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# Questioni di Economia e Finanza

(Occasional Papers)

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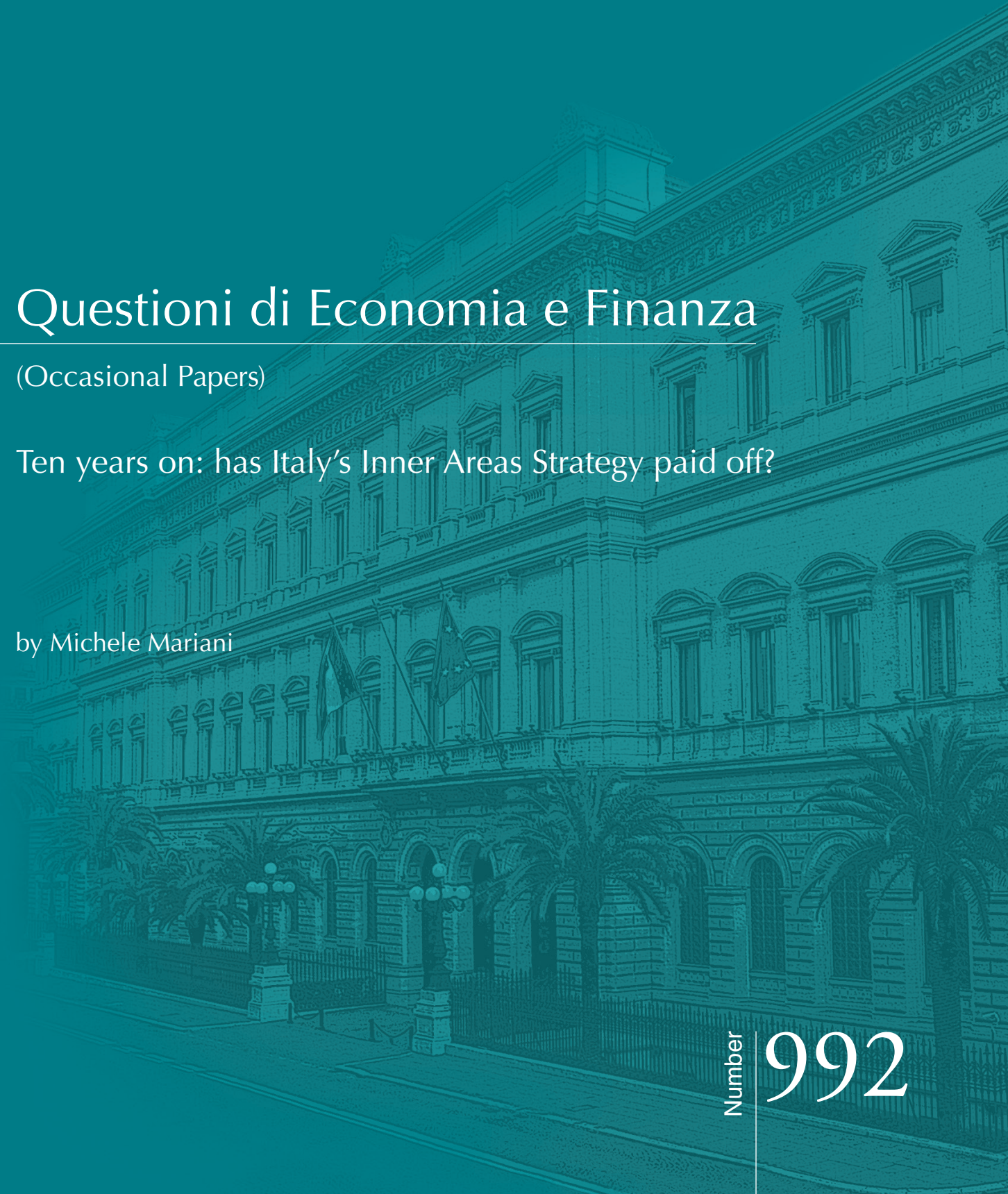
by Michele Mariani



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# TEN YEARS ON: HAS ITALY'S INNER AREAS STRATEGY PAID OFF?

by Michele Mariani*

## Abstract

This paper evaluates the impact of Italy's National Strategy for Inner Areas (SNAI), a place-based policy launched in 2014 to counteract demographic and economic decline in peripheral areas. Using a staggered difference-in-differences approach on detailed municipal-level data, we find no evidence of population growth, consistent with the typically long timeframe required for demographic changes to manifest. In contrast, we observe a significant increase in local business density in treated municipalities, with no corresponding effects on employment and housing prices. Notably, municipalities with higher administrative capacity are more successful in attracting funding and exhibit stronger positive impacts, highlighting the critical role of governance quality in shaping policy outcomes. Geographical disparities emerge, with stronger economic effects observed in Central and Northern Italy.

**JEL Classification**: C18, H54, O18, R11, R58.

**Keywords**: place-based policy, policy evaluation, inner areas, Italy.

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# 1 Introduction[1]

The dominant belief in agglomeration economies has led to the view that peripheral areas are inherently prone to stagnation and decline. As a result, development policies have largely adopted a "city-first" approach (Coombes, 2014), placing urban centers as the main engines of economic growth (Fujita et al., 2001; Krugman, 1991). In this context, peripheral and rural areas are often seen as extensions to large metropolitan areas (Harrison and Heley, 2015), with the expectation that less urbanized ones may still benefit from the economic dynamism of cities through a trickle-down effect (Herrschel, 2009). This perspective assumes that growth and innovation generated in urban centers have positive spillover effects on surrounding areas.

While significant research has confirmed the positive effects of agglomeration, such as increased productivity, innovation, and resource allocation efficiency (Roca and Puga, 2017), empirical evidence also suggests that the spillover effects from urban to peripheral areas have been limited, leading to a widening of the gap between urban and rural areas over time (Modica et al., 2021). This growing divide in regional inequalities has been extensively documented in the literature (Rodríguez-Pose and Hardy, 2015; Eurofound, 2023).

Peripheral areas face issues of marginalization and depopulation, which contribute to their impoverishment and worsen inequalities in access to basic services. These challenges also harm cultural heritage and increase vulnerability to natural disasters (Giffoni et al., 2017). Without the critical mass and external networks required to compete with central areas, peripheral areas often experience significant decline[2]. These problems are widely acknowledged across academic, political, media, and social sectors, as well as various disciplines (economics, sociology, demography, urban planning), at both national and European levels. Efforts are increasingly focused on fighting poverty and reducing inequalities, both between member states and within regions (e.g., Liberati and Resce, 2022).

Italy is no exception to these trends. Over the past four decades, the growth of cities, particularly larger ones, has primarily been driven by the expansion of surrounding suburbs, resulting in longer commuting distances. The typical benefits associated with

[1]I would like to thank Monica Andini, Francesco David, Silvia Del Prete, Elena Gentili, Marcello Pagnini, Andrea Petrella, Alessandro Pietropaoli, Roberto Torrini, and the participants at the Bank of Italy internal seminars for their helpful comments and insightful discussions. The views expressed are those of the author and do not necessarily reflect those of the Bank of Italy.

[2]Further research could examine differences between municipalities affected by natural disasters (earthquakes, floods) or by mafia infiltration and organized crime, even before the observation decade, to assess their long-term impact on the effectiveness of the SNAI. In this work, we account for these factors through geographic, orographic, and societal control variables.

agglomeration – such as higher wages, increased productivity, and innovation – have been constrained, while costs, such as congestion and rising housing prices, have also been observed (Lamorgese and Petrella, 2018; Loschiavo, 2019; Manzoli and Mocetti, 2019). At the same time, there has been a deterioration in the conditions of the more peripheral areas, further widening the gap between urban and rural areas (Carrosio et al., 2018).

In response to these challenges, Italy introduced the National Strategy for the Inner Areas (*Strategia Nazionale per le Aree Interne*, SNAI hereafter) in 2014, a place-based policy (PBP hereafter) aimed at addressing the issues faced by peripheral areas. The SNAI seeks to improve local services and capitalize on economic opportunities, with a particular focus on areas experiencing depopulation and a lack of essential services (Pezzi and Urso, 2016). By targeting marginalized areas, the SNAI aims to promote long-term economic development and reverse population decline. Through this policy, the government seeks to establish sustainable pathways for these areas, fostering more balanced and inclusive territorial development.

This paper analyzes the impact of the SNAI ten years after its introduction, contributing to the literature on the effectiveness of PBPs (Neumark and Simpson, 2015). The evaluation of the SNAI is important for several reasons. First, Italy is the only country to have developed a specific strategy of this kind, making the SNAI a unique case within the broader context of European PBPs (Moscarelli and Fera, 2024). Consequently, the SNAI has been widely discussed in various OECD working groups and within the framework of the European Strategy for the Alpine Region, with countries such as Morocco, France, Spain, Portugal, Japan, and Poland studying its characteristics and implementation mechanisms (Lucatelli and Storti, 2019). Second, the SNAI remains part of the policy framework outlined for the 2021–2027 cohesion policy cycle. Third, the initiative operates on a considerable scale: it encompasses around 1,000 municipalities (about 12 percent of the total), roughly 2 million residents, approximately 1,700 projects, and has scheduled over 400 million euros in resources. Finally, the SNAI differs from other Italian PBPs in its wider geographic scope: unlike many cohesion policies that primarily target Southern Italy, the SNAI also encompasses peripheral areas in Central and Northern Italian regions, with nearly 40 percent of resources allocated to these regions, making it a particularly informative case study.

We assess the impact of the funding received by municipalities participating in the SNAI on several outcome variables, including population, number of local businesses, housing prices, and employment. The focus on these indicators is based on the premise that many SNAI projects aim to generate employment for local residents, with employment

and business density serving as key measures of intervention success. Additionally, project funding has the potential to stimulate the local economy, generating indirect effects tied to project implementation. Beyond these direct economic outcomes, other factors, such as housing prices and population movements, may also reflect the broader impacts of these initiatives. A comprehensive analysis of these dimensions is essential for understanding the overall effects on the local economy and providing a complete evaluation of the effectiveness of the SNAI.

We use a geographically detailed dataset from OpenCoesione website, which includes information on SNAI projects, allocations, and payments. This data is merged at the municipal level with additional sources, such as the Italian National Institute of Statistics (Istat), to construct the outcome and control variables. The empirical analysis is based on a panel dataset covering the period from 2014 to 2023. The identification strategy employs a staggered difference-in-differences (DiD) approach (Sun and Abraham, 2021). We exploit that municipalities involved in the SNAI received funding (the treatment) at different times, with some municipalities yet to receive it. We create treatment cohorts based on the timing of the funding, and control group consisting of municipalities that have never received funds. All municipalities were eligible under the SNAI strategy and shared the same policy context, making non-funded ones a meaningful counterfactual as they lacked only the financial implementation.

Our findings indicate that the SNAI has not yet produced measurable effects on demographic trends, which are inherently slow-moving and are expected to respond only over a longer time horizon. In contrast, we observe a positive impact on local economic activity, notably an increase in business density in treated municipalities. However, no significant effects on employment or housing prices are detected, suggesting that the policy has not yet produced measurable structural changes in labor markets or real estate dynamics. The effectiveness of the policy is closely linked to the quality of local governance, with stronger increases in business density observed in municipalities with higher administrative capacity. Additionally, economic benefits appear more pronounced in Central and Northern Italy.

Although the SNAI has been in place for a decade, its implementation is still ongoing[3]. As a result, the findings primarily capture early-stage effects, and the analysis should therefore be interpreted as a preliminary assessment of the policy's impact. This is further compounded by the fact that, to date, only a small portion of national funds – mainly allocated to essential services – has been disbursed, reflecting administrative and bureaucratic delays during the early stages of implementation. The modest impacts

[3]As of the end of the observation period, based on expenditure data, only 23 percent of projects had been completed, 59 percent were still underway, and 18 percent had not yet started.

observed may partly stem from this gradual rollout. Access to basic infrastructure is a critical prerequisite for local development, as the lack of essential services hinders both private investment and population mobility in structurally disadvantaged areas.

The structure of our paper is as follows. Section 2 provides a review of the relevant literature, while Section 3 presents an overview of the institutional setting. Section 4 describe the empirical choices and data sources. The results are illustrated in Section 5. Section 6 provides a conclusion.

# 2 Literature review

This section first reviews the broader literature on PBPs and then focuses on the SNAI, emphasizing our contribution to the study of targeted policy initiatives.

PBPs aim to reduce economic disparities in remote areas and address market failures – such as under-provision of public goods, labor market frictions, and persistent disparities in employment rates – which are often cited as key justifications for place-based interventions (Farole et al., 2011; Kline and Moretti, 2013; Bartik, 2020). While theoretical justifications exist, identifying market imperfections is challenging, and interventions may have limited or unintended effects (Accetturo and De Blasio, 2012). PBPs have sparked debate, with proponents emphasizing their role in supporting disadvantaged areas, while critics argue that they are inefficient, costly, and may merely redistribute economic activity without improving local welfare (Kline, 2010). The impact of PBPs on local efficiency remains an empirical question, with studies yielding mixed results. These varied outcomes reflect the complexity and context-dependence of such interventions, with results influenced by factors such as timeframe, geography, and policy instruments employed (Becker et al., 2010; Mohl and Hagen, 2010)[4].

Turning to the Italian context, the effectiveness of PBPs has been examined in several studies, generally indicating limited impacts on local economic development (Accetturo and De Blasio, 2019). Citing some contributions from the literature, Accetturo and De Blasio (2012) reported no significant impact from the "Patti Territoriali" program, while Andini and De Blasio (2016) argued that the "Contratti di Programma" had limited effects on growth. Similarly, Ciani and De Blasio (2015) found minimal effects of European Structural Funds on employment, population, and housing prices in Southern Italy between 2007 and 2013. Giua (2017) identified positive employment effects in

[4]For instance, tax exemptions and hiring subsidies often show limited impact, whereas infrastructure policies tend to yield more positive results (Busso et al., 2013; Briant et al., 2015). The effects of European structural funds on local development and productivity is less clear (Ciani and De Blasio, 2015, Albanese et al., 2021).

certain municipalities during the 2000–2006 period. Other contributions, including those by Aiello and Pupo (2012) and Albanese et al. (2021), have found small positive effects on GDP growth and total factor productivity. More recent evidence offers a nuanced view: Cingano et al. (2025) show that Law 488/1992 increased investment and employment in recipient firms but at a high cost per job, with political discretion reducing cost-effectiveness[5]. Ciani et al. (2025) find that subsidies targeting the long-term unemployed in Southern Italy significantly raised their employment and generated tax revenues exceeding programme costs, although these gains largely dissipated once the subsidies ended. Complementarily, Incoronato and Lattanzio (2024) document that the Industrial Development Areas of the 1960s–70s produced persistent agglomeration effects and long-run local gains in services, wages, and human capital, driven by high-tech manufacturing, local multipliers, and the formation of a skilled workforce.

Focusing on the SNAI, this policy represents a highly targeted intervention aimed at fostering the development of Italy's inner areas. A central goal of the SNAI is to mitigate depopulation in peripheral areas – a particularly challenging task, given that it must both curb out-migration and operate within a broader context of declining fertility and overall demographic contraction. Initial evaluations of the SNAI have been carried out by Monturano et al. (2025) and Di Matteo (2025), providing early insights into its impacts on local economic and demographic outcomes. In particular, Monturano et al. (2025) found that, up to 2020, the policy increased the number of local businesses in treated municipalities but had no significant effect on population structure. Di Matteo (2025) examined the policy's role in revitalizing lagging municipalities through tourism-driven development during 2014–2022, reporting a significant rise in overnight stays. Our paper builds upon existing research by exploring the effects of the SNAI on a broader range of outcomes, including employment, housing market, and other economic indicators, utilizing a more extensive dataset. In doing so, we aim to provide a deeper and more nuanced understanding of the policy's wider economic implications. Additionally, we decompose the average treatment effect by considering various dimensions, including the type of intervention, the quality of local governance, and territorial characteristics. This approach allows us to highlight key factors that could offer valuable insights for policymakers.

[5]Previous firm-level studies on Law 488/92 report mixed results: Bronzini and De Blasio (2006) find mainly investment anticipation effects, while Cerqua and Pellegrini (2014) identify positive net impacts. See Cingano et al. (2025) for a discussion of these differences.

# 3 Institutional setting

European Union policies have increasingly aimed at addressing inequalities both between and within territories, with a particular focus on the most disadvantaged areas. In this context, EU rural development policies have gained greater importance (Crescenzi and De Filippis, 2016). Building on this broader policy framework, in 2012 the Italian government introduced the concept of "inner areas" (IAs hereafter), identifying regions facing persistent social, economic, and environmental challenges. Subsequently, in 2014, the government launched the SNAI to improve public service delivery and promote economic opportunities in these areas.

The SNAI is a PBP within the framework of cohesion policy, particularly the 2014-2020 programming cycle[6], focusing on marginalized regions and promoting both intensive and extensive development[7]. The SNAI seeks to ensure access to essential services (e.g., transport, education, healthcare) while funding local development projects. Its goals include improving per capita welfare, employment, land reuse, and reducing depopulation costs, all contributing to long-term objectives of economic growth and reversing population decline. A schematic representation of SNAI's actions, intermediate and final goals, adapted from Barca et al. (2014), is presented in Figure 1. The SNAI is financed through a combination of national resources, mainly directed toward essential service interventions, and European funds (ERDF, ESF, and EAFRD), which primarily support local development initiatives.

The policy's design and coordination were entrusted to a dedicated Technical Committee for Inner Areas, composed of representatives from key national ministries, regional administrations, and technical experts. This committee has played a pivotal role in guiding implementation, monitoring progress, and supporting local governance throughout the policy cycle (Carrosio et al., 2018). The design of the SNAI policy can be synthetically described in two main phases.

First, IAs (i.e., municipalities eligible for funding) were identified (Dipartimento per lo Sviluppo e la Coesione Economica, 2014). Municipalities were categorized into groups based on whether essential services were available locally and, if not, on their proximity to the nearest services, measured as travel time in minutes by car. The essential services considered include healthcare (at least one hospital equipped with an emergency de-

[6]The SNAI was also confirmed for the 2021-2027 cycle.

[7]Intensive development refers to all changes that improve the well-being of individual residents in inner areas – such as increases in income, access to essential services, and quality of life – without altering the overall scale of productive activities. In contrast, extensive development refers to changes that, in addition to improving individual well-being, also lead to an expansion in the scale or scope of productive processes (Barca et al., 2014).

partment of Level I or II), education (at least one classical or scientific high school and one technical or vocational institute), and transportation (at least one regional railway station). Municipalities offering all of these services were classified as "Centres"[8], while the remaining municipalities were further classified into four categories based on their distance from the nearest center: (i) city belt (less than 20 minutes); (ii) intermediate (between 20 and 40 minutes); (iii) peripheral (between 40.1 and 74.9 minutes); (iv) ultraperipheral (more than 75 minutes). A more aggregated classification was later introduced: municipalities with direct access to essential services or located within a 20-minute travel radius were defined as Central Areas (CAs), while those beyond the 20-minute threshold were classified as IAs, encompassing intermediate, peripheral, and ultraperipheral municipalities. It is important to note that the identification of IAs is based solely on the criterion of distance from essential services, a definition that transcends traditional territorial divisions in Italy, such as the North-South divide, the city-periphery dynamic, and the distinction between industrial districts and other areas. Consequently, this approach results in significant heterogeneity within the set of IAs (a discussion of this heterogeneity is provided in Appendix B.1). Municipalities in IAs represent over half of the total number of municipalities in Italy and are inhabited by approximately 13 million people, which constitutes over 20 percent of the national population. These regions are predominantly mountainous and are classified as rural areas according to the European urbanization classification. The majority of municipalities (85 percent) have populations of fewer than 5,000 residents, and their population density is substantially lower than that of the CAs (Istituto Nazionale di Statistica, 2022). These areas are characterized by structural weaknesses in their productive and economic systems, including low employment rates, limited entrepreneurial activity, and comparatively low levels of income and wealth. Demographic decline is another critical feature: IAs often face high depopulation rates, youth outmigration, declining birth rates, and an aging population (Gallo and Pagliacci, 2020; Vendemmia et al., 2021). Despite these disadvantages, IAs possess valuable assets and untapped potential. Many are embedded within rich environmental and cultural contexts, offering natural resources, historical heritage, and strong local identities that can serve as foundations for tailored development strategies (Barca et al., 2014).

Second, the initial implementation of SNAI involved the identification of specific Project Areas (hereafter PAs), consisting of clusters of adjacent municipalities primarily located within the IAs. Municipalities within these PAs were eligible to receive SNAI funds and constitute the focus of our analysis. The identification of PAs was carried out by

[8]In particular, Centres are further distinguished between "Polo" and "Polo intercomunale", depending on whether service provision is managed independently or through inter-municipal cooperation.

the Technical Committee through a public evaluation process that combined extensive data collection and on-site investigations, including focus groups aimed at defining the optimal boundaries of each area. The selection primarily relied on quantitative socioeconomic and demographic indicators, capturing structural characteristics linked to local development lags. In particular, 90 indicators were considered, covering: demographic dynamics, sectoral specialization and agriculture, digital divide, cultural heritage and tourism, health, accessibility, education, and the degree of inter-municipal cooperation[9]. Moreover, the evaluation also considered the presence of qualitative prerequisites, such as a shared vision among stakeholders, willingness to establish clear political leadership, project planning capacity, signs of innovation in service management, and political-administrative stability within the area (Carrosio et al., 2018).

A total of 72 PAs were identified, encompassing 982 IAs municipalities[10] (12.4 percent of the national total and 24 percent of the IAs) and approximately 2 million residents (3.2 percent of the population), covering 16 percent of Italy's territory. Figure 2 maps all Italian municipalities according to the SNAI classification. The selected PAs correspond to those inner areas exhibiting the most pronounced socio-economic challenges, including higher rates of depopulation and aging, lower educational attainment, less dynamic labor markets, reduced labor productivity, weaker economic conditions, and diminished institutional quality (Dipartimento per le politiche di coesione, 2019, 2020).

Within each PA, municipalities are required to collaborate through a structured, multistage process that begins with the definition of the Area Strategy (SA) and culminates in the approval of a Framework Programme Agreement (FPA, *Accordo di Programma Quadro* - APQ). This agreement serves as a comprehensive planning instrument, consolidating all proposed projects and detailing their financial structure, implementation mechanisms, timelines, and responsible entities. It also specifies the expected outputs and socio-economic outcomes, providing a clear framework for achieving the policy's objectives (Boscariol, 2017). Although the SNAI was launched in 2014, the first SAs were only approved in 2016, and the initial FPAs followed in 2017, largely due to administrative and bureaucratic delays during the early implementation phase (Dipartimento per le politiche di coesione, 2021)[11]. As a result of these delays, substantial and systematic payments began to be recorded only from 2018 onwards (Monturano et al. 2025; Di Matteo 2025).

[9]The full list of indicators used during the evaluation process is available at: https://www.agenziacoesione.gov.it/strategia-nazionale-aree-interne/la-selezione-delle-aree/.

[10]A total 1,060 municipalities were selected, including 982 IAs and 78 CAs; we focus on IAs in PAs.

[11]By the end of 2018, only 12 out of 72 PAs had signed their FPAs, reflecting the slow start of the program. Approvals accelerated between 2019 and 2020, and by 2021 all FPAs had been signed (see Figure 3).

As of August 2024, a total of 1,688 projects involving 982 municipalities had been defined and approved, with total funding of 410 million euros allocated[12]. By 2023, approximately 160 million euros had been disbursed across 501 treated municipalities (see Section 4.1), corresponding to an average allocation of 314,000 euros per municipality. While the total amount may appear modest in absolute terms, it can represent a substantial injection of resources for these small local economies, with an average population of around 2,000 inhabitants. The distribution of projects and funding varies markedly by geography, source, theme, and type. Central-Northern Italy accounts for 65 percent of the projects but only 41 percent of total funding, while the South hosts 35 percent of projects yet receives 59 percent of resources. The average cost per project in the South (approximately 400,000 euros) is about 2.7 times higher than in the Centre-North (around 150,000 euros), accompanied by a higher payment rate – mainly reflecting differences in project typology. In the South, investments are concentrated in transport, mobility, and tourism, whereas in the Centre-North they are more often directed toward firm competitiveness, education, and social inclusion. Of the total projects, 784 have been completed (23 percent of total costs), 619 are ongoing (59 percent), and 285 have not yet started (18 percent). In terms of funding sources, 58 percent (234 million euros) derives from national resources, which exhibit a lower payment rate (23 percent), while 42 percent originates from European structural funds, showing a higher disbursement capacity (63 percent). By type, infrastructure projects – accounting for more than 58 percent of total planned costs – show lower payment rates, reflecting the longer implementation times and procedural complexity typical of large-scale investments. The purchase of goods and services represents roughly one-third of total planned costs, with a payment-to-cost ratio of 30 percent, indicating that many initiatives are still in early implementation stages. Finally, incentives to firms and individuals, though accounting for only 6 percent of total planned costs, display high execution efficiency, with payment-to-cost ratios around 88 percent. This set of information is summarized in Figures 4, 5, and 6.

# 4 Empirical framework

In this Section, we present the empirical choices made to conduct the analysis, along with a description of the data sources used to analyze the impact of the SNAI.

[12]Based on financial data from the area strategies approved as of December 31, 2020, the programmed interventions for the 72 project areas exceeded 1.15 billion euros (Dipartimento per le politiche di coesione, 2021); a complete funding list is reported in Moscarelli and Fera (2024).

## 4.1 Definition of the treatment and control group

Our analysis focuses on municipalities located within the PAs that were formally eligible to receive SNAI funding.

As a first step, we define the treated group as municipalities that received any positive SNAI-related payment during the observation period, and the control group as those that did not receive any payment in the same period. While using non-funded municipalities as a control group may raise concerns – especially given that almost a decade has passed since the launch of SNAI – it is important to clarify the rationale behind this choice. All municipalities in the sample were formally designated as eligible by the SNAI strategy and, in principle, had access to the same funding opportunities, governance arrangements, and institutional support. However, the actual implementation of the policy varied significantly across areas. The persistence of zero disbursements for some municipalities over such an extended period does not necessarily reflect ineligibility or exclusion from the strategy; rather, it highlights heterogeneity in the uptake and execution of funded projects. Factors such as administrative delays, limited project design capacity, or political inertia may have hindered access to funds in some municipalities[13]. These municipalities therefore serve as a meaningful counterfactual: while exposed to the same policy environment, they did not experience its financial implementation[14].

To ensure comparability also from a statistical standpoint, we match treated and control municipalities based on observable characteristics measured at the beginning of the period. Columns (1)–(3) of Table 1 present baseline comparisons, revealing some differences between the two groups. Treated municipalities tend to be located at higher altitudes, are larger in size, and are more geographically remote. They also exhibit higher employment rates, greater labor force participation, and a larger presence in industrial districts. In addition, they have a higher share of highly educated residents and better-performing local administrations – factors that may have increased their capacity to access SNAI resources. These factors not only increase its capacity to attract resources but also enhance an area's ability to utilize them (for further details see Section 5.2.1). This pattern aligns with the findings of Becker et al. (2013), which show that regions with lower human capital or weaker institutions face significant barriers in accessing European funds, even when classified as "Convergence" regions.

[13] In our empirical specification, we also control for municipal administration quality, in order to account for differences in institutional capacity that may influence both treatment assignment and potential outcomes.

[14] This interpretation is consistent with prior literature on PBPs, which emphasizes that variation in local capacity – rather than formal eligibility – often determines effective access to resources (Becker et al., 2013). In this context, control municipalities can be seen as a "non-implementing" group within the same policy framework, allowing us to isolate the effect of actual funding disbursement rather than mere inclusion in the strategy.

To address these pre-treatment imbalances, we follow the approach of Kline and Moretti (2014), also used in Barone et al. (2025). We estimate a logit model predicting treatment status based on the characteristics in Table 1, and trim the 30 percent of control municipalities with the lowest predicted probability of receiving treatment[15]. After trimming, the treated and control groups are balanced across all key baseline characteristics, as shown in Columns (4)–(6) of Table 1.

As a second step, we further refine the definition of treated municipalities by categorizing them into six cohorts based on the timing of their first funding disbursement, from 2018 to 2023. The control group remains composed of municipalities that were eligible but did not receive any funds. In our baseline model, the first year of treatment is defined as the year in which a municipality receives at least 33 percent of its allocated payments. This threshold reflects a critical point in the project lifecycle – when enough resources have been disbursed to enable implementation – and provides a standardized benchmark for comparing treatment effects across cohorts[16]. Figure 7 displays the geographical distribution of treated municipalities – distinguished by year of intervention – alongside control and trimmed municipalities. To test the robustness of this definition, we repeat the analysis using alternative thresholds that capture earlier and later stages of disbursement; results are reported in Figure C1.

Table 2 presents the funding, SNAI financial progress (in terms of payments), the number of municipalities, the number of inhabitants, and the corresponding per capita values, broken down by control group, treated group, and cohorts based on the year of treatment.

## 4.2 Data and sample

The empirical analysis is based on several data sources, which have been merged into a unique municipality-level dataset[17]. Municipalities are observed over the period 2014–2023, resulting in a panel dataset. The sample consists of the trimmed dataset as discussed in Section 4.1. A complete list of variables, summary statistics, and data sources are provided in Table 3.

[15]The 25 percent trimming threshold used by Kline and Moretti (2014) and the 30 percent threshold used by Barone et al. (2025) both represent established approaches in the literature. We perform the analysis using both thresholds, obtaining similar results. As an additional robustness check, we construct the control group using propensity score matching, finding no significant differences in the results, which are reported in Figure C3.

[16]Additionally, the 33 percent figure corresponds to the first quartile of the payment progress distribution, meaning that by this point, a notable portion of funds has been allocated, signaling that the project is underway. This approach ensures a realistic and timely evaluation of the project's early stages.

[17]Unique municipality identifiers are provided by Istat and have been mapped according to the official classification as of December 2021.

*SNAI projects data.*– Data on the SNAI projects, including allocations and payments, come from the OpenCoesione website (www.opencoesione.gov.it). This archive contains expenditure data from both European Structural Funds and co-financing by the Italian Government (or local authorities), and in some cases, the private sector. Notably, the data include detailed geo-referenced information on the targeted locations. Specifically, for more than 95 percent of the projects, we have location data at the municipality level. For the remaining cases, which were at the provincial or regional level, we reallocated the spending to municipalities based on the 2014 population (the start date of the SNAI). National-level projects were excluded, as they would not contribute to estimating the effect due to the focus on geographical variation (Ciani and De Blasio, 2015; Albanese et al., 2021).

*Territorial and socio-economic data.*– Data on territorial characteristics, such as altitude, population density, and other geographic factors, as well as socio-economic conditions, including the number of local business units and the related number of employees, educational attainment, and other relevant indicators at the municipal level, are sourced from Istat[18].

*Housing data.*– Housing data come from the *Osservatorio del Mercato Immobiliare* (OMI), the real estate market observatory of the Italian Tax Office. The OMI database provides semiannual estimates of residential property prices, expressed as ranges of euros per square meter, for each OMI zone within Italian municipalities. OMI price estimates are derived from administrative records of real estate transactions and are intended as reference values for market analysis. For the purposes of this study, we aggregated the semiannual zone-level data to the municipality-year level. Specifically, for each observation we computed the arithmetic mean of the minimum and maximum price within the reported range, and then averaged these values across all OMI zones in the same municipality and year. This procedure yields a single annual average price per square meter for each municipality in the sample. As a robustness check, we also use data from the digital platform *Immobiliare.it*, the leading online marketplace for buying and selling housing units in Italy (for details, see Loberto et al., 2018). Unlike OMI, these data do not record actual transactions and are available only from 2017 onward; however, they provide detailed information on each advertisement, including geographical coordinates, key property characteristics, and the asking price. This level of detail allows us to analyze price variations while holding property characteristics

[18]Specifically, data on the number of local business units and employees are drawn from the Istat ASIA (Statistical Register of Active Enterprises) database, which provides information on private firms and publicly-owned companies. However, data are not available for central and local public administrations, universities, entities of the National Health Service, and firms operating in the agricultural sector.

constant: to account for these differences, we estimate a hedonic regression and use the residuals as the outcome variable. Results based on OMI and *Immobiliare.it* data are not significantly different; the comparison is reported in Figure C2.

*Governance quality data.*– Data on the quality of local governance are derived from the dataset constructed by Cerqua et al. (2025), which integrates information from the Ministry of the Interior, the Annual Account of the State General Accounting Office, and the Register of Local and Regional Administrators. This dataset is the foundation for the Municipal Administration Quality Index (MAQI), a composite index that evaluates local governance quality through three fundamental pillars: (i) the quality and capacity of the local bureaucratic apparatus, (ii) the quality of local politicians, and (iii) the fiscal efficiency and economic performance of local governments.

## 4.3 Empirical strategy

The empirical strategy used to estimate the effect of the SNAI policy on outcome variables relies on a staggered difference-in-differences (DiD) approach. This method is well-suited to the SNAI policy, as its implementation occurred in distinct cohorts over several years, specifically from 2018 to 2023[19]. In this framework, the cohorts consist of groups of municipalities that began receiving treatment (i.e., payments from SNAI funds) at different times. In our setting, treatment timing can be regarded as effectively random, as it was largely determined by administrative and resource constraints – such as imperfect information flows between local and central authorities and limited availability of funds – rather than by observable municipal characteristics[20].

We use the "interaction-weighted" (IW) estimator developed by Sun and Abraham, 2021 for staggered DiD designs. The estimation method improves upon traditional DiD techniques by addressing the biases that can arise when treatments are introduced at different points in time[21]. This method for the cohort average treatment effect on the treated (CATT) focuses on calculating the cohort-specific treatment effect by comparing the outcomes of treated units with those of an appropriate control group.

Before delving into the estimation method, we first introduce the necessary notation. We consider a panel dataset with $N$ units and $T+1$ periods. For each $i \in \{0, \ldots, N\}$ and $t \in \{0, \ldots, T\}$, we observe the outcome $Y_{i,t}$ and treatment status $D_{i,t} \in \{0, 1\}$:

[19] In the event studies, we exclude the 2018 cohort due to small sample sizes (see Table A1).

[20] Moreover, by applying the trimming procedures described in Section 4.1, we already account for potential differences in the structural characteristics of municipalities in the pre-treatment period.

[21] The classic DiD methodology can produce biased estimates when treatment adoption is staggered and treatment effects are heterogeneous. In such cases, the two-way fixed effects (TWFE) estimator may yield misleading results due to inappropriate weighting of comparison groups, which compromises the estimates.

$D_{i,t} = 1$ if $i$ is treated in period $t$ and $D_{i,t} = 0$ if $i$ is not treated in period $t$. The treatment is considered an absorbing state, meaning once a unit is treated, it cannot revert to the untreated state. We can thus uniquely characterize a treatment path by the time period of the initial treatment, denoted with $E_i = \min\{t : D_{i,t} = 1\}$. If unit $i$ is never treated, i.e. $D_{i,t} = 0$ for all $t$, we set $E_i = \infty$. Based on when they first receive the treatment, we can also uniquely categorize units into disjoint cohorts $e$ for $e \in \{0, \ldots, T, \infty\}$, where units in cohort $e$ are first treated at the same time $\{i : E_i = e\}$. Furthermore, we define $D^{\ell}_{i,t} := 1\{t - E_i = \ell\}$ to be an indicator for unit $i$ being $\ell$ periods away from initial treatment at calendar time $t$. For never-treated units $E_i = \infty$, we set $D_{\ell i,t} = 0$ for all $t$.

The method consists of three main steps. First, we estimate the CATT using a linear two-way fixed effects specification that interacts relative period indicators with cohort indicators:

$$y_{i,t} = \sum_{e \neq C} \sum_{\ell \neq -1} \delta_{e,\ell} \left(1\{E_i = e\} \cdot D^{\ell}_{i,t}\right) + X'_{i,t}\omega + \alpha_i + \lambda_t + \epsilon_{i,t} \tag{1}$$

where $y_{i,t}$ denotes the outcome of interest (e.g. population, number of local business establishments, housing prices, or employment) for municipality $i$ at time $t$. We exclude the never-treated cohort, i.e. $C = \infty$, and we normalized the event study with respect to $-1$, the previous relative time. $\delta_{e,\ell}$ represents the average treatment effect $\ell$ periods from the initial treatment for the cohort of units first treated at time $e$. $X'_{i,t}$ is an optional matrix of time-varying control variables, $\alpha_i$ and $\lambda_t$ represent the municipality and time fixed effects, respectively, which account for municipality-specific characteristics and time-specific shocks. Finally, $\epsilon_{i,t}$ is the stochastic error term. The standard errors are robust and clustered at municipal level.

Second, we estimate the weights by sample shares of each cohort in the relevant period $\ell$. These weights reflect the relative importance of each cohort in the overall average treatment effect calculation.

Finally, the IW estimator is computed as the weighted average of the CATTs (from the first step), using the weights obtained in the second step.

*Identification assumptions.*– The identifying assumptions extend the classical DiD framework: (i) no anticipatory effects; and (ii) parallel trends (for further technical details, see Sun and Abraham, 2021). Both assumptions are theoretically plausible.

Regarding anticipatory effects, it is important to distinguish between two potential sources of bias: one stemming from the perspective of individual agents, such as en-

trepreneurs or workers, and the other from the viewpoint of local politicians. From the perspective of individual agents, the historical and cultural inertia typical of small municipalities makes it highly improbable that they could have anticipated the effects of the policy. Moreover, the novelty and inherent uncertainty surrounding the policy further reduced the likelihood that these agents could foresee its benefits. Consequently, individual agents had little realistic opportunity to adjust their behavior in advance, a key condition that supports the validity of the identification strategy. From the perspective of local politicians, potential concerns arise from the fact that receiving SNAI funding may depend on factors such as the quality of local administration and the extent of political connections. To address this potential source of selection bias and strengthen the credibility of our identification strategy, we include a control for local administrative quality and explicitly explore heterogeneity in treatment effects (see Section 5.2.1)[22].

The parallel trends assumption holds credibility as the municipalities were selected based on shared characteristics, ensuring comparability between the treatment and control groups. Additionally, the time-invariant structural challenges faced by these municipalities, such as geographic isolation, significantly influence the outcome variable and are unlikely to change in the absence of the policy intervention.

# 5 The impact of the SNAI

## 5.1 Baseline results

We assess the impact of the SNAI on demographic trends and local economies by examining four outcome variables: population, the number of local business establishments, housing prices, and employment. These variables are expressed in logarithmic form to both reduce heteroscedasticity in the disturbances and allow for the interpretation of the estimated coefficients as percentage changes, via the logarithmic approximation.

After testing several specifications, the preferred model (hereafter referred to as the baseline specification) includes, in addition to municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. The sample is trimmed as detailed in Section 4.1.

Figure 8 shows the results (whereas the coefficients are reported in Table 5). This

[22]Furthermore, to ensure robustness of our identification strategy, we replicate our baseline results using the last cohort of treated municipalities as the control group, restricting the comparison to units that receive funding. The results are broadly consistent with the baseline estimates.

specification is able to capture dynamics that are similar to those observed before the event, as the pre-treatment trend remains substantially flat across all outcomes considered. The coefficients from the pre-treatment period are not statistically significant, suggesting no noticeable difference between treated and control municipalities prior to the intervention. The treated group did not differ from the control group before the event, but showed different trends in some outcome variables after treatment. The results that emerge are as follows.

First, we assess whether SNAI funding has influenced demographic trends, a primary objective of the policy. Overall, we do not find statistically significant effects on population dynamics (Figure 8, top left panel). This result is consistent with the expectation that demographic changes may take longer to materialize. Reversing or mitigating depopulation is a particularly challenging task, as it requires not only curbing outmigration but also operating within a broader context of declining fertility and overall demographic contraction. A small positive effect, significant at the 10 percent level, appears four years after treatment; however, this finding is driven exclusively by the 2019 cohort and should be interpreted with caution. Further analysis of population structure (Figure A1) reveals a modest reduction in the old-age ratio. This pattern appears to be largely associated with the relatively more favorable initial demographic profile of the 2019 cohort, which included a younger population structure and lower mortality rates at baseline. Net migration appears largely unchanged[23]. More robust conclusions will require additional data and future updates.

Second, the policy produced a positive and statistically significant effect – approximately 2 percent – in the number of local business units (aggregated ATT in Table 5). The effect emerges in the year of implementation and intensifies over time (Figure 8, top right panel). These results align with those reported in Monturano et al. (2025)[24]. However, it is important to emphasize that the observed increase in business establishments stems primarily from the creation of new enterprises, rather than from the mere prevention of closure of at-risk establishments. The SNAI program has the potential both to stimulate local entrepreneurship and to slow the decline of existing businesses in the area: the short- and medium-term effects are evident, as the estimated coefficients increase significantly over time. When disaggregating the analysis by ATECO macro-sectors, a persistent growth in manufacturing local units (industry

[23]Although the natural growth rate improves, it remains negative overall, and net migration is near zero. The improvement in the natural growth rate, despite limited in-migration and stable emigration, suggests that inner areas may be stabilizing demographically from within. Rather than reversing decline by attracting new residents, these territories retain their existing population, likely benefiting from improved living conditions and services that encourage family formation and reduce demographic outflows; unfortunately we cannot directly test these hypothesis.

[24]Due to data availability, Monturano et al. (2025) can only observe the effect up to $t=1$.

and construction) emerges. Conversely, no significant effects are observed for services, particularly those related to tourism (see Figure A2).

Third, regarding economic well-being, we find no significant effects on housing prices (Figure 8, bottom left panel). This result is unsurprising: given the absence of measurable population growth or substantial increases in activities such as tourism that could drive housing demand, the SNAI's short-term impact on the housing market is expected to be modest or negligible[25].

Finally, in the labor market (Figure 8, bottom right panel), no significant effects are observed[26]. Several plausible mechanisms may explain the observed increase in local business units without a corresponding rise in employment, though these cannot be directly tested in our analysis. Possible explanations include the predominance of small and micro enterprises with limited labor demand, the use of labor-saving technologies, short- to medium-term lags in employment growth, and the presence of informal or undeclared labor not captured by administrative data. This pattern is consistent across all ATECO macro-sectors (see Figure A3).

## 5.2 Decomposing the impact of the SNAI

Within the sample, there exists significant heterogeneity, particularly in terms of the quality of local government and geographic location[27]. Analyzing this heterogeneity is essential for developing a more nuanced and comprehensive understanding of the diverse impacts of the SNAI.

### 5.2.1 Local quality of administration

The ability to absorb and effectively utilize external funding is influenced by several factors, one of which is the level of local administrative quality (Becker et al., 2013; Ciani and De Blasio, 2015). We assess the impact of administrative quality on outcomes to determine whether it plays a crucial role in the effectiveness of the SNAI.

The quality of local administrations influences both the ability to attract external resources (see Section 4.1) and the capacity to effectively manage and allocate them once received. Our results indicate that the effects on the number of local business units are stronger in municipalities with higher administrative quality (Figure 9). This suggests that the impact of SNAI funding is not determined solely by whether a municipality

[25] Additionally, the SNAI's focus on local development rather than directly targeting the housing sector could explain why no significant price changes are observed in the short term.

[26] Our dataset does not include public administration and agriculture; therefore, potential effects in these sectors are not captured.

[27] In Appendix B.2, we also report the decomposition of the effects by type of intervention.

receives support, but also by the capacity of local administrations to manage and implement the resources effectively. Municipalities with more capable administrations tend to experience more pronounced improvements in local business density, highlighting the role of governance quality in shaping the policy's effectiveness.

### 5.2.2 Geographical heterogeneity

In analyzing the impact of the SNAI, it is crucial to consider territorial heterogeneity. We focus on the distinction between the North-Central and Southern macro regions[28], as this classification captures a significant portion of the heterogeneity within the PAs (for further details, see Appendix B.1).

Figure 10 shows the results. The impact of the SNAI differs between these two macro-areas. Prior to the introduction of the policy, municipalities in the Centre-North PAs exhibited a higher level of industrial specialization, a more dynamic labor market, greater human capital, and better quality of local administration (for further details, see Appendix B.1). These characteristics likely contributed to a relatively larger increase in the number of local business sites, suggesting a stronger response in terms of economic activity. These heterogeneous effects highlight the importance of considering regional specificity when evaluating PBPs.

## 5.3 Interactions with other funding

A relevant aspect to consider in assessing the effects of the SNAI is the involvement of other funding sources in the municipalities of the PAs during the same analysis period (i.e. 2014-2023). In particular, it is important to focus on those funds that have had a significant impact on these areas, as their interaction with the SNAI could influence the overall outcomes. Accounting for these additional funding sources is crucial for isolating the true effect of the SNAI, as the observed results may otherwise be influenced by the presence of other financial interventions, making it difficult to attribute changes solely to the SNAI.

In this section, we specifically examine the interaction with (i) the NRRP (National Recovery and Resilience Plan); (ii) the Cohesion Funds of the 2014–2020 programming cycle; and (iii) the 2016 Central Italy earthquake event.

*The NRRP.*– The National Recovery and Resilience Plan has allocated substantial funds both for targeted interventions within PAs and for broader initiatives affecting

[28]The Centre-North includes the regions of Piedmont, Valle d'Aosta, Lombardy, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Tuscany, Umbria, Marche, and Lazio. The South includes Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, Sicily, and Sardinia.

the PAs more generally[29]. Regarding the targeted NRRP funds, we consider two main programs: (i) the attractiveness of villages and (ii) territorial proximity health services. The attractiveness of villages refers to initiatives aimed at making small municipalities more appealing to residents and tourists by improving quality of life, services, and infrastructure. These interventions are intended to preserve cultural heritage, revitalize tourism, and stimulate economic development in less populated and disadvantaged areas[30]. Territorial proximity health services, on the other hand, involve the establishment of local health facilities that ensure more direct and rapid access to healthcare services, particularly in peripheral areas. These services are designed to reduce the gap between urban and rural areas by improving the quality and efficiency of healthcare, providing services to populations that might otherwise face challenges in accessing care[31]. In order to better isolate the effect of SNAI, we replicate the baseline analysis excluding municipalities targeted by specific NRRP interventions – such as those aimed at enhancing village attractiveness or improving territorial health services[32]. Regarding the broader NRRP funds affecting pilot areas, we distinguish between municipalities that received per-capita funding above or below the median within these areas (approximately 160 euros).The results, shown in Figure 11, reveal no significant deviations from the baseline estimates.

*Cohesion funds 2014-2020.–* We also investigate the interaction with other payments recorded on the OpenCoesione platform, focusing in particular on those from the 2014–2020 programming period. Within the PAs, payments from these cohesion funds amounted to approximately 1.75 billion euros. To better isolate the effect of the SNAI policy, we conduct two complementary analyses. In the first, we differentiate municipalities according to whether they received high or low per-capita cohesion fund payments (above or below the median within the PAs). In the second, we restrict the sample to municipalities where SNAI funds predominated[33]. Results are reported in Figure 12

[29] As of 2023, the effects of these funds remain limited, with only 18 percent of the allocated resources disbursed. The timing of our analysis, combined with these disbursement delays, helps isolate the effect of the SNAI policy.

[30] The attractiveness of villages is structured into two lines: (i) Line A, which allocates 420 million to fund pilot projects for the regeneration of at-risk or abandoned villages, emphasizing cultural, social, and economic revitalization; and (ii) Line B, with 580 million, which aims to support urban and social regeneration in historic villages, fostering local economic growth through cultural, tourism, and artisanal activities.

[31] This initiative is part of the SNAI, with approximately 19 million allocated to support the development of these services.

[32] Specifically, 88 municipalities are excluded from the control group and 123 from the treated group, resulting in a sample reduction of approximately 28 percent.

[33] Specifically, treated municipalities are included if their SNAI payments are greater than or equal to their total cohesion payments, while control municipalities are included if their cohesion payments are less than or equal to the average SNAI payment among treated municipalities (approximately 300,000 euros). This filtering reduces the sample by about 60 percent but allows for a cleaner identification of

and do not show significant differences compared to the baseline model.

*Central Italy earthquake.*– The 2016 Central Italy earthquake caused significant damage across several municipalities, some of which are also located in IAs, leading to the allocation of substantial reconstruction funds (see Dottori, 2024 for further details). These resources may overlap or interact with SNAI funding, potentially influencing the observed effects of the SNAI program. Mirroring the exercises conducted for the NRRP and Cohesion funds, to isolate the effect of the SNAI policy, we exclude from the sample the municipalities affected by the 2016 earthquake[34]. The results remain consistent with the baseline specification and are presented in Figure 13.

### 5.4 Spatial spillover effects

Finally, we investigate the potential presence of spatial spillovers, with a focus on assessing both the magnitude and the impact of the treatment on neighboring municipalities. A priori, the exact direction and extent of any spillover effects, if they exist, is unknown, and their assessment must rely on empirical evidence[35]. To manage this uncertainty, we implement a strategy where we progressively exclude from the control group those units located at increasing distances from treated municipalities (Kline and Moretti, 2014; Albanese et al., 2021; Monturano et al., 2025). Specifically, we use exclusion thresholds of 10 and 20 kilometers distance between the centroids of municipalities. These thresholds are consistent with the spatial dimensions of the areas involved: the average municipality has a radius of 4 kilometers, PAs extend to 15 kilometers, with a maximum of 25 kilometers.

Figure 14 presents results indicating the absence of spatial spillover effects on the outcome variables. This lack of significant spillovers further supports the robustness of our baseline model.

## 6 Conclusion

Ten years after its introduction, the SNAI has yielded mixed but informative results. There is no clear evidence of a sustained increase in population trends, in line with the structural and long-term nature of demographic change. A small positive signal

the SNAI effect.

[34]We exclude approximately 7 percent of the sample, removing 35 municipalities from the treated group and 13 from the control group.

[35]In our baseline model, we observe a significant increase in local business units, which raises the question of potential spillover effects. On the one hand, positive spillovers could occur, as more active and thriving municipalities may generate dynamics that benefit firms in neighboring areas. On the other hand, negative spillovers are also possible, as firms might relocate their productive activities to nearby treated municipalities to take advantage of the treatment.

emerges only four years after treatment, and is limited to the cohort of municipalities for which this analysis can be fully implemented. The policy has effectively stimulated local economic activity, particularly by increasing the number of business units in treated municipalities. Nonetheless, its impact remains limited: no significant effects on employment or housing prices were detected, indicating that labor market and real estate dynamics have not substantially changed in the short to medium term. Municipalities characterized by higher administrative capacity exhibit stronger positive effects in local business density, highlighting the critical role of governance quality in the successful implementation of place-based policies. Additionally, geographical disparities exist, with economic impacts more pronounced in Central and Northern Italy.

It is important to stress that this analysis offers a preliminary assessment. Despite a decade having passed since its formulation, SNAI implementation remains ongoing, and the outcomes examined here largely reflect its early stages. Furthermore, to date, only a small portion of national funds – primarily allocated to essential services – has been disbursed, largely due to administrative and bureaucratic delays during the early implementation phase. The modest effects observed may, in part, reflect the gradual pace of implementation. Access to basic infrastructure such as schools, hospitals, and reliable transport networks represents a key precondition for fostering local development. Without such services, attracting private investment or encouraging residential mobility remains a significant challenge for many structurally disadvantaged areas. Overall, these findings underscore the complexity of addressing regional imbalances and suggest that policy refinements may be necessary to improve the long-term sustainability of the SNAI. Future research should focus on the policy's long-term effects as additional data become available, particularly concerning its influence on demographic trends and structural economic transformation.

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# Figures and Tables

Figure 1: Actions, intermediate, and final objectives of the SNAI

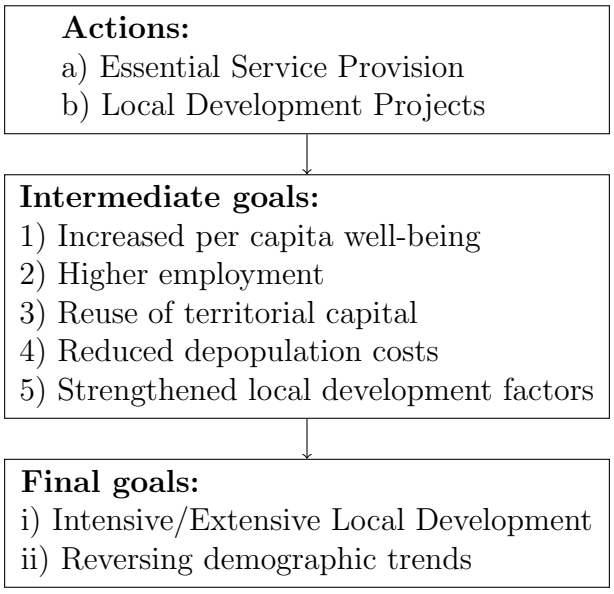
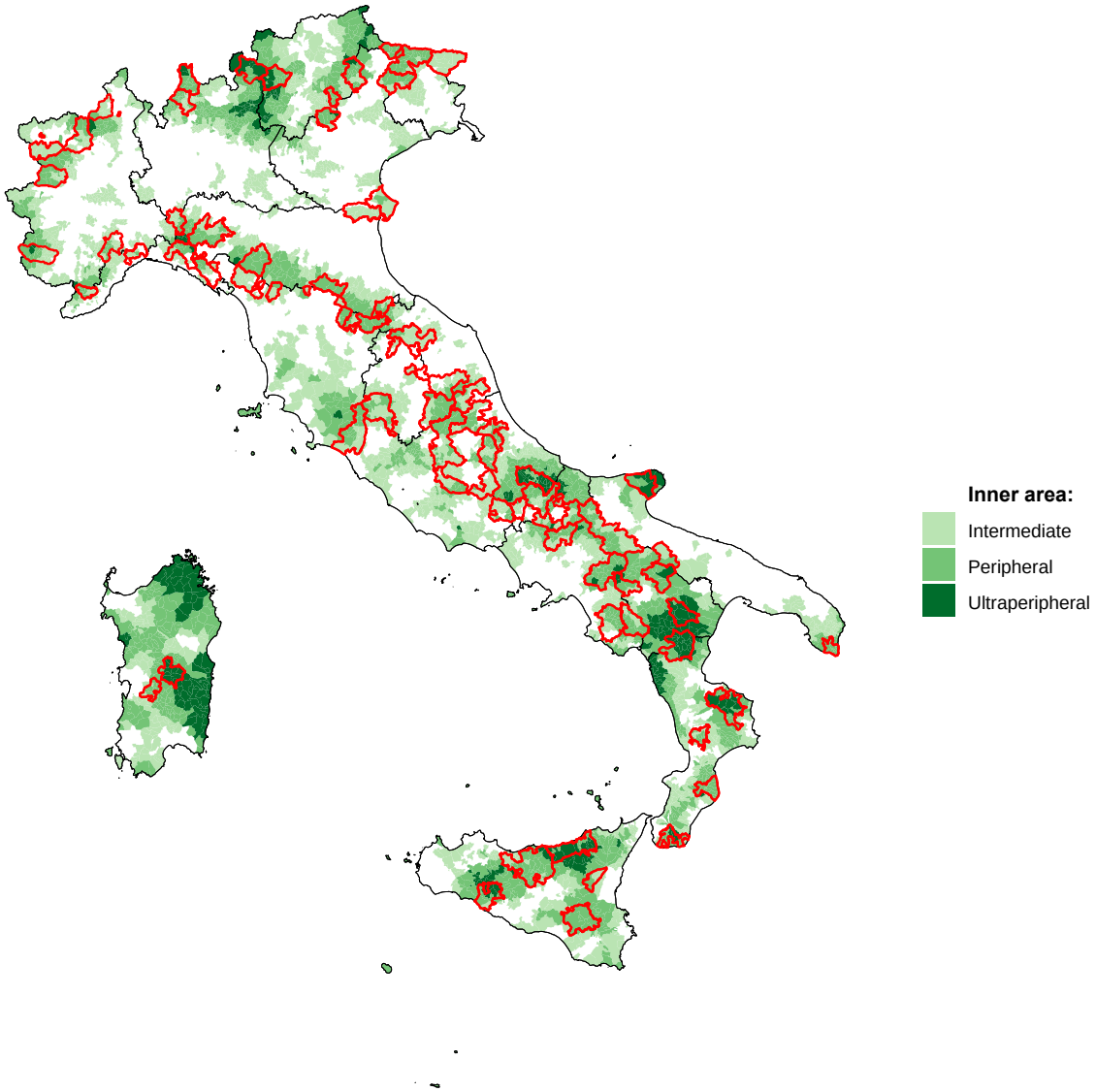
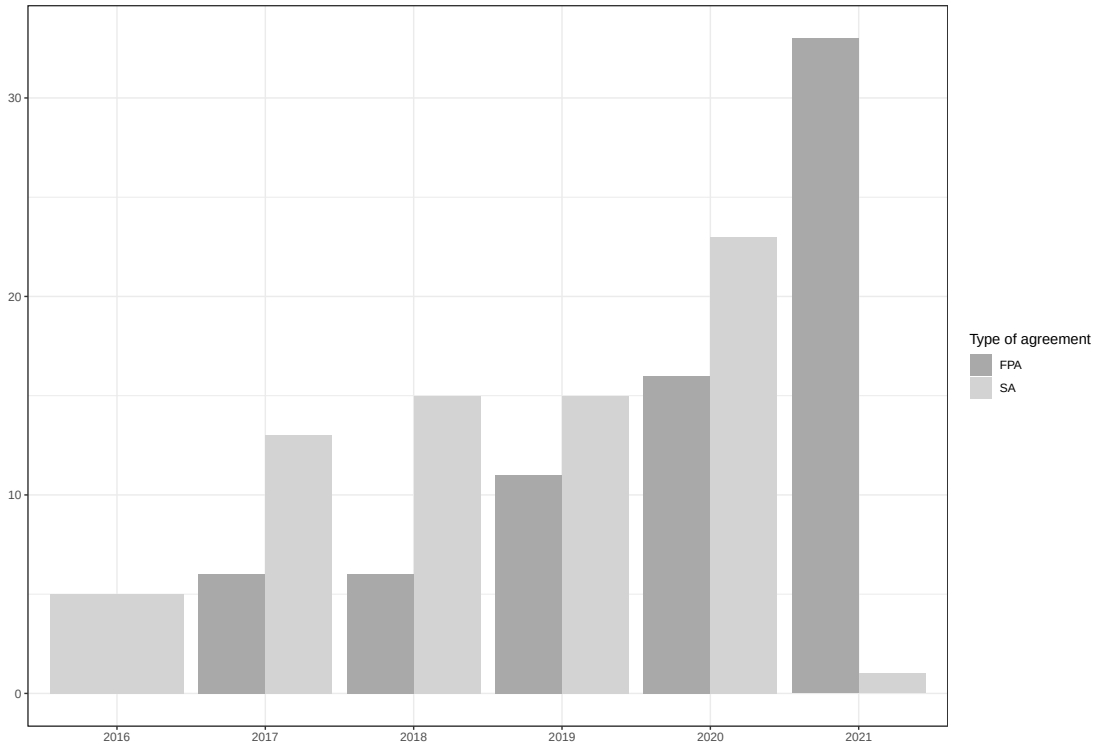


Figure 2: Classification of municipalities according to the SNAI



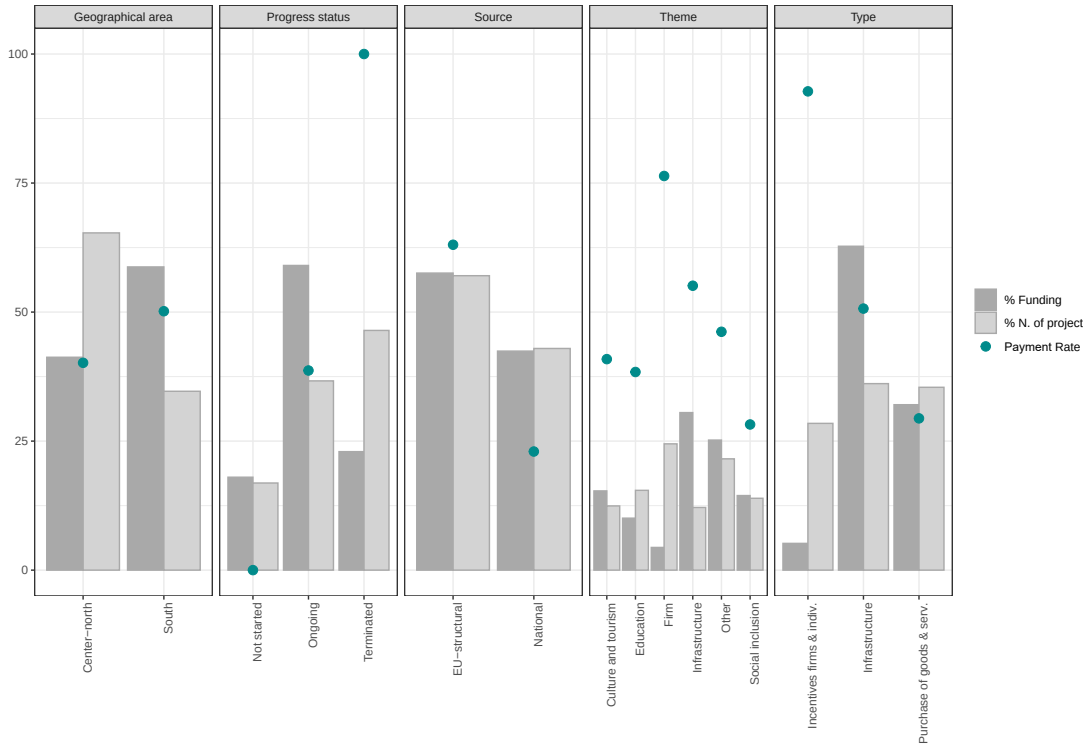

*Notes* - IAs are represented in various shades of green, from the lightest for intermediate municipalities to the darkest for the most peripheral ones; CAs are represented in white; the border of the PAs are represented in red.

Figure 3: Distribution of signing dates: Area Strategies (SAs) and Program Framework Agreements (FPAs)



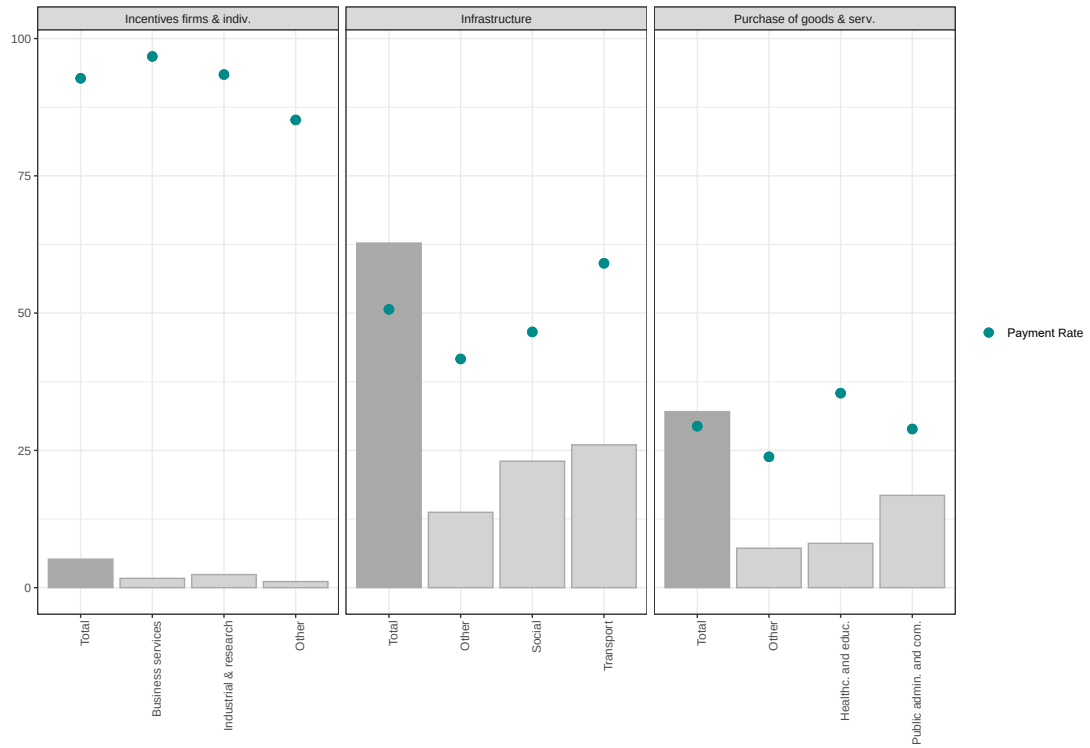

*Notes* - Distribution by year of signing of the Area Strategies (SAs) and Program Framework Agreements (FPAs). Author's elaboration based on data from the OpenCoesione website and from Dipartimento per le politiche di coesione, 2021.

Figure 4: Distribution of funding, projects and payment rate by source, geographical area, progress status, theme and type



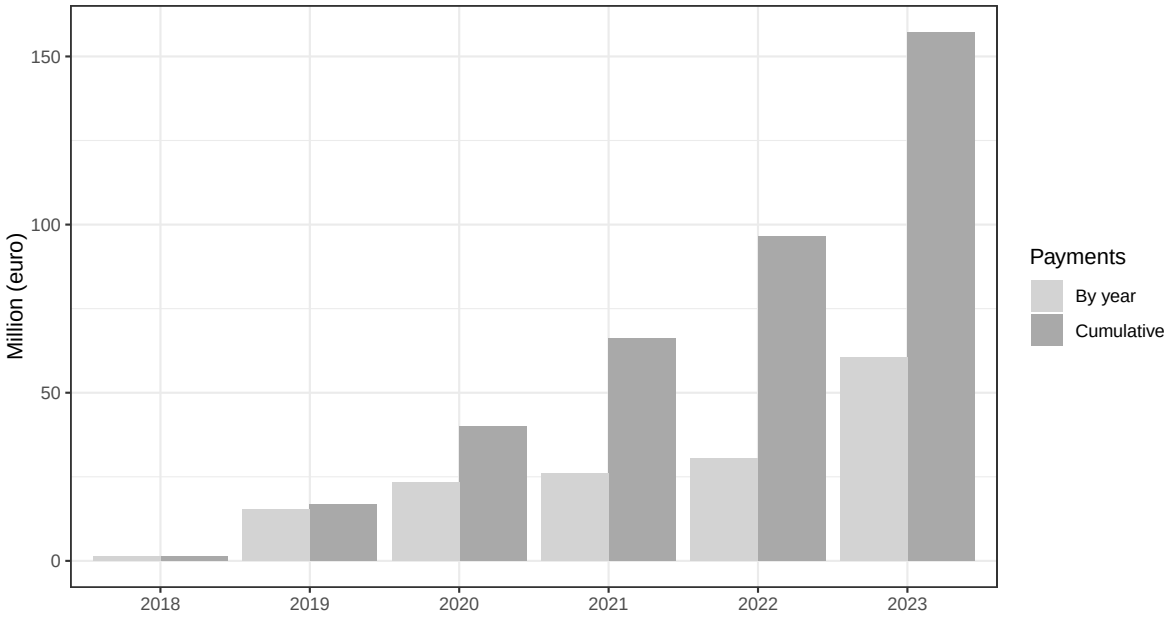

*Notes* - Distribution of funding, projects and payment rate by source, geographical area, progress status, theme and type of project. Author's elaboration based on data from the OpenCoesione website.

Figure 5: Distribution of fundings and payment rate by type and sub-type of project



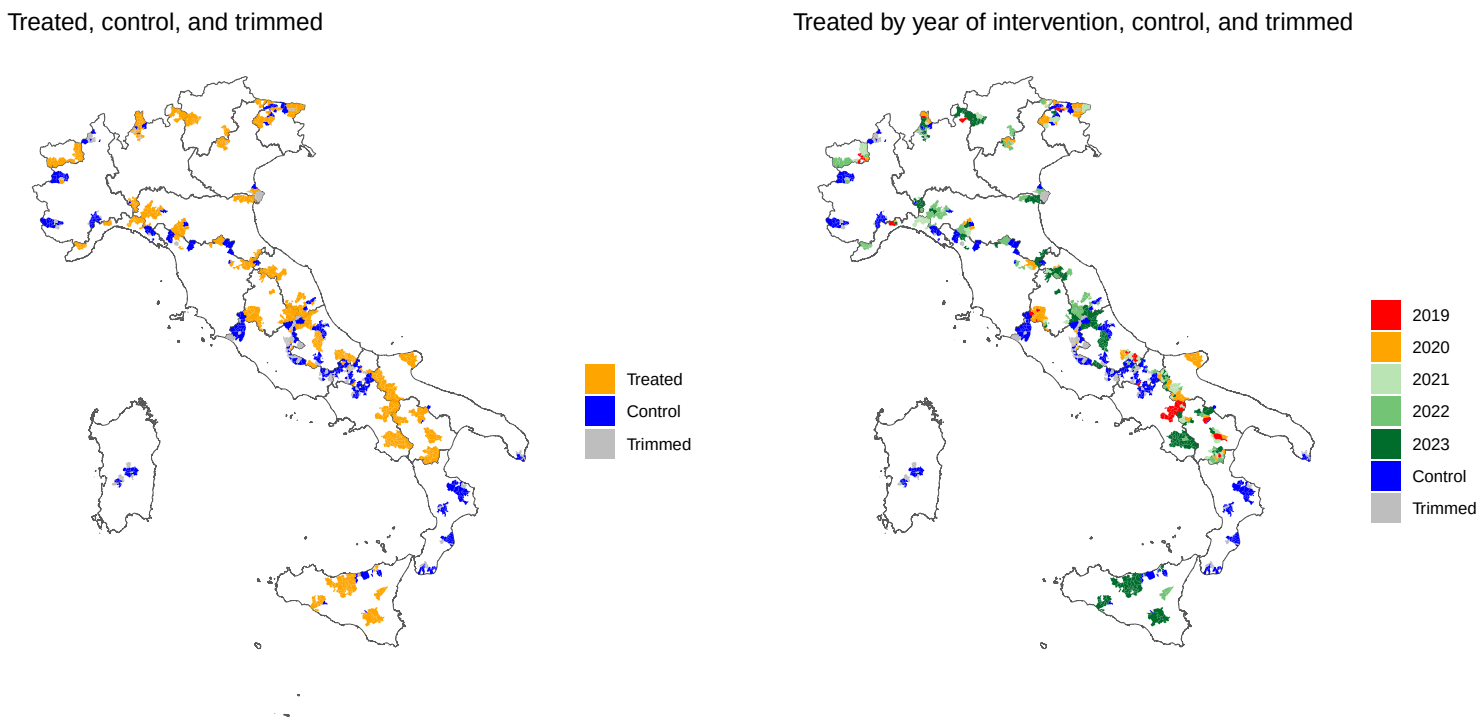

*Notes* - Distribution of funding and payment rate by type and sub-type of project. Author's elaboration based on data from the OpenCoesione website.

Figure 6: SNAI payments 2018-23



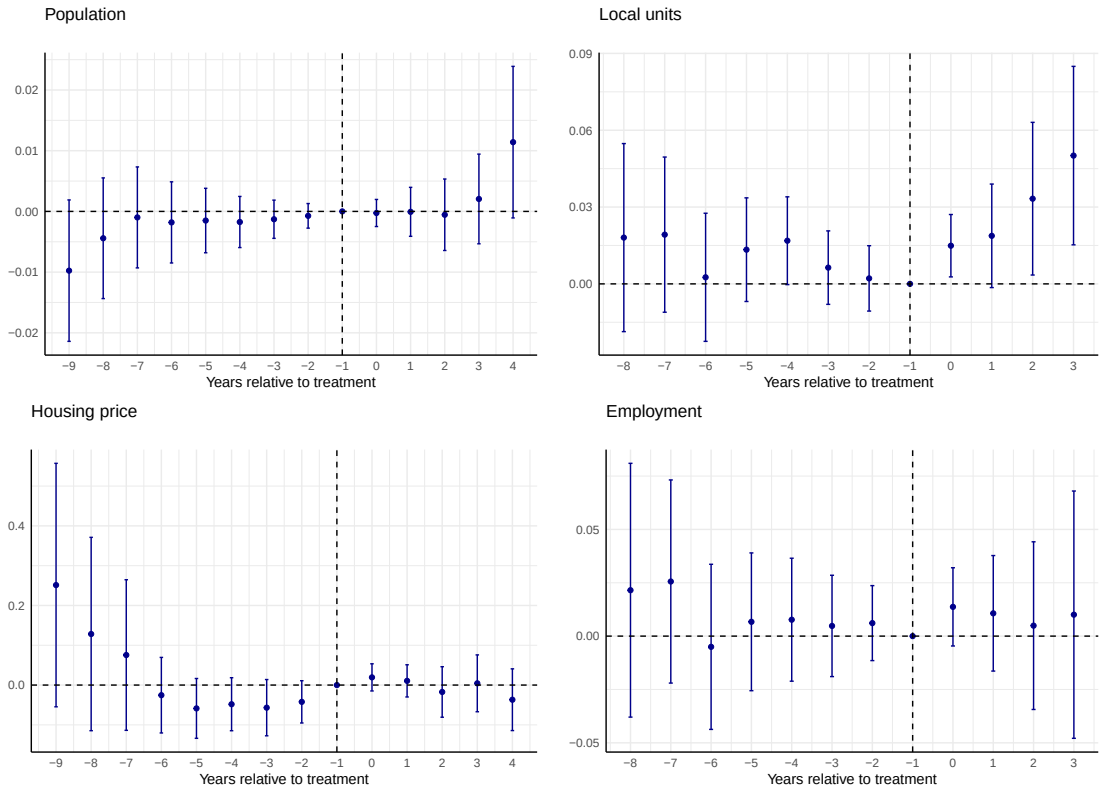

*Notes* - SNAI payments in 2018-2023. Author's elaboration based on data from the OpenCoesione website.

Figure 7: Treated, control and trimmed municipalities



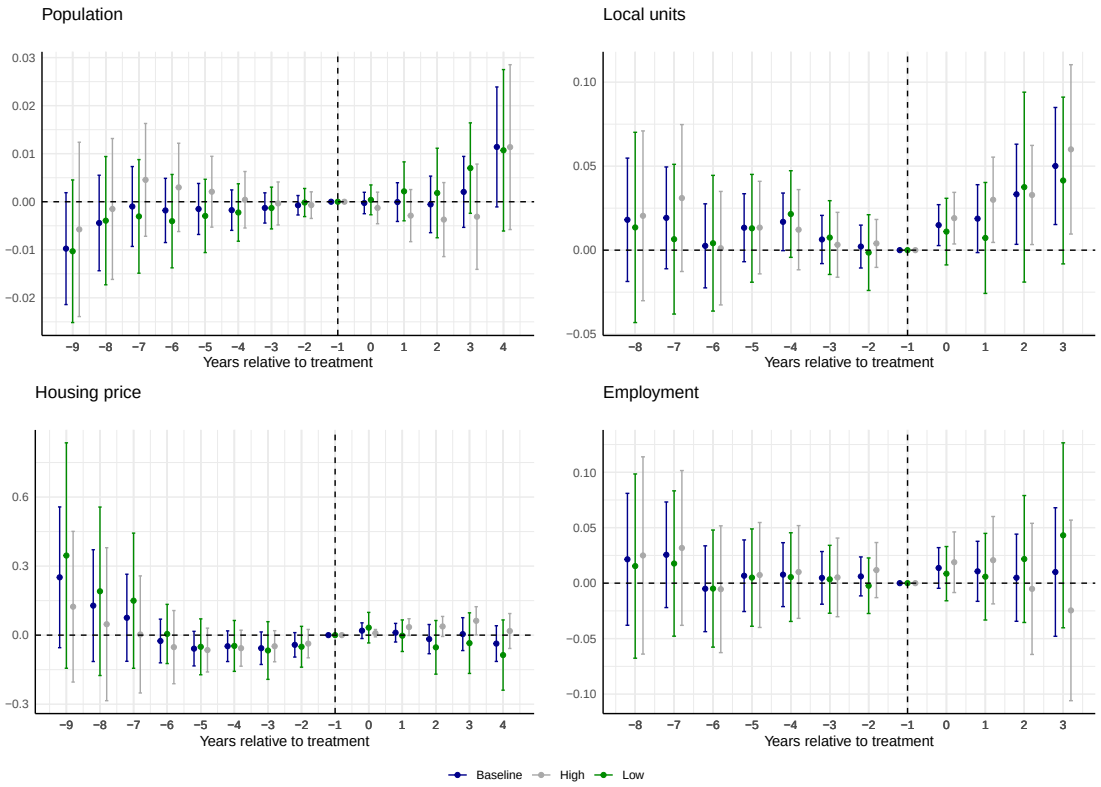

*Notes* - The left panel reports the map displaying treated, control, and trimmed municipalities. The right panel provides a breakdown of the treated municipalities by year of intervention, as defined in Section 4.1.

Figure 8: Event study: baseline results



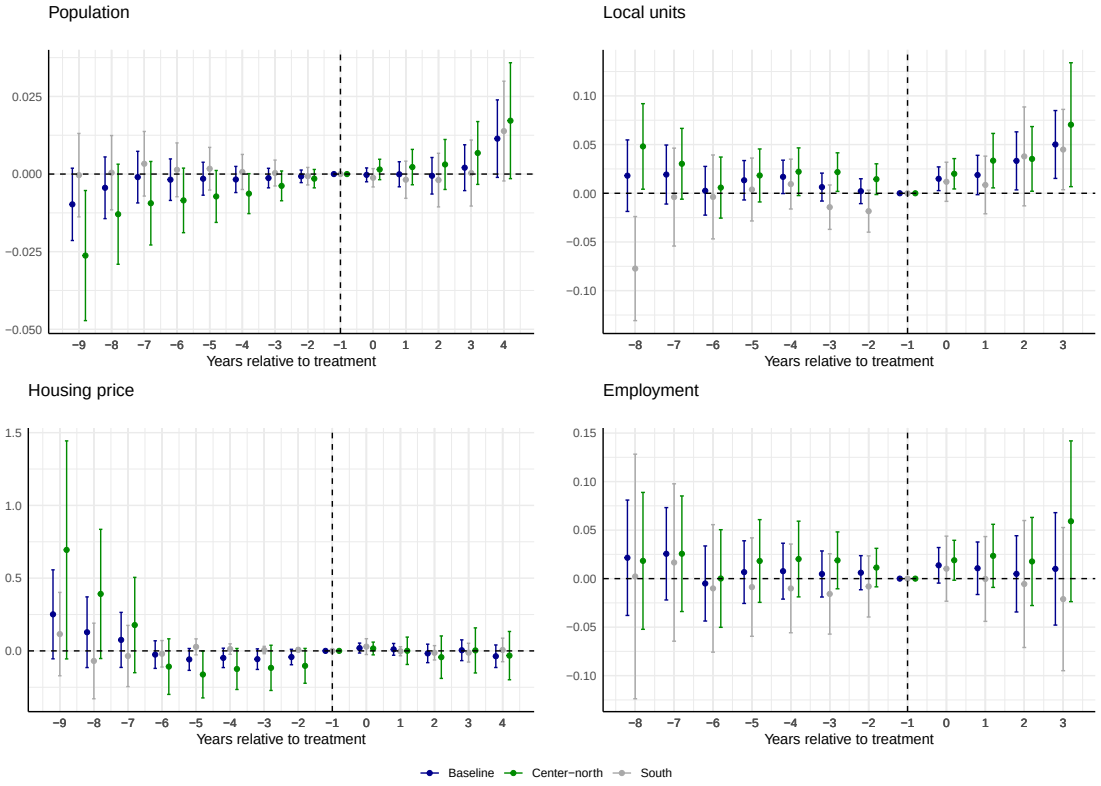

*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of population in the top left panel, the logarithm of the number of local units in the top right panel, the logarithm of average housing unit prices per square meter in the bottom left panel, and the logarithm of the employment in the bottom right panel. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Figure 9: Event study: level of local administration quality



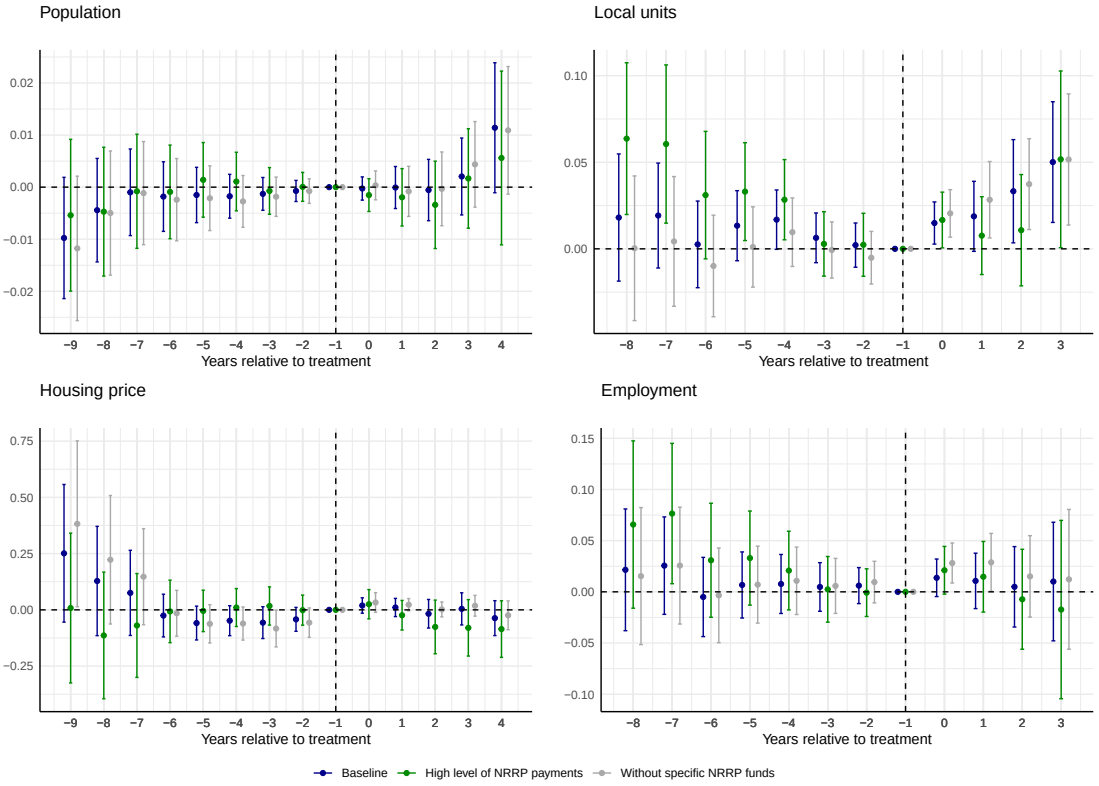

*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of population in the top left panel, the logarithm of the number of local units in the top right panel, the logarithm of average housing unit prices per square meter in the bottom left panel, and the logarithm of the employment in the bottom right panel. The blue line shows the baseline regression, while the grey and green lines report estimates based on sub-samples of municipalities with, respectively, high and low levels of local administrative quality. High and low quality are defined as being above or below the median of the MAQI index distribution (Cerqua et al., 2025). The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Figure 10: Event study: geographical heterogeneity



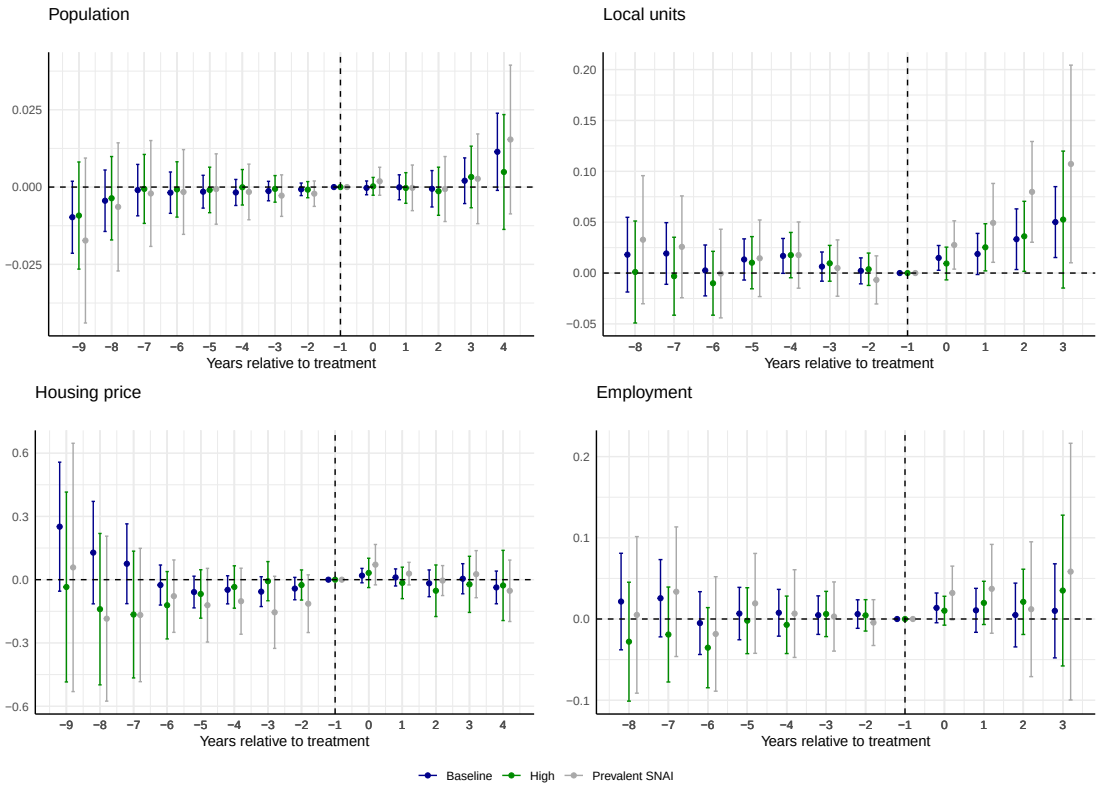

*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of population in the top left panel, the logarithm of the number of local units in the top right panel, the logarithm of average housing unit prices per square meter in the bottom left panel, and the logarithm of the employment in the bottom right panel. The blue line shows the baseline regression, while the green and grey lines report estimates based on sub-samples of municipalities located in the Centre-North (Piedmont, Valle d'Aosta, Lombardy, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Tuscany, Umbria, Marche, and Lazio) and the South (Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, and Sicily) NUTS-2 italian regions. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Figure 11: Event study: interaction with NRRP funding



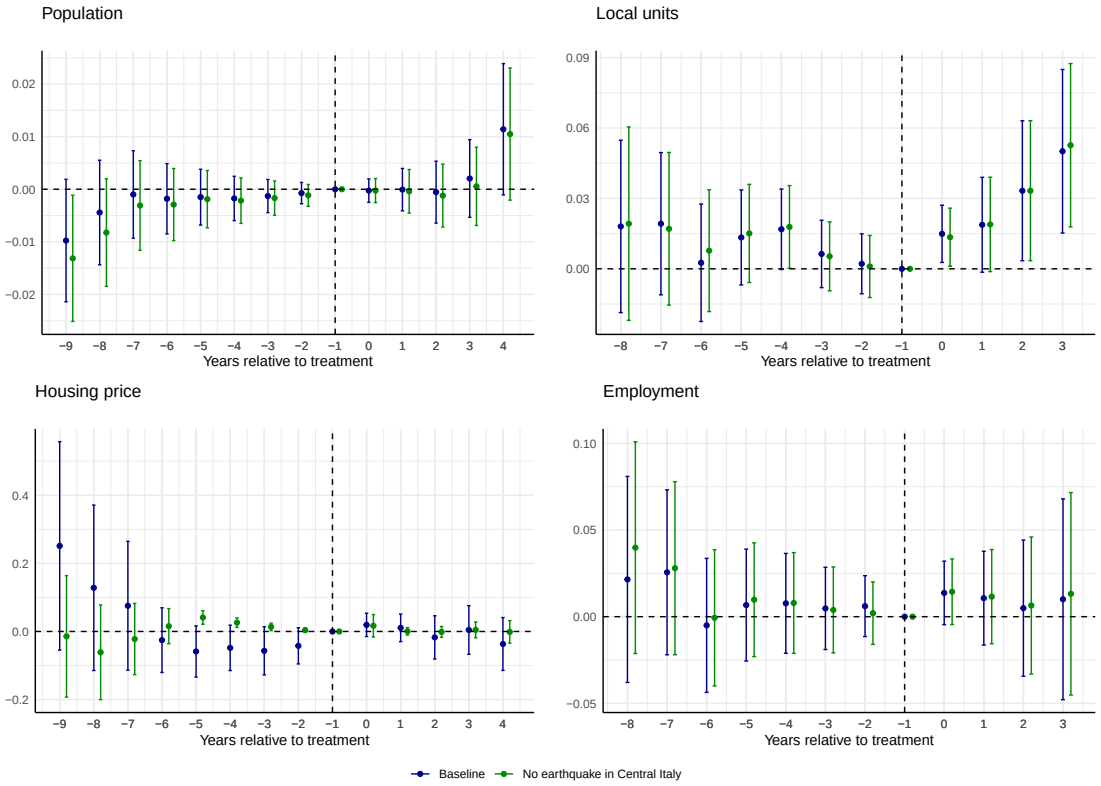

*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of population in the top left panel, the logarithm of the number of local units in the top right panel, the logarithm of average housing unit prices per square meter in the bottom left panel, and the logarithm of the employment in the bottom right panel. The blue line shows the baseline regression, while the green line reports estimates based on a sub-sample of municipalities with high levels of NRPP payments (defined as those above the median of the payments distribution). The grey line reports estimates obtained by excluding from the baseline sample municipalities targeted by specific interventions, such as those focused on village attractiveness and proximity-based healthcare services. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Figure 12: Event study: interaction with the 2014-2020 Cohesion policy programming cycle



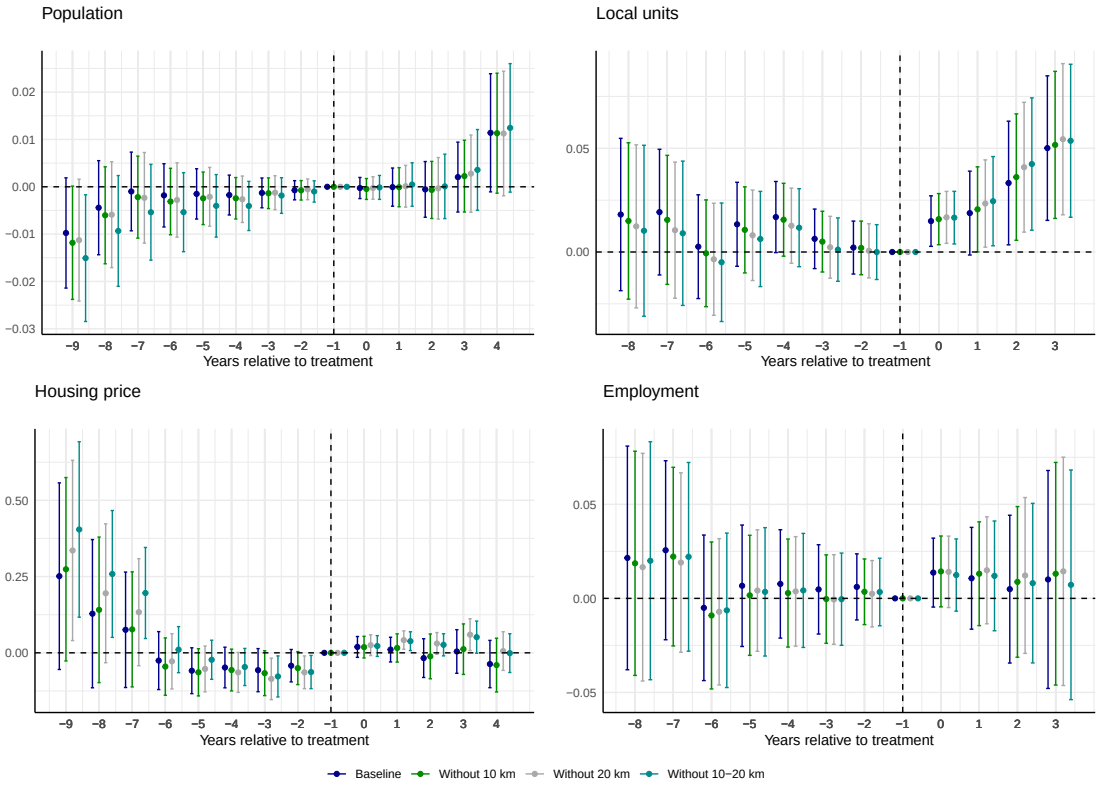

*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of population in the top left panel, the logarithm of the number of local units in the top right panel, the logarithm of average housing unit prices per square meter in the bottom left panel, and the logarithm of the employment in the bottom right panel. The blue line shows the baseline regression, while the green line reports estimates based on a sub-sample of municipalities with high levels of Cohesion payments (defined as those above the median of the payments distribution). The grey line reports estimates obtained by considering only municipalities with prevalent SNAI-related payments. Specifically, treated municipalities are included if their SNAI payments are greater than or equal to their total cohesion payments, while control municipalities are included if their cohesion payments are less than or equal to the average SNAI payment among treated municipalities (approximately 300,000 euro). The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Figure 13: Event study: interaction with the 2016 Central Italy earthquake




*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of population in the top left panel, the logarithm of the number of local units in the top right panel, the logarithm of average housing unit prices per square meter in the bottom left panel, and the logarithm of the employment in the bottom right panel. The blue line shows the baseline regression, while the green line reports estimates based on a sub-sample of municipalities excluding those affected by the 2016 Central Italy earthquake. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Figure 14: Event study: spatial spillover




*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of population in the top left panel, the logarithm of the number of local units in the top right panel, the logarithm of average housing unit prices per square meter in the bottom left panel, and the logarithm of the employment in the bottom right panel. The blue line shows the baseline regression, while the green, grey, and cyan lines report estimates based on sub-samples of municipalities where control units located within, respectively, 10 km, 20 km, and between 10 and 20 km are excluded. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Table 1: Trimming of the sample: treated and control group characteristics

| | Whole sample | | | Trimmed sample | | |
|---|---|---|---|---|---|---|
| | Treated | Control | P-value | Treated | Control | P-value |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| South | 0.527 | 0.504 | 0.785 | 0.527 | 0.534 | 0.574 |
| Mountain | 0.986 | 0.961 | 0.028 | 0.986 | 0.982 | 0.661 |
| Density | 0.055 | 0.050 | 0.730 | 0.055 | 0.052 | 0.958 |
| Size: less than 1.000 inhab. | 0.449 | 0.570 | 0.000 | 0.449 | 0.456 | 0.664 |
| Peripheral | 0.677 | 0.560 | 0.001 | 0.677 | 0.622 | 0.230 |
| | | | | | | |
| Share of workers in manufact. | 0.185 | 0.180 | 0.495 | 0.185 | 0.185 | 0.813 |
| Share of workers in constr. | 0.195 | 0.198 | 0.888 | 0.195 | 0.195 | 0.777 |
| Share of workers in services | 0.620 | 0.622 | 0.607 | 0.620 | 0.620 | 0.664 |
| Labor market participation | 44.79 | 44.15 | 0.082 | 44.79 | 44.55 | 0.485 |
| Employment rate | 40.08 | 39.00 | 0.008 | 40.08 | 39.66 | 0.268 |
| Industrial district | 0.117 | 0.093 | 0.091 | 0.117 | 0.102 | 0.257 |
| | | | | | | |
| Pop. growth 1971-2011 | -0.255 | -0.255 | 0.750 | -0.255 | -0.260 | 0.517 |
| Old-age ratio | 1.344 | 1.343 | 0.922 | 1.344 | 1.349 | 0.741 |
| Share of college educated | 49.56 | 46.54 | 0.000 | 49.56 | 48.70 | 0.107 |
| Children 0-2 yrs in childcare | 6.893 | 6.108 | 0.222 | 6.893 | 6.412 | 0.481 |
| Share of houses in poor state | 1.820 | 2.033 | 0.135 | 1.820 | 2.038 | 0.133 |
| N. of tourist accommodations | 340.5 | 190.5 | 0.013 | 340.5 | 229.2 | 0.148 |
| | | | | | | |
| Municipal union | 0.519 | 0.460 | 0.155 | 0.519 | 0.502 | 0.933 |
| Municipal admin. quality | 101.3 | 100.5 | 0.003 | 101.3 | 100.9 | 0.161 |
| - burocracy | 102.6 | 102.400 | 0.486 | 102.6 | 102.3 | 0.429 |
| - political | 102.9 | 101.299 | 0.004 | 102.9 | 102.4 | 0.314 |
| - economy | 98.33 | 97.88 | 0.474 | 98.33 | 97.91 | 0.602 |
| | | | | | | |
| Observations | 501 | 421 | | 501 | 295 | |

*Notes* - Average characteristics of treated and control municipalities in 2014 (pop. growth 1971-2011, share of houses in poor state refer to 2011). Treated and control municipalities are defined as discussed in Section 4.1. Data are at municipal level. *South* is a dummy variable equal to one for municipalities in Southern Italy (Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, and Sicily). *Mountain* is a dummy variable equal to one for municipalities with Istat altitude zone different from plain. *Density* is the ratio between municipal population and surface. *Size: less than 1.000 inahab.* is a dummy variable equal to 1 for municipalities with less than 1.000 inhabitants. *Peripheral* is a dummy variable equal to 1 if the municipality is distant (driving time) more than 75 min. from Centres. *Share of workers in manufacturing, Share of workers in construction, Share of workers in services* are the shares of workers in manufacturing, construction and private services, respectively. *Labor market participation* is the share of workers out of municipal population. *Employment rate* is defined as the number of employees in local business units divided by the municipal population aged 15 and over. *Industrial district* is a dummy variable equal to one if the municipality is part of an industrial district. *Pop. growth 1971–2011* is the decadal growth rate of population between 1971 and 2011. *Old-age ratio* is the ratio between municipal population over 65 years old and municipal population below 15 years old. *Share of college educated* is the share of population with college education. *Children 0-2 yrs in childcare* is the share of children from 0 to 2 years enrolled in the municipal child care services. *Share of houses in poor state* is the share of residential buildings in poor condition relative to total residential buildings. *N. of tourist accomodation* is the total number of tourist accomodation. *Municipal union* is a dummy variable equal to one if the municipal is a part of municipal union. *Municipal admin. quality* is an indicator of the quality of local government, as defined in Cerqua et al., 2025. The index comprises three components: *bureaucracy*, *politics*, and *economy*. Values are reported as index numbers (2001=100).

Table 2: SNAI financial progress by control group, treated group and cohorts by year of treatment

| | Control | Treated | Year of treatment | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Funding | 41,907,372 | 267,623,424 | 2,694,607 | 25,687,511 | 34,651,750 | 37,363,548 | 49,061,321 | 118,164,687 |
| Payments | - | 157,205,289 | 1,488,267 | 15,234,648 | 23,372,721 | 26,150,368 | 30,400,484 | 60,558,802 |
| Number of municipalities | 295 | 501 | 10 | 44 | 72 | 78 | 85 | 212 |
| Number of inhabitants | 455,120 | 1,026,323 | 11,621 | 78,018 | 157,459 | 89,640 | 216,632 | 472,953 |
| Payments per municipality | - | 313,783 | 148,827 | 346,242 | 324,621 | 335,261 | 357,653 | 285,655 |
| Payments per inhabitant | - | 153.2 | 128.1 | 195.3 | 148.4 | 291.7 | 140.3 | 128.0 |
| Average inhabitants per muncipality | 1,543 | 2,049 | 1,162 | 1,773 | 2,187 | 1,149 | 2,549 | 2,231 |

*Notes* - Funding, payments, number of municipalities, number of inhabitants, and corresponding per capita values by control group, treated group, and cohorts by year of treatment. Control group, column (1); treated group, column (2); cohorts of treated by year of treatment, columns (3)-(8). Treated and control municipalities are defined as discussed in Section 4.1. Data are at municipal level.

Table 3: Summary statistics

| | Obs. | Mean | Std. Dev. | Unit | Source | Year |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Population | 7,860 | 6.990 | 1.110 | Logarithm | Istat | 2014-23 |
| Local business units | 7,072 | 4.265 | 1.154 | Logarithm | Istat | 2014-22 |
| Housing unit price per smq | 5,872 | 6.189 | 1.062 | Logarithm | OMI | 2014-23 |
| Number of employees | 7,072 | 5.018 | 1.348 | Logarithm | Istat | 2014-22 |
| | | | | | | |
| South | 7,860 | 0.525 | 0.499 | Dummy | Istat | 2014 |
| Mountain | 7,860 | 0.982 | 0.132 | Dummy | Istat | 2014 |
| Density | 6,288 | 0.055 | 0.088 | Units/Sq-Km | Istat | 2014 |
| Size: less than 1,000 inhab. | 7,860 | 0.447 | 0.497 | Dummy | Istat | 2014 |
| Peripheral | 7,860 | 0.653 | 0.476 | Dummy | Istat | 2014 |
| | | | | | | |
| Share of workers in manufact. | 7,860 | 0.181 | 0.156 | Share | Istat | 2011 |
| Share of workers in constr. | 7,860 | 0.183 | 0.134 | Share | Istat | 2011 |
| Share of workers in services | 7,860 | 0.637 | 0.171 | Share | Istat | 2011 |
| Industrial district | 7,820 | 0.116 | 0.321 | Dummy | Istat | 2014 |
| Labor market participation | 7,860 | 44.77 | 6.091 | Percentage | Istat | 2011 |
| | | | | | | |
| Pop. growth 1971-2011 | 7,820 | -0.257 | 0.239 | Percentage | Istat | 2011 |
| Share of college educated | 7,860 | 49.16 | 8.375 | Percentage | Istat | 2014 |
| Children 0-2 yrs in childcare | 6,228 | 8.278 | 13.91 | Percentage | Istat | 2014 |
| Share of houses in poor state | 7,860 | 1.947 | 2.597 | Percentage | Istat | 2011 |
| N. of tourist accomodations | 7,860 | 298.3 | 1007.3 | Percentage | Istat | 2014-2023 |
| | | | | | | |
| Municipal union | 7,860 | 0.511 | 0.500 | Dummy | MoI | 2014 |
| Muncipal administration quality | 7,740 | 102.4 | 3.985 | Index (2001=100) | Cerqua et al., 2025 | 2014-22 |
| - burocracy | 7,740 | 100.6 | 5.814 | Index (2001=100) | Cerqua et al., 2025 | 2014-22 |
| - political | 7,740 | 104.4 | 9.492 | Index (2001=100) | Cerqua et al., 2025 | 2014-22 |
| - economy | 7,740 | 102.3 | 5.384 | Index (2001=100) | Cerqua et al., 2025 | 2014-22 |

*Notes* - Number of observations, average characteristics, standard deviation, measurement units, source, and the year of the data. Treated and control municipalities are defined as discussed in Section 4.1. Data are at municipal level. *Istat* is the Italian National Institute of Statistics, *OMI* is the *Osservatorio del Mercato Immobiliare*, *MoI* is the Italian Ministry of Interior. *Population* is the average number of inhabitants in each municipality. *Local business units* is the number of local business units. *Housing price* is the average housing price per square meter. *Number of employees* is the average number of employees. *South* is a dummy variable equal to one for municipalities in Southern Italy (Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, and Sicily). *Mountain* is a dummy variable equal to one for municipalities with Istat altitude zone different from plain. *Density* is the ratio between municipal population and surface. *Size: less than 1.000 inahab.* is a dummy variable equal to 1 for municipalities with less than 1.000 inhabitants. *Peripheral* is a dummy variable equal to 1 if the municipality is distant (driving time) more than 75 min. from Centres. *Share of workers in manufacturing, Share of workers in construction, Share of workers in services* are the shares of workers in manufacturing, construction and private services, respectively. *Labor market participation* is the share of workers out of municipal population. *Employment rate* is defined as the number of employees in local business units divided by the municipal population aged 15 and over. *Industrial district* is a dummy variable equal to one if the municipality is part of an industrial district. *Pop. growth 1971–2011* is the decadal growth rate of population between 1971 and 2011. *Share of college educated* is the share of population with college education. *Children 0-2 yrs in childcare* is the share of children from 0 to 2 years enrolled in the municipal child care services. *Share of houses in poor state* is the share of residential buildings in poor condition relative to total residential buildings. *N. of tourist accomodation* is the total number of tourist accomodation. *Municipal union* is a dummy variable equal to one if the municipal is a part of municipal union. *Municipal admin. quality* is an indicator of the quality of local government, as defined in Cerqua et al., 2025. The index comprises three components: *bureaucracy*, *politics*, and *economy*. Values are reported as index numbers (2001=100).

Table 4: Control group, treated group and cohorts by year of treatment

| | Control | Treated | Year of treatment | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Population | 6.932 | 7.113 | 6.577 | 7.227 | 7.291 | 6.630 | 7.111 | 7.233 |
| Local units | 4.130 | 4.371 | 3.823 | 4.443 | 4.533 | 3.894 | 4.462 | 4.466 |
| Housing unit price | 4.805 | 5.116 | 4.771 | 5.268 | 5.292 | 4.556 | 5.253 | 5.191 |
| Number of employees | 6.554 | 6.675 | 6.717 | 6.479 | 6.805 | 6.690 | 6.775 | 6.629 |
| South | 0.535 | 0.514 | 0.300 | 0.681 | 0.388 | 0.500 | 0.247 | 0.646 |
| Mountain | 0.979 | 0.984 | 1.000 | 1.000 | 1.000 | 0.987 | 0.976 | 0.976 |
| Density | 0.054 | 0.054 | 0.063 | 0.035 | 0.051 | 0.065 | 0.081 | 0.044 |
| Size: less than 1,000 inhabitants | 0.461 | 0.445 | 0.800 | 0.386 | 0.347 | 0.589 | 0.447 | 0.419 |
| Peripheral | 0.630 | 0.672 | 1.000 | 0.795 | 0.652 | 0.743 | 0.564 | 0.655 |
| Share of workers in manufacturing | 0.184 | 0.186 | 0.256 | 0.270 | 0.193 | 0.141 | 0.192 | 0.178 |
| Share of workers in construction | 0.191 | 0.194 | 0.114 | 0.188 | 0.191 | 0.202 | 0.186 | 0.200 |
| Share of workers in services | 0.624 | 0.619 | 0.629 | 0.540 | 0.615 | 0.655 | 0.621 | 0.621 |
| Industrial district | 0.099 | 0.125 | 0.100 | 0.000 | 0.055 | 0.051 | 0.223 | 0.165 |
| Labor market participation | 44.55 | 44.85 | 42.79 | 45.87 | 46.32 | 43.54 | 46.42 | 44.10 |
| Pop. growth 1971-2011 | -0.265 | -0.253 | -0.315 | -0.225 | -0.206 | -0.326 | -0.265 | -0.241 |
| Share of college educated | 48.55 | 49.55 | 50.81 | 50.12 | 49.87 | 49.68 | 49.28 | 49.32 |
| Children 0-2 yrs in child care serv. | 6.361 | 6.965 | 9.963 | 6.912 | 7.836 | 5.618 | 8.328 | 6.486 |
| Share of houses in poor state | 2.125 | 1.831 | 1.442 | 1.163 | 1.648 | 2.320 | 2.002 | 1.802 |
| N. of tourist accomodations | 234.8 | 353.4 | 463.5 | 130.9 | 517.2 | 313.7 | 494.0 | 297.0 |
| Municipal union | 0.511 | 0.514 | 0.700 | 0.295 | 0.500 | 0.589 | 0.552 | 0.514 |
| Muncipal administration quality | 100.8 | 101.2 | 102.7 | 100.4 | 102.2 | 102.0 | 101.0 | 100.8 |
| -burocracy | 102.3 | 102.6 | 105.1 | 102.0 | 102.6 | 103.0 | 102.2 | 102.6 |
| -political | 102.2 | 102.9 | 99.7 | 102.8 | 104.4 | 102.3 | 101.4 | 103.3 |
| -economy | 98.03 | 98.30 | 103.3 | 96.53 | 99.60 | 100.8 | 99.45 | 96.63 |
| Observations | 295 | 501 | 10 | 44 | 72 | 78 | 85 | 212 |

*Notes* - Average characteristics in 2014 (pop. growth 1971-2011, share of houses in poor state refer to 2011). Control group, column (1); treated group, column (2); cohorts of treated by year of treatment, columns (3)-(8). Treated and control municipalities are defined as discussed in Section 4.1. Data are at municipal level. *Population* is the average number of inhabitants in each municipality. *Local business unit* is the average number of local business units. *Housing price* is the average housing price per square meter. *Number of employees* is the average number of employees. *South* is a dummy variable equal to one for municipalities in Southern Italy (Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, and Sicily). *Mountain* is a dummy variable equal to one for municipalities with Istat altitude zone different from plain. *Density* is the ratio between municipal population and surface. *Size: less than 1.000 inahab.* is a dummy variable equal to 1 for municipalities with less than 1.000 inhabitants. *Peripheral* is a dummy variable equal to 1 if the municipality is distant (driving time) more than 75 min. from Centres. *Share of workers in manufacturing, Share of workers in construction, Share of workers in services* are the shares of workers in manufacturing, construction and private services, respectively. *Labor market participation* is the share of workers out of municipal population. *Employment rate* is defined as the number of employees in local business units divided by the municipal population aged 15 and over. *Industrial district* is a dummy variable equal to one if the municipality is part of an industrial district. *Pop. growth 1971–2011* is the decadal growth rate of population between 1971 and 2011. *Share of college educated* is the share of population with college education. *Children 0-2 yrs in childcare* is the share of children from 0 to 2 years enrolled in the municipal child care services. *Share of houses in poor state* is the share of residential buildings in poor condition relative to total residential buildings. *N. of tourist accomodation* is the total number of tourist accomodation. *Municipal union* is a dummy variable equal to one if the municipal is a part of municipal union. *Municipal admin. quality* is an indicator of the quality of local government, as defined in Cerqua et al., 2025. The index comprises three components: *bureaucracy*, *politics*, and *economy*. Values are reported as index numbers (2001=100).

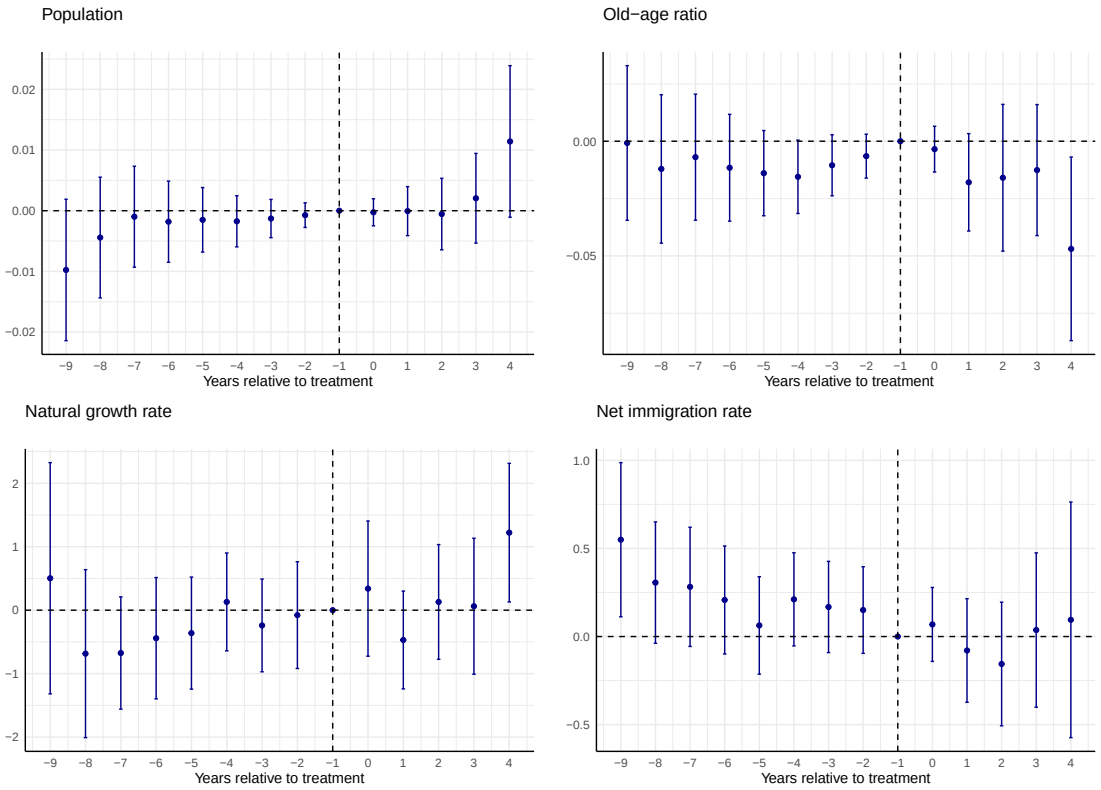
Table 5: Event study coefficients: baseline model

| | Population | Local units | Housing price | Employment |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Years relative to treatment: | | | | |
| -9 | −0.010 | | 0.251 | |
| | (0.006) | | (0.156) | |
| -8 | −0.004 | 0.018 | 0.128 | 0.022 |
| | (0.005) | (0.019) | (0.124) | (0.030) |
| -7 | −0.001 | 0.019 | 0.075 | 0.026 |
| | (0.004) | (0.015) | (0.096) | (0.024) |
| -6 | −0.002 | 0.003 | −0.025 | −0.005 |
| | (0.003) | (0.013) | (0.048) | (0.020) |
| -5 | −0.002 | 0.013 | −0.059 | 0.007 |
| | (0.003) | (0.010) | (0.038) | (0.016) |
| -4 | −0.002 | 0.017* | −0.048 | 0.008 |
| | (0.002) | (0.009) | (0.034) | (0.015) |
| -3 | −0.001 | 0.006 | −0.057 | 0.005 |
| | (0.002) | (0.007) | (0.036) | (0.012) |
| -2 | −0.001 | 0.002 | −0.042 | 0.006 |
| | (0.001) | (0.006) | (0.027) | (0.009) |
| 0 | −0.000 | 0.015** | 0.019 | 0.014 |
| | (0.001) | (0.006) | (0.017) | (0.009) |
| 1 | −0.000 | 0.019* | 0.011 | 0.011 |
| | (0.002) | (0.010) | (0.021) | (0.014) |
| 2 | −0.001 | 0.033** | −0.017 | 0.005 |
| | (0.003) | (0.015) | (0.032) | (0.020) |
| 3 | 0.002 | 0.050*** | 0.004 | 0.010 |
| | (0.004) | (0.018) | (0.036) | (0.029) |
| 4 | 0.011* | | −0.037 | |
| | (0.006) | | (0.039) | |
| Aggregated ATT | 0.000 | 0.022** | 0.006 | 0.010 |
| | (0.002) | (0.008) | (0.020) | (0.011) |
| Year fixed effects | ✓ | ✓ | ✓ | ✓ |
| Municipality fixed effects | ✓ | ✓ | ✓ | ✓ |
| Controls | ✓ | ✓ | ✓ | ✓ |
| Observations | 7,740 | 5,112 | 5,793 | 5,112 |

*Notes* - The event study is normalized with respect to the first year before the treatment in each year. In column (1) the dependent variable is the logarithm of the population, in column (2) the logarithm of the local business units, in column (3) the logarithm of average housing unit prices per square meter, and in column (4) the logarithm of the number of employees. The regressions include municipality and years fixed effects and the control variables listed in Table 1 (except for the employment and labor market participation rate). All control variables, except for municipal administration quality, are interacted with a time trend. Significance level: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors (in parenthesis) are robust and clustered at municipal level.

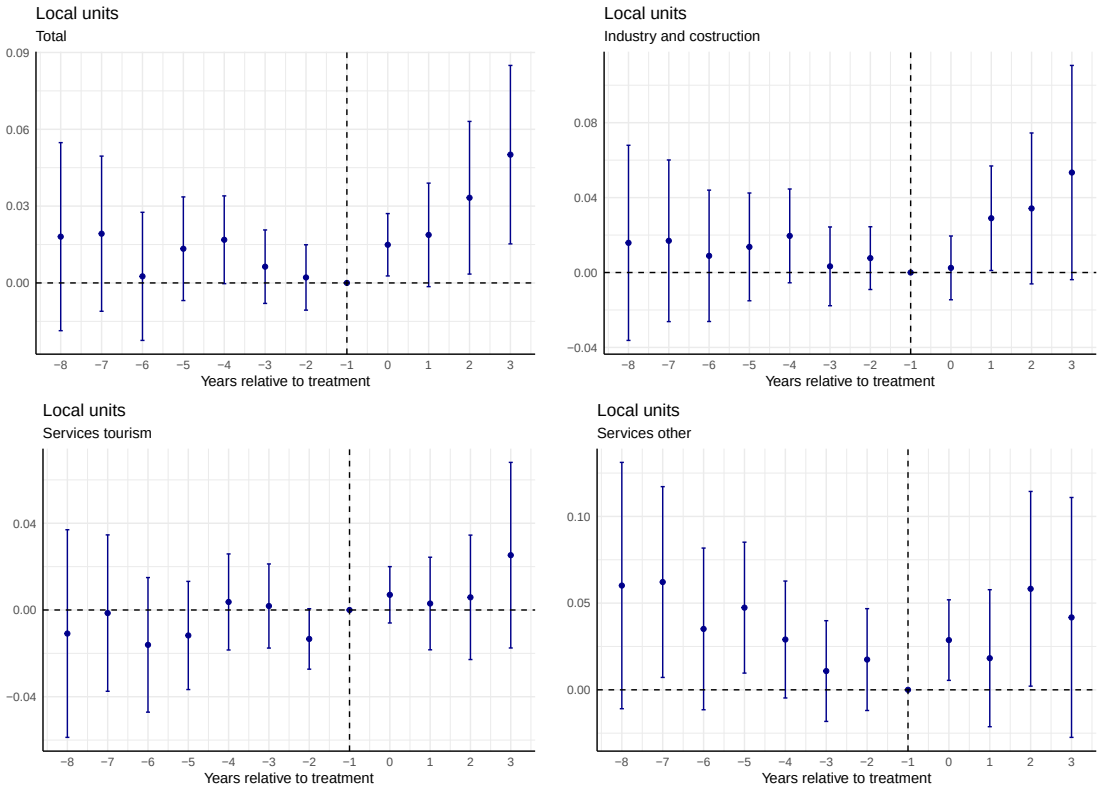
# Appendix A Supplementary Figures and Tables

Figure A1: Event study: population structure



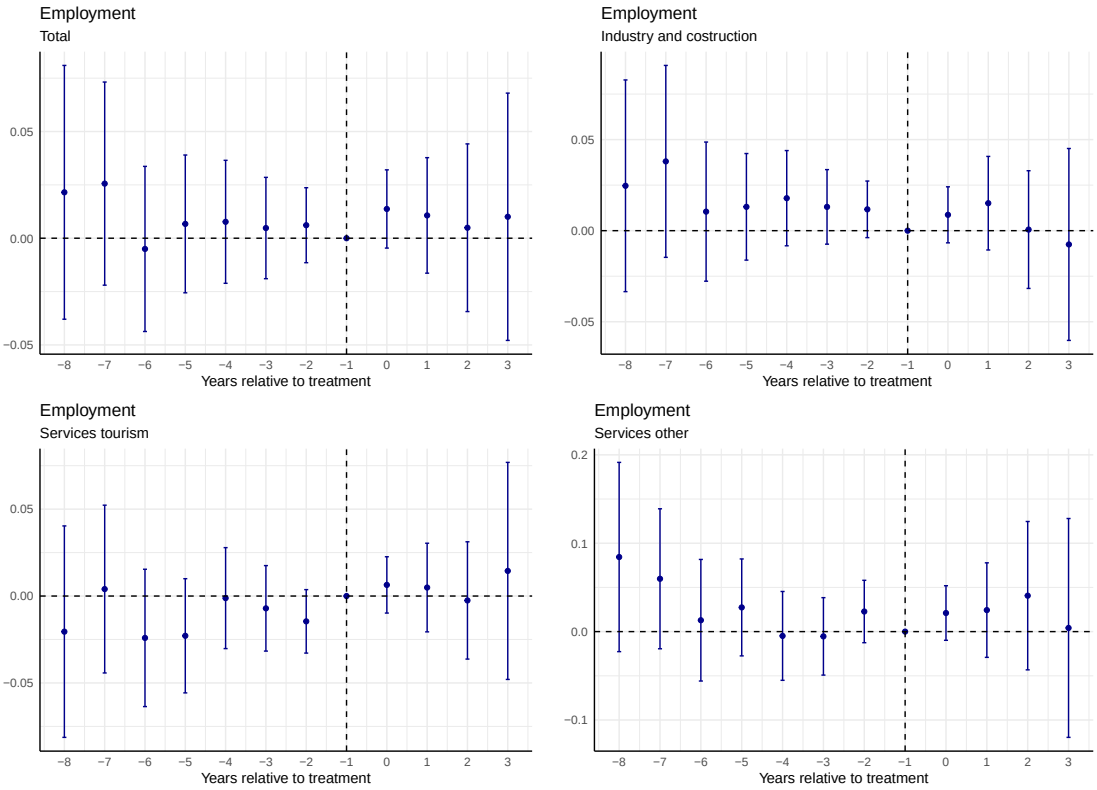

*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of the population in the top left panel, the logarithm of the old-age ratio in the top right panel, the logarithm of the natural growth rate (difference between the number of births and the number of deaths divided by the average population; it is expressed per 1,000 inhabitants) in the bottom left panel, and the logarithm of the net migration rate (difference between the number of immigrants and the number of emigrants divided by the average population; it is expressed per 1,000 inhabitants) in the bottom right panel. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Figure A2: Event study: local units by macro-sector




*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of the number of local units. Specifically, the top left panel displays the total number of local units; the top right panel focuses on units operating in industry (ATECO B, C, D, E) and construction (ATECO F); the bottom left panel refers to units in tourism-related services (ATECO G, H, I); and the bottom right panel shows units in all other service sectors. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Figure A3: Event study: employment by macro-sector




*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of the number of employed persons. Specifically, the top left panel displays total employment; the top right panel focuses on employment in industry (ATECO B, C, D, E) and construction (ATECO F); the bottom left panel refers to employment in tourism-related services (ATECO G, H, I); and the bottom right panel shows employment in all other service sectors. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Table A1: SNAI Project Areas: Agreement Dates, Funding, and Payments

| NUTS-2 | PA | SA date | FPA date | Population | N. of munic. | Funding | Funding per-munic. | Payment | Payment per-munic. |
|---|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Abruzzo | Alto Aterno - Gran Sasso Laga | Mar-20 | Jul-21 | 12,848 | 11 | 0.46 | 0.04 | 0.01 | 0.00 |
| | Basso Sangro - Trigno | Jan-17 | Nov-17 | 18,826 | 33 | 3.28 | 0.10 | 2.74 | 0.08 |
| | Subequana | May-20 | Jun-21 | 8,312 | 24 | 3.28 | 0.14 | 0.40 | 0.02 |
| | Valfino-Vestina | Feb-19 | Apr-21 | 23,577 | 19 | 2.74 | 0.14 | 0.00 | 0.00 |
| | Valle del Giovenco - Valle Roveto | May-19 | Jun-21 | 18,022 | 11 | 1.06 | 0.10 | 0.14 | 0.01 |
| Basilicata | Alto Bradano | Sep-20 | Dec-21 | 23,151 | 8 | 21.92 | 2.74 | 7.73 | 0.97 |
| | Marmo Platano | Dec-20 | Nov-21 | 20,033 | 7 | 16.27 | 2.32 | 5.88 | 0.84 |
| | Montagna Materana | Aug-17 | May-19 | 9,858 | 8 | 29.01 | 3.63 | 13.90 | 1.74 |
| | Mercure Alto Sinni Valsarmento | Feb-20 | Nov-20 | 29,920 | 19 | 21.13 | 1.11 | 22.71 | 1.20 |
| Calabria | Grecanica | Oct-20 | Oct-21 | 16,259 | 11 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Ionico - Serre | May-21 | Dec-21 | 31,461 | 14 | 2.65 | 0.19 | 0.00 | 0.00 |
| | Reventino - Savuto | Oct-18 | Feb-20 | 20,018 | 14 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sila e Presila | Aug-20 | Dec-21 | 23,791 | 19 | 0.00 | 0.00 | 0.00 | 0.00 |
| Campania | Alta Irpinia | May-17 | Oct-17 | 58,071 | 25 | 16.38 | 0.66 | 2.41 | 0.10 |
| | Cilento Interno | Mar-20 | Jun-21 | 25,603 | 22 | 4.64 | 0.21 | 0.57 | 0.03 |
| | Tammaro - Titerno | Sep-20 | Jun-21 | 59,893 | 24 | 4.44 | 0.19 | 0.00 | 0.00 |
| | Vallo di Diano | Aug-18 | Apr-19 | 56,557 | 15 | 6.87 | 0.46 | 3.00 | 0.20 |
| Emilia-Romagna | Alta Valmarecchia | Dec-19 | Feb-21 | 16,844 | 7 | 3.42 | 0.49 | 1.03 | 0.15 |
| | Appennino Emiliano | Dec-17 | Feb-19 | 32,220 | 7 | 5.59 | 0.80 | 4.02 | 0.57 |
| | Appennino Piacentino Parmense | Jan-19 | Nov-20 | 20,686 | 12 | 4.13 | 0.34 | 1.81 | 0.15 |
| | Basso Ferrarese | Dec-18 | Jun-20 | 46,877 | 6 | 2.90 | 0.48 | 1.32 | 0.22 |
| Friuli-Venezia Giulia | Alta Carnia | Mar-17 | Sep-18 | 18,700 | 20 | 2.18 | 0.11 | 2.12 | 0.11 |
| | Canal del Ferro - Val Canale | Feb-20 | Jul-21 | 9,700 | 7 | 1.60 | 0.23 | 1.60 | 0.23 |
| | Dolomiti Friulane | May-19 | Jun-21 | 4,577 | 8 | 2.28 | 0.29 | 2.28 | 0.29 |
| Lazio | Alta Tuscia Antica Città del Castro | Oct-20 | May-21 | 50,734 | 19 | 3.43 | 0.18 | 0.00 | 0.00 |
| | Monti Reatini | May-19 | Nov-20 | 23,639 | 29 | 9.84 | 0.34 | 2.74 | 0.09 |
| | Monti Simbruini | Aug-20 | Jun-21 | 23,806 | 22 | 4.24 | 0.19 | 0.00 | 0.00 |
| | Valle del Comino | Aug-18 | Jul-20 | 19,079 | 15 | 2.22 | 0.15 | 0.00 | 0.00 |
| Liguria | Alta Valle Arroscia | Oct-20 | Jun-21 | 4,228 | 11 | 0.18 | 0.02 | 0.07 | 0.01 |
| | Antola-Tigullio | Oct-19 | Dec-17 | 12,688 | 14 | 1.08 | 0.08 | 0.57 | 0.04 |
| | Beigua SOL | Jun-16 | Nov-20 | 2,921 | 3 | 0.81 | 0.27 | 0.70 | 0.23 |
| | Val di Vara | Nov-18 | Apr-21 | 5,271 | 6 | 0.00 | 0.00 | 0.00 | 0.00 |
| Lombardia | Alta Valtellina | Apr-16 | May-17 | 18,329 | 5 | 11.66 | 2.33 | 5.98 | 1.20 |
| | Alto Lago di Como e Valli del Lario | Jun-18 | Oct-20 | 38,402 | 31 | 6.12 | 0.20 | 5.10 | 0.16 |
| | Appennino Lombardo - Alto Oltrepò Pavese | Mar-18 | Oct-20 | 10,170 | 14 | 7.95 | 0.57 | 3.68 | 0.26 |
| | Valchiavenna | May-16 | Jun-17 | 24,223 | 12 | 9.33 | 0.78 | 7.17 | 0.60 |
| Marche | Alto Maceratese | Apr-19 | May-20 | 12,469 | 12 | 0.67 | 0.06 | 0.34 | 0.03 |
| | Appennino Basso Pesarese e Anconetano | Jul-16 | Jun-17 | 31,235 | 9 | 5.10 | 0.57 | 2.82 | 0.31 |
| | Piceno | Jul-18 | Jul-19 | 23,414 | 15 | 1.76 | 0.12 | 0.68 | 0.05 |
| Molise | Alto Medio Sannio | Aug-20 | Apr-21 | 30,148 | 30 | 5.40 | 0.18 | 0.58 | 0.02 |
| | Fortore | Nov-18 | Apr-21 | 17,753 | 11 | 3.45 | 0.31 | 0.20 | 0.02 |
| | Mainarde | Oct-20 | Jul-21 | 7,510 | 10 | 2.67 | 0.27 | 0.00 | 0.00 |
| | Matese | Jul-17 | Jan-19 | 19,352 | 14 | 2.79 | 0.20 | 0.06 | 0.00 |
| Piemonte | Val Bormida | Nov-20 | Mar-21 | 11,958 | 28 | 2.48 | 0.09 | 0.00 | 0.00 |
| | Val di Lanzo | Dec-20 | Jun-21 | 23,292 | 19 | 0.70 | 0.04 | 0.05 | 0.00 |
| | Val d'Ossola | Jun-18 | Oct-21 | 3,229 | 8 | 3.90 | 0.49 | 0.00 | 0.00 |
| | Valli Grana e Maira | Feb-17 | Sep-18 | 12,417 | 17 | 4.80 | 0.28 | 0.00 | 0.00 |
| Puglia | Alta Murgia | May-19 | Dec-21 | 15,844 | 3 | 0.20 | 0.07 | 0.00 | 0.00 |
| | Gargano | Oct-20 | Jul-21 | 33,818 | 5 | 0.92 | 0.18 | 0.91 | 0.18 |
| | Monti Dauni | Aug-20 | Jun-19 | 54,403 | 29 | 24.19 | 0.83 | 19.20 | 0.66 |
| | Sud Salento | Dec-17 | Sep-20 | 64,642 | 13 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sardegna | Alta Marmilla | Jul-17 | Mar-19 | 8,971 | 19 | 0.35 | 0.02 | 0.32 | 0.02 |
| | Gennargentu - Mandrolisai | Feb-19 | Dec-21 | 13,199 | 11 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sicilia | Calatino | Apr-20 | Apr-21 | 72,037 | 8 | 6.40 | 0.80 | 4.07 | 0.51 |
| | Madonie | Feb-17 | Sep-18 | 58,864 | 21 | 10.11 | 0.48 | 6.01 | 0.29 |
| | Nebrodi | Dec-19 | Nov-20 | 57,292 | 21 | 16.46 | 0.78 | 2.98 | 0.14 |
| | Terre Sicane | May-20 | Apr-21 | 46,834 | 12 | 5.09 | 0.42 | 1.43 | 0.12 |
| | Valle del Simeto | Mar-18 | May-19 | 62,085 | 3 | 5.74 | 1.91 | 4.77 | 1.59 |
| Toscana | Casentino - Valtiberina | Nov-16 | Jan-18 | 20,014 | 9 | 1.52 | 0.17 | 1.20 | 0.13 |
| | Garfagnana | Jun-18 | Nov-20 | 26,097 | 13 | 3.35 | 0.26 | 0.37 | 0.03 |
| | Valdarno e Valdisieve, Mugello, Val Bisenzio | Dec-20 | Dec-21 | 15,669 | 5 | 3.51 | 0.70 | 0.31 | 0.06 |
| Trento | Tesino | Nov-17 | Mar-19 | 2,152 | 3 | 3.66 | 1.22 | 0.66 | 0.22 |
| | Val di Sole | Apr-19 | Sep-20 | 15,511 | 13 | 4.38 | 0.34 | 1.57 | 0.12 |
| Umbria | Nord Est Umbria | Jul-18 | May-19 | 5,248 | 2 | 0.09 | 0.05 | 0.03 | 0.02 |
| | Sud Ovest Orvietano | Apr-19 | Feb-18 | 51,393 | 19 | 4.83 | 0.25 | 3.12 | 0.16 |
| | Val Nerina | May-19 | May-21 | 15,613 | 13 | 3.22 | 0.25 | 0.90 | 0.07 |
| Valle d'Aosta | Bassa Valle | Jul-17 | Feb-18 | 14,138 | 17 | 3.25 | 0.19 | 1.03 | 0.06 |
| | Grand Paradis | Mar-18 | Mar-20 | 2,278 | 6 | 1.86 | 0.31 | 0.57 | 0.09 |
| Veneto | Agordino | Dec-20 | Jun-21 | 18,647 | 16 | 1.65 | 0.10 | 0.00 | 0.00 |
| | Comelico | Dec-18 | Sep-20 | 6,884 | 5 | 2.95 | 0.59 | 0.64 | 0.13 |
| | Contratto di Foce - Delta del Po | May-19 | Feb-21 | 37,439 | 4 | 0.50 | 0.12 | 0.18 | 0.05 |
| | Spettabile Reggenza | Nov-17 | Apr-19 | 20,334 | 7 | 3.49 | 0.50 | 2.49 | 0.36 |
| **Total** | | | | **1,771,447** | **982** | **355** | **0.36** | **157** | **0.16** |

*Notes* - Column (1) reports the region (NUTS2 level); column (2) shows the name of the project area (PA); columns (3) and (4) report the dates of the Area Strategy (SA) definition and the Program Framework Agreement (FPA), respectively, as recorded in the official documentation (Dipartimento per le politiche di coesione, 2021); column (5) presents the population residing in the inner areas within each PA; column (6) indicates the number of municipalities included in each PA; column (7) reports the total funding available for each PA (in millions of euros); column (8) shows the average funding per municipality (in millions of euros); column (9) reports the total payments made for each PA (in millions of euros); and column (10) the average payments per municipality (in millions of euros).

Table A2: Event study coefficients: baseline model, CATT estimates

| | Cohorts | | | | |
|---|---|---|---|---|---|
| | 2019 | 2020 | 2021 | 2022 | 2023 |
| | (1) | (2) | (3) | (4) | (5) |
| Population | | | | | |
| -9 | | | | | -0.010 (0.006) |
| -8 | | | | 0.010 (0.009) | -0.010* (0.006) |
| -7 | | | 0.015** (0.008) | 0.004 (0.008) | -0.009* (0.005) |
| -6 | | 0.001 (0.005) | 0.009 (0.007) | 0.002 (0.006) | -0.008* (0.004) |
| -5 | 0.002 (0.005) | -0.004 (0.004) | 0.008 (0.006) | 0.000 (0.006) | -0.006 (0.004) |
| -4 | -0.000 (0.004) | -0.005 (0.004) | 0.002 (0.005) | -0.001 (0.004) | -0.003 (0.003) |
| -3 | -0.001 (0.004) | -0.008*** (0.003) | -0.002 (0.004) | 0.001 (0.003) | 0.000 (0.002) |
| -2 | -0.001 (0.002) | -0.005** (0.002) | -0.002 (0.003) | 0.001 (0.002) | 0.001 (0.002) |
| 0 | 0.004* (0.002) | 0.003 (0.002) | -0.002 (0.003) | -0.002 (0.003) | -0.001 (0.002) |
| 1 | 0.004 (0.003) | 0.002 (0.003) | -0.005 (0.005) | 0.000 (0.004) | |
| 2 | 0.007* (0.004) | 0.001 (0.003) | -0.007 (0.006) | | |
| 3 | 0.010* (0.006) | -0.003 (0.004) | | | |
| 4 | 0.011* (0.006) | | | | |
| Local units | | | | | |
| -8 | | | 0.018 (0.019) | | |
| -7 | | | 0.016 (0.022) | 0.022 (0.017) | |
| -6 | | 0.019 (0.019) | 0.011 (0.022) | -0.021 (0.018) | |
| -5 | 0.026 (0.016) | 0.022 (0.019) | 0.015 (0.019) | -0.003 (0.016) | |
| -4 | 0.023 (0.017) | 0.018 (0.015) | 0.018 (0.018) | 0.012 (0.014) | |
| -3 | 0.002 (0.012) | 0.023 (0.016) | -0.007 (0.014) | 0.007 (0.012) | |
| -2 | 0.009 (0.011) | 0.011 (0.013) | -0.010 (0.015) | 0.003 (0.012) | |
| 0 | 0.016 (0.013) | 0.008 (0.014) | 0.025** (0.012) | 0.011 (0.011) | |
| 1 | 0.023 (0.014) | 0.015 (0.019) | 0.020 (0.016) | | |
| 2 | 0.036* (0.019) | 0.032 (0.021) | | | |
| 3 | 0.050*** (0.018) | | | | |
| Housing price | | | | | |
| -9 | | | | | 0.251 (0.156) |
| -8 | | | | -0.055 (0.187) | 0.194 (0.151) |
| -7 | | | -0.017 (0.088) | -0.097 (0.182) | 0.176 (0.140) |
| -6 | | -0.158 (0.098) | -0.105 (0.075) | -0.118 (0.171) | 0.084* (0.050) |
| -5 | 0.026 (0.081) | -0.168** (0.075) | -0.102 (0.066) | -0.249 (0.175) | 0.037 (0.037) |
| -4 | -0.112 (0.070) | -0.130** (0.066) | 0.101*** (0.038) | -0.269 (0.171) | 0.009 (0.037) |
| -3 | -0.119* (0.063) | -0.072 (0.138) | 0.045** (0.019) | -0.282 (0.172) | 0.000 (0.035) |
| -2 | 0.049 (0.032) | 0.010 (0.010) | 0.011 (0.013) | -0.275 (0.170) | -0.024 (0.015) |
| 0 | -0.020* (0.010) | 0.008 (0.014) | -0.035 (0.029) | 0.070*** (0.027) | 0.038 (0.037) |
| 1 | -0.014 (0.014) | -0.002 (0.035) | -0.021 (0.035) | 0.078*** (0.028) | |
| 2 | -0.042 (0.032) | 0.018 (0.041) | -0.028 (0.036) | | |
| 3 | -0.024 (0.037) | 0.028 (0.044) | | | |
| 4 | -0.037 (0.039) | | | | |
| Employment | | | | | |
| -8 | | | | 0.022 (0.030) | |
| -7 | | | 0.005 (0.034) | 0.045 (0.030) | |
| -6 | | -0.030 (0.026) | 0.012 (0.032) | 0.001 (0.029) | |
| -5 | -0.004 (0.029) | -0.016 (0.026) | 0.031 (0.030) | 0.009 (0.027) | |
| -4 | -0.019 (0.024) | -0.002 (0.026) | 0.019 (0.028) | 0.020 (0.025) | |
| -3 | -0.029 (0.024) | -0.002 (0.023) | 0.010 (0.026) | 0.024 (0.020) | |
| -2 | -0.008 (0.021) | -0.001 (0.015) | 0.005 (0.022) | 0.022 (0.015) | |
| 0 | 0.005 (0.017) | -0.010 (0.021) | 0.030 (0.023) | 0.024* (0.013) | |
| 1 | 0.033 (0.022) | -0.008 (0.024) | 0.015 (0.022) | | |
| 2 | 0.030 (0.026) | -0.010 (0.027) | | | |
| 3 | 0.010 (0.029) | | | | |
| Year fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ |
| Munic. fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |

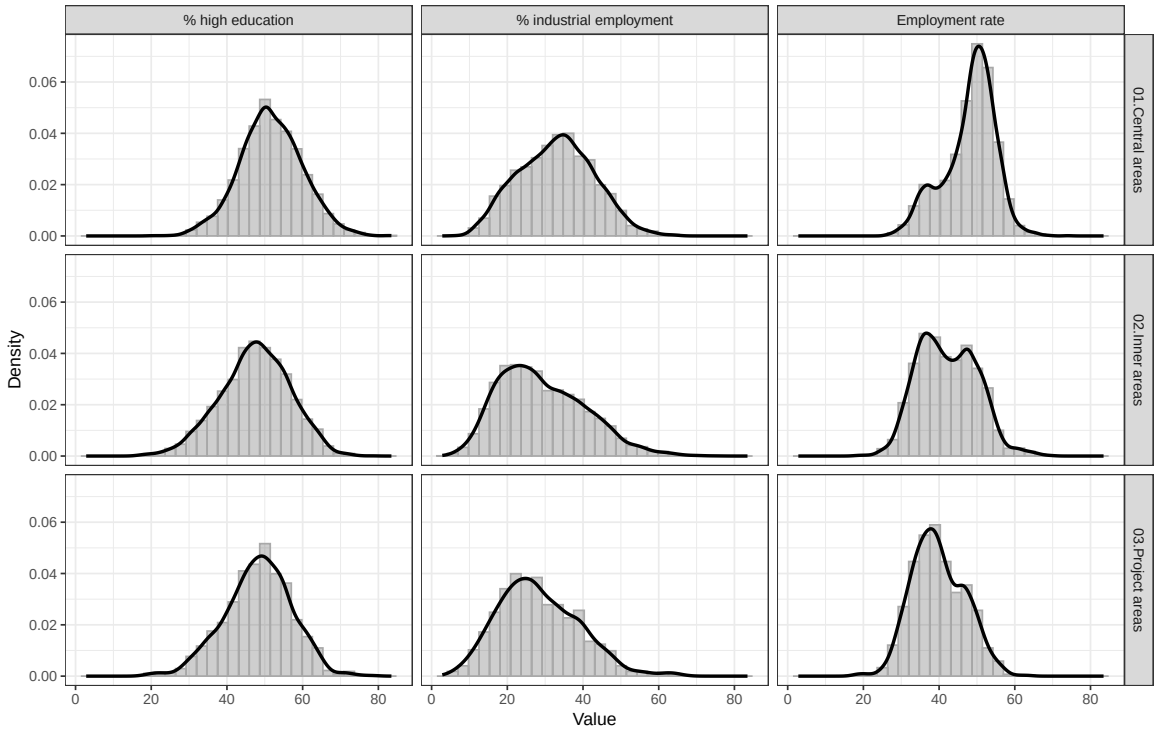
*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Columns (1)–(5) report the estimated treatment effects for the 2019 to 2023 cohorts, respectively, across different relative time periods. The four outcome variables considered are: the logarithm of the resident population, the logarithm of the number of local business units, the logarithm of average housing unit prices per square meter, and the logarithm of the number of employees. The regressions include municipality and years fixed effects and the control variables listed in Table 1 (except for the employment and labor market participation rate). All control variables, except for municipal administration quality, are interacted with a time trend. Significance level: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors (in parenthesis) are robust and clustered at municipal level.

# Appendix B Heterogeneity

## B.1 Heterogeneity within PAs

There is considerable heterogeneity not only between Inner Areas (IAs) and Central Areas (CAs), but also within the Project Areas (PAs) themselves, across several key dimensions such as education levels, sectoral composition, and labor market outcomes. Figure B1 illustrates the distribution of three selected indicators: the share of population with higher education (ISCED levels 5–8), the share of workers employed in the industrial sector, and the employment rate – comparing values across CAs, IAs, and the overall sample of PAs.

Figure B1: Heterogeneity of IAs, PAs and CAs




For both IAs and PAs, all indicators exhibit substantial variability, although their average levels tend to be lower than those observed in CAs. Given that our analysis focuses specifically on the sample of PAs, we explore this internal heterogeneity more systematically by performing a clustering analysis using the k-means algorithm. This analysis is based on a set of indicators, including the sectoral composition of the local economy, socio-demographic factors, and the quality of local administration, all measured in 2014, the beginning of the period. The full list of variables used for the clustering analysis is presented in Table B1. We exclude geographical variables to focus solely on differences arising from socio-economic factors.

We create two alternative cluster analysis grouping the PAs into two and three clusters. The results of the clustering are presented in Figure B2 while the determinants of each cluster are shown in Table B1.

Upon analyzing the grouping into two clusters, we identified the following characteristics for the first cluster compared to the second: municipalities in more peripheral areas with stagnant labor markets, lower levels of sectoral specialization, and poorer educational outcomes and local administration quality (see Column (1) in Table B1). Notably, the first cluster is predominantly located in the Southern regions, while the second cluster is mainly concentrated in the Central-Northern regions[36]. An important observation is the high degree of homogeneity within the PAs, although some specific differences persist, emphasizing the role of spatial relationships and local context.

The definition of three clusters differentiates certain Central areas from those in the North. However, considering the two macro-areas — North-Center and South — provides a useful proxy for understanding the heterogeneity within the PAs.

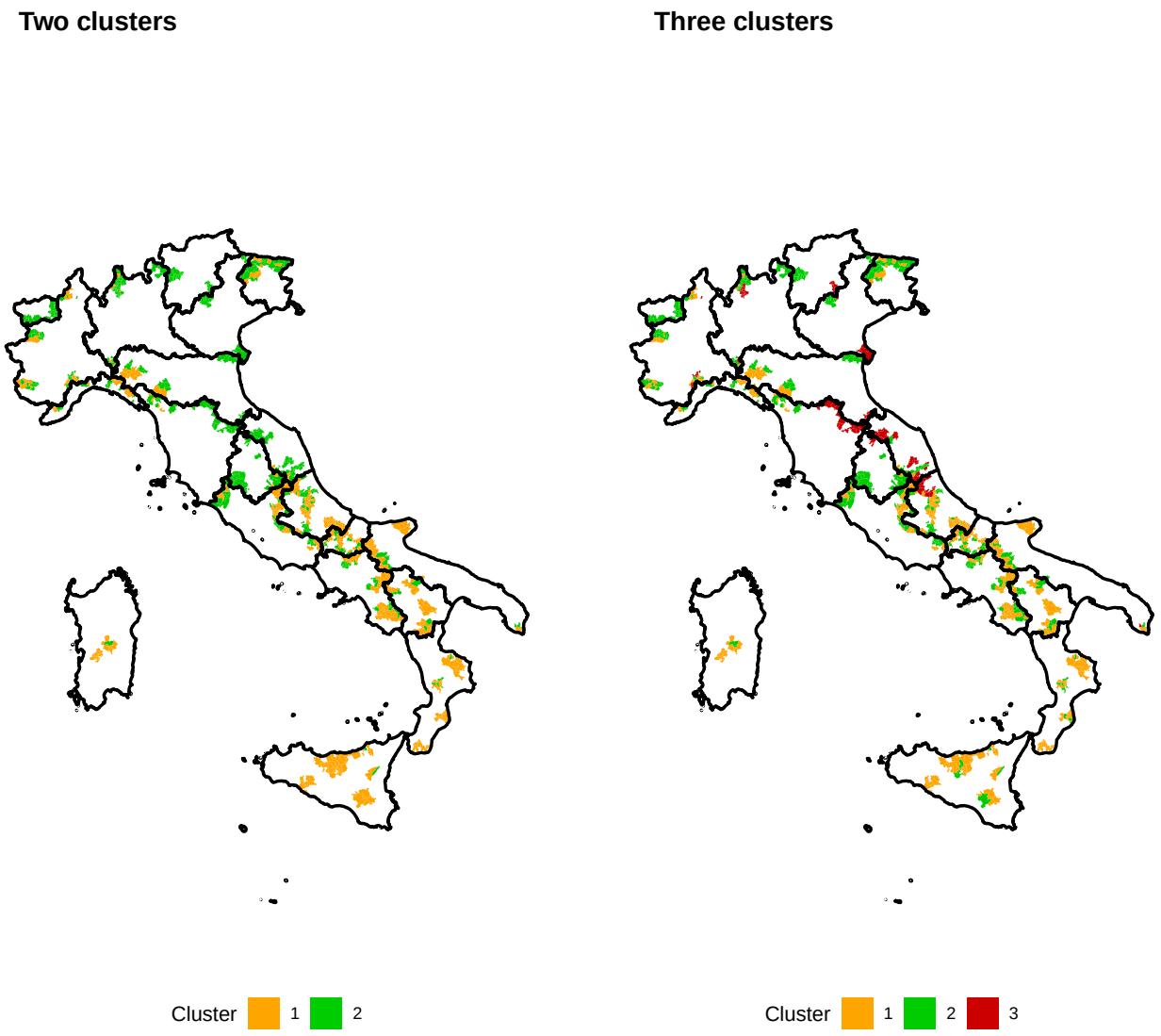
[36]The Centre-North includes the regions of Piedmont, Valle d'Aosta, Lombardy, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Tuscany, Umbria, Marche, and Lazio. The South includes Abruzzo, Molise, Campania, Apulia, Basilicata, Calabria, Sicily, and Sardinia.

Table B1: Cluster determinants - split in two and three clusters

| | Two clusters | | Three clusters | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Peripheral | 0.197*** | −0.197*** | 0.152*** | 0.001 | −0.153*** |
| | (0.021) | (0.021) | (0.022) | (0.004) | (0.022) |
| Share of workers in manufact. | −0.391*** | 0.391*** | −0.389*** | 0.030** | 0.359*** |
| | (0.069) | (0.069) | (0.072) | (0.015) | (0.072) |
| Share of workers in costr. | −0.003 | 0.003 | −0.098 | 0.020 | 0.078 |
| | (0.079) | (0.079) | (0.082) | (0.017) | (0.083) |
| Employment rate | −0.014*** | 0.014*** | −0.012** | 0.001 | 0.011** |
| | (0.005) | (0.005) | (0.005) | (0.001) | (0.005) |
| Labour market participation | −0.022*** | 0.022*** | −0.021*** | −0.000 | 0.021*** |
| | (0.004) | (0.004) | (0.004) | (0.001) | (0.004) |
| Industrial district | −0.106*** | 0.106*** | −0.172*** | 0.953*** | −0.781*** |
| | (0.033) | (0.033) | (0.035) | (0.007) | (0.035) |
| Pop. growth 1971-2011 | −0.447*** | 0.447*** | −0.369*** | −0.005 | 0.374*** |
| | (0.059) | (0.059) | (0.062) | (0.013) | (0.062) |
| Old-age ratio | 0.036 | −0.036 | 0.165*** | −0.021*** | −0.143*** |
| | (0.037) | (0.037) | (0.039) | (0.008) | (0.039) |
| Share of college educated | −0.005*** | 0.005*** | −0.005*** | −0.000 | 0.006*** |
| | (0.001) | (0.001) | (0.001) | (0.000) | (0.001) |
| Children 0-2 yrs in childcare | −0.004*** | 0.004*** | −0.004*** | 0.000 | 0.003*** |
| | (0.001) | (0.001) | (0.001) | (0.000) | (0.001) |
| Share of houses in poor state | 0.007* | −0.007* | 0.007* | −0.002** | −0.005 |
| | (0.004) | (0.004) | (0.004) | (0.001) | (0.004) |
| Municipal union | −0.011 | 0.011 | −0.022 | 0.003 | 0.019 |
| | (0.020) | (0.020) | (0.021) | (0.004) | (0.021) |
| Municipal admin. quality | −0.005* | 0.005* | −0.003 | −0.000 | 0.003 |
| | (0.003) | (0.003) | (0.003) | (0.001) | (0.003) |
| Year fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ |
| Municipality fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 953 | 953 | 953 | 953 | 953 |

*Notes* - In columns (1)-(2) the aggregation in two clusters, in columns (3)-(5) the aggregation in three clusters. In each column the dependent variable is a dummy variable equal to 1 for identify the cluster, i.e. the probability of being the cluster. The correspondence to Figure B2 is as follows: two clusters (1)=1, (2)=2; three clusters (3)=1, (4)=4, (5)=2. Significance level: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors (in parenthesis) are robust and clustered at municipal level.

Figure B2: Cluster analysis



## B.2 SNAI impact by intervention type

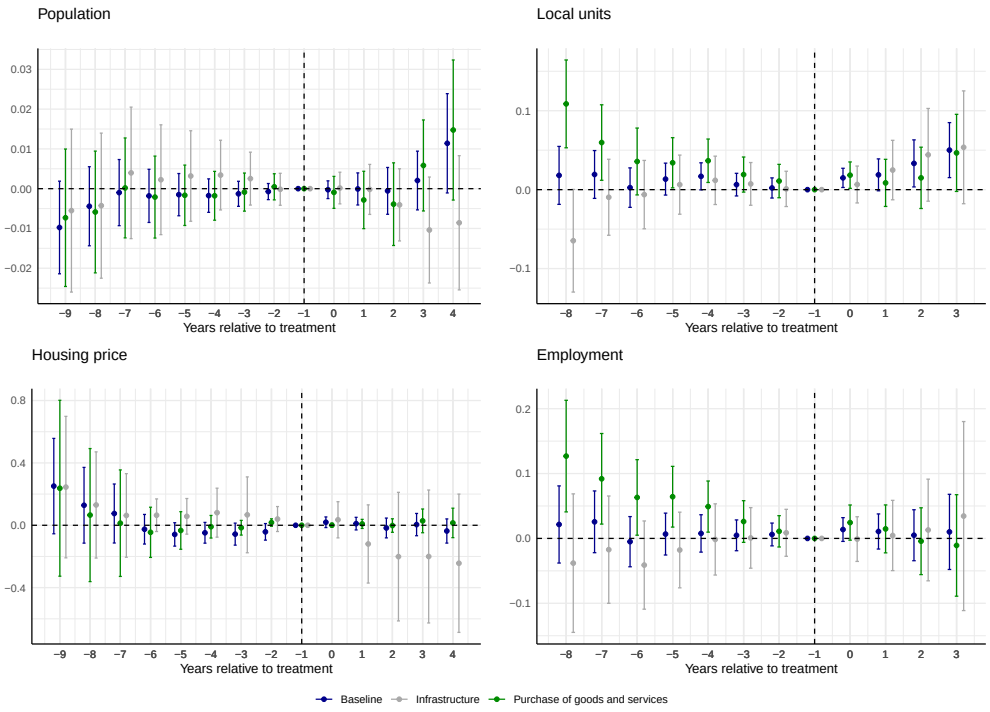
The projects funded by SNAI cover a diverse range of interventions, broadly classified into three main categories. First, payments for goods and services, which include expenditures related to administrative operations, procurement, and various public service provisions. Second, incentives for firms and individual support, such as grants, subsidies, and financial support aimed at fostering entrepreneurship, employment, and skill development. Finally, payments for infrastructure projects, which encompass investments in transportation networks, digital infrastructure, utilities, and public facilities, aimed at enhancing connectivity and stimulating overall economic development. From a theoretical perspective, each of these expenditure types has the potential to positively influence the outcomes under analysis. The provision of goods and services can improve the quality of life and the business environment, indirectly supporting economic growth. Firm incentives can stimulate private investment, foster innovation, and drive job creation. Infrastructure investments can enhance productivity and economic performance by increasing public capital and reducing transaction costs. It is important to differentiate the effects by expenditure type because the disbursement of payments varies depending on the nature of the intervention. Furthermore, the magnitude of payments differs significantly across categories, influencing the scale of their economic impact. Infrastructure projects, which typically involve large-scale investments with longer implementation times, are likely to have delayed effects on outcome variables. In contrast, firm incentives and service-related expenditures tend to have more immediate effects, providing direct financial support or operational improvements.

Our empirical strategy decomposes the treatment effects by expenditure type, enabling us to assess whether and to what extent different interventions drive the observed impacts[37]. This approach allows us to account for the timing and scale of disbursements, offering a more nuanced understanding of how policy measures translate into economic and social outcomes. Results of the event-study are reported in Figure B3, while descriptive statistics are shown in Figure 5. Infrastructure projects, which account for over 58 percent of total planned costs, are mainly concentrated in transport and social infrastructure. However, they exhibit low payment-to-cost ratios (39–59 percent), reflecting the longer implementation times and procedural complexity typical of large-scale investments. Consistent with these patterns, no significant effects are detected in

[37]In cases where multiple types of interventions are implemented within the same municipality, we classify the municipality according to the predominant intervention type. While approximately 50 percent of municipalities host more than one type of intervention, the predominant intervention accounts on average for 85 percent of the total funding across all three categories considered. This indicates that, even when multiple projects coexist, one specific intervention tends to be overwhelmingly dominant, justifying our classification approach.

the short term, although a positive – albeit not yet significant – tendency is observed in the number of local units. The purchase of goods and services represents roughly one-third of total planned costs, with public administration and community services as the main components, followed by healthcare and education. Disbursement rates are modest, with payment-to-cost ratios of 34 percent for healthcare and education and as low as 22 percent for other services, suggesting that many initiatives are still in early implementation phases. In line with this, we do not observe significant impact on the outcomes. Finally, incentives to firms and individuals account for just 6 percent of total planned costs, but they stand out for their high execution efficiency, with payment-to-cost ratios around 88 percent. However, their small financial weight and the limited number of comparable observations in the control group (approximately 3 percent) prevent the detection of statistically significant effects in our analysis.

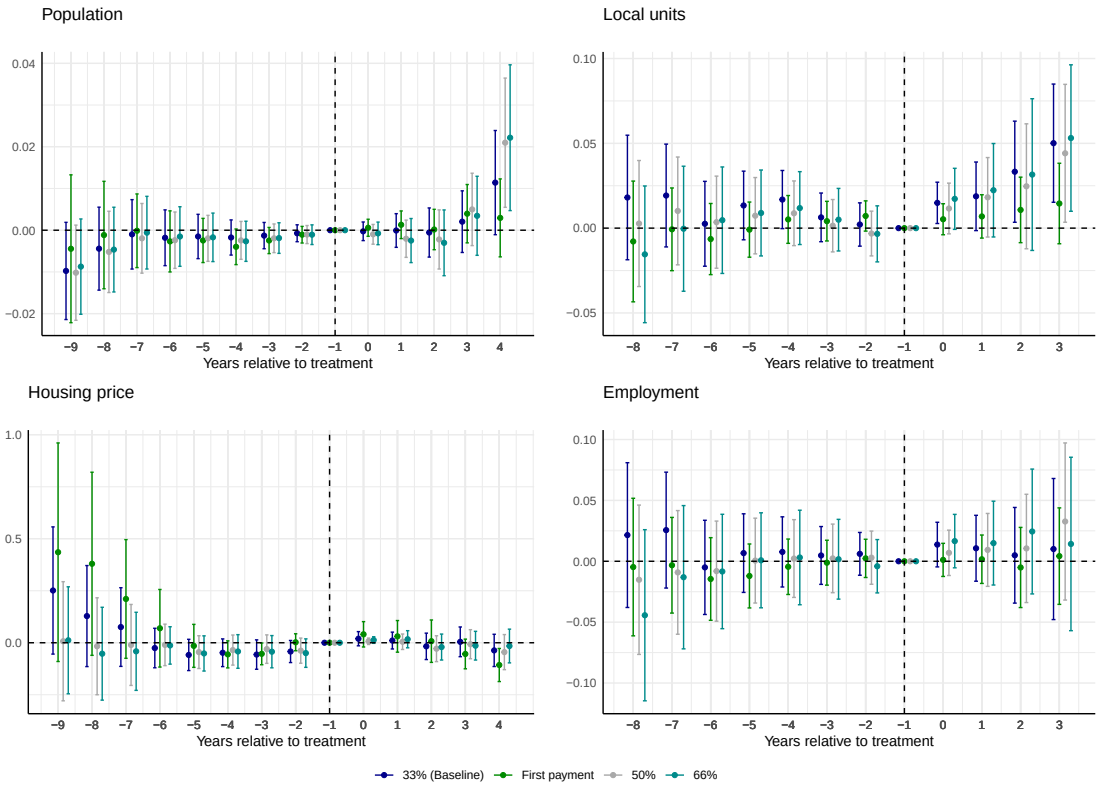
Figure B3: Event study: type of intervention




*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of population in the top left panel, the logarithm of the number of local units in the top right panel, the logarithm of average housing unit prices per square meter in the bottom left panel, and the logarithm of the employment in the bottom right panel. The blue line reports the baseline regression, while the grey and green lines show the regressions estimated on sub-samples of municipalities with, respectively, exclusively or predominantly infrastructure projects, and projects related to the purchase of goods and services. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

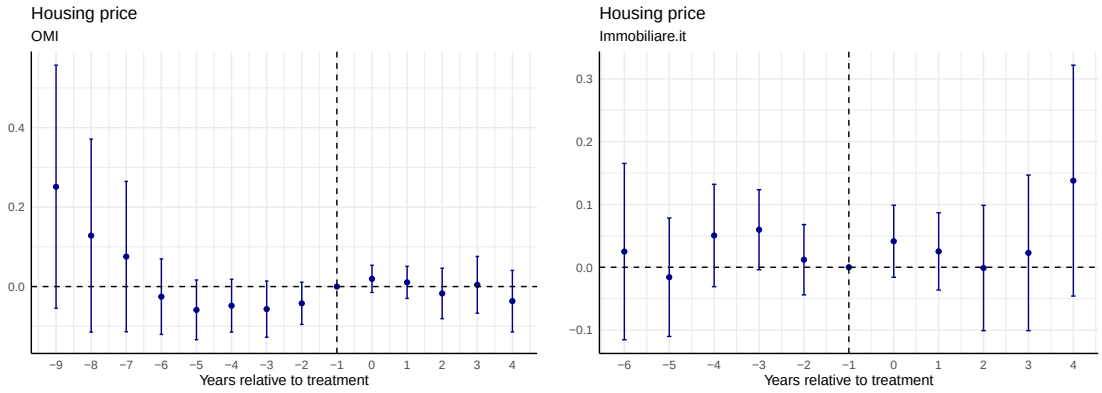
# Appendix C Robustness checks

Figure C1: Event study: different threshold effect



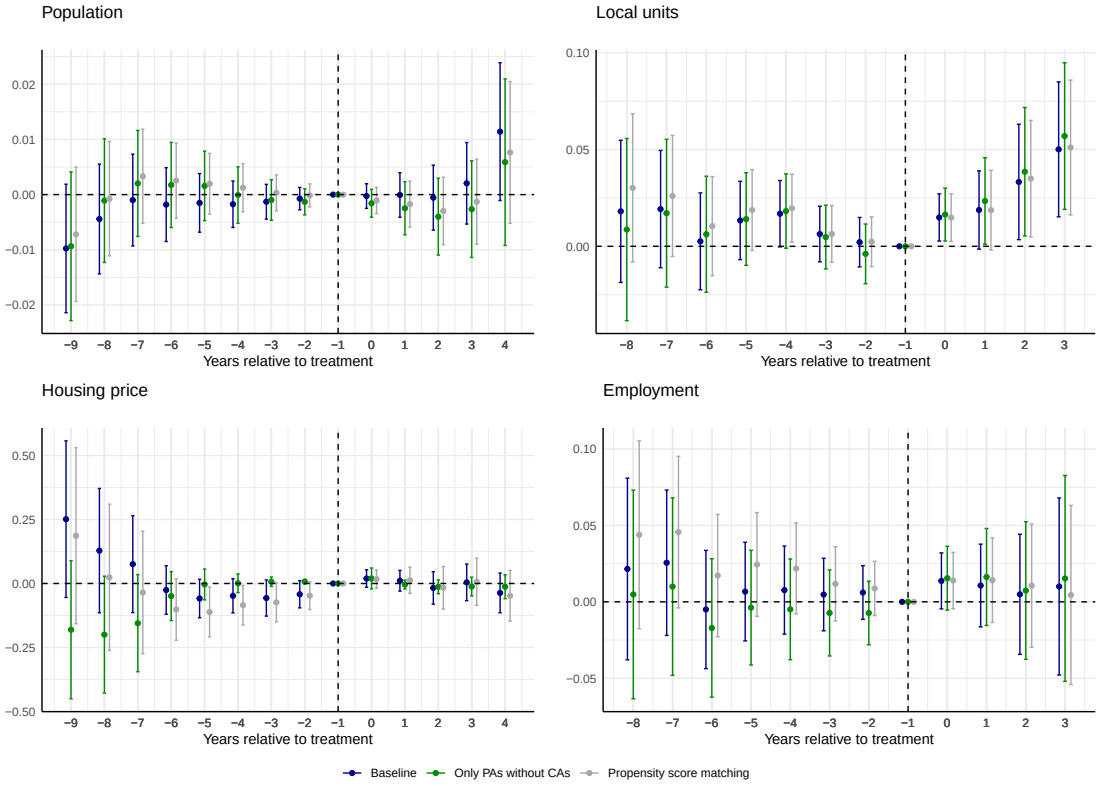

*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of population in the top left panel, the logarithm of the number of local units in the top right panel, the logarithm of average housing unit prices per square meter in the bottom left panel, and the logarithm of the employment in the bottom right panel. The blue line shows the baseline regression, while the green, grey, and cyan lines report estimates based on three alternative thresholds, each corresponding to a different stage of payment disbursement: the first payment, 50%, and 66% of total payments, respectively. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Figure C2: Event study: housing price using OMI and Immobiliare.it as data sources




*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable in the left panel is the logarithm of the average housing unit price per square meter, based on OMI data. In the right panel, the dependent variable is the logarithm of the average residuals from a hedonic regression of housing unit prices per square meter, controlling for various housing characteristics such as balcony presence, number of rooms, energy class, and others. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Figure C3: Event study: selected PAs and propensity score matching




*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. The dependent variable is the logarithm of population in the top left panel, the logarithm of the number of local units in the top right panel, the logarithm of average housing unit prices per square meter in the bottom left panel, and the logarithm of the employment in the bottom right panel. The blue line shows the baseline regression. The green line reports estimates based on a sub-sample of project areas (PAs) composed exclusively of inner areas (IAs), excluding those that include central areas (CAs). The grey line reports estimates using a propensity score matching approach to identify the control group, as opposed to the sample trimming method used in the baseline specification. The regressions include municipality and year fixed effects, control variables such as time-varying indicators of local government quality and geographical factors, sectoral composition of the local economy, and socio-economic indicators at the beginning of the period, interacted with a time trend; a full list of the variables is provided in Table 3. Point estimates are reported with 95% confidence intervals. Standard errors are robust and clustered at municipal level.

Table C1: Event study coefficients: the role of the control variables

| | Population | | | Local units | | | Housing price | | | Employment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Years relative to treatment: | | | | | | | | | | | | |
| -9 | −0.005 | −0.010* | −0.010 | | | | 0.237 | 0.260 | 0.251 | | | |
| | (0.006) | (0.006) | (0.006) | | | | (0.157) | (0.158) | (0.156) | | | |
| -8 | −0.005 | −0.004 | −0.004 | 0.006 | 0.007 | 0.018 | 0.141 | 0.135 | 0.128 | 0.018 | 0.019 | 0.022 |
| | (0.005) | (0.005) | (0.005) | (0.020) | (0.021) | (0.019) | (0.127) | (0.126) | (0.124) | (0.028) | (0.030) | (0.030) |
| -7 | −0.000 | −0.001 | −0.001 | 0.011 | 0.013 | 0.019 | 0.086 | 0.079 | 0.075 | 0.021 | 0.022 | 0.026 |
| | (0.004) | (0.004) | (0.004) | (0.016) | (0.016) | (0.015) | (0.098) | (0.097) | (0.096) | (0.023) | (0.024) | (0.024) |
| -6 | −0.002 | −0.002 | −0.002 | −0.002 | −0.001 | 0.003 | −0.005 | −0.018 | −0.025 | −0.005 | −0.005 | −0.005 |
| | (0.004) | (0.003) | (0.003) | (0.013) | (0.013) | (0.013) | (0.044) | (0.047) | (0.048) | (0.019) | (0.020) | (0.020) |
| -5 | −0.002 | −0.001 | −0.002 | 0.006 | 0.007 | 0.013 | −0.046 | −0.055 | −0.059 | −0.001 | 0.000 | 0.007 |
| | (0.003) | (0.003) | (0.003) | (0.011) | (0.011) | (0.010) | (0.036) | (0.037) | (0.038) | (0.017) | (0.017) | (0.016) |
| -4 | −0.002 | −0.002 | −0.002 | 0.014* | 0.015* | 0.017* | −0.034 | −0.041 | −0.048 | 0.006 | 0.007 | 0.008 |
| | (0.002) | (0.002) | (0.002) | (0.008) | (0.009) | (0.009) | (0.031) | (0.032) | (0.034) | (0.014) | (0.014) | (0.015) |
| -3 | −0.001 | −0.001 | −0.001 | 0.006 | 0.006 | 0.006 | −0.042 | −0.047 | −0.057 | 0.005 | 0.006 | 0.005 |
| | (0.002) | (0.002) | (0.002) | (0.007) | (0.007) | (0.007) | (0.034) | (0.035) | (0.036) | (0.012) | (0.012) | (0.012) |
| -2 | −0.001 | −0.001 | −0.001 | 0.002 | 0.002 | 0.002 | −0.034 | −0.036 | −0.042 | 0.005 | 0.006 | 0.006 |
| | (0.001) | (0.001) | (0.001) | (0.006) | (0.006) | (0.006) | (0.026) | (0.026) | (0.027) | (0.009) | (0.009) | (0.009) |
| 0 | −0.000 | −0.000 | −0.000 | 0.015** | 0.015** | 0.015** | 0.016 | 0.019 | 0.019 | 0.014 | 0.014 | 0.014 |
| | (0.001) | (0.001) | (0.001) | (0.006) | (0.006) | (0.006) | (0.016) | (0.017) | (0.017) | (0.009) | (0.009) | (0.009) |
| 1 | 0.001 | −0.000 | −0.000 | 0.019* | 0.019* | 0.019* | −0.005 | 0.008 | 0.011 | 0.012 | 0.011 | 0.011 |
| | (0.002) | (0.002) | (0.002) | (0.010) | (0.010) | (0.010) | (0.017) | (0.019) | (0.021) | (0.014) | (0.014) | (0.014) |
| 2 | −0.000 | −0.000 | −0.001 | 0.033** | 0.033** | 0.033** | −0.027 | −0.016 | −0.017 | 0.006 | 0.005 | 0.005 |
| | (0.003) | (0.003) | (0.003) | (0.015) | (0.015) | (0.015) | (0.029) | (0.031) | (0.032) | (0.020) | (0.020) | (0.020) |
| 3 | 0.004 | 0.003 | 0.002 | 0.054*** | 0.052*** | 0.050*** | −0.025 | −0.004 | 0.004 | 0.013 | 0.010 | 0.010 |
| | (0.004) | (0.004) | (0.004) | (0.017) | (0.017) | (0.018) | (0.030) | (0.034) | (0.036) | (0.029) | (0.029) | (0.029) |
| 4 | 0.008 | 0.013** | 0.011* | | | | −0.022 | −0.032 | −0.037 | | | |
| | (0.007) | (0.006) | (0.006) | | | | (0.031) | (0.039) | (0.039) | | | |
| Year fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Municipality fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Geographic controls | | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ |
| Socio-economic controls | | | ✓ | | | ✓ | | | ✓ | | | ✓ |
| Observations | 7,860 | 7,860 | 7,740 | 5,166 | 5,166 | 5,112 | 5,872 | 5,872 | 5,793 | 5,166 | 5,166 | 5,112 |

*Notes* - The event study is normalized with respect to the first year before the treatment in each year. Treated and control municipalities are defined as discussed in Section 4.1. In column (1)-(3) the dependent variable is the logarithm of population, in column (4)-(6) the logarithm of the number of local business units, in column (7)-(9) the logarithm of average housing unit prices per square meter, and in column (10)-(12) the logarithm of the number of employees. The regressions (1), (4), (7), (10) include municipality and years fixed effects. The regressions (2), (5), (8), (11) add geographic controls (such as south, peripheral, etc.). The regressions (3), (6), (9), (12) add all the control variables listed in Table 1 (except for the employment and labor market participation rate). All control variables, except for municipal administration quality, are interacted with a time trend. Significance level: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors (in parenthesis) are robust and clustered at municipal level.