest methodologies based on difference-in-differences (Goodman-Bacon, 2021; de Chaisemartin and d'Haultfoeuille, 2020), also shifting the analysis from the binary to the continuous context (de Chaisemartin and D'Haultfoeuille, 2022).

The rest of the paper is as follows. Section 2 outlines the institutional background. Section 3 describes data and section 4 presents the estimation strategy. Section 5 discusses the results. Section 6 focuses on the potential underlying mechanisms driving our results. Section 7 provides a series of robustness checks in the form of both diagnostic tests and alternative estimators. Section 8 concludes.

## 3.2 Institutional background

### 3.2.1 Antimafia Policies: DC and SR

The rise of mafia-type criminal organization in Italy traces back to the years following the Italian Unification (1861)<sup>5</sup> and was originally tied to the provision of protection services for agricultural lands in the Southern regions (Skaperdas, 2001). Organized crime groups have evolved over the years, becoming a pervasive entity to the social, economic, and political fabric using violence and extortion, particularly in the prosperous years after the Second World War (Lupo, 2009). As the economic boom opened many revenue opportunities to exploit whom organized crime groups started infiltrating the legitimate economy and political sphere, the power of criminal organization became a concern to the Italian State - despite its attempt to curb the spread of mafia infiltration may have not always have appeared consistent (Arlacchi, 1983; Shelley, 1994; Paoli, 2003). The crime of mafia-type association, however, will be introduced in the Italian Penal Code only in 1982, with the Rognoni-La Torre act (Law 646/1982), which also disposes of the confiscation of illicit assets owned by mafia members. The 1990s saw a massive enforcement of this piece of legislation, in conjunction with Law 221/1991, providing for the dissolution of city councils for mafia infiltration. The implementation of these two antimafia policies represented a turning point in the fight against organized crime aiming at undermining both its political influence and its economic power.

The SR policy is regulated by Law 646/1982 and Decree 159/2011 (*Codice antimafia*). Both pieces of legislation provide that the judicial authority can order the seizure and reassignment of property owned by members of criminal organizations when there is evidence that they are the result of illegal activities. The policy is implemented by Court, on the recommendation of the Public Prosecutor's Office or the Police Authority, which, in Italy, are independent of the political government. The seized assets are entrusted - from seizure to 1<sup>st</sup>-degree confiscation (phase 1) - to the judicial administrator, appointed by the court at the same time as the seizure order, and -from 1<sup>st</sup>-degree confiscation to destination (phase 2) - to the National Agency of Confiscated Assets (*Agenzia Nazionale per l'amministrazione e la destinazione dei Beni Sequestrati e Confiscati alla criminalità organizzata* - ANBSC). The Agency, through its Board of Directors, must determine new

---

<sup>5</sup>On the historical origins of the mafia in Italy, see Gambetta (1993); Bandiera (2003); Buonanno et al. (2015).

destinations for the assets, and several new uses or purposes are possible according to Law 109/1996. For what concerns this paper, the relevant four broad categories are:

- Public institutional purposes, which mainly refer to the reassignment to local bodies of public administration, such as civic offices, municipal museums, and other public spaces.
- Social institutions, such as non-profit charitable organizations, day-care centers, cultural centers, and social cooperatives.
- Governmental uses, which are essentially related to justice, law enforcement, and public order, such as police stations, military bases, and fire stations.
- Asset selling or firm foreclosure. The sale of confiscated assets or companies is regulated by Decree-Law n. 230/1989 (and then Law 282/1989). Almost all confiscated companies are foreclosed (889 out of 959 in our sample).<sup>6</sup>

The DC policy was introduced by Decree-Law 164/1991 (then Law 221/1991) and is currently regulated by Article 143 of the Consolidated Law of Local Authorities (*Testo Unico degli Enti Locali*). Increasing evidence of mafia infiltration in local politics prompted the issue of a legislative measure disposing of the dismissal of municipal councils when there is concrete, unambiguous, and relevant evidence that local bureaucrats are affiliated to or influenced by criminal organizations. The application of DC policies consists of the following steps. The provincial prefect orders an investigation and appoints an external, non-elected commission which draws up a report that is submitted to the prefect and then to the Minister of Interior. The Minister proposes the dissolution to the Council of Ministers and the President of the Republic. The proposal must specify the measures necessary to restore public interest. The members of the municipal council who are held responsible are removed from office. The ordinary management of the municipality is transferred to an external commission until new elections are held. Differently from the SR policy, it is interesting to note that the DC policy is implemented by bodies accountable to the Italian government (the executive power).

### 3.2.2 The real estate market in Italy

Residential property represents the main source of wealth for households in Italy.<sup>7</sup> And investment in real estate is also an activity traditionally pursued by Italian criminal organizations (Transcrime, 2013a).

---

<sup>6</sup>See also Calamunci (2022) on the deterioration in the probability of survival of mafia firms under judicial administration.

<sup>7</sup>According to the reports of Banca d'Italia (2019), the relative share of real estate investments on total household assets is around 50%. Italians are traditionally owner-occupiers: in 2012, 80% live in a house they own (Cannari et al., 2016).

Time fluctuations in housing prices may reflect many socio-economic phenomena. This is why the indices of residential property prices are important indicators of macroeconomic growth, financial stability, and business decisions.<sup>8</sup> Average residential prices more than doubled between 1950 and 2012 (Cannari et al., 2016), and the evolution of prices followed an overall increasing pattern between the 1960s and the 2010s, despite some brief trend inversions. In 2019, the revenue of the Italian residential market reached around 97.5 billion euros, with a 3.5% increase over the last year - which is mainly due to the increase in the volume of transactions (Agenzia delle Entrate, 2020).

Given the high segmentation of the real estate sector, disaggregated data on property prices may be more insightful than national average trends. The geographical areas with a traditionally prominent presence of criminal organizations, such as Calabria and Sicily, are notably those with the lowest property prices (see Figure 1). This is consistent with the literature on crime and real estate values.

Real estate is also one of the main sectors where organized crime groups invest their illicit profits thereby infiltrating the legitimate economy (Transcrime, 2013a). Investing in property is indeed a safe channel to place in legal markets the proceeds of money-laundering activities. And this appears to be a frequent practice for criminal organizations all over the world (Schneider, 2004; Nelen, 2008; Naheem, 2017) and more specifically in Italy (Transcrime, 2013a; Dugato et al., 2015). In this perspective, it is not unlikely for the pervasive presence of organized crime groups to affect real estate values. Following the reasoning of Calamunci et al. (2022), we hypothesize that the infiltration of the mafia in the real estate sector acts as a latent disamenity which curbs property prices. Thus, provided they turn out to be effective, public policies aimed at hitting organized crime and at weakening their influence and power over the local economy and politics may be expected to increase residential property values.

### 3.3 Data

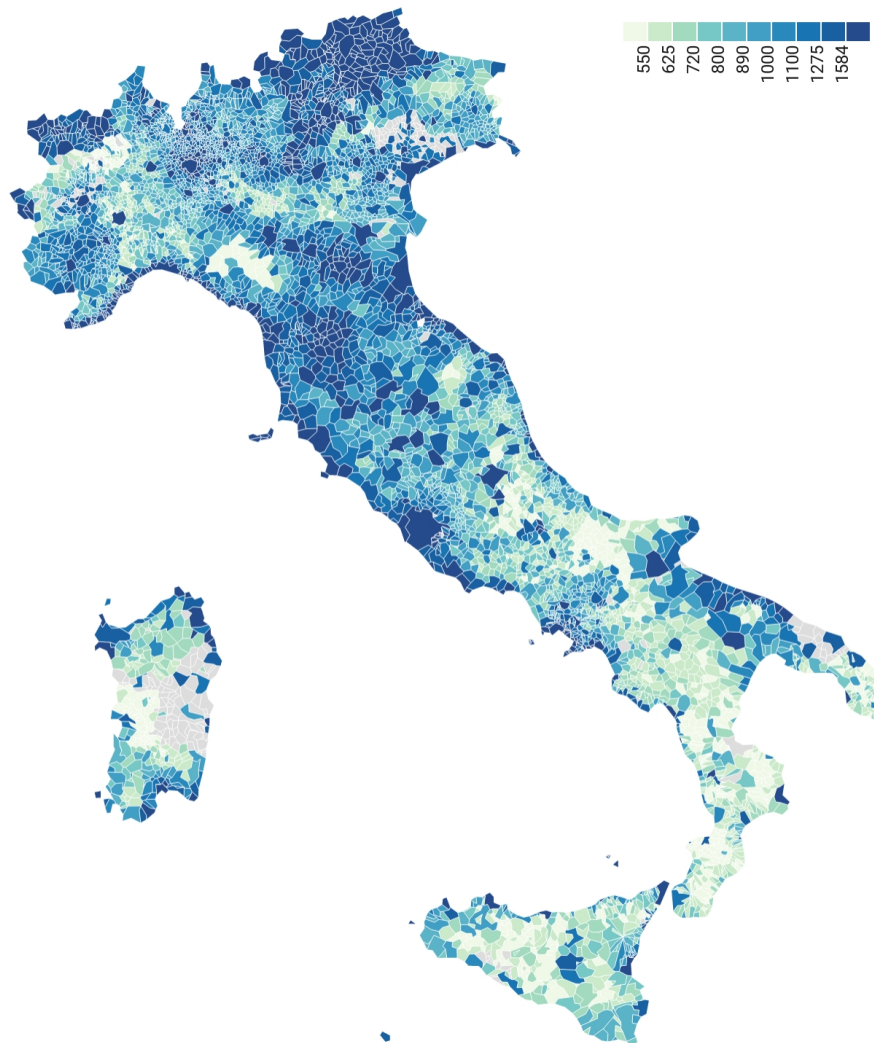
The empirical study is conducted using two main sources and is based on a panel dataset running from the second semester of 2002 to the first semester of 2019. First, we use data on property values from the Italian Estimate and Observatory on the Real Estate (*Osservatorio del Mercato Immobiliare* - OMI), published by the Italian Revenue Agency (*Agenzia delle Entrate*). This agency delivers half-yearly reports on the average maximum and minimum house sale and rent prices for infra-municipal geographical areas, i.e., the so-called OMI zones, that are homogeneous from a socio-economic standpoint. We consider only the prices of residential houses located in the city center of each municipality (B1 OMI zone).<sup>9</sup> The reason is that the link between real estate values and disposable income

---

<sup>8</sup>For a comprehensive overview, see Cannari et al. (2016).

<sup>9</sup>Admittedly, some municipalities not only have B1 zones, but also other zones such as B2, B3, etc. which are part of historical centres. But almost every Italian municipality possesses at least the B1 zone.

Figure 3.1: Average prices of residential houses located in B1 zones ( $\text{€}/\text{m}^2$ ). The figure shows the average prices of residential houses located in B1 zones across Italian municipalities in the first semester of 2019. Source: Our elaboration on Osservatorio del Mercato Immobiliare (OMI) data.



is stronger in the city center and weaker in the suburbs, as reported by Manzoli and Mocetti (2019). This allows us to better detect the effects of antimafia policies on the price trend of a given geographical area. Moreover, in the city center area the possibility for urban expansion is limited. This implies that changes in property prices are more likely to result from the appraisal of pre-existing houses rather than from areas and building of recent construction.

Second, the data comprehend records on the enforcement of the DC policy from the reports of the Italian Ministry of Interior, whereas data on the SR policy were gathered from Open Regio, the online portal managed by ANBSC, the National Agency for the

---

This is the reason why we specifically focus on B1 OMI sale and rental prices.



## Administration and Destination of Seized and Confiscated Assets.

As organized crime presence tends to be a latent phenomenon, there is no certainty that the cities that have never been affected by neither of the measures are actually never been infiltrated by criminal organizations. It may be the case that in those municipalities, the local mafia has not been detected and hit by law enforcement actions *yet*. Or on the contrary, those cities may be completely mafia-free for real. We are not able to assess whether for a municipality not experiencing any antimafia policy equates to never having suffered from mafia infiltration at some extent. Since the territorial presence of the mafia is likely to affect the price dynamics of the real estate market, to mitigate estimation biases, our sample includes only municipalities where at least one antimafia measure among the DC and the SR policy has been enacted (see Figure 2 for their geographical distribution in Italy).<sup>10</sup> This allows us to compare the effect of the two policies considering a relatively homogeneous selection of units.

Figure 3 shows the time trends of DC and SR policies in Italy, from 1990 to 2019, while Figure 4 describes the different reallocation purposes of confiscated assets. In Italy, almost 15% of the municipalities have been subjected to at least one SR policy and less than 3% to DC policies. Most SR policies concern the reassignment to public and social institutions, whereas only a small fraction to governmental uses and asset selling.

### 3.4 Empirical Strategy

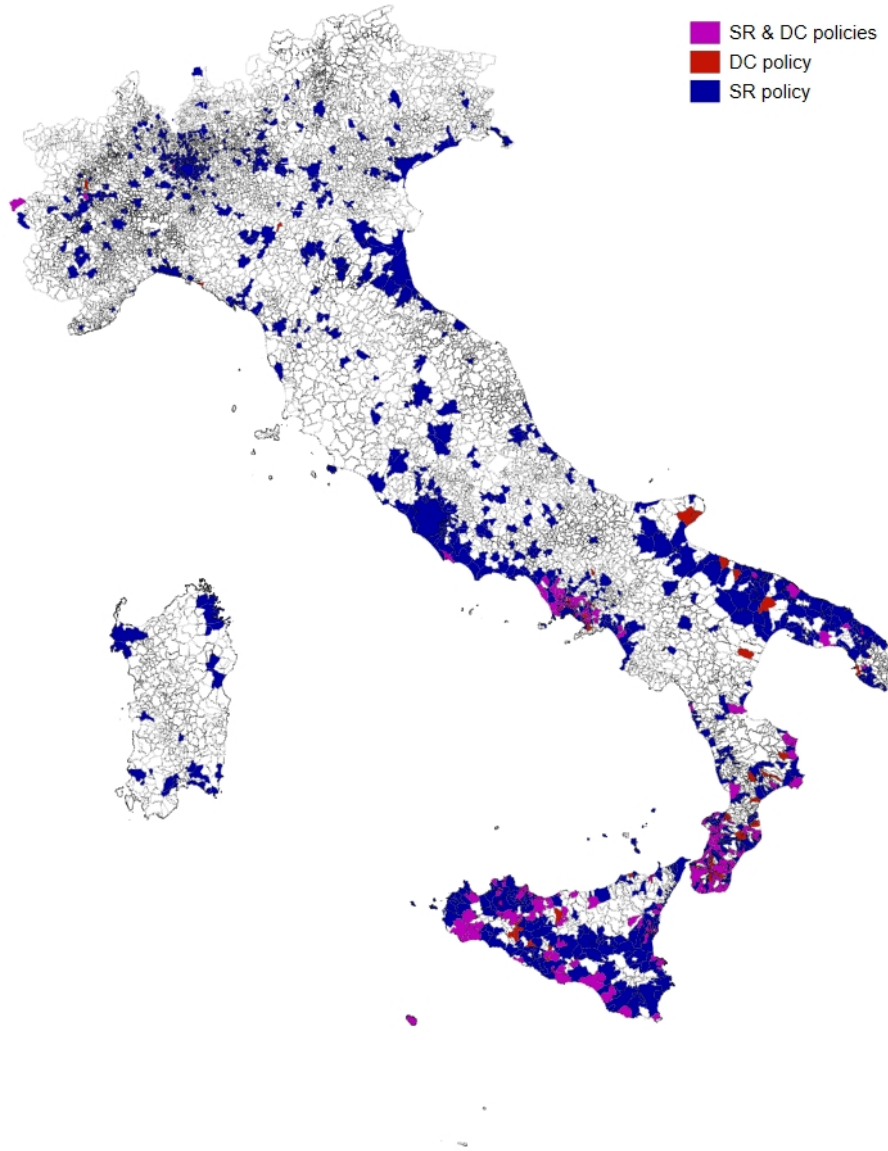
The empirical identification of causal effects in the study of crime is demanding, especially as the focus shifts from individual offenders to criminal groups and from simple crimes to complicated criminal enterprises (Pinotti, 2020). In this situation, the difficulty of identification is compounded with the difficulties for researchers to perform controlled randomized tests, since it is impossible to realize due to ethical concerns.

To address this issue, a well-established stream of research focuses mostly on “quasi-experiments” that induce variation in treatment exposure, which may then be utilized to identify and investigate the impact of interest. Following this line, taking advantage of the panel structure of the data, we rely on the exogenous shock resulting from the staggered municipal-level antimafia enforcement measures (DC and SR) to study their impact on the housing market. In our analysis, the treatment is the execution of one of the two policies. We exploit the temporal variation in the enactment of these antimafia policies across municipalities to estimate the effects on residential property values. In both cases, we argue that the hypothesis of exogeneity of the treatment is sufficiently justified. We provide a more detailed discussion later in this section. Therefore, we base our approach on a staggered difference-in-differences (DiD) estimation with variation in treatment timing. Specifically, we estimate the following equations:

---

<sup>10</sup>Thus, in our case, never treated units are cities in which at least one of the two antimafia policies has not been implemented yet but eventually will at some point in time during the observation period.

Figure 3.2: Italian municipalities affected by the SR policy and the DC policy. The figure displays the Italian municipalities affected by at least one SR policy (in blue), at least one DC policy (in red), and at least one of both policies (in purple), up to the first semester of 2019. Source: Our elaboration on ANBSC and Ministry of Interior data. ANBSC, Agenzia Nazionale per l'amministrazione e la destinazione dei Beni Sequestrati e Confiscati alla criminalità organizzata; DC, dismissal of city councils; SR, reassignment of confiscated assets.



$$GRHP_{tm} = \eta_m + \beta DC_{mt-1} + \gamma_t + \varepsilon_{mt} \quad (3.1)$$

$$GRHP_{tm} = \eta_m + \delta SR_{mt-1} + \gamma_t + \varepsilon_{mt} \quad (3.2)$$

More in detail, we control for the simultaneous causality between the two antimafia policies in the outcome:

$$GRHP_{tm} = \eta_m + \beta DC_{mt-1} + \delta SR_{mt-1} + \gamma_t + \varepsilon_{mt} \quad (3.3)$$

Figure 3.3: Italian municipalities affected by DC and SR policies over time. Source: Our elaboration on Ministry of Interior and ANBSC data. ANBSC, Agenzia Nazionale per l'amministrazione e la destinazione dei Beni Sequestrati e Confiscati alla criminalità organizzata; DC, dismissal of city councils; SR, reassignment of confiscated assets.

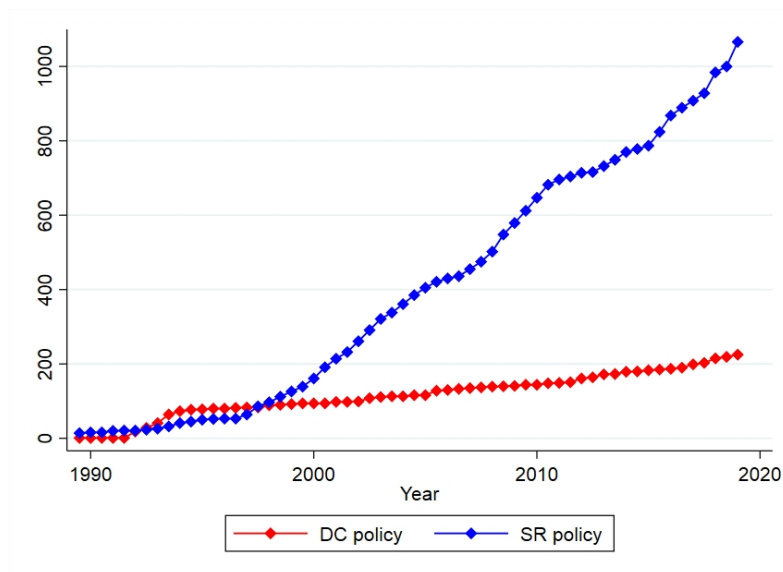
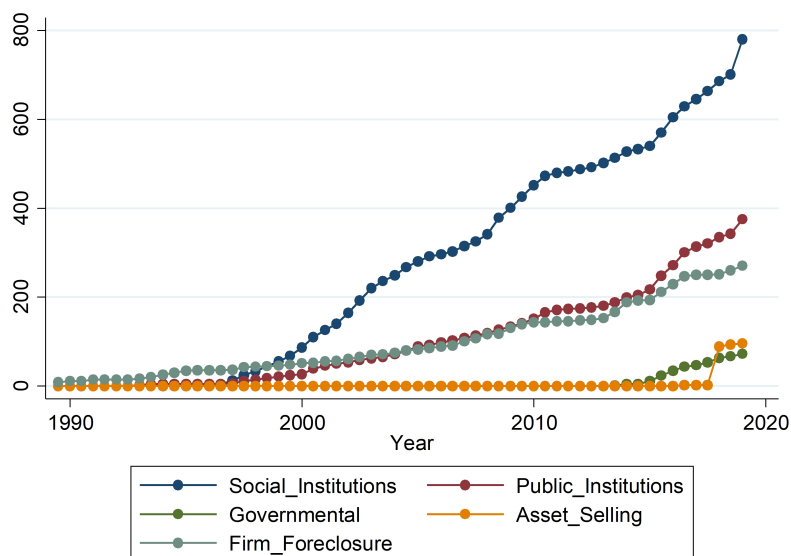


Figure 3.4: Italian municipalities affected by SR policies by reassignment purposes over time. Source: Our elaboration on ANBSC data. ANBSC, Agenzia Nazionale per l'amministrazione e la destinazione dei Beni Sequestrati e Confiscati alla criminalità organizzata; SR, reassignment of confiscated assets.



Following Ihlanfeldt and Mayock (2010), the dependent variable in all the specifications is  $GRHP$ , the growth rate of housing price in the municipality  $m$  at time  $t$ . Considering the variable in terms of percentage variation addresses and alleviates endogeneity issues inherently related to organized crime presence and property values (Ihlanfeldt and Mayock, 2010).

The variable  $DC$  ( $SR$ ) takes value 1 starting from the semester  $t$  when at least one DC ( $SR$ ) policy has been implemented in the semester prior to the release of the report on

house prices, and 0 otherwise. The coefficient  $\eta$  controls for fixed effects at the municipal level and  $\gamma$  controls for time fixed effects (at the semester level) to account, respectively, for unobserved heterogeneity across municipalities, and for common dynamics over time. The parameters  $\beta$  and  $\delta$  define the “treatment effect” on our outcome variables, indicating if and how the dissolution of a council and the reassignment of confiscated assets affect the growth rate of housing prices in the municipality where the antimafia program has been implemented. In a further specification, we decompose the variable  $SR$  in a set of dummy variables, according to the reassignment purposes (public institutions, social institutions, governmental uses, asset selling, and firm foreclosure).

The identification strategy behind this estimate is based on two main assumptions. Firstly, the parallel trends assumption requires that in the absence of any treatment, treated and untreated municipalities would have followed the same trends in the outcome variables over time. Secondly, the year in which a municipality experienced an antimafia policy is plausibly exogenous to its housing market trend, controlling for the large set of fixed effects (conditional independence assumption). Several facts support this assumption for both policies. As far as the DC policy is concerned, it consists of the dissolution of municipal councils where mafia infiltration episodes have been detected by judicial authorities. The *Commissione Parlamentare Antimafia* conducts a national-level inquiry that is kept secret until it is implemented, therefore eliminating local politicians from the probe. Similarly, behind the SR implementation, a committee of judges reviews the individual case and enacts each final judgment of confiscation independently and every provision of reassignment is examined according to the antimafia Code. In our analysis, we focus on the reassignment step, which follows the confiscation of the mafia asset and makes the measure final (while the seizure stage may be withdrawn). As evidenced by the Corte dei Conti (2016), the time gap between confiscation and reassignment may vary for each instance due to the substantial heterogeneity in disposition time among and within districts.

From the perspective of the first two assumptions, we perform an event study in the spirit of Angrist and Pischke (2008). The purpose is to test whether a statistically significant difference between municipalities treated receiving antimafia policies and non-treated municipalities arises before the actual implementation of the policy. To this end we estimate a version of equations 1 and 2 where DC and SR dummies are replaced by a full set of leads and lags, taking the semester before the treatment takes place as our reference category. This specification generates a more flexible functional form that allows for a period-to-period variation in the estimated effect of DC and SR on our outcome. The equations take the following form:

$$GRHP_{m,t+1} = \eta_m + \gamma_t + \sum_{\tau=0}^{\rho} \delta_{-\tau} POL_{m,t-\tau} + \sum_{\tau=0}^q \delta_{+\tau} D_{m,t+\tau} + \varepsilon_{m,t+1} \quad (3.4)$$

Where  $POL$  indexes the set of dummy variables for each observation period preceding

the implementation of the antimafia policy;  $D$  indexes the set of dummy variables following the implementation of the policy;  $\rho$  indexes the anticipatory effects and  $q$  indexes the post-policy effects. In our case, we consider ten periods before the implementation of the antimafia policy and ten periods after the implementation of the policy (i.e.,  $\rho = q = 10$ )

### 3.5 Results

Table 1 reports the estimation results. Specification (1) shows that the implementation of DC has no effect on the growth rate of housing prices, whereas in specification (2), SR policies are statistically associated with a higher growth rate of prices (the coefficient is equal to 0.0046 and statistically significant at the 1% level). In specification (3), we evaluate the impact of both policies, and in specification (4) we consider their joint implementation. Again, only the SR policy appears to positively affect housing prices at a statistically significant level of 0.01. The simultaneous enforcement is supposed to have a more decisive effect, but the coefficient of the interaction is not statistically significant.

A possible explanation for this result is that only those policies that affect the economic and financial interests of the mafia can effectively reduce its influence in a territory. After the SR policy, criminal groups appear to be financially vulnerable and, thus, lose legitimacy and authority in the eyes of local communities. This gives empirical support to the strategy “follow the money” (*seguì i soldi*), pursued by Judge Falcone in his fight against the mafia. Despite the economic content, the specific case of reassignment policy returning an asset to the local community compensates society for the losses deriving from the organized crime infiltration, thereby reducing the disamenities related to organized crime and increasing local amenity. This generates an increase in the rate of housing prices of about 0.5 %.

However, to further evaluate this explanation, in specification (5), we report the result for the relevant sub-categories of reassignment purposes. We find that *Public Institutions* (*Social Institutions*) is negatively (positively) associated with the dependent variable. The other reallocation types are not statistically significant. As noted in the Introduction, this dichotomous result can be explained by the negative reputation of public institutions in Italy and by the proactive role played by social institutions in urban regeneration.

### 3.6 Event study analysis

The results of the event study analysis are graphically reported in Figure 5, panel (a-b) for DC and SR. Figure 5 shows that before the implementation of either one of the policies there is very limited variation in the growth rate of house prices. Put differently, there is no significant evidence that a change in the growth rate preceded the actual enforcement of the policy, supporting the evidence of a common trend before the treatment and the absence of an anticipation effect. Rather, if any, a somewhat increasing trend is registered

Table 3.1: Estimation results. Dependent variable: Growth rate of housing prices ( $\text{€}/m^2$ ).

| Variables                  | (1)                 | (2)                   | (3)                   | (4)                   | (5)                    |
|----------------------------|---------------------|-----------------------|-----------------------|-----------------------|------------------------|
| <i>DC</i>                  | -0.0029<br>(0.0041) |                       | -0.0025<br>(0.0041)   | -0.0023<br>(0.0053)   | -0.0024<br>(0.0040)    |
| <i>SR</i>                  |                     | 0.0047***<br>(0.0014) | 0.0046***<br>(0.0014) | 0.0046***<br>(0.0015) |                        |
| <i>DR × SR</i>             |                     |                       |                       | -0.0002<br>(0.0043)   |                        |
| <i>Public_Institutions</i> |                     |                       |                       |                       | -0.0042***<br>(0.0016) |
| <i>Social_Institutions</i> |                     |                       |                       |                       | 0.0045***<br>(0.0016)  |
| <i>Governmental</i>        |                     |                       |                       |                       | -0.0010<br>(0.0025)    |
| <i>Asset_Selling</i>       |                     |                       |                       |                       | -0.0005<br>(0.0024)    |
| <i>Firm_Foreclosure</i>    |                     |                       |                       |                       | -0.0042<br>(0.0027)    |
| <i>PurposeN/A</i>          |                     |                       |                       |                       | 0.0027<br>(0.0023)     |
| Year dummies               | YES                 | YES                   | YES                   | YES                   | YES                    |
| Municipal Fes              | YES                 | YES                   | YES                   | YES                   | YES                    |
| R-squared                  | 0.1755              | 0.1759                | 0.1759                | 0.1759                | 0.1763                 |
| Observations               | 26,381              | 26,381                | 26,381                | 26,381                | 26,381                 |
| N. of municipalities       | 1,044               | 1,044                 | 1,044                 | 1,044                 | 1,044                  |

Notes : Notes: \*\*\*, \*\*, and \* denote significance at 1%, 5% and 10%. Robust standard errors clustered at municipal level in parentheses. *Public\_Institutions* includes public uses, while *Governmental* includes justice and public order purposes.

in the periods following the implementation of the policy. This is especially true for the SR policy, where we find a statistically significant effect at the third lag and after 6 lags. Indeed, in line with the main results only the SR policy generates a positive shock increasing the price of houses, since the reassignment improves local amenities of a city and is a signal of organized crime weakness.

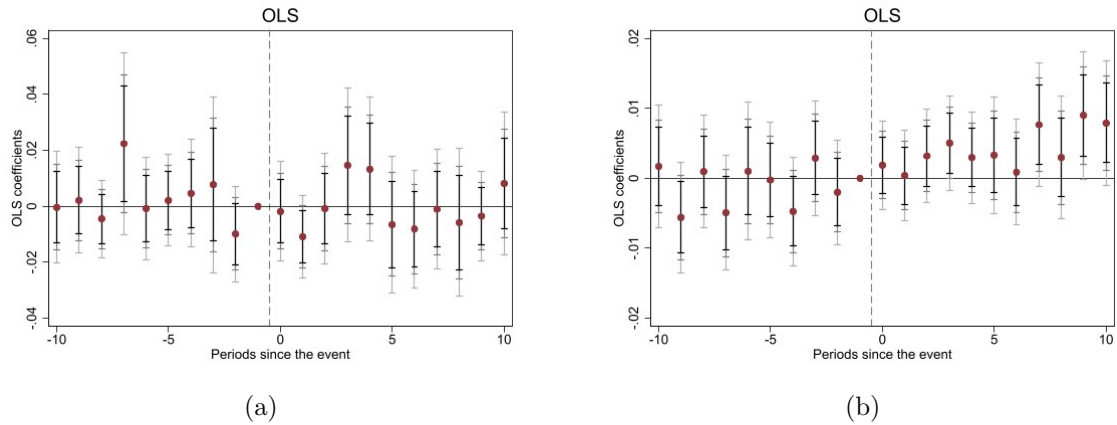


Figure 3.5: Event studies, using TWFE OLS estimation. The panels show the event study results using TWFE OLS estimation. The dependent variable is the growth rate of housing prices, GRHP. Coefficient estimates are provided together with the 90% (black), 95% (gray), and 99% (light gray) confidence intervals. (a) Panel A: DC policy and (b) Panel B: SR policy. DC, dismissal of city councils; OLS, ordinary least squares; SR, reassignment of confiscated assets; TWFE, twoway fixed effects.

### 3.7 A focus on the intensity of mafia presence

The execution and outcome of antimafia policies may also depend both on the quality of the social context and pre-existing intensity of mafia presence. For example, in areas with high mafia concentration, the outcome may be weak due to the pervasiveness of organized crime in the territory. The reassignment may result in decreased disamenities, or it may go ignored and have no impact on the local amenity stock. Under such circumstances, the negative effect of reallocation to public institutions may be exacerbated, as it can create fertile conditions for further corruption and misconduct in the public sector.

To account for this aspect, we use Calderoni (2011) Index of organized crime intensity to determine if a municipality is mafia-ridden or not. More in detail, we consider a municipality with a relatively high level of mafia intensity if it is located in the 25 most mafia-ridden provinces, according to the index. These provinces tend to be situated in the Southern regions of Italy, and account for approximately 55% of the observations. The results, displayed in Table 2, show that in municipalities located in a province with a low mafia presence, the reassignment to social purposes leads to an increase in the growth rate of prices of about 0.5%, as well as for the full sample. In contrast, the reallocations to public institutions do not seem to have any effect. We also report the negative sign of the variable *Public\_Institutions* in the sub-sample with municipalities located in highly mafia-ridden provinces (coefficient equal to -0.0040, and statistically significant at 0.05). This confirms our intuition on how the reassignment to public purposes is not inherently harmful, except in contexts in which institutions are very weak and corrupt

Table 3.2: Estimation results. Dependent variable: Growth rate of housing prices €/m<sup>2</sup>. Subsamples of mafia and non-mafia provinces.

|                            | Low-mafia context     |                      | High-mafia context  |                       |
|----------------------------|-----------------------|----------------------|---------------------|-----------------------|
|                            | (6)                   | (7)                  | (8)                 | (9)                   |
| Variables                  |                       |                      |                     |                       |
| <i>DC</i>                  | -0.0046<br>(0.0081)   | -0.0048<br>(0.0081)  | -0.0010<br>(0.0044) | -0.0011<br>(0.0043)   |
| <i>SR</i>                  | 0.0052***<br>(0.0019) |                      | 0.0027<br>(0.0022)  |                       |
| <i>Public_Institutions</i> |                       | -0.0028<br>(0.0031)  |                     | -0.0040**<br>(0.0019) |
| <i>Social_Institutions</i> |                       | 0.0047**<br>(0.0021) |                     | 0.0043**<br>(0.0022)  |
| <i>Governmental</i>        |                       | -0.0027<br>(0.0027)  |                     | -0.0005<br>(0.0035)   |
| <i>Asset_Selling</i>       |                       | -0.0018<br>(0.0031)  |                     | 0.0015<br>(0.0034)    |
| <i>Firm_Foreclosure</i>    |                       | 0.0029<br>(0.0048)   |                     | -0.0048<br>(0.0031)   |
| <i>PurposeN/A</i>          |                       | 0.0054*<br>(0.0033)  |                     | -0.0008<br>(0.0030)   |
| Year dummies               | YES                   | YES                  | YES                 | YES                   |
| Municipal Fes              | YES                   | YES                  | YES                 | YES                   |
| R-squared                  | 0.1690                | 0.1694               | 0.1822              | 0.1829                |
| Observations               | 11,715                | 11,715               | 14,666              | 14,666                |
| Number of municipalities   | 471                   | 471                  | 573                 | 573                   |

Notes : \*\*\*, \*\*, and \* denote significance at 1%, 5% and 10%. Robust standard errors in parentheses. Public\_Institutions includes public uses, while Governmental includes justice and public order purposes. High-mafia context = first 25 Italian provinces according to the mafia-index of Calderoni (2011).

### 3.8 Potential mechanisms: discussion

The findings coming from both the static and dynamic settings reveal that the SR policy is more effective in generating economic value as measured by the growth of housing prices. As for the specific mechanism underlying our empirical evidence, as aforementioned, admittedly a clear-cut explanation is not provided in this analysis. Indeed, due to both



the very nature of the mafia and the availability of reliable data, a proper first-stage study on how public policy affects the mafia is currently not feasible. However, we briefly discuss here three main possible mechanisms compatible with our results. More specifically, we further elaborate on our interpretation of the significant impact of the SR policy versus the substantially null effect of DC policy, providing both anecdotal evidence and qualitative analysis backing them.

First, we hypothesize that seizing the mafia's assets is a more effective way to reduce the economic mafia power compared to the alternative DC policy because once the mafia's pressure on territories is (at least partially) released, then the change in the economic environment fosters economic development (Calamunci and Drago, 2021; Calamunci et al, 2022). This, in turn, increases housing pressure (Beer et al., 2007) in territories formerly affected by the mafia presence; hence, the registered positive effect of SR policy on the growth rate of home prices. Specifically, SR policy somewhat returns added value to the community, in the form of social service as compensation for the damage suffered by the community due to the mafia presence.<sup>11</sup> Put in the words of the director of the ANBSC, the prefect Corda: "the symbolic value of the confiscation of illicitly accumulated assets, belonging to mafia, is full only when it is effectively returned and reused by citizens who, until recently, in those same assets they read the symbol of criminal power".<sup>12</sup> The existence of a lagged effect in this regard could be interpreted in the sense that the antimafia policies are to be considered a process, rather than an event. Indeed, while quite often they substantiate into very public events with high visibility echoed by mass media, it might reasonably take some time before people learn that, as a consequence of a cumulative process stimulated by the policy, the mafia has reduced capacity. Moreover, the released pressure of the mafia leaves more room for the development of social capital which, again, requires time to be appreciable and capable of producing significant effects. Overall, the evidence seems to confirm that the SR policy would generate such a socio-economic impulse in the community and territory affected by the plague of mafia presence.

Second, on a similar premise, one could argue that the reassignment of assets fosters local investments also due to increased social capital (Hansen, 1965; Faguet, 2002).<sup>13</sup> In fact, seized properties serve as a kind of cultural testament of public ethics in addition

---

<sup>11</sup>Several examples bear witness that the redevelopment of confiscated assets represents an excellent opportunity for economic and social development. For instance, the social cooperative Pio La Torre that manages 180 hectares of land, used to cultivate cereals, legumes, grapes, nettles and olives following the concept of sustainability and taking care of the job placement of disadvantaged people, thus creating employment opportunities. Read here for other good practices: <https://www.fondazioneconilsud.it/news/beni-confiscati-17-nuovi-progetti-al-sud/>

<sup>12</sup>Translated from Italian. <https://www.interno.gov.it/it/notizie/anbsc-prefetto-corda-valore-simbolico-dei-beni-confiscati-e-pieno-quando-sono-riconsegnati-e-riutilizzati-dai-cittadini>

<sup>13</sup>During the COVID pandemic, in these places some public initiatives were organized to help local population: <https://www.confiscatibene.it/blog/i-beni-confiscati-riutilizzati-finalit%C3%A0-sociali-palestre-di-vita-tempo-di-pandemia>

to having inherent economic and social content.<sup>14</sup> Their improvement, therefore, might provide the basis for the regeneration of the local areas from an urban, social, and cultural perspective. This regeneration results in positive effects for both local development and house price growth. Admittedly, it is worth noticing here that places that are viewed as having a higher potential for future development are more likely to attract investment from social services compared to places with a substantially lower potential, where likely only government agencies are willing to step in. Hence, it should not be overlooked that the effectiveness of the policy can be influenced by the degree of responsiveness of local communities.

Lastly, one could argue that the observed effects stem from the fact that the presence of the mafia might have a detrimental effect on the territories with mafia-owned places (and/or surrounding estates) making them more prone to degradation and criminal use (e.g. drug dealing and/or consumption). Once the presence of the mafia is at least reduced, the places treated with antimafia policies register (i) a reduction in their degree of degradation and, therefore, (ii) an increase in the growth rate of estates' prices. However, in critically assessing this argument, it is worth noticing that the presence of mafia assets per se does not imply a generalized urban decay. Indeed, on the contrary: "some confiscated assets are then *materially* cultural assets, buildings of artistic value or works of art stolen from organized crime and can become instruments of redemption and education in beauty".<sup>15</sup> Either way, the seizure and reassignment of mafia assets is potentially able to start a process of urban regeneration improving neighborhood amenities, which, in turn, are reflected in growing housing prices. In conclusion, we deem that the aforementioned mechanisms might well be operating simultaneously and, furthermore, the attempt to disentangle the effect of each and all is a rather complex exercise that we leave for further research.

### 3.9 Diagnostic tests and alternative estimator

In this section, we provide a series of robustness through the estimation of a set of diagnostics tests. Following de Chaisemartin and d'Haultfoeuille (2020), we first estimate how much of the treatment impact is due to negative weights, and we then decompose our data to evaluate how much of the treatment effect is due to changes at different group-time as Goodman-Bacon (2021). Then, we introduce the new DiD estimation techniques, which were developed by the econometric literature to tackle the econometric issues related to the usual Two-Way Fixed Effects (TWFE) as our baseline specification. Finally, we move from a binary DiD approach to a continuous case.

---

<sup>14</sup>There are several cases of good experiences such as the Parco Ammaturo, Parco della legalità con auditorium, Fattoria Didattica ex Zaza, Ludoteca isola rossa, etc. See Transcrime (2013b) for additional information.

<sup>15</sup>See Confiscati bene 2.0. <https://www.confiscatibene.it/>

### 3.9.1 Decomposition estimates

Standard panel DiD techniques have lately been called into doubt (among others, Borusyak and Jaravel 2017; Goodman-Bacon 2021; de Chaisemartin and d’Haultfoeuille 2020; Callaway and Sant’Anna 2021) because of treatment heterogeneity. Thus, our DiD results may be biased since municipalities treated at multiple points in time may generate an average of treatment effects across all municipalities groups and periods, where non-convex weights can occur. These negative weights bias the results away from the true treatment effect sign (de Chaisemartin and d’Haultfoeuille, 2020), with certain treatment effects having more weight than others (Goodman-Bacon, 2021). To address these issues, we first estimate the weights attached to each of the average treatments effects on treated (ATTs) to compute the overall  $\beta$  and  $\delta$  estimates (equations 1 and 2), using the *twowayfweights* command, developed by de Chaisemartin et al., 2020 and available in STATA repository.

Table 3 shows the percentage of all ATT estimations with a negative weight as well as the sum of negative weights. Focusing on DC (SR) policy, we find that 63% (65%) are strictly positive and 37% (35%) are strictly negative. Similarly, the sum of the positive weights is equal to 1.0844 (1.4037), while the amount of negative weights is equal to -0.0026 (-0.0027). It is worth considering two diagnostic measures able to further assess the validity of our estimate.<sup>16</sup> The first diagnostic measure,  $\underline{\sigma}_{fe}$  suggests that  $\beta$  ( $\delta$ ) and the ATT may be of different signs if the standard deviation of the average treatment effects deriving from DC (SR) policy across treated municipalities and semester is above to 0.0012 and 0.0023 respectively; while the second one,  $\underline{\underline{\sigma}}_{fe}$ , indicates that  $\beta$  ( $\delta$ ) may be of an opposite sign than the average treatment effects of DC (SR) policy in each municipality if the standard deviation of those effects is above to 0.0144 and 0.0046.

Second, we decompose our data based on the model developed by Goodman-Bacon (2021). Specifically, we re-estimate the DiD models for DC and SR policies, and the two cases of SR policies that are statistically significant in specification (5).

In Table 4 we report the DiD estimates as a weighted average of all possible two-group/two-period DiD estimators, along with the different combinations of units treated at different times.<sup>17</sup> In Figure 6, we plot the time-decomposed DiD estimates against their weights.<sup>18</sup> Rather than relying on single grouping, we detect different sets of treatment and control groups. So, we depict the heterogeneity of the several components and show their different contribute to our estimations. As a result, we provide a more nuanced picture in Table 4. The variable *DC* has a generalized negative sign across different groupings except for the *Treated vs. Already Treated* grouping. Hence, in municipalities

<sup>16</sup>For details and definitions see Corollary 1 in de Chaisemartin and d’Haultfoeuille (2020).

<sup>17</sup>One limitation of this method is the impossibility to do it for an unbalanced sample. For this reason, we did this exercise using a restricted balanced panel.

<sup>18</sup>Generally speaking, the weights depend on the sub-sample share represented by each group and the time of treatment. For details on the weights and weighting procedure, see Goodman-Bacon (2021, p.8).

Table 3.3: Diagnostic Test: de Chaisemartin and dHaultfoeuille (2020)

| Variable                              | <i>GRHP</i> |           |
|---------------------------------------|-------------|-----------|
| Mean of dep. Var                      | 0.007       |           |
| St. dev. of dep. Var                  | 0.057       |           |
| Variable                              | <i>DC</i>   | <i>SR</i> |
| % ATTs with negative weights          | 36.97       | 35.15     |
| % ATTs with positive weights          | 63.03       | 64.85     |
| Sum of negative weights               | -0.0026     | -0.0027   |
| $\underline{\sigma}_{fe}$             | 0.0012      | 0.0023    |
| $\underline{\underline{\sigma}}_{fe}$ | 0.0144      | 0.0046    |

*Notes* : The dependent variable is the Growth Rate of Housing Prices, GRHP. Standard errors (corrected for heteroskedasticity and clustered at the municipality level) are reported in parentheses. The symbols \*\*\*, \*\* and \* indicate respectively that coefficients are statistically significant at the 1%, 5% and 10% level.

treated with *DC* antimafia policies, we generally observe a lower growth rate of house prices. Put differently, houses located in municipalities where the presence of the mafia has been ascertained and addressed by *DC* policy measures, systematically show a lower price growth trend compared to homogenous houses in those municipalities not subjected to any intervention. The most significant grouping in terms of weights is the *Treated vs. Never Treated* (weight equal to 0.842). A similar pattern applies to *Public Institutions*. However, the variables *SR* and *Social Institutions* follow a different pattern. Indeed, both variables have a positive sign without exceptions. In terms of weights the highest relative importance is registered for the *Treated vs. Already Treated* and *Treated vs. Never Treated*, for *SR* and *Social Institutions* (weight equal to 0.494 and 0.421, respectively).

Finally, by summing up the weights on the timing comparison *versus* the treated/untreated weights, this decomposition allows us to determine how much of the variation comes from the time effect. In the case at hand, timing matters most for the variable *SR* (sum of weights equals to 0.890), and to a lesser extent for *DC*, *Public\_Institutions*, and *Social\_Institutions* (respectively, 0.157, 0.212, and 0.579).

### 3.9.2 Alternative estimator

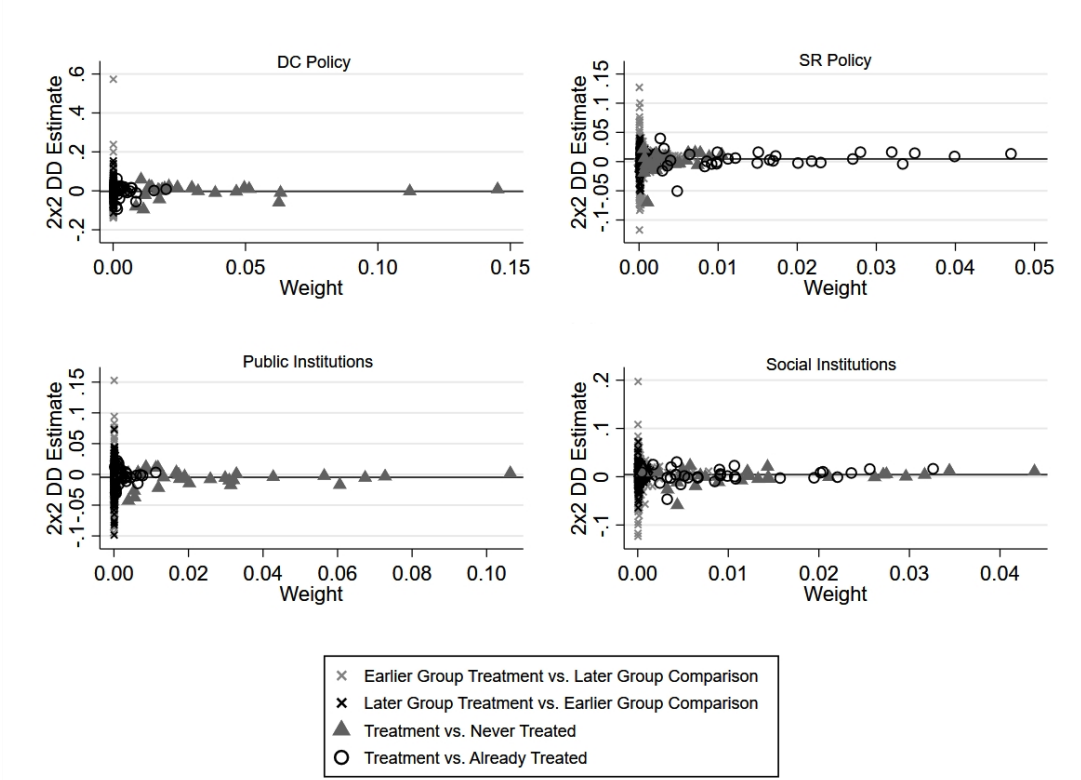
The econometric challenges related to the TWFE apply also in the event study context. Indeed, even in a dynamic staggered situation, the coefficient on a specific lead or lag might be tainted by impacts from previous periods (Sun and Abraham, 2021), making difficult also the testing for the parallel trend assumption. Several estimators have been recently proposed to modify the set of units that can be used as effective comparison

Table 3.4: DiD decomposition for *GRHP* and selected antimafia policy.

|                              | <i>DC</i>         | <i>SR</i>        | <i>PublicInstitutions</i> | <i>SocialInstitutions</i> |
|------------------------------|-------------------|------------------|---------------------------|---------------------------|
| <i>Earlier T vs. Later C</i> | -0.010<br>(0.024) | 0.004<br>(0.229) | -0.004<br>(0.078)         | 0.006<br>(0.165)          |
| <i>Later T vs. Earlier C</i> | -0.002<br>(0.017) | 0.002<br>(0.167) | -0.003<br>(0.051)         | 0.005<br>(0.101)          |
| <i>T. vs NeverTreated</i>    | -0.003<br>(0.842) | 0.003<br>(0.110) | -0.005<br>(0.788)         | 0.003<br>(0.421)          |
| <i>T. vs Already Treated</i> | 0.001<br>(0.116)  | 0.006<br>(0.494) | -0.002<br>(0.083)         | 0.006<br>(0.313)          |
| DiD estimate                 | -0.003            | 0.004            | -0.005                    | 0.004                     |

Notes : *GRHP* denotes the Growth Rate of Housing Prices(€/m<sup>2</sup>). *T* = Treatment; *C* = Comparison. The table reports both the average and the decomposition of DiD estimates using the Goodman-Bacon (2021) procedure (weights in parenthesis). The DiD estimate refers to the case in which each policy is individually considered in a simple DiD exercise, that is without the simultaneous effect of other policies.

Figure 3.6: DiD decomposition for *GRHP* and selected antimafia policies. The figure plots each 2 × 2 DiD components following GoodmanBacon (2021) procedure against their weight. *DC*, dismissal of city councils; DiD, differenceindifferences; *GRHP*, growth rate of housing price; *SR*, reassignment of confiscated assets.



units in the estimation process (Sun and Abraham, 2021; Callaway and Sant’Anna, 2021; Gardner, 2021; de Chaisemartin and d’Haultfoeuille, 2020). However, there is no commonly accepted strategy among the new alternatives, although Baker et al. (2022) advise incorporating at least one among the new ways as the robustness of inference.

Therefore, we employ the alternative estimator established by de Chaisemartin and d’Haultfoeuille (2020),<sup>19</sup> which is robust to heterogeneous or dynamic treatment effects. This method has two main advantages. Firstly, it does not rely on constant treatment effect assumption across groups and time, and secondly, it is robust to negative-weighting issues. In this setting, the instantaneous treatment effect is defined as the average of simple DiD estimations that compare groups that have been treated for the first time with those who have not been treated yet from one previous semester to the following one, while the dynamic effect by the weighted average cumulative effects of simple DiD estimations.<sup>20</sup> Similarly, the parallel trends assumption is tested through the generation of “placebo estimators” comparing treated municipalities when they are not yet treated compared to untreated ones in the control group in the same period, between two consecutive periods.

Notwithstanding, the main disadvantage of the de Chaisemartin and d’Haultfoeuille estimator is represented by the fact that it requires more data than the standard approach. For example, it requires leads and lags for untreated units to characterize both the dynamic change attributable to the treatment effect and the placebo effect, producing greater standard deviations than the TWFE estimator.<sup>21</sup>

Figure 7, panels (a) and (b), displays the point estimates up to 10 semesters before/after the municipality experiences a DC or SR policy. Overall, the panels provide strong robustness, validating our empirical design. Indeed, there is no discernible pattern in the pre-trend point estimates. In keeping with the primary findings, for the DC policy no dynamic effects are detected, whilst for the SR policy, the dynamic effects begin to rise and become statistically significant after 6 semesters. Overall, the results are in line with those based on the classic event study.

### 3.9.3 Continuous case

The literature related to DiD strategy and causal inference method, in general, is mostly based on binary treatment variables. However, sometimes the same units of analysis register multiple treatments making the discrete approach too simple. For example, many empirical applications deal with a treatment that does not just “switch on”, but rather has

---

<sup>19</sup>We use the *did\_multiplegt* package available in Stata repository (de Chaisemartin et al., 2019).

<sup>20</sup>In our context, we compute DiD by comparing the evolution of the outcome over two consecutive semesters across municipalities whose treatment varies between semesters and municipalities whose treatment does not vary.

<sup>21</sup>Chareyron et al. (2020) correctly point out that there exists a variance-bias trade-off. It is because the TWFE decreases variance while improving the inference accuracy, whilst the de Chaisemartin and d’Haultfoeuille estimator mitigates bias owing to heterogeneous treatment effects.

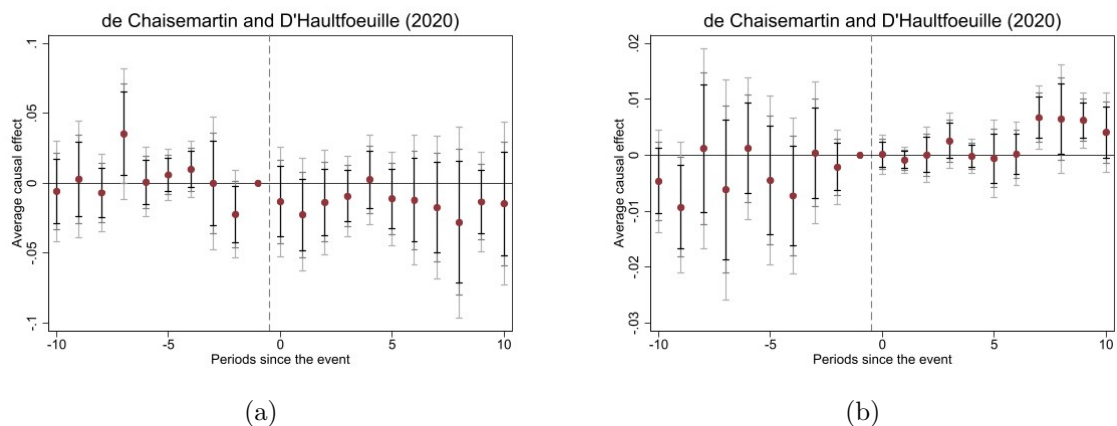


Figure 3.7: Event studies, using de Chaisemartin and d’Haultfoeuille (2022a) methodology. The panels show the event study results, implemented through the estimator developed by de Chaisemartin and d’Haultfoeuille (2022a). The dependent variable is the growth rate of housing prices, GRHP. Coefficient estimates are provided together with the 90% (black), 95% (gray), and 99% (light gray) confidence intervals. (a) Panel A: DC policy and (b) Panel B: SR policy. DC, dismissal of city councils; SR, reassignment of confiscated assets.

a “dose” response or function at varying intensities (Callaway et al., 2021). Our context is the case: a municipality could be interested by several episodes of reassignment and not just one. Hence, the binary approach is able to capture the effect of just one episode of reassignment in which the treatment switches to 1 and does not change, representing a limitation.

Recently, the stream of literature studying the advancement in the econometric issues related to the standard TWFE approach, among the mentioned methods for the binary (staggered) case, also introduced the possibility of the continuous case. Even in the presence of several treatments, the treatment coefficients may not be robust to heterogeneous effects and be contaminated by the effects of the treatment occurring with different intensities and time.

For this instance, Callaway et al. (2021) and de Chaisemartin and D’Haultfoeuille (2022), de Chaisemartin and D’Haultfoeuille (2022) propose alternative DID estimators that are robust to heterogeneous effects and do not suffer from the contamination problem.

The de Chaisemartin and D’Haultfoeuille estimator, in addition to the binary treatment that switches on and off, can be used with a continuous and staggered treatment (groups begin treatment at different dates, with varying intensities, but once a group is treated, its treatment status never changes).

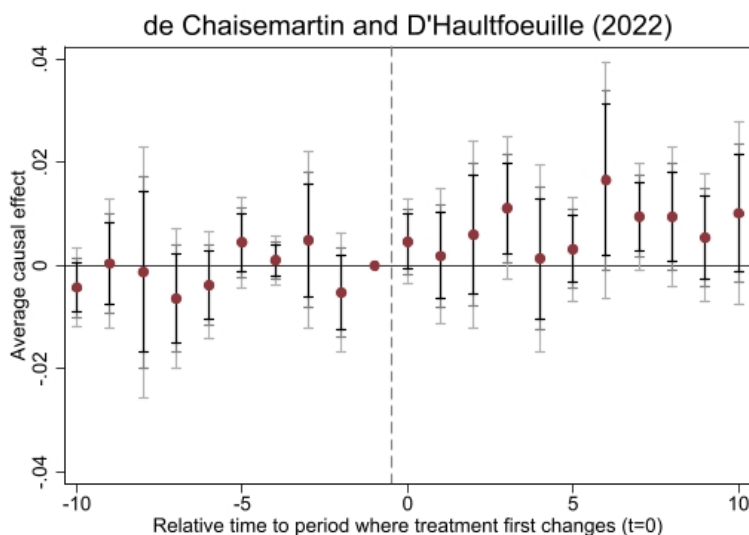
To corroborate the interpretation of our baseline results and overcome the binary setting limitations, following this approach, and using the *did\_multiplot* command, we move from the binary context to the continuous one, where the dummy variable SR is replaced by a variable that accounts for the number of reassignments that are registered in each municipality every semester.<sup>22</sup> We apply this approach for the SR policy, as in

<sup>22</sup>In our setting, consider a municipality  $n$  with a treatment sequence of this type: 0 0 1 0 3 3. It

many municipalities the seizure and reassignment measures are enforced more than once in time, and many assets can be reallocated at the same moment.

Figure 8 reports the result. Overall, we provide strong robustness since we have dealt with the treatment structure, the timing problem, and the dynamic effects. To the right of zero, the figure shows the cumulative effect of a reassignment policy on the growth rate of house prices, from the year of the first change onward. We observe a positive dynamic, that starts to be increasing immediately and becomes significant in the third period. To the left, the figure shows the placebo estimators, which should not significantly differ from 0 if the condition of the parallel trend is satisfied. The estimation is weighted by the population in each municipality-group  $\times$  year.

Figure 3.8: Event studies, using de Chaisemartin and d’Haultfoeuille (2022a, 2022b) methodology: continuous case-SR policies. The figure shows the event study results, implemented through the continuouscase methodology developed by de Chaisemartin and d’Haultfoeuille (2022a, 2022b). The dependent variable is the Growth Rate in House Prices, GRHP. Coefficient estimates are provided together with the 90% (black), 95% (gray), and 99% (light gray) confidence intervals. SR, reassignment of confiscated assets



### 3.10 Conclusions

Several legislative measures aiming at eradicating organized crime have been implemented in Italy over the last thirty years. Among them, two antimafia policies stand out: the dismissal of municipal councils for mafia infiltration and the reassignment to a new destination of property confiscated from mafia members. This paper investigates whether the experiences a first event in the third period. From that period onward, it is part of the treatment group. Then, the command estimates the cumulative effects of all its current past treatments. For instance, at period 5, the command estimates its effect of having 3 reassignments today plus having had 1 reassignment one period ago. In this way, we are able to assess the cumulative effect of the policy.



implementation of these policies has had an impact on the growth in real estate prices between 2002 and 2019.

Our results do not detect any significant effect on the dynamics of housing prices due to the implementation of the DC policy. By contrast, we find that the impact of the SR policy on real estate values depends on the specific reallocation purpose. When confiscated assets are reassigned to social institutions, we observe an increase in the growth rate of residential property prices, whereas reallocations to public institutions appears to have an opposite sign, but only where the presence of criminal organizations is stronger.

Although these results call for further investigation at a more granular level, our analysis provides robust empirical evidence that house prices do react to antimafia measures, particularly to the SR policy. In this regard, we argue that its effectiveness depends on how the socioeconomic reintegration of confiscated assets is realized through different potential mechanisms promoting investment, local development, and urban regeneration. Social institutions seem to actively contribute to the desired goal of policy, as reflected by the positive effect on real estate prices triggered by reassignments to social purposes.

Overall, the paper deals with the policy assessment of legislative measures undertaken to address issues related to organized crime that are relevant to the social and economic fabric plagued by its presence not just in Italy, but also around the world. Indeed, legislators in many countries have used comparable legal tools such as asset freeze, seizure, and confiscation UNODC (2017) of criminal property mimicking the Italian model, as well as the spread of an antimafia culture, to protect the legitimate economy from organized crime infiltration.

The battle against criminal organization is central to the international policy agenda, both unilaterally and through international security cooperation. The main policy implications that can be drawn is that central and local governments should be more involved in the activities of civic interest groups and associations, and promote the work of social institutions in local communities. The design of antimafia policies should take full account of the spontaneous reaction of civil society against criminal organizations and people's willingness to engage in collective action. We believe these further efforts are necessary to develop and maintain a culture of lawfulness, engaging in a successful pathway of urban and territory regeneration.<sup>23</sup> This is even more relevant since other studies (Eriksson et al., 2016; Mihinjac and Saville, 2020), settled in unlawful contexts, highlight the importance of background and neighborhood as drivers that may foster resilience to criminal activity.

The evaluation of antimafia policies might thus offer substantial insights to policymakers. The most effective way to generate public value in areas plagued by mafia-type organizations is through nurturing social capital. Moreover, the empirical analysis detects lagged effects testifying that this creation of social capital must be considered a process

---

<sup>23</sup>For a more thorough study on the role of civil society against the mafia, see Cayli (2013).

rather than an event. We believe this is the ultimate solution to effectively undermine the control exerted by the mafia on local communities and thus contribute to creating a successful pathway for urban and territory regeneration.

## References

- Acconcia, A., Corsetti, G., and Simonelli, S. (2014). Mafia and public spending: Evidence on the fiscal multiplier from a quasiexperiment. *American Economic Review*, 104(7), 2185-2209.
- Agenzia delle Entrate. (2020). Rapporto immobiliare 2020. Il Settore Residenziale (Technical Report).
- Angrist, J. D., and Pischke, J.-S. (2008). *Mostly harmless econometrics*. Princeton University Press.
- Arlacchi, P. (1983). La mafia imprenditrice: l'etica mafiosa e lo spirito del capitalismo. Il Mulino.
- Baker, A. C., Larcker, D. F., and Wang, C. C. Y. (2022). How much should we trust staggered difference-in-differences estimates? *Journal of Financial Economics*, 144(2), 370-395.
- Banca d'Italia'Italia. (2019). La ricchezza delle famiglie e delle società non finanziarie italiane 2005-2017 (Report).
- 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.
- Battisti, M., Bernardo, G., Lavezzi, A. M., and Maggio, G. (2022). Shooting down the price: Evidence from mafia homicides and housing prices. *Papers in Regional Science*.
- Beer, A., Kearins, B., and Pieters, H. (2007). Housing affordability and planning in Australia: The challenge of policy under neoliberalism. *Housing Studies*, 22(1), 11-24.
- Berrittella, M. (2018). Organized crime and public spending: A panel data analysis. *Economics of Governance*, 19(2), 119-140.
- Borusyak, K., and Jaravel, X. (2017). Revisiting event study designs [Working Paper]. Available at SSRN 2826228.
- Bradbury, J. C. (2022). Does hosting a professional sports team benefit the local community? Evidence from property assessments. *Economics of Governance*, 23, 219-252.

- 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.
- Butts, K., and Gardner, J. (2021). did2s: Two-stage difference-in-differences. *arXiv preprint arXiv:2109.05913*.
- Calamunci, F., and Drago, F. (2020). The economic impact of organized crime infiltration in the legal economy: Evidence from the judicial administration of organized crime firms. *Italian Economic Journal*, 6(2), 275-297.
- Calamunci, F. M. (2022). What happens in criminal firms after godfather management removal? Judicial administration and firms' performance. *Small Business Economics*, 58(1), 565-591.
- Calamunci, F. M., Ferrante, L., and Scebba, R. (2022). Closed for mafia: Evidence from the removal of mafia firms on commercial property values. *Journal of Regional Science*, 62, 1487-1511.
- Calderoni, F. (2011). Where is the mafia in Italy? Measuring the presence of the mafia across Italian provinces. *Global Crime*, 12(1), 41-69.
- Callaway, B., Goodman-Bacon, A., and Sant'Anna, P. H. (2021). Difference-in-differences with a continuous treatment. *arXiv preprint arXiv:2107.02637*.
- Callaway, B., and Sant'Anna, P. H. C. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2), 200-230.
- Cannari, L., D'Alessio, G., and Vecchi, G. (2016). I prezzi delle abitazioni in Italia, 1927-2012. *Bank of Italy Occasional Paper*, 333.
- Cayli, B. (2013). Italian civil society against the mafia: From perceptions to expectations. *International Journal of Law, Crime and Justice*, 41(1), 81-99.
- Chareyron, S., Goffette-Nagot, F., and Letrouit, L. (2020). Impacts of a French urban renewal program on local housing markets. *GATE WP*.
- Corrado, G., and Rossetti, F. (2018). Public corruption: A study across regions in Italy. *Journal of Policy Modeling*, 40(6), 1126-1139.
- Corte dei Conti. (2016). L'amministrazione dei beni sequestrati e confiscati alla criminalità organizzata e l'attività dell'agenzia nazionale. deliberazione 23 giugno 2016, n. 5/2016/g (Technical Report).
- Costa, A. M. (2010). The economics of crime: A discipline to be invented and a Nobel Prize to be awarded. *Journal of Policy Modeling*, 32(5), 648-661.

- 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 Chaisemartin, C., and D’Haultfoeuille, X. (2022a). Two-way fixed effects and differences-in-differences estimators with several treatments. Technical report, *National Bureau of Economic Research*.
- de Chaisemartin, C., and D’Haultfoeuille, X. (2022b). Difference-in-differences estimators of intertemporal treatment effects. Technical report, *National Bureau of Economic Research*.
- de Chaisemartin, C., D’Haultfoeuille, X., and Deeb, A. (2020). *Twowayfeweights*: Stata module to estimate the weights and measure of robustness to treatment effect heterogeneity attached to two-way fixed effects regressions.
- de Chaisemartin, C., d’Haultfoeuille, X., and Guyonvarch, Y. (2019). *DID\_MULTIPLEGT*: Stata module to estimate sharp difference-in-difference designs with multiple groups and periods. Statistical Software Components S458643. Boston College Department of Economics.
- De Feo, G., and De Luca, G. D. (2017). Mafia in the ballot box. *American Economic Journal: Economic Policy*, 9(3), 134-167.
- Di Cataldo, M., and Mastrorocco, N. (2022). Organized crime, captured politicians, and the allocation of public resources. *The Journal of Law, Economics, and Organization*, 38(3), 774-839.
- Dugato, M., Favarin, S., and Giommoni, L. (2015). The risks and rewards of organized crime investments in real estate. *British Journal of Criminology*, 55(5), 944-965.
- Elsenbroich, C. (2017). The Addio Pizzo movement: Exploring social change using agent-based modelling. *Trends in Organized Crime*, 20, 120-138.
- Eriksson, K. H., Hjalmarsson, R., Lindquist, M. J., and Sandberg, A. (2016). The importance of family background and neighborhood effects as determinants of crime. *Journal of Population Economics*, 29, 219-262.
- Esposito, P., and Ricci, P. (2015). How to turn public (dis) value into new public value? Evidence from Italy. *Public Money and Management*, 35(3), 227-231.

- Faguet, J. P. (2002). The determinants of central vs. local government investment: Institutions and politics matter. *LSE Development Studies Institute Working Paper*, 02-38.
- Falcone, G. (1991). *Cose di cosa nostra*, in collaborazione con Marcelle Padovani. Milano: Biblioteca Universale Rizzoli.
- Fenizia, A., and Saggio, R. (2022). Organized crime and economic growth: Evidence from municipalities infiltrated by the mafia [Working paper]. Available at [https://www.dropbox.com/s/w51rv7z9b9610i1/Mafia\\_DB\\_version\\_December\\_2022.pdf?dl=1](https://www.dropbox.com/s/w51rv7z9b9610i1/Mafia_DB_version_December_2022.pdf?dl=1)
- Ferrante, L., Fontana, S., and Reito, F. (2021a). Mafia and bricks: Unfair competition in local markets and policy interventions. *Small Business Economics*, 56(4), 1461-1484.
- Ferrante, L., Reito, F., Spagano, S., and Torrisi, G. (2021b). Shall we follow the money? antimafia policies and electoral competition. *Journal of Policy Modeling*, 43(5), 1110-1130.
- Galletta, S. (2017). Law enforcement, municipal budgets and spillover effects: Evidence from a quasiexperiment in Italy. *Journal of Urban Economics*, 101, 90-105.
- Gambetta, D. (1993). *The Sicilian mafia: The business of private protection*. Harvard University Press.
- Gibbons, S. (2004). The costs of urban property crime. *The Economic Journal*, 114(499), F441-F463.
- Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, 225(2), 254-277.
- Hansen, N. M. (1965). The structure and determinants of local public investment expenditures. *The Review of Economics and Statistics*, 47, 150-162.
- Ihlanfeldt, K., and Mayock, T. (2010). Panel data estimates of the effects of different types of crime on housing prices. *Regional Science and Urban Economics*, 40(2-3), 161-172.
- Lupo, S. (2009). *History of the mafia*. Columbia University Press.
- Lynch, A. K., and Rasmussen, D. W. (2001). Measuring the impact of crime on house prices. *Applied Economics*, 33(15), 1981-1989.
- Mangialardo, A., and Micelli, E. (2016). Social capital and public policies for commons: Bottom up processes in public real estate property valorization. *Procedia-Social and Behavioral Sciences*, 223, 175-180.

- Manzoli, E., and Mocetti, S. (2019). The house price gradient: Evidence from Italian cities. *Italian Economic Journal*, 5(2), 281-305.
- Mihinjac, M., and Saville, G. (2020). *Crime and fear in hollygrove-Building neighborhood resilience*. In V. Ceccato and M. K. Nalla (Eds.), *Crime and fear in public places* (pp. 379-400). Routledge.
- Naheem, M. A. (2017). Money laundering and illicit flows from China-The real estate problem. *Journal of Money Laundering Control*, 20, 15-26.
- Nelen, H. (2008). Real estate and serious forms of crime. *International Journal of Social Economics*, 35, 751-762.
- Operti, E. (2018). Tough on criminal wealth? Exploring the link between organized crime's asset confiscation and regional entrepreneurship. *Small Business Economics*, 51(2), 321-335.
- Paoli, L. (2003). *Broken bonds: Mafia and politics in Sicily*. In R. Godson (Ed.), *Menace to society: Political-criminal collaboration around the world* (pp. 27-70). Routledge.
- Pinotti, P. (2015). The economic costs of organised crime: Evidence from Southern Italy. *The Economic Journal*, 125(586), F203-F232.
- Pinotti, P. (2020). The credibility revolution in the empirical analysis of crime. *Italian Economic Journal*, 6(2), 207-220.
- Pope, D. G., and Pope, J. C. (2012). Crime and property values: Evidence from the 1990s crime drop. *Regional Science and Urban Economics*, 42(1-2), 177-188.
- Rosen, S. (1974). Hedonic prices and implicit markets: Product differentiation in pure competition. *Journal of Political Economy*, 82(1), 34-55.
- Schneider, S. (2004). Organized crime, money laundering, and the real estate market in Canada. *Journal of Property Research*, 21(2), 99-118.
- Scognamiglio, A. (2018). When the mafia comes to town. *European Journal of Political Economy*, 55, 573-590.
- Shelley, L. I. (1994). Mafia and the Italian state: The historical roots of the current crisis. *Sociological Forum*, 9(4), 661-672.
- Skaperdas, S. (2001). The political economy of organized crime: Providing protection when the state does not. *Economics of Governance*, 2(3), 173-202.
- Sun, L., and Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2), 175-199.

- Thomas, A. (2004). The rise of social cooperatives in Italy. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, 15(3), 243-263.
- Tita, G. E., Petras, T. L., and Greenbaum, R. T. (2006). Crime and residential choice: A neighborhood level analysis of the impact of crime on housing prices. *Journal of Quantitative Criminology*, 22(4), 299-317.
- Transcrime, C. I. (2013a). Progetto PON sicurezza 2007-2013. Gli investimenti delle mafie. <https://www.transcrime.it/investmentioc/wp-content/uploads/2017/07/Gli-investimenti-delle-mafie-1.pdf>
- Transcrime, C. I. (2013b). Progetto PON Sicurezza 2007-2013. Il riutilizzo dei beni confiscati. [https://www.transcrime.it/wp-content/uploads/2015/01/PON\\_2-Il\\_riutilizzo\\_dei\\_beni\\_confiscati-D2.3-Final.pdf](https://www.transcrime.it/wp-content/uploads/2015/01/PON_2-Il_riutilizzo_dei_beni_confiscati-D2.3-Final.pdf)
- United Nations Office on Drugs and Crime (UNODC). (2017). Effective management and disposal of seized and confiscated assets (Technical Report).
- Vaccaro, A., and Palazzo, G. (2015). Values against violence: Institutional change in societies dominated by organized crime. *Academy of Management Journal*, 58(4), 1075-1101.
- Van Dijk, J. (2007). Mafia markers: Assessing organized crime and its impact upon societies. *Trends in Organized Crime*, 10(4), 39-56.

# Chapter 4

## Empirical evidence on the impact of the Catholic Church on political participation in Italy

At the end of the 19th century, the leading proponent of the Unification process of Italy (1861), Camillo Benso, Count of Cavour, insisted on the importance of a “free Church within a free State”. As a retaliatory act to the loss of ownership over episcopal lands, a papal policy was promulgated. The *Non Expedit* Act (1874) compelled Italian Catholics to abstain from the polls in parliamentary elections of the newly formed Kingdom of Italy. This prescription lasted for almost a century until 1919, but it was the Second Vatican Council (1962-1965) that ultimately turned the tide by pushing for active participation in political life. Using a novel dataset on voter turnout and historical religiosity proxies spanning four general election years straddling the Second Vatican Council, the present thesis aims at investigating whether the shift in the Holy See attitude may have affected Italian Catholics’ civic participation. We find that in areas where citizens are more likely to abide by religious norms, electoral engagement significantly grows after the Second Vatican Council.

### 4.1 Introduction

Economic theory has recently turned its attention toward the impact of religion and religiosity on socio-economic outcomes. Following the seminal works of Iannaccone (1998), Weber (2013) and Iyer (2016), which contributed to establish the strand of literature on the *economics of religion*, several papers have investigated the impact of religious beliefs and behavior on economic growth and development (Barro and McCleary, 2003; Squicciarini, 2020), income (Paldam and Gundlach, 2013; Buser, 2015), education (Brown and



Taylor, 2007; Hungerman, 2014), crime (Moreno-Medina, 2021), insurance consumption (Chen, 2010; Auriol et al., 2020), and social cooperation (Levy and Razin, 2012).

The pervasiveness of religion pertains to an individual dimension in that it shapes the set of moral values and conducts of the believers, but it also possesses a political, economic, and social facet. Churches and religious bodies tend to fill a power vacuum in contexts where secular institutions are weak (Ferrari and Ferrari, 2015; Grzymala-Busse, 2016). For instance, the Catholic Church has steadily played a vital role throughout the history of Italy, both via its religious influence and its temporal control. This did not stop being true after the Unification of the Italian peninsula under one Nation in 1861. The Unification period marked a turning point for the Church on more than one level.

First, it coincided with a weakening of the secular power of Italian Catholic bodies due to the process of secularization operated by the Italian government. In fact, during those years, the Royal Decree n. 3036/1866, and Law n. 3848/1867 were promulgated, regulating the suppression of religious corporations and the seizure and sale of Church lands, respectively.

Second, as a reaction to this serious blow, the Holy See struck back with the promulgation of the *Non Expedit* Act (1874), advising Italian Catholics against participation in public and political life of the newly formed Kingdom of Italy. Despite this policy was formally repealed in 1919, it was the Second Vatican Council (1962-1965) that ultimately shifted the tide of the opposition of Italian Catholics institution toward believers' engagement with politics.

In the present thesis, we investigate whether the shift in the Holy See attitude may have affected Italian citizens' civic participation depending on the degree of religiosity intensity. we exploit the Second Vatican Council (1962-1965), which marked a change in the Church's view of Catholics' involvement in public life, as a breakpoint to investigate if electoral turnout – proxying citizens' engagement with politics – is affected depending on the degree of adherence to religious precepts.

This work speaks to the literature on the economics of religion and, more specifically, to the line of research focused on assessing a nexus between religious observance and voter turnout. Several contributions in the literature suggest that church attendance is positively related to political participation and that it is possible to establish a directional effect of religiosity on the probability of voting (Jones-Correa and Leal, 2001; Ammann, 2015; Gerber et al., 2016; Kurek and Fałkowski, 2022). Our analysis closely relates to the paper recently published by Kurek and Fałkowski (2022), which relies on a panel data empirical investigation and shows that in post-Communist Poland, more religious municipalities experience a higher voter turnout.

We focus on 20th-century Catholicism in Italy. Our investigation aims to empirically test how the change of the Holy See's prescription toward Catholics' involvement in public and political life impacted Italian citizens' voter turnout in general elections. We conjecture that religiosity filters political participation. More specifically, we argue that

higher religiosity – defined as intrinsic beliefs and practices of the Catholic Church – implies a stricter adherence to religious norms. Religiosity may affect voter turnout through the channel of civic associationism and social cohesion (Iannaccone, 1998; Iyer, 2016), but our hypothesis is more subtle: it is Catholics’ compliance to the Church edicts that ultimately drives their civic participation.

We hypothesize that the areas where citizens used to abide by religious precepts closely – and reasonably, where the presence of Catholic institutions was more substantial – developed a less “pro-state” view around the time of Unification and low civic participation as a byproduct. But as soon as the Holy See changed its disposition, Italian citizens’ voter turnout exhibit a significant increase. The transmission channel would be the influence of religious obedience and Catholic institutions on believers’ individual behavior.

In this perspective, we assume that after the Second Vatican Council voter turnout will be positively affected and that this increase will be relatively more prominent in the provinces and dioceses with higher religiosity.

## 4.2 Historical context

In the years following the Unification of Italy (1861), Italian Catholic authorities, whose long-lasting influence in institutional and political matters had inevitably shaped the country’s history, encouraged believers to boycott any involvement in public life. This was a direct consequence of the recent turbulent history between the Catholic Church and the newly formed Kingdom of Italy.<sup>1</sup>

In 1861, the entire Italian peninsula – including the city of Rome and the Papal States – was unified under one Nation, a constitutional monarchy. The promoters of the Unification supported a stark separation between the Kingdom of Italy and the Catholic Church. The words pronounced by Camillo Benso, Count of Cavour – one of the leading proponents of the Unification process of Italy, “free Church within a free State”, became a slogan supporting the secularist position.

The process of secularization initiated by the Italian government translated into the enactment of the suppression of religious orders and of the confiscation and sale of Church assets, regulated by the Royal Decree n. 3036/1866, and Law n. 3848/1867. These measures threatened the Holy See’s power and inevitably triggered its reaction. In retaliation for what was labeled as the “spoliation” of the Catholic Church, in 1874, a papal policy was promulgated, known as *Non Expedit*, which means “it is not expedient, it is not suitable”. Through this Act, the Church encouraged Catholics to abstain from the polls in parliamentary elections and from active participation in the political life of the Kingdom of Italy.

The Church maintained this position for decades. Only during the 1910s, did a shift in the attitude of the Holy See occur. In 1913, with the Gentiloni Pact (in Italian,

---

<sup>1</sup>For a thorough overview of the post-unification history of Catholicism in Italy, see Pollard (2008).

*Patto Gentiloni*), instances of change started surfacing: the Church informally agreed for Catholics to stand as Liberal candidates. This decade also saw the extension of voting rights to all male adults<sup>2</sup> as well as the birth of the so-called era of the *mass parties*, i.e., political parties that sought to obtain broad popular consensus by promoting the interests of the working class.

Unsurprisingly, the official repeal of the *Non Expedit* dates to this historical period, specifically in 1919. This year marked the entry into politics of the Italian People's Party (in Italian, *Partito Popolare Italiano*, *PPI*), established by the Catholic priest Luigi Sturzo, and backed by the Church. The foundation of *PPI* represented the first step towards an active political comeback for Italian Catholics after their enduring boycott, in compliance with the *Non Expedit* Act, and gathered a remarkable success in the 1919 and 1921 general elections.

The rise of the Fascist dictatorship and the consequent rigged and violent political climate interfered and ultimately prevented an organic development of the *PPI*, leading to its dissolution in 1926. But, the legacy of the *PPI* was not lost, as its political agenda and its Catholic teaching-inspired values were inherited by the Christian Democracy (in Italian, *Democrazia Cristiana*, *DC*). The *DC* party was established in 1943 during World War II, by former members of the *PPI*, and ended up obtaining overwhelming electoral consensus in the following decades, until during the 1990s the judicial investigation of *Mani pulite* and *Tangentopoli* (translated from Italian as “clean hands”, and “Bribesville”) unveiling scandals of corruption of Italian political parties, marked its dissolution.

It was the Second Vatican Council – the ecumenical council of the Roman Catholic Church – taking place between 1962 and 1965 to achieve a realignment of the Catholic doctrine to the modern era – that formalized the new position of the Holy See. In this context, the Church explicitly promoted a different outlook toward its believers' civic duties, urging them to participate in their Nation's public and political life actively. As stated in Chapter 4 of the *Gaudium et spes* – one of the constitutions promulgated during the Second Vatican Council– “[a]ll Christians must be aware of their own specific vocation within the political community. It is for them to give an example by their sense of responsibility and their service of the common good”.

We hypothesize the Second Vatican Council as the breakpoint that significantly shifted the tides of Catholics' involvement in political life. While we recognize that the birth of Catholic political parties like the *PPI* and the *DC* may also represent crucial events with similar implications for believers' engagement with politics, the limited availability or lack of records on religiosity as well as voter turnout for the years between the 1910s and the 1940s prevent this type of investigation. The same reasoning applies to the use of other major announcements from the Holy See, like the repeal of the *Non Expedit* Act (1919), or more informal events such as Gentiloni Pact (1913), that should have affected political participation, as potential placebo tests. To the best of our knowledge and effort,

---

<sup>2</sup>Regulated by Law n. 666/1912 and Law n. 1985/1918.

gathering sufficiently granular historical data on voter turnout and religious adherence for the time frame 1910-1946 is not feasible.<sup>3</sup>

Conversely, less binding limitations concern the access to religious adherence and electoral data from the 1950s onward.

## 4.3 Data

The empirical analysis is conducted on two panel datasets built using many data sources. We use two separate samples because of the different spatial aggregation of the records employed. While for voter turnout municipality-level data are available, for the religiosity intensity proxies, the most granular level of collection is either the provincial level or the diocese level, as we describe in detail later in the present section.

### 4.3.1 Data on political participation

We proxy citizens' involvement in public life using electoral turnout. And since the prescription of the *Non Expedit* originally pertained to Catholics' engagement with *national* politics, we specifically focus on Italian general elections. We retrieve municipal-level records on polls in parliamentary elections from the Department of Internal and Territorial Affairs of the Italian Ministry of Interior (in Italian, *Dipartimento per gli Affari interni e territoriali*, *DIAT*). The Ministry provides election data (i.e., number of voters and registered voters) since 1946 through the open-source portal *Eligendo*. We consider the Italian general elections of the Chamber of Deputies taking place in 1953, 1958, 1968, and 1972. Out of these four elections, the former two have occurred just before the Second Vatican Council (1962-1965), whereas the latter two immediately follow it. We do not include any elections held during the Second Vatican Council.

Figure 4.1 displays the provincial-level distribution of voter turnout in Italy during the four election years considered.

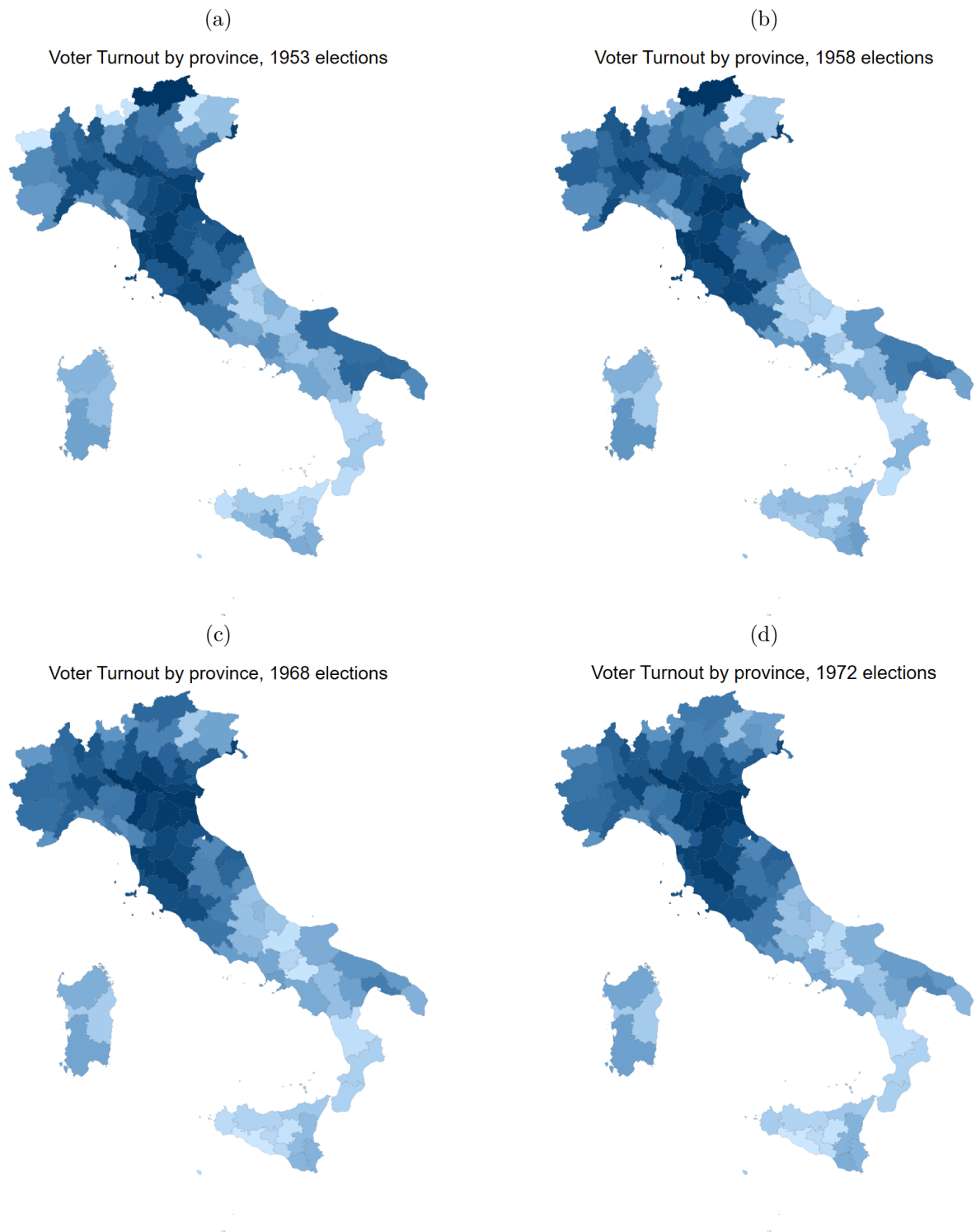
### 4.3.2 Religiosity intensity proxies at the provincial level

Measuring religiosity intensity presents several challenges, especially so considering our investigation concerns *historical* religious compliance (Hood Jr et al., 2018). For instance,

---

<sup>3</sup>As far as electoral data are concerned, We contacted multiple times both the office of the Department of Internal and Territorial Affairs of the Italian Ministry of Interior, and that of the Central Archives of the State, but they ignored our request for information and data supply. As for religious compliance data, through ISTAT's *Contact Center* we inquired about more detailed records on marriages by month of celebration on the years of our analysis as well as on previous ones. ISTAT personnel informed me that electronic records on marriage start from 1969, and that for earlier years no ulterior processing is possible. Thus, the only source remains the data published in the *Annuari di Statistiche Demografiche* – where, however, information on marriages by month of celebration are not available for every year. See Section 3 for more detail.

Figure 4.1: Distribution of voter turnout by province in Italy, election years 1953-1972



historical Italian censuses did not comprise questions on respondents' religious beliefs and practices. And despite the literature on the economics of religion often relies on religiosity proxies retrieved from surveys such as the Religious Landscape Survey and the World Values Survey,<sup>4</sup> We did not find similar data sources for religious proxies regarding Italian municipalities, provinces or dioceses during the period 1953-1972.

The historical setting of the present study also prevents me from relying on novel religiosity proxies employed in some recent contributions to this stream of research. For instance, Moreno-Medina (2021) combines records from the American Time Use Survey with data from Google's Popular Times to build a measure of Church attendance at the county level in the U.S.. Bentzen (2021) proxies religiosity as the percentage of Google searches related to prayer, and shows that the Covid-19 pandemic led to a significant increase in prayer intensity, validating the theory of relying on religion as a coping mechanism against adverse events.

Despite these limitations related to the historical dimension of the analysis, our study presents a variety of religiosity intensity proxies.

First, we construct the *Marriages in Lent and Advent* (henceforth, *MLA*) index developed by Lesthaeghe (1991). It is a measure of secularization, and likewise, an inverse indicator of religiosity. The *MLA* index exploits the observance of the Catholic precept of avoiding the celebration of marriages during Lent and Advent, and it is computed as the sum of the percentages of marriages celebrated in March<sup>5</sup> and that of the weddings taking place in December, divided by the seasonality coefficient 2/12. Values of the *MLA* index greater than (smaller than) 1 imply the disobedience (deference) of the Catholic ban on marriages during Lent and Advent (Lesthaeghe, 1991; Lesthaeghe and Lopez-Gay, 2013). As we are interested in measuring the degree of religiosity, to facilitate the interpretation of the results, we use the complement to the *MLA* index, i.e.,  $c\_MLA$ :

$$c\_MLA = 1 - \left( \frac{\text{Religious marriages celebrated in Lent and Advent}}{\text{Total number of religious marriages}} \div \frac{2}{12} \right) \quad (4.1)$$

Historical data on religious marriages were drawn from the volumes of the *Annuari di Statistiche Demografiche*, published by the Italian National Institute of Statistics (in Italian, *Istituto Centrale di Statistica, ISTAT*), of the years corresponding to the four elections considered: 1953, 1958, 1968 and 1972 (Istituto Centrale di Statistica, 1955, 1961, 1971, 1974a). The *Annuari* contain census-like records on the number of religious

---

<sup>4</sup>Among the works using these surveys, see Paldam and Gundlach (2013); Chantziaras et al. (2020); Hsieh et al. (2022).

<sup>5</sup>Admittedly, Lent does not always fall in March, thus considering the percentage of marriages celebrated in March as the wedding taking place in Lent is indeed an approximation. However, the literature agrees that the month of March generally tends always to be included in the period of Lent (Lesthaeghe, 1991; Alter and Gutmann, 2005; Lesthaeghe and Lopez-Gay, 2013; Ruiu and Breschi, 2015; Engelen, 2017).

and civil marriages taking place each year in Italian provinces, as well as the proportion of religious marriages celebrated in each month of the year.

We also gather provincial controls – i.e., resident population and population density – from the volumes of *Popolazione e Movimento Anagrafico dei Comuni* (Istituto Centrale di Statistica, 1956, 1959, 1969, 1974b)

### 4.3.3 Religiosity intensity proxies at the diocesan level

We use historical data on Italian citizens' religiosity from *Catholic Hierarchy*, a website collecting detailed information on Catholic bishops and dioceses all over the world, using as the primary data source official ecclesiastical documents.<sup>6</sup> More specifically, we extract diocese-level records on the number of Catholic priests, parishes, parishioners, and diocesan population size for the entire Italian territory.

We aggregate municipality-level elections data to the diocese level by matching each municipality to its corresponding diocese. To locate municipalities into dioceses, we use the *Annuario Pontificio*, available through the web browser of [www.chiesacattolica.it](http://www.chiesacattolica.it), the official site of the Episcopal Conference of Italy. In the (very few) cases of parishes located in the same city and yet belonging to different dioceses, we decided to match the municipality to the diocese with the highest number of parishioners. For instance, if parish *A* and parish *B* (the only two parishes of municipality *M*) belong to diocese *X* and diocese *Y*, respectively, we end up matching municipality *M* to diocese *X* rather than diocese *Y* if the number of parishioners from parish *A* is larger than the number of parishioners from parish *B*.

The *Catholic Hierarchy* records allow me to create two additional religiosity measures: *Priests*, and *Parishes*, that is, the per capita number of Catholic priests and that of parishes. We use these variables as a proxy for the presence of the Church within each diocese. Our conjecture is that a higher concentration of religious personnel and places of worship intensifies believers' tendency to follow religious precepts. As reported by Garelli (2007), the number of parishes is positively related to the size of the diocesan population, whereas the distribution of the clergy does not follow explicitly disclosed criteria – as each assignment of a priest to a particular parish boils down to a decision from the bishop in office. More specifically, Garelli (2007) argues that the number of priests within each diocese does not seem to depend on the share of baptized Catholics. Moreover, northern (southern) regions register a high (low) concentration of the clergy with respect to the population size, while central Italy possesses a more balanced ratio of priests to inhabitants.

---

<sup>6</sup>Among them, collection of volumes *Hierarchia Catholica*, or the book *Series episcoporum Ecclesiae catholicae quotquot innotuerunt a beato Petro apostolo* by Pius Bonifacius Gams are worth mentioning.

## 4.4 Empirical strategy

To empirically test the existence of an impact on civic participation related to the shift of the attitude of the Holy See and driven by religiosity intensity, we consider a DiD Two Way Fixed Effect (TWFE) model. The current empirical literature has questioned the implementation of standard TWFE specifications (de Chaisemartin and d’Haultfoeuille, 2020; Callaway and Sant’Anna, 2021; Goodman-Bacon, 2021; Jakiela, 2021; Baker et al., 2022). The main issue relates to the fact that TWFE models with staggered treatment (i.e., treatment adoption occurs at different points in time, and differs across units) estimate the treatment effect in the form of a single coefficient that is a weighted average of the Average Treatment Effects on the Treated (ATTs). Values below the mean treatment intensity receive negative weight, and not all are weighed equally (Jakiela, 2021). This may bias the TWFE estimates in case of treatment effect heterogeneity. The negative-weights bias may distort the sign of treatment effect, and result in some ATTs having more weight than others.

The equation describes the TWFE specification:

$$\begin{aligned} VoterTurnout_{i,t} = & \alpha_i + \beta Religiosity\_Proxy_{i,t} \times D\_SVC \\ & + \gamma Religiosity\_Proxy_{i,t} + \delta_t + \mathbf{X}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (4.2)$$

$VoterTurnout_{i,t}$  is the voter turnout in province (diocese)  $i$  in election year  $t$ ,  $\alpha_i$  controls for province-level (diocese-level) fixed effects,  $\beta$  retrieves the treatment effect on the outcome variable,  $Religiosity\_Proxy_{i,t}$  stands for the different variables proxying religiosity intensity in our dataset,  $D\_SVC$  is a dummy equal to 1 if the Second Vatican Council already took place and 0 otherwise,  $\delta_t$  accounts for time fixed effects,  $\mathbf{X}_{i,t}$  is the vector of controls (i.e., population size and population density), and  $\varepsilon_{i,t}$  is the error term.

In this setting,<sup>7</sup> all the units receive the treatment at the same point in time. Our empirical strategy follows that of Finkelstein (2007), and is to investigate whether there is a break in any pre-existing differences in voter turnout around the time of the Second Vatican Council. More specifically, we compare changes in civic participation in provinces (dioceses) of Italy where Catholics’ compliance to the shift in the Holy See’s attitude had a more significant effect relative to areas with less impact.

Our baseline specification considers  $c\_MLA$  as a religiosity proxy. The reason is twofold. On the one hand,  $c\_MLA$  possesses sufficient variation over time, as displayed in Figure 4.2. The graph plots the evolution of the average  $c\_MLA$  aggregated by Italian macroregions (Center, Islands, North-East, North-West, and South) throughout the four election years. This implies we can exploit the historical variation in the adherence to

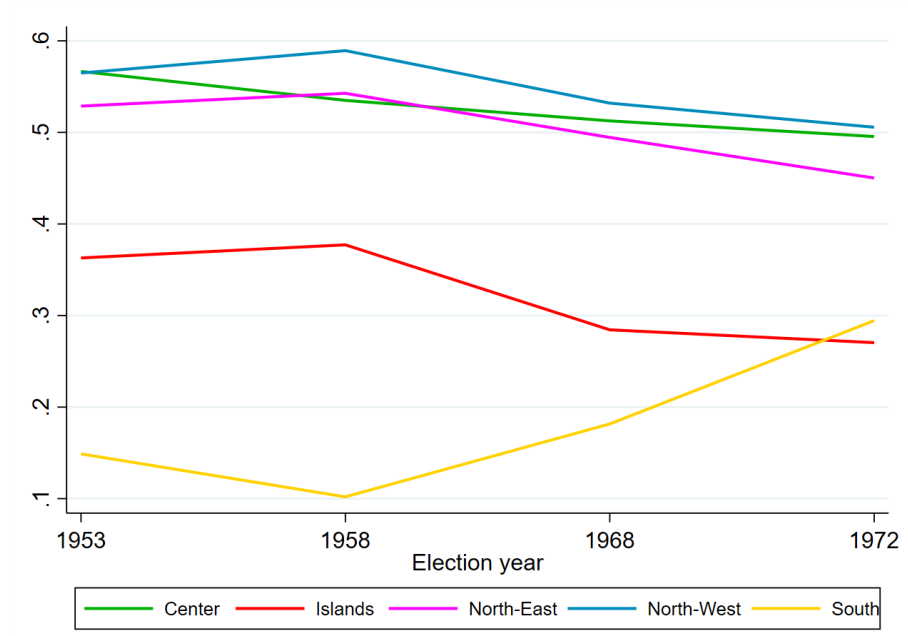
---

<sup>7</sup>In our model, the treatment adoption is not staggered, and no control group exists. This, coupled with the limited number of election years, prevents me from testing the parallel trend assumption and other diagnostics for TWFE (Jakiela, 2021).



Catholic norms to test whether more religious areas exhibit a significantly higher voter turnout following the Second Vatican Council.

Figure 4.2: Evolution of  $c\_MLA$  over time, by Italian macroregions, 1953-1972



*Notes:* The figure shows the average value of  $c\_MLA$  aggregating the provinces in the sample by the Italian macroregions they are located across the four general election years considered in the analysis (1953, 1958, 1968, 1972). Source: our elaboration on ISTAT data.

On the other hand,  $c\_MLA$  better captures the aspect of religiosity we are interested in, that is, religious adherence to precepts of the Church. Moreover, among the religiosity proxies in our dataset,  $c\_MLA$  is also the most conventional and established in the literature (Lesthaeghe, 1991; Alter and Gutmann, 2005; Lesthaeghe and Lopez-Gay, 2013; Ruiu and Breschi, 2015; Engelen, 2017). Plus, its source (Istituto Centrale di Statistica, 1955, 1961, 1971, 1974a) is highly reliable, despite the limitations related to the granularity of the data – i.e., the spatial aggregation is provincial instead of municipal.

We also check whether the set of religiosity proxies positively and significantly affects the first difference change in voter turnout when considering the two election years straddling the Second Vatican Council: 1958 and 1968. We estimate the following equation:

$$\Delta VoterTurnout_{i,t} = \alpha_0 + \beta Religiosity\_Proxy_{i,t-1} + \mathbf{X}_{i,t} + \varepsilon_{i,t} \quad (4.3)$$

Here, we regress the first difference of the outcome variable on the lagged proxy for religiosity intensity. This may contribute to limiting concerns of reverse causality, as our goal is to attempt to establish a directional effect of religiosity on electoral participation and not the other way around.

As far as the *Catholic Hierarchy* proxies are concerned, the availability of these census-like, historical data is limited, in the sense that most of the Italian dioceses only possess

a record entry for the years before the Second Vatican Council and one for those immediately after. For this reason, these data display lower variability over time than  $c\_MLA$ . Thus we employ them as secondary religiosity proxies.

In line with the hypothesis we sketched in the previous section, we expect the coefficient  $\beta$  of both Equations 4.2 and 4.3 to be statistically different from zero, and to display a positive sign.

## 4.5 Results

Table 4.1 reports the result of the estimates obtained using  $c\_MLA$  as a religious observance proxy.

Table 4.1: Estimation results. Religiosity proxy:  $c\_MLA$ .

|  | <i>VoterTurnout</i> | $\Delta$ <i>VoterTurnout</i> |           |
|--|---------------------|------------------------------|-----------|
|  | (1)                 | (2)                          | (3)       |
| $c\_MLA$                               | -0.0479**           | -0.0364*                     | 0.0586*** |
|  | (-2.64)             | (-2.60)                      | (5.92)    |
| $c\_MLA \times D\_SVC$                 |                     | 0.114***                     |           |
|  |                     | (7.41)                       |           |
| Provincial fixed effects               | Yes                 | Yes                          | No        |
| Year dummies                           | Yes                 | Yes                          | No        |
| F-test $c\_MLA + c\_MLA \times D\_SVC$ |                     | 14.54***                     |           |
| Observations                           | 360                 | 360                          | 90        |
| N. of provinces                        | 90                  | 90                           | 90        |

*Notes:* \*\*\*, \*\*, and \* denote significance at 1%, 5% and 10%. *t* statistics in parentheses. We control for the population size at the provincial level, as well as for the population density.

We find that higher religiosity is inversely related with electoral participation, as displayed by the coefficient of  $c\_MLA$  in column (1). But, the sign and the significance level of the estimated coefficient of the interaction between  $c\_MLA$  and  $D\_SVC$  in column (2) reveals that after the Second Vatican Council, the most religious provinces experience a significant increase in voter turnout. To provide an understanding of the total effect of  $c\_MLA$ , column (2) also report the joint significance of the estimated

coefficients of  $c\_MLA$  and  $c\_MLA \times D\_SVC$ . This confirms our hypothesis that the influence of the Catholic Church passes through believers' individual behavior, and it depends on the intensity of religiosity.

Moreover, the first-difference regression, presented in column (3), suggests that the change in voter turnout in the election years around the Second Vatican Council is positively and significantly linked to the religiosity proxy. In other words, the rise in electoral participation mirrors the shift in the attitude of the Holy See concerning Catholics' involvement in public life and is attributable to a higher degree of religiosity<sup>8</sup> of the province.

### 4.5.1 Alternative religiosity proxies

As robustness, we employ the two *Catholic Hierarchy* variables as ulterior religious proxies. Tables 4.2 and 4.3, respectively, present the results obtained using the number of Catholic priests and parishes over the diocesan population.

The estimates essentially confirm the findings of the baseline model: the more religious the diocese, the more the voter turnout increases after the Second Vatican Council (columns (2) and (4) of Tables 4.2 and 4.3). And the post-treatment level of electoral participation displays a positive and significant relationship with these alternative religiosity intensity proxies (column (5) of both Tables 4.2 and 4.3).

These alternative specifications are relevant for two reasons. First, they validate the results of the main analysis in terms of the sign and significance level of the coefficients of interest. Second, they provide robustness because the findings are consistent with a different spatial aggregation of the sample (from provinces to dioceses), making the econometric interpretation more generalizable.

## 4.6 Conclusions

The present work seeks to assess whether the change in Catholic Church's disposition toward believers' involvement in electoral participation, assumed to coincide with the Second Vatican Council, may have affected voter turnout in the Italian general elections of the 1960s and 1970s. The results corroborate this conjecture and reveal that this effect is exacerbated by the degree of religiosity. Electoral engagement significantly grows after the Second Vatican Council in areas where citizens are more likely to abide by religious norms. Individuals' religiosity, via compliance to religious edicts, is the channel through which the "agenda" of the Holy See unfolds, thereby unveiling the long-standing ramification of the leverage of the Catholic Church as a secular institution.

This study suffers from a number of limitations, notably related to the issues in finding historical data with a sufficiently high degree of variability and detail granularity. Several

---

<sup>8</sup>Measured in the previous election year to avoid potential endogeneity issues.

Table 4.2: Estimation results. Fixed effect model and first difference regression. Religiosity proxy: *Priests*.

|                                      | <i>VoterTurnout</i> |          |         |         | $\Delta$ <i>VoterTurnout</i> |
|--------------------------------------|---------------------|----------|---------|---------|------------------------------|
|                                      | (1)                 | (2)      | (3)     | (4)     | (5)                          |
| <i>Priests</i>                       | -4.447              | -7.053   | -4.178  | -4.749  | 13.73***                     |
|                                      | (-1.42)             | (-1.86)  | (-1.42) | (-1.71) | (5.74)                       |
| <i>Priests</i> $\times$ <i>D_SVC</i> |                     | 16.08*** |         | 4.073** |                              |
|                                      |                     | (4.20)   |         | (3.05)  |                              |
| Diocesan fixed effects               | Yes                 | Yes      | Yes     | Yes     | No                           |
| Year dummies                         | Yes                 | Yes      | No      | No      | No                           |
| Linear time trend                    | No                  | No       | Yes     | Yes     | No                           |
| Controls                             | Yes                 | Yes      | Yes     | Yes     | Yes                          |
| Observations                         | 822                 | 824      | 822     | 824     | 206                          |
| N. of dioceses                       | 206                 | 206      | 206     | 206     | 206                          |

*Notes:* \*\*\*, \*\*, and \* denote significance at 1%, 5% and 10%. *t* statistics in parentheses. The religiosity proxy *Priests* measures the number of Catholic priests over the population of the diocese. We control for the population size at the diocese level.

Table 4.3: Estimation results. Fixed effect model and first difference regression. Religiosity proxy: *Parishes*.

|                                       | <i>VoterTurnout</i> |                     |                   |                    | $\Delta$ <i>VoterTurnout</i> |
|---------------------------------------|---------------------|---------------------|-------------------|--------------------|------------------------------|
|                                       | (1)                 | (2)                 | (3)               | (4)                | (5)                          |
| <i>Parishes</i>                       | -0.790<br>(-0.07)   | -43.14**<br>(-3.26) | -4.062<br>(-0.36) | -22.68*<br>(-2.03) | 27.66***<br>(6.19)           |
| <i>Parishes</i> $\times$ <i>D_SVC</i> |                     | 31.20***<br>(6.11)  |                   | 12.56***<br>(4.44) |                              |
| Diocesan fixed effects                | Yes                 | Yes                 | Yes               | Yes                | No                           |
| Year dummies                          | Yes                 | Yes                 | No                | No                 | No                           |
| Linear time trend                     | No                  | No                  | Yes               | Yes                | No                           |
| Controls                              | Yes                 | Yes                 | Yes               | Yes                | Yes                          |
| Observations                          | 822                 | 824                 | 822               | 824                | 206                          |
| N. of dioceses                        | 206                 | 206                 | 206               | 206                | 206                          |

*Notes:* \*\*\*, \*\*, and \* denote significance at 1%, 5% and 10%. *t* statistics in parentheses. The religiosity proxy *Parishes* measures the number of parishes over the population of the diocese. We control for the population size at the diocesan level.

additional aspects – such as other potential breaks signaling the shift in the position of the Church as an institution – may be further explored by future developments of the present work. It could also be interesting to extend the analysis to other socio-economic outcomes, such as historical measures of human capital and institutional quality, as well as more recent ones, to discover any potential long-term effects of the phenomenon at hand. Nonetheless, our work contributes to the literature on the economics of religion. More specifically, it represents an advancement towards a deeper understanding of the relationship between religiosity and political participation.

## Bibliography

- Alter, G. and Gutmann, M. (2005). Belgian historical demography as viewed from North America: Protoindustrialization, fertility decline, and the use of population registers. *Revue Belge d'Histoire Contemporaine*, 45(4):523–546.
- Ammann, S. L. (2015). Is there an attendance effect? Examining the causal link between religious attendance and political participation. *American Politics Research*, 43(4):602–624.
- Auriol, E., Lassebie, J., Panin, A., Raiber, E., and Seabright, P. (2020). God insures those who pay? Formal insurance and religious offerings in Ghana. *The Quarterly Journal of Economics*, 135(4):1799–1848.
- Baker, A. C., Larcker, D. F., and Wang, C. C. (2022). How much should we trust staggered difference-in-differences estimates? *Journal of Financial Economics*, 144(2):370–395.
- Barro, R. J. and McCleary, R. M. (2003). Religion and economic growth.
- Bentzen, J. S. (2021). In crisis, we pray: Religiosity and the COVID-19 pandemic. *Journal of Economic Behavior & Organization*, 192:541–583.
- Brown, S. and Taylor, K. (2007). Religion and education: Evidence from the National Child Development Study. *Journal of Economic Behavior & Organization*, 63(3):439–460.
- Buser, T. (2015). The effect of income on religiousness. *American Economic Journal: Applied Economics*, 7(3):178–95.
- Callaway, B. and SantAnna, P. H. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, 225(2):200–230.
- Chantziaras, A., Dedoulis, E., Grougiou, V., and Leventis, S. (2020). The impact of religiosity and corruption on CSR reporting: The case of US banks. *Journal of Business Research*, 109:362–374.
- Chen, D. L. (2010). Club goods and group identity: Evidence from Islamic resurgence during the Indonesian financial crisis. *Journal of Political Economy*, 118(2):300–354.
- de Chaisemartin, C. and d’Haultfoeuille, X. (2020). Two-way fixed effects estimators with heterogeneous treatment effects. *American Economic Review*, 110(9):2964–96.
- Engelen, T. L. (2017). What the Seasons Tell Us. The Monthly Movement of Marriages, Economic Modernization, and Secularization in the Netherlands, 1810-1940.

- Ferrari, A. and Ferrari, S. (2015). Religion and the secular State: the Italian Case. *Religion and the secular state: National reports*, pages 445–465.
- Finkelstein, A. (2007). The aggregate effects of health insurance: Evidence from the introduction of medicare. *The Quarterly Journal of Economics*, 122(1):1–37.
- Garelli, F. (2007). The public relevance of the church and catholicism in italy. *Journal of Modern Italian Studies*, 12(1):8–36.
- Gerber, A. S., Gruber, J., and Hungerman, D. M. (2016). Does church attendance cause people to vote? Using blue laws repeal to estimate the effect of religiosity on voter turnout. *British Journal of Political Science*, 46(3):481–500.
- Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, 225(2):254–277.
- Grzymala-Busse, A. (2016). Weapons of the meek: How churches influence public policy. *World Politics*, 68(1):1–36.
- Hood Jr, R. W., Hill, P. C., and Spilka, B. (2018). *The psychology of religion: An empirical approach*. Guilford Publications.
- Hsieh, W.-L. G., Wu, W.-S., and Tu, A. H. (2022). Religiosity and sovereign credit quality. *Journal of Empirical Finance*.
- Hungerman, D. M. (2014). The effect of education on religion: Evidence from compulsory schooling laws. *Journal of Economic Behavior & Organization*, 104:52–63.
- Iannaccone, L. R. (1998). Introduction to the Economics of Religion. *Journal of Economic Literature*, 36(3):1465–1495.
- Istituto Centrale di Statistica (1955). *Annuario di statistiche demografiche. 1953*. Roma. Istat.
- Istituto Centrale di Statistica (1956). *Popolazione e movimento anagrafico dei comuni. Popolazione residente dei comuni calcolata al 31 dicembre 1953, 1954, 1955*. Roma. Istat.
- Istituto Centrale di Statistica (1959). *Popolazione e movimento anagrafico dei comuni. Popolazione residente dei comuni al 31 dicembre 1957 e 1958 e movimento anagrafico nel 1958*. Roma. Istat.
- Istituto Centrale di Statistica (1961). *Annuario di statistiche demografiche. 1958*. Roma. Istat.
- Istituto Centrale di Statistica (1969). *Popolazione e movimento anagrafico dei comuni. Vol. XIV - 1968*. Roma. Istat.



- Istituto Centrale di Statistica (1971). *Annuario di statistiche demografiche. 1968*. Roma. Istat.
- Istituto Centrale di Statistica (1974a). *Annuario di statistiche demografiche. 1971-1972*. Roma. Istat.
- Istituto Centrale di Statistica (1974b). *Popolazione e movimento anagrafico dei comuni. Vol. XVII - Edizione 1973*. Roma. Istat.
- Iyer, S. (2016). The new economics of religion. *Journal of Economic Literature*, 54(2):395–441.
- Jakiela, P. (2021). Simple diagnostics for two-way fixed effects. *arXiv preprint arXiv:2103.13229*.
- Jones-Correa, M. A. and Leal, D. L. (2001). Political participation: Does religion matter? *Political Research Quarterly*, 54(4):751–770.
- Kurek, P. J. and Fałkowski, J. (2022). Religiosity and political participation-panel data evidence from post-communist poland. *European Journal of Political Economy*, page 102177.
- Lesthaeghe, R. (1991). Marriage seasonality, moral control and reproduction in Belgium (1600-1900). In *Historiens et populations*, pages 259–279. Academia Press.
- Lesthaeghe, R. and Lopez-Gay, A. (2013). Spatial continuities and discontinuities in two successive demographic transitions: Spain and Belgium, 1880-2010. *Demographic Research*, 28:77–136.
- Levy, G. and Razin, R. (2012). Religious beliefs, religious participation, and cooperation. *American Economic Journal: Microeconomics*, 4(3):121–51.
- Moreno-Medina, J. (2021). Sinning in the rain: Weather shocks, church attendance and crime. *The Review of Economics and Statistics*, pages 1–46.
- Paldam, M. and Gundlach, E. (2013). The religious transition. a long-run perspective. *Public Choice*, 156(1):105–123.
- Pollard, J. (2008). *Catholicism in modern Italy: Religion, society and politics since 1861*. Routledge.
- Ruiu, G. and Breschi, M. (2015). For the times they are a changin– The respect for religious precepts through the analysis of the seasonality of marriages. Italy, 1862–2012. *Demographic Research*, 33:179–210.

Squicciarini, M. P. (2020). Devotion and development: religiosity, education, and economic progress in nineteenth-century France. *American Economic Review*, 110(11):3454–91.

Weber, M. (2013). *The Protestant ethic and the spirit of capitalism*. London: Penguin Books.