All for one, one for all: Inter-municipal cooperation and public good provision

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Abstract

Do agglomeration or congestion effects dominate when municipalities merge government functions? I exploit an Italian policy reform, which forced municipalities below 5,000 residents to join inter-municipal communities (IMCs), to estimate the effects on local real estate prices and government services. Affected areas see an 8% increase in commercial property prices and a 19% increase in rents but no change for residential properties. These changes arise because new IMCs were able to lower property taxes without reducing public service quality, suggesting that small municipalities were operating below an efficient scale before the reform. **JEL**: H70, H71, H72, R23, R31

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1. Introduction

There has been a long-standing debate about the optimal size of jurisdictions (Epple and Romer 1989; Ostrom et al. 1961; Ostrom 2010). Public choice and fiscal federalism theories suggest that public goods and services should be provided at the lowest level of government that can achieve specific objectives (Oates 1972, 1999; Ostrom et al. 1961). However, excessive fragmentation can hinder economies of scale and scope and increase transaction costs (Oates 1999), leading to a reduction in competition (Tiebout 1956; Alesina and Spolaore 1997; Bolton and Roland 1997).

Governments worldwide have been moving toward the integration of small areas through cooperation and mergers to achieve savings and exploit economies of scale in response to the debt crisis that followed the 2008 global financial crisis (Bel and Warner 2015; Warner 2006). However, the efficiency of larger entities in providing public services is still an ambiguous question, with the literature not yet providing a clear-cut answer. Some studies suggest that the aggregation of small municipalities reduces per capita expenditure levels without affecting the quantity and quality of services provided (Bel and Costas 2006; Bel and Mur 2009; Bel et al. 2013; Dijkgraaf and Gradus 2013; Zafra-Gomez et al. 2013), while others have come to the opposite conclusion (Sorensen 2007; Garrone et al. 2013).

In this study, I investigate the impact of a mandate that compelled Italian municipalities with populations under 5,000 inhabitants to collaborate with neighboring municipalities through the use of the so-called *Unioni di Comuni* on local house prices. I use multiple sets of administrative data, including municipality membership to inter-municipal communities, and data on local residential and commercial building sales and rent prices. I employ a fuzzy difference-in-discontinuity design (Grembi et al. 2016; Galindo-Silva et al. 2021) to estimate the relationship between inter-municipal coop-

eration and house prices, which allows us to remove the confounding effects of other policy changes at the same cutoff.

My results show that cooperating municipalities experience a decrease in residential building prices, with a decline of 57% in sales prices and 29% in rent prices, while I observe no detectable effect on commercial house prices. I attribute this effect to a decrease in the quality of public goods available to residents. Although I am limited by data availability to directly test this mechanism, My findings provide compelling evidence that this is the underlying mechanism at play. I note that municipalities that joined an IMC did not change their property tax rate, which did not play a role in the effect observed, and experienced a consistent outflow of population consistent with a decline in the amenities provided in the municipality of origin following the initiation of cooperation (Tiebout 1956).

This study contributes to the existing literature on the optimal size of jurisdictions. Due to the tradeoff between the Oates' agglomeration argument (Oates 1969) and congestion (Brueckner 1981), the empirical research offers mixed results Bel and Sebő (2021). Evidence of savings has been found in Israel and Germany (only for compulsory mergers) (Blesse and Baskaran 2016; Reingewertz 2012), while there is no effect in France, the Netherlands, and Italy (Allers and de Greef 2018; Blom-Hansen et al. 2016; Luca and Modrego 2021) because of the compensation between savings and deterioration across different areas within the same country[1]. The benefits of agglomeration depend on the cost structure of public services, the structure of local government, and the governance framework (Bel and Warner 2015). My work complements these previous findings by showing that the creation of larger government units induces a reduction in property tax rates and improves tax collection, differently from Breuillé et al. (2018) and Charlot

[1]In contrast, Ferraresi et al. (2018) find that inter-municipal communities lead to a reduction in public expenditures in the Emilia Romagna region of Italy.

et al. (2015) that find evidence of reduced tax competition in France.

Second, I contribute to the literature on the production of local public goods. The theory of local public goods has been long explored in the literature (Stiglitz 1977; Besley and Coate 2003). However, there is extraordinarily little evidence of the effects of jurisdiction size on public good production. The literature on IMC focused on sewage and waste disposal (Bel et al. 2013; Bel and Warner 2015), daycare and libraries (Tricaud 2021), and garbage collection (Allers and de Greef 2018; Dijkgraaf and Gradus 2013). Facing this data limitation, other authors focus on house prices as a proxy of public good due to amenities capitalization: for example, Schoenholzer (2018) finds a house price increase due to municipal annexation in California. The closest paper to mine is Tricaud (2021), which studies the effect of inter-municipal cooperation in France on building permit supply and house prices, through an NYMBY perspective. Differently from there, I find that IMC affects house prices but only for residential units, and I justify this effect by a combination of effects on public goods and property tax rate choice.

2. Background

Italy is an ideal setting to study the phenomenon of inter-municipal cooperation because, even though this is a recent phenomenon, its historical evolution well fits the analysis of the relationship between

2.1. *Unioni di Comuni*

Municipalities form the lowest level of the Italian administrative hierarchy. They are at the closest administrative level to citizens and oversee several public functions in many areas such as social welfare services, waste disposal, and infrastructural spending. They

are also sparsely populated: the median and mean population sizes of municipalities were 2,498 and 7,514 inhabitants. Given this fragmentation, and inspired by theories of functional federalism, Italian lawmakers have increasingly encouraged measures of municipal cooperation to improve the efficiency of the local governments (Ermini and Fiorillo 2009).[2]

Intermunicipal communities (IMCs), known as *Unioni di Comuni*, were introduced in Italy three decades ago. By joining an IMC, municipalities transfer some of their decision-making powers and financial resources in specific pre-agreed policy areas to the newly established administrative entity, which, in return, provides the corresponding services. Therefore, the union is a legal entity with its budget, its president, who is chosen among the mayors of the municipalities joining the union, and its council composed of the council members of cooperating municipalities. Intermunicipal communities are commonly formed by bordering municipalities that belong to the same commuting zone and are present throughout the whole country, as shown in Figure 1. They are more common in the Northern regions of the country, with Lombardy and Piedmont having the largest number of IMCs, and are more frequent in remote areas of the country, such as the mountainous regions of the Alps and the Apennines, where municipalities are smaller and service provision limited[3].

In financial terms, the share of the municipal unions' budget on the total expenditure of local governments has increased over time. In 2007, the total expenditures of municipal unions accounted for about 0.10% (403 million euros) of the total local expenditures in Italy (350 billion euros). By 2013, the total expenditures of municipal unions had more than doubled, accounting for approximately 0.30% (970 million euros)

[2]Functional federalism is a theory that advocates for the decentralization of political power, giving more decision-making power to lower-level administrative entities such as municipalities.

[3]In 2009, Mountainous Communities (*Comunita' Montane*), another form of inter-municipal cooperation, were dismissed and transformed into Unions of Municipalities, which explains why they are particularly common among mountainous municipalities.

of the total local expenditures in Italy (334 billion euros) (Ferraresi et al. 2018)[4].

2.2. The evolution of the phenomenon

The evolution of inter-municipal communities (IMCs) in Italy is of particular interest for the research strategy described in Section 4, especially the last phases of its development. The introduction of IMCs took three steps, as summarized in Figure 2.

Initially, the tool was developed as a temporary measure for small municipalities with a population below 5,000 inhabitants (one local government with up to 10,000 inhabitants was also allowed to join) to prepare for a full merger into a single municipality within 10 years. However, the temporary nature of the coordination tool, combined with limited economic incentives, did not attract much interest among local administrators, resulting in only 16 communities in 1999. In 1999, the temporary nature and population size limits were abolished, but the reform did not have much more success.

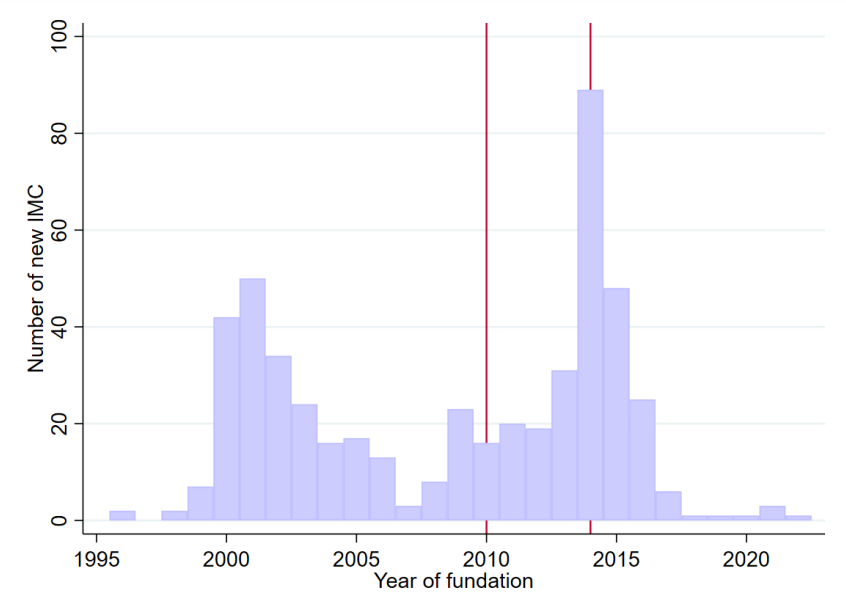
Finally, in 2010, local governments with populations below 5,000 (3,000 if in mountainous areas) inhabitants were required to start delivering public services through IMCs, in which they had to engage in compulsory joint management of basic public services. The law established that municipalities below a certain population threshold had to start jointly managing at least three "fundamental functions" by January 1, 2013. The "fundamental functions" commonly transferred to the newly created communities are administration and management, municipal police, education, roads, and transport services, planning and environment, and social welfare. This last step was followed by a legislative move that facilitated the creation of IMCs and generated economic incentives for municipalities to join one.

Figure 1 illustrates the number of newly created IMCs in Italy in each year over the

[4]However, these percentages underestimate the real expenditure quota of the unions, as municipalities often do not write off their quota of the delegated function and continue to register it as their expenditure.

past 25 years. Before 2000, IMCs were extremely rare because they were a stepping stone toward a merger. Once the merger requirement was removed in 1999, there is a clear jump in the bar graph that lasts four to five years, after which there is a slowdown. The slowdown ended with the 2010 mandate, even though it is not until 2014 that one can see a big spike in the number of new IMCs, thanks to the incentives for the members introduced that year. This figure identifies three periods, which will be the fundaments of the identification strategy: a pre-reform period before 2010, a transition period between 2010 and 2013, and a post-period from 2014 on. As of 2018, there are 574 active municipal unions, accounting for 40% of all municipalities in Italy.

FIGURE 1. Inter-municipal communities over time



Note: The figure shows the number of new inter-municipal communities (IMC) created every year in Italy over the last 25 years. The red vertical lines indicate the two reform years of interest for this work: 2010 when the mandate for small municipalities to join an IMC was introduced and 2014 when a system of incentives was introduced to foster the birth of IMCs.

3. Data

The data used for this project comes from different administrative sources. First, I collected data on all the inter-municipal communities that ever existed in Italy between 1990 and 2018. These data are provided by the Italian Ministry of Internal Affairs and have been supplemented with information from regional registries of inter-municipal communities, local newspaper articles, and other local government resources (e.g., IFEL). The complete dataset contains information for 574 IMCs, their members, and the year of creation (and termination if applicable).

I complemented these data with complete administrative data on real estate prices and rents collected and harmonized by the Italian Treasury. This dataset spans the period between 2002 and 2018 and includes information on both residential and non-residential units (including commercial real estate[5]) and offices. Following Cannari and Faiella (2008) and Fenizia and Saggio (2020), the house price measure is computed as the average real estate selling price/rents in municipality m in year t[6].

To explore the mechanism, I obtained measures of public good from the Italian National Statistical Institute for the number of childcare seats per capita and road lights per kilometer of road for the years 2000-2015. I also obtained property tax rates set at the municipal level for the years 2000-2019 from IFEL. The data contains information on the two main property tax rates: the one for the main dwelling buildings and the one for all other buildings. Next, I collected population counts from the 2001 and 2011 Censuses to use as a running variable in the analysis and intercensal population for the mechanism analysis. Finally, I include expenditure figures from the municipal balance sheets; I have information on current and capital expenditures, computed per capita

[5]Commercial real estate includes factories, industrial buildings, and craft workshops.

[6]I exclude outlier transactions from the sample and only include buildings whose status is reported as "normal" (excluding poor and excellent status buildings).

and in real terms.

Finally, I collected municipal-level data, including the share of the population between 0 and 14 years old and over 65 years old, the share of the foreign population, population density, altitude, and the share of employed individuals in the primary and secondary sectors, as well as election years, to use as controls.

Once I merged all the data sources, I restricted the analysis to municipalities in Ordinary Status regions[7] that existed for the entire period of analysis[8]. The final sample consists of 6,410 municipalities over the years 2002-2018, for a total of 108,970 observations.

4. Methodology

The inter-municipal cooperation (IMC) mandate, which has been in place since 2010, has a population cutoff of 5,000 inhabitants. Notably, there are at least two other municipal policies in Italy that have the same cutoff point: a mayoral and executive committee wage policy, as well as a set of financial constraints (Gagliarducci and Nannicini 2013; Grembi et al. 2016). Both policies were established before 2010. As a result, using the cross-sectional regression discontinuity (RD) estimator to estimate the average treatment effect of interest in a neighborhood of the threshold could lead to a biased estimate, as the effects of the three confounded treatments cannot be disentangled from one another.

To address this issue, I employ a difference-in-discontinuity identification strategy as in Grembi et al. (2016). In this approach, the pre-period is used to identify the impacts of the other policies at the discontinuity, while the difference between the pre- and

[7] Municipalities in Special Status regions follow different rules regarding expenditure management, face different fiscal constraints, etc.

[8] I dropped municipalities that merged with others to create new municipalities, suppressed municipalities due to incorporation, and new municipalities formed during the period of analysis.

post-period discontinuity identifies the impact of the treatment of interest. Following Butts (2021), I use a regression discontinuity design on the first-differenced outcomes. This approach is appropriate under two key assumptions: (1) outcomes are continuous in the counterfactual absence of the policies and (2) no other policy is implemented between periods that causes a discontinuity in the absence of the treatment. Since the effects of previous policies were already fully developed in the pre-period, a regression discontinuity estimated on a first-differenced outcome will identify the treatment effect. To estimate the treatment effect, I use the non-parametric, robust bias-corrected estimator with covariate adjustment proposed by Calonico et al. (2019).

Figure 2 shows the first stage results and illustrates how the identification strategy works. In all plots, the two red lines indicate 2010, the year the IMC policy was implemented, and 2013, the year the sharing of municipal functions became effectively mandatory. Subfigures (a) and (b) show two regression discontinuity plots in 2006, one of the years before the reform, and 2016, one of the years after[9]. One can observe that before the policy was implemented, having less than 5,000 inhabitants did not significantly affect the probability of being part of an inter-municipal community (subfigure (a)). After the policy was implemented (subfigure (b)), however, the probability of joining a community increased, although the increase was small in magnitude (about 15 percentage points). Subfigure (c) displays the evolution of the yearly RD estimates over time, along with their 95% confidence intervals. Three conclusions can be drawn from this figure. First, before 2010, the RD estimates were not significant and close to zero, indicating that municipalities cooperated independently of their population size before the mandate. Second, even after the mandate was implemented in 2010, not all municipalities that were required to join an inter-municipal community did so. Even in 2018, only

[9]These years were chosen randomly for explanatory purposes; the conclusions would not change if any other year pairs were chosen.

20% of municipalities with less than 5,000 inhabitants belonged to an inter-municipal community[10]. To account for non-compliance, a fuzzy Difference-in-Discontinuity estimation is performed, following the approach proposed by Galindo-Silva et al. (2021) and Millán-Quijano (2020).

I thus define a post period starting in 2013, when the municipal function sharing was official (as in Bellodi et al. (2022)) and compare municipalities above and below 5000 inhabitants, before and after that date. In formal terms, I estimate the following model:

$$\Delta IMC_{r(m),i-j} = \alpha_1 Treated_{r(m)} + \beta_1 \tilde{Popr}(m) + \gamma[\tilde{Popr}(m) \times Treated_{r(m),i-j}] + \\ + \theta_{r(m)} + u_{r(m),i-j} \tag{1}$$

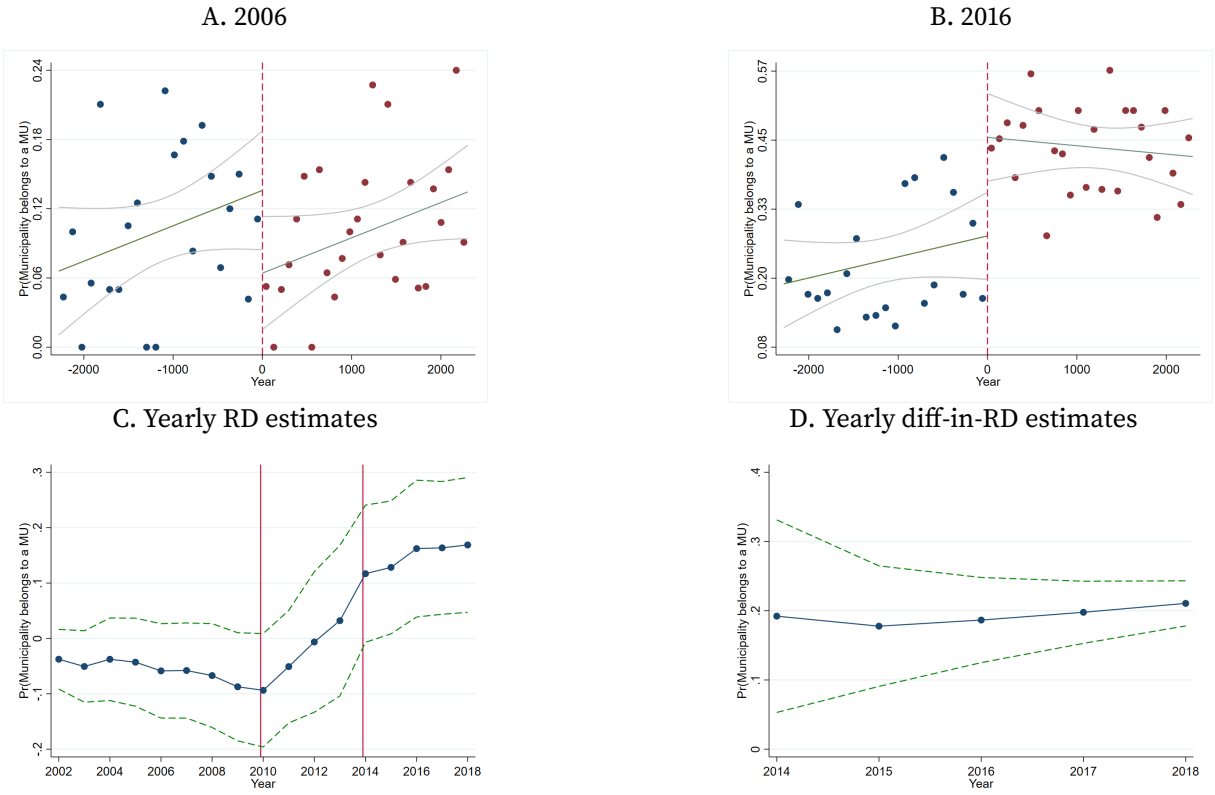
$$\Delta Y_{r(m),i-j} = \alpha_2 \Delta \hat{IMC}r(m), i-j + \beta_2 \tilde{Popr}(m) + \gamma_{r(m)} + \varepsilon_{r(m),i-j} \tag{2}$$

Here, $\Delta IMC_{r(m),i-j}$ denotes the first difference between all post-reform years i (2013-2018) and all pre-reform years j (2002-2002), stacked together, of a dummy variable that takes a value of one if a municipality m in the region r belongs to an inter-municipal community. $Treated_{r(m)}$ is a dummy variable that takes a value of one for municipalities m in region r with a population of less than 5,000 after 2010[11]. $\tilde{Popr}_{r(m)}$ is the re-centered running variable. $\theta_r(m)$ are region fixed effects that control for the potential presence of confounders due to the presence of different regional features, such as varying regional incentives to join inter-municipal communities (Ferraresi et al. 2018). Finally, $Y_{r(m),i-j}$ is the first-differenced outcome for municipality m in the region r.

[10] Anecdotal evidence shows that strong parochialism, especially in smaller towns, and local politicians' fear of losing support in the municipalities where they were elected are among the reasons for avoiding the mandate.

[11] The relevant population measure is the 2001 Census one.

FIGURE 2. First stage estimates



Note: This figure shows the first stage results. Subfigures a) and b) show RD plots for the years 2006 and 2016, before and after the IMC reform, respectively. The running variable is centered around 5000 and the dots above the cutoff represent municipalities with less than 5000 inhabitants and vice versa. Subfigure c) shows yearly RD coefficients; each dot is the RD estimate from a regression of a dummy variable equal to one if a municipality is part of a municipal union in a certain year. The dotted line represents 95% confidence intervals, and the two red vertical lines indicate the two stages of the reform, implementation in 2010 and reinforcement in 2014. Subfigure (d) shows the difference-in-discontinuity estimates for each of the post-reform years. The optimal bandwidth is computed using Calonico et al. (2017), the polynomial is first degree, and the kernel is triangular.

The estimation is a Two-Stage Least Square in first differences: Equation (1) estimates the first stage, where I instrument the treatment, $IMC_{r(m),i-j}$, using the policy cutoff, and Equation (2) estimates the second stage. The coefficient of interest is α_2. Both equations are estimated nonparametrically using the Calonico et al. (2019) algorithm. There is no optimal procedure to select bandwidths in a difference-in-discontinuity setting so I choose a bandwidth of 700 inhabitants for the main results and show robustness to a wide selection of bandwidths in the Appendix (Galindo-Silva et al. 2021). The main

specification uses a first-order polynomial and robust estimation procedure. In the Appendix, I estimate the same model using higher-order polynomials (second and third) and provide estimates coming from different estimation procedures.

5. Results

The analysis begins with a focus on the effect of joining an inter-municipal community on house prices. House prices are the main outcome of interest as they serve as an indicator of changes in the quality of public services. Previous research has demonstrated that amenities such as schools, parks, and shopping centers (as well as negative factors like noise and pollution) can affect house prices (Fishel 2001). Homebuyers and tenants are willing to pay more for properties in areas that offer more desirable features.

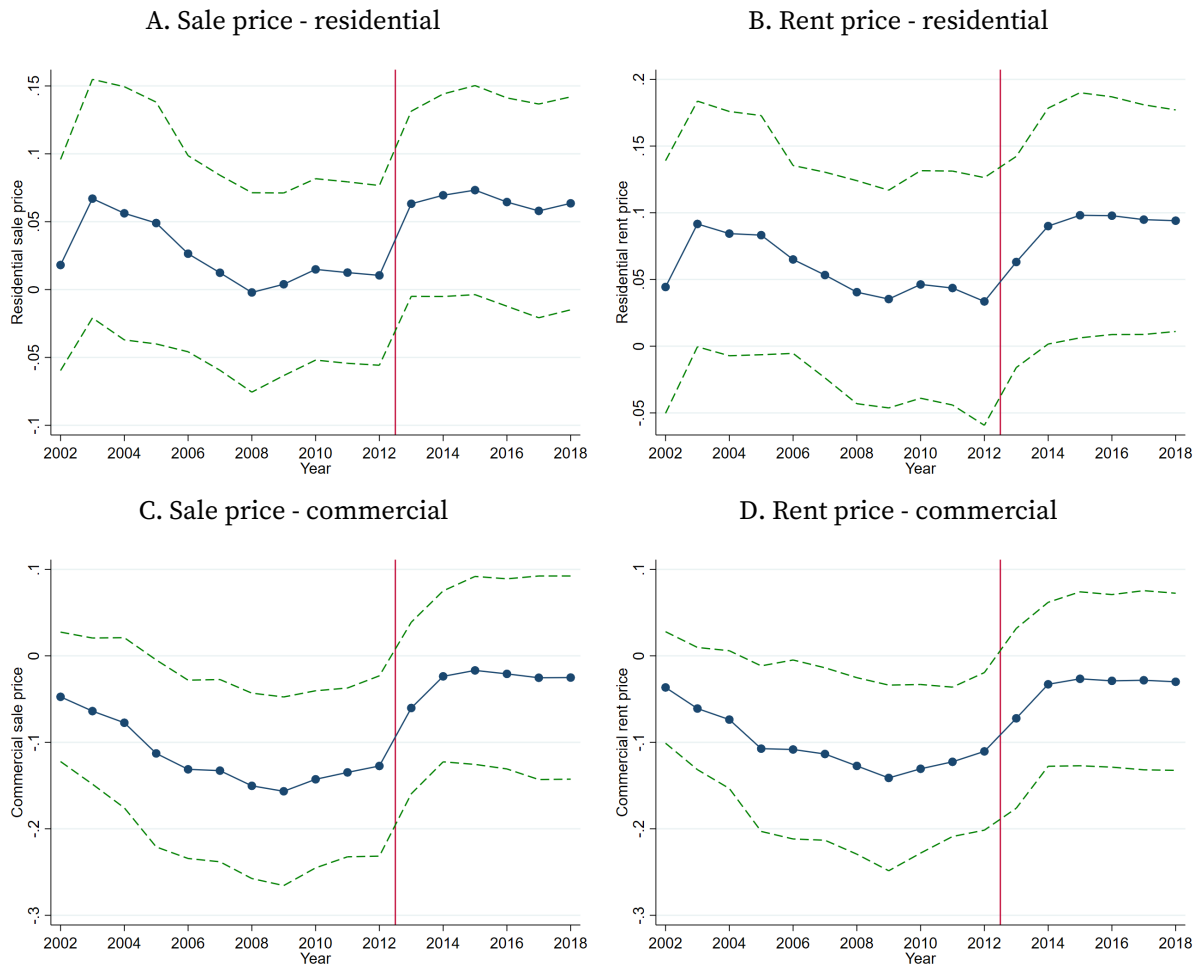
Figure 3 plots the yearly reduced-form regression discontinuity estimates for the sale and rent prices of residential and commercial properties. Panels a) and b) show the yearly estimates for residential sales and rent prices, respectively. Each estimate is obtained from a regression discontinuity model of the logarithmic transformation of sale and rent prices on the instrument, the 5000 inhabitants' cutoff. Notably, there is a stable pre-trend for both sale and rent prices up until 2013. This finding indicates that there are no significant pre-trends for these outcomes. After 2013, there is a sharp increase in both prices, which remains constant thereafter. Panels c) and d) show that commercial building sale and rent prices exhibit a similar pattern. These results suggest that the IMC mandate is associated with an increase in both residential and commercial house prices.

The visual finding is supported by the fuzzy difference-in-discontinuity estimates presented in Table 1. The F statistics show that the first stage regression is strong across the board. Columns (1) and (2) of Table 1 show that residential sale prices increase

by 28-29.5% in municipalities that joined an IMC after the mandate was implemented. Rents have increased by approximately 26%. These estimates are consistent across different estimation procedures and are robust to changes in the polynomial form of the running variable and bandwidths, as presented in the Appendix. Columns (3) and (4) show that the commercial building prices also increased by a larger amount, roughly 57-58% (rents by 41%).

A municipality that joins an inter-municipal community experiences an increase in house prices in both the residential and commercial categories. These findings differ from Tricaud (2021) which does not find any change in house prices because of positive and negative effects compensating each other across municipalities with stronger and weaker shocks to housing supply. Italy has no available data on housing permits at the municipal level so I cannot investigate how the housing stock changes but I explore other avenues. In the next section, I explore two potential mechanisms behind the change in house prices: tax rates and the quality of public goods.

FIGURE 3. Reduced form estimates for house prices



Notes: These plots show the yearly reduced form estimates of house price measures on the instrument, having less than 5,000 inhabitants. Subfigures a) and b) report sale and rent prices for residential buildings, respectively. Subfigures c) and d) show the same plots for house prices of commercial buildings. The kernel used is triangular, and the bandwidth is computed using the Calonico et al. (2017) algorithm.

TABLE 1. House prices - Difference-in-Discontinuity Estimates

	Residential		**Commercial**	
	(1)	(2)	(3)	(4)
	ln(sale)	ln(rent)	ln(sale)	ln(rent)
Conventional	0.282**	0.266**	0.571***	0.441**
	(0.110)	(0.120)	(0.195)	(0.198)
First-stage F	37.78	38.38	21.24	20.85
Bias-corrected	0.295***	0.263**	0.584***	0.413**
	(0.110)	(0.120)	(0.195)	(0.198)
First-stage F	42.09	42.75	23.71	23.28
Robust	0.295**	0.263*	0.584***	0.413*
	(0.124)	(0.135)	(0.218)	(0.221)
First-stage F	34.53	34.64	19.17	18.92
Observations	7,463	7,463	7,554	7,554
Mean	1236.243	4.385	890.597	4.289
Bandwidth	989.4	1053	1563	780.8

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors clustered at the municipality level are reported in parentheses. The table reports difference-in-discontinuity estimates for house prices in logs, by building category (residential and commercial). The F statistics are for the first stage regressions of the probability to belong to an IMC on an indicator for having less than 5,000 inhabitants. Controls include the fraction of workers in the first and second sector, the fraction of population between 0-4 and above 65, the share of foreign population, altitude of the municipality, population density, dummies for the municipality being in the North and Center of the country, a dummy for rural municipalities, a dummy equal to one if the year is an election year, and region fixed-effects.

6. Mechanism

So far we know that a municipality that joins an inter-municipal community experiences an increase in house prices. Two are the main drivers I explore in this section: property

tax and public goods.

First, I consider the possibility that municipalities entering an inter-municipal community might change their property tax rate differently from municipalities that do not cooperate. This idea is backed up by findings in the empirical and theoretical literature. Breuillé et al. (2018) investigates this possibility in France and finds that inter-municipal cooperation leads to an increase in taxation, following the argument that reduced competition frees municipalities from the need to undercut each other as before cooperation. However, there are other forces in play when thinking about inter-municipal cooperation: one of the main reasons to support IMC is that they help the creation of economies of scale which are expected to reduce not only public expenditure but also taxation (Duncombe and Yinger 1993); spillovers also play a role, and in the presence of positive (negative) spillovers, IMC should increase (decrease) taxation because of their internalization (Wilson 1986). Thus, the direction of this effect is unclear a priori.

The property tax rate is the main source of own revenues for local governments in Italy (in 2015, property tax revenues were 18% of the total revenue and 42% of the tax revenue for the average municipality[12]) and mayors have freedom in setting its rate. The Italian property tax has two main rates, a lower one for the residential buildings identified as main dwellings[13] and a higher one for the rest of the buildings, the so-called base buildings[14].

The first two columns of Table 2 show the estimates of the effect of inter-municipal cooperation on property tax rates. There is no statistically significant effect on either of

[12]Ministry of Finance, 2015

[13]A house is identified as the main dwelling if an individual and the members of her family officially and habitually reside there.

[14]The property tax structure has been reformed in 2012. The main change consists of an increase in the range of adjustment of the tax rate, which gave mayors larger discretion in how to set the tax rate. The reform affected the whole country at the same time and in the same way and the mayors endogenously decided if and how to adjust the tax rates.

the tax rates. These results are also robust to different estimation techniques, higher-order polynomials in the running variable, and different bandwidths. Thus, the house price increase is not reflecting the capitalization of property tax as it is common in OECD countries and Italy in particular Cebula (2009); Oliviero et al. (2019).

All of this reconnects to the findings of the seminal Oates (1969) paper, which finds a negative relationship between property tax rates and house prices. Moreover, it finds that "for an increase in property taxes unaccompanied by an increase in the output of local public services, the bulk of the rise in taxes will be capitalized in the form of reduced property values". Thus, as a next step, I investigate the effect of cooperation on measures of public good quality.

I focus on two services, childcare, and street lighting. Both measures have been used in the literature on decentralization and public good provision (Ferraresi et al. 2018; Bianchi et al. 2022). I take the measures in per capita terms and logarithms given the highly skewed distribution. Columns (3) and (4) of Table 2 show the estimates. There is a 15.6% increase in per capita spots at public childcare in municipalities that join an IMC and 75% more illuminated kilometers of municipal road per capita. Both estimates are consistent across estimation methods, polynomials of the running variable, and bandwidth sizes. These findings are consistent with other work on a smaller set of municipalities in Italy (Ferraresi et al. 2018) and France (Tricaud 2021).

To corroborate this finding, I evaluate Tiebout's "voting with their feet" hypothesis. Tiebout hypothesizes that if local public good quality changes, then people will move across jurisdictions searching for the best combination of taxes and amenities. Results are shown in column (3) of the first panel of Table 2: there is a 22% decrease in population after a municipality is forced to join an IMC. This is an additional hint that residential house prices might be reflecting a worsening in public goods quality. This is particularly relevant given that Italy is a typical low-mobility country where people have strong

family ties (Faini et al. 1997; Manacorda and Moretti 2006).

To conclude, I analyze if the improvement in public service provision comes from larger investments or increased efficiency. The last two columns of Table 2 report the difference-in-discontinuity estimates for current and investment expenditures. Both figures are in per capita and real terms and taken in logarithms. Column (7) shows that joining an IMC increases current expenditure by 46%, which is expected given that the IMC is a new entity that needs an organization to function and thus requires the hiring of bureaucrats, whose wages weigh on the current expenditures of the member municipalities (Ivaldi et al. 2016). Column (8), instead, shows that there is no change detected in investment expenditure for municipalities that starts cooperating. The estimate is non-significant and thus means that these municipalities are not working on additional investments. This is indirect evidence that the improvement in public service provision is likely coming from an increase in efficiency coming from cutting duplicate functions and duplicate investments.

Altogether these findings help shading light on the mechanism behind the increase in house prices that affects municipalities that join an inter-municipal community. The price increase is the result of the capitalization of improved amenities that are now available in the cooperating municipalities thanks to improved efficiency.

TABLE 2. Mechanism

	Tax rates		Public goods	
	(1)	(2)	(3)	(4)
	Main dwelling	Base	Childcare	Street lights
Conventional	-0.049	-0.064	0.156***	0.750**
	(0.032)	(0.042)	(0.045)	(0.372)
First-stage F	31.04	25.17	54.74	57.57
Observations	7,851	7,856	5,563	7,850
Mean	0.485	0.769	0.055	16.946
	Population		Expenditure	
	(5)	(6)	(7)	(8)
	Log(Population)	Net Immigration	Current	Investment
Conventional	0.065***	88.737***	0.461**	-1.89
	(0.020)	(26.177)	(0.222)	(1.500)
First-stage F	59.12	59.64	12.46	12.88
Observations	7,895	7,895	6,488	6,330
Mean	20,782.13	93.502	474.942	42.659

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors clustered at the municipality level are reported in parentheses. The table reports difference-in-discontinuity estimates for property tax rate for main dwelling and other buildings (in %), public good measures (log childcares per 1000 inhabitants and log kilometers of street lights per 1000 inhabitants), current and investment expenditures (in per capita and real terms), and population growth and net immigration. The F statistics are for the first stage regressions of the probability to belong to an IMC on an indicator for having less than 5,000 inhabitants. Controls include the fraction of workers in the first and second sector, the fraction of population between 0-4 and above 65, the share of foreign population, altitude of the municipality, population density, dummies for the municipality being in the North and Center of the country, a dummy for rural municipalities, a dummy equal to one if the year is an election year and region fixed-effects.

7. Conclusions

This article provides new evidence on the effects of inter-municipal cooperation on member municipalities. By exploiting an Italian mandate that forced municipalities

with populations below 5,000 to join an inter-municipal community, I find that municipalities that begin cooperating experience an increase in the sale and rent prices of both residential and commercial buildings. I justify this change by showing that it is the result of the capitalization of improved public goods in house prices. I find that municipalities that cooperate, improve efficiency and can improve their childcare and street lighting services.

These results suggest that inter-municipal cooperation can have positive consequences on the member municipalities because it reaches its objective of expenditure rationalization, which translates into better public goods. This has the consequence of increasing house prices so that on average it is unclear if the overall welfare ends up increasing or not. This is outside the scope of the paper but it would be interesting to give a more general equilibrium perspective to the theme.

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TABLE 1. Summary statistics

	(1) pop $\leq$ 5000		(2) pop $>$ 5000	
	Mean	SD	Mean	SD
Panel A: House prices				
Residential sale price	892.98	355.17	1236.24	478.17
Residential rent price	3.22	1.34	4.38	1.70
Commercial sale price	648.29	260.30	890.60	332.59
Commercial rent price	3.16	1.26	4.29	1.55
Panel B: Property tax rates				
Main dwelling tax rate	0.25	0.27	0.23	0.26
Base building tax rate	0.71	0.16	0.77	0.17
Panel C: Population and public goods				
Population	1829.40	1291.72	20782.13	76827.51
Net immigration (%)	0.34	2.03	0.57	1.27
Δ% Population	-0.17	2.21	0.40	1.19
Childcare providers	0.04	0.21	0.06	0.12
Street lights	37.45	390.39	16.06	146.06
Panel D: Controls				
Primary sector workers	0.10	0.09	0.06	0.07
Secondary sector workers	0.33	0.11	0.32	0.10
Young share of population	0.13	0.03	0.15	0.02
Old share of population	0.23	0.07	0.19	0.04
Foreign share of population	0.06	0.04	0.07	0.04
Altitude (m)	406.60	285.44	178.71	174.09
Population density	145.77	237.84	710.01	1063.25
North	0.60	0.49	0.53	0.50
Rural	0.82	0.38	0.15	0.36
Observations	75,829		32,931	

Notes: This table shows the summary statistics (mean and standard deviation) of the outcomes and control variables used in the main analysis. All prices in Panel A are computed in logs. In Panel B, property tax rates are in percentage points and the tax deduction is in euros. In Panel C, net immigration is defined as inflow minus outflow of people in the municipality, Δ%Population is the yearly percentage change in population. Childcare and street lights are computed per 1,000 inhabitants.

TABLE 2. House prices - Absolute values

	Residential		**Commercial**	
	(1)	(2)	(3)	(4)
	Sale	Rent	Sale	Rent
Conventional	360.340***	0.659	321.613**	0.858
	(119.791)	(0.413)	(135.033)	(0.638)
First-stage F (Conv.)	39.39	37.78	20.64	21.60
Bias-corrected	384.513***	0.676	340.590**	0.704
	(119.791)	(0.413)	(135.033)	(0.638)
First-stage F (Bias-corr.)	43.88	42.09	23.04	24.11
Robust	384.513***	0.676	340.590**	0.704
	(135.028)	(0.461)	(150.807)	(0.713)
First-stage F (Robust)	35.81	34.44	18.75	19.46
Observations	7,463	7,463	7,554	7,554
Mean	1236.243	4.385	890.597	4.289
Bandwidth	993	1141	1540	1087

Notes: The table reports difference-in-discontinuity estimates for house price outcomes, separated by building category (residential and commercial). The F statistics are for the first stage regressions of the probability to belong to an IMC on the treatment status, i.e., having less than 5,000 inhabitants in 2010. Controls include the fraction of workers in the first and second sector, the fraction of population between 0-4 and above 65, the share of foreign population, altitude of the municipality, population density, dummies for the municipality being in the North and Center of the country, a dummy for rural municipalities, a dummy equal to one if the year is an election year and region fixed-effects.

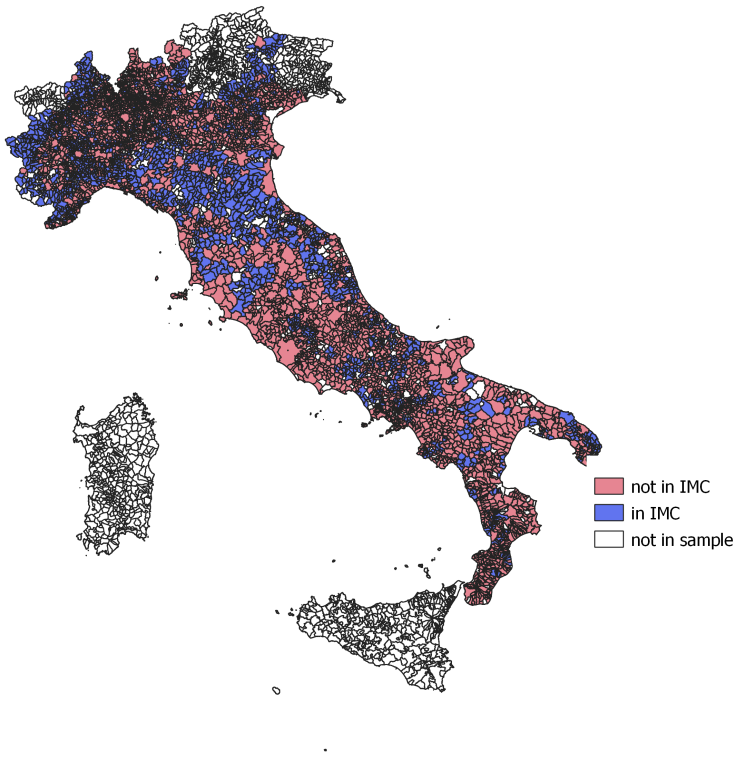
TABLE 3. House prices - Other polynomials

	Residential		Industrial	
	(1)	(2)	(3)	(4)
	ln(sale)	ln(rent)	ln(sale)	ln(rent)
Panel A: 2nd degree polynomial				
Estimate	0.578**	0.456**	1.904	2.021
	(0.229)	(0.228)	(1.235)	(1.377)
First-stage F	14.44	14.74	2.777	2.804
Panel B: 3rd degree polynomial				
Estimate	2.272*	1.553	-6.574	-6.036
	(1.380)	(1.027)	(11.038)	(9.604)
First-stage F	2.712	2.730	0.451	0.474
Observations	7,463	7,463	7,554	7,554
Mean	6.827	1.462	6.517	1.456
Bandwidth	1618	1493	1618	1493

Notes: The table reports difference-in-discontinuity estimates for house price outcomes, separated by building category (residential and commercial). The polynomial form of the running variable is second-degree (Panel A) and third-degree (Panel B). The F statistics are for the first stage regressions of the probability to belong to an IMC on the treatment status, i.e., having less than 5,000 inhabitants in 2010. Controls include the fraction of workers in the first and second sector, the fraction of population between 0-4 and above 65, the share of foreign population, altitude of the municipality, population density, dummies for the municipality being in the North and Center of the country, a dummy for rural municipalities, a dummy equal to one if the year is an election year and region fixed-effects.

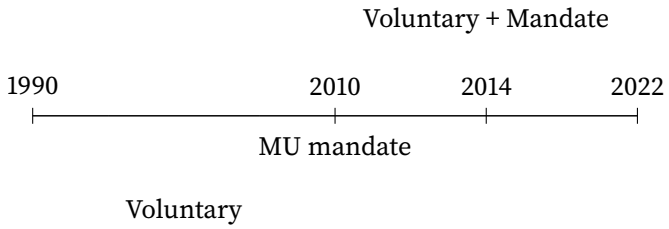
Appendix 8. Additional Figures

FIGURE 1. Inter-municipal communities in Italy in 2018



Note: The map shows the municipalities that are part of an inter-municipal community (purple) and those that were not (pink) in 2018. Blank municipalities are not included in the sample because they are either part of a Special Status region (e.g., Sicily) or they have missing values for the main outcomes of interest

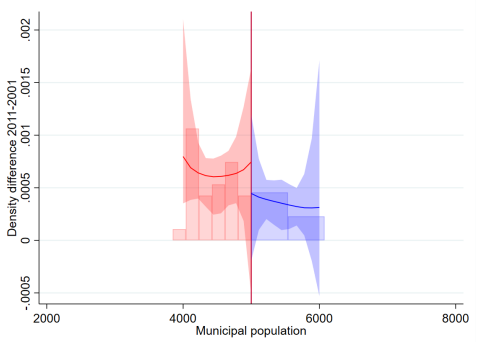
FIGURE 2. Timeline of the inter-municipal cooperation reforms



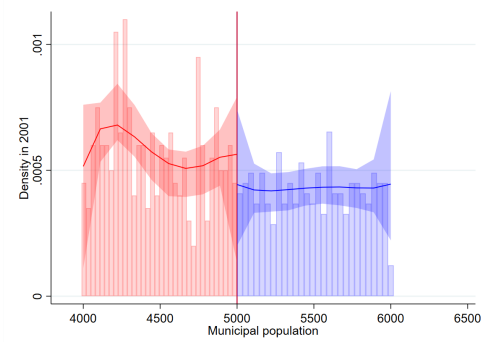
- In 1990, municipal unions were introduced in Italian public law. Municipalities were free to join but they had to merge after 10 years of union.
- In 2000, the mandatory fusion requirement has been removed.
- In 2010, Italy passed a law that **mandate** municipalities with less than 5,000 inhabitants to join a MU.
- In 2014, the discipline of municipal unions has been simplified, reducing the types of unions existing, facilitating the internal organization

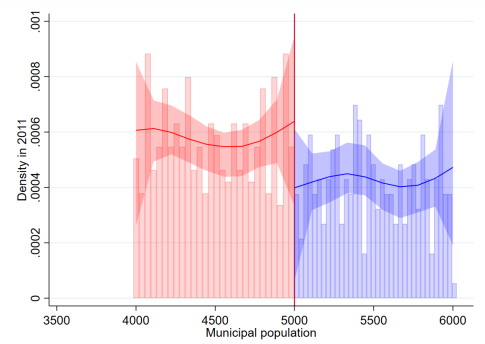
FIGURE 3. McCrary test

A. Population 2011-2001



B. Population 2001

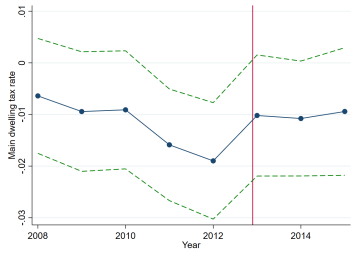




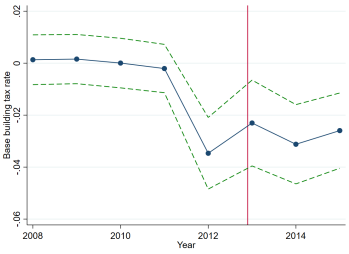
C. Population 2011

Note: The figures show the test of continuity at the 5,000 inhabitant threshold. The top figure shows the continuity of the difference between the 2011 and 2001 populations (data from the Census), while the two bottom figures who the continuity of the 2001 and 2011 populations separately. The lines are local polynomials, the histograms show the population distribution and the shaded areas are 95% confidence intervals.

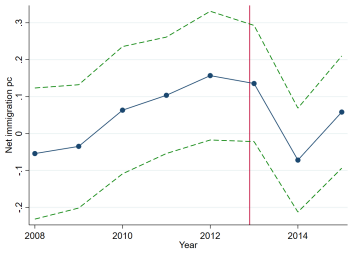
FIGURE 4. Multiple bandwidths



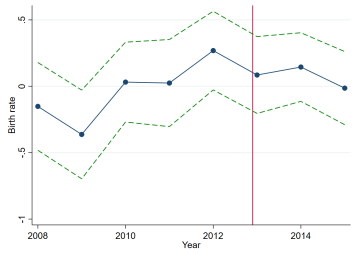
A. Main dwelling price



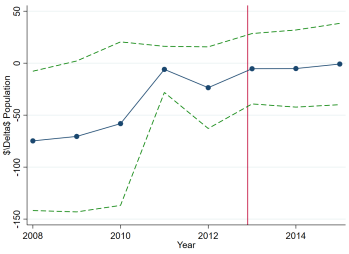
B. Commercial building price



C. Net immigration

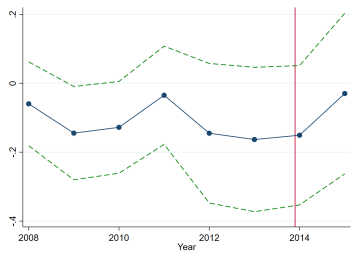


D. Birth rate



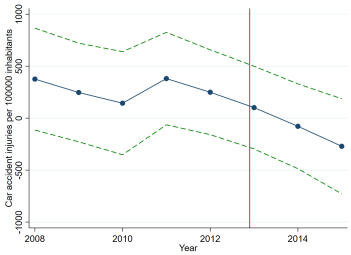
E. ΔPopulation

F. Childcare

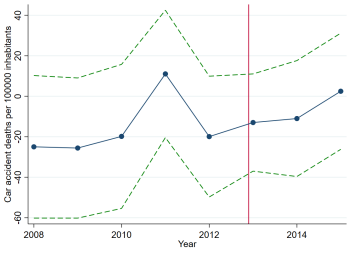


G. Street lights

H. Libraries



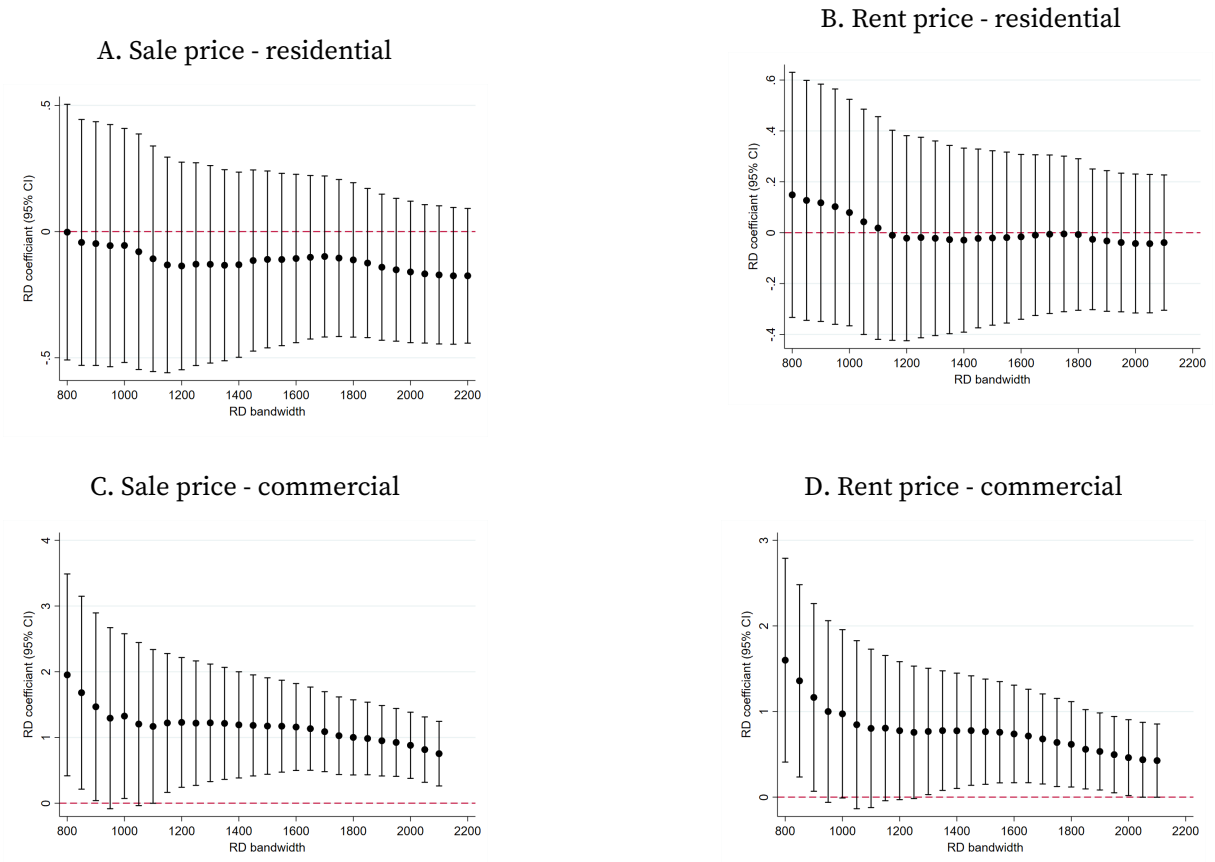
I. Accidents with wounded



J. Accidents with death

Note: The figures show difference-in-discontinuity estimates for house price measures (sale and rent prices) for residential and commercial buildings and a set of bandwidth sizes ranging from 800 to 2200.

FIGURE 5. Different bandwidths



Note: The figures show difference-in-discontinuity estimates for house price measures (sale and rent prices) for residential and commercial buildings and a set of bandwidth sizes ranging from 800 to 2200.