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ESSAYS ON INSTITUTIONS AND DEVELOPMENT

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Introduction

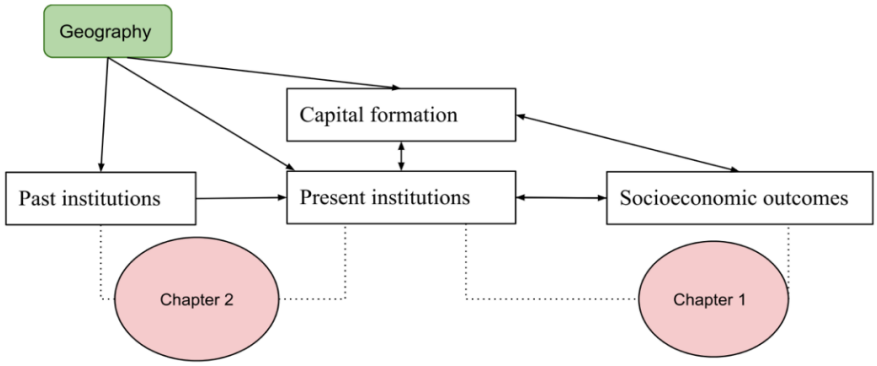
Institutions are widely viewed as a fundamental cause of socio-economic development (North,1990; Rodrik et al., 2004, Acemoglu et al., 2002) alongside geography (see e.g., Diamond 1998), capital formation (Solow, 1956; Swan, 1956; Romer, 1986: Lucas, 1988) and economic integration (Frankel and Romer, 1999). Unlike geographic features and demography, nominal institutions can change quickly through wars, revolutions, or the dissolution of empires. However, do institutions really change completely and abruptly? A burgeoning literature on institutional persistence provides evidence that this is not the case. The effects of the past persist, even though they may be subtle, and typically span various aspects of society and the economy in addition to institutions: language, culture, land use, laws, consumption and saving patterns, infrastructure quality, city locations et cetera.

Quantifying how modern institutions influence current development outcomes is crucial for policy. However, this is a challenging task, as the relationship is confounded by institutional persistence: is an outcome observed today caused by present institutions, or are the former and the latter both caused by the past? As with any confound, natural experiments are a precious tool to tease apart causal relations from mere correlation. This thesis presents two such quasi-experimental studies, aimed at disentangling the intertwined relationship between past and present institutions and modern development (as shown in Figure 1). Chapter 1 is examining the current institutions - socio-economic outcomes relationship, providing evidence on how different institutional arrangements produce diverging population dynamics in fragile areas. Chapter 2 is essentially a persistence study that illustrates how modern institutional heterogeneity is rooted in the past. In both Chapters particular attention is paid to geographical controls, recognising the paramount importance of geography for economic development.

It is not by chance that both natural experiments are set in Italy. Italy experienced centuries of institutional variety prior to Unification, and even nowadays is characterized by a high degree of heterogeneity at various levels. The most widely known case of this heterogeneity concerns the North-

South divide in economic performance. However, in both chapters of the thesis I examine heterogeneity within the Italian North, effectively ruling out capital formation and macrogeographic differences as explanations for the observed differences.

Figure 1: Relations between present institutions and relevant outcomes are confounded by past institutions and geography.



Chapter 1 of this thesis is single authored and is titled "Thrive, survive or perish: the impact of regional autonomy on demographic dynamics in Italian Alpine territories". In this chapter I attempt to quantify the effects of current institutional differences, with reference to the nature and degree of local autonomy on population growth in 2000-2015. This is an outcome that is of paramount importance to mountain communities, which are under the threat of depopulation in aging countries like Italy or Japan. I leverage the administrative discontinuity represented by regional borders between autonomous and ordinary statute regions in the Italian Alps, showing that population dynamics differs on either side of the border: the population in the ordinary stature Italian regions of Veneto, Piedmont, and Lombardy declines significantly faster than in the neighbouring autonomous regions of Trentino-Alto Adige, Val d'Aosta, and Friuli-Venezia Giulia. The spatial regression discontinuity analysis suggests that the effect is due to institutional differences across the border, with climate, elevation, income and other control data being continuous across it. Using fine grained data, I focus my analysis on the sub-municipal level, by extracting random squares on the map from both sides of the border within a cut-off. This way, the effect of spatial autocorrelation is mitigated, as

confirmed by the relevant robustness checks. Moreover, I examine two sources of autonomous status variation in order to support my claim. First, I make use of historical census population data starting from 1921, and show that the discontinuity in population dynamics was not present before the introduction of autonomous statute regions with the Republican Constitution. Second, I focus on the municipality of Sappada, that managed to change its region from an ordinary statute region (Veneto) to a special statute one (Friuli-Venezia Giulia): when compared to nearby contiguous mountain municipalities that did not change region, the "little municipality that could" stopped its trend of population loss.

While the discontinuity in demographic dynamics is an interesting result in and on itself, I further investigate its origin by resorting to Leslie-matrix based demographic modelling in order to decompose demographic change into components and explore the plausible causal pathway from fiscal autonomy to population dynamics. Model simulations suggest that differences in death rates, transient differences in age structure, or bursts of migrations are not responsible for the different population growth rates. I find that the likely culprit is different policy effecting the birth rates through increased fertility, due to the availability of facilities such as kindergartens. This is corroborated by the fact that the availability of kindergarten places Granger-causes fertility on the sample of all Italian municipalities. I argue that the patterns of local spending that positively influence birth rate in special statute regions are enabled by fiscal autonomy.

Chapter 2 is titled "The luck of falling on the bright side. Enlightenment and long-term persistence of local administrative traditions" and is co-authored with my advisors Prof. Giulio Cainelli and Asst. Prof. Roberto Ganau. We are investigating long-term institutional persistence in the Italian context. We exploit the historical border between the Duchy of Milan under the rule of the Austrian Empire and the neighbouring Kingdom of Savoy-Piedmont-Sardinia. The border was established by the Aix-la-Chapelle treaty of 1748 as a result of War of Austrian succession. This border in part coincides with the current administrative border between Lombardy and Piedmont but a significant part of it runs through Lombardy. This is not the case for other pre-unification borders

in Italy, as an absolute majority of them tends to be preserved in the form of inter-regional or inter-provincial borders today. We argue that the Aix-la-Chapelle border is largely exogenous - being the result of a treaty between great powers that was essentially imposed on both the Habsburg Austrian Empire and the Kingdom of Savoy-Piedmont-Sardinia. While both the Habsburgs and the Kingdom implemented administrative reform aimed at homogenizing local bureaucracies, the regimes differed in the final scope and the type of the reform, empowering them to efficiently allocate local resources in the case of municipalities belonging to the Duchy of Milan, centralizing power in Savoy. Indeed, our border strategy reveals a discontinuity in present day municipality efficiency in service provision at the historical border, which is not justified by a difference in other variables, including local public expenditure. The result holds when including historical, socio-economic and geographical controls and is robust to a battery of additional tests, including alternative sample specifications. Moreover, the discontinuity can be traced back to 1884, soon after Italian unification under Savoy. We examine the 1884 budget data and find a significant difference in other measure of administrative efficiency, most importantly the amount of discretionary (as opposed to compulsory) expenditure on education. The long shadow of the (institutional) past appears to still affect Italian institutions today, hundreds of years after the Austrian and Savoy reforms introduced divergence of administrative traditions. What is the mechanism that could lead to such long-term persistence? Under which institutional parameters can this result be possible? We introduce a model aimed at exploring possible pathways for persistence, showing that under some plausible conditions a government organization can perpetuate values that differ from those of the underlying population through enculturation of its individual members.

While we establish a link between past reforms and current institutional differentials in service provision efficiency, we also present some concrete evidence of the effect this has on socio-economic outcomes. Ex-Duchy of Milan municipalities tend to provide significantly more nursery places than ex-Savoy ones, after controlling for relevant covariates. This effect might not result in tangible GDP per capita discontinuities but is crucial in the long term. Having shown in Chapter 1 that the

availability of childcare services Granger-causes fertility on the municipal level for Italy as a whole, the social service provision capacity of municipalities receives a whole new importance especially for an ageing society.

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Chapter 1

Thrive, survive or perish:

the impact of regional autonomy on the demographic dynamics of Italian Alpine territories

by Nadiia Matsiuk[1]

Abstract: Mountain communities face the threat of depopulation, as residents age or move to large cities in the lowland. This issue is pressing for Italy, where a large portion of the territory is mountainous, and the overall population is rapidly aging. This paper analyses whether the autonomous status of a region affects the demographic dynamics of its mountain areas. The question is currently being fiercely debated in Italy, with border municipalities seeking to switch region in pursuit of perceived benefits, mainly in the form of the direct management of a larger portion of taxes. The analysis relies on an adjacency-based estimation approach, including spatial regression discontinuity techniques, in order to compare population changes in mountain areas randomly selected from Northern Italian regions with special statutes vs. neighbouring regions without special statute. Measuring population changes in the 2000s shows a significant difference in the demographic dynamics in border regions, with areas in autonomous regions experiencing more favourable population dynamics. Our hypothesis is that fiscal autonomy contributes to sustainable local development and the survival of mountain communities.

Keywords: population dynamics, regional development, fiscal autonomy, spatial regression discontinuity, mountain communities

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1. Introduction

The Italian political and administrative system is structured at the regional level in what is generally defined as a system of 'asymmetric regionalism', with elements of both a centralized and a federal system. Five regions have autonomous status, and fifteen regions 'ordinary' status. Municipalities on the border between two regions have the constitutional right to change their regional jurisdiction. Not so long ago, this constitutional right has been exploited. One of the two successful cases of regional 'migration' was the municipality of Sappada[2]. In October 2008, a referendum on 'migration' from the region of Veneto to the autonomous region of Trentino-Alto Adige was held in the municipalities of Cortina d'Ampezzo, Livinallongo del Col di Lana, and Colle Santa Lucia. The referendum had a high voter turnout and a large proportion of 'yes' votes[3].

The administrative differences between neighboring Italian regions can be used to investigate the socio-economic effects of various regional arrangements, including the effects of fiscal decentralization on local development once other factors have been accounted for, such as fiscal transfer patterns from the central government, and pre-existing geographic, demographic, and cultural differences. Specifically, this setting can be exploited to analyze whether and to what extent the autonomy status of a region has effects on population dynamics in the mountains, as the borders between ordinary-statute regions (OSR) and special-statute regions (SSR) are mostly in the Alpine area. 35.2% of Italian territory is in the mountains, home to 12% of the country's

[2] The first case of changed jurisdiction occurred between two regions with ordinary statutes. In 2009, several border municipalities in the area of Alta Valmarecchia left Le Marche for the Emilia-Romagna region. Following the 2007 referendum, Sappada officially moved from Veneto to the Friuli-Venezia Giulia region in December 2017. The process was quite lengthy, as approval was required both from the new region and the national Parliament. Consequently, the relatively small municipality of Sappada – with a population of 1,315 inhabitants as of January 2018 (ISTAT) – established a precedent, 'migrating' from a region with an ordinary statute to one with a special statute.

[3] According to the Italian national newspaper La Repubblica, around 80% of Cortina d'Ampezzo voters supported jurisdiction change (http://www.repubblica.it/2007/10/sezioni/cronaca/referendum-cortina/referendum-quorum/referendum-quorum.html). The 'migration' process has yet to be finalized, however. This is not surprising, considering the economic importance of Cortina d'Ampezzo, a very significant ski resort with around 6,000 inhabitants and many tourists. In 1956, Cortina d'Ampezzo hosted the Winter Olympics game. The town regularly hosts major international sports events, for instance the World Alpine Skiing Championships in February 2021. Therefore, the Veneto Regional Authorities strongly opposed the potential loss and used the case to argue for autonomy for the entire Veneto region.

population, but the share is even higher in the North of Italy, i.e., about 46% and 15% respectively (in 2015, according to ISTAT), so the topic is evidently important for policy decisions.

Mountain communities are especially sensitive to local public expenditure, as they have historically fewer economic opportunities than nearby plateau areas. Considering global urbanization trends (UN, 2019), rural mountain communities are no exception, and thus are subject to depopulation. These tendencies are readily apparent in panel (b) of Figure 1, showing the population change in Northern Italy between 2000 and 2015. Along the Trentino-Alto Adige-Veneto border (TAA-VEN), the pattern of slower depopulation in the autonomous region of Trentino-Alto Adige can be seen by comparing the deep red in the northern part of Veneto region (corresponding to a negative population change), with the white or light blue along the border of the autonomous province of Trento in Trentino-Alto Adige, indicating respectively stagnating or moderately increasing population dynamics. The pattern over the Trentino-Alto Adige-Lombardy (TAA-LOM) and the Valle d'Aosta-Piemonte (VDA-PIE) border is similar, with the autonomous side experiencing slower depopulation. This is not readily apparent at the border between Veneto and Friuli-Venezia Giulia (VEN-FVG), possibly due to the peculiarities of this latter autonomous region discussed further on.

[--- Figure 1 ---]

In order to estimate the demographic effects of autonomy, we began our analysis with a baseline municipality-level Ordinary Least Squares (OLS) spanning all the alpine municipalities in either ordinary or special-statute regions of Northern Italy. We then applied a border strategy by restricting the sample to contiguous cross-border municipalities. Due to the variability in the shape and size of Italian municipalities, which show systematic differences across regions and are limited in number along the Veneto-Friuli-Venezia Giulia border, we complemented our border-strategy analysis with a quasi-experimental framework based on spatial Regression Discontinuity Design

(RDD) applied to the centroids of all municipalities within a strip along the border and to the finer grained Gridded Population of the World (GPW) data which reaches sub-municipal resolution. To this end, within a given distance from the inter-regional border, we randomly selected squares from the treated areas – i.e., the autonomous regions of Trentino-Alto Adige, Valle d'Aosta, and Friuli-Venezia Giulia – as well as from the counterfactual areas – i.e., Veneto, Lombardia, and Piemonte. The distance to the border is the scoring variable based on which the local average treatment effect on population growth is estimated. Our spatial RDD approach relies on the assumption that the observable characteristics of the border territory are similar[4]. We test this assumption directly by using both municipal-level data such as per-capita income, and higher resolution climate and remote sensing data such as night-time lights. Bearing in mind that the devolution of power from the central government to local entities was asynchronous for Italian SSRs and OSRs, with most reforms having taken place by the end of the 1990s, we mainly focus our attention on Alpine population dynamics in the 2000s[5]. However, we also repeat the municipal-level analysis with data from censuses held with a cadence of ten years from 1921 to 2001 to determine how the discontinuity in population growth at the OSR-SSR border changed over time and specifically at the introduction of the Trentino-Alto Adige and Valle d'Aosta OSRs coincident with the establishment of the republican constitution; as a further check we also leverage the recent transition of the municipality of Sappada from Veneto to Friuli-Venezia Giulia to investigate whether this resulted in changes in its demographic evolution.

Controlling for average per capita taxable income confirms our results, suggesting that our findings are not a mere reflection of differences in income between SSR and OSR. Similarly, there is no discontinuity at the border in Gross Domestic Product (GDP) as proxied by nighttime lights data in 2000. Nighttime lights data are used to this end as they have been shown to correlate

[4] Some regional indicators for the six regions of interest are presented in Appendix B.
[5] For SSRs, to the exclusion of Friuli-Venezia Giulia, decentralization started immediately after World War II, while for OSRs the first regional elections took place in the 1970s.

closely with GDP, and to reflect economic development levels (Henderson et al., 2012; Sutton et al., 2007; Mellander et al., 2015). The absence of local discontinuity in economic development means that possible differences in local GDP are likely not the main driver of demographic change. Climate, quantified in terms of temperature, precipitation and Köppen-Geiger classification, also does not reveal any sharp discontinuity at the border between OSR and SSR. This is a crucial check, since climate in mountain regions has important effects on economic activities, such as the ability to operate a ski resort, which in turn may affect demographics.

One more point corroborating our thesis is the fact that global fiscal residuals for SSR are not radically different from the OSR ones and are in most cases negative. Fiscal residuals are defined as the difference between the government expenditure and the taxes collected within a given region, and their estimate must rely on a meticulous tallying with some elements of discretion in the analysis, which includes, for instance, having to account for whether the ultimate recipient of a service provided at the regional level is indeed a resident of the region. Negative fiscal residuals mean that there is no room for direct transfers from the central government in affecting the observed outcome, so that the effect of autonomy is not merely due to extra resources. The composition of regional finance of Northern Italian regions with different statutes is presented in detail in Section 3, Subsection 3.1.

The rest of the article is organized as follows. Sections 2 and 3 review the theory and empirical evidence of fiscal decentralization and briefly introduce Italian decentralization reforms. Section 4 outlines the econometric methodology. The results of the baseline and spatial RDD analyses as well as robustness checks are presented in Sections 5 and 6. In Section 7 we discuss the possible causes and consequences of the effects observed, analyzing some demographic indicators at the provincial level in the regions investigated. We present our conclusions, including policy implications, in Section 8.

2. Related literature

2.1. Fiscal decentralization: Theoretical framework

The positive effect of the proper degree[6] of fiscal decentralization on local development has been investigated by two generations of scholarship in the fiscal decentralization literature. These two streams of studies have identified different mechanisms for the effects of decentralization on local development. According to first-generation studies, fiscal decentralization fosters local development through the more efficient resources allocation. Indeed, according to Oates (1972) decentralization theorem, which assumes identical costs for public good provision sustained by national and local authorities and the absence of public goods externalities, local governments are more or no less as Pareto-efficient than the central government in providing public goods in each geographic area. This is because preferences in a region are generally more homogeneous than among different regions. Another mechanism through which fiscal decentralization brings about more efficient public good provision is through Tiebout (1956) sorting mechanisms, also known as "voting with ones' feet". If localities provide different baskets of goods and services, people evaluate them according to their own preferences and move to more suitable areas, making collective local preferences more homogeneous.

The second generation of studies on fiscal decentralization suggests that central government is less efficient than local governments in resource allocation because it is conditioned in its choices by information asymmetry, political reasons, or the need to provide an equitable distribution of resources (Vo, 2010). Conversely, local governments are more informed about local needs and, thus, can better match expenses with local preferences. This is particularly true in the era of globalization and the information revolution, where national governments are losing control over important aspects of socio-economic life – e.g., the movement of goods, capital, people, ideas. In

[6] The notion of the 'proper degree' of decentralization stems from the Musgravian trade-off between fiscal decentralization and the macroeconomic stability of the state (Musgrave 1959).

these conditions, local authorities can react faster to the changing economy simply because they know their own markets better (Shah, 2008).

As a result, regional development can be fostered in regions with fiscal autonomy. It should be clear that the positive effect of decentralization on local development can be attained under certain conditions, such as a common market with free factor-mobility between regions, inter-jurisdictional competition, hard budget constraints, and institutionalized authority (Weingast, 2009). Under these conditions federalism is market-preserving and contributes to local development by reducing corruption and rent-seeking behavior. Local officials are motivated by fiscal incentives as they aim to increase the tax base. For instance, if local authorities directly manage property taxes, they may enact policies that encourage property prices to rise. In addition, local officials are more exposed to the public and hence motivated to take the right decisions, as their choices are clear to local voters, unlike the decisions of central government, as underscored by Casalone (2016).

Overall, from a theoretical viewpoint, fiscal decentralization can be expected to provide a more efficient process of resource allocation, provided certain conditions at the national level are met and the positive effects outweigh the potential threats, such as diseconomies of scale and negative externalities[7].

2.2. Fiscal decentralization: Empirical evidence

Despite the generally optimistic theoretical predictions, there is no consensus in the empirical literature on the effects of decentralization on socio-economic outcomes. Empirical evidence differs depending on the development stage of the countries under investigation, the administrative level of analysis considered, and the outcome variables. However, the exact causal mechanisms underlying the outcome of decentralization remain unclear, the 'efficient use of resources' being a vague concept. Hence, researchers turn to measurable variables arguably representing resource-use

[7] For the potential threats of fiscal decentralization see (Prud'homme, 1995).

efficiency: economic growth, population dynamics, health/wellbeing outcomes, institutional quality. Empirical works on the socioeconomic effects of fiscal decentralization often encounter problems of endogeneity and are fiscal decentralization measure sensitive (Martinez-Vazquez and McNab, 2003).

Empirical studies of decentralization in developing countries often find a detrimental impact on development indicators (Davoodi and Zou, 1998), and these findings are in line with theory since the conditions required for successful decentralization are typically absent in this context. Somewhat surprisingly, the results estimated for developed countries often stray from theoretical predictions. Fiscal decentralization in developed countries is usually positively associated with decreased corruption (Shah and Huther, 1999; Gurgur and Shah, 2005; Fisman and Gatti, 2002) and better health outcomes (Cavalieri and Ferrante, 2016; Di Novi et al., 2019), but the effects of fiscal devolution on economic growth are case-specific. For example, Thießen (2000) finds a positive relationship between economic growth and its determinants for middle-income countries and a hump-shaped relationship for high-income countries. The latter is confirmed for American states in 1992-1997 by Akai et al. (2007). Bähr (2008) argues that in 1975-1995 European Union structural funds were more effective in promoting economic growth in the more intensely federalized states of the 13 members investigated. Podestà (2017) uses synthetic control in the difference in difference method to evaluate the economic growth of the Italian Friuli-Venezia Giulia region after it obtained autonomous status in 1964. He concludes that without autonomy the region would have grown significantly less. Yet, when (Baskaran and Feld, 2013) examine the effects of fiscal decentralization on the economic growth of countries in the Organization for Economic Co-operation and Development (OECD) for the period 1975-2008 they find a negative impact of decentralization. Similarly, the negative relationship between decentralization measures and growth in 16 Central and Eastern European countries for the period 1990-2004 was found by panel data analysis in (Rodríguez-Pose and Krøijer, 2009)). However, in this study, the country-

specific long-term effects vary. When using the sample of OECD countries Rodríguez-Pose and Ezcurra (2010) find a negative relation between fiscal decentralization and economic growth in 1990-2005.

The estimation results are not only country-specific but also sensitive to the administrative level of analysis. Indeed, (Hammond and Tosun, 2011) discuss different effects of decentralization for metropolitan and non-metropolitan counties in the US, the latter being negatively impacted by decentralization. As pointed out by (Rowland, 2001) it is unlikely that administrative units of different size are affected by decentralization the same way. Small municipalities, unlike large urban areas, have a limited tax base, which is the fundamental source of local finance. Thus, population size might hinder potential gains from decentralization.

This paper contributes to the literature on the effects of fiscal decentralization by using a municipal-level border strategy on the alpine areas of northern Italy, complemented by RDD on fine-grained population data. This approach is in line with the literature on policy evaluation carried out in other contexts, such as Giua (2014), Pellegrini et al. (2013), Becker et al. (2010) on the effects of European regional policy, Becker et al. (2016) and Dell (2010) on policy persistence, and Holmes (1998) on the evaluation of industrial policies. We evaluate the effect of the difference in local governance on Alpine socio-economic development by focusing on the mountain population located near the border between Italian SSRs and OSRs. Bearing in mind the ubiquitous trend of mountain depopulation, the expected finding is that a higher degree of local government autonomy keeps the mountains 'alive' by providing a better mix of services and incentives to the inhabitants.

The approach adopted in this paper is novel for the empirical literature on the effects of fiscal decentralization on local development. First, population dynamics are chosen as an outcome of interest, since it is arguably the most relevant measure of development in non-metropolitan areas (Hammond and Tosun, 2011; Rowland, 2001). Mountain communities need a certain number of

residents in order to be viable, while population decline threatens infrastructure and mountain ecosystems, which are historically intertwined with anthropic activities. Furthermore, the spending powers of Italian regions are predominantly in healthcare and welfare services and may affect population numbers through the Tiebout sorting mechanism.

Second, our complementary RDD approach enables us to concentrate on mountain areas at sub-municipal scale across the regional borders in Northern Italy. Until now, the county/municipality level was the smallest scale of analysis used in the fiscal decentralization literature because of data availability issues. Our approach allows us to overcome the shortcomings of relying on municipal subdivisions – thus mitigating, for example, the modifiable areal unit problem (MAUP) when regressing against covariates.

Finally, we leverage changes in autonomous status including the recent events regarding the municipality of Sappada, as well as a comparison with population dynamics at the pre-WW2 census, before SSRs were instituted, and throughout the post-bellum period to attempt to untangle the effects of autonomy from those of time invariant confounds.

3. The Italian historical and institutional background

3.1. The Italian federalism

Of the twenty Italian regions, five have a sort of a home rule with a high degree of autonomous administrative, legislative, and financial powers. The powers of local administrations in autonomous regions differ and are enshrined in individual Special Statutes which are Constitutional Laws. SSRs are quite heterogeneous, and include the islands of Sicily and Sardinia, the mountainous and partly francophone Valle d'Aosta region, a region in the north-east (Friuli-Venezia Giulia, bordering Slovenia and characterized by the presence of a Slovenian-speaking minority), and the historically partly German-populated Trentino-Alto Adige, which also hosts a linguistic minority of Ladin language speakers.

All but Friuli-Venezia Giulia became autonomous regions immediately after World War II, as established by the Italian Constitution in 1948[8]. The post-war autonomy of Trentino-Alto Adige was negotiated at an international level[9]. Part of the Austro-Hungarian empire for centuries, Alto Adige (South Tyrol) became part of Italy after World War I. During the interwar period, the Italian authorities tried to assimilate the local German-speaking population. In the aftermath of World War II, this area was granted autonomy while remaining part of the Italian state in order to protect the linguistic and cultural heritages of the German-speaking population residing mainly in the Province of Bolzano. Valle d'Aosta was granted an SSR status as an acknowledgement of its linguistic differences (a dialect of French is widely spoken in the area), and to assuage separatist claims (see for example Street, 1998). Friuli-Venezia Giulia obtained the Special Statute in 1963 arguably for geopolitical reasons – i.e., its position close to Yugoslavia – and the presence of a Slovene speaking minority along the eastern border. In general, there were four main reasons for granting certain regions autonomous status: geographical (in the case of the islands), the presence of distinct linguistic minorities (which are explicitly acknowledged and protected by article 6 of the 1948 constitution), the geopolitical situation, and the prevention of separatism.

Regarding the ordinary statute regions, the reforms of regional governance in Italy were gradual, starting in the 1970s – the first ordinary-statute regional elections taking place in 1970 – and the 1980s, when some healthcare, industry, agriculture, and transport functions were transferred to the regions. The most dramatic changes took place during the 1990s. For example, two regional taxes (the Regional Surcharge on Personal Income Tax, and the Regional Tax on Productive Activities) were established in 1996 with central government transferring some healthcare services to all regions. In 1992, local government directly managed an average of 15% of locally collected taxes; by 2000 this had increased to 45% (Ambrosanio et al., 2010).

[8] Post-war formation of Italian regions was seen by many as a process imposed from above, without any attempts of the central government to separate regions based on economic or cultural similarities of the local population (Desideri, 2014). This point is relevant to the discussion on the exogeneity of inter-regional borders in Section 4.

[9] Autonomy was established by the De Gaspari-Gruber agreement of 1947, incorporated into the Paris Peace Treaty.

While empowering local OSR entities, fiscal devolution in the 1990s did not rectify the imbalance between OSRs and SSRs. Indeed, Italian autonomous and ordinary regions differ substantially in the amount of taxes managed in loco. Subnational SSR governments (SNGs) have more responsibilities and therefore more expenditure, and thus retain a higher share of local tax revenues. Table A.1 in Appendix A sets out examples of shares of taxes managed directly by the SSRs of interest, together with data for regional and total public expenditure per capita for the year 2016.

According to the principle of equity for regional public expenditure, the regions with greater fiscal devolution receive fewer funds from the central government – the so-called 'direct state interventions'. At first sight, comparison of regional state expenditure in SSRs and OSRs in the North of Italy shows a disparity: depending on the measure used, regional public expenditure per capita in SSRs are generally higher than in OSRs. However, comparing plain numbers of regional expenditure per capita is quite misleading.

The inter-regional redistribution effected by the government's taxation and expenditure policy is often measured by resorting to a synthetic indicator of the impact of public finance on the territory, namely, the fiscal residual. The fiscal residual of a given area is defined as the difference between the expenditures made and the revenues collected (net of transfers between different levels of government) by any public administration in that area, to measure the extent of the financial flows between the economic subjects referable to that area and the public sector. A positive (negative) fiscal residual of a given regional area thus indicates that the public budget produces a re-distributive flow into (out of) that area from (in favor of) the rest of the country. The public budget determines a redistribution between territories which, in most cases (the exception being programs explicitly aimed at reducing territorial gaps in terms of development potential), occurs without there being an explicit objective of territorial re-distribution but simply as a consequence of the heterogeneity of the distribution in the various areas of individuals according to the characteristics

relevant to the provision of spending (age, state of health, working condition, income, etc.) and its financing (income, consumption, wealth, etc.). For instance, as summarized in (Cerea, 2013), total state regional expenditure is substantially higher in less populated regions as there is no scale economy effect. Similarly, costs for infrastructure and administrative activities are higher in geographically rugged areas. Besides, factors such as military infrastructure, the share of retired citizens, the presence of multiple state institutions, and subsequent salary payments to state employees mean official statistics of regional expenditure are not easily comparable. In the case of SSRs, devolution and more responsibilities create the need for a relatively larger local administrative apparatus, yet another source of additional expenditure.

Using regression analysis to account for some of the above-mentioned factors, (Cerea, 2013) finds that there is not only a statistically significant tendency of the Italian State to transfer more resources per-capita to the less developed Southern regions (including the Islands) and to the less populated regions, but also the autonomous regions in the North tend to receive around 20% more state funds than comparable OSRs.

The findings by Cerea (2013) are one of the many attempted evaluations of inter-regional redistribution currently available for Italy (see e.g., Staderini and Vadalà, 2009; Arachi et al., 2010; Giannola et al., 2016; Di Caro and Monteduro, 2017). These offer a rather heterogeneous array of results, with values of the fiscal residuals attributed to the individual regional areas that vary considerably based on the adopted methodology. The discrepancies are mostly due to the difficulties inherent in regionalizing expenditure, i.e., on tracking who exactly are the beneficiaries and assigning them on a regional basis. At least as far as the direct expenditure[10] flows of central government are concerned (personnel expenses, purchases of goods and services and investments), the transactions imply the presence of suppliers, from which the government purchases goods and services that it in turns provides to the community. These goods and services can benefit specific

[10] Whether to include or not into the computation of government expense any company that is partly owned or otherwise controlled by the government is still an additional level of complication.

individuals or, indiscriminately, the entire population. The public expenditure in question can then be attributed to the regions either based on the location of the suppliers or based on the region in which the factors purchased are physically employed by the Government to produce goods and services for the population or instead based on who ultimately benefits from the good or service produced. Although the three criteria may coincide (if, for example, the Government entrusts a company from Trentino-Alto Adige with the construction of a university in Trento), it is easy to imagine situations in which the location of the supplier is different from the place in which the factors purchased will be used (if a company from Lombardy is awarded the contract for the construction of the university in Trento) and cases in which the latter does not correspond to the location of the benefit deriving from such goods and services (if the university in Trento attracts students from Veneto). The latter case concerns spending that finances services of collective demand - such as defense, or general services of the public administration - which are produced thanks to a particular physical allocation of factors on the territory, but from which the entire population benefits indiscriminately.

With this in mind, we made use of the database maintained by the Azienda per la Coesione Territoriale (Italian Agency for Territorial Cohesion)[11] to obtain estimates of the regionalized tax revenue and expenditure, with the aim to understand whether, and to which extent, SSRs receive preferential economic treatment from the central government. This data is summarized in Table 1.

[--- Table 1 ---]

The data presented in Table 1 shows that the net fiscal residue of both the SRRs and the OSRs under consideration is negative, meaning that all these regions contribute to the state budget through taxes more than they receive in terms of services. Moreover, the fiscal residue considered as a

[11]At the website https://www.contipubbliciterritoriali.it

percentage of the state revenue in each region is similar in magnitude between SSRs and OSRs, perhaps except for Friuli-Venezia Giulia.

In Figure 2 we examine the entity composition of regional finance. We show that in SSRs the expenditure directly controlled by the central government and the national state-controlled enterprises is lower than in OSRs; in Trentino- Alto Adige and Valle d'Aosta it amounts to less than half the total state expenditure in the region. Therefore, the distribution of resources and the efficiency of resource allocation by the regional and local government is likely to have a much greater impact in these latter regions.

[--- Figure 2 ---]

In fact, the way regional governments distribute available resources differs across Italian regions. According to Buglione (2014), when compared to OSRs, SSRs spend a larger share of their finances on promoting economic activities (trade, tourism, agriculture, manufacturing), welfare, education, and general administration. Unlike OSRs, SSR governments are responsible for teachers' salaries, disability pensions and other welfare benefits, firefighting services, local finance, and universities[12].

The analysis of fiscal residuals and regional finance composition suggests that the main driver of the demographic effects that we study in the following sections is not a mere preferential treatment of the SSRs by the central government, but it is the product of increased tax retention combined with local administration of taxation revenue.

[12] University funding and some additional responsibilities, including road management, were devolved to local governments over the course of decades in line with their wishes, as noted in Cerea (2013). This demonstrates that the autonomies have been proactive in their relationship with the State.

3.2. The Alpine regions in Italy

Due to the historically rooted asymmetric nature of Italian federalism, Italian Alps belong to either OSRs or SSRs. As in the nearby lowlands, Italian Alpine areas host predominantly small and medium-sized enterprises in numerous industrial districts. However, upland areas do not have big urban centers (the population being concentrated in the valleys), are characterized by less favourable climatic and geomorphological conditions (Cantiani et al., 2016) and are less integrated into the global economy. Thus, mountain areas can be considered not only 'exceptional' but 'exceptionally fragile' (Perlik, 2020). For instance, Alpine sustainability is currently under threat from climate change, with the risk of a negative impact on biodiversity, a crucial resource in Europe and globally (Antonescu, 2018).

During the last century, Alpine economies gradually shifted towards services (mainly tourism) from previously widespread agriculture and forestry; in recent years the number of tourists visiting the Alps has been tenfold compared to the local population[13]. Well-preserved forests, pristine landscapes and relatively clean air present valuable recreational opportunities for European city dwellers. In addition to tourism, natural resource (including drinking water) mining and hydroelectric power production are significant features of modern Alpine economies (Perlik, 2020).

The need for survival in harsh geographical conditions has led to the consolidation of local communities with high levels of social capital and mutual trust, exemplified by practices of common resource management (Notaro and Paletto, 2011). Indeed, when hundreds of self-governing mountain communities in Northern Italy were annexed by centralized nation states in the late 18th century, the loss of communal institutions and shared resources resulted in negative demographic dynamics (O'Grady and Tagliapietra, 2017). The Alpine population loss has continued since the interwar period (Toniolo, 1937; Viazzo, 2012), with surges in immigration partly offsetting the negative trend throughout the first decades of the 21st century.

[13] 100 million tourists as opposed 10 million Alpine inhabitants according to Antonescu (2018).

With a view to the characteristics and needs of inner mountain areas, the quality and abilities of local government are crucial for boosting development. As shown by Musolino and Silvetti (2020), the decisions of entrepreneurs who choose to establish businesses in the Italian Alps depend mainly on the quality of local government, with firms particularly appreciating the pro-business actions of autonomous regions. Tailor-made policies, localized management, and grass-root initiatives are increasingly seen as a prerequisite for the development of mountain communities (Mühlinghaus and Wälty, 2001; Battaglia et al., 2019) in the framework of local development 'from within' (Kretzmann and McKnight, 1996).

The Italian regional set-up, characterized by asymmetric powers, provides a suitable setting for a quasi-natural experiment to examine whether local or centralized governance is more beneficial for the development of hinterlands. Population change, an important indicator of any area's socio-economic development, is an indicator of how efficiently the needs of mountain communities are met.

4. Empirical strategy: methods and data

4.1. Baseline estimation

We start our analysis of mountain population dynamics with municipal level data. First, we run a pooled OLS including all mountain municipalities (364 observations) within the regions of interest. Subsequently, the municipality sample is restricted to the ones contiguous to the borders between OSRs and SSRs (63 observations). The selection was performed in QGIS (the map showcasing the selection is provided in Appendix E). We estimate the effect of belonging to autonomous regions post-1990s (end of decentralization reforms) on population dynamics by means of an OLS regression with a dummy accounting to autonomous status. We obtain historical population data on municipality level from ISTAT[14] for census years 1921, 1931, 1951, 1961, 1971, 1981, 1991,

[14] Accessible at http://ottomilacensus.istat.it/download-dati/

2001, and 2011. This series allows us to compare pre-treatment population values and demographic dynamics in Italian Alpine communities. For the baseline regression exercise we only keep the municipalities that existed in the year 1951. We furthermore select municipalities with the minimum altitude of 600 meters[15]. The dependent variable is population change from 2001 to 2011. Pre-treatment population (as of 1951) is included as a control variable, as well as the median altitude of the municipality's territory and taxable income per capita in 2010[16] as a control of municipalities' economic development. Thus, our first model takes the following form:

$$\Delta P_i = \beta_0 + \alpha D_i + \beta_1 A_i + \beta_2 P_{0i} + \beta_3 I_{0i} + \epsilon_i \qquad (1)$$

where ΔP_i the population change for municipality i over the 2001-2011 period, D_i is the autonomy dummy variable, A_i the altitude of municipality i , P_{0i} is the pre-treatment 1951 population of municipality i and I_{0i} is taxable income per capita.

We run this regression on two samples of municipalities: one including all municipalities within the regions of interest (pooled OLS), and one including only the municipalities contiguous to the inter-regional border between a SSR and an OSR (border strategy). In the second specification we introduce a border-segment dummy, that accounts for which part of the border any given municipality is contiguous to, i.e., Valle d'Aosta-Piemonte, Lombardia-Trentino-Alto Adige (chosen as the base level for the dummy), Veneto-Trentino-Alto Adige, and Veneto-Friuli-Venezia Giulia. In the first regression (pooled OLS) it is impractical to introduce such a dummy variable, because it is not clear how to assign municipalities that are well inside a given region to a given border segment: for example, the municipality of Merano in Trentino-Alto Adige is

[15] The elevation level of 600 meters was chosen in accordance with the definition of mountain communities in Italy. Elevation data was taken from ISTAT and DEM-ISPRA https://www.istat.it/en/archivio/municipalities

[16] The source of data is the Italian Ministry of Economy and Finance.

roughly equidistant from the Veneto-Trentino-Alto Adige and the Lombardia-Trentino-Alto Adige border and is in any case nearer to the national border with Austria than to any of these.

4.2. Spatial regression discontinuity

To further restrict our attention to the border between SSRs and OSRs we evaluate population dynamics in 2000-2015 via spatial regression discontinuity (e.g., see Skovron and Titiunik, 2015) on a sub-municipal level again with distance to the border as a forcing variable. To this purpose we use GPW Population Count v4.11 data set, produced by CIESIN[17], which provides us with 30 by 30 arc-sec (approx. 1 by 1 km) resolution raster data. GPW reports ISTAT census data with 399,014 level 4 administrative units (census sections), making the mean administrative area about 0.75 km sq[18]. This resolution enables us to concentrate on small adjacent mountain areas and, thus, we can go beyond the municipality dimension in our analysis. We randomly select mountain areas within a given distance from inter-regional borders, treated areas belonging to the three autonomous regions, and their counterfactuals belonging to ordinary statute regions.

Adjacency-based identification is one of the most convincing geographic natural experiments (Keele and Titiunik, 2016). In addition to the Stable Unit Treatment Value Assumption (SUTVA), spatial RDD relies on Local Geographic Ignorability: the exact position of administrative borders between geographical areas is assumed to be somewhat arbitrary. Thus, the only difference of adjacent areas is the institutional or policy one, not the initial geographical, ecological, cultural differences. Another (related) assumption of spatial RDD design is Compound Treatment Irrelevance (Keele and Titiunik, 2015): there are no other simultaneous treatments happening at the same administrative level that may influence the outcome of interest.

[17] Center for International Earth Science Information Network - CIESIN - Columbia University. 2018. Gridded Population of the World, Version 4 (GPWv4): Population Count, Revision 11. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/H4JW8BX5

[18] Total area of Italy being 301,338 km sq

A concern regarding the Local Geographic Ignorability assumption may come from the possible persistence effect of the historical border between Italian states and the Austro-Hungarian Empire as a substantial part of the border between Trentino-Alto Adige with Lombardy and Veneto has long been an interstate border. The well-respected administrative traditions (Becker et al., 2016) of the Empire might have persisted until nowadays. We are dealing with this possible concern in the following ways. First, we include the other two Special Statute regions into the analysis and concentrate on the average effect. Second, our sampling scheme allows us to select observations almost exclusively from the Autonomous Province of Trento that has a longer history of Italian affiliation. Third, we emphasize that there is no language discontinuity at the Trentino-Alto Adige border, resulting in ethnic and cultural similarity in the border vicinity. For visual evidence one can consult VerbaAlpina, an interactive map of languages spoken in Alpine regions of Italy[19].

We report the results from both non-parametric (local) and parametric (global) RD estimation, with and without covariates. As stressed in Lee and Lemieux (2010) these two approaches are complementary and persuasive RDD results are typically robust to both specifications.

A global linear regression can be interpreted as a local regression that has a bandwidth that encompasses all the data points[20]. In the global parametric RDD each point is weighed equally, even if far from the cutoff. Local (non-parametric) RDD, on the other hand, uses a kernel function to assign greater weights to points near the cutoff. Local RD and the first-order global RD both take the following form (without covariates):

$$P_i = \beta_0 + \alpha D_i + \beta_1 Z_i + \beta_2 Z_i D_i + \varepsilon_i \qquad (2)$$

[19] URL: https://www.verba-alpina.gwi.uni-muenchen.de/it/?page_id=27&db=221 Verba Alpina is a digital project of Ludwig-Maximilians-Universität München on the distribution of languages in the Alpine region (Krefeld and Lücke (2014)). We observe that there are virtually no coincidences of main linguistic groups and inter-regional Italian borders: populations across the inter-regional borders tend to speak Romance languages, including Autonomous Province of Trento (southern part of Trentino-Alto Adige)

[20] While local estimation reduces the bias, the global approach utilizes all the observations and decreases variance. Nevertheless, a wrong functional form of global estimation can introduce bias.

where ΔP_i is the outcome variable for point *i* (population growth of a selected area in our case), Z_i is the score variable (distance to the border), D_i is the treatment variable (which takes values of 0 for untreated and 1 for treated points in the autonomous regions), and ε_i is an error term. The coefficient of the interaction term corresponds to the LATE.

We use the *rdd* R package (Dimmery, 2016) to run a local RDD estimation. As a default this package uses a triangular kernel function with Imbens and Kalyanaraman (2012) bandwidth (henceforth IK). We use the *rddtools* R package (Stigler and Quast, 2015) for the global estimation and robustness checks.

We consider the following variables as covariates[21] that have a potential to influence mountain population dynamics. First, we control for altitude by the mean elevation of the selected area measured in meters above sea level[22]. Second, we include a measure of remoteness - the distance from the center of the selected area to the nearest regional capital. Finally, as more economically developed regions attract and/or retain more residents, we include a subnational measure of economic development for the year 2000 - night-time light data from the DMSP-OLS satellite[23].

Nighttime lights can be used either alone or combined with standard measures of economic activity in order to assess economic growth. The statistical framework for using globally calibrated night lights data to this purpose was first almost simultaneously stated in Henderson et al. (2012) and Chen and Nordhaus (2011). Early attempts to link luminosity data to economic activity and population dynamics include, among others Elvidge et al. (1997), Sutton et al. (2007), Tilottama et al. (2010). Night-time light data proves exceptionally useful in the absence of reliable official economic growth statistics (which is often the case of developing countries, see

[21] Inclusion of covariates into RDD does not change the optimal bandwidth but can increase the precision of the LATE estimate (Frölich, 2007).
[22] Population decreases with elevation.
[23] 23This publicly available dataset sums up 20 years of observations of global nighttime light by the U.S. Air Force Defense Meteorological Satellite Program (DMSP) Operational Linescan System (OLS). Accessible at https://ngdc.noaa.gov/eog/dmsp/download.html

Michalopoulos and Papaioannou, 2013) or to probe smaller geographical scales than the size of administrative subdivisions as in our case. Mellander et al. (2015) show that there is a strong correlation between luminosity data and measures of economic activity (such as wages and enterprise density) derived from micro-data in Sweden, proving the applicability of this data source even in developed countries. Pinkovskiy (2017) uses a regression discontinuity framework in order to examine the effects of institutions on economic growth on a global scale. He shows that growth of light per capita as a measure of economic growth changes discontinuously while crossing the border between poorer and richer countries.

We describe our handling of night-time lights data, including the issue of overglow and our mitigation strategy in Appendix C.

We define our sampling scheme by first computing the absolute difference in population count between 2015 and 2000 GPW raster data sets. Then we randomly extract 10000 4.7 by 4.7 km squares within the latitude range from 44° to 47.2° and the longitude range from 6.6° to 13.9° and sum the population counts of all the pixels that fall within. The side of the square was chosen so that its area matches the median area of an Italian municipality, which is 21.9 km^2 according to ISTAT data[24]. We keep only the squares whose center is located above 600 meters of elevation (mountain areas as seen in panel (b) of Figure 3) and within 40 km of the border between autonomous and regular Italian regions. Additionally, we reject those squares whose centers ended up in any neighboring country such as Austria, Switzerland or France. After applying the rejection filters, we are left with 1601 squares. We further filter out the squares containing less than 500 residents. This latter decision was made for two reasons: first of all, as it is reasonable to model the population counts of a given square as Poisson distributed, the squares with very low numbers of residents will be overly affected by counting error in the number of residents; additionally the effect we are looking for (loss or gain of a few percent of population over a period of fifteen years)

[24] See https://www.istat.it/it/archivio/156224 We also re-run our analysis with squares sized 4 km and 8 km, results remain significant.

is likely impossible to observe in a small sample due to the discreteness of resident counts. The final sample is graphically represented in panel (a) of Figure 3.

[--- Figure 3 ---]

Then, we calculate the sum of population difference for all pixels falling within a given square, with the result constituting our outcome variable. Each square center was assigned a distance to the border calculated in terms of two-dimensional Euclidean distance[25] to the nearest point on the border. This distance is the score in our spatial RDD. Covariates were treated similarly to the outcome variable, i.e., averaged over each square. Squares may happen to straddle the border in some cases: this introduces a smoothing effect which would in principle make it harder to detect a discontinuity in the outcome at the border: therefore, our conclusions hold *a fortiori*.

5.Results

5.1. Baseline estimation (pooled OLS and border strategy)

As discussed before, we consider the two samples, one including all the municipalities in the six regions of interest (pooled OLS) and one including only the municipalities contiguous to the inter-regional border (border strategy). The resulting samples are summarized in Table D1 in Appendix D. For each sample we considered both the relative population change and the absolute change over the 2001 − 2011 period as dependent variables.

In the OLS regressions for both relative and absolute population change spanning all municipalities we find that population growth is significantly affected by autonomous region status,

[25] Keele and Titiunik, 2015; Dell, 2010), that ”naive” measures of distance (including the shortest distance) are not establishing the exact position of the observation along the border, which might be a problem for long borders with heterogeneous effects along the borders. In our study we deal with three relatively short inter-regional borders (see Figure 3a) and we are interested in average border effects. According to Zajonc (2012) the ”naive” distance measure remains a recommended practice in this situation, as it permits to estimate average effects consistently and has a more comprehensible visual representation.

with municipalities located in autonomous regions growing ≈ 5% more (≈ 64 persons more for growth in absolute terms) in the analyzed period than their non-autonomous counterparts, even after controlling for elevation, pre-treatment population and taxable income per capita. The results of these regressions are summarized in the first columns of Table 2 (relative population change) and of Table 3 (absolute population change).

[--- Table 2 ---]

[--- Table 3 ---]

In the border strategy regression, where we include only municipalities contiguous to the regional borders, we also find a significant result for autonomous region status both for relative (Table 2, second column) and absolute (Table 3, second column) population change.

Finally, the last column of Table 2 (relative population change) and of Table 3 (absolute population change), reports on a border strategy regression with dummy variables to account for different segments of the border between autonomous and ordinary statute regions. We included three such dummy variables, which we name VENFVG for the border segment between Veneto and Friuli Venezia Giulia, VENTAA for the border segment between Veneto and Trentino-Alto Adige, and VDAPIE for the border segment between Valle d'Aosta and Piemonte. The border segment between Lombardia and Trentino Alto Adige is accounted for by the base case, when all dummy variables are set to 0. At any rate we find that none of these dummy variables have ever a significant coefficient in any one of the regressions we run, showing that no idiosyncratic properties of individual border segments play a role in our results.

Regarding the regressions with relative population change we obtain a similar effect size (≈ 5%) for the autonomy dummy variable in both the pooled OLS and the border strategy, even though for

border municipalities the general trend of population change is a strong decrease (the intercept coefficient is negative over the period under consideration). Elevation does not appear to have a systematically significant effect in either regression, likely since we include only municipalities whose minimum altitude (over the territory) is above 600 meters: actually, for the border strategy sample mean elevation is 1912 meters, with maximum elevation 2681 for the municipality of Gressoney-La-Trinité. Similar results are obtained for absolute population change, even though absolute population change at the municipal level is dominated by few municipalities with many inhabitants. This issue is confirmed by a Shapiro normality test on the regression residuals, which shows a significant departure from normality of the residuals for the absolute population change regression while failing to reject the null of normality for relative population change.

5.2. RDD on sub municipal data

Even though the previous results suggest that autonomy is an important factor in determining the population dynamics of mountain communities, they rely on data aggregated at the level of administrative subdivisions (municipalities). This may prevent an effective use of the border discontinuity to set up a quasi-experimental test of our hypothesis. To probe arbitrary distances from the border within an RDD setup, we switch to sub-municipal data using the GPW dataset, where population data is arranged on a grid with side $\approx$ 1 km. Using gridded population data as opposed to municipal level data also solves the problem of absolute population change being dominated by few, heavily populated municipalities.

We find a significant difference between autonomous and non-autonomous regions in absolute population growth for mountain areas. The local RD results are shown graphically in Figure 4. The LATE amounts to a positive 145-resident change in population in autonomous regions with respect to regular ones. This is significant to the 0.1% level as shown in Table 4, first column. The result is

still significant when we double the bandwidth but not when we halve it. The latter effect may be due to the very limited number of data points left with this bandwidth choice.

[--- Figure 4---]

[--- Table 4 ---]

[--- Table 5 ---]

When controlling for elevation, economic activity and a measure of remoteness (distance to the nearest regional capital), the result is still significant. We find that elevation does not significantly affect population change, i.e., mountain communities situated at higher elevations do not present a more adverse population evolution than those located at lower elevations. This may seem surprising at first, since elevation clearly does affect population. However, our sample is already restricted to elevations above 600 meters, and -as we noted before- the border is situated in the average at even higher altitudes, so perhaps the residents face the choice of leaving the mountains for the cities located in the plains no matter how high up they reside, and the additional effects of elevation may not be important.

Economic development at the beginning of the study period (i.e., in year 2000), as proxied by nighttime light, instead has a significant, positive effect on population growth: a fraction (0.16) of a resident is gained per increase of one digital level of nighttime light. The more development, the more attractive a mountain location is. Further interpretation is however not warranted, as digital levels in light do not scale linearly with luminosity and a proper calibration of DMSP-OLS nighttime light data is beyond the scope of this paper.

Finally, remoteness as measured by the distance to the nearest regional capital, has a significant negative effect on population growth with one more kilometer of distance accounting for two less

residents at the end of the period. This is understandable in terms of the inability to conveniently commute towards economic centers, which forces residents to relocate.

We also run a parametric (linear) estimation. Its results are reported in Table 5.

[--- Table 5 ---]

As this latter approach considers all the sample points, even those situated further away from the inter-regional border, some differences emerge with respect to the previous analysis. However, its main qualitative results are confirmed. In the parametric estimation autonomous status still produces a significant positive effect on population growth, the effect of nighttime light is more significant while keeping approximately the same size and sign, but the effect of remoteness, while staying negative, is reduced by half. The main change is the role of elevation, that appears to significantly hamper population growth: 13 residents are lost per hundred meters of additional elevation.

6. Robustness checks

6.1. RD robustness and falsification checks

Following the recommendations of relevant literature (Keele and Titiunik 2015; Skovron and Titiunik 2015; Cattaneo et al. 2020), we perform several types of robustness checks and falsification tests. Additionally, as we are working with geographic data, we check whether spatial autocorrelation affects our results.

First, we conduct the score density test even though there is no score manipulation possibility in our design in order to receive treatment[26]. McCrary density test result for the score variable is reported in panel (a) of Figure 5. Notwithstanding the decreasing frequency of observations near the border, there is no significant discontinuity at the cut-off.

[26] Changing jurisdiction would be a manipulation. However, the only case of a municipality "migrating" from Veneto to Friuli-Venezia Giulia took place in 2017.

[--- Figure 5 ---]

Second, we run placebo tests on the cut-off values. The results are reported in panel (c) of Figure 5. The cut-offs were enacted at 5 km intervals (from 4 to 36 km to the border). There are no significant discontinuities at other values of the cut-off besides the inter-regional border, which means that the effect of treatment is observable at the border between autonomous and ordinary regions. Moreover, we present some additional visual evidence in order to spot any discontinuities at the inter-regional border using historical data on precipitation and temperature in Europe (see Appendix F).

Third, we re-run the analysis by treating covariates as dependent variables to check whether the treatment effect is significant. Optimal bandwidth is recalculated each time and is different from the one used in the estimation on population change. The results are summarized in Table H.1 in the Appendix H. None of the covariates shows a significant discontinuity at the cut-off. Moreover, population in 2000 does not show a discontinuity.

Fourth, we explore sensitivity of LATE to the bandwidth choice. In Table 4 we already reported LATE at half and double optimal BW. We additionally explore how LATE changes with BW change by increments of 2.5 (from 2.5 km to 40 km to the border). As seen from panel (b) of Figure 5, for smaller values of BW (with less observations, and bigger variance) LATE is not significant (as already revealed in Table 4).

Finally, we examine whether spatial autocorrelation, a typical problem of regressions with georeferenced data, affects our results. In the presence of spatial autocorrelation t-statistics or z-scores tend to become inflated and thus lead to severely flawed significance levels (Kelly, 2019). By default, statistical RD packages perform regression analysis under the assumption of the absence of spatial autocorrelation in the data. In order to calculate the true p-values of the

coefficients, we must calculate the actual distribution of z-scores under the presence of spatial autocorrelation, as opposed to the theoretical distribution assumed in the absence of autocorrelation. In the spirit of Kelly (2019), we calculate Moran's I (Moran, 1950) for our final population change spatial data set (its value is 0.6), generate random autocorrelated noise with same global Moran's I and run the regression of interest on this generated data set for 100 times. Then we compare the z-score of our regression to the distribution obtained from analyzing the generated autocorrelated data (see panel (d) of Figure 5. The obtained significance of our z-score is at 1%. Random extraction of elevated populated areas had, thus, allowed us to mitigate the threat of spatial autocorrelation.

6.2. Exploiting variation in autonomous status

6.2.1. Evolution of LATE over time

Even though the focus of this study are the years following the 90s decentralization reform, we resort to historical data in order to explore the potential role of the time-invariant factors (e.g., the presence of mountain ridges along the border) in affecting the observed discontinuity in population dynamics.

Autonomous status was introduced for Trentino-Alto Adige and Valle d'Aosta in 1948 and for Friuli-Venezia Giulia in 1963; it is thus natural to check whether the demographic effect we reveal shows any sign of temporal variation. We obtain municipality level demographic data from Italian censuses held in the years 1921, 1931, 1951, 1961, 1971, 1981, 1991, 2001, and 2011. For each decade between censuses, we calculate the relative population growth for each municipality, and run a RD regression using distances from the regional borders as score variable, with each municipality lying less than 40 km away from an SSR/OSR border being assigned to its nearest regional border.

We take the score variable to be the oriented distance between the geometric center of each municipality and the nearest point on any SSR-OSR border, with negative sign assigned to the OSR side. Geometric centers or centroids were computed by taking the mean latitude and the mean longitude of the points defining the border polygon of each municipality. In principle this does not guarantee that the resulting centroid lies within the territory of the municipality, unless its shape is convex. However, we were able to visually ascertain that this is the case for most of the municipalities in our sample. The outcome variables chosen are the population growth across the census years 1921-1931, 1951-1961, 1961-1971, 1971-1981, 1981-1991, 1991-2001, and 2001-2011. This allows us to study the evolution of the border discontinuity across time, reaching even to the pre-war period, in which neither the SSR nor the OSR existed yet.

Since the institution of SSRs dates to the introduction of the republican constitution in 1948, we would expect the LATE for our RD to be significant only from the 1951 census onward. This is indeed the case, as shown in Table 6 and, graphically, in Figure 6. An example of the results of one such RD regression for 2001-2011 is shown in Appendix I.

[--- Figure 6 ---]

[--- Table 6 ---]

6.2.2. The case of Sappada

An independent way to check that it is indeed autonomy that drives the demographic effect we observe, is to leverage the fact that the municipality of Sappada was part of Veneto (an OSR) until it became part of Friuli-Venezia Giulia (an SSR) following a referendum held in 2007. While the result of the referendum was immediately widely known, the region change was finalized only 2017, so any effects of the expected policy changes may have occurred at any time between these

two dates. For this reason, we limit our discussion of this case to a qualitative comparison of the population evolution as a function of time between Sappada and that of the neighboring municipalities in Veneto. These were selected as the municipalities immediately bordering on Sappada (Santo Stefano di Cadore, Vigo di Cadore) and those bordering the latter (Lozzo di Cadore, Lorenzago di Cadore, San Pietro di Cadore, San Nicolò di Comelico, Danta di Cadore, Auronzo di Cadore). As the names suggest, most of these municipalities are part of the historic region of Cadore[27], and in general we have reason to believe that they are all quite homogeneous in many respects. All these municipalities are still in Veneto and there is no expectation that they follow Sappada in joining Friuli-Venezia Giulia.

The population as a function of time for Sappada and its neighbors is shown in Figure 7, source: ISTAT. There is an apparent difference between the population evolution of Sappada with respect to that of its neighbors, even though it is hard to pinpoint when exactly the trend changes, for the reasons discussed above.

[--- Figure 7---]

7. Underlying mechanisms

We found a significant difference in mountain community population dynamics across the border between autonomous and non-autonomous regions. The difference is quite persistent in time, showing itself throughout censuses from WW2 to the present. Our border strategy approach - complemented by RD - rules out several potential confounds that may be unrelated to policy while varying continuously across the border, such as climate. However, the question remains as to what the details of the causal mechanism for this outcome may be. Clearly, the most pressing question is whether indeed policy enabled by regional autonomy is an important part of the explanation. In the following we address this through a combination of demographic modelling, fertility data and an

[27] See e.g., http://www.magnificacomunitadicadore.it

analysis of the municipal budgets and policies implemented by autonomous municipalities to support the parents of young children.

We structure our discussion of the relationship between autonomy-induced policy and demographic change with the help of a simple demographic model that is based on assuming a linear relation between the population age structure at time *t* and at time *t+1*, where discrete time steps may be taken to correspond to, for example, censuses. The resulting equation is as follows:

$$P_{t+1} = LP_t + M_t \quad (3)$$

where *P* is a vector of resident population binned by age (e.g., fraction of people between age 0 and age 1, between age 1 and 2, etc...), M_t is a vector of the same shape describing migrant population (representing net immigration with a positive sign) and *L* is a transition matrix often called Leslie matrix after its originator (Leslie, 1945).

The matrix *L* models the aging of the population (including the death rate by age group) and the birth of new people (dependent on fertility rates by age group). Each row contains the coefficients used to calculate the numerical consistency of a given age group as a linear combination of the other age groups at a previous time. The matrix thus has as many rows as there are age bins.

If we ignore migration for now, the long-term behavior of the population age structure is dictated by the Leslie matrix *L*. In the non-degenerate case, *L* will have as many linearly independent eigenvectors $E_1, \ldots, E_n$ as the number of age bins. Thus, the age structure of any population P_0 can be written as a linear combination $P_0 = \alpha_0 E_1 + \ldots + \alpha_n E_n$ where $\alpha_1, \ldots, \alpha_n$ are the relevant coefficients. Using *L* to evolve P_0 for *k* time steps, we obtain:

$$P_k = L^k P_o = \alpha_1 L^k E_1 + \ldots + \alpha_n L^k E_n = \alpha_1 \lambda_1^k E_1 + \ldots + \alpha_n \lambda_n^k E_n \quad (4)$$

where λ_1 , ..., λ_n are the eigenvalues of L. Upon repeated application of L the population converges to a stable age structure represented by the eigenvector associated to the leading eigenvalue of L, i.e., the largest eigenvalue in modulus. Whether the total population grows or shrinks exponentially in the long term depends on this eigenvalue being greater or smaller than one.

Figure 8 a) shows population evolution with only three age categories (children, adults, seniors) with the respective shares of 20%, 50% and 30% in the general population. The relative L and P_0 are specified in the following equations:

$$L = \begin{pmatrix} 1 - 1/15 & 1/60 & 0 \\ 1/15 & 1 - 1/45 & 0 \\ 0 & 1/45 & 1 - 1/30 \end{pmatrix} \qquad (5)$$

$$P_0 = \begin{pmatrix} 0.20 \\ 0.50 \\ 0.3 \end{pmatrix} \qquad (6)$$

In this admittedly simplistic model, people less than 15-year-old are considered children, people between 15 (included) and 60 are adults, and people older than 60 constitute the last age group, that of the seniors. The first row of the matrix in Equation 5 lets us calculate the number of children at time as a function of the number of children, adults, and seniors at time *t−1*. The first coefficient of the row represents the fraction of children that are still children after one period elapses. Assuming a flat distribution of ages, this is 14/15, as all children aged 14 become 15 and are no longer counted as children. The second coefficient represents newborn children, which depend on the previous adult population, since neither children nor seniors have children. The third coefficient represents the number of children born to seniors, which is 0. The coefficients of the second and third rows have similar interpretations. Notably, the bottom right coefficient represents the fraction of seniors that are still alive after one period elapses; decreases in death rate will be reflected by this coefficient increasing.

This system, if left to itself, evolves to a steady state age structure, shown by the dotted lines in the bottom panel of Figure 8 a) exponentially converging to constants. While the structure of the population does not change, i.e., the relative proportion of children, adults, and seniors stay constant, the total population steadily declines (given the numbers of this example) approaching a constant negative growth rate (top panel of Figure 8 a).

[--- Figure 8---]

Thus, the effects of the initial age structure of the population are transient and cannot justify sustained differences in growth in the long term (with respect to the time constant of the exponential, which is the reciprocal of the relative growth or decline rate). The long-term population dynamics depends only on the coefficients of the Leslie matrix, while differences in the initial conditions amount only to transient departures from the steady state.

Having ruled out an effect of initial conditions, population may grow more in one place than in another because of three possible causes: lower death rate, migration, and higher birth rate.

7.1. Death rate

In an advanced economy in peacetime the bulk of the death rate is due to old age. Improved living conditions for the elderly may lower the death rate in the short term, but eventually it will simply result in a higher fraction of elderly population as our current medical technology is unable to indefinitely postpone death (see e.g., De Grey and Rae, 2007). The solid lines in Figure 8 a) show the consequences of decreasing the death rate. At the 33-year mark in our simulation, the death rate of seniors was decreased from 1/30 to 1/40, which may be understood as an increase of the life span of the elderly from 30 to 40 years (dying at 100 rather than at 90) if we make the unrealistic assumption that the age distribution of the elderly is flat. This brings about a sudden increase in the population growth rate, as shown by the solid line in the top panel. However, the effects are

ephemeral: since the other coefficients of the Leslie matrix did not change, and the elderly still do not have children and eventually die, the population growth rate converges back to the unperturbed long-term behavior, represented by the dotted line. What does change permanently is the age structure of the population: after the sudden decrease of mortality, the fraction of the elderly in the population increases relative to the other age groups. Empirically, we consider data aggregated at the provincial level from ISTAT for 2002-2017[28] . We plot the averages of some demographic indicators of provinces located at the border between autonomous and ordinary statute regions[29] in the areas of interest (Figure K.1, Figure K.2, and Figure K.3 in Appendix K). Life expectancy is indeed higher in the special statute regions, as shown by provincial-level data in Figure K.1 (bottom left panel for life expectancy at birth and bottom right panel for life expectancy at 65). Without a demographic model, no matter how simplistic, it would have been impossible to argue that this difference in life expectancy is likely not the main driver of the differences in population dynamic we observe.

7.2. Migration

A single burst of migration is also unable to change the long-term behavior of the population if the behavior of migrants quickly converges to that of the local population (i.e., if the Leslie matrix is unchanged), because its effect would be equivalent to that of changing initial conditions, thus being transient. This is shown in Figure 8 b), where at the 33-year mark we simulated the influx of adult migrants corresponding to an increase of the native population by 2.5% in 5 years (solid lines).

Population growth rate is increased while the immigrant flux takes place and shortly thereafter, since the migrants are adults and can have children. However, in the long term both the population age structure and the overall growth rate go back to the original, undisturbed steady state (dashed

[28] http://dati.istat.it/Index.aspx?DataSetCode=DCISINDDEMOG1&Lang=en

[29] Provinces from OSRs: Pordenone, Treviso, Belluno, Vicenza, Verona, Sondrio, Brescia, Torino, Biella, Verbano-Cusio-Ossola, Vercelli. Provinces from SSRs: Valle d'Aosta, Udine, Pordenone, Provincia Autonoma Trento, Provincia Autonoma Bolzano

lines). A sustained migration flow is needed to explain the observed discrepancy in growth rate between SSR and OSR mountain community populations.

Provincial-level data show that net internal migration (bottom left panel of Figure K.3) is indeed higher for autonomous status regions than for ordinary statute regions, likely bringing in younger people[30] as migrants are typically younger in general. On the other hand, migration from abroad has a similar pattern in ordinary and autonomous regions, suggesting that the conditions that apply to both Italian citizens and international migrants are not driving the different population patterns between the two regions. For example, if the younger mean age (and higher fertility rate and life expectancy) in autonomous regions were simply due to greater economic development, we would expect a somewhat higher influx of international migrants to autonomous regions, even though this may not be the case if international migrants tend to prefer urban areas to mountain areas no matter the local economic prosperity. A comparison between the populations of international migrants in neighboring Switzerland shows that indeed international migrants are more concentrated in the lowest mean-altitude canton (Basel, where they constitute 37% of the population) than in the highest mean-altitude canton (Valais, where migrant share falls to 23%), but they represent a large share in the population of the latter, nonetheless. The fact that there is a higher influx of internal migrants might suggest that either economic opportunities and/or policies applicable to Italian citizens are driving the difference (e.g., because benefits for young couples are more available to Italian citizens than to foreign newcomers) perhaps through Tiebout sorting.

Indeed, multiple sources describe Val d'Aosta and Trentino-Alto Adige as abundant welfare systems (Vampa, 2016), as opposed to efficient welfare systems in nearby OSRs[31]. While efficient welfare meets the needs of population, abundant welfare can be seen as a the one providing a premium to residents on top of meeting their basic needs. The differences in welfare result in slightly higher share of economically inactive women in abundant welfare systems, if they were

[30] Or not losing them.
[31] However, the welfare system of Friuli-Venezia Giulia is rather attributed to the efficient welfare category.

economically active before (Caltabiano, 2004). In other words, more generous welfare enables more maternity leaves.

7.3. Birth rates

Upon examination of demographic indicators, we find that border provinces in autonomous regions in fact have a higher total fertility rate (top right panel of Figure K.1 in Appendix K) despite similar rates of marriage (top left panel). As expected with higher fertility, birth rates are also higher (top left panel of Figure K.3).

Policy that may affect the fertility rate and, hence, population growth, is indeed different across the border between SSR and OSR (see Milan et al., 2020, and below for a discussion). Among the many facets, we concentrate on the availability of childcare services to the general population. Country level data suggests that these services may impact fertility. In fact, when all Italian municipalities are considered, the fraction of municipalities that have activated childcare services Granger-causes the total fertility rate of Italian women over the period 2004-2019 at the 1% significance level; the reverse is not the case (see Table 7). Even though this result does not prove a causal link, it is indeed suggestive that implementing better childcare services may positively affect the choices of couples to start a family.

[--- Table 7---]

Milan et al. (2020) discusses in geographic detail the policies in support of childhood and parenthood implemented by Italian local institutions (municipalities, provinces and regions) with particular attention to the availability of day-care centers. They state that (page 41, our translation, and their Table 5.3) *The use of daycare primarily affects children of employed parents: in the three-year period 2017-2019, about 60% of children enrolled in daycare are children of dual earners* so

it is reasonable to infer that the availability of daycare is one of the factors considered in family planning by working couples.

In fact, Milan et al. (2020) show (see their Figure 1.2, reproduced in Appendix L as Figure L.1) that autonomous regions have a higher number of available places in daycare for children up to two years of age than the national average, and higher than the nationwide policy target of 33%. This holds both for the regional and provincial capitals and for the other municipalities (except for Bolzano, which is however explained by the choice of providing childcare services directly at home rather than in a daycare center, as evidenced by Figure 1.4 of Milan et al. (2020)). Since the latter are mostly in mountainous areas, as opposed to the capitals that tend to be in valleys, this is an indication of the superior resource allocation abilities of autonomous regions. The maps in Figure 2.1 (reproduced here in Figure 9) and Figure 2.2 of Milan et al. (2020) also paint a clear picture of the discrepancy between the availability of daycare services in Trentino Alto Adige and Val D'Aosta and the neighboring regions, in terms both of places available and of distance of the structures providing the services from the families.

[--- Figure 9---]

In order to establish a link between childcare availability and local finance, we examine the budget data at the municipal level revealing that municipalities at the border between OSR and SSR have indeed different budget structures. We obtained data on the municipal budget of our border municipalities from *Openbilanci*[32] for 2016.

In Figure 10 a) we show an indicator of fiscal independence for these municipalities broken down by region. Fiscal independence is measured as the fraction of revenue of each municipality not coming from direct transfers from either the state or the parent region or province and the total

[32] The portal https://openbilanci.it portal aggregates municipal level budget data for Italy.

revenue. We find that municipalities in SSR are less fiscally independent than those in OSR. While all these municipalities are reliant on transfers to some extent, since they are situated in remote mountainous areas, SSR municipalities receive proportionally more transfers as a fraction of their total budget. However, these transfers are not coming from the central State, as shown in Figure 10 b). They are coming mostly from the parent region, which essentially replaces the State in this role for its municipalities, as shown in Figure 10 c). This shows that SSRs can leverage their autonomy to allocate more resources to their own mountain communities through increased transfers to municipalities.

[--- Figure 10---]

We further examine the link between local finance and childcare expenses. Regression analysis reported in Table 8 indicates that mountain municipalities in SSRs allocate greater number of resources to early childcare. The result persists after controlling for municipal population and total budget expenses per capita.

[--- Table 8---]

To sum up, OSRs and SRRs differ in the way they allocate resources to the municipalities. Mountain municipalities in SSRs spend more on childcare which is likely affecting birth rates. This mechanism results in sustained demographic differences observed by comparing population dynamics on both sides of the border.

8. Discussion

We want to address some caveats to our analysis. Perhaps, the most important one is the possibility that factors other than administrative differences change at the border between ordinary regions and special statute regions. While no observational study can entirely rule confounders out, our due diligence was as rigorous as we deemed feasible.

For instance, by using historical census data going back to before the Second World War, we have shown that the difference in demographic behavior between OSRs and SSRs mountain regions is a new phenomenon, which appears significant for the first time in the fifties. While an obvious reason for potential endogeneity is the fact that linguistically, culturally, and even genetically distinct populations live on different sides of the ordinary statute / autonomous region border, these factors were largely untouched by the war and the subsequent regime change, while the new constitution introduced the SSR institute in 1948. For instance, all three autonomous regions host linguistic minorities, Valle d'Aosta being partly French speaking, Trentino Alto Adige hosting a significant German speaking minority, and Friuli Venezia Giulia hosting a Slavic minority. After all, the presence of these linguistic minorities is one of the reasons the regions became autonomous in the first place. However, the French border hardly changed at the end of the war, with just two villages lost to France; the Trentino-Alto Adige/Austria border was set during the First World War, and, if anything, the Eastern border with Yugoslavia (now Slovenia) changed in a way that reduced the prominence of minority language speakers on the territory of Friuli-Venezia Giulia, which was in fact flooded by displaced Italian speakers from the previously Italian Istria and Dalmazia.

Moreover, around the border between Trentino-Alto Adige and Veneto, the language is Italian, as the German speaking minority in Trentino-Alto Adige is situated in the north (towards the border with Austria, not the border with the Veneto region) and similarly the Slavic minority in Friuli-Venezia Giulia is in the eastern portion of the region (towards the border with Slovenia). In Valle D'Aosta the language divide is much less prominent, French (and its local dialects) being part of the

Romance language family together with Italian, as opposed to German and Slovenian which belong to different families. Moreover, Valle D'Aosta shares a long history with the neighboring territory of Piemonte, both ruled by the Grand Duchy of Savoy after the Restoration (and previously, before Napoleon).

9. Conclusions

This paper investigates the effect of autonomy on population dynamics in mountain areas in the Italian Alps. An initial OLS regression based on municipality level data reveals the significant effect of autonomous status, which partially offsets the general depopulation trend experienced by mountain areas in the 2000s: border municipalities located in autonomous regions lost about 5% less population than their counterparts in ordinary statute regions. This holds even if we control for altitude, taxable income, and pre-treatment covariates such as population in 1951; moreover, the effect is not significantly different along any of the border segments considered (VDA-PIE, TAA-LOM, TAA-VEN, and VEN-FVG), despite marked differences in the geographical and cultural characteristics of each internal border. The internal borders between special statute and ordinary regions do not fully overlap with language divides or with historical borders. Furthermore, historical census data shows that the different trend in population growth persists since the census year 1951, while being absent in the pre-war period (1921-1931). This all suggests that our finding is indeed due to the effects of differences in policy between ordinary statute and autonomous regions, the latter having been introduced with the 1948 constitution.

A further check that our finding is not dependent on the details of how municipality borders are drawn is carried out using a geographic RDD scheme on gridded sub-municipal population data. We find that from 2000 to 2015 a random sample of mountain areas in autonomous regions lost significantly less population than their counterparts, even after controlling for local economic development (proxied by night-time lighting data) and other covariates such as the distance to the

nearest city, which may be important in driving migration. We attribute the observed effect to the 'localized' form of governance made possible by the fiscal autonomy of SSRs, excluding competing explanations of the discontinuity: the difference in local economic development and the difference in initial population levels are not discontinuous at the border. In this context it is worth noting that the fiscal residue, i.e., the difference between the value of services provided by the State and the amount of taxes collected in each region is negative for all the six regions we considered, no matter whether SSR or OSR. Thus, the observed difference in growth patterns cannot be trivially explained by direct economic transfers from the central government.

Mountain areas in Italy's SSRs appear to be more 'alive', due - in our findings - to the direct and indirect effects of policy differences. A demographic analysis shows that the population in special statute regions is younger on average, with higher birth and lower death rates, and a difference in internal migration rate towards SRR and OSR. Based on a simple demographic model, we argue that longer life expectancy in SSRs would produce a transient effect only (as people eventually still die); similarly transient would be the effect of a burst in internal migration. Hence only sustained migration or higher birth rates brought about by higher fertility should be considered as mechanisms for explaining the observed discrepancy. We find indeed that better publicly funded childcare opportunities are provided to the residents of SSRs. These are managed at the local (municipality) level and leverage transfers from the autonomous region to local authorities to be viable.

Rural-urban migration and population ageing are global trends that affect countries worldwide, especially their peripheral regions. A dramatic example of Japan is described in Feldhoff (2013). At the beginning of the twenty-first century, many of Japanese mountain communities have reached the limits of manageability because of depopulation coupled with nationwide population ageing. Japanese central government incentives did not manage to improve the fate of these "marginal settlements". In fact, Feldhoff (2013) stresses that what Japanese mountain communities need are

local initiatives and development from within. In fact, the evidence from the Italian Alps suggests that a higher level of regional fiscal independence turns out to be a more favourable form of governance for places with rugged geographies. In peripheral places, more decentralized governments seem to be meeting local needs, namely the welfare ones, more effectively, resulting in less depopulation.

If we assume a link between a higher degree of autonomy and the ability to attract and maintain a younger, more prolific population, then fiscal autonomy could indeed be a part of the recipe to fight dwindling populations in mountain regions all over the world. It may be argued that increasing the number of autonomous regions is not a feasible way of implementing better governance, both for political and pragmatic reasons. The advantages of autonomy would not continue to hold if more and more regions became autonomous, since some of these benefits may be the outcome of a zero-sum game between regions. This is the case for internal migration. Even without changes in autonomous status, a possible solution is the implementation of successful practices introduced by existing autonomies also in OSR, possibly in view of federalist reforms in Italy.

An alternative regional initiative has been taking place since 2014 on the border between Trentino-Alto Adige and Lombardia and Veneto: the establishment of Border Municipalities' Fund. The Provinces of Bolzano and Trento undertook to allocate considerable funds to socio-economic and infrastructure matters specifically destined to the bordering mountain municipalities from OSRs. It remains to be seen whether this initiative will be able to smooth out border discontinuities in socio-economic outcomes.

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Tables

Table 1: Taxation, expenditure and fiscal residue summary for Northern Italian regions, 2019

Region	Current expenditure	Per capita	Current revenue	Per capita	Fiscal Residue	Residue/Revenue
VDA	2585	20570	3297	26236	−712	−21.6%
TAA	19538	18226	25488	23776	−5950	−23.3%
FVG	22253	18315	24038	19784	−1785	−7.4%
SSR	44376	18393	52823	21894	−8447	−16.0%
PIE	70989	16297	83020	19059	−12031	−14.5%
LOM	183028	18194	237995	23658	−54967	−23.1%
VEN	71058	14484	94258	19213	−23200	−24.6%
OSR	325075	16824	415273	21492	−90198	−21.7%

Notes: Data is from the Italian Agency for Territorial Cohesion. The three special statute regions (VDA - Val d'Aosta, TAA - Trentino Alto-Adige, FVG - Friuli-Venezia Giulia) considered are presented in the first half of the table, and the three counterfactual ordinary regions (PIE - Piemonte, LOM - Lombardy, VEN - Veneto) in the second part of the table. For each part the last line corresponds to the sum of the three regions above. Absolute figures are given in millions of Euros, per capita figure in euros.

Table 2. Results of OLS estimation, relative population change (percentage).

	Pooled OLS	Border strategy	Border strategy w. dummies
Autonomous	5.4**	5.5**	5.1**
	(1.1)	(1.7)	(1.9)
Elevation	−0.25*	0.14	0.073
	(0.11)	(0.21)	(0.29)
Pre-treatment population	−0.40	−0.48	−0.88
	(0.45)	(0.77)	(0.96)
Income per capita	2.0***	1.5***	1.6***
	(0.2)	(0.4)	(0.4)
VENFVG			−3.7 (3.7)
VENTAA			−0.9 (3.0)
VDAPIE			−2.8 (2.8)
Intercept	−30.1***	−32.0***	−28.5***
	(3.6)	(6.2)	(7.2)
Observations	364	56	56
Multiple R2	0.342	0.454	0.477

Notes: Significance codes ***< 0.001, **<0.01, *<0.05. Income per capita in euros, elevation in units of 100 meters, pre-treatment population in 1000 of people. Standard errors in parentheses. VENFVG stands for the border segment between Veneto and Friuli Venezia Giulia, VENTAA for the border segment between Veneto and Trentino-Alto Adige, VDAPIE for the border segment between Valle d'Aosta and Piemonte.

Table 3. Results of OLS estimation, absolute population change. Income per capita in euros, elevation in units of 100 meters, pre-treatment population in 1000 of people.

	Pooled OLS	Border strategy	Border strategy w. dummies
Autonomous	63.91***	81.59***	73.26**
	(16.07)	(22.52)	(22.79)
Elevation	−0.030	−0.007	−0.023
	(0.017)	(0.028)	(0.035)
Pre-treatment Pop.	0.022**	−0.029**	−0.036**
	(0.007)	(0.010)	(0.012)
Income per cap	0.018***	−0.011*	0.011*
	(0.0003)	(0.005)	(0.005)
VENFVG			−96.58 (44.77)
VENTAA			−16.00 (36.20)
VDAPIE			−55.23 (34.11)
Intercept	−267.2***	−182.6*	13.40
	(53.57)	(80.58)	(78.75)
Observations	364	56	56
Multiple R2	0.220	0.443	0.53

Notes: Significance codes ***< 0.001, **<0.01, *<0.05. Standard errors in parentheses. VEN-FVG stands for the border segment between Veneto and Friuli Venezia Giulia, VENTAA for the border segment between Veneto and Trentino-Alto Adige, VDAPIE for the border segment be-tween Valle d'Aosta and Piemonte.

Table 4. Non-parametric estimation results. Dependent variable is the absolute population change in the sample of observations from 2000 to 2015.

	Local linear regression	
Autonomous status (LATE)	145***	121**
	(43)	(44)
Distance to border−	−12**	−12**
	(4)	(4)
Distance to border+	14**	14**
	(5)	(5)
Elevation		0.0007 (0.03)
Light		0.16* (0.07)
Distance to the nearest regional capital		−2.0** (0.4)
Intercept	−120*** (28)	−44 (48)
Bandwidth	15.74	15.74
Observations	268	268
Multiple R2	0.19	0.35
LATE (Half-BW)	74(48)	68(48)
Half-BW	7.9	7.9
Observations	123	123
LATE (Double-BW)	194** (33)	105** (35)
Double-BW	31.5	31.5
Observations	471	471

Notes: Significance codes ***< 0.001, **<0.01, *<0.05. Standard errors in parentheses.

Table 5. Parametric estimation results. Dependent variable is the absolute population change in the sample of observations from 2000 to 2015.

	Global linear regression	
Autonomous status	245*** (49)	206*** (44)
Distance to border−	−7*** (2)	−5.4**(1.8)
Distance to border+	10.0 *** (2.7)	8.5*** (2.4)
Elevation		−0.13*** (0.03)
Light		0.46*** (0.05)
Distance to the nearest regional capital		−1.0* (0.4)
Intercept	−101.2** (35.3)	−21.1 (48.6)
Observations	515	515
Multiple R2	0.13	0.33

Notes: Significance codes ***< 0.001, **<0.01, *<0.05. Standard errors in parentheses.

Table 6. RD results for relative population growth at different times.

Years	LATE	Standard error	p-values
1921− 1931	-0.0015	0.02804	0.96
1951− 1961	0.050	0.025	0.04
1961− 1971	0.12	0.043	0.006
1971− 1981	0.067	0.026	0.008
1981− 1991	0.054	0.021	0.010
1991− 2001	0.072	0.023	0.002
2001− 2011	0.050	0.019	0.010

Table 7. Granger causality tests, childcare availability and fertility, for all Italian municipalities

Direction	Lags	p-value
Childcare → fertility	1 year	0.010
Childcare → fertility	2 years	0.002
Childcare → fertility	3 years	0.010
Fertility → childcare	1 year	0.644
Fertility → childcare	2 years	0.034
Fertility → childcare	3 years	0.143

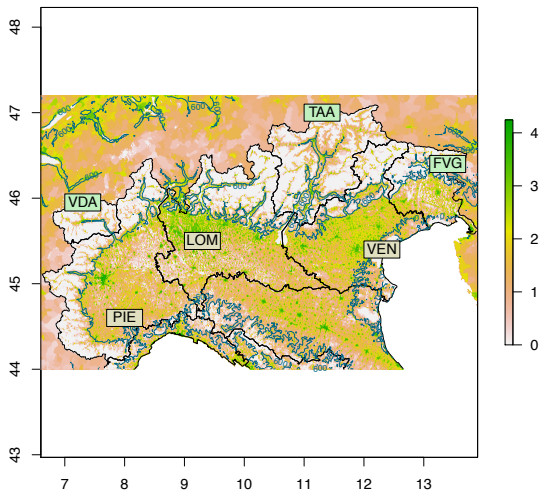
Table 8. Expenses on early childhood daycare per capita, border municipalities, 2016, OLS

Autonomous region	15.1** (5.2)	14.6** (5.1)	12.1* (5.3)
Population		0.003* (0.002)	0.004 (0.002)
Total expenses per capita			0.002 (0.002)
Intercept	8.5* (3.3)	9.4** (3.3)	3.3 (5.2)
Observations	123	123	123
Multiple R2	0.07	0.09	0.11

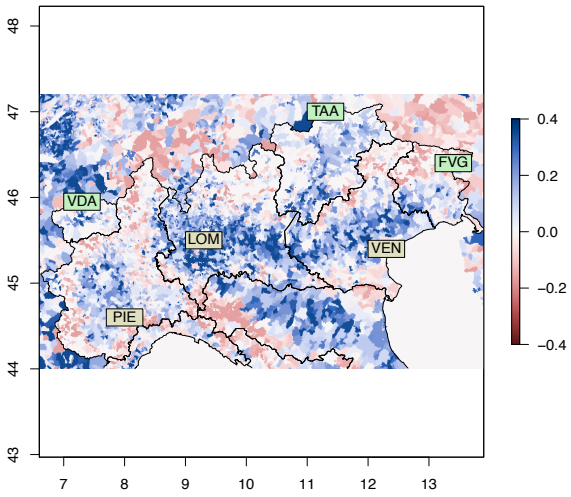
Notes: Significance codes ***< 0.001, **<0.01, *<0.05. Standard errors in parentheses

Figures

Figure 1. Comparison of population levels and qualitative assessment of population dynamics for the regions of Northern Italy.

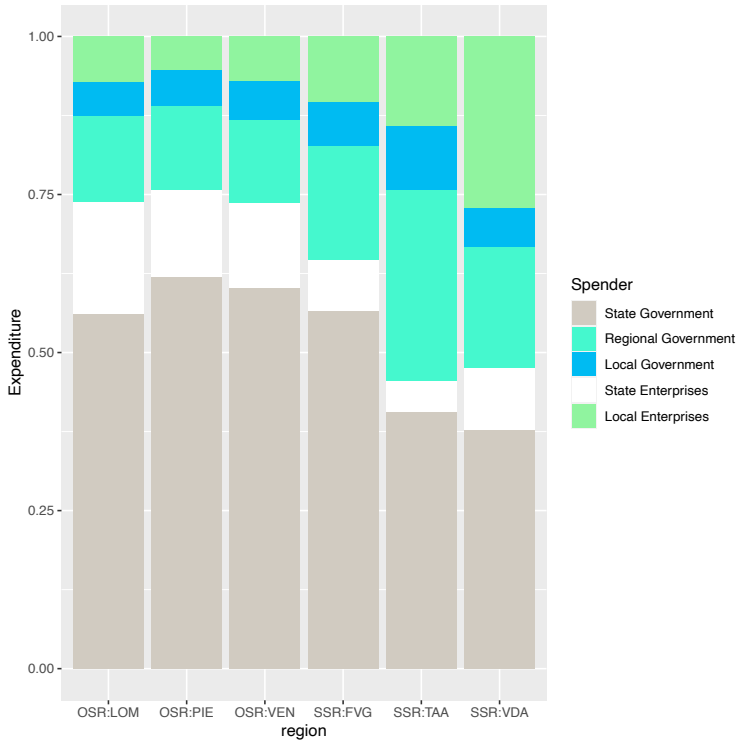


(a) (left) Population levels in North Italian regions in 2000, as revealed by the GPW data set. Each pixel represents the population count. Population count values are plotted in logs for easier comparability. Regional borders are shown in black with abbreviated names (green boxes are SSRs). The 600-meter elevation contour separating mountain and flat to hilly areas is overplotted.



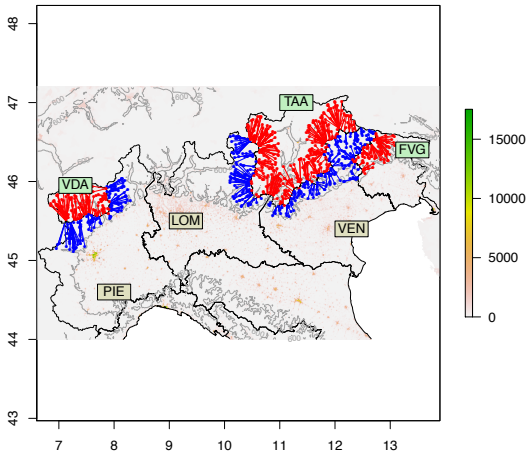
(b) (right) Relative population change (fraction) in North Italian regions, 2000-2015, from the GPW dataset. The color scale was clipped to the 5th and 95th percentile. Areas with increasing population are color-coded blue and areas with decreasing populations red. Regional borders are shown as black with abbreviated names. Abbreviations on a green background correspond to autonomous regions.

Figure 2. State expenditure by region, 2019

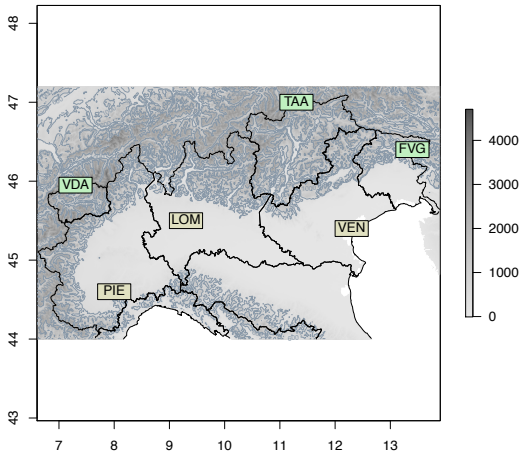


Expenditure is broken down by percentage spent by the central administration (gray), the regional administration (sea green), the local administration (sky blue), national state-controlled enterprises (white), and local state-controlled enterprises (green). Source of the data: Italian Agency for Territorial Cohesion.

Figure 3. Sampling scheme and elevation map

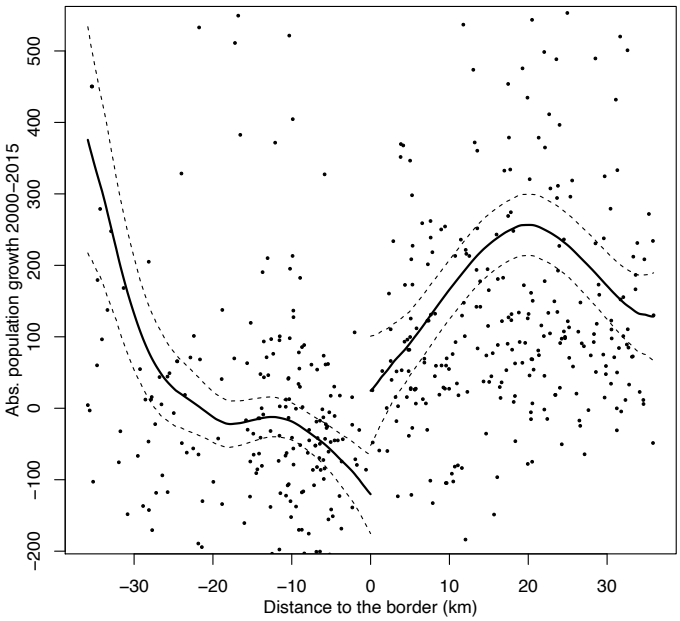


(a) (left) Sampling scheme. 4.7 by 4.7 km squares were extracted uniformly at random over the area shown in the map (Gridded Population of the World population count, 2000), rejecting those further than 40 km from inter-regional borders and those at altitudes below 600 meters or outside Italy. Blue dots (the centers of squares) are in ordinary regions, and red dots in autonomous regions. Lines represent the shortest distance.



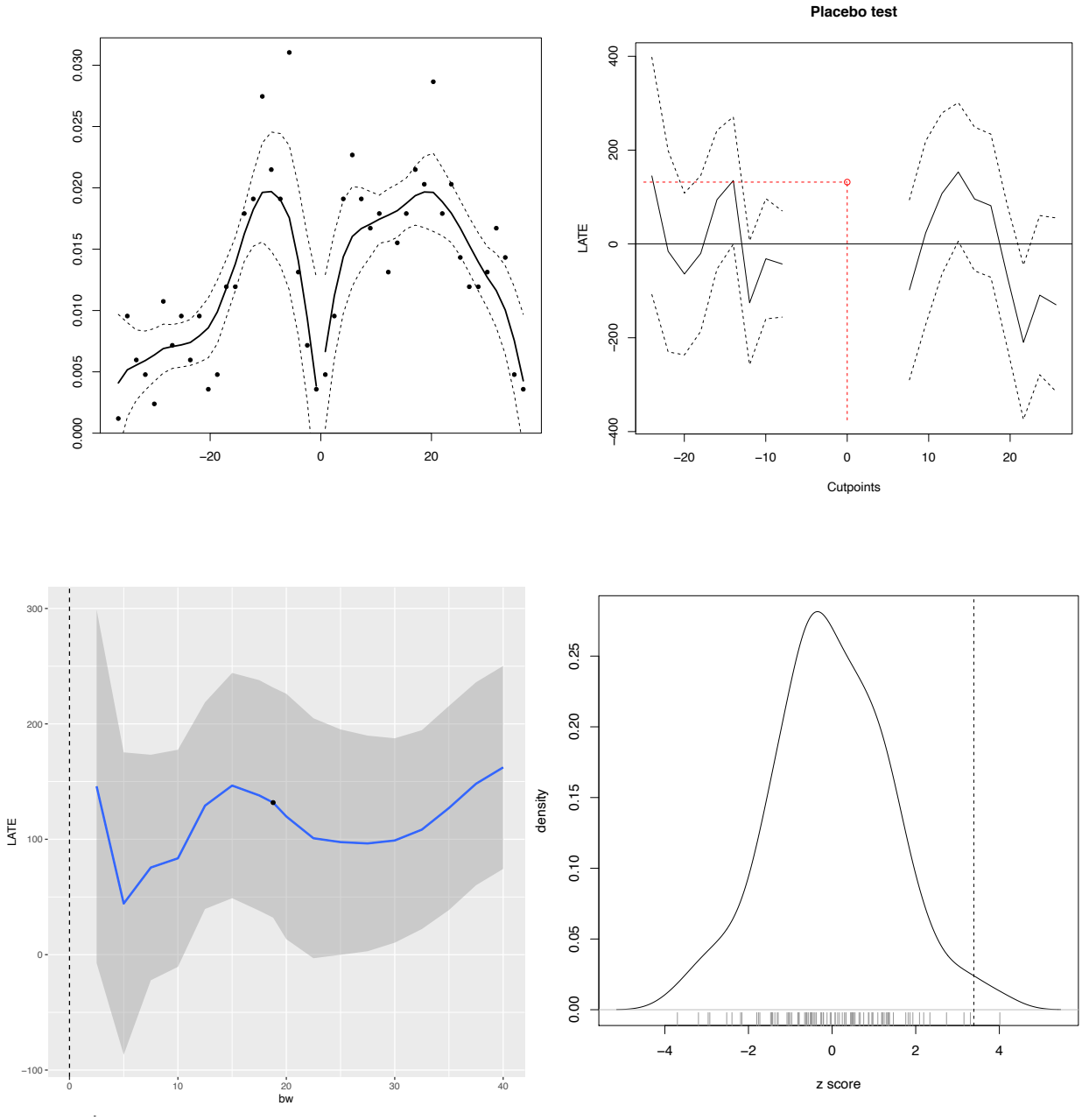
(b) (right) Elevation map of Northern Italy, from the EU-DEM v1.1 dataset. Altitude is represented on a gray scale, in meters. Virtually all the border between Val d'Aosta and Piemonte as well as the border between Trentino-Alto Adige with Lombardy and Veneto is within the Alpine territory. For Friuli-Venezia Giulia about half of the western border is in the mountains.

Figure 4. Non-parametric RD result



Difference between year 2000 and year 2015 in the sum of the population over a sampling square as a function of its distance from the inter-regional border taken with positive sign for autonomous regions and negative sign for neighboring regions. Solid line represents the results of local linear regression with triangular kernel and IK bandwidth. Dashed lines represent 95% confidence intervals.

Figure 5. Falsification tests and robustness checks

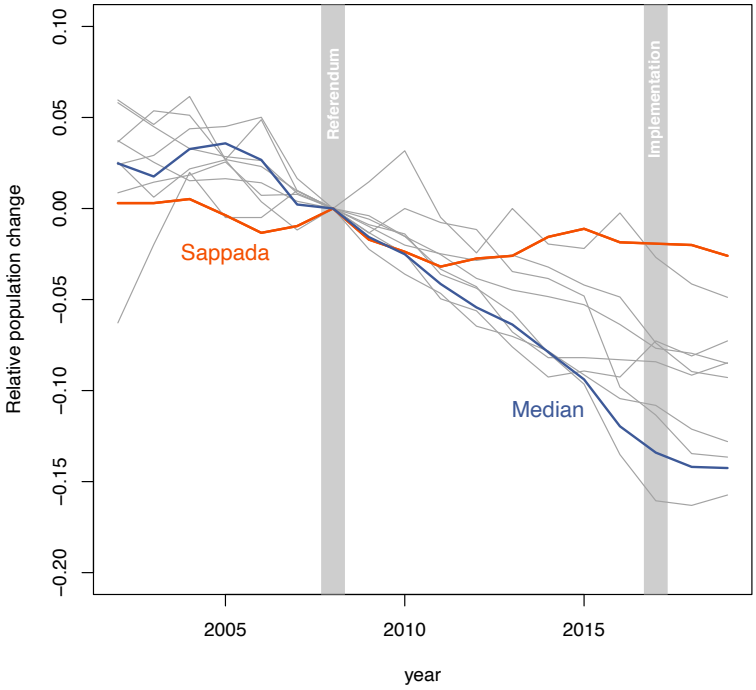


a) (upper left) McCrary density test for the scoring variable, binned
b) (lower left) Bandwidth sensitivity test, 90% confidence intervals. Optimal BW from local non-parametric estimation is represented by a black point.
c) (upper right) Placebo cut points for local RDD at different values of distance to the border, 95% confidence intervals.
d) (lower right) Distributions of z-score from LATE estimation on autocorrelated noise. The dashed line corresponds to the actual z-score of LATE for non-parametric RDD.

Figure 6. Evolution of LATE over time for municipality-based RD design

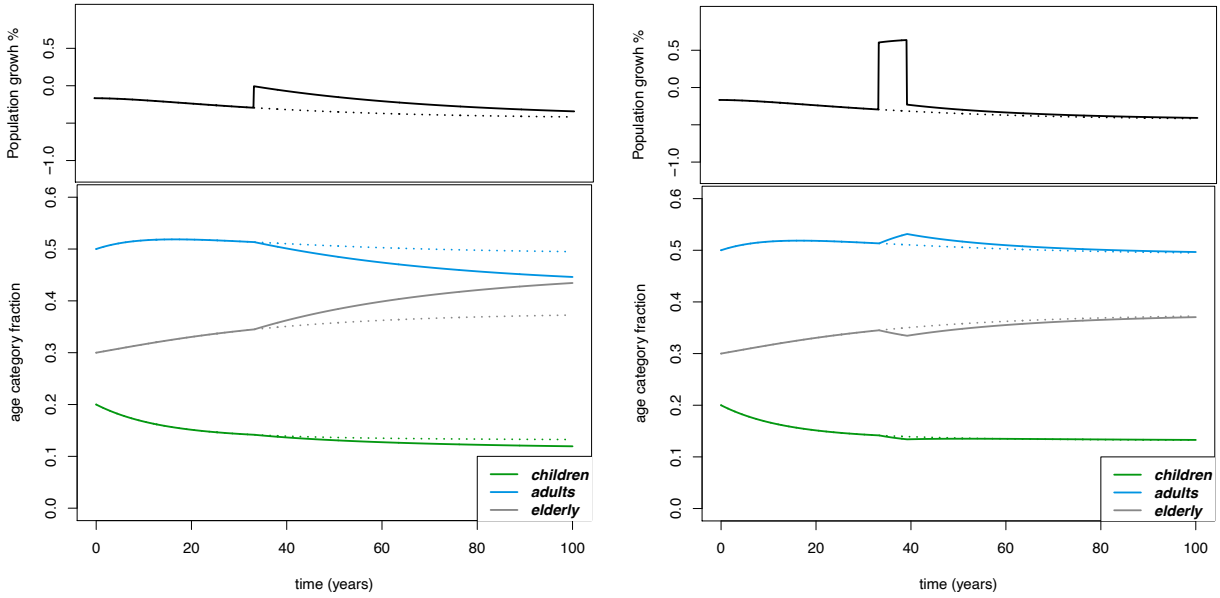
The corresponding 95% confidence interval is delimited by the dashed lines. The difference in population growth for mountain communities in autonomous regions becomes significantly positive after WW2 (the vertical line is drawn in correspondence of 1945) as shown by the bottom dashed line not intersecting the x axis (gray solid line).

Figure 7. The case of Sappada



Population dynamics with respect to (the year immediately following the referendum, shown as a vertical shaded area) for Sappada (thick orange line) 2008 and for the neighboring municipalities in Veneto (thin grey lines and thick blue line for their median). The actual implementation of the referendum's decision took place in 2017 (also shown as a shaded region). Data: ISTAT.

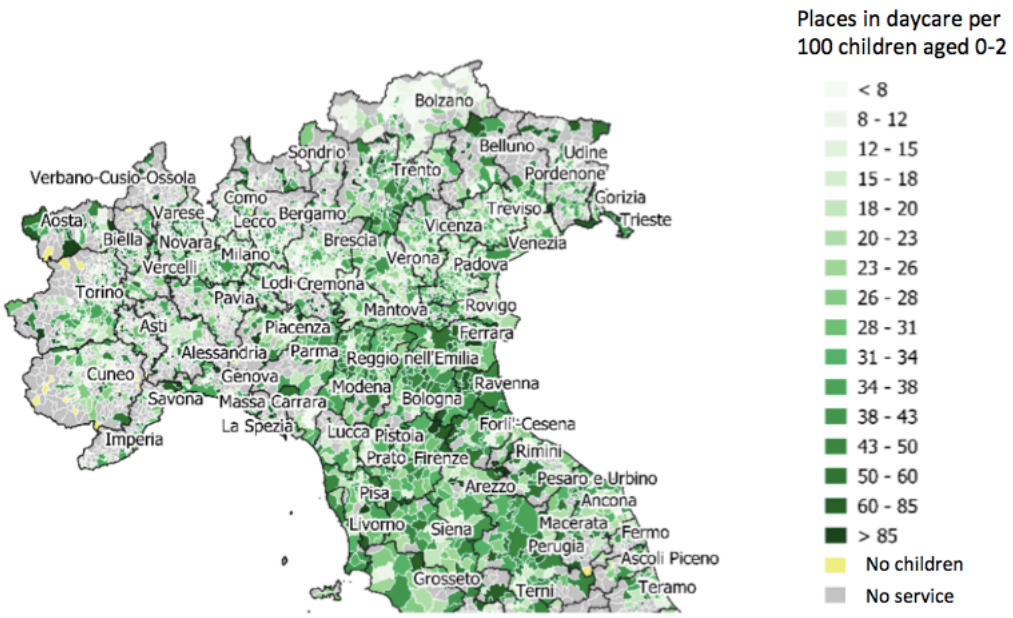
Figure 8. Simulations of demographic evolution for a population with three classes of age: children (green), adults (blue), and elderly (gray).



(a) (left) A sudden decrease of death rate. The top panel shows the total growth rate of the population as a function of time, the bottom panel the ratios of the three classes to the total. Dashed lines show the evolution of the population with no further intervention, while solid lines represent the result of instantaneously decreasing the death rate at year 33.

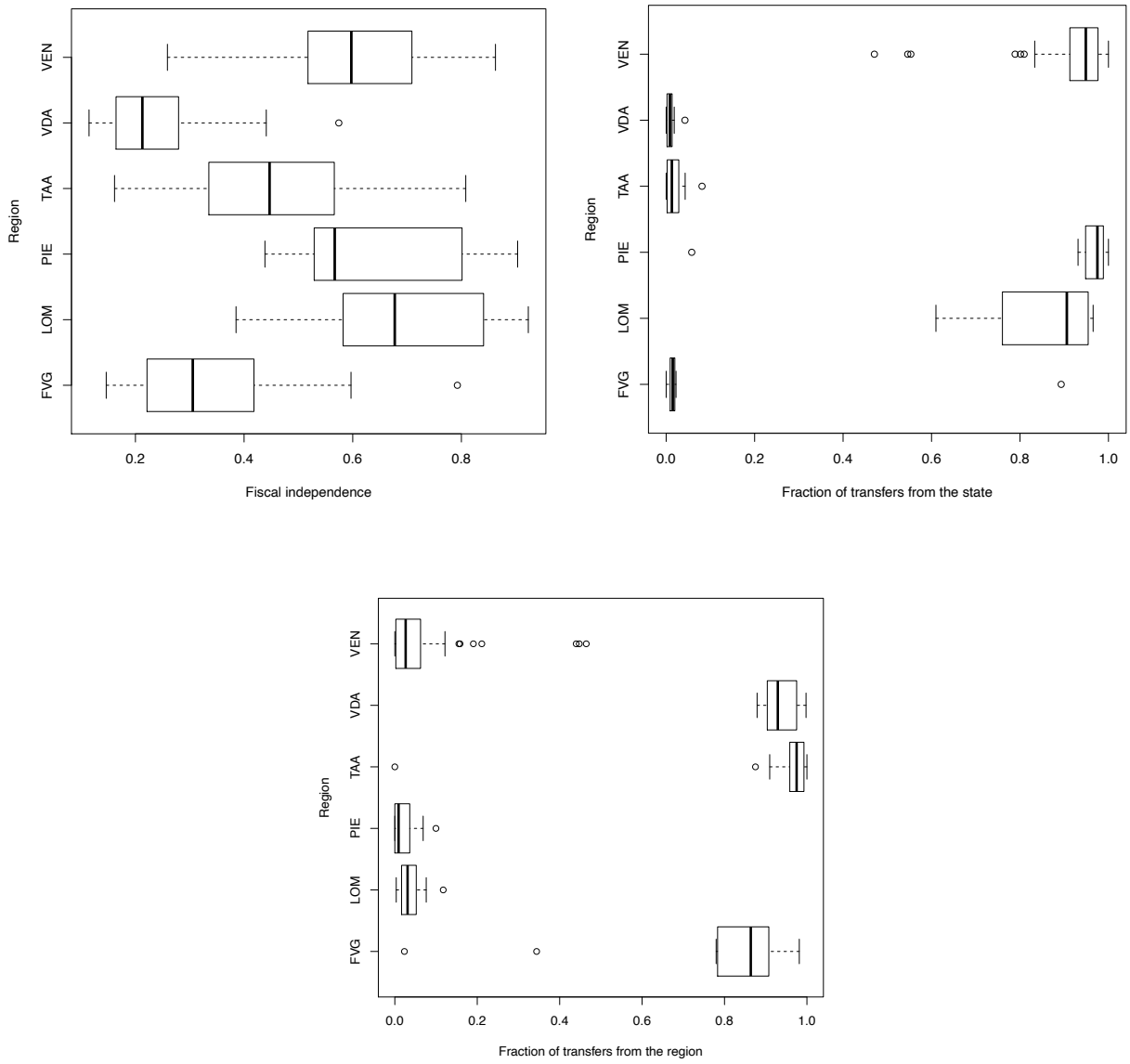
(b) (right) Burst of migration. The top panel shows the total growth rate of the population, the bottom panel the ratios of the three classes. Dashed lines show the evolution of the population with no further intervention, while solid lines represent the result of a burst of migration lasting five years, comprised on adults only and amounting to 2.5% of the total native population.

Figure 9. Day care coverage in the North of Italy.



Adapted Figure 2.1 from Milan et al. (2020). The shades of green represent the number of daycare places available in each municipality for every 100 children aged 0 − 2. The municipalities shown in gray do not have local daycare facilities and rely on neighboring municipalities. Municipalities in yellow do not have children in this age bracket.

Figure 10. Fiscal indicators of mountain municipalities situated on the border between OSRs and SSRs



a) (left top) Fiscal independence of mountain municipalities, by parent region. Municipalities located in autonomous regions (VDA, TAA, and FVG) appear less fiscally independent, i.e., they are more reliant on transfers in their budget.
b) (right top) Transfers from the State received by municipalities as a fraction of the total transfers received. Municipalities located in autonomous regions (VDA, TAA, and FVG) receive only very limited amounts of transfers from the central State.
c) (bottom) Transfers from the parent region received by municipalities as a fraction of the total transfers received. Municipalities located in autonomous regions (VDA, TAA, and FVG) receive most of their transfers from the parent region.

Appendix

Appendix A. Fiscal consequences of autonomy

Table A.1. Proportion of taxes managed directly by Northern special statute and ordinary statute regions after 1996, only the main categories; total and regional public expenses in 2016.

Tax type	**TAA**	**VDA**	**FVG**	**Veneto**	**Lombardia**	**Piemonte**
IRPEF (income tax)	90%	90%	60%	5%	0%	0%
IRPEG (corporate tax)	90%	90%	45%	0%	0%	0%
IVA (VAT)	70%	90%	80%	37%	38,55%	38,55%
Electricity consumption tax	100%	90%	90%	0%	0%	0%
Tax on gasoline	90%	90%	30%	11%	11%	11%
CG regionalized expense, 2016 (euros per capita)	8,152	9,388	5,168	2,802	2,563	2,904
Total public expense, 2016 (euros per capita)	13,427	15,455	11,778	8,200	8,355	9,129

Notes: CG stands for central government. The proportions of a given tax retained are negotiated between regions and the State and thus are subject to change. Table compiled by the author based on the Report by the Region of Veneto. Regional expenses for 2016 were published by the State General Accounting Office.

Appendix B. Regional socio-economic indicators

Table B. 1. Some regional indicators for autonomous and neighboring ordinary statute regions in Northern Italy

Indicator	TAA	VDA	FVG	Veneto	Lombardia	Piemonte
Territory, km sq	13.606	3.261	7.862	18.407	23.864	25.387
Population, 2011 (thousands)	1.029	127	1.219	4.857	9.704	4.364
Population density, 2011 (residents per km sq)	75	39	155	264	407	172
Mean population age, 1st Jan 2015	42,9	45,1	46,6	44,6	44,4	46,2
Population living in urbanized areas	52,7%	49,5%	71,8%	80,1%	88,1%	71,2%
Regional GDP per capita, 2011	33.765	34.945	29.364	30.003	33.597	28.380
Mountain terrain	100%	100%	42,5%	29,1%	40,5%	43,3%

Notes: Territory, population, urbanization data taken from an ISTAT publication (02.01.2020), "Principali statistiche geographiche sui comuni" https://www.istat.it/it/archivio/156224. Data on GDP per capita, mean age are from ISTAT: Data on morphology of the Italian territory from Noi-Italia, ISTAT. Some values were rounded to integers.

Appendix C. Nighttime light data: potential issues and mitigation

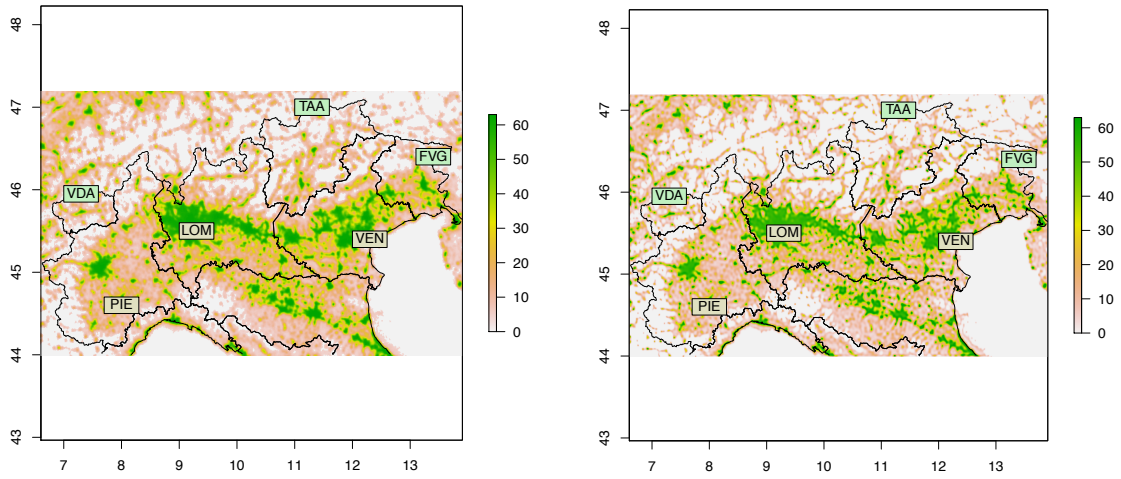
Certain issues must be addressed prior to using DMSP-OLS data in order to estimate local economic development. First, the data set comprises data collected by 9 satellites in different years. There is a well-documented inconsistency in measurements between the satellites, as they had different initial gain settings and tended to wear off over the years (due mainly to sensor degradation). The suggested strategies for accounting for satellite discrepancies are inter-satellite calibration or estimation with fixed effects (Bennett and Smith, 2017). In the context of this paper, we use night-time lighting data essentially to identify any discontinuity in GDP at the border between regions and therefore use just one measurement at the beginning of the time span considered, corresponding to satellite F15 in year 2000.

Second, DMSP-OLS luminosity data is encoded by digital numbers ranging from 0 to 63 and very bright sources such as urban centers may be affected by saturation, all represented by pixels encoded at the highest possible value, 63. Thus, without further processing, this dataset cannot accurately follow increases in brightness in urban centers. However, our interest is in the socioeconomic dynamics of sparsely populated mountain communities, so the saturation issue can be ignored.

Another problem is blooming or overglow. This phenomenon has two main sources. First, the physical nature of lights data: light from bright pixels spreads to nearby pixels increasing their brightness. Second, the data collection procedure of DMSP-OLS blurs the originally observed brightness: because of low volumes of on-board memory, the data is first integrated into larger pixel dimensions, and then redistributed over the 30 arc-sec raster. Overglow is of more concern for our purposes as it smudges possible GDP border discontinuities over a range of several pixels, corresponding to a few kilometers. How to deal properly with DMSP-OLS overglow is an area of active research in the remote sensing field (Bu, 2019; Abrahams et al., 2018). For the purposes of our paper, we reduce overglow by applying a deconvolution algorithm, commonly used in astronomy to solve the problem of known point spread function (PSF) deconvolution: the Lucy-

Richardson (LR) algorithm (Lucy, 1974; Richardson, 1972). While the actual DMSP-OLS PSF is in principle unknown, it has been argued (Abrahams et al., 2018) that it is a good Gaussian approximation. We adopted a Gaussian PSF with a standard deviation of two pixels. The LR algorithm is a non-linear, iterative procedure (as opposed to other, simpler methods to correct for overglow based on linear filters) which requires us to specify, in addition to the PSF, the number of iterations to run. We tested various choices for this parameter and decided, upon visual inspection, to carry out ten iterations. The results are shown in Figure C.1, which compares the original light dataset over Northern Italy (left-hand panel) with the result of LR deconvolution (right-hand panel). Several small-scale features, such as cities and highways, heavily blurred in the original, appear much sharper in the deconvolved image.

Figure C.1. Deconvolution procedure.



a) (left) Nighttime lights of Northern Italy, 2000
Map of nighttime lights in Northern Italy observed by the F15 DMSP-OLS satellite in 2000. The raster data are from cloud-free stable lights in a yearly composite dataset. The data excludes sunlit and moonlit observations and includes only persistent light sources. Brightness is encoded as a discrete number ranging from from 0 (darkest) to 63 (brightest). Night luminosity tracks economic activity irrespective of municipality borders.

b) (right) Lucy-Richardson deconvolved map of nighttime lights of Northern Italy.
LR deconvolution results in discrete levels above the original maximum of 63, so these have been clipped to 70 (roughly corresponding to the 99th percentile of the values) and linearly rescaled to the 0-63 range. The effect of LR deconvolution is apparent in the sharpening of small-scale details of the map, e.g., cities, roads, etc. leading to a decrease in the spatial autocorrelation of the dataset.

Appendix D. Summary statistics for the samples used for baseline OLS estimation

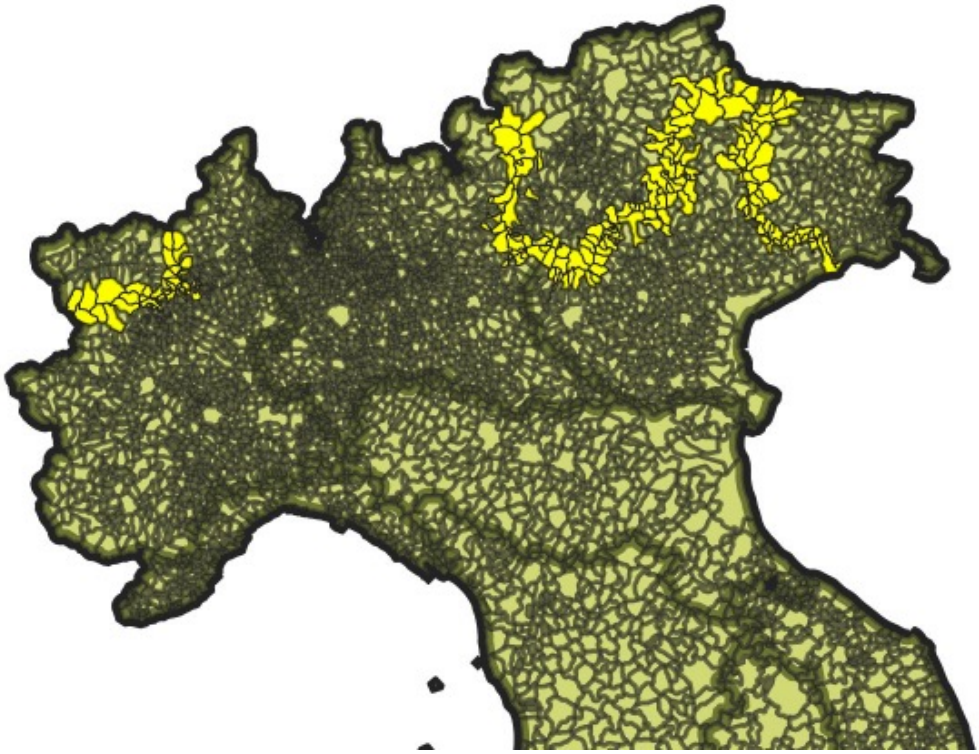
Table D.1 summarizes the properties of the municipality samples used in our regression.

Table D.1. Summary statistics, OLS estimation

	Pooled OLS	Border strategy
	364 observations	56 observations
Altitude		
Minimum	717	1192
Mean	1682	1912
Median	1672	1884
Maximum	2681	2681
Population change, relative (2000-2011)		
Minimum	−30.4%	−23.2%
Mean	−0.4%	−1.7%
Median	−0.3%	−1.6%
Maximum	61.6%	17.2%
Population change, absolute (2000-2011)		
Minimum	−494	−242
Mean	32.2	−9.5
Median	−1	−13
Maximum	1779	345
Pre-treatment population, 1951		
Minimum	74	132
Mean	1303	1532
Median	932	1472
Maximum	6871	5964
Income		
Minimum	6350	10690
Mean	16270	16382
Median	16280	16264
Maximum	23936	22629

Appendix E. Selection of municipalities for border strategy

Figure E.1. Municipalities selected for our border strategy before filtering for altitude to select only the mountain ones.



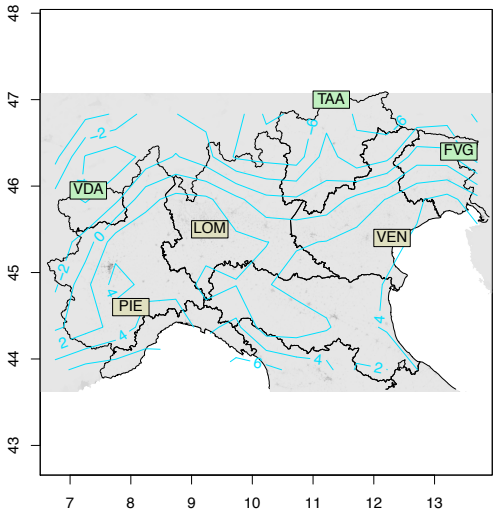
Appendix F. Additional checks for potential border discontinuities: precipitation, temperature, and climate classification

We plot the isohyet and isothermal lines in order to examine precipitation and temperature patterns in the regions under examination. Both precipitation and temperature datasets for Europe are available at https://crudata.uea.ac.uk/cru/data/hrg/#current .

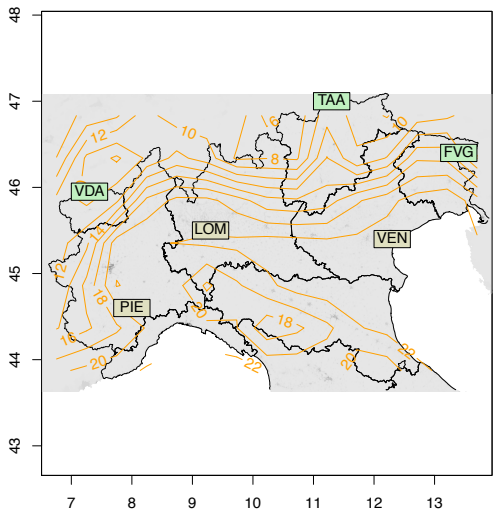
Seasonal temperature data (Luterbacher et al., 2004) is available for European territory for years 1500-2002 in ASCII format, at 0.5-degree resolution. Starting from 1901 the data comes from direct observations. Temperature data for winter and summer in the year 2000 is shown in Figure F.1, left and right panel respectively. Seasonal precipitation data (Pauling et al., 2006) features the same resolution, similar time (1500-2000) and territorial coverage. Similarly, data prior to 1901 is reconstructed, but afterwards it is observational.

The resolution of temperature and precipitation datasets is too coarse (55 by 55 km cell size) to be used directly for municipality level analysis or RDD.

Figure F.1. Isotherms.



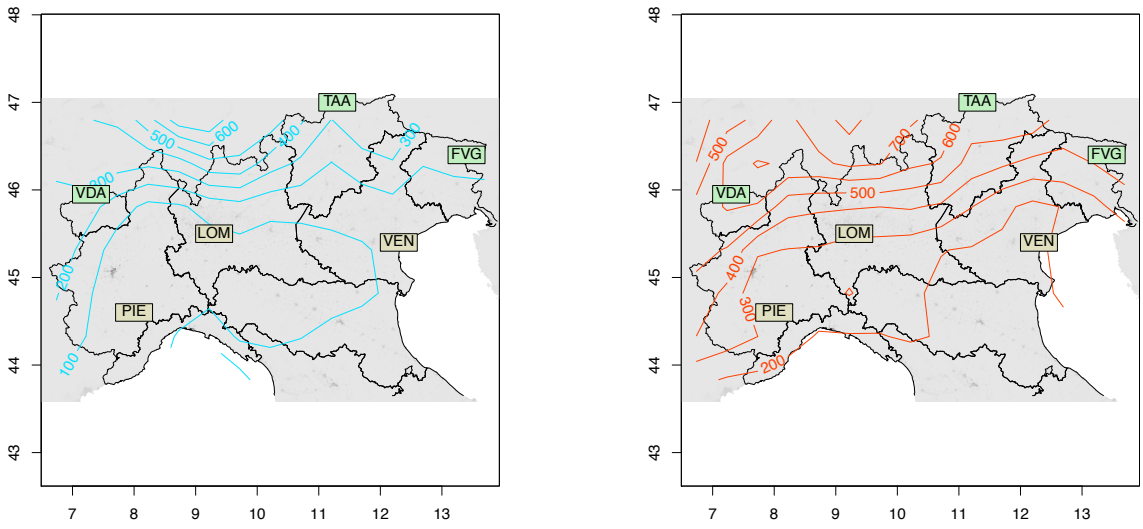
a) Average winter temperatures in ° C for the year 2000



b) Average summer temperatures in ° C for the year 2000

The panels of Figure F.1 depict average winter and summer temperatures in ° C for the year 2000 (light blue contours) overplotted onto a population map of Northern Italy (GPW for year 2000, coded as grayscale). Regional borders are mostly not aligned with isothermal lines, suggesting that temperature is not discontinuous at the border. We notice how the freezing line, which may hold particular significance for agriculture and ski tourism is mostly contained within non-autonomous regions.

Figure F.2. Isohyets.



a) Average winter precipitation in mm, 2000.

b) Average summer precipitations in mm, 2000

The two panels of Figure F.2 show average winter and summer precipitations in mm for the year 2000 (light blue and orange contours) overplotted onto the same population map. Regional borders are largely not aligned with the isohyet lines, suggesting that precipitations are not discontinuous at the border.

In addition to the temperature/precipitation data, we plot the Köppen-Geiger classification of climate for the northern Italian alpine region. Figure F.3 is based on 1-km resolution data from (Beck et al., 2018). This classification organizes climates in five broad categories, of which three

are of interest for the alpine regions of northern Italy under consideration: group C - temperate climate; group D - continental climate; and group E - polar climate.

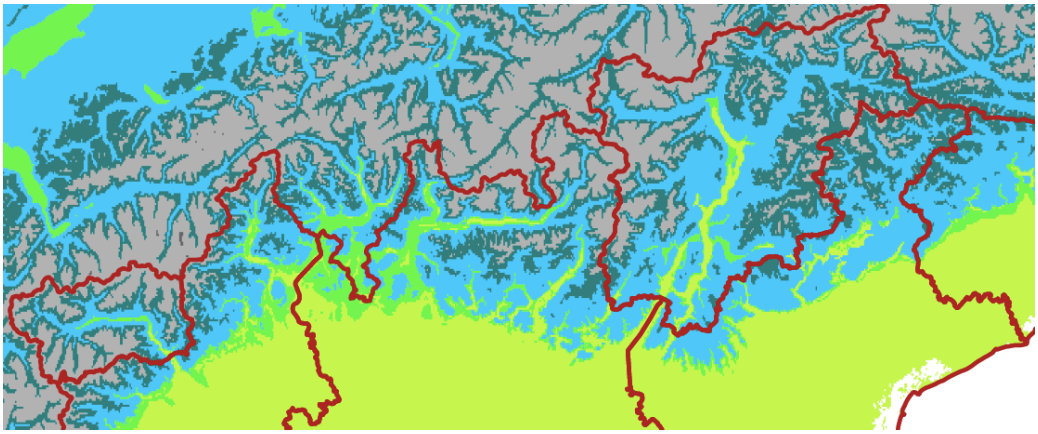


Figure F.3. Köppen climate classification for northern Italian Alps. Colors are associated to climate classification, color coded as follows: *Cfa* (light green), Cfb (darker green), *Dfb* (light blue), *Dfc* (dark blue), *ET* (gray).

More in detail, the *pianura padana* plains are in group *Cfa*, humid subtropical climate characterized by mild temperatures and a good amount of precipitation, moving up towards the mountains in the pre-alpine region, this switches to *Cfb*, oceanic climate, with colder but still relatively mild temperatures. The city of London (UK) is the prototypical example of this climate. At even higher altitudes the climate becomes *Dfb*, hemiboreal and higher still *Dfc*, subarctic; these are characterized by lower temperatures, with longer and colder winters. Finally, the mountain tops reach the *ET*, or tundra climate, where temperatures reach above zero only one month per year.

Since elevation is the main determinant of climate characteristics in the Alps, we find a general symmetric situation between the climate to the south and to the north of most mountain ridges, as can be seen in Figure F.3. This is reassuring, given that in several cases the borders between special and ordinary regions coincide with mountain ridges, and climate may influence economic activities such as tourism (ski, especially) and agriculture.

Appendix G. Descriptive statistics of the RDD sample, sub municipal level

Table G.1. Descriptive statistics for the whole sample used in RDD

Variable	Min	Median	Mean	Max
Latitude	45.1	46.1	46.1	47.0
Longitude	6.9	11.0	10.5	13.1
Population count 2000	0.04	122.2	649.7	30574.8
Population count 2015	0.05	121.1	687.8	31291.7
Population, abs change 2000-2015	−1032.6	0.16	38.0	2280.4
Distance to the border, km	−35.9	3.2	3.5	35.9
Average night time lights in 2000	0	114.0	170.8	1463.7
Elevation, meters	600.1	1497.0	1536.9	3733.4
Distance to the nearest regional capital, km	0.63	58.9	59.1	123.4

Appendix H. Placebo outcomes

Table H.1. Placebo outcomes. Non-parametric estimation results for covariates

Dependent variable	LATE estimate (standard error)	BW	Observations
Elevation, m	78.53 (87.9)	27.93	435
Light, 2000	20.39(40.58)	21.5	357
Distance to the nearest regional capital, km	−8.1(10.2)	13.6	233
Population count, 2000	−117.5(273)	12.9	221

Notes: Significance codes ***< 0.001, **<0.01, *<0.05.

We find that population in the year 2000 is not significantly discontinuous at the border. This may be puzzling if taken at face value, because we showed previously that the (relative) population growth is indeed significantly discontinuous at the same border, all over the period starting from the WW2 to the present. However absolute population numbers have a much higher standard deviation than relative population growths on a municipal basis (see Table G.1): our data does not allow us to declare the difference in the former significant, while it does for the latter. It should be noted though that population is generally lower on the non-autonomous side of the border, even though not significantly so.

Appendix I. RDD on municipal data

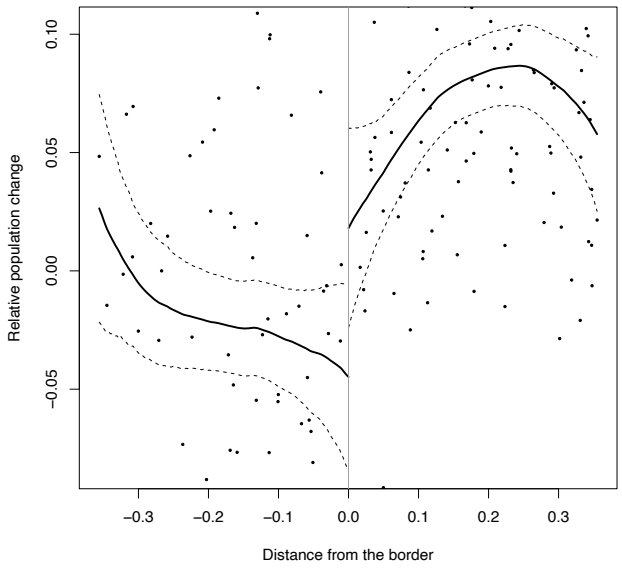
In Table I.1 and in Figure I.1 we show the results of an RD design applied to municipal data for year 2001-2011, scored on the distance of each municipality's centroid from the SSR/OSR border. The p-value for the covariate-free specification (first column of Table I.1) is exactly 0.01; the LATE value is compatible with the coefficient of the autonomy dummy in both our pooled OLS and border strategy regressions.

Table I.1. RDD results for relative population growth over the census years 2001 − 2011, percentages.

	No covariates	Border segment dummy	All covariates
LATE	4.97*	4.77 *	2.84.
	(1.93)	(1.90)	(1.75)
Observations	354	354	354

Notes: Significance codes ***< 0.001, **<0.01, *<0.05, .<0.1. Standard errors in parentheses.

Figure I.1. Municipality based RDD for relative population growth over the census years 2001-2011. The solid lines indicate the local linear regression, the dashed lines the associated 95% confidence intervals.



Appendix J. Conley standard errors

As an additional check, we report in Table J.1 the Conley standard errors for the regressions based on municipal level relative population change data discussed previously, including also the coefficient estimates (which are largely unchanged). The regressions were run using the *conleyreg()* function in R, with distance cutoff 10 km.

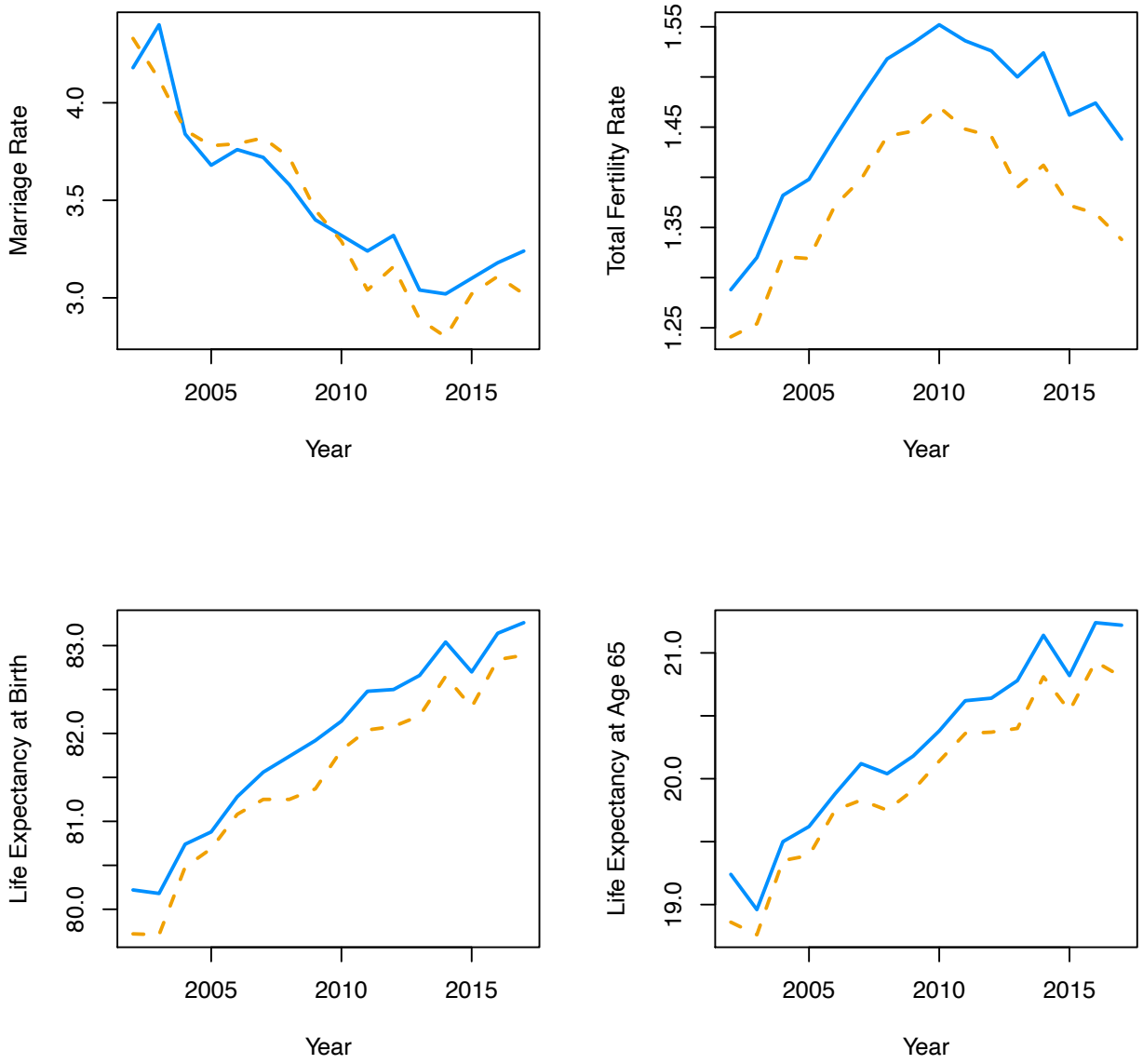
Table J.1. Results of OLS estimation, relative population change, with Conley standard errors (percentage)

	Pooled OLS	Border strategy	Border strategy w. dummies
Autonomous	5.415***	5.520**	5.089 **
	(1.102)	(1.629)	(1.546)
Elevation	−0.25*	0.14	0.073
	(0.12)	(0.21)	(0.38)
Pre-treatment population	−0.40	-0.48	-0.88
	(0.43)	(0.83)	(0.91)
Income per capita	2.0 ***	1.5***	1.6***
	(0.2)	(0.35)	(0.33)
VENFVG			−3.730 (4.783)
VENTAA			−0.9383 (3.623)
VDAPIE			−2.781 (3.415)
Intercept	−30.12*** (3.723)	−31.96 *** (6.617)	−28.53 *** (10.06)
Observations	364	56	56
Multiple R^2	0.34	0.45	0.48

Notes: Significance codes ***< 0.001, **<0.01, *<0.05. Conley standard errors in parentheses. Elevation in 100 meters, income per capita in euros, pre-treatment population in 1000 of people. VENFVG stands for the border segment between Veneto and Friuli Venezia Giulia, VENTAA for the border segment between Veneto and Trentino-Alto Adige, VDAPIE for the border segment between Valle d'Aosta and Piemonte.

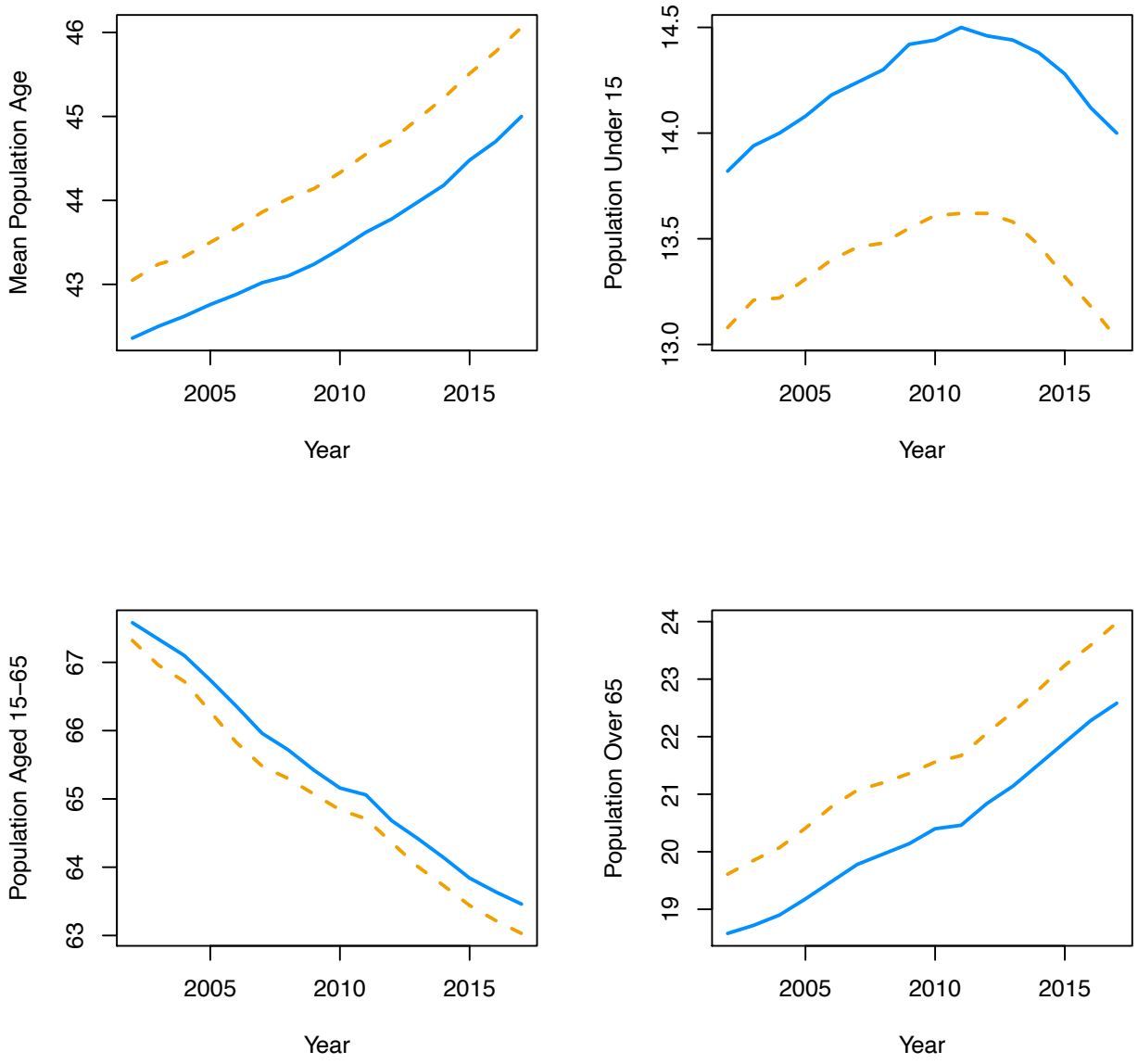
Appendix K. Demographic indicators at the provincial level

Figure K.1. Provincial demographic indicators: marriage rate (top left), total fertility rate (top right), life expectancy at birth (bottom left) and at age 65 (bottom right), 2002-2017, ISTAT.



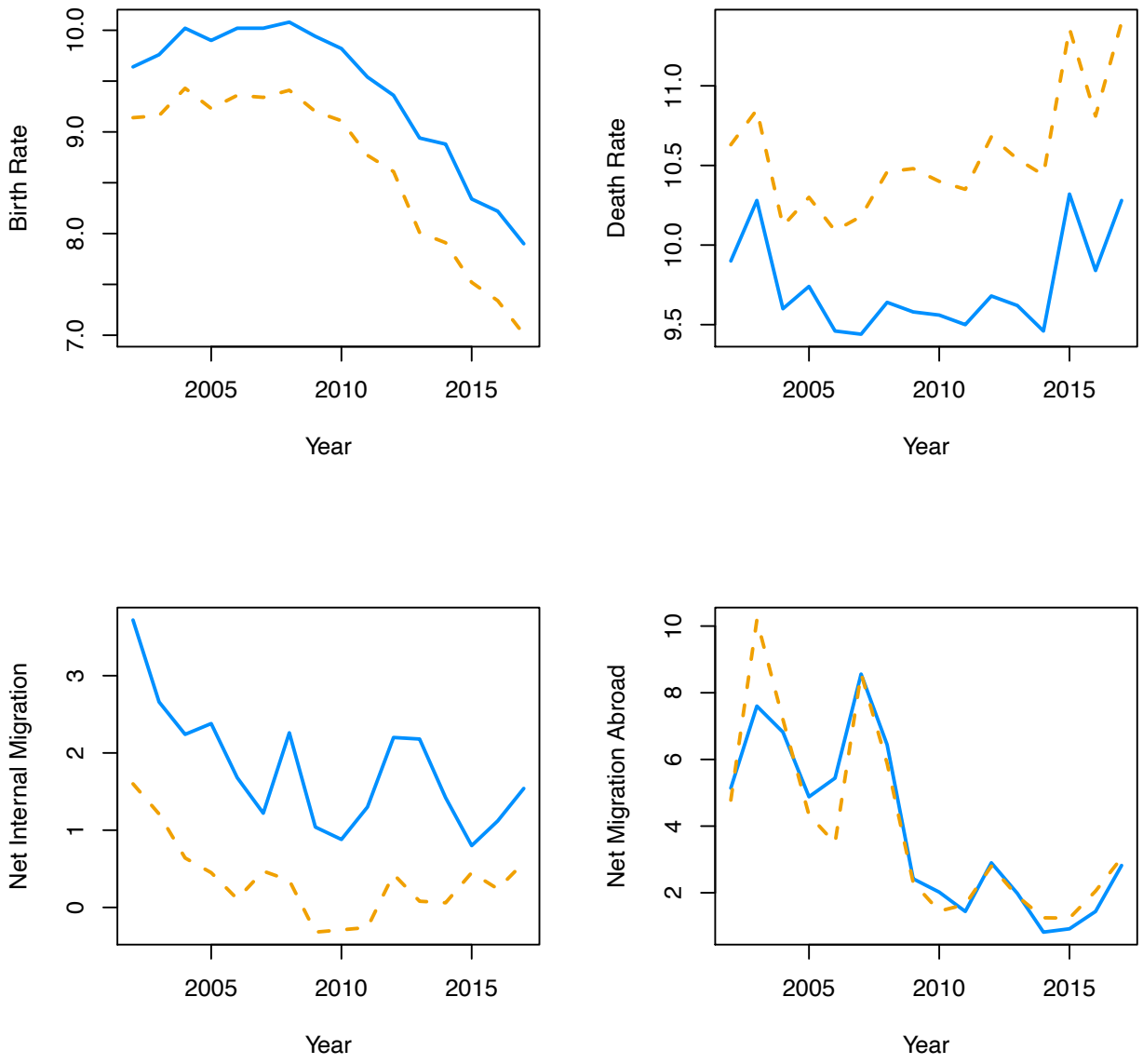
Dashed orange line represents average values of demographic indicators for the provinces that are parts of ordinary regions: Pordenone, Treviso, Belluno, Vicenza, Verona, Sondrio, Brescia, Torino, Biella, Verbano-Cusio-Ossola, Vercelli. Blue line represents average values of indicators for the provinces that belong to SRs: Valle d'Aosta, Udine, Pordenone, Provincia Autonoma Trento, Provincia Autonoma Bolzano.

Figure K.2. Provincial demographic indicators of age structure of population, 2002-2017, ISTAT.



The top left panel of Figure K.2 shows the average age of the population, the other three panels the fraction of population in age brackets (under 15 ,15-65, and over 65 respectively). Dashed orange line represents average values of demographic indicators for the provinces that are parts of ordinary regions: Pordenone, Treviso, Belluno, Vicenza, Verona, Sondrio, Brescia, Torino, Biella, Verbano-Cusio-Ossola, Vercelli. Blue line represents average values of indicators for the provinces that belong to special statute regions: Valle d'Aosta, Udine, Pordenone, Provincia Autonoma Trento, Provincia Autonoma Bolzano.

Figure K.3. Provincial demographic indicators: birth (top left) and death rates (top right), net internal migration (bottom left) and net migration from abroad (bottom right) 2002-2017, ISTAT.



Dashed orange line represents average values of demographic indicators for the provinces that are parts of ORs: Pordenone, Treviso, Belluno, Vicenza, Verona, Sondrio, Brescia, Torino, Biella, Verbano-Cusio-Ossola, Vercelli. Blue line represents average values of indicators for the provinces that belong to SRs: Valle d'Aosta, Udine, Pordenone, Provincia Autonoma Trento, Provincia Autonoma Bolzano.

Appendix L. Availability of daycare in Italian regions

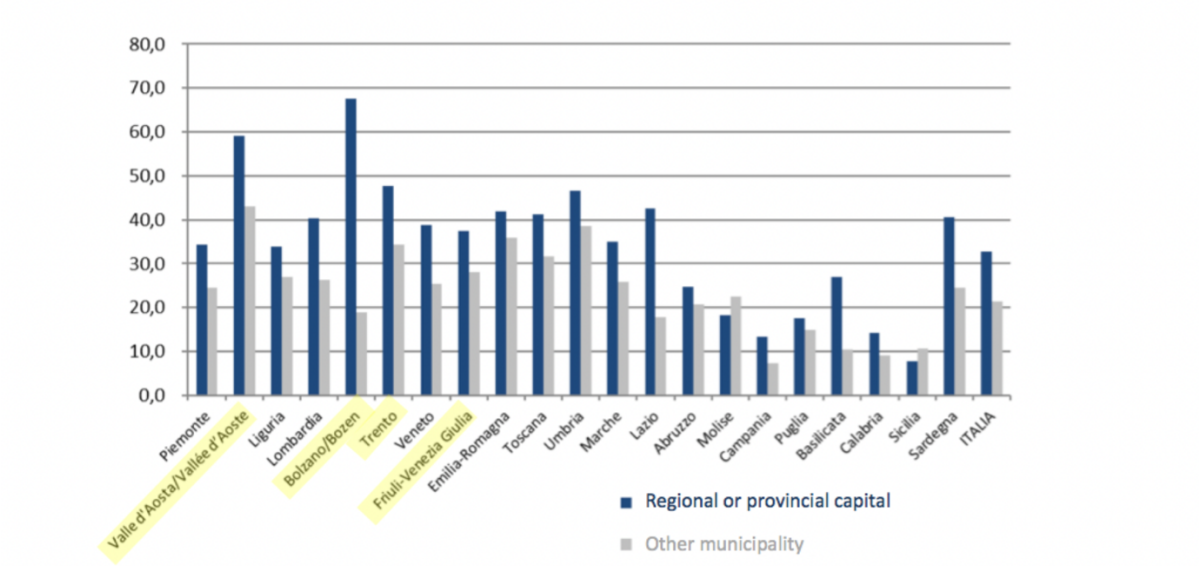


Figure L.1. Availability of daycare in Italian regions (reproduced from Milan et al., (2020).
The blue bars represent the number of places available in daycare for children in the 1-2- age bracket in provincial and regional capitals. The gray bars represent the places in other municipalities. The autonomous statute regions are highlighted in yellow.

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Chapter 2

The luck of falling on the bright side.

Enlightenment and long-term persistence of local administrative traditions

by Giulio Cainelli, Roberto Ganau and Nadiia Matsiuk

Abstract: We study the long-term, persistent effects of historical administrative reforms on current local administrative efficiency. We exploit the Enlightenment-inspired administrative reform introduced by the Habsburg Monarchy in 1755 to analyse current administrative efficiency differentials in Northern Italy between municipalities ruled by the Habsburgs and those ruled by the Savoy House in the second half of the 18th century. The Habsburg reform introduced a democratic form of self-government at the municipality level by attributing to all land taxpayers the right of nominating local civil servants, managing public spending, and deciding on taxation and general-interest matters. By contrast, municipalities ruled by the Savoy House were subject to a highly centralised system where local civil servants were nominated by and were under the control of the *Intendente*, who was appointed directly by the King. We exploit exogeneity in the frontier established in 1748 – after more than 40 years of war – by the Treaty of Aix-la-Chapelle between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. We rely on spatial regression discontinuity design techniques and employ an original dataset combining current and historical municipality-level data. We find evidence of a persistent positive effect of the Habsburg reform on current administrative efficiency, especially in terms of public goods and services provision. We explain our results through a model of persistence of administrative traditions driven by a within-institution 'bureaucracy enculturation' mechanism.

Keywords: Historical administrative reforms; Enlightenment; Persistence; Administrative efficiency; Northern Italy.

1. Introduction

The idea that past institutions have a long-lasting effect and may explain economic growth differentials is now a well-recognised empirical fact (Acemoglu et al., 2001; Nunn, 2009, 2020; Tabellini, 2010; Spolaore and Wacziarg, 2013; Michalopoulos and Papaioannou, 2013; Guiso et al., 2016). The impact of European colonialism (Engerman and Sokoloff, 1997; La Porta et al., 1997, 1998; Acemoglu et al., 2001), Latin American mining *mita* – i.e., a forced labour system instituted by the Spanish Crown in Peru and Bolivia from 1573 to 1812 – (Dell, 2010), pre-colonial ethnic institutions in Africa (Michalopoulos and Papaioannou, 2013), and historical State administrative institutions in Vietnam (Dell et al., 2018) are only some examples of a broad literature showing the role and the importance of 'historical institutions' in explaining present-day socio-economic outcomes.[1]

This body of research has analysed a variety of potential mechanisms in order to explain the role of history and its long-term effects (Nunn, 2009, 2020; Voth, 2021). Some of these mechanisms operate through the evolution and persistence over time of some 'initially implemented' historical institutions, such as the legal (La Porta et al., 1997, 1998) or fiscal systems (Berger, 2009) of the coloniser countries during the colonisation process, or the Napoleonic codes introduced by the French revolutionary armies in some European countries (Acemoglu et al., 2011).[2] An alternative view postulates that past institutions can have a persistent, long-term effect on current cultural norms, beliefs, civic capital (Putnam, 1993; Nunn, 2009; Tabellini, 2010; Guiso et al., 2016; Lowes et al., 2017; Bazzi et al., 2020), preferences (Alesina and Fuchs-Schündeln, 2007; Becker et al., 2020), as well as on the interaction between citizens and current institutions (Becker et al., 2016). Studies on

[1] Historical evidence supporting these insights concerns also the presence of (relatively) non-absolutist institutions when some European countries gained access to the Atlantic Ocean (Acemoglu et al., 2005), and the effect of Africa' slave trade (Nunn, 2008).

[2] La Porta et al. (1997, 1998) document that former colonies established either a Roman civil law or a British common law legal system depending on the identity of the coloniser country. These legal systems persisted after former colonies gained independence. Berger (2009) investigates the impact of colonial policies in two regions of Nigeria, i.e., North and South Nigeria. The main difference between these two regions concerned the taxation system and the way through which taxes were collected. Since North Nigeria relied on a poll tax to raise revenues, new institutions were developed to collect taxes and control corruption and incompetence of civil servants. Berger (2009) finds that vaccination rates – as a proxy for current local government quality – in North Nigeria are higher than in South Nigeria.

the Habsburg Empire (Becker et al., 2016; Grosfeld and Zhuravskaya, 2015), the Italian free city-states during the Middle Age (Guiso et al., 2016), the effects of the separation and reunification processes in Germany (Fuchs-Schündeln and Schündeln, 2005; Alesina and Fuchs-Schündeln, 2007; Becker et al., 2020; Laudenbach et al., 2020), and the historical State's influence in Vietnam (Dell et al., 2018) well document the mechanisms through which people's norms of collective action, civic capital, attitudes, preferences, and values may persist over time.

A limitation of this literature is that it has paid little attention to the long-term effects and persistence of some historical institutions on the functioning and outcomes of present-day (formal) institutions, and on the mechanisms behind these phenomena. Basically, this topic remains a 'black box' whose 'inside' mechanisms are not clearly understood (Nunn, 2009). An interesting 'inside' mechanism for explaining the long-lasting effects of past institutions on the outcomes of current ones has been recently suggested by the comparative public administration literature (Ongaro, 2008; Mayer-Sahling and Yesilkagit, 2011). This mechanism is mainly based on the concept of 'administrative tradition', generally defined as a 'historically based' set of traits such as administrative values, norms, structures, and practices concerning the functioning of national and local institutions in a country or in a 'family of nations' (Ongaro, 2008; Mayer-Sahling and Yesilkagit, 2011).[3] As suggested by these studies (Meyer-Sahling and Yesilkagit, 2011), the persistence of an administrative tradition is fundamentally a problem of 'inter-generational' transmission. In fact, a set of administrative values, norms, structures, and practices may persist over time only if there exists a within-institution channel driving its transmission. Only the presence of this mechanism may explain 'reproductive capacity' over time and, therefore, the persistence of an administrative tradition. Needless to say, a key role in this mechanism is played by bureaucracy.

To the best of our knowledge, the idea of analysing the long-term effects of some 'initially implemented' historical institution on current institutions by exploiting inter-generational transmission mechanisms related to the concept of administrative tradition has not yet been explored

[3] A widely investigated case-study is represented by the Napoleonic tradition in the public administration of countries such as France, Greece, Italy, Portugal, and Spain (Ongaro, 2008).

in the literature. This is exactly what we do in this paper. Specifically, we exploit the Enlightenment-inspired administrative reform introduced by the Habsburg Monarchy in 1755 as a natural experiment to analyse current administrative efficiency differentials in Northern Italy between the municipalities that belonged to the Habsburg-ruled Duchy of Milan and the neighbouring ones ruled by the Savoy House. The main goal of the administrative reform introduced by Maria Theresa of Austria in 1755 – entitled *Riforma al governo ed amministrazione delle comunità dello Stato di Milano* – was to increase the tax base given the large public debt accumulated by the Habsburgs during the Succession Wars occurred in the first half of the 18th century (Rotelli, 1975; Capra, 1987, 2014; Meriggi, 2002). One of the main innovations of this reform was to attribute to all land taxpayers of a local community – through the *Convocato Generale* (or *Assemblea*) *degli Estimati*, i.e., a democratic form of self-government at the municipality level – the power of: (i) nominating a *Deputazione* (i.e., the municipal council) of five members; (ii) approving the municipal budget; (iii) deciding and managing the public spending composition; and (iv) deciding on the level of local taxation, and on some general-interest matters. Moreover, the 1755 reform established the presence in each district (i.e., a set of municipalities) of the so-called *Cancelliere Delegato del Censo*, an official representing the central government, who had many complex tasks including: (i) keeping the maps and cadastral registers of each municipality; (ii) receiving from and transmitting to the central government any complaint; and, more important for our analysis, (iii) checking the regularity of the municipal elections and annual municipal budgets and, in case, reporting abuses and (financial) irregularities to the central authorities (Capra, 1987).

This 'double' mechanism of governance, monitoring, and control – 'internal' through the *Convocato Generale degli Estimati*, and 'external' through the *Cancelliere Delegato del Censo* – concerning budget formation and general-interest decision-making processes at the municipality level deeply shaped the Habsburg 'administrative tradition' of the Duchy of Milan. In fact, this reform – that took place in the period of the Habsburg-ruled Duchy of Milan between 1755 and 1796 and, in a slightly different version (Rotelli, 1975), in the period of the Habsburg-ruled Kingdom of Lombardy-

Venetia between 1815 and 1859 – influenced not only the administrative structure of Habsburg-ruled municipalities, but also the values, norms, and practices of the local bureaucracy. Inspired by Enlightenment values, Maria Theresa of Austria's reform introduced the idea that administrative efficiency and public good ('*pubblico bene*') (Mozzarelli, 1975) should be the main goal of a bureaucracy (Rotelli, 1975; Capra, 1987). In 1783, Emperor Joseph II reinforced this idea: he issued the famous *Lettere Pastorali* to civil servants in order to strengthen their love for the "general good of the state" and stigmatise "self-interest as the bane of public affairs and the most unforgivable crime in those who serve the state" (Capra, 1987; Mozzarelli, 1975).[4]

In this sense, the Habsburg administrative tradition seems to have developed a greater sensitivity for the '*pubblico bene*' (Mozzarelli, 1975) in the bureaucracy of the Duchy of Milan (Rotelli, 1975; Capra, 1987, 2014; Meriggi, 2002). Moreover, the presence of the *Convocato* – as a form of local democracy and self-government – resulted in a 'comparatively' better alignment between the provision of local public goods and services and the general interests of local communities. In other words, it is reasonable to assume that the *Convocato Generale degli Estimati* was able to meet the needs of the local population much better than any other more centralistic local administrative structure.[5] Finally, in the local institutions of the Duchy of Milan, public spending was constrained by the level of local taxation. In fact, municipalities could not make extraordinary expenditures or accumulate debts. Indeed, the budget of these local institutions had to be balanced, otherwise the *Cancelliere Delegato del Censo* – with her functions of monitoring and control – would have intervened (Capra, 1987). We argue that the values, cultural norms, and practices characterising the Habsburg administrative tradition, absorbed by its bureaucratic apparatus, have persisted over time through an inter-generational transmission mechanism. Specifically, we assume a 'bureaucracy enculturation' transmission channel.[6]

[4] *Dispaccio di S.M. l'Imperatore ai capi dei Dipartimenti sul modo di trattare gli affari pubblici* (1783) in Capra (1987).
[5] Some recent studies have shown how local democratic institutions are generally beneficial for local public goods provision through mechanisms such as competition, monitoring, and accountability (Schiel et al., 2022).
[6] Not surprisingly, bureaucracy is generally considered – together with the army and the court aristocracy – one of the pillars of the Habsburg Monarchy (Magris, 1963).

At the same time, the neighbouring municipalities ruled by the Savoy House were subject to a highly centralised administrative system where the mayor and the members of the *Consiglio Ordinario* (i.e., the municipal council) were appointed by the *Intendente* and, therefore, were indirectly nominated by and under the control of the King. The *Indendente* had functions of monitoring and control, and was the instrument used by the King to increase his government power over local communities. As suggested by Salvemini (1961), in this local administrative order, the "most reactionary in Europe", "the electoral principle was reduced to a minimum, the heads of the administrations were royal appointees, and furthermore the administrations had no autonomy". Therefore, while the *Cancelliere Delegato del Censo* and the *Intendente* had 'similar' supra-municipal functions of monitoring and control on the behalf of the central government, the *Convocato Generale degli Estimati* and the *Consiglio Ordinario* had different characteristics in terms of self-government, autonomy, and capability to meet the needs of the local population.

To test these ideas, we examine the current administrative efficiency measures of the municipalities that belonged to the Habsburg-ruled Duchy of Milan and those ruled by the Savoy House. We rely on spatial regression discontinuity design techniques and employ an original dataset combining current and historical municipality-level information, partially drawn from a 1751 census. We exploit exogeneity in the frontier between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. Such frontier, established in 1748 by Treaty of Aix-la-Chapelle, was the result of more than 40 years of war that saw the enlargement of the Savoy House at the expense of the Duchy of Milan. Since this frontier was simply the result of the relative military strength of the Habsburgs and the Savoy House, it is not surprising that it does not coincide with any previous border.

Our empirical results support our expectations. We find a long-run, persistent positive effect of the 1755 Habsburg reform on current administrative efficiency. Specifically, our main results point to an overall administrative efficiency premium for Habsburg-ruled municipalities compared to those ruled by the Savoy House. We document that such premium is driven by a relatively higher efficiency in providing public goods and services. By contrast, we do not find evidence of differences in current

administrative efficiency related to budget management. In other words, municipalities exposed to the Habsburg reform tend to provide more public goods and services to their citizens while spending as much as the neighbouring municipalities that, in the second half of the 18th century, were ruled by the Savoy House.

Our results are robust to a variety of robustness and falsification tests. Moreover, we support our main findings in different ways. First, we find suggestive evidence that investment in public goods in the second half of the 18th century – captured by the opening of public-use libraries – tends to amplify the long-term, persistent effect of the Habsburg reform on current administrative efficiency, especially in terms of public goods and services provision. Second, differences in public goods and services provision can be traced back to 1884 municipal budget data. In fact, we document that, in the aftermath of the Italian unification process (occurred in 1861), Habsburg-ruled municipalities tended to spend relatively more in discretionary expenses than municipalities ruled by the Savoy House. In particular, we find evidence of higher discretionary expenses in education, while no difference emerges when considering discretionary expenses in infrastructure. Finally, we quantify higher current efficiency in public goods provision by considering the case of authorised nursery places in 2013: we find that Habsburg-ruled municipalities tend to provide more nursery places per 100 children aged 0-2 years than municipalities ruled by the Savoy House.

Finally, we interpret this evidence through the lens of a simple theoretical model allowing us to explain the persistence of the Habsburg administrative tradition. According to our model, these long-term effects seem to be driven by a within-institution 'bureaucracy enculturation' channel.

Our paper is contributing to several different streams of literature. First, we add to the literature analysing the long-term effects and persistence of history on current economic, political, and institutional outcomes (Putnam, 1993; Nunn, 2020; Acemoglu et al., 2021; Voth, 2021). Second, we use a historical frontier in our identification strategy (Oto-Peralías and Romero-Ávila, 2017; Bazzi et al., 2020; Oto-Peralías, 2020). Third, we contribute to the study of 'administrative traditions' and their evolution (Ongaro, 2008; Meyer-Sahling and Yesilkagit, 2011). Finally, our contribution is

strongly related to the literature concerning inter-generational cultural transmission mechanisms (Bisin and Verdier, 2000, 2011).

The novelty of this paper is twofold. First, we contribute to the debate on the historical persistence of the 'initially implemented' historical institutions (Nunn, 2009; Nunn and Wantchekon, 2011) on the current institutions. Specifically, we focus our analysis on the long-term effects of history through the impact of a past administrative reform on current administrative efficiency of formal institutions. Second, we develop an original simple theoretical model capable of explaining how an administrative tradition persists over time. This allows us to describe a plausible within-institution mechanism of transmission over time of administrative values, norms, and practices based on a strong bureaucracy enculturation process.

The rest of the paper is organised as follows. We briefly present the historical background in Section 2. In Section 3 we describe the study region, the municipality-level data on current administrative efficiency, the sample, the empirical model, and the identification strategy. We discuss main empirical findings in Section 4. In Section 5 we analyse possible sources of effect heterogeneity. In Section 6 we provide some additional evidence concerning public goods provision over three different historical periods. Our original theoretical model suggesting a mechanism driving persistence of administrative tradition within institutions is introduced in Section 7. We conclude with some remarks and policy implications in Section 8.

2. Historical Background

The 18th century was a period of reforms inspired by the ideas, values, and principles of the Enlightenment (Meriggi, 2002). A well-known example of such reformism is represented by the Napoleonic codes (Acemoglu et al., 2011). In fact, the French invasion of some European countries brought reforms that left a long-lasting mark. In this period, particularly relevant were the administrative reforms that played a fundamental role in the process of state- and nation-building in many European countries. These administrative reforms generated new sets of administrative values,

norms, practices, and structures (Ongaro, 2008). Pre-unitary Italian States were invested by this reform process of the administrative system.

Particularly interesting for our analysis are the administrative reforms introduced in Northern Italy by the Habsburg Monarchy and the Savoy House, respectively. These reforms shared some common characteristics. Both reforms introduced, within the territories under their respective domains, a 'homogeneous' administrative system by standardising functions, elective mechanisms, and the composition of local administrative bodies. Indeed, before the period of administrative reformism that characterised the second half of the 18th century, local administrative functions and institutions were characterised by high heterogeneity even within the same State. However, despite this common element, the reforms implemented by the Habsburgs in the Duchy of Milan and by the Savoy House had important differences. In fact, the Savoy House's reform introduced an absolutist/centralist system of governance and administration, while the reform implemented by the Habsburgs in the Duchy of Milan was mainly based on a 'double' mechanism of governance, monitoring, and control: an 'internal' mechanism based on the *Convocato Generale degli Estimati*, and an 'external' mechanism based on the *Cancelliere Delegato del Censo*. We describe in detail some characteristics of the two administrative reforms in the next two sub-Sections.

2.1. The reform of local administrations in the Savoy House's territories

The main goal of the administrative reform introduced, first, by Victor Amadeus II and then, by Charles Emmanuel III was to increase control and power over local communities. This reform process began in 1717, when Victor Amadeus II promulgated the Edict of 1717, and was completed in 1775 with the promulgation of the *Regolamento dei Pubblici*. These two reforms overcame and reordered the variety of pre-existing laws and institutions characterising central and local public administration by providing for a new centralistic administrative system.

The 1717 Edict defined the new administrative order by assigning 'specific' administrative functions to municipalities. In this context, the *Intendente* was introduced as the instrument used by

the King to increase his control over local communities. The Edict of 29 April 1733 by Charles Emmanuel III on the *Buon Reggimento delle Comunità* was the first law on municipal administration that defined both the administrative functions assigned to each municipality, and the composition of the municipal bodies. The main goal of this reform was to create municipal bodies that could be easily controlled by the *Intendente* who, in turn, was appointed directly by the King. This Edict accentuated the intervention and control of the central government and, therefore, of the King – through the *Intendente* – in the administrative life of municipalities.

In 1775, the *Regolamento dei Pubblici* was promulgated to increase the King's centralising power over local administrations. This *Regolamento* attributed to the *Consiglio Ordinario* – consisting of 7, 5, or 3 members, including the mayor – the administration of the municipality. The day-by-day administration of the municipality was carried out jointly with the *Intendente*, who had extensive powers of control and supervision over the *Consiglio Ordinario*. Indeed, the *Intendente* could: (i) increase or decrease the number of municipal councillors; (ii) remove municipal councillors; (iii) settle disputes regarding municipal appointments and elections; and (iv) annul decisions made by the *Consiglio Ordinario*. The 1775 legislation was made compulsory for all municipalities in the territories ruled by the Savoy House, thus cancelling all forms of municipal autonomy.

Therefore, the reforms implemented by the Savoy House in the period 1717-1775 homogenised the local administrative system, and their main goal was to centralise the power in the hands of the King. Indeed, the King appointed the *Intendente*, who had monitoring and control functions over the *Consiglio Ordinario*; in turn, this municipal body was appointed by the *Intendente*, and had only limited administrative powers.

2.2. The reform of local administrations in the Habsburg-ruled Duchy of Milan

The Enlightenment-inspired administrative reform introduced by Maria Theresa of Austria on 30 December 1755 in the Habsburg-ruled Duchy of Milan, entitled *Riforma al governo ed*

amministrazione delle comunità dello Stato di Milano, had different goals compared to Savoy House's administrative reformism. In fact, Maria Theresa's 1755 reform – a direct consequence of the cadastral reform – was based on three elements.

First, the reform introduced, for the very first time, a homogeneous administrative model in the Duchy of Milan compared to the previous system characterised by strong administrative heterogeneity generally related to the old municipal statutes. Indeed, the variety of forms of local government subject to the influence of few powerful people – usually, the feudal lord – was replaced by a uniform model of local administration.[7]

Second, the reform provided the municipalities with a local institute of self-government – the *Convocato Generale* (or *Assemblea*) *degli Estimati* – based on the participation of all the *Estimati* of a local community, i.e., all citizens appearing in the Cadastral Register for any amount as holders of non-exempt landed property (Rotelli, 1975). Meeting at least twice a year, the *Convocato* had the power to: (i) nominate a *Deputazione* of five members (i.e., the municipal council); (ii) approve the municipal budget; (iii) decide the composition of the public spending; (iv) manage the public spending; and (v) decide on the level of local taxation, as well as on other general-interest matters. At the first meeting, held in January of each year, the *Convocato* was required to determine the yearly level of taxes. At the second meeting, held in Autumn of each year, it was required to elect the *Deputazione*, that was composed by three deputies representing the *Estimati* (one of whom had to be chosen from among the three largest *Estimati*), one deputy representing all citizens paying the personal tax (*imposta personale*), and one deputy representing all citizens paying the mercantile tax (*imposta mercimoniale*). The deputies representing the landowners were in the majority (3 out of 5), and they were also the only ones with decision-making powers; in fact, the other two deputies – the

[7] Before the 1755 Habsburg reform, local institutions in many municipalities of the Duchy of Milan were limited to councils in which a reduced number of landowners decided on some general-interest matters. Responsibility for local government was, therefore, in the hands of few men: usually, the largest landowners or their procurators (i.e., the *Cancellieri*). In these municipalities, collective participation was very modest in favour of an oligarchic-type power structure. In some municipalities, public interests were under the control of the first *Estimato*; in others, of the first two, three, or four *Estimati*. Finally, these *Estimati* appointed the tax collectors, and kept the municipality's public records in the absence of a municipal archive. In addition, many municipalities were under the control of a Feudal Lord, who had almost unlimited power – exerted through a *Cancelliere* appointed by her – over administrative matters.

staff deputy, and the mercantile deputy – had only advisory powers. The *Deputazione* appointed a mayor and a consul. The mayor acted on the delegation of the *Deputazione* on ordinary public affairs, while the consul had police and local administration tasks.[8]

Finally, the 1755 reform introduced the *Cancelliere Delegato del Censo*, who represented the central government within each district – i.e., a set of municipalities. The *Cancelliere Delegato del Censo*, who was expected to have a high level of education – indeed, she had to be either a doctor, a collegiate notary, a collegiate engineer, or a public land surveyor (Capra, 1987) – had numerous tasks. She was responsible for: (i) presiding over and dissolving the summonses; (ii) keeping the maps and cadastral registers of each municipality of competence; (iii) receiving from and transmitting to the central government any complaint related to the municipalities of competence; (iv) checking the regularity of the deputies' elections and the annual municipal budgets; (v) reporting any abuse to the central government; and (vi) providing for the administration of the local communities. It thus emerges clearly how the roles and functions assigned to the *Cancelliere Delegato del Censo* by the Habsburg reform were 'similar' to those attributed to the *Intendente* by the Savoy House.

Furthermore, it is worth noting how the Habsburg administrative reform was implemented with some margin of heterogeneity within the Duchy of Milan – something we will explore empirically later in the paper. On the one hand, the 1755 administrative reform was extended to the Habsburg-ruled Mantuan territories of the Duchy of Milan – that were previously part of the former Duchy of Mantua – only in 1784 (Dispatch of 5 November 1784). On the other hand, some municipalities of the Habsburg-ruled Milanese territories of the Duchy of Milan were granted a certain degree of administrative autonomy through *ad hoc* edicts beyond the 1755 general administrative system. In fact, between January 1756 and February 1758, the Habsburg ruler promulgated a series of 'specific' edicts targeting selected municipalities to account for local specificities and peculiar conditions related to either their size, pre-existing degree of autonomy and self-government, or specific needs in providing public services to the local community. These edicts were promulgated to grant the targeted

[8] The term of office of the deputies, mayor, and consul was one year. By contrast, the term of office of the tax collector was three years (Capra, 1987).

municipalities additional administrative autonomy or the possibility of maintaining pre-existing local statutes, but providing that such norms were not – and should not be – in contrast with the 1755 general municipal administrative system, and, specifically, with the *Convocato* institute. Indeed, the *Convocato* represented the baseline rule for local governance.

3. Empirical Framework

3.1. Study region, administrative efficiency data, and sample

3.1.1. Habsburg- and Savoy House-ruled territories after the Treaty of Aix-la-Chapelle

Our study region includes Northern Italian municipalities that, starting from the signature of the Treaty of Aix-la-Chapelle in 1748, were ruled by either the Habsburg Monarchy or the Savoy House. This region, which is depicted in Figure 1, includes 2,302 municipalities belonging to the current regions of Aosta Valley, Emilia Romagna, Liguria, Lombardy, Piedmont, and Veneto – corresponding to the level 2 of the *Nomenclature des Unités Territoriales Statistiques* (NUTS).[9]

[--- Figure 1 ---]

Municipalities ruled by the Savoy House represent 63.03% of the study region, while the remaining municipalities were part of the Duchy of Milan under Habsburg domination. On the one hand, the Habsburg-ruled Duchy of Milan comprehended territories that, before the beginning of the Succession Wars period 1701-1748, were part of the Duchy of Mantua, the Duchy of Milan, the Duchy of Modena and Reggio, the Duchy of Parma and Piacenza, and the Swiss Bailiwicks beyond the Mountains. On the other hand, the dominions of the Savoy House comprehended territories that, at the beginning of the 18th century, were part of the Duchy of Milan, the Duchy of Montferrat, the

[9] The study region comprehends 74 municipalities belonging to the current NUTS-2 region of Aosta Valley, three municipalities belonging to the current NUTS-2 region of Emilia Romagna, 54 municipalities belonging to the current NUTS-2 region of Liguria, 982 municipalities belonging to the current NUTS-2 region of Lombardy, 1,182 municipalities belonging to the current NUTS-2 region of Piedmont, and seven municipalities belonging to the current NUTS-2 region of Veneto.

Duchy of Parma and Piacenza, the *Gouvernement de Dauphiné*, the Principality of Masserano, the Principality of Piedmont, and the Republic of Genoa.[10]

This political configuration lasted between 1748 and 1796, when the French Army led by Napoleon conquered Northern Italy: the territories ruled by the Savoy House became part of the First French Republic – later renamed French Empire in 1804 –, while those ruled by the Habsburgs became part of the Cisalpine Republic – later renamed Republic of Italy (1802-1805), and then Kingdom of Italy (1805-1814) –, a dictatorial republic established by Napoleon that was under the control of the First French Republic and, then, of the French Empire. During the period 1797-1814, the territories that were ruled by the Savoy House and the Habsburgs before Napoleon's Italian Campaigns underwent a process of administrative and institutional homogenisation that involved the imposition of the French administrative model and body of laws to replace the pre-existing ones.

However, this political configuration lasted until the signature of the Final Act of the Congress of Vienna (9 June 1815), whose main goal was to restore pre-Napoleonic boundaries. Indeed, both the Habsburg Monarchy and the Savoy House were restored to their pre-1797 Italian dominions, and the frontier established in 1748 by the Treaty of Aix-la-Chapelle was identified again as the border between the Habsburgs and the Savoy House in Northern Italy. In addition, the Congress of Vienna provided for the Habsburgs to enlarge their dominions in Northern Italy towards East by gaining control over the former Republic of Venice – that, together with the already Habsburg-ruled Duchy of Milan, was renamed as the Kingdom of Lombardy-Venetia –, and the Savoy House to enlarge their dominions towards South by gaining control over the entire Republic of Genoa. During the Conservation Order, that started with the Congress of Vienna in 1815, both the Habsburgs and the Savoy House re-established the administrative set-ups predating the Napoleonic experience. In other words, the municipality-level administrative systems characterising the Habsburg- and Savoy House-ruled territories before the French occupation were restored after the Congress of Vienna.

[10] The Principality of Masserano was a papal feud that, starting from 1741, felt under the control of Charles Emmanuel III of Savoy, who was nominated papal vicar of the Principality by Pope Benedetto XIV. The Principality of Masserano was formally ceded to the Savoy House in 1753.

Such heterogeneity in administrative systems lasted until 1859, when the Savoy House annexed most territories of the Kingdom of Lombardy-Venetia to the Kingdom of Sardinia. Indeed, at the end of the Second Italian War of Independence (27 April to 12 July 1859), the Savoy House – with the support of the French Army – annexed the Habsburg-ruled Duchy of Milan except for Mantua – that was later annexed in 1866, together with the Habsburg-ruled former territories of the Republic of Venice (Treaty of Vienna, 3 October 1866). This represented the first step of the Italian unification process and was characterised by the extension of the administrative system, institutional set-up, and bulk of laws of the Savoy House's Kingdom of Sardinia to the previously Habsburg-ruled territories of the Duchy of Milan.

3.1.2. Measuring administrative efficiency

Our intent is to assess whether differences in current administrative efficiency exist between the municipalities that were ruled by either the Habsburg Monarchy or the Savoy House in the second half of the 18th century. In other words, we aim at assessing whether municipalities that experienced the Enlightenment-inspired administrative reform implemented by the Habsburgs exhibit a premium in terms of current administrative efficiency – especially, in terms of public goods and services provision – compared to those that underwent the highly centralised administrative system implemented by the Savoy House.

To this aim, we rely on municipality-level public administration efficiency indicators provided by SOSE – an Italian company owned by the Italian Ministry of Economy and Finance and the Bank of Italy, that provides data analysis on tax, government, and corporate matters – through the web-portal *OpenCivitas*. SOSE relies on data (provided by municipal governments) on actual expenditure and public services provided – related to those functions and services under municipalities' remit –

to estimate their standard expenditure needs and standard levels of services by considering geographical and socio-demographic characteristics of municipalities' resident population.[11]

Specifically, SOSE computes two synthetic municipality-level indexes capturing the expenditure and services provision dimensions of administrative efficiency, respectively, plus an overall index combining these two. The index capturing the expenditure dimension of administrative efficiency – defined 'expenditure gap' – is calculated as the difference between a municipality's actual expenditure and its estimated standard expenditure need. It can be considered as an input-oriented index of administrative efficiency, as it captures the internal efficiency of a municipal government in managing the available resources. The index capturing the services provision dimension of administrative efficiency – defined 'output gap' – is calculated as the difference between a municipality's actual level of services provided and the estimated standard level of services it should provide to the local community. It can be considered as an output-oriented efficiency index, as it captures the effectiveness of a municipal government in providing public goods and services with respect to its needs. The two indexes are then converted to a 1-10 scale: a higher value of the expenditure administrative efficiency index denotes a lower efficiency of the municipality in managing the budget; by contrast, a higher value of the services provision administrative efficiency index denotes a higher efficiency of the municipality in providing public services to the local community.

SOSE calculates also an 'overall' municipality-level administrative efficiency index as the weighted average of expenditure administrative efficiency (with weight equal to 0.4) and services provision administrative efficiency (with weight equal to 0.6). Therefore, a municipality recording a value of five on the 1-10 scale of the 'overall' administrative efficiency index is in line with either

[11] Municipalities' standard expenditure needs are estimated by considering, among others, population and demographic characteristics, the level of services provided (e.g., assistance to children with handicaps), geographical features (e.g., earthquake risk, altitude), input prices (e.g., rental housing index), social hardships (e.g., number of families in absolute poverty), traffic and vehicles, tourism (e.g., number museum visitors), and the investments carried out over the past five years.

the services provided to the local community or the average expenditure with respect to other municipalities with similar characteristics.[12]

We capture municipalities' overall, expenditure, and services provision dimensions of administrative efficiency by relying on the available data referring to the year 2013.[13] In particular, we have considered the original indexes capturing overall administrative efficiency and services provision administrative efficiency as provided by SOSE. By contrast, and for the sake of interpretation, we have rescaled the expenditure administrative efficiency index in order to have a higher value of the index denoting a higher efficiency of the municipal government in managing the budget.

Overall, municipality-level administrative efficiency data referring to the year 2013 are available for 6,311 municipalities belonging to ordinary-statute NUTS-2 regions. By contrast, data are completely unavailable for municipalities belonging to special-statute NUTS-2 regions, namely Aosta Valley, Friuli-Venezia Giulia, Sardinia, Sicily, and Trentino-South Tyrol.

3.1.3. Estimation sample

Looking at our study region and given the abovementioned constrained on administrative efficiency data availability, we restrict our estimation sample to 2,093 municipalities, which represent 90.92% of the population of municipalities in the study region, and which are mapped in Figure 2.

[--- Figure 2 ---]

[12] See Brunello et al. (2015) for a detailed explanation of the methodology employed by SOSE.

[13] The Law No. 95 of 6 July 2012 – entitled *Disposizioni urgenti per la revisione della spesa pubblica con invarianza dei servizi ai cittadini* – increased from six to ten the number of functions managed by municipalities. However, the 2013 data we employ still refer to pre-2012 variations provided by the Law No. 95/2012. In particular, the administrative efficiency indexes calculated by SOSE for the year 2013 are based on the following functions of municipalities: (i) general administrative, management, and control functions (including tax office, technical office, civil registry office, and other general services); (ii) local police (including municipal and local administrative police); (iii) education (including school construction, and the organisation and management of school services); (iv) transport (including roads and local public transports); (v) land use and environmental functions (including land management and planning, environmental protection, and waste management); (vi) social care (including child care, and other social services excluding child care).

Overall, missing data refer to 48 Habsburg-ruled municipalities and 161 Savoy House-ruled municipalities. We lack administrative efficiency data for all Savoy House-ruled municipalities belonging to the special-statute NUTS-2 region of Aosta Valley, as well as for some municipalities belonging to the ordinary-statute NUTS-2 regions of Liguria (two out of 54 Savoy House-ruled municipalities), Lombardy (six out of 138 Savoy House-ruled, and 48 out 796 Habsburg-ruled municipalities), and Piedmont (79 out of 1,182 Savoy House-ruled municipalities).

Looking at the distribution of municipalities with respect to dominant States as defined at the beginning of the Succession Wars period 1701-1748, our estimation sample comprehends: 80 municipalities that belonged to the Duchy of Mantua (later ruled by the Habsburgs); 1,113 municipalities that belonged to the Duchy of Milan (723 of which later ruled by the Habsburgs, and the remaining 390 later ruled by the Savoy House); 132 municipalities that belonged to the Duchy of Montferrat (later ruled by the Savoy House); six municipalities that belonged to the Duchy of Parma and Piacenza (later ruled by the Savoy House); 16 municipalities that belonged to the *Gouvernement de Dauphiné* (later ruled by the Savoy House); 21 municipalities that belonged to the Principality of Masserano (later ruled by the Savoy House); and 725 municipalities that belonged to the Principality of Piedmont (later ruled by the Savoy House).

3.2. Empirical modelling

We test for current differences in local administrative efficiency between the municipalities that belonged to the Duchy of Milan under Habsburg domination and those ruled by the Savoy House by assessing discontinuities across the 1748 frontier established between the two territories with the Treaty of Aix-la-Chapelle. Formally, we specify the following spatial regression discontinuity (RD) equation:

$$Y_{mbrs} = \alpha + \beta T_{mbrs} + g(geographical\ location_m) + \boldsymbol{\gamma}_b + \boldsymbol{\delta}_r + \boldsymbol{\zeta}_s + \sum_{k=1}^{K} \theta_k X_{mbrs}^k + \varepsilon_{mbrs} \quad (1)$$

where Y_{mbrs} denotes the log-transformed dependent variable for administrative efficiency (either the overall, the expenditure, or the services provision measure) in the year 2013 referring to municipality m located along segment b of the frontier, within current NUTS-2 region r, and that belonged to independent State s in year 1700 – i.e., before the beginning of the Succession Wars period 1701-1748. The term α denotes a constant term. The term T_{mbrs} denotes the binary treatment variable that takes a value of one for municipalities that belonged to the Duchy of Milan (both Milanese and Mantuan territories) under Habsburg domination, and a value of zero for Savoy House-ruled municipalities, with β being the associated parameter of our interest.

The term $g(geographical\ location_m)$ denotes the one-dimensional RD polynomial controlling for smooth functions of geographical location. We first specify the RD polynomial as an interacted linear polynomial of the form $g(geographical\ location_m) = \pi D_{mf} + \rho(T_{mbrs} \times D_{mf})$, where D_{mf} denotes the forcing variable capturing the distance between the centroid of municipality m and the closest point on the frontier f (e.g., Grosfeld and Zhuravskaya, 2015; Gonzalez, 2021). We then test for alternative specifications of $g(geographical\ location_m)$ by relying on (interacted and non-interacted) quadratic and cubic one-dimensional RD polynomials (e.g., Becker et al., 2016; Oto-Peralías and Romero-Ávila, 2017; Oto-Peralías, 2020; Gonzalez, 2021), as well as on linear, quadratic, and cubic two-dimensional RD polynomials in latitude and longitude that use the absolute geo-location of a municipality as a forcing variable (e.g., Dell, 2010).

The right-hand side of Equation (1) includes also: (i) the vector $\boldsymbol{\gamma}_b$ consisting of six boundary segment fixed effects (FE) – with a municipality assigned to the boundary segment that is the closest one to its centroid – to ensure that we are comparing municipalities lying within the same segment of the frontier, and thus to control for heterogeneity along the frontier; (ii) the vector $\boldsymbol{\delta}_r$ of current NUTS-2 region FEs to control for unobservable factors common to all the municipalities belonging the same region, under the rationale that Italian NUTS-2 regions have some degree of autonomy in administrative and government functions attributed by the Italian Constitution; and (iii) the vector $\boldsymbol{\zeta}_s$

of pre-Spanish Succession War FEs to control for heterogeneity among municipalities that belonged to different dominant States in the year 1700 and, thus, that were subject to different administrative set-ups and institutional frameworks before the war period that ultimately ended with the establishment of the 1748 frontier.

We also include the vector X^{k}_{mbrs} of municipality-level control variables in Equation (1). This vector consists of three sets of variables. First, we consider a set of historical variables referring to the pre-1748 period, which includes: (i) a dummy variable capturing whether a municipality has been the seat of a bishop to control for the presence of first forms of political and institutional organisation and coordination (e.g., Guiso et al., 2016); (ii) a dummy variable capturing whether a municipality has been a *commune* (i.e., a free city-state) in the period 1000-1300 – representing the most relevant period for the communal movement in Northern-Central Italy (e.g., Wickham, 1981; Cardini and Montesano, 2006) – to control for the early presence of socio-economic and institutional forms of self-organisation of municipalities based on local participatory government through the direct involvement of private citizens in the administration of the city (e.g., Belloc et al., 2016; Guiso et al., 2016; Serafinelli and Tabellini, 2022); (iii) a dummy variable capturing whether a municipality has been granted the right to hold a market (i.e., a fair) by the State authority in the period 1196-1721 to control for early experiences of local economic activity formalisation (Cantoni and Yuchtman, 2014); (iv) a dummy variable capturing whether a municipality recorded a population of at least 10,000 inhabitants during the period 1300-1700 to control for the early presence of a large city (e.g., Bosker et al., 2013); and (v) a variable capturing the distance (in kilometres, log-transformed) between a municipality's centroid and the closest ancient Roman road, under the rationale that a closer proximity to ancient commercial routes could have favoured the growth of a city as a main trading, political, and administrative centre (e.g., Oto-Peralías and Romero-Ávila, 2017). Second, we account for first-order geographical and administrative differences among municipalities through the following variables: (i) altitude (log-transformed); (ii) terrain ruggedness (log-transformed); (iii) minimum distance to the sea coast (log-transformed); (iv) land area (in square kilometres, log-transformed); (v)

the distance between a municipality's centroid and the centroid of its own current NUTS-2 region capital city (log-transformed); and (vi) a dummy variable capturing whether a municipality is the capital city of its own current NUTS-3 region. Third, we consider a set of demographic and economic variables to account for current socio-economic differences among municipalities, namely: (i) a log-transformed variable capturing income per taxpayer in 2010 to control for average wealth; (ii) a log-transformed variable capturing population density (population per square kilometres) in 2011 to control for relative size; (iii) a variable capturing the share of foreign population to total population in 2011 to control for the 'cosmopolitan' nature of a municipality; (iv) a variable capturing the share of illiterate population to total population in 2011 to control for low-level development; (v) a variable capturing the share of tertiary-educated population to total population in 2011 to control for human capital endowment; (vi) a variable capturing unemployment rate in 2011 to control for conditions of the local labour market; and (vii) three variables capturing the share of primary (agriculture, fishery, forestry, and extraction), manufacturing, and services employment, respectively, to total employment in 2011 to control for the economic structure of a municipality.[14]

Finally, ε_{mbrs} denotes the error term. We estimate Equation (1) via Ordinary Least Squares (OLS), and correct standard errors for spatial dependence of unknown form *à la* Conley (1999). We estimate our spatial RD specification by selecting the bandwidth – i.e., the neighbourhood of municipalities around the frontier making up the estimation sample – in order to reconcile two conditions (Lee and Lemieux, 2010): first, the bandwidth has to be small enough to give us a sufficiently good fit to the forcing variable; second, it has to be large enough to include a sufficiently large number of municipalities for statistical power reasons. We choose a bandwidth of 30 km around the frontier – i.e., we select municipalities whose centroids fall within 30 km on either side of the frontier – as a baseline, and employ a distance cut-off value of 60 km beyond which we assume spatial

[14] Table A1 from Appendix A provides the definition and data source of the dependent variables and the control variables included in the vector X^k_{mbrs}. Appendix B Table B1 presents some descriptive statistics of the same variables for both the whole sample of municipalities, and the sub-sample of municipalities lying within 30 km on either side of the frontier. Tables B2 and B3 in Appendix B report the correlation matrix of the control variables included in the vector X^k_{mbrs} for the whole sample of municipalities and the sub-sample of municipalities lying within 30 km on either side of the frontier, respectively.

correlation to be zero.[15] Such a bandwidth provides us with a sample of 657 municipalities, 371 of which belonging to the treatment group (and all of them belonging to the Milanese territories of the Habsburg-ruled Duchy of Milan). The 30-km bandwidth sample includes municipalities belonging to the current NUTS-2 regions of Emilian Romagna, Lombardy, and Piedmont.[16] We then test our baseline specification using both alternative bandwidths, and alternative cut-off values for the spatial dependence structure.

3.3. Identification strategy

Our identification strategy relies on two assumptions, namely: (i) the exogeneity of the 1748 frontier between the Habsburg-ruled Duchy of Milan and the Savoy House's territories; and (ii) the absence of substantial differences in pre-1748 characteristics between the municipalities at the two sides of the frontier.

The first assumption concerns the strict exogeneity of the frontier. We are confident that the 1748 frontier is exogenous, it being the result of a period of wars, military occupations, and political treaties that started in 1701 with the Spanish Succession War, passed through the Polish Succession War during the 1730s, and finished with the signature of the Treaty of Aix-la-Chapelle in 1748 ending the Austrian Succession War (e.g., Pugliese, 1924; Guichonnet, 1950; Anceschi, 2021). Indeed, the Duchy of Milan was geographically much wider towards West and South-West at the outset of the Spanish Succession War compared to its 1748 extension and included several territories that were later annexed by the Savoy House. By contrast, the Savoy House was ruling a limited number of territories compared to its 1748 dominations, as several municipalities were under different dominant States in the first half of the 18th century – namely, the Duchy of Milan, the Duchy of Montferrat, the

[15] We consider a distance cut-off of 60 km around each municipality as sufficiently large given that municipalities lying within 30 km on either side of the frontier have, on average, a size of about 13.4 square kilometres.

[16] Figure C1 in Appendix C maps the estimation sample of municipalities lying within 30 km on either side of the frontier. Considering dominant States at the beginning of the Succession Wars period 1701-1748, the 30-km bandwidth estimation sample comprehends 371 treated municipalities that belonged to the Duchy of Milan, 266 control municipalities that belonged to the Duchy of Milan, six control municipalities that belonged to the Duchy of Parma and Piacenza, five control municipalities that belonged to the Principality of Masserano, and nine control municipalities that belonged to the Principality of Piedmont.

Duchy of Parma and Piacenza, the Principality of Masserano, and the *Gouvernement de Dauphiné*. First, the Spanish Succession War (1701-1714) caused a severe territorial dissolution of the Duchy of Milan in favour of the Savoy House. According to the Treaty of Turin (1703), the Savoy House – firstly allied with the French Crown against the Habsburg Monarchy – had promised the Duchy of Montferrat (that was an independent State), and the territories of Novara, Val d'Ossola, Valsesia, and Lomellina (that were part of the Duchy of Milan). At the end of war, the Treaty of Utrecht (1713) sanctioned the annexation of the Duchy of Montferrat, the Milanese cities (and relative countryside) of Valenza and Alessandria, and parts of the Milanese territories of Lomellina and Valsesia to the Savoy House, while the Habsburg Monarchy refused to give up for the other promised territories, that later underwent a period of severe turbulence and instability due to continuous military occupations by the Savoy House army. By contrast, with the Treaty of Rastatt (1714), the Habsburg Monarchy obtained the remaining part of the Duchy of Milan, as well as the Duchy of Mantua (that was previously an independent State). Second, the political geography of Northern Italy changed significantly during the Polish Succession War (1733-1738). The Duchy of Milan became an object of contest and a battleground also during the 1730s, as the Savoy House and French armies occupied the cities of Pavia, Vigevano, and Milan, and the territories of Novara and Val d'Ossola between 1733 and 1736, thus inducing 'institutional uncertainty' over these territories. The Polish Succession War ended with the signature of the Treaty of Vienna (1738), according to which the occupied Milanese territories of Novara, Tortona, Langhe, and Siccomario (in the Lomellina area) were officially annexed to the Savoy House, while the remaining part of the occupied territories of the Duchy of Milan was given back to the Habsburg Monarchy – which obtained also the Duchy of Parma and Piacenza from the Spanish Crown. Third, the final geo-political set-up characterising Northern Italy emerged only after the Austrian Succession War (1740-1748), that was characterised by a similar scenario of military and political instability. The cities of Pavia and Milan, as well as many other territories of the Duchy of Milan, were occupied in 1745, and this led the Austrian Empress Maria Theresa to establish a provisional government in Mantua in contraposition to that of Milan. With the

Treaty of Worms (1743), the Habsburg Monarchy lost the territories of Val d'Ossola and Oltrepò Pavese in favour of the Savoy House. Then, with the Treaty of Aix-la-Chapelle (1748), the Habsburg Monarchy lost also the territories of the former Duchy of Parma and Piacenza in favour of the Spanish Crown, and the Milanese territories of Vigevano and Bobbio in favour of the Savoy House. Therefore, it was not until the 1748 Treaty of Aix-la-Chapelle that the river Ticino became the frontier between the Habsburg-ruled Duchy of Milan and the Savoy House – a frontier later confirmed with the Treaty of Milan in 1751.[17]

In addition, the exogeneity of the 1748 frontier is further reinforced by the fact that the Habsburg Monarchy did not implement any type of administrative reform in the Milanese and Mantuan territories of the Duchy of Milan before December 1755, when the Maria Theresa of Austria began an Enlightenment-inspired reform process that substantially reshaped the administrative and institutional set-up of the Duchy of Milan from the central to the local (i.e., municipality) level. For all these reasons, we can reasonably expect the frontier exogeneity assumption to hold.[18]

The second identification assumption concerns the absence of deep differences between treated and control municipalities before the establishment of the 1748 frontier. We test empirically whether this assumption holds with respect to the set of historical control variables previously presented. Formally, we consider municipalities lying within 90 km, 60 km, and 30 km on either side of the frontier, and we regress each historical variable on the treatment dummy variable (T_{mbrs}) plus a constant term. Table 1 reports the results of this exercise, which clearly point to the absence of statistically significant differences between treated and control municipalities included in the 30-km bandwidth sample that we have chosen as a baseline. Differences are almost zero in magnitude in the case of historical institutional characteristics such as the presence of a bishop, the communal

[17] Appendix D Figures D1 to D7 present a series of (historical) maps depicting the political scenario of the study region between the year 1700 and the signature of the Treaty of Aix-la-Chapelle.

[18] We have also conducted a manipulation test to check for potential sorting around the cut-off of the distance-to-the 1748 frontier variable by relying on the robust bias-correction approach proposed by Calonico et al. (2018) and Cattaneo et al. (2018). We cannot reject the null hypothesis of no discontinuity of the density at the cut-off, as the test gives a *p*-value of 0.179 when considering the whole sample of municipalities, and a *p*-value of 0.342 when restricting the sample to those municipalities lying within 30 km on either side of the frontier. Therefore, we do not find statistical evidence of systematic manipulation of the running variable.

experience, and the right to hold a market. This evidence suggests that, on average, bandwidth municipalities lying on the two sides of the 1748 frontier entered the second half of the 18th century with very similar past local-level institutional experiences, such that we would expect differences in current administrative efficiency being the time-persistent result of the administrative and institutional reform process occurred after the 1748 Treaty of Aix-la-Chapelle.[19]

[--- Table 1 ---]

4. Empirical Results

According to the historical narrative previously presented in Section 2, we can reasonably hypothesise that the 1748 frontier between the Habsburg-ruled Duchy of Milan and the territories ruled by the Savoy House has created a long-lasting divide in terms of local-level administrative efficiency as a consequence of the administrative tradition that resulted from the Enlightenment-inspired administrative reform implemented by the Habsburg Monarchy in the Duchy of Milan, compared to the Savoy House's authoritarian and high-centralised administrative system. We test our hypothesis empirically by assessing whether differences in current administrative efficiency exist between the municipalities lying on the two sides of the 1748 frontier.

4.1. Preliminary evidence

We start our analysis by presenting some preliminary evidence. First, we have simplified Equation (1) by omitting the spatial RD polynomial, thus providing evidence from a purely border specification estimated via OLS on the 30-km bandwidth sample, and we have introduced the three sets of historical, geographical, and socio-economic control variables according to a stepwise procedure in

[19] Appendix E Table E1 reports the results of the test for cross-frontier differences concerning the sets of geographical, demographic, and economic control variables included in the vector X^{k}_{mbrs}. We have considered the sub-sample of municipalities lying within 30 km on either side of the frontier, and regressed each variable on the treatment dummy (T_{mbrs}) plus a constant term with standard errors corrected for spatial dependence with a cut-off value of 60 km. The results point to the absence of statistically significant differences in 10 out of 15 control variables. As we will show later in the paper, the inclusion of control variables does not affect the results.

order to assess the sensitivity of the results. Two insights emerge from Table 2. First, we find that municipalities ruled by the Habsburg Monarchy record higher overall administrative efficiency and, especially, higher efficiency in providing public goods and services compared to those ruled by the Savoy House. By contrast, we estimate statistically negligible coefficients in the case of expenditure administrative efficiency. Second, we find that our results are substantially robust to the inclusion of alternative sets of municipality-level control variables.[20]

[--- Table 2 ---]

Second, we have relied on a standard RD-type plot with observations sorted along the distance (in kilometres) to the frontier and expressed as local averages of each outcome variable by partitioning the distance to the frontier by 5-km bins. Figure 3 plots the non-parametric locally weighted relationship between each of the three variables for administrative efficiency and the distance to the 1748 frontier. We find a clear jump in both overall administrative efficiency and efficiency in providing public goods and services and detect a discontinuity that is larger for the latter than for the former variable. By contrast, there is no evidence of discontinuity at the frontier in the variable for expenditure administrative efficiency. This preliminary graphical evidence both confirm the results presented in Table 2 and suggests an administrative efficiency premium – especially related to public goods and services provision – for Habsburg-ruled municipalities compared to those ruled by the Savoy House. Furthermore, the three figures highlight how the relationship between the administrative efficiency variables and the distance to the 1748 frontier is well approximated by a

[20] We have tested the baseline border specification on the 30-km bandwidth sample by: (i) including only control variables that are statistically significant as for Appendix E Table E1(see Appendix F Table F1); (ii) excluding 9 municipalities in the Duchy of Milan – all belonging to the current NUTS-3 region of Como – that, despite lying within 30 km to the 1748 frontier, are not contiguous due to the shape of the Italian external border (see Appendix G Figure G1 and Table G1); and (iii) excluding the municipalities that belonged to the Principality of Masserano within the Savoy House's territories (Appendix G Table G2). The results of these exercises fully corroborate those presented in Table 2. We have also replicated the border estimation strategy by considering both the whole sample – i.e., without imposing any bandwidth – , and the whole sample but excluding those municipalities that belonged to the Principality of Masserano and/or the Duchy of Mantua. The results of these exercises are presented in Appendix G Tables G3 and G4, respectively, and confirm those reported in Table 2.

linear relationship within 30 km to the frontier, thus providing support to the baseline empirical strategy we have chosen – i.e., to consider a 30-km bandwidth sample and a linear one-dimensional RD polynomial.

[--- Figure 3 ---]

4.2. Main results

We now present the results of the semi-parametric spatial RD analysis aimed at identifying whether a discontinuous jump at the frontier in the dependent variables exist. Table 3 reports the results obtained by estimating Equation (1) on the 30-km bandwidth sample with the three sets of historical, geographical, and socio-economic control variables included according to a stepwise procedure.

The results confirm the preliminary evidence previously presented.[21] On the one hand, we do not find evidence of a statistically significant difference in expenditure administrative efficiency between the municipalities ruled by the Habsburg Monarchy and those ruled by the Savoy House. On the other hand, we find clear evidence of discontinuity in both overall administrative efficiency and efficiency in public goods and services provision, suggesting a long-lasting, time-persistent effect associated with the administrative set-up that has characterised the Duchy of Milan under Habsburg domination. In other words, this administrative efficiency premium seems to be the result of the Habsburg 'administrative tradition' based on a 'double' mechanism of governance, monitoring, and control: 'internal' through the *Convocato Generale degli Estimati*, and 'external' through the *Cancelliere Delegato del Censo*. Looking at Column (5), we estimate that a switch from the Savoy

[21] We confirm the results presented in Table 3 also by: (i) including only control variables that are statistically significant as for Appendix E Table E1 (see Appendix G Table G2); (ii) excluding the 9 non-contiguous treated municipalities belonging to the current NUTS-3 region of Como (see Appendix G Table G6); and (iii) excluding the municipalities that belonged to the Principality of Masserano within the Savoy House's territories (Appendix G Table G7).

House to the Habsburg Monarchy side of the frontier leads to a 28.39% increase in overall administrative efficiency, and to a 72.57% increase in services provision administrative efficiency.[22]

[--- Table 3 ---]

4.3. Robustness tests

In this sub-section, we present a series of exercises aimed at testing the robustness of the main results presented in Column (5) of Table 3.

First, we have tested for alternative operationalisations of the standard errors. The results of this exercise are reported in Table 4, where we present standard errors: (i) clustered at the municipality level in parentheses; (ii) corrected for spatial dependence with distance cut-off set at 30 km in brackets; (iii) corrected for spatial dependence with distance cut-off set at 120 km in braces; (iv) corrected for spatial dependence with distance cut-off set at 180 km in angle brackets; and (v) corrected for spatial dependence with distance cut-off set at 240 km in guillemets. The results presented in Column (5) of Table 3 are fully confirmed.

[--- Table 4 ---]

Second, we have tested for alternative specifications of the RD polynomial by considering: (i) non-interacted linear, quadratic, and cubic one-dimensional polynomials in distance to the frontier; (ii) interacted quadratic and cubic one-dimensional polynomials in distance to the frontier; and (iii)

[22] The magnitude of the impact of the treatment dummy variable (T_{mbrs}) is assessed according to the expression $100 \times \left[\left(e^{\beta}\right) - 1\right]$, where β denotes the parameter in Equation (1) capturing the discontinuous jump in the dependent variable at the frontier.

linear, quadratic, and cubic two-dimensional polynomials in latitude and longitude.[23] The results of these exercises are presented in Table 5, and fully confirm our main findings.

[--- Table 5 ---]

Third, we have tested for alternative bandwidths of 15 km, 60 km, and 90 km on either side of the frontier.[24] As shown in Table 6, our main results are confirmed also in this case.[25]

[--- Table 6 ---]

Fourth, we have replicated the spatial RD analysis by including in the control group only those municipalities that were part of the Duchy of Milan in 1700, i.e., before the Succession Wars period that lasted between 1701 and 1748.[26] The rationale of this exercise is to compare treated and control municipalities characterised by the same pre-1748 institutional set-up. The results of this exercise are reported in Table 7, and fully confirm our main findings.

[--- Table 7 ---]

Fifth, we have restricted the estimation sample to only those municipalities belonging to the current NUTS-2 region of Lombardy – see Appendix G Figure G4. This exercise allows us to rule

[23] The non-interacted linear, quadratic, and cubic one-dimensional polynomials in distance to the frontier take the form $g(\cdot) = \sum_{h=1}^{H} \pi_h D_{mf}^h$. The interacted quadratic and cubic one-dimensional polynomials in distance to the frontier take the form $g(\cdot) = \sum_{h=1}^{H} \pi_h D_{mf}^h + \rho_h \left(T_{mbrs} \times D_{mf}^h\right)$. Let x_m and y_m denote the latitude and longitude, respectively, of municipality m; then, we have specified the two-dimensional RD polynomial as: (i) a linear function of the form $g(\cdot) = x_m + y_m$; (ii) a quadratic function of the form $g(\cdot) = x_m + y_m + x_m^2 + y_m^2 + x_m y_m$; and (iii) a cubic function of the form $g(\cdot) = x_m + y_m + x_m^2 + y_m^2 + x_m y_m + x_m^3 + y_m^3 + x_m^2 y_m + x_m y_m^2$.

[24] Appendix G Figure G2 maps the estimation sample municipalities grouped by distance band (0 to 15 km, 15 to 30 km, 30 to 60 km, and 60 to 90 km) within 90 km on either side of the frontier.

[25] The results presented in Table 6 obtained using 60-km and 90-km bandwidth samples are confirmed also when excluding the municipalities that belonged to the Principality of Masserano and/or the Duchy of Mantua from the estimation sample (see Appendix G Table G8).

[26] Appendix G Figure G3 maps this reduced estimation sample.

out any potential confounding effect related to the fact the part of the 1748 frontier coincides with the current border between the NUTS-2 regions of Lombardy and Piedmont – despite we control for NUTS-2 region FEs in all our specifications. In this exercise, we still consider a 30-km bandwidth sample, while controlling for NUTS-3 rather than NUTS-2 region FEs. The results of this exercise are reported in Table 8, and fully confirm our main findings.

[--- Table 8 ---]

Sixth, we have restricted the analysis to the sub-sample of municipalities bordering the 1748 frontier and have thus estimated a simple border specification – i.e., we have omitted the spatial RD polynomial from Equation (1) – via OLS. First, we have considered all border (i.e., 43 treated and 31 control) municipalities; second, we have excluded 5 treated municipalities – all belonging to the current Lombardy NUTS-3 region of Varese – that do not have an adjacent municipality on the other side of the 1748 frontier.[27] The results, as shown in Table 9, corroborate our spatial RD analysis.

[--- Table 9 ---]

We have carried out a series of additional robustness exercises, whose results are presented in the Appendix. First, we have tested the robustness of the baseline RD specification by: (i) replacing NUTS-2 with NUTS-3 region FEs, as NUTS-3 regions have attributed some – despite very limited – degree of administrative autonomy in exerting institutional functions on their municipalities of competence; (ii) excluding NUTS-3 capital city municipalities from the sample, them being relatively large municipalities where NUTS-3 level institutional bodies usually have their seat; (iii) adding a log-transformed variable capturing the distance between a municipality's centroid and the centroid of the own NUTS-3 region capital city; and (iv) adding a log-transformed variable capturing the distance

[27] Appendix G Figure G5 reports the maps of these two estimation samples.

between a municipality's centroid and the centroid of the municipality of Milan, it being the most important municipality lying within 30 km on either side of the frontier. The results of these exercises are reported in Appendix H Table H1, and fully confirm the main ones. Second, we have tested the robustness of the baseline RD specification without applying any log-transformation to both the dependent and explanatory variables. The results of this exercise are presented in Appendix H Table H2, and fully confirm the main ones. Finally, we have winsorized the three dependent variables at 1% and 99%, 5% and 95%, and 10% and 90%. The results of these exercises are presented in Appendix H Table H3, and fully confirm the main ones.

4.4. Placebo analysis

We present here five placebo exercises aimed at ensuring that our results are not driven by some unobserved spatial pattern.

First, we have considered the frontier of the Duchy of Milan in the year 1700, i.e., before the Succession Wars period 1701-1748. We have identified as placebo-treated those municipalities in the 'true' control group but that belonged to the Duchy of Milan in 1700, and lying within 30 km East to the 1700 frontier; by contrast, the placebo-control group includes those municipalities that in 1700 belonged to the Duchy of Montferrat, the Duchy of Parma and Piacenza, the Principality of Masserano, and the Principality of Piedmont, and lying within 30 km West to the 1700 frontier of the Duchy of Milan. The results of this exercise are presented in Table 10 and highlight the absence of statistically significant differences between placebo-treated and placebo-control municipalities.

[--- Table 10 ---]

Second, we have moved the 1748 frontier by 5 km towards East and West, respectively, in order to assess the sensitivity of the results to a slight shift of the frontier. Third, we have moved the 1748 frontier by 40 km towards East: in this case, we have identified as placebo-treated those municipalities

belonging to the 'true' treatment group and lying within 30 km East to the placebo frontier; by contrast, the placebo-control group includes those municipalities belonging to the 'true' treatment group and lying within 30 km West to the placebo frontier. Therefore, we have compared municipalities all belonging to the Duchy of Milan under Habsburg domination. Fourth, we have moved the 1748 frontier 40 km towards West: in this case, we have identified as placebo-treated those municipalities belonging to the 'true' control group and lying within 30 km East to the placebo frontier; by contrast, the placebo-control group includes those municipalities belonging to the 'true' control group and lying within 30 km West to the placebo frontier. Therefore, we have compared municipalities all ruled by the Savoy House after the 1748 Treaty of Aix-la-Chapelle.

The results of these three placebo exercises are reported in Table 11, and clearly show that none of the placebo frontiers leads to statistically significant differences between municipalities located on either side of each frontier, meaning that the effect of the treatment is observable only at the 1748 frontier between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. This corroborates our results and, specifically, the fact that current differences in administrative efficiency are ascribable to differences in the administrative set-ups that emerged in the period 1748-1796.

[--- Table 11 ---]

As a final placebo exercise, we have replicated our main analysis on 1,000 randomly drawn placebo frontiers in order to assess the magnitude of the estimated effect associated with the 1748 frontier. We have defined the study region for this exercise in order to draw the placebo frontiers in the geographical space 43° to 47° in latitude and 7.5° to 10° in longitude. The rationale for this choice relies on two considerations: first, the 1748 frontier follows a North-South orientation, such that we have to draw the sequence of placebo frontiers along the East-West dimension; second, the municipalities in our sample lie in the geographical space 43.82° to 46.24° in latitude and 6.73° to 11.36° in longitude, such that we have chosen to draw placebo frontiers in the range 7.5° to 10° in

longitude in order to have a sufficiently large number of municipalities lying on both sides of each placebo frontier. Following the same approach adopted by Oto-Peralías and Romero-Ávila (2017) and Oto-Peralías (2020), we have generated a longitude coordinate according to a random walk process for each centesimal fraction of a latitude degree, and we have then identified as placebo-treated (placebo-control) those municipalities whose centroids fall to the West (East) of each drawn placebo frontier.[28] We have then estimated Equation (1) by choosing a 30 km bandwidth around each placebo frontier as in our baseline RD specification, and by relying on interacted linear, quadratic, and cubic one-dimensional RD polynomials.

The results of this exercise are presented in Figure 4, which plots the cumulative distribution of the coefficients obtained from the estimation of Equation (1) on the 1,000 randomly drawn placebo frontiers with respect to the three dependent variables for administrative efficiency, and considering three alternative functional forms of the one-dimensional RD polynomial. We find that the 'true' estimated effect associated with the 1748 frontier is larger (in absolute value) than the 90% of the placebo effects in 8 out of 9 simulations – the only exception refers to the variable for expenditure administrative efficiency in the case of the interacted linear RD polynomial, with respect to which the 'true' estimated coefficient is systematically negligible from a statistical point of view. Overall, this exercise further corroborates our previous evidence of the long-lasting, time-persistent effect ascribable to the Enlightenment-inspired administrative reform implemented by the Habsburg Monarchy in the Duchy of Milan compared to the Savoy House's authoritarian and high-centralised administrative system.

[--- Figure 4 ---]

[28] A detailed explanation of the procedure we have followed to perform this exercise can be found in Oto-Peralías and Romero-Ávila (2017, Appendix L, pp. 37-39).

5. Heterogeneity analysis

We now provide additional evidence by investigating potential sources of heterogeneity. First, we study municipality-level heterogeneity within the Habsburg-ruled Duchy of Milan by focusing on administrative autonomy granted by the Habsburg Monarchy through *ad hoc* edicts beyond the 1755 general administrative system. Second, we investigate heterogeneity related to the time of implementation of the Habsburg administrative reform: indeed, the reform was implemented in 1755 in the Milanese territories of the Duchy of Milan, while it was extended to the Mantuan territories in 1784. Finally, we exploit historical information on feudalism to investigate differences in pre-1755 local institutional set-ups and evaluate potential constraints to the long-term effects of the 1755 Habsburg administrative reform.

5.1. Special status municipalities in the Habsburg-ruled Duchy of Milan

We start our heterogeneity analysis by disentangling the treatment group according to whether municipalities were granted a 'special status' by law beyond the 1755 general administrative system. In fact, as discussed previously in sub-Section 2.2, the Habsburgs promulgated a series of specific edicts between January 1756 and February 1758 providing the targeted municipalities with additional

autonomy in terms of local administrative regulation. Looking at our sample, we can identify twenty edicts granting municipalities a 'special status' from an administrative point of view.[29]

We have thus tested whether treated municipalities that were granted a 'special status' by law through *ad hoc* edicts experience a larger premium in terms of current administrative efficiency than those purely subject to the 1755 general administrative system, compared to municipalities ruled by the Savoy House. To this aim, we have modified Equation (1) by replacing the treatment dummy variable with a categorical variable taking a value of zero for control municipalities, a value of one for treated municipalities subject to the general administrative system, and a value of two for 'special status' treated municipalities. First, we have relied on a simple OLS border specification estimated on the whole sample of municipalities. Second, we have replicated the same exercise but excluding the Habsburg-ruled municipalities of the former Duchy of Mantua from the treatment group, as the 1755 general administrative system was extended to the Mantuan territories only in 1784. Third, we have relied on a semi-parametric spatial RD approach using an interacted linear polynomial in

[29] The twenty edicts referred to the municipalities of Soncino (Edict of 9 January 1756), Casalmaggiore (Edict of 2 June 1756), Busto Arsizio (Edict of 23 June 1757), Monza (Edict of 30 July 1757), Varese (Edict of 19 August 1757), Codogno (Edict of 19 August 1757), Gravedona (Edict of 11 November 1757), Gallarate (Edict of 14 December 1757), Abbiategrasso (Edict of 16 December 1757), Borghetto Lodigiano (Edict of 19 December 1757), Pizzighettone (Edict of 20 December 1757), Castiglione d'Adda (Edict of 30 December 1757), Canzo (Edict of 30 December 1757), Casalpusterlengo (Edict of 21 January 1758), Maleo (Edict of 21 January 1758), Treviglio (Edict of 21 January 1758), San Colombano al Lambro (Edict of 4 February 1758), Castelleone (Edict of 15 February 1758), and Soresina (Edict of 22 February 1758), plus the 14 municipalities that were part of the Valsassina Valley (Edict of 16 September 1757). As for example, the municipality of San Colombano was granted the right to maintain the pre-1755 local administrative set-up according to which the municipal decisional body was composed by only 24 *Estimati*. Due to the very large number of *Estimati*, the 1757 *ad hoc* Edict regulating Busto Arsizio provided that decisional and administrative functions as for the 1755 general reform had to be exerted by a restricted municipal council composed by only 32 *Estimati* elected by the *Convocato*, plus two deputies representing citizens subject to the personal tax and the mercantile tax, respectively. Council members where in charge for four years, and every year the *Convocato* had to replace only eight of them. Moreover, as provided for the pre-1755 local statute, the community was entitled to elect two mayors and two consuls rather than one as for the 1755 general reform. The 1758 *ad hoc* Edict regulating Soresina provided that all decisional functions were exerted by a municipal council composed by 24 *Estimati* who were effectively residing in the municipality, and who owed at least 300 *scudi d'estimo*. Council members were elected for a six-year period by the *Convocato*, which was composed only by the first 40 *Estimati*. In addition, the 1758 Edict granted the municipality the right to elect two mayors, rather than one, due to its very large territorial extension. A relatively different framework was defined by the 1757 *ad hoc* Edict regulating Pizzighettone, where decisional functions were attributed to a restricted council composed by 18 *Estimati* elected for life by the *Convocato*, plus two deputies representing citizens subject to the personal tax and the mercantile tax, respectively. The council had to elect three deputies representing the *Estimati*, who were in change of daily administrative activities. A final interesting example concerns the 1757 *ad hoc* Edict regulating the Valsassina Valley (including the municipalities of Casargo, Cassina Valsassina, Cortenova, Crandola Valsassina, Cremeno, Margno, Moggio, Pagnona, Parlasco, Pasturo, Premana, Primaluna, Taceno, and Vendrogno), which provided for the establishment of a cross-municipality institute (a *società*) in charge of administering and providing services for the mutual and common needs of the whole Valley. All the edicts can be accessed at "https://www.lombardiabeniculturali.it/leggi/editti-1760/".

distance to the frontier and focusing on those municipalities lying within 30 km on either side of the frontier.

The results of these exercises are reported in Table 12, and clearly suggest a premium in terms of both overall administrative efficiency and services provision administrative efficiency that is higher in magnitude for 'special status' treated municipalities than for treated municipalities purely subject to the general Habsburg administrative system, compared to the Savoy House's municipalities. This result is not surprising since the granting of a 'special status' implied that these municipalities experienced a more intense tradition of administrative 'autonomy' that resulted in a stronger attention for the needs of the local populations.

[--- Table 12 ---]

5.2. Heterogeneity between Milanese and Mantuan Habsburg-ruled municipalities

The results presented in Table 12 may lead one to wonder whether higher current administrative efficiency in the Habsburg-ruled Duchy of Milan is the result of a limited number of 'special status' municipalities, rather than of the general administrative set-up based on the *Convocato* institute, as well as whether the time lag in the implementation of the general administrative system – established in the Milanese territories in December 1755, while in the Mantuan territories only in November 1784 – could have developed a deeper Habsburg administrative tradition in the Milanese municipalities of the Duchy of Milan compared to the Mantuan ones.

To assess whether this is the case, we have carried out three exercises by restricting our attention to the treatment group. First, we have simply compared Milanese versus Mantuan municipalities within the Habsburg-ruled Duchy of Milan. We have thus estimated a modified version of Equation (1) via OLS on the sub-sample of municipalities belonging to the Duchy of Milan under Habsburg domination and have replaced the treatment variable with a dummy variable taking a value of zero for Mantuan municipalities, and a value of one for Milanese municipalities. Second, we have tested

for potential differences between Milanese municipalities purely subject to the 1755 general administrative system and 'special status' Milanese municipalities compared to Mantuan municipalities. In this case, we have considered a categorical variable taking a value of zero for Mantuan municipalities, a value of one for Milanese municipalities purely subject to the 1755 general administrative system, and a value of two for 'special status' Milanese municipalities. Finally, we have tested for potential differences in current administrative efficiency between Milanese municipalities purely subject to the 1755 general administrative system and 'special status' Milanese municipalities through a dummy variable taking a value of zero for the former type of municipality, and a value of one for the latter type.

As shown in Table 13, we systematically find absence of statistically significant differences in current administrative efficiency among the three types of Habsburg-ruled municipalities. This result provides further support for our general hypothesis: i.e., that the Habsburg administrative system based on the *Convocato* institute – as a more democratic form of local government allowing for a generalised participation of the local community to the municipality's decisional and administrative activities – has represented a structural innovation with long-lasting, time-persistent effects in terms of local administrative efficiency. In other words, municipalities that were ruled by the Habsburg Monarchy in the second half of the 18th century keep traces of the high-valued Habsburg administrative tradition.

[--- Table 13 ---]

5.3. Feudalism as a constraint to the transmission of administrative values

In this sub-Section we focus on pre-1755 institutional heterogeneity by assessing the role that the feudal system could have played as a constraint on the full transmission to – and 'assimilation' by – local institutions of the administrative values of community welfare and attention for the public good that characterised the local administrative system envisaged by the 1755 Habsburg reform.

The feudal system was severely curtailed by the 1755 Habsburg reform – and, subsequently, completely abolished by Napoleon with the arrival of the French armies in Italy. Indeed, one of the goals of the 1755 Habsburg administrative reform was to downsize the role, functions, and powers of the aristocracy and, thus, of the feudal system (Capra, 1987). Generally, the local government and administration of a feudal municipality – i.e., a municipality acquired by a Feudal Lord at the *Regia Camera* of Milan – was carried out by the *Cancelliere*, a man appointed by the Feudal Lord. Under feudalism, the local government of a municipality was in the hands of the Feudal Lord and her delegates, thus resulting in a strong oligarchic structure. In this sense, feudalism could have represented a 'constraint' on the diffusion among local bureaucrats of the culture of the '*pubblico bene*' – so much emphasised by the Habsburgs – and, thus, on a relatively greater attention to the provision of local public goods. It is thus likely that this pre-existing 'administrative culture' significantly weakened and attenuated the effectiveness of the long-term transmission of the Habsburg administrative tradition.

To test empirically whether the feudal system could have represented such a constraint for the long-term persistent transmission of the Habsburg administrative tradition, we collected data on whether a municipality was subject to a Feudal Lord before the implementation of the 1755 reform. We have digitalised information drawn from the 1751 census carried out by the Habsburg Monarchy in the Milanese territories of the Duchy of Milan and complemented it with further information on Lombardy municipalities belonging to the current NUTS-3 region of Pavia that were annexed by the Savoy House during the Succession Wars period 1701-1748. This information has been collected from the historical archives maintained by the Lombardy region, which preserves historical documents – including copies of the 1751 Habsburg census – useful to reconstruct the institutional development process of Lombardy municipalities.[30] Overall, we have been able to precisely identify whether a municipality was subject to a Feudal Lord for 664 out of 723 Habsburg Milanese municipalities included in our sample, and for 123 out of 132 Savoy House-ruled municipalities

[30] Summaries of municipality-level institutional information concerning the 18th century can be accessed at "https://www.lombardiabeniculturali.it/istituzioni/materiali/".

belonging to the current Lombardy NUTS-3 region of Pavia. We have thus constructed a dummy variable (*Feudo*) taking a value of one for municipalities that were subject to a Feudal Lord, and a value of zero otherwise.

As a preliminary exercise, we have assessed whether a correlation exists between the feudal status of a municipality and the salary paid to the *Cancelliere* as a proxy for the Feudal Lord's institutional power and the influence she could exert on the decision-making and administrative processes of the local community. To this aim, we have digitalised 1751 census data on the salary paid to the *Cancelliere* by a municipality and its resident population – despite such information is available only for 154 Milanese municipalities of the Duchy of Milan –, and estimated via OLS whether the feudal status of a municipality was associated with a higher salary per capita. As shown in Table 14, we find that this was indeed the case. This result suggests that the Feudal Lord was able to exert her personal influence on the decision-making and administrative processes of the local community through monetary incentives paid to the *Cancelliere*.

[--- Table 14 ---]

We now compare the municipalities ruled by the Savoy House with those ruled by the Habsburg Monarchy by exploring feudal status heterogeneity among Milanese municipalities in order to assess whether feudalism has represented a constraint to the long-term transmission of the Habsburg administrative tradition for treated municipalities. To this aim, we have modified Equation (1) by replacing the treatment dummy variable with a categorical variable taking a value of zero for control municipalities, a value of one for treated Milanese municipalities that were not subject to a Feudal Lord, and a value of two for treated Milanese municipalities that were subject to a Feudal Lord in the pre-1755 period. We have relied on a semi-parametric spatial RD approach using an interacted linear polynomial in distance to the frontier and have focused on those municipalities lying within 30 km on either side of the frontier.

The results of this exercise are reported in Table 15. First, we confirm a premium for treated municipalities in terms of both overall and services provision current administrative efficiency, while there is no evidence of statistically significant differences between municipalities on the two sides of the 1748 frontier in terms of current expenditure administrative efficiency. Second, we find a relatively larger premium for Milanese municipalities that were not subject to a Feudal Lord with respect to those that, instead, were subject to her, compared to Savoy House-ruled municipalities. This last result confirms the previous narrative: feudalism has represented a constraint for the diffusion and 'assimilation' of community welfare values envisaged by the 1755 reform, thus lowering the long-term transmission of the Habsburg administrative tradition.

[--- Table 15 ---]

As a final exercise, we complement the previous analysis by focusing on the sample of current Lombardy municipalities to exploit information on feudalism on either side of the frontier. In other words, we compare treated Milanese municipalities with control municipalities belonging to the current Lombardy NUTS-3 region of Pavia that were ruled by the Savoy House. To this aim, we have modified Equation (1) by including the dummy variable capturing whether a municipality was subject to a Feudal Lord (*Feudo*), plus an interaction term between the treatment and the feudalism dummy variables.

The results of this exercise – based on a semi-parametric spatial RD approach estimated on a 30-km bandwidth sample – are reported in Table 16. First, the results confirm that only overall and services provision administrative efficiency keep traces of the Habsburg reform – by contrast, we do not estimate a statistically significant coefficient in the case of expenditure administrative efficiency. Second, we confirm the results of the heterogeneity analysis presented in Table 15: indeed, we estimate negative coefficients of the interaction term between the treatment and the feudalism dummy variables in the case of both overall and services provision administrative efficiency. This suggests

that any current administrative efficiency premium associated with the 1755 Habsburg reform is constrained by the pre-1755 presence of the feudal system. On the one hand, we estimate a marginal effect of 0.758 for treated municipalities that were not subject to a Feudal Lord, and a marginal effect of 0.469 for treated municipalities that were subject to a Feudal Lord, compared to the control municipalities in the case of overall administrative efficiency. On the other hand, we estimate a marginal effect of 0.718 for treated municipalities that were not subject to a Feudal Lord, and a marginal effect of 0.458 for treated municipalities that were subject to a Feudal Lord, compared to the control municipalities in the case of services provision administrative efficiency.

[--- Table 16 ---]

6. Evidence on public goods provision

Our empirical analysis suggests that Habsburg-ruled municipalities have higher current administrative efficiency compared to Savoy House-ruled municipalities, and that such premium is especially driven by a relatively higher efficiency in providing public goods and services. Moving from this general result, we now provide further evidence focusing on public goods provision, and consider this dimension with respect to three different historical periods. First, we look at the second half of the 18th century – i.e., when the Habsburg administrative reform took place –, and provide more suggestive evidence on the role of public culture in the Enlightenment age as a moderating force in the long-run relationship between the Habsburg administrative reform and current administrative efficiency. Second, we exploit information on municipalities' expenses for public goods provision in the mid-1880s, i.e., about two decades after the beginning of the Italian unification process that led to the homogenisation of the administrative and institutional set-ups in the Habsburg- and Savoy House-ruled territories. Finally, we consider the case of nurseries as an example of municipality-provided public good and assess differences in authorised nursery places in the year 2013 between Habsburg- and Savoy House-ruled municipalities.

6.1. The role of public culture in the Enlightenment age

In this sub-Section, we focus on the Enlightenment cultural atmosphere that inspired the Habsburg Monarchy reformism in the second half of the 18th century, and provide a more suggestive, correlation-based analysis by considering the potential moderating role of public culture in the long-run relationship between the 1755 Habsburg administrative reform and current administrative efficiency.

We consider access to public culture as a public good, and proxy it through the opening of public-use libraries in the period 1748-1796. The rationale relies on the idea that culture represents a public good, and the opening of public-use libraries could have facilitated the spread of Enlightenment ideas and values among citizens and, consequently, could have promoted a shared vision of community interests – the '*pubblico bene*' (Mozzarelli, 1975) – by the bureaucratic apparatus and the civil society.

We have collected municipality-level information on existing libraries, their year of foundation, and whether they were of public use from the paper-based source *Statistica del Regno d'Italia. Biblioteche. Anno 1863* published in 1865 by the Italian Ministry of Public Education. Looking at our sample, we have identified public-use libraries opened in the period 1748-1796 in three treated municipalities (Cremona, Milano, and Pavia) and in two control municipalities (Alessandria and Fossano). We have thus constructed a dummy variable – capturing public culture as a public good – that takes a value of one for municipalities where a public-use library was opened in the period 1748-1796, and a value of zero otherwise. Drawing from the same source, we have also gathered information on public- and private-use libraries already existing in 1748: in this case, we have identified libraries in three treated municipalities (Como, Lodi, and Milano) and in six control municipalities (Casale Monferrato, Torino, Varallo, Ventimiglia, Vercelli, and Vernante).

We have collected information also on citizens' private access to culture. Specifically, we have considered a synthetic proxy measure of citizens' private exposure to the Enlightenment based on five dimensions, namely: (i) international book purchases from the *Société Typographique de*

Neuchâtel (STN); (ii) international postal correspondence with the STN; (iii) subscriptions to the *quarto* of the French *Encyclopédie*; (iv) subscriptions to the Venetian *Giornale Enciclopedico*; and (v) foundations of private-use libraries in the period 1748-1796. First, we have relied on the *French Book Trade in Enlightenment Europe* (FBTEE) database (Burrows, 2018; Curran, 2018) to gather information on international book purchases. The FBTEE database provides data on international book trading by the Swiss publishing house STN during its period of activity from 1769 to 1794.[31] The FBTEE database is built on STN's archives, and represents a unique and almost exhaustive source of information on European book trade in the Enlightenment period given that the STN operated as an international supplier selling both own edited works and works edited by other publishers, including clandestine copies of illegal and pirate editions banned in several States. Looking at our sample, the FBTEE database records book purchases from four treated municipalities (Cremona, Milano, Olginate, and Pavia) and only from the municipality of Turin in the control group. Second, we have collected data on international postal correspondence with the STN during its period of activity from Pasta (1997, pp. 228-229), who identifies the cities from which letters to the STN have been sent in the period 1769-1794. Looking at our sample, we have identified letters sent to the STN from four treated municipalities (Como, Cremona, Milano, and Pavia) and only from the municipality of Turin in the control group. Third, we have collected data on subscriptions to the *quarto* of the French *Encyclopédie* in circa 1780 provided by Darnton (1979, pp. 586-593), and have identified subscriptions in two treated municipalities (Mantua and Milan) and only in the municipality of Turin in the control group. Fourth, we have included data on subscriptions to the *Giornale Enciclopedico*, a monthly journal reporting on literary and scientific innovations in Enlightenment Europe that was published in the Republic of Venice between 1774 and 1782 (Di Maro, 2021). We have checked all the published issues of the *Giornale Enciclopedico*, and we have identified subscriptions in five treated municipalities (Como, Cremona, Mantua, Milan, and Pavia) and in two

[31] The FBTEE database can be accessed at "http://fbtee.uws.edu.au/stn/".

control municipalities (Turin and Vercelli).[32] Finally, we have used information on private-use libraries from the *Statistica del Regno d'Italia. Biblioteche. Anno 1863*, and we have identified private-use libraries opened in the period 1748-1796 only in the municipality of Turin in the control group. We have then constructed a dummy variable taking a value of one for municipalities recording a strictly positive value on at least one of the five proxies for citizens' 'private exposure' to the Enlightenment culture, and a value of zero otherwise.

We have thus augmented Equation (1) by including the dummy variable for public-use libraries opened in the period 1748-1796 as a proxy for public goods provision and interacting it with the treatment variable to assess whether public access to culture plays an amplifying effect on the long-run positive relationship between Habsburg reformism and current local administrative efficiency. We have augmented Equation (1) by including also the dummy variable for libraries already existing in 1748, and the dummy variable capturing citizens' 'private exposure' to the Enlightenment in the period 1748-1796. We have then estimated this augmented version of Equation (1) via OLS on the whole sample of 2,093 municipalities.

The results of this exercise are reported in Table 17. The coefficient of the interaction term capturing the moderating role of public culture as a proxy for public good is positive with respect to all the three dependent variables capturing current administrative efficiency, but it is statistically significant only when considering the dependent variables for overall administrative efficiency and efficiency in public goods and services provision. On the one hand, we estimate a marginal effect of 0.280 for treated municipalities where no public-use library was opened in the period 1748-1796, and a marginal effect of 0.777 for treated municipalities where a public-use library was opened in the same period, compared to the control municipalities in the case of current overall administrative efficiency. On the other hand, we estimate a marginal effect of 0.599 for treated municipalities where no public-use library was opened, and a marginal effect of 1.390 for treated municipalities where a

[32] All issues of the *Giornale Enciclopedico* report the list of municipalities where the journal was sold via subscription. We have collected these data via inspection of microfilm digitalised copies of the *Gironale Enciclopedico*.

public-use library was opened, compared to the control municipalities in the case of current services provision administrative efficiency.

[--- Table 17 ---]

6.2. Local public goods provision in the aftermath of the Italian unification

We now provide evidence on the mid-term effects of the Habsburg administrative reform by considering municipalities' expenditure for public goods and services provision in the mid-1880s. We analyse municipality-level differences in discretionary expenditure in 1884, i.e., 25 years after the beginning of Italian unification process – led by Victor Emmanuel II of Savoy – that homogenised the administrative and institutional set-ups of the territories previously ruled by the Habsburg Monarchy and the Savoy House. This homogenisation process took place, first, through the extension of Savoy's Rattazzi Law (Law No. 3702 of 23 October 1859) to the territories of the Habsburg-ruled Duchy of Milan that were annexed in 1859; second, through the enforcement of the 1865 *Legge per l'unificazione amministrativa del Regno d'Italia* (Law No. 2248 of 20 March 1865), which extended and homogenised the bulk of norms provided for by the 1859 Rattazzi Law throughout the entire new-born Kingdom of Italy.

Specifically, Title II of the Rattazzi Law – entitled *Dell'amministrazione comunale* – defined for each municipality its administrative and governing bodies (the council and the mayor), their composition, the rules for their election, and the principles of municipal administration and accounting. It also split municipal expenses into two categories of 'compulsory' and 'discretionary' expenses. Compulsory expenses assigned to municipalities included: (i) the payment of salaries to municipal employees; (ii) primary education; (iii) the maintenance of municipal roads and public squares; (iv) the collection of municipal taxes; (v) the preservation of municipal properties; and (vi) the management of cemeteries. Discretionary expenses were grouped into eight categories concerning: (i) public administration (e.g., the payment of an allowance to the mayor, the payment of

subsidies to civil servants, their widows, and their orphans); (ii) local police and hygiene (e.g., public healthcare, public lighting, expenses for the slaughterhouse and dog-catching); (iii) public security and justice (e.g., payment and accommodation for firefighters); (iv) public infrastructures (e.g., beautification of streets and squares, maintenance of gardens, construction of canals and aqueducts, construction of harbours on lakes and rivers, construction of slaughterhouses, construction and maintenance of markets, construction of barracks); (v) public education (e.g., kindergartens, evening and festive schools for adults, schools for blind and deaf-mute people, industrial schools, commercial schools, vocational schools, elementary schools beyond the number prescribed by law, expenditure on museums and libraries, expenditure on classical and technical secondary education); (vi) worship; (vii) charity (e.g., orphanages, nursing homes, funeral transport and coffins for the poor); and (viii) other miscellaneous expenses (e.g., the purchase of instruments for the town band, theatre endowments, magazine and newspaper subscriptions).

We exploit the distinction between 'compulsory' and 'discretionary' expenses provided for by law and consider discretionary expenses as a proxy for a municipality's attention to local community needs. Indeed, we can reasonably hypothesise that municipalities that were spending relatively more in discretionary expense categories were relatively more inclined to provide public goods and services to citizens.

To test whether this is the case, we have relied on municipality-level balance sheet data referring to the year 1884 – i.e., the first available year for which municipality-level information on revenues and expenditure is available – drawn from the paper-based source *Bilanci Comunali per l'Anno 1884* published in 1887 by the Italian Ministry for Agriculture, Industry and Trade. This source provides aggregate information on total revenues, while more disaggregated information on the expenditure side. Indeed, expenditure figures are split according to their compulsory or discretionary nature, as well as with respect to three main aggregate categories, namely: (i) public education; (ii) public infrastructures; and (iii) other expenditures (including the categories of public administration, local police and hygiene, public security and justice, worship, charity, and other miscellaneous expenses).

Moreover, this source provides municipality-level population figures for the year 1881. Overall, we have been able to collect 1884 balance-sheet data and 1881 population figures for 1,987 of the 2,093 municipalities that make up our sample.

We have constructed three dependent variables to proxy for a municipality's inclination to provide public goods and services to the local community: (i) the share of discretionary expenses to total expenses, to capture a relatively higher attention to local community needs; (ii) the amount of discretionary expenses in public education per capita (log-transformed); and (iii) the amount of discretionary expenses in public infrastructures per capita (log-transformed).[33] We have also constructed three additional control variables: (i) effective revenues per capita (log-transformed), to capture the amount of resources available to a municipality; (ii) share of total (i.e., compulsory and discretionary) expenses in public education to total expenses; (iii) share of total (i.e., compulsory and discretionary) expenses in public infrastructures to total expenses; and (iv) population density in 1881 (population per square kilometres, log-transformed).

We have modified Equation (1) by: (i) omitting the set of current (i.e., 2010-2011) demographic and economic control variables; (ii) replacing the set of current NUTS-2 region FEs with NUTS-3 region FEs as for the 1881 administrative geography of the Kingdom of Italy; (iii) replacing the geographical control variable capturing the distance between a municipality and the own current NUTS-2 region capital city with a variable capturing a municipality's distance to the own 1881 NUTS-3 region capital city; and (iv) adding the control variables for revenues per capita in 1884, population density in 1881, share of public education expenditure in 1884, and share of public infrastructures expenditure in 1884. We have thus estimated the modified version of Equation (1) both via OLS on the whole sample of municipalities, and via a semi-parametric spatial RD approach (using an interacted linear polynomial in distance to the frontier) focusing on those municipalities lying within 30 km on either side of the 1748 frontier.

[33] Per capita variables are based on 1881 population figures. Indeed, population figures are not available for the year 1884 because the population census was carried out in 1881 and then in 1901.

The results of this exercise are reported in Table 18. We find that, in the aftermath of the Italian unification process, municipalities that were previously under Habsburg domination tended to spend relatively more in discretionary expenses than municipalities that were ruled by the Savoy House. We find evidence of higher discretionary expenses per capita in public education, while no difference emerges when considering discretionary expenses in public infrastructures.[34] This result is not surprising: while the Title II of the Rattazzi Law assigned to each municipality a significant role in primary education through discretionary expenses, discretionary expenses in public infrastructures had less importance as they were including only the 'maintenance' of municipal roads and public squares. In fact, the 1859 Rattazzi Law assigned a key role in the field of public infrastructures to the *Province* – corresponding to the NUTS-3 region – rather than to the municipality.

[--- Table 18 ---]

6.3. Long-run effects: the case of nurseries

We now move to more recent times and provide additional evidence to support our main result of Habsburg-ruled municipalities having a relatively higher efficiency in providing public goods and services compared to Savoy House-ruled municipalities by considering the case of nurseries. In other words, we leverage on the nursery case to quantify the premium estimated for Habsburg-ruled municipalities in terms of services provision administrative efficiency.

The case of nurseries suits our intent, them representing a public good provided locally by municipalities. We have collected data on the number of authorised nursery places per 100 children aged 0-2 years referring to the year 2013 and provided by the Italian National Institute of Statistics (ISTAT), and we have considered two types of nursery services: (i) standard nursery; and (ii) standard nursery plus 'spring section' nursery (i.e., a nursery service addressing children aged 24 to 36 months

[34] We have replicated our baseline RD analysis – see Column (5) in Table 3 – on the reduced estimation sample for which we have 1884 municipality-level balance sheet data available. The results of this exercise are reported in Appendix I Table I1, and fully corroborate our main findings.

facilitating the transition from nursery to pre-school).[35] Overall, we have been able to collect nursery data for 2,082 out of the 2,093 municipalities that make up our sample (with missing data for only one municipality in the control group when restricting the estimation sample to a 30-km bandwidth around the 1748 frontier).

We have thus estimated Equation (1) via OLS on the whole sample of municipalities, and via a semi-parametric spatial RD approach (using an interacted linear polynomial in distance to the frontier) focusing on those municipalities lying within 30 km on either side of the 1748 frontier. The results of this exercise are reported in Table 19 and highlight clearly that Habsburg-ruled municipalities outperform Savoy House-ruled ones in providing access to nursery services. Thus, we can confirm our general results that Habsburg-ruled municipalities have a relatively higher efficiency in providing public goods and services to the local community compared to Savoy House-ruled ones.[36]

[--- Table 19 ---]

7. The Underlying Mechanism

According to our empirical results, municipalities exposed to the Habsburg administrative reform seem to provide more public goods and services to their citizens while spending as much as the neighbouring municipalities that were ruled by the Savoy House in the second half of the 18th century. Furthermore, this difference in public goods and services provision can be traced back to 1884 municipal budget data. These results are consistent with our interpretation of the role played – and

[35] It is worth clarifying that municipality-level nursery data provided by ISTAT are aggregated over four types of nursery services: (i) nursery directly operated by the municipality; (ii) nursery in municipal management but entrusted to third parties; (iii) private nursery with reservation of posts by the municipality; and (iv) municipal contribution to families for public or private nursery service. Unfortunately, data are not available for each individual type of nursery service. However, the aggregate does not include private nursery services without reservation of posts by the municipality, implying that the nursery data we rely on refer to an education service provided by municipalities and, thus, represent a good proxy for municipality-level public goods and services provision.

[36] We have replicated our baseline RD analysis – see Column (5) in Table 3 – on the reduced estimation sample for which we have 2013 municipality-level nursery data available. The results of this exercise are reported in Appendix J Table J1, and fully corroborate our main findings.

the long-term effects produced – by the Enlightenment-inspired administrative reform introduced by Maria Theresa of Austria in 1755. At that time, the main effect of this reform was to generate a new set of values, norms, and practices in the administrative system: in other words, the 1755 reform 'activated' a new administrative tradition (Ongaro, 2008; Mayer-Sahling and Yesilkagit, 2011). However, an administrative tradition may persist over time only if it is driven by some within-institution channel. In fact, only the presence of a within-institution transmission mechanism may explain the 'reproductive capacity' over time and, therefore, the persistence of an administrative tradition.

We now propose a simple, minimal model that can explain the persistence over time of an administrative tradition. In this model, we identify a within-institution mechanism of transmission over time of values, norms, and practices of an administrative tradition based on a 'bureaucracy enculturation' channel. While models of cultural transmission including retirement and knowledge transmission among individuals can be found in the literature – see, for example, Harrison and Carroll (1991) for cultural transmission in the institutional setting, Suzuki (1997) for international organisations, Bisin and Verdier (2000, 2011) for intergenerational cultural transmission within the society as a whole –, our model attempts to capture the basic stylised facts of persistence while minimising the number of free parameters employed, and making sure that the model does not differentiate between desirable and undesirable characteristics.

7.1. Modelling persistence in administrative traditions

Suppose that, at any time, there are N civil servants operating in a local institution – in our case, a municipality. They have a distribution of some trait T – in our case, administrative efficiency – which we take to be binary. Let gN be the number of civil servants who have the trait $T = 1$, such that $bN = (N - gN)$ is the number of civil servants for whom $T = 0$. Then, $g = (1 - b)$ is the fraction of civil servants with trait $T = 1$. For definiteness, we refer to civil servants with trait $T = 1$ as 'good' ones

(i.e., with high administrative efficiency), and to those with trait $T = 0$ as 'bad' ones (i.e., with low administrative efficiency).

At the end of each period, a fraction $\alpha > 0$ of civil servants retires and is replaced by newly-hired ones picked from the general population – in our case, a municipality's population. We assume that in the latter $p(T = 1) = p(T = 0) = 1/2$, i.e., the fraction of the general population endowed with the 'good' version of the trait T equals the fraction of the general population endowed with the 'bad' version of T.

It follows that, in each period, αN civil servants retire, of which $\alpha g N$ have $T = 1$ and $\alpha b N$ have $T = 0$. Then, $\alpha N/2$ of the replaced civil servants have $T = 1$, and $\alpha N/2$ will have $T = 0$. Therefore, the fraction of 'good' civil servants at time $t + 1$ can be defined as follows:

$$g_{t+1} = \frac{1}{N}\left(g_t N - \alpha g_t N + \alpha \frac{N}{2}\right) = g_t - \alpha\left(g_t - \frac{1}{2}\right) \quad (2)$$

The time-continuum equivalent of Equation (2) is:

$$\dot{g} = -\alpha\left(g - \frac{1}{2}\right) \quad (3)$$

where α is now the fraction of civil servants replaced per unit of time. In a society where people work for about 50 years $\alpha \approx 1/50\ year^{-1}$. A caveat concerning this result is that, in our idealisation, civil servants live forever (i.e., we would treat death as retirement), and are replaced at random.

On a more technical note, we point out that the equation for $b = (1 - g)$ is symmetrical to the one for g, that is:

$$\dot{b} = -\alpha\left(b - \frac{1}{2}\right) = -\alpha\left(1 - g - \frac{1}{2}\right) = \alpha\left(g - \frac{1}{2}\right) = -\dot{g} \quad (4)$$

The symmetry must be the case, as we assumed that $(g + b) = 1$. As a result, $(\dot{g} + \dot{b}) = 0$, such that $\dot{g} = -\dot{b}$.

Equation (3) does not yet describe any persistence. It can be solved by introducing the new variable $u = (g - 1/2)$, for which $\dot{u} = \dot{g}$, and the following equation holds:

$$\dot{u} = -\alpha u \tag{5}$$

The solution to the above equation is of the form:

$$u(t) = u(0)e^{-\alpha t} \tag{6}$$

which can be rewritten in terms of g as follows:

$$g(t) = \frac{1}{2} + \left(g(0) - \frac{1}{2}\right)e^{-\alpha g(t)} \tag{7}$$

Figure 5 shows the evolution of $g(t)$ for $\alpha = 0.02$ and $g(0) = 0.9$. In general, for $t \to \infty$, the resulting evolution brings the composition of civil servants to the average value of the general population, as one would expect. This is a general result.

[--- Figure 5 ---]

We now need to introduce an 'enculturation' term to model the long-term persistence of an administrative tradition. A very general form could be $\beta(g - 1/2)^k$, where the power-law dependence with exponent $k > 1$ is meant to model network effects among civil servants: in general, the value of having the trait $T = 1$ depends on how many other persons in the local institution also have $T = 1$. For instance, the incentive for the individual civil servant to be efficient is much higher

if most of her colleagues are efficient and hold her to the same standard as they hold themselves. A seemingly natural choice for k would be $k = 2$. However, if the enculturation term were quadratic, the property of symmetry for b and g would not hold; indeed, our model would introduce a preference in either direction, depending on the sign of β. The simplest polynomial term that does not have this shortcoming is in the cubic form. Thus, we can rewrite Equation (3) augmented with the enculturation term as follows:

$$\dot{g} = -\alpha\left(g - \frac{1}{2}\right) + \beta\left(g - \frac{1}{2}\right)^3 \tag{8}$$

In Equation (8), it is ensured that persistence of the 'good' trait will be as likely as persistence of the 'bad' trait, depending only on initial conditions. By setting $u = (g - 1/2)$, then Equation (8) can be rewritten as follows:

$$\dot{u} = -\alpha u + \beta u^3 \tag{9}$$

where β has dimensions of one over time – i.e., it is measured in $year^{-1}$ – just like α. It is the reciprocal of the enculturation time scale (i.e., $1/\beta$) that captures how long it takes for the typical worker to absorb the values of the majority within workplace.

Let us consider now the steady state of Equation (9). By setting $\dot{u} = 0$, we obtain:

$$u(\alpha - \beta u^2) = 0 \tag{10}$$

which has three possible solutions:

$u = 0$; and $u_{1,2} = \pm\sqrt{a/b}$.

If we require these solutions to be real, we get the condition $\alpha/\beta > 0$, which, having taken $\alpha > 0$, corresponds to require $\beta > 0$. The latter result corresponds to enculturation being towards the majority group of the civil servants – i.e., 'good' civil servants lead to 'good' civil servants, and 'bad' civil servants lead to 'bad' civil servants. If this is not the case, then we get a sort of 'anti-enculturation' mechanism. While anti-conformist behaviour certainly may exist, we assume that it is not prevalent among civil servants, such that we do not discuss this case.

An important condition we impose on the above possible solutions to Equation (10) is that $u \in [-1/2\,, 1/2]$, which is equivalent to requiring g to be positive and less than 1. This restriction leads to the following two cases, depending on the values of the relevant coefficients of Equation (9): either $\sqrt{\alpha/\beta} \leq 1/2$ or $\sqrt{\alpha/\beta} > 1/2$. We name these two cases as 'strong enculturation' and 'weak enculturation', respectively. We start discussing them from the latter.

7.1.1. Weak enculturation scenario

The 'weak enculturation' scenario emerges when $\sqrt{\alpha/\beta} > 1/2$. Given that $\alpha > 0$ and $\beta > 0$ as discussed previously, it follows that $\alpha/\beta > 1/4$, such that $1/\beta > 1/(4\alpha)$. In other words, the typical time it takes to absorb workplace values (i.e., $1/\beta$) is longer than $1/4$ of the typical time it takes to retire a civil servant: the older employees retire too fast before being able to 'teach' the new ones how to be 'good' (or 'bad') civil servants. As a result, $(\beta/4 - \alpha) < 0$ and $(\beta u^2 - \alpha) < 0$, as $u^2 \leq 1/4$ since $u \in [-1/2\,, 1/2]$. Therefore, by rewriting Equation (9) as follows:

$$\dot{u} = u(\beta u^2 - \alpha) \tag{11}$$

we can notice that the right-hand side has the opposite sign of $\dot{u}$, such that $\dot{u}$ is negative if u is positive, and vice versa. This leaves only $u = 0$ (i.e., $g = 1/2$) as a stable equilibrium. It follows that 'weak enculturation' does not bring about persistence: eventually, civil servants become distributed similarly to the parent population.

7.1.2. Strong enculturation scenario

The 'strong enculturation' scenario emerges if $\sqrt{\alpha/\beta} \leq 1/2$. In this case, there are two symmetric points $u_{1,2} = \pm\sqrt{\alpha/\beta}$ within the interval $[-1/2, 1/2]$ which are steady-state solutions. In this scenario, enculturation is fast enough to induce persistence. The solution $u = 0$ is still the only stable one since the term $(\beta u^2 - \alpha)$ is negative around 0, and $\dot{u}$ becomes proportional to $-u$, but near those two points $\dot{u}$ has the same sign as $u_{1,2}$ making them unstable. This is more easily seen graphically in Figure 6.

[--- Figure 6 ---]

The green curve corresponds to $\dot{u}(u)$ in the 'strong enculturation' case (with $\alpha = \beta/8$), while the red curve corresponds to the 'weak enculturation' case (with $\alpha = \beta/3$). In the case of 'strong enculturation', and with initial conditions such that $|u(0)| > \sqrt{\alpha/\beta}$, u would increase or decrease forever. In practice, it will have to stop either at $u = 1/2$ or at $u = -1/2$ due to the restriction imposed on u (i.e., $u \in [-1/2\,, 1/2]$). It follows that either all civil servants become 'good' (efficient), or all become 'bad' (inefficient).

This could seem counterintuitive if we think that a small number of counter-aligned civil servants should exist at any given time because those who retired were substituted by newly hired ones picked from the general population. However, this is not an inconsistency of the model. Indeed, in continuous time, an infinitesimal number of civil servants retires at any given time, and individuals hired to replace them within the local institution are immediately enculturated.[37]

Our simple model suggests that under 'weak enculturation' we would inevitably converge to $u = 0$, i.e., with civil servants' values representing the general population. Under 'strong enculturation', instead, we may converge to either of three situations: (i) all civil servants are 'good';

[37] It is true that firing several civil servants suddenly *en masse* would result in a fluctuation that would take time to evolve back to stability; however, this is not a scenario we model here.

(ii) all civil servants are 'bad'; or (iii) civil servants represent the general population. Crucially, an infinitesimal difference in the initial condition $u(0)$ can determine whether we fall into the all-'good' equilibrium, the all-'bad' equilibrium, or the representing-the-general population equilibrium.

If we interpret our empirical findings through the lens of the proposed model, the municipalities along both sides of the Aix-la-Chapelle border were clearly exposed to different administrative practices, effectively changing the efficient/inefficient bureaucrat ratio within local governments. If the enculturation process within government organisations had been weak, that is the employee turnover had been fast enough to prevent learning at the workplace, we would not possibly observe discontinuity in administrative efficiency today. However, it is more likely that the enculturation process within Italian bureaucracy has been following the strong scenario. There is ample evidence of life-long tenure and little geographical mobility of a typical Italian local bureaucrat, as well as her immunity to political turmoil (Cole, 1953). It is less clear how learning at the workplace happens within Italian local governments, but it is reasonable to assume that conformism to existing practices is prevailing. Under such conditions, administrative differences under Habsburg and Savoy rule could well have perpetuated until modern times.

7.2. Ruling out external-to-the institution transmission mechanisms

Similarly to local institutions, local populations may have also been affected by different institutional arrangements associated with the administrative reforms implemented by the Habsburgs and the Savoy House, respectively. In turn, differences in the populations' attitude towards local institutions – and their efficiency in, for example, providing public goods and services – may affect the present-day characteristics of the latter. Perhaps, the most obvious mechanisms for this are people's civic capital and voting preferences. Indeed, differences in civic capital – as the set of norms and values affecting individuals' behaviour in the society (Guiso et al., 2011) – and voting preferences may reflect differences in past administrative traditions if such administrative traditions have shaped the attitude of the local populations towards the management of the public good.

We assess empirically whether differences at the 1748 frontier exist with respect to the two dimensions of civic capital and voting preferences in order to rule out such potential mechanisms – that are external to the local institution, but internal to the local population. We can thus reasonably interpret the absence of statistically significant differences in civic capital and voting preferences between Habsburg- and Savoy House-ruled municipalities as evidence supporting our within-institution 'bureaucracy enculturation' mechanism.

To this aim, we have collected municipality-level data on volunteering activity, voter turnout, and voting preferences. We have considered two alternative measures to proxy for civic capital. First, the per-inhabitant number of unpaid voluntary workers in non-profit organisations in the year 2011 (log-transformed), with data drawn from the Census of Non-Profit Institutions (ISTAT). The rationale of this variable rests on the idea that the absence of economic payoffs in doing unpaid voluntary work "can be seen as a direct measure of how much people internalize the common good" (Guiso et al., 2011, p. 453).[38] Second, we have proxied civic capital with voter turnout (e.g., Putnam, 1993) as it captures "the extent to which people in a community are willing to pay a personal cost to enhance the common good" without receiving any "direct economic payoff to voting" (Guiso et al., 2011, p. 453). We have considered the Italian referendum held on June 2011 and collected data from the Italian Ministry of the Interior. This referendum included four questions, three of which were strictly related to public goods and services, namely: the entrusting and management of local public services with economic relevance (question #1); the determination of the integrated water service tariff based on an adequate return on invested capital (question #2); and the production of nuclear electric power on the national territory (question #3).[39] We have thus considered voter turnout both with respect to the three questions separately, and by averaging them. We have relied on the same three questions of the referendum held on June 2011 to capture voting preferences: namely, the share of 'yes' votes and the share of blank votes with respect to each question separately, and then by averaging them.

[38] Similar proxy variables for civic capital that have been used in the literature are based on organ or blood donation (e.g., Guiso et al., 2004, 2016).
[39] We have not considered question no. 4 on the legal impediment of the Prime Minister and the Ministers due to its strict political nature.

We have thus replicated our baseline spatial RD specification – see Column (5) in Table 3 – by considering this set of alternative dependent variables for civic capital and voting preferences. As shown in Tables 20 and 21, we do not find evidence of a statistically significant discontinuity at the 1748 frontier with respect to the measures of civic capital and voting preference here considered.[40]

[--- Table 20 ---]

[--- Table 21 ---]

While this evidence does not rule out subtler differences that may have an important cumulative effect, we interpret this result through the lens of our theoretical model that allows for the establishment of a persistent difference in any relevant characteristic of local institutions – in our case, differences related to an administrative tradition – without the need for a similar persistent difference in the characteristics of the underlying local populations. This is due to the fact that in the proximity of the unstable stationary points that fall within the admissible parameter range – as in the case of 'strong enculturation' – the evolution towards either of the stable equilibria can be affected by arbitrarily small differences in the initial conditions. Thus, even in the presence of local populations that are identical throughout, a relatively 'small' exogenous shock to a local institution with a relatively high internal enculturation level and low employee turnover can nudge the institution's evolution towards a diverging direction, and the resulting difference can later be maintained indefinitely.

[40] We have replicated our baseline RD analysis – see Column (5) in Table 3 – also controlling for civic capital and voting preferences. Specifically, the set of control variables for civic capital includes log-volunteering and the average voter turnout at the referendum held on June 2011 (questions #1, #2, and #3); the set of control variables for voting preferences includes the average percentage of 'yes' votes at the referendum held on June 2011 (questions #1, #2, and #3), and the average percentage of blank votes at the same referendum (questions #1, #2, and #3). The results of this exercise are reported in Appendix K Table K1, and fully corroborate our main findings.

8. Conclusions

In this paper we have exploited the Enlightenment-inspired administrative reform introduced by the Habsburg Monarchy in 1755 as a natural experiment to analyse current administrative efficiency differentials in Northern Italy between the municipalities that belonged to the Habsburg-ruled Duchy of Milan and the neighbouring ones ruled by the Savoy House in the second half of the 18th century. We have found clear evidence of a persistent positive effect of the Habsburg reform on current administrative efficiency, especially in terms of public goods and services provision.

We have supported these findings in different ways. First, we have looked at the second half of the 18th century and provided more suggestive evidence on the role of public culture in the Enlightenment age as a moderating force in the long-run relationship between the Habsburg administrative reform and current administrative efficiency. Second, we have exploited information on municipalities' expenses for public goods provision in the mid-1880s, showing that differences in public goods and services provision can be traced back to 1884 municipal budget data. Finally, we have considered the case of nurseries as an example of municipality-provided public good and assessed differences in authorised nursery places in the year 2013 between Habsburg- and Savoy House-ruled municipalities.

All this evidence confirms our main hypothesis drawn from the history of Enlightenment reformism in the 18th century: municipalities exposed to the Habsburg administrative reform tend to provide more public goods and services to their citizens while spending as much as the neighbouring municipalities that were ruled by the Savoy House. Finally, we have attempted to identify the underlying mechanisms of these phenomena by developing a simple model of persistence of an administrative tradition driven by a within-institution 'bureaucracy enculturation' mechanism.

This line of research does not seem to leave "room for policy" (Nunn, 2020, p. 5). If current economic, political, and institutional outcomes are conditioned by historical events occurred in the past, then which role can be assigned to current economic policies? In other words: is it possible to use history to inform policy?

The findings of this paper seem to suggest that some useful policy indications can be drawn from this type of historical analysis. First, current reforms should account for the administrative traditions of a country. In fact, these traditions can "block, delay or filter the reform proposals of political and administrative reformers" (Meyer-Sahling and Yesilkagit, 2011, p. 311). Second, in a country such as Italy that has been exposed to different administrative traditions during its pre-unitary period, empirical findings and mechanisms such as those discussed in this paper could explain the administrative efficiency heterogeneity. In this sense, 'differentiated' public policies and reforms should account for this heterogeneity which, in turn, depends on historical events and institutional choices made in the past. In other words, our history, including the institutional and administrative aspects to it, conditions our current life.

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Tables

Table 1: Mean difference in historical (pre-1748) variables across the frontier.

Dependent Variable	Bishop	*Commune*	Market	Large City	Distance to Closest Roman Road
Bandwidth			90 km		
Duchy of Milan (Austria)	-0.007	-0.003	-0.002	-0.000	-0.516***
	(0.004)	(0.004)	(0.005)	(0.004)	(0.200)
R^2	0.00	0.00	0.00	0.00	0.07
No. Municipalities	1,587	1,587	1,587	1,587	1,587
No. Treated Municipalities	748	748	748	748	748
No. Control Municipalities	839	839	839	839	839
Bandwidth			60 km		
Duchy of Milan (Austria)	-0.007	-0.005	-0.007	0.000	-0.740***
	(0.006)	(0.006)	(0.006)	(0.005)	(0.263)
R^2	0.00	0.00	0.00	0.00	0.13
No. Municipalities	1,239	1,239	1,239	1,239	1,239
No. Treated Municipalities	687	687	687	687	687
No. Control Municipalities	552	552	552	552	552
Bandwidth			30 km		
Duchy of Milan (Austria)	-0.002	-0.003	0.005	0.005	-0.558
	(0.006)	(0.008)	(0.007)	(0.005)	(0.342)
R^2	0.00	0.00	0.00	0.00	0.07
No. Municipalities	657	657	657	657	657
No. Treated Municipalities	371	371	371	371	371
No. Control Municipalities	286	286	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. All dependent variables are binary, except for the variable capturing the log-distance to the closest ancient Roman road. All specifications include a constant term.

Table 2: Border specification with 30 km bandwidth around the frontier.

Dependent Variable	Administrative Efficiency				
	(1)	(2)	(3)	(4)	(5)
Duchy of Milan (Austria)	0.348****	0.347****	0.226****	0.307****	0.267****
	(0.048)	(0.050)	(0.053)	(0.053)	(0.054)
R^2	0.21	0.21	0.22	0.26	0.27
Dependent Variable	Administrative Efficiency – Expenditure				
	(1)	(2)	(3)	(4)	(5)
Duchy of Milan (Austria)	0.125	0.118	0.016	-0.058	0.020
	(0.080)	(0.080)	(0.119)	(0.052)	(0.079)
R^2	0.04	0.04	0.07	0.12	0.14
Dependent Variable	Administrative Efficiency – Services				
	(1)	(2)	(3)	(4)	(5)
Duchy of Milan (Austria)	0.650****	0.654****	0.506****	0.630****	0.542****
	(0.075)	(0.079)	(0.079)	(0.114)	(0.098)
R^2	0.29	0.30	0.32	0.32	0.35
Historical Controls	No	Yes	No	No	Yes
Geographical Controls	No	No	Yes	No	Yes
Demographic and Economic Controls	No	No	No	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes	Yes	Yes
No. Municipalities	657	657	657	657	657
No. Treated Municipalities	371	371	371	371	371
No. Control Municipalities	286	286	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The dependent variables are log-transformed. All specifications include a constant term.

Table 3: Baseline RD specification with 30 km bandwidth around the frontier.

Dependent Variable	Administrative Efficiency				
	(1)	(2)	(3)	(4)	(5)
Duchy of Milan (Austria)	0.249***	0.248***	0.204****	0.261***	0.250****
	(0.087)	(0.085)	(0.056)	(0.085)	(0.067)
R^2	0.22	0.22	0.22	0.27	0.28
Dependent Variable	Administrative Efficiency – Expenditure				
	(1)	(2)	(3)	(4)	(5)
Duchy of Milan (Austria)	-0.109	-0.099	-0.087	-0.104	-0.022
	(0.101)	(0.094)	(0.121)	(0.091)	(0.096)
R^2	0.05	0.05	0.07	0.12	0.14
Dependent Variable	Administrative Efficiency – Services				
	(1)	(2)	(3)	(4)	(5)
Duchy of Milan (Austria)	0.616****	0.600****	0.525****	0.617****	0.546****
	(0.164)	(0.168)	(0.114)	(0.173)	(0.135)
R^2	0.30	0.30	0.32	0.32	0.35
Historical Controls	No	Yes	No	No	Yes
Geographical Controls	No	No	Yes	No	Yes
Demographic and Economic Controls	No	No	No	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes	Yes	Yes
No. Municipalities	657	657	657	657	657
No. Treated Municipalities	371	371	371	371	371
No. Control Municipalities	286	286	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table 4: Baseline RD specification using alternative operationalisations of the standard errors.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.250	-0.022	0.546
	(0.075)****	(0.112)	(0.128)****
	[0.073]****	[0.122]	[0.139]****
	{0.053}****	{0.068}	{0.090}****
	⟨0.043⟩****	⟨0.058⟩	⟨0.073⟩****
	«0.038»****	«0.050»	«0.064»****
R^2	0.28	0.14	0.35
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	657	657	657
No. Treated Municipalities	371	371	371
No. Control Municipalities	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors clustered at the municipality level in parentheses. Standard errors corrected for spatial dependence: in brackets with distance cut-off set at 30 km; in braces with distance cut-off set at 120 km; in angle brackets with distance cut-off set at 180 km; and in guillemets with distance cut-off set at 240 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table 5: Alternative specifications of the RD polynomial.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
RD Polynomial	Non-Interacted Linear Polynomial in Distance to the Frontier		
Duchy of Milan (Austria)	0.270****	0.022	0.545****
	(0.053)	(0.081)	(0.100)
R^2	0.28	0.14	0.35
RD Polynomial	Interacted Quadratic Polynomial in Distance to the Frontier		
Duchy of Milan (Austria)	0.177***	-0.138	0.455****
	(0.064)	(0.114)	(0.120)
R^2	0.28	0.14	0.35
RD Polynomial	Non-Interacted Quadratic Polynomial in Distance to the Frontier		
Duchy of Milan (Austria)	0.272****	0.011	0.558****
	(0.052)	(0.076)	(0.101)
R^2	0.28	0.14	0.35
RD Polynomial	Interacted Cubic Polynomial in Distance to the Frontier		
Duchy of Milan (Austria)	0.154*	-0.245	0.452****
	(0.089)	(0.181)	(0.128)
R^2	0.28	0.14	0.36
RD Polynomial	Non-Interacted Cubic Polynomial in Distance to the Frontier		
Duchy of Milan (Austria)	0.273****	0.009	0.560****
	(0.053)	(0.074)	(0.101)
R^2	0.28	0.14	0.36
RD Polynomial	Linear Polynomial in Latitude and Longitude		
Duchy of Milan (Austria)	0.244****	-0.008	0.511****
	(0.070)	(0.079)	(0.150)
R^2	0.28	0.14	0.35
RD Polynomial	Quadratic Polynomial in Latitude and Longitude		
Duchy of Milan (Austria)	0.230***	-0.004	0.489****
	(0.074)	(0.094)	(0.143)
R^2	0.29	0.14	0.36
RD Polynomial	Cubic Polynomial in Latitude and Longitude		
Duchy of Milan (Austria)	0.231***	-0.005	0.491****
	(0.072)	(0.087)	(0.126)
R^2	0.30	0.14	0.39
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	657	657	657
No. Treated Municipalities	371	371	371
No. Control Municipalities	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The dependent variables are log-transformed. All specifications include a constant term.

Table 6: Alternative bandwidths around the frontier.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Bandwidth		15 km	
Duchy of Milan (Austria)	0.117**	0.010	0.252***
	(0.052)	(0.154)	(0.079)
R^2	0.32	0.18	0.45
No. Municipalities	336	336	336
No. Treated Municipalities	196	196	196
No. Control Municipalities	140	140	140
Bandwidth		60 km	
Duchy of Milan (Austria)	0.262****	0.023	0.533****
	(0.049)	(0.061)	(0.085)
R^2	0.19	0.10	0.25
No. Municipalities	1,239	1,239	1,239
No. Treated Municipalities	687	687	687
No. Control Municipalities	552	552	552
Bandwidth		90 km	
Duchy of Milan (Austria)	0.295****	0.030	0.567****
	(0.053)	(0.062)	(0.092)
R^2	0.17	0.10	0.22
No. Municipalities	1,587	1,587	1,587
No. Treated Municipalities	748	748	748
No. Control Municipalities	839	839	839
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table 7: RD specification with only control municipalities part of the Duchy of Milan in 1700.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.248****	-0.023	0.544****
	(0.068)	(0.097)	(0.137)
R^2	0.27	0.13	0.33
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	No	No	No
No. Municipalities	637	637	637
No. Treated Municipalities	371	371	371
No. Control Municipalities	266	266	266

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The categorical variable for Dominant State in 1700 is omitted due to collinearity. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table 8: RD specification on current Lombardy municipalities.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.124***	0.025	0.202**
	(0.043)	(0.065)	(0.098)
R^2	0.29	0.18	0.40
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	No	No	No
NUTS-3 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	281	281	281
No. Treated Municipalities	160	160	160
No. Control Municipalities	121	121	121

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The dummy variable for large city (historical controls) is omitted due to collinearity. NUTS-2 region FEs are replaced by NUTS-3 region FEs. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table 9: Border specification on border municipalities.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Border Municipalities		All	
Duchy of Milan (Austria)	0.100*	-0.262	0.408***
	(0.052)	(0.220)	(0.154)
R^2	0.65	0.52	0.80
No. Municipalities	74	74	74
No. Treated Municipalities	43	43	43
No. Control Municipalities	31	31	31
Border Municipalities	With an Adjacent Municipality on the Other Side of the Frontier		
Duchy of Milan (Austria)	0.092*	-0.258	0.391**
	(0.053)	(0.222)	(0.159)
R^2	0.67	0.53	0.81
No. Municipalities	69	69	69
No. Treated Municipalities	38	38	38
No. Control Municipalities	31	31	31
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	No	No	No

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The dummy variable for bishop (historical controls) and the categorical variable for Dominant State in 1700 are omitted due to collinearity. The dependent variables are log-transformed. All specifications include a constant term.

Table 10: Falsification test using the Western frontier of the Duchy of Milan in year 1700.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Placebo-Duchy of Milan (Austria)	0.037	-0.038	0.109
	(0.045)	(0.074)	(0.073)
R^2	0.32	0.17	0.34
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	713	713	713
No. Treated Municipalities	373	373	373
No. Control Municipalities	340	340	340

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the placebo frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the placebo frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table 11: Falsification test shifting the 1748 frontier towards East and West.

Falsification Test	Frontier Eastward Shifted by 5 km			Frontier Westward Shifted by 5 km		
Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Placebo-Duchy of Milan (Austria)	-0.002	-0.091	0.126	0.122	0.091	0.237
	(0.098)	(0.094)	(0.159)	(0.082)	(0.111)	(0.145)
R^2	0.22	0.15	0.32	0.26	0.12	0.34
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes	Yes	Yes	Yes
No. Municipalities	661	661	661	647	647	647
No. Treated Municipalities	371	371	371	344	344	344
No. Control Municipalities	290	290	290	303	303	303
Falsification Test	Frontier Eastward Shifted by 40 km			Frontier Westward Shifted by 40 km		
Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Placebo-Duchy of Milan (Austria)	0.025	-0.004	0.068	-0.003	0.213	-0.136
	(0.063)	(0.076)	(0.136)	(0.082)	(0.158)	(0.095)
R^2	0.17	0.15	0.20	0.31	0.14	0.31
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region FE	No	No	No	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes	Yes	Yes	Yes
No. Municipalities	589	589	589	567	567	567
No. Treated Municipalities	246	246	246	315	315	315
No. Control Municipalities	343	343	343	252	252	252

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the placebo frontiers. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The categorical variable for NUTS-2 region is omitted when shifting the border towards East by 40 km due to collinearity. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the placebo frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table 12: Local autonomy beyond the 1755 Habsburg general administrative system.

Estimation Strategy	OLS						Spatial RD		
Sample	Whole Sample			Whole Sample Excluding Duchy of Mantua			30-km Bandwidth Sample		
Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Savoy House	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Duchy of Milan (Austria)									
General Administrative System	0.276****	-0.047	0.596****	0.274****	-0.043	0.592****	0.244	-0.026	0.538
	(0.045)	(0.070)	(0.069)	(0.045)	(0.070)	(0.070)	(0.075)***	(0.113)	(0.129)****
							[0.067]****	[0.096]	[0.138]****
Special Status	0.394****	0.114	0.694****	0.397****	0.132	0.692****	0.428	-0.081	0.863
	(0.075)	(0.129)	(0.117)	(0.075)	(0.129)	(0.118)	(0.105)****	(0.199)	(0.147)****
							[0.048]****	[0.135]	[0.123]****
R^2	0.17	0.15	0.21	0.17	0.15	0.20	0.28	0.14	0.35
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Municipalities	2,093	2,093	2,093	2,013	2,013	2,013	657	657	657
No. Treated Municipalities	803	803	803	723	723	723	371	371	371
General Administrative System	770	770	770	690	690	690	361	361	361
Special Status	33	33	33	33	33	33	10	10	10
No. Control Municipalities	1,290	1,290	1,290	1,290	1,290	1,290	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors clustered at the municipality level in parentheses. Spatial RD setting: standard errors corrected for spatial dependence in brackets with distance cut-off set at 60 km, and one-dimensional RD polynomial specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table 13: Administrative heterogeneity within the Habsburg-ruled Duchy of Milan.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Mantuan Municipalities	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	…	…	…
Milanese Municipalities									
All Municipalities	0.064	0.099	0.048	…	…	…	…	…	…
	(0.062)	(0.128)	(0.088)						
General Administrative System	…	…	…	0.059	0.097	0.040	Ref.	Ref.	Ref.
				(0.063)	(0.131)	(0.090)			
Special Status	…	…	…	0.107	0.115	0.106	0.060	0.049	0.076
				(0.083)	(0.157)	(0.123)	(0.069)	(0.128)	(0.109)
R^2	0.13	0.15	0.21	0.13	0.15	0.21	0.12	0.14	0.18
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Dominant State in 1700 FE	No	No	No	No	No	No	No	No	No
No. Municipalities	803	803	803	803	803	803	723	723	723
No. Mantuan Municipalities	80	80	80	80	80	80	…	…	…
No. Milanese Municipalities	723	723	723	723	723	723	723	723	723
General Administrative System	…	…	…	690	690	690	690	690	690
Special Status	…	…	…	33	33	33	33	33	33

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are clustered at the municipality level. The dependent variables are log-transformed. All specifications include a constant term.

Table 14: Correlation between feudal status and salary paid to the *Cancelliere*.

Dependent Variable	Salary Per Capita in 1751
Feudo	0.027**
	(0.013)
R^2	0.01
No. Milanese Municipalities	154
Free from a Feudal Lord	24
Subject to a Feudal Lord	130

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are clustered at the municipality level.

Table 15: Feudalism as a constraint to the long-term effects of the Habsburg reform.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Savoy House	Ref.	Ref.	Ref.
Duchy of Milan (Austria)			
Free from a Feudal Lord	0.282	-0.055	0.659
	(0.125)**	(0.151)	(0.199)****
	[0.107]***	[0.091]	[0.178]****
Subject to a Feudal Lord	0.215	-0.026	0.470
	(0.078)***	(0.119)	(0.134)****
	[0.066]***	[0.103]	[0.142]****
R^2	0.29	0.13	0.36
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	625	625	625
No. Treated Municipalities	339	339	339
Free from a Feudal Lord	77	77	77
Subject to a Feudal Lord	262	262	262
No. Control Municipalities	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors clustered at the municipality level in parentheses. Standard errors corrected for spatial dependence in brackets: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table 16: Feudalism as a constraint to the long-term effects of the Habsburg reform in current Lombardy municipalities.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.612	-0.143	1.443
	(0.286)**	(0.368)	(0.423)****
	[0.166]****	[0.141]	[0.254]****
Feudo	0.475	-0.153	1.216
	(0.234)**	(0.329)	(0.343)****
	[0.123]****	[0.118]	[0.278]****
Duchy of Milan (Austria) × *Feudo*	-0.576	0.167	-1.433
	(0.305)*	(0.404)	(0.454)***
	[0.187]***	[0.181]	[0.331]****
R^2	0.33	0.19	0.44
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	No	No	No
NUTS-3 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	258	258	258
No. Treated Municipalities	144	144	144
Free from a Feudal Lord	46	46	46
Subject to a Feudal Lord	98	98	98
No. Control Municipalities	114	114	114
Free from a Feudal Lord	12	12	12
Subject to a Feudal Lord	102	102	102

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors clustered at the municipality level in parentheses. Standard errors corrected for spatial dependence in brackets: the distance cut-off is set at 60 km. NUTS-2 region FEs are replaced by NUTS-3 region FEs. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table 17: The role of public culture in the 18th century.

Estimation Strategy	OLS		
Sample	Whole Sample		
Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.280****	-0.041	0.599****
	(0.045)	(0.070)	(0.069)
Public Libraries Opened in 1748-1796	-0.189	0.321	-0.473**
	(0.140)	(0.217)	(0.210)
Duchy of Milan (Austria) × Public Libraries Opened in 1748-1796	0.496*	0.357	0.791**
	(0.264)	(0.372)	(0.315)
Private Culture in 1748-1796	-0.144	-0.227	-0.145
	(0.125)	(0.309)	(0.174)
Libraries Exiting in 1748	-0.095	-0.208	0.057
	(0.118)	(0.209)	(0.138)
R^2	0.17	0.15	0.21
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	2,093	2,093	2,093
No. Treated Municipalities	803	803	803
No. Control Municipalities	1,290	1,290	1,290

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors clustered at the municipality level in parentheses. The dependent variables are log-transformed. All specifications include a constant term.

Table 18: Public goods provision in the Italian post-unification period.

Dependent Variable	Share Discretionary Expenses in 1884		log(Discretionary Expenses in Education Per Capita in 1884)		log(Discretionary Expenses in Infrastructures Per Capita in 1884)	
Estimation Strategy	OLS	Spatial RD	OLS	Spatial RD	OLS	Spatial RD
Sample	Whole Sample	30-km Bandwidth Sample	Whole Sample	30-km Bandwidth Sample	Whole Sample	30-km Bandwidth Sample
Duchy of Milan (Austria)	0.038**	0.037**	0.675*	0.599**	-0.572	-0.038
	(0.018)	(0.016)	(0.390)	(0.268)	(0.392)	(0.485)
log(Revenues Per Capita in 1884)	0.017***	0.032***	1.396****	1.344****	1.136****	1.781****
	(0.006)	(0.011)	(0.191)	(0.204)	(0.220)	(0.248)
log(Population Density in 1881)	0.016***	0.016	1.261****	0.729****	0.860****	0.828***
	(0.005)	(0.012)	(0.130)	(0.207)	(0.163)	(0.305)
Share Expenses in Education in 1884	…	…	2.869***	1.360	2.236**	4.011***
			(1.059)	(1.603)	(0.960)	(1.380)
Share Expenses in Infrastructures in 1884	…	…	-0.261	0.449	4.353****	5.938****
			(0.590)	(0.661)	(0.691)	(1.353)
R^2	0.26	0.26	0.28	0.27	0.16	0.23
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-3 Region in 1881 FE	Yes	Yes	Yes	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes	Yes	Yes	Yes
No. Municipalities	1,987	606	1,987	606	1,987	606
No. Treated Municipalities	743	337	743	337	743	337
No. Control Municipalities	1,244	269	1,244	269	1,244	269

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are clustered at the municipality level in OLS estimates. Standard errors (in parentheses) are corrected for spatial dependence in spatial RD estimates: the distance cut-off is set at 60 km. The set of geographical controls includes the distance to the own NUTS-3 region capital city referring to the year 1881. All specifications include a constant term.

Table 19: Public goods provision – The case of nurseries.

Dependent Variable	log(Authorised nursery places per 100 children aged 0-2 years in 2013)			
Nursery Type	Standard Nursery		Standard Nursery and Spring Section	
Estimation Strategy	OLS	Spatial RD	OLS	Spatial RD
Sample	Whole Sample	30-km Bandwidth Sample	Whole Sample	30-km Bandwidth Sample
Duchy of Milan (Austria)	2.268****	2.429****	2.238****	2.397****
	(0.550)	(0.563)	(0.562)	(0.612)
R^2	0.47	0.50	0.47	0.50
Historical Controls	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes	Yes
No. Municipalities	2,082	656	2,082	656
No. Treated Municipalities	803	371	803	371
No. Control Municipalities	1,279	285	1,279	285

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are clustered at the municipality level in OLS estimates. Standard errors (in parentheses) are corrected for spatial dependence in spatial RD estimates: the distance cut-off is set at 60 km. All specifications include a constant term.

Table 20: Baseline RD specification on civic capital.

Dependent Variable	log(Volunteering)	Voter Turnout			
		Question #1	Question #2	Question #3	Average
Duchy of Milan (Austria)	0.324	-0.008	-0.008	-0.008	-0.008
	(0.348)	(0.010)	(0.010)	(0.010)	(0.010)
	[0.217]	[0.010]	[0.010]	[0.010]	[0.010]
R^2	0.19	0.23	0.23	0.23	0.23
Historical Controls	Yes	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes	Yes	Yes
No. Municipalities	657	657	657	657	657
No. Treated Municipalities	371	371	371	371	371
No. Control Municipalities	286	286	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors clustered at the municipality level in parentheses. Standard errors corrected for spatial dependence in brackets: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables for voter turnout refer to the referendum held on June 2011: question #1 concerns the entrusting and management of local public services with economic relevance; question #2 concerns the determination of the integrated water service tariff based on an adequate return on invested capital; question #3 concerns the production of nuclear electric power on the national territory. All specifications include a constant term.

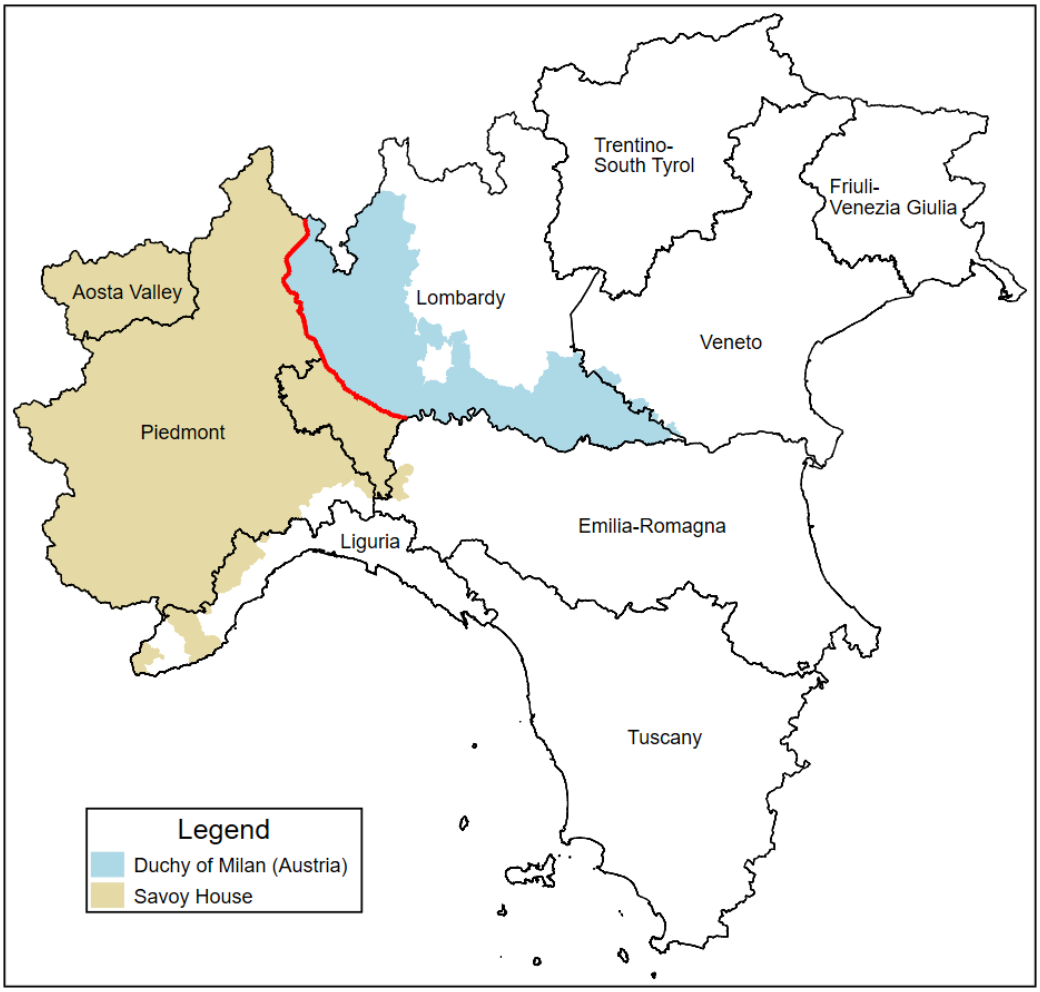
Table 21: Baseline RD specification on voting preferences.

Dependent Variable	Share of 'Yes' Votes			
	Question #1	Question #2	Question #3	Average
Duchy of Milan (Austria)	0.004	0.003	0.003	0.003
	(0.004)	(0.004)	(0.004)	(0.004)
	[0.004]	[0.003]	[0.003]	[0.003]
R^2	0.28	0.28	0.14	0.26
Dependent Variable	Share of Blank Votes			
	Question #1	Question #2	Question #3	Average
Duchy of Milan (Austria)	-0.002	-0.001	-0.000	-0.001
	(0.002)	(0.001)	(0.001)	(0.001)
	[0.001]	[0.001]	[0.001]	[0.001]
R^2	0.33	0.33	0.27	0.35
Historical Controls	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes	Yes
No. Municipalities	657	657	657	657
No. Treated Municipalities	371	371	371	371
No. Control Municipalities	286	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors clustered at the municipality level in parentheses. Standard errors corrected for spatial dependence in brackets: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables capturing the share of 'yes' and blank votes refer to the referendum held on June 2011: question #1 concerns the entrusting and management of local public services with economic relevance; question #2 concerns the determination of the integrated water service tariff based on an adequate return on invested capital; question #3 concerns the production of nuclear electric power on the national territory. All specifications include a constant term.

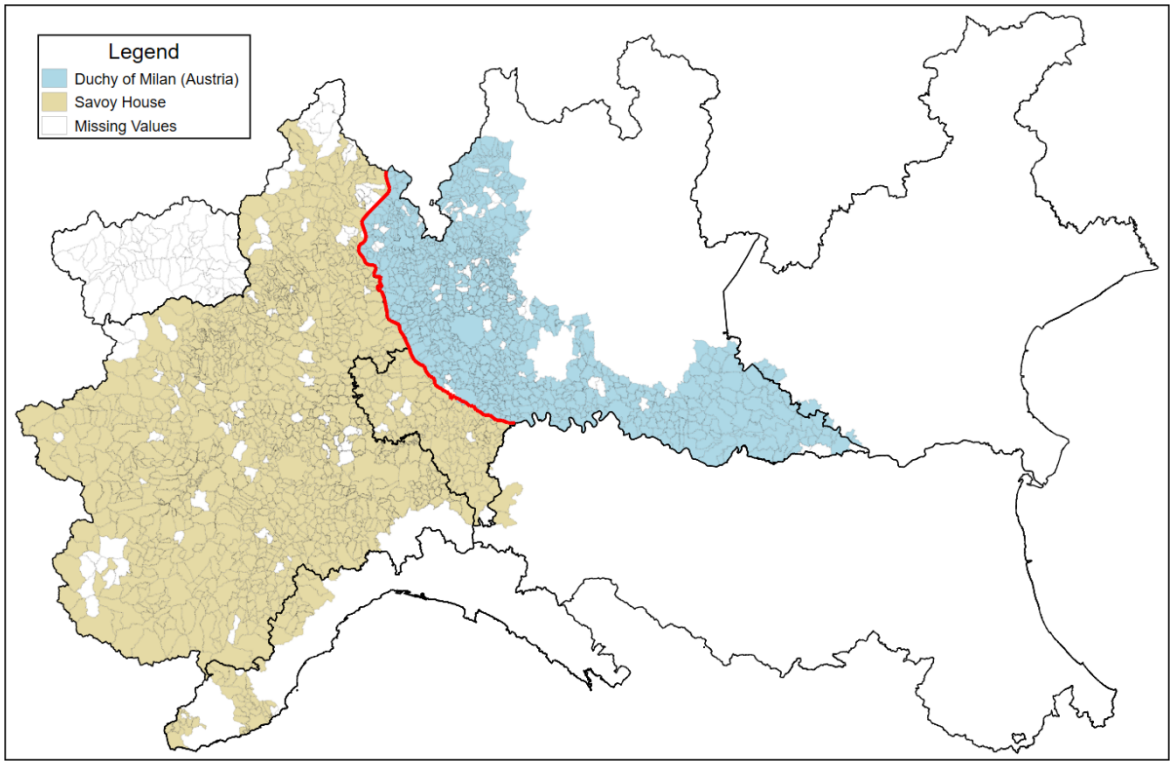
Figures

Figure 1: Study region.



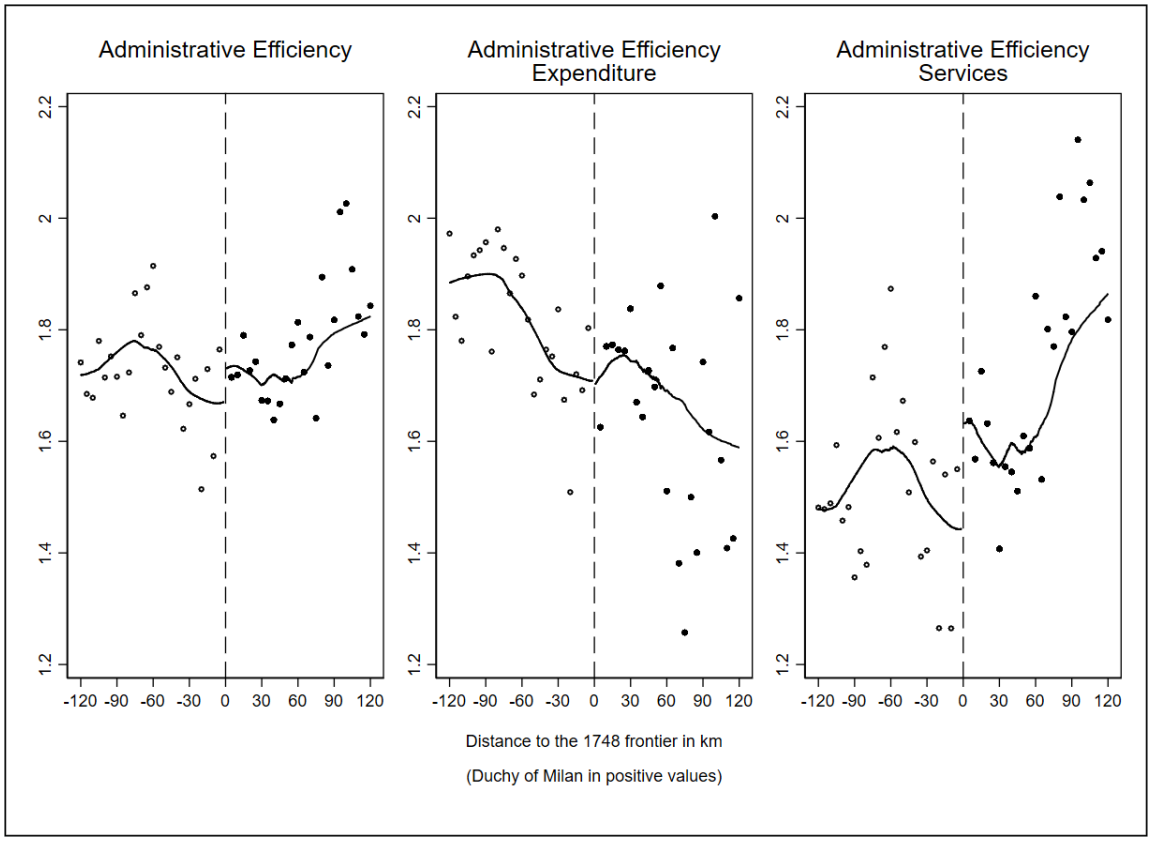
Notes: The light-blue area denotes the Duchy of Milan (Milanese and Mantuan territories) under Habsburg domination starting from the 1748 Treaty of Aix-la-Chapelle. The light-khaki area denotes the territories ruled by the Savoy House starting from the same year. The red line identifies the frontier established in 1748 between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. The black lines identify the borders of the current Italian NUTS-2 regions.

Figure 2: Municipalities in the sample.



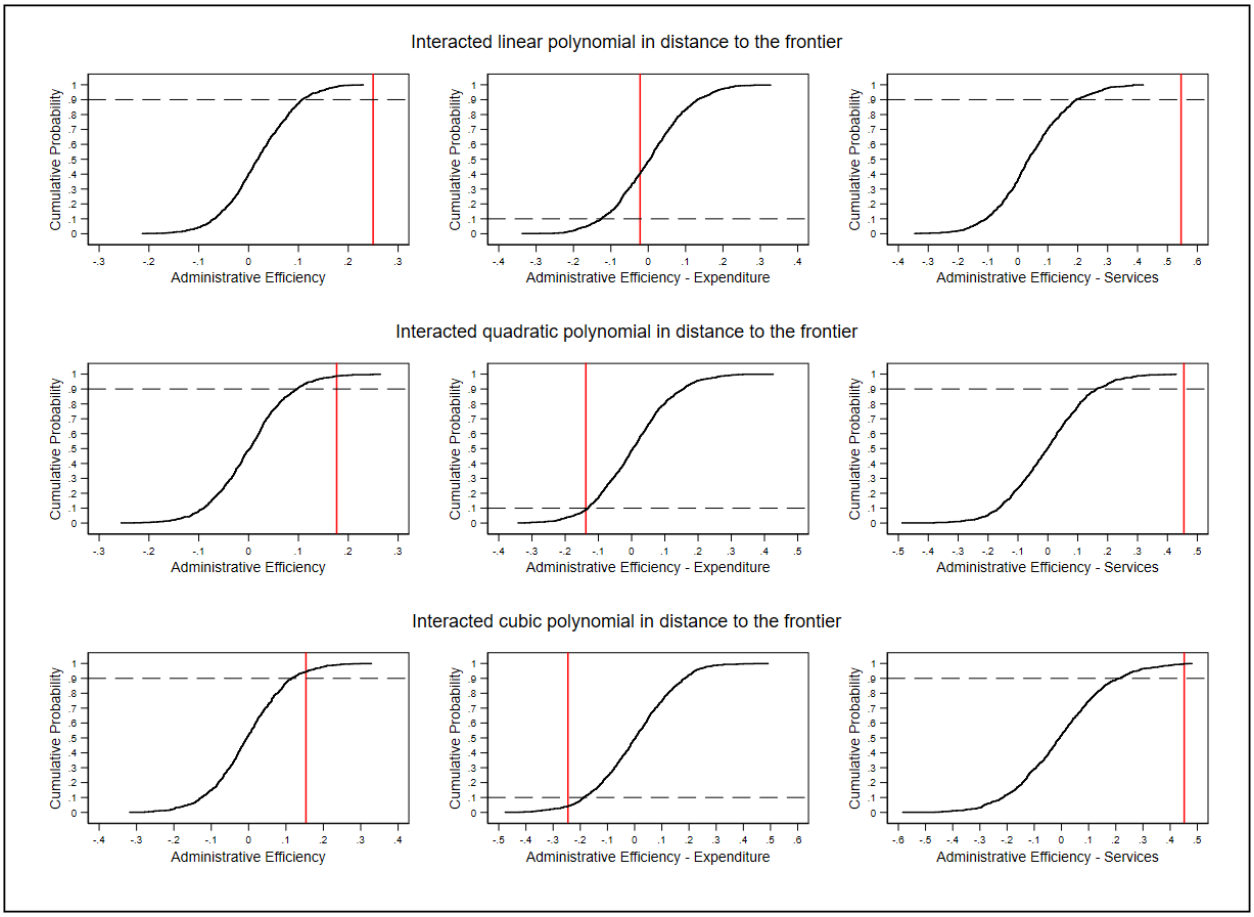
Notes: The light-blue area denotes the Duchy of Milan (Milanese and Mantuan territories) under Habsburg domination starting from the 1748 Treaty of Aix-la-Chapelle. The light-khaki area denotes the territories ruled by the Savoy House starting from the same year. White-coloured municipalities are excluded from the sample due to missing values in the dependent variables for current administrative efficiency. The red line identifies the frontier established in 1748 between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. The black lines identify the borders of the current Italian NUTS-2 regions.

Figure 3: One-dimensional RD plots.



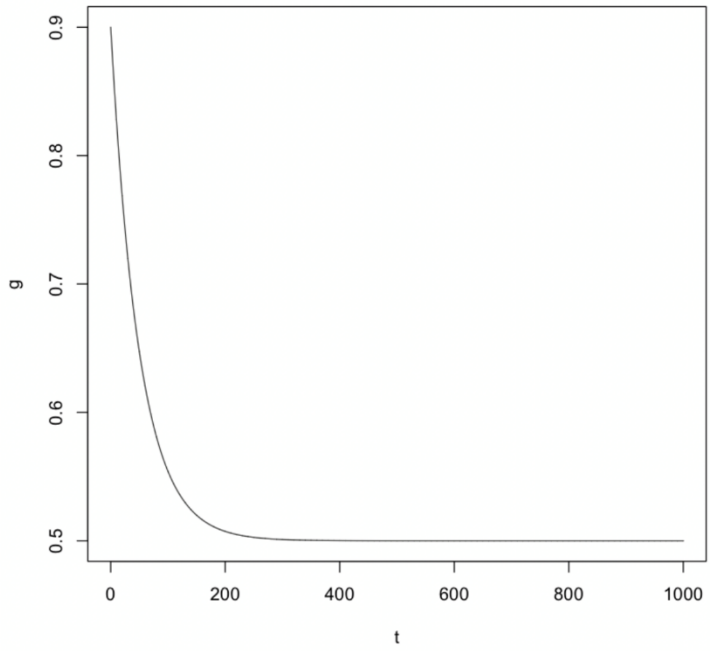
Notes: Locally weighted regression. Dots show local averages of the dependent variables for municipalities in 5-km bins of their distance to the frontier. The dependent variables are log-transformed.

Figure 4: Cumulative distribution of coefficients from 1,000 randomly drawn placebo frontiers.



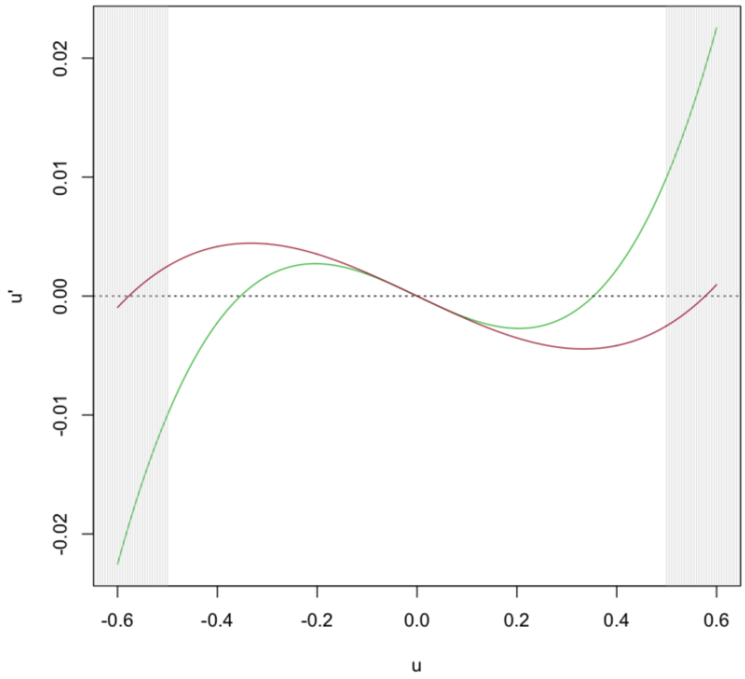
Notes: The plots report the cumulative distribution of coefficients obtained from a simulation of 1,000 random placebo frontiers. The *y*-axis indicates the point in the distribution, with the black dashed line referring to the 10% or the 90% of the cumulative distribution. The *x*-axis indicates the value of the placebo coefficients, while the red vertical line indicates the value of the 'true' coefficient obtained from the corresponding RD specification.

Figure 5: A model without enculturation and cultural persistence.



Notes: The plot displays the evolution of $g(t)$ for $\alpha = 0.02$ and $g(0) = 0.9$.

Figure 6: The weak and strong enculturation scenarios.

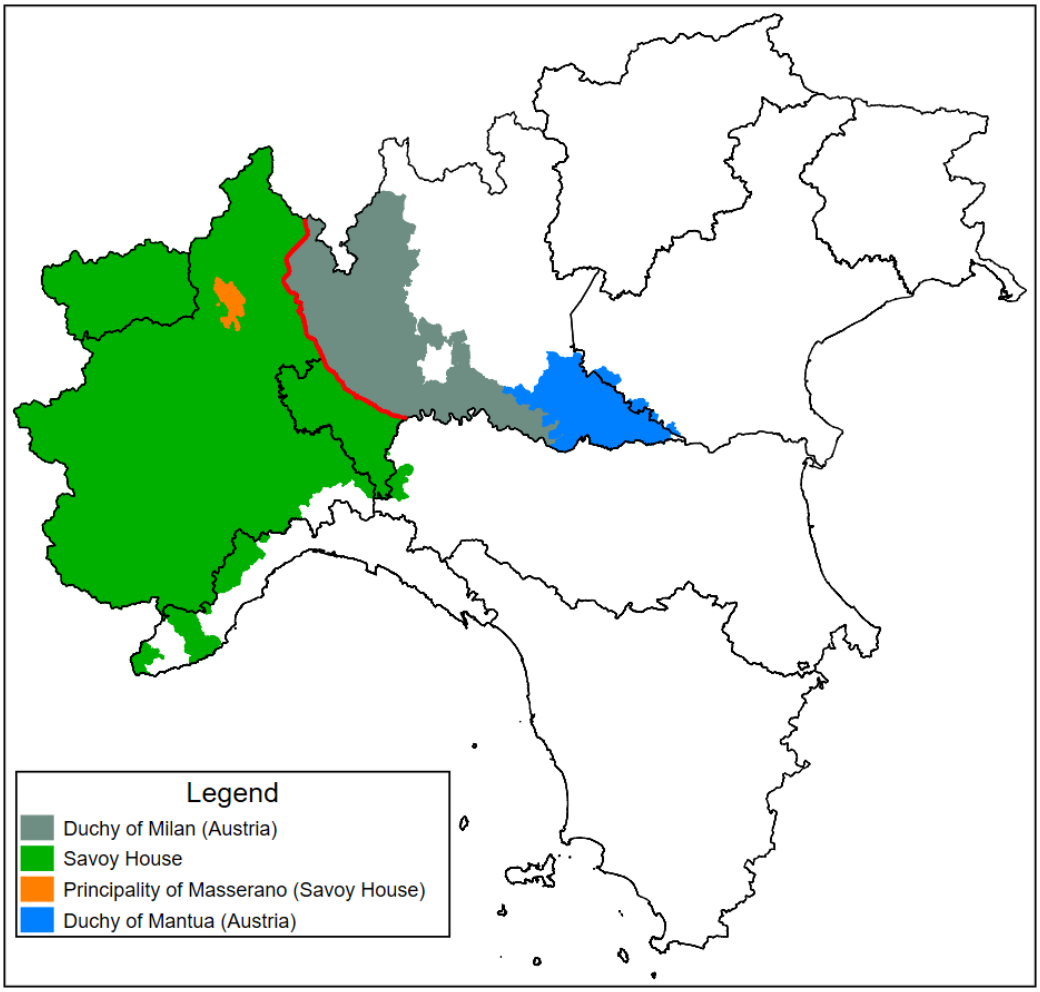


Notes: The plot displays the weak (red curve) and strong (green curve) enculturation scenarios. The u parameter is plotted on the x-axis, while the time derivative of u (i.e., u') is plotted in the y-axis.

Appendix

Appendix A. Study region, variables and data sources.

Figure A1: Study region highlighting the Principality of Masserano under the Savoy House and the Milanese and Mantuan territories under Habsburg domination.



Notes: The teal area denotes the Milanese territories of the Duchy of Milan under Habsburg domination starting from the 1748 Treaty of Aix-la-Chapelle. The mid-blue area denotes the Mantuan territories of the Duchy of Milan under Habsburg domination starting from the 1748 Treaty of Aix-la-Chapelle. The green area denotes the territories ruled by the Savoy House starting from the 1748 Treaty of Aix-la-Chappelle. The orange area denotes the Principality of Masserano ruled by the Savoy House. The territory of Masserano was elevated to the status of 'principality' in 1598 by Pope Clemente VIII. Indeed, it was a papal feud directly dependent to the Papal States. However, in 1741, Charles Emmanuel III of Savoy was nominated papal vicar of the Principality of Masserano by Pope Benedetto XIV, and the Principality felt under the control of the Savoy House. Later in 1753, the feud was formally ceded to Charles Emmanuel III. Finally, in 1767, the last Prince of Masserano, Vittorio Filippo, gave up all his remaining rights over the Principality. The red line identifies the frontier established in 1748 between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. The black lines identify the borders of the current Italian NUTS-2 regions.

Table A1: Definition of variables and data source.

Variable	Definition	Source
Dependent Variables		
Administrative Efficiency – Expenditure (log)	Expenditure gap as the difference between the actual expenditure of a municipality and the estimated standard expenditure needs, normalised in the interval [1, 10]	OpenCivitas
Administrative Efficiency – Services (log)	Output gap as the difference between the actual level of services provided by a municipality and the estimated standard level of services, normalised in the interval [1, 10]	OpenCivitas
Administrative Efficiency (log)	Weighted average of the expenditure (40%) and the services provision (60%) indexes of a municipality, normalised in the interval [1, 10]	OpenCivitas
Historical Variables		
Bishop (d)	Dummy variable equal to one if a municipality has been the seat of a bishop before the year 1748	Elaboration on various sources (1)
Commune (d)	Dummy variable equal to one if a municipality has been a *commune* in the period 1000-1300	De Agostini (2007); Bosker et al. (2013); Belloc et al. (2016)
Market (d)	Dummy variable equal to one if a municipality has been granted the right to hold a market before the year 1748	Cantoni and Yuchtman (2014)
Large City (d)	Dummy variable equal to one if a municipality has recorded a population of at least 10,000 inhabitants in the period 1300-1700	Malanima (1998)
Distance to the Closest Roman Road (log)	Distance between the centroid of a municipality and the closest Roman road in kilometres	Elaboration on ISTAT (2) and McCormick et al. (2013)
Dominant State in 1700 (c)	Categorical variable for dominant State in year 1700	Elaboration on Euratlas and CHA (5)
Geographical Variables		
Altitude (log)	Elevation of a municipality from the sea level in meters	ISTAT (2)
Terrain Ruggedness (log)	Terrain ruggedness index	Elaboration on EEA (3)
Distance to Sea Coast (log)	Minimum distance to the nearest sea coast in kilometres	Elaboration on EEA (4)
Land Area (log)	Land area of a municipality in square kilometres	ISTAT (2)
Distance to Regional Capital City (log)	Distance between the centroids of a municipality and its own NUTS-2 region capital city in kilometres	Elaboration on ISTAT (2)
Provincial Capital City (d)	Dummy variable equal to one if a municipality is a NUTS-3 region capital city	Elaboration on ISTAT (2)
Demographic and Economic Variables		
Income Per Taxpayer (log)	Income per taxpayer in a municipality in year 2010	Elaboration on MEF
Population Density (log)	Population of a municipality per square kilometres in year 2011	Elaboration on ISTAT (2, 6)
Share Foreign Population (s)	Share of non-Italian population to total population in a municipality in year 2011	Elaboration on ISTAT (6)
Share Illiterate Population (s)	Share of illiterate population to total population in a municipality in year 2011	Elaboration on ISTAT (6)
Share Tertiary-Educated Population (s)	Share of population with tertiary education to total population in a municipality in year 2011	Elaboration on ISTAT (6)
Unemployment Rate (s)	Unemployment rate in a municipality in year 2011	ISTAT (6)
Share Manufacturing Employment (s)	Share of manufacturing sector employment to total employment in a municipality in year 2011	Elaboration on ISTAT (7)
Share Primary Employment (s)	Share of primary (agriculture, fishery, forestry, extraction) sector employment to total employment in a municipality in year 2011	Elaboration on ISTAT (7)
Share Services Employment (s)	Share of services sector employment to total employment in a municipality in year 2011	Elaboration on ISTAT (7)

Notes: (log) denotes a log-transformed. (d) denotes a binary variable. (c) denotes a categorical variable. (s) denotes a share defined in the interval [0, 1]. ISTAT stands for Italian National Institute of Statistics. EEA stands for European Environment Agency. MEF stands for Italian Ministry of Economy and Finance. (1) We collected data on bishops from various sources: (i) the *Atlante delle diocesi d'Italia* (Italian Episcopal Conference, 2000); (ii) Bosker et al. (2013); (iii) the website "https://it.cathopedia.org/wiki/Elenco_delle_diocesi_italiane_suddivise_per_regioni_ecclesiastiche"; and (iv) the websites of the various bishops, providing historical information on year of establishment and subsequent changes. (2) Digital cartography. (3) Global Digital Elevation Model (DEM) derived from GTOPO30, with 1 km-by-1 km resolution. (4) European coastline shapefile. (5) Euratlas's Georeferenced Historical Vector Data and Centennia Historical Atlas (CHA) research edition (year 1700). (6) Italian Population Census, year 2011. (7) Italian Industry and Services Census, year 2011.

Appendix B. Descriptive statistics

Table B1: Descriptive statistics of the dependent and the control variables.

Sample	Whole Sample				30 km Bandwidth			
Statistics	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
Dependent Variables								
Administrative Efficiency (log)	1.714	0.364	0.000	2.303	1.701	0.375	0.000	2.303
Administrative Efficiency – Expenditure (log)	1.752	0.589	0.000	2.303	1.721	0.602	0.000	2.303
Administrative Efficiency – Services (log)	1.548	0.590	0.000	2.303	1.533	0.628	0.000	2.303
Historical Variables								
Bishop (d)	0.010	0.097	0.000	1.000	0.006	0.078	0.000	1.000
Commune (d)	0.015	0.121	0.000	1.000	0.012	0.110	0.000	1.000
Market (d)	0.011	0.102	0.000	1.000	0.017	0.128	0.000	1.000
Large City (d)	0.008	0.090	0.000	1.000	0.006	0.078	0.000	1.000
Distance to Closest Roman Road (log)	1.818	0.964	-3.066	3.893	1.991	1.043	-3.066	3.893
Geographical Variables								
Altitude (log)	5.450	0.882	1.386	7.618	5.216	0.716	3.784	7.070
Terrain Ruggedness (log)	4.002	1.749	0.089	6.902	3.374	1.715	0.566	6.727
Distance to Sea Coast (log)	4.560	0.598	-0.864	5.329	4.768	0.294	3.996	5.269
Land Area (log)	2.466	0.852	-0.404	5.316	2.289	0.772	0.365	5.202
Distance to Regional Capital City (log)	3.888	0.705	-9.210	5.154	3.804	0.785	-9.210	5.123
Provincial Capital City (d)	0.008	0.090	0.000	1.000	0.009	0.095	0.000	1.000
Demographic and Economic Variables								
Income Per Taxpayer (log)	9.784	0.171	8.756	11.038	9.826	0.190	8.756	11.038
Population Density (log)	4.942	1.427	-0.084	8.936	5.438	1.303	1.629	8.830
Share Foreign Population (s)	0.070	0.039	0.000	0.367	0.069	0.034	0.000	0.367
Share Illiterate Population (s)	0.005	0.004	0.000	0.085	0.005	0.003	0.000	0.019
Share Tertiary-Educated Population (s)	0.093	0.035	0.000	0.369	0.098	0.038	0.007	0.369
Unemployment Rate (s)	0.050	0.019	0.000	0.200	0.053	0.016	0.000	0.174
Share Manufacturing Employment (s)	0.305	0.203	0.000	0.915	0.322	0.195	0.000	0.915
Share Primary Employment (s)	0.011	0.037	0.000	0.549	0.009	0.033	0.000	0.549
Share Services Employment (s)	0.518	0.177	0.059	1.000	0.518	0.175	0.059	1.000

Notes: The whole sample includes 2,093 municipalities. The sub-sample identified within 30 km around the frontier includes 657 municipalities. (log) denotes a log-transformed variable. (d) denotes a binary variable. (s) denotes a share defined in the interval [0, 1].

Table B2: Correlation matrix of the control variables for the whole sample.

Variable		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
Bishop (d)	[1]	1																			
Commune (d)	[2]	0.76	1																		
Market (d)	[3]	0.47	0.41	1																	
Large City (d)	[4]	0.65	0.69	0.41	1																
Distance to Closest Roman Road (log)	[5]	-0.10	-0.10	-0.03	-0.08	1															
Altitude (log)	[6]	-0.07	-0.06	-0.04	-0.05	0.26	1														
Terrain Ruggedness (log)	[7]	-0.03	-0.03	-0.01	-0.05	0.26	0.81	1													
Distance to Sea Coast (log)	[8]	-0.06	-0.03	0.01	-0.02	0.08	0.08	-0.03	1												
Land Area (log)	[9]	0.21	0.23	0.16	0.22	0.07	-0.05	-0.01	-0.13	1											
Distance to Regional Capital City (log)	[10]	0.03	-0.13	-0.07	-0.19	0.27	0.00	0.23	-0.21	0.13	1										
Provincial Capital City (d)	[11]	0.48	0.65	0.36	0.64	-0.07	-0.05	-0.03	0.02	0.19	-0.18	1									
Income Per Taxpayer (log)	[12]	0.08	0.11	0.08	0.10	-0.24	-0.22	-0.31	0.25	-0.18	-0.42	0.12	1								
Population Density (log)	[13]	0.09	0.13	0.09	0.11	-0.28	-0.29	-0.35	0.28	-0.35	-0.50	0.14	0.64	1							
Share Foreign Population (s)	[14]	0.08	0.09	0.06	0.08	-0.09	-0.37	-0.24	-0.21	0.10	0.05	0.07	-0.04	0.11	1						
Share Illiterate Population (s)	[15]	0.04	0.04	0.03	0.03	-0.08	-0.24	-0.22	-0.05	0.06	0.03	0.03	-0.04	0.11	0.24	1					
Share Tertiary-Educated Population (s)	[16]	0.18	0.23	0.15	0.21	-0.17	-0.09	-0.09	0.09	-0.10	-0.30	0.25	0.69	0.46	0.04	-0.09	1				
Unemployment Rate (s)	[17]	0.05	0.06	0.05	0.05	0.02	-0.05	-0.04	0.07	0.03	-0.08	0.04	0.03	0.07	0.01	0.02	-0.02	1			
Share Manufacturing Employment (s)	[18]	-0.06	-0.07	-0.04	-0.04	-0.07	-0.21	-0.27	0.15	-0.09	-0.10	-0.06	0.24	0.32	0.09	0.12	-0.04	0.00	1		
Share Primary Employment (s)	[19]	-0.02	-0.03	-0.02	-0.02	0.03	0.01	0.03	-0.11	0.03	0.08	-0.02	-0.18	-0.18	-0.01	0.02	-0.12	-0.03	-0.13	1	
Share Services Employment (s)	[20]	0.11	0.15	0.09	0.10	-0.02	0.07	0.10	-0.08	0.13	-0.03	0.13	-0.01	-0.09	0.01	-0.08	0.23	0.03	-0.79	-0.06	1

Notes: Correlation coefficients calculated on 2,093 municipalities. (log) denotes a log-transformed variable. (d) denotes a binary variable. (s) denotes a share defined in the interval [0, 1].

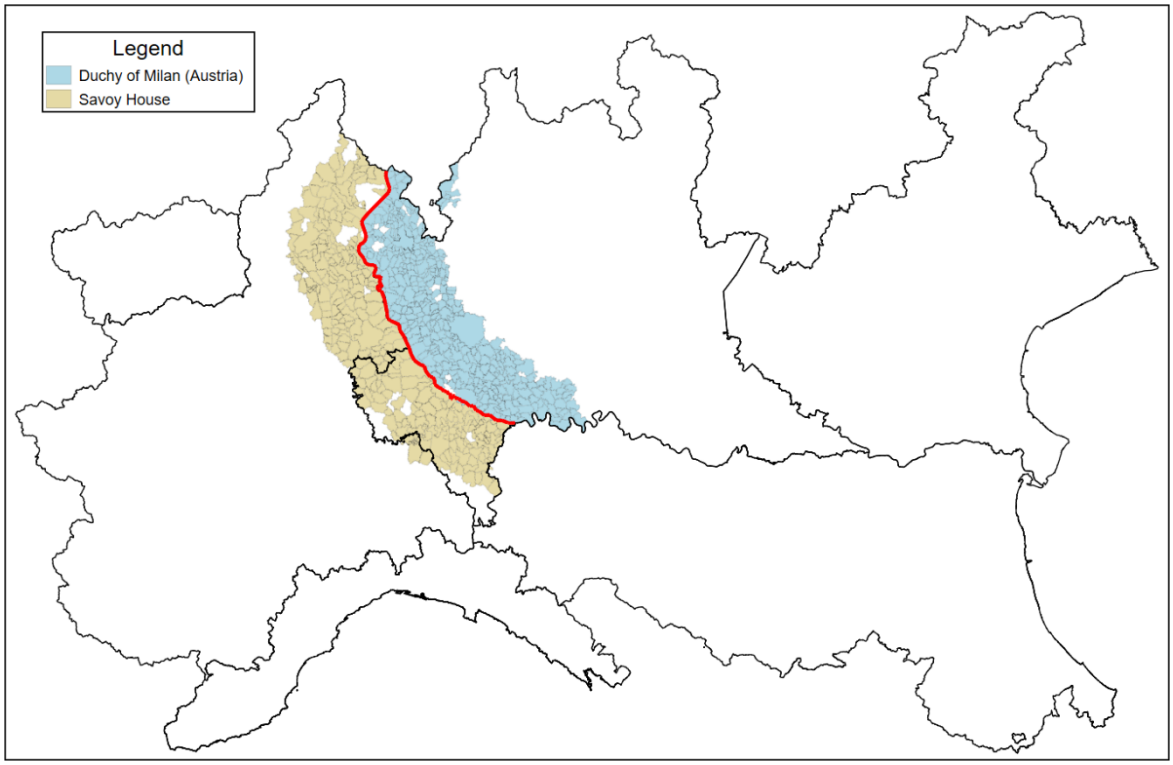
Table B3: Correlation matrix of the control variables for the sub-sample of municipalities within 30 km bandwidth around the frontier.

Variable		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
Bishop (d)	[1]	1																			
Commune (d)	[2]	0.70	1																		
Market (d)	[3]	0.29	0.31	1																	
Large City (d)	[4]	0.75	0.70	0.45	1																
Distance to Closest Roman Road (log)	[5]	-0.12	-0.08	0.01	-0.13	1															
Altitude (log)	[6]	-0.06	-0.05	0.02	-0.07	0.55	1														
Terrain Ruggedness (log)	[7]	-0.05	-0.05	0.03	-0.06	0.60	0.84	1													
Distance to Sea Coast (log)	[8]	-0.04	-0.01	0.05	-0.03	0.47	0.67	0.59	1												
Land Area (log)	[9]	0.20	0.23	0.21	0.21	-0.03	-0.16	-0.07	-0.14	1											
Distance to Regional Capital City (log)	[10]	-0.01	-0.22	-0.18	-0.35	0.45	0.36	0.47	0.19	0.04	1										
Provincial Capital City (d)	[11]	0.61	0.72	0.36	0.61	-0.09	-0.03	-0.02	0.01	0.24	-0.25	1									
Income Per Taxpayer (log)	[12]	0.08	0.11	0.09	0.11	-0.22	-0.29	-0.37	-0.04	-0.09	-0.41	0.12	1								
Population Density (log)	[13]	0.09	0.13	0.11	0.11	-0.26	-0.08	-0.21	0.22	-0.29	-0.52	0.14	0.58	1							
Share Foreign Population (s)	[14]	0.08	0.12	0.08	0.10	-0.19	-0.29	-0.16	-0.29	0.11	-0.15	0.10	0.05	0.08	1						
Share Illiterate Population (s)	[15]	0.02	0.03	0.03	0.01	-0.09	-0.12	-0.14	-0.01	0.06	-0.02	0.02	-0.02	0.19	0.13	1					
Share Tertiary-Educated Population (s)	[16]	0.20	0.25	0.22	0.26	-0.09	-0.03	-0.04	0.04	-0.03	-0.33	0.30	0.65	0.43	0.15	-0.14	1				
Unemployment Rate (s)	[17]	0.03	0.03	0.03	0.01	0.06	-0.06	-0.07	0.01	0.08	0.06	0.02	-0.04	-0.04	0.21	0.15	-0.13	1			
Share Manufacturing Employment (s)	[18]	-0.06	-0.09	-0.07	-0.07	-0.02	0.00	-0.09	0.10	-0.08	-0.02	-0.09	0.27	0.22	-0.07	0.13	-0.09	-0.07	1		
Share Primary Employment (s)	[19]	-0.02	-0.02	-0.03	-0.02	-0.03	-0.10	-0.04	-0.11	0.00	0.02	-0.02	-0.08	-0.16	-0.01	0.01	-0.07	0.09	-0.13	1	
Share Services Employment (s)	[20]	0.11	0.15	0.13	0.12	-0.08	-0.08	0.00	-0.10	0.13	-0.10	0.15	-0.06	-0.01	0.20	-0.09	0.27	0.02	-0.83	-0.09	1

Notes: Correlation coefficients calculated on 657 municipalities. (log) denotes a log-transformed variable. (d) denotes a binary variable. (s) denotes a share defined in the interval [0, 1].

Appendix C. Estimation sample

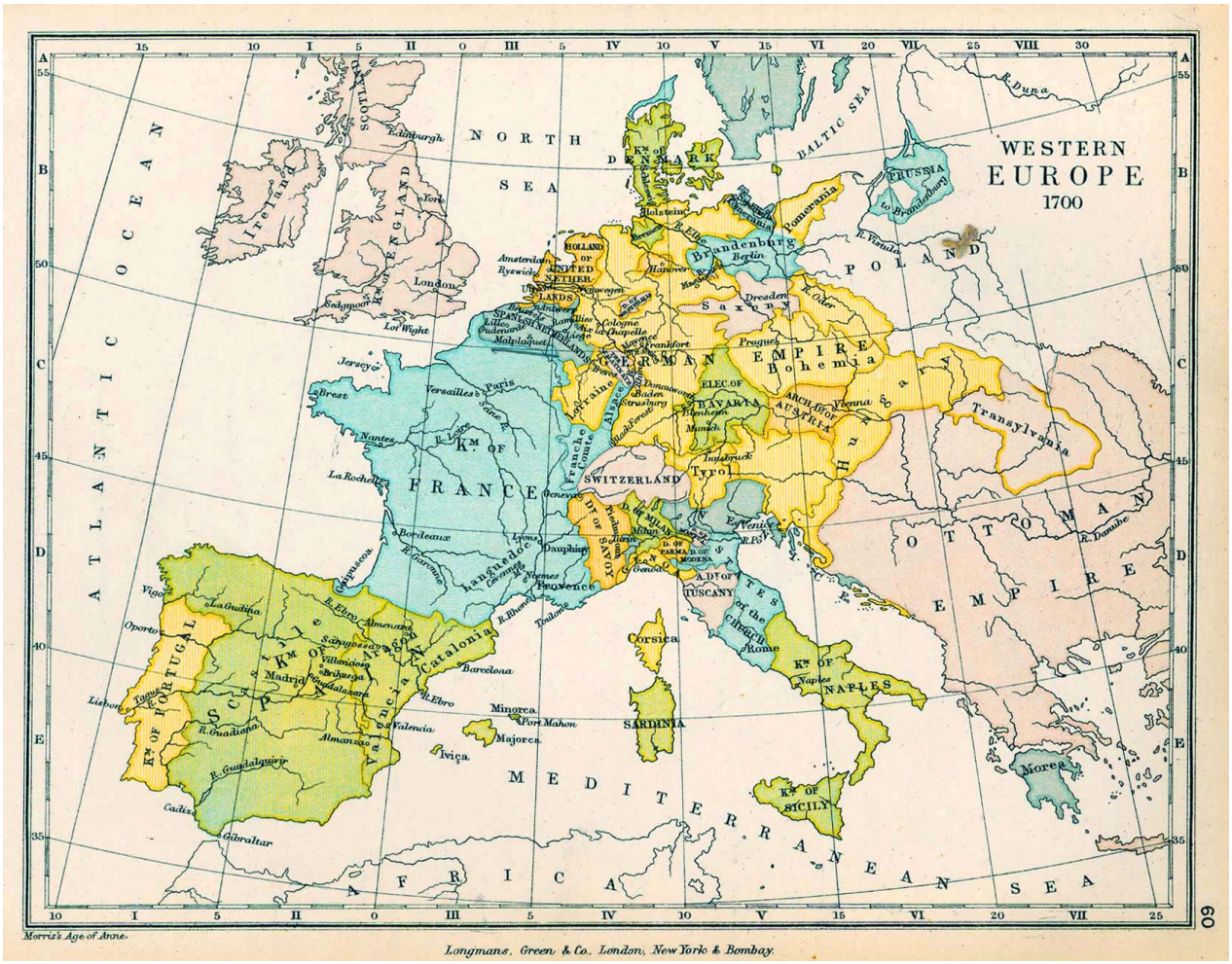
Figure C1: Estimation sample within 30 km on either side of the frontier.



Notes: The map displays estimation sample municipalities lying within 30 km on either side of the frontier. The light-blue area denotes municipalities of the Duchy of Milan under Habsburg domination starting from the 1748 Treaty of Aix-la-Chapelle. The light-khaki area denotes municipalities ruled by the Savoy House starting from the same year. The red line identifies the frontier established in 1748 between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. The black lines identify the borders of the current Italian NUTS-2 regions.

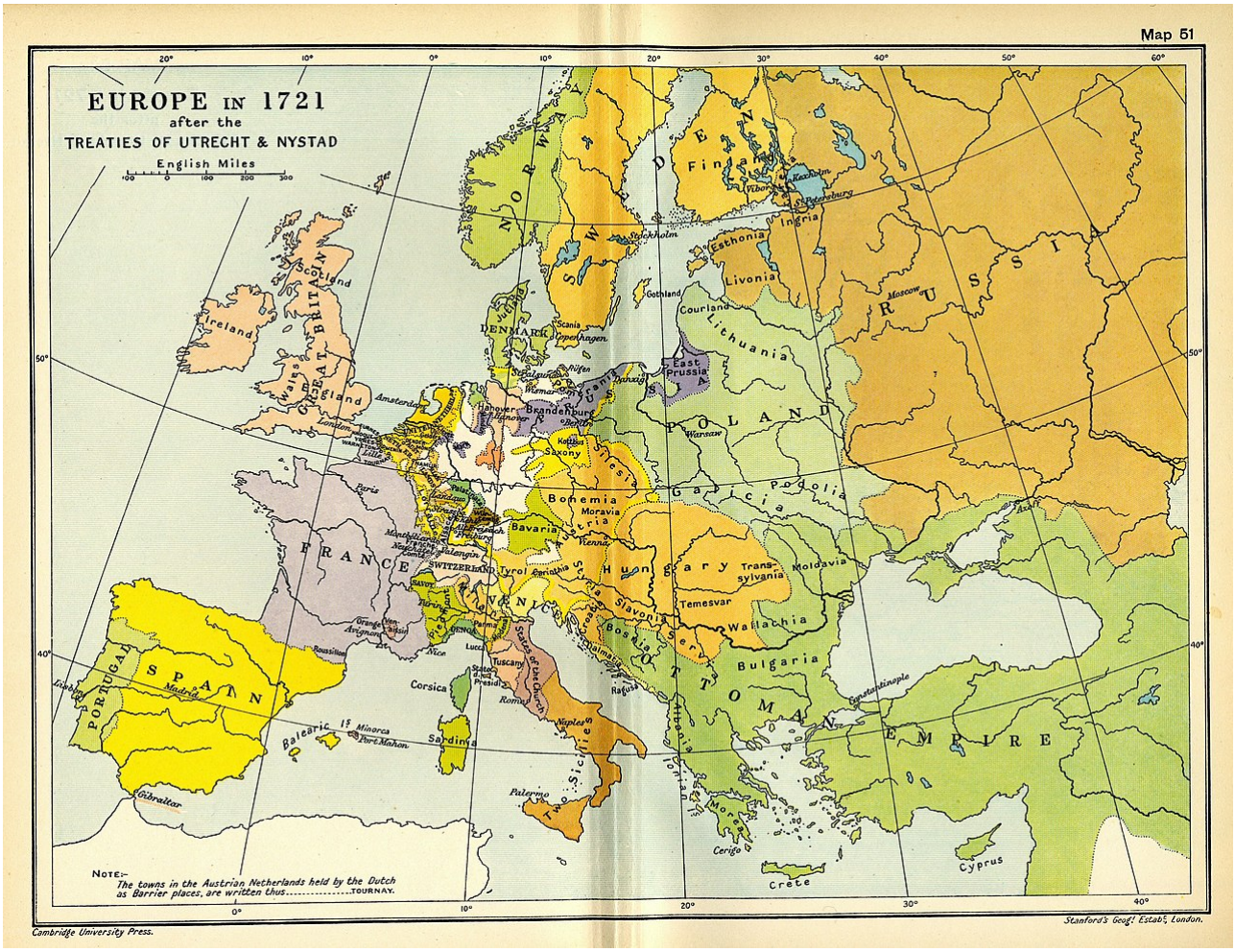
Appendix D. Historical maps of the study region.

Figure D1: Europe in 1700.



Source: Colbeck (1905).

Figure D2: Europe in 1721.



Source: Ward et al. (1912).

Figure D3: Europe in 1748.

Source: De Agostini (2011, p. 117).

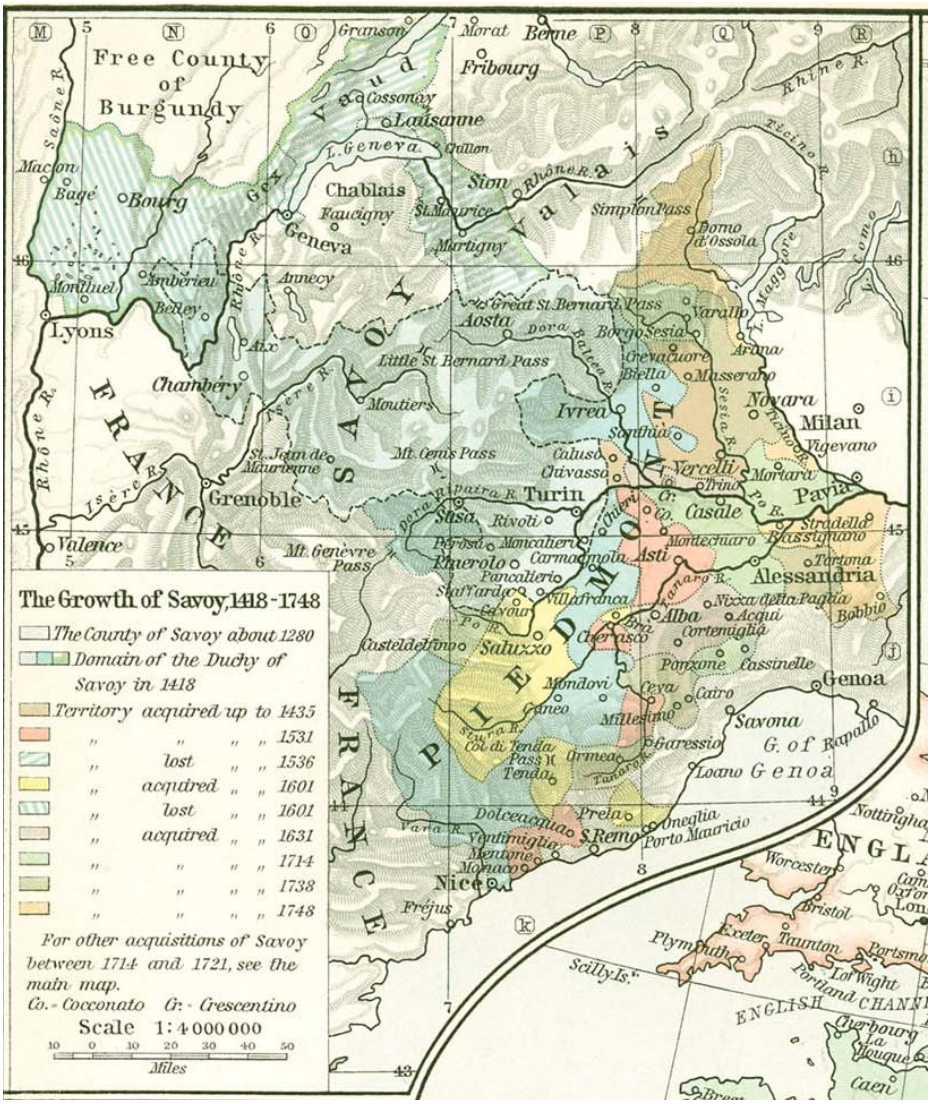
Figure D4: Italy in 1748.

Source: The map is taken from the *Mapping History* project developed by the University of Oregon and the Universität Münster, and can be accessed at "https://pages.uoregon.edu/mapplace/EU/EU19%20-%20Italy/Maps/EU19_42.jpg". It depicts dominant States in 1748, and highlights the changes in territorial domination between the Treaty of Utrecht (1713) and the Treaty of Aix-la-Chapelle (1748).

Figure D5: Territorial expansion of the Savoy House (1416-1748).

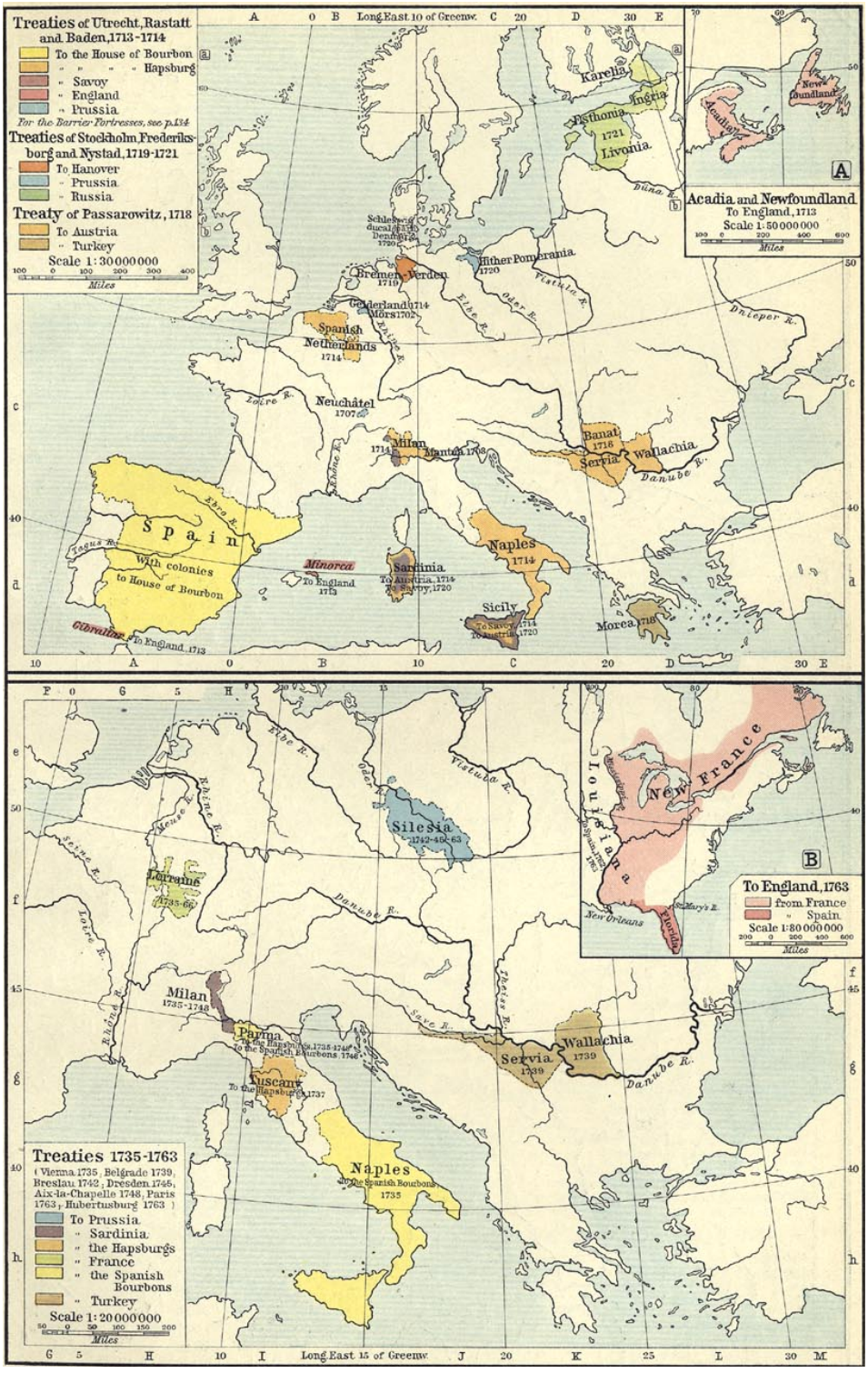
Source: The map is taken from the *Mapping History* project developed by the University of Oregon and the Universität Münster, and can be accessed at "https://pages.uoregon.edu/mapplace/EU/EU19%20-%20Italy/Maps/EU19_74.jpg". It highlights the changes in Savoy House's domination, especially on the border with the Duchy of Milan.

Figure D6: Territorial expansion of the Savoy House (1418-1748).



Source: Shepherd (1926, p. 130). The map highlights the changes in Savoy House's domination, especially on the border with the Duchy of Milan.

Figure D7: Territorial variations agreed through treaties in Western Europe (1713-1763).



Source: Shepherd (1911, p. 133).

Appendix E. Mean difference across the border.

Table E1: Mean difference in geographical, demographic, and economic variables across the frontier.

Dependent Variable	Altitude	Terrain Ruggedness	Distance to Sea Coast	Land Area	Distance to Regional Capital City	Provincial Capital City
Duchy of Milan (Austria)	-0.139	-0.543	0.161	-0.489***	-0.802****	0.004
	(0.301)	(0.676)	(0.136)	(0.163)	(0.184)	(0.006)
R^2	0.01	0.03	0.07	0.10	0.26	0.00
No. Municipalities	657	657	657	657	657	657
No. Treated Municipalities	371	371	371	371	371	371
No. Control Municipalities	286	286	286	286	286	286
Dependent Variable	Income Per Taxpayer	Population Density	Share Foreigner Population	Share Illiterate Population	Share Tertiary-Educated Population	
Duchy of Milan (Austria)	0.121****	1.547****	0.007	0.000	0.019***	
	(0.031)	(0.253)	(0.007)	(0.000)	(0.006)	
R^2	0.10	0.35	0.01	0.00	0.06	
No. Municipalities	657	657	657	657	657	
No. Treated Municipalities	371	371	371	371	371	
No. Control Municipalities	286	286	286	286	286	
Dependent Variable	Unemployment Rate	Share Manufacturing Employment	Share Primary Employment	Share Services Employment		
Duchy of Milan (Austria)	-0.005	0.029	-0.000	0.010		
	(0.003)	(0.025)	(0.003)	(0.023)		
R^2	0.02	0.01	0.00	0.00		
No. Municipalities	657	657	657	657		
No. Treated Municipalities	371	371	371	371		
No. Control Municipalities	286	286	286	286		

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. All specifications include a constant term.

Appendix F. Border specification with only statistically significant controls

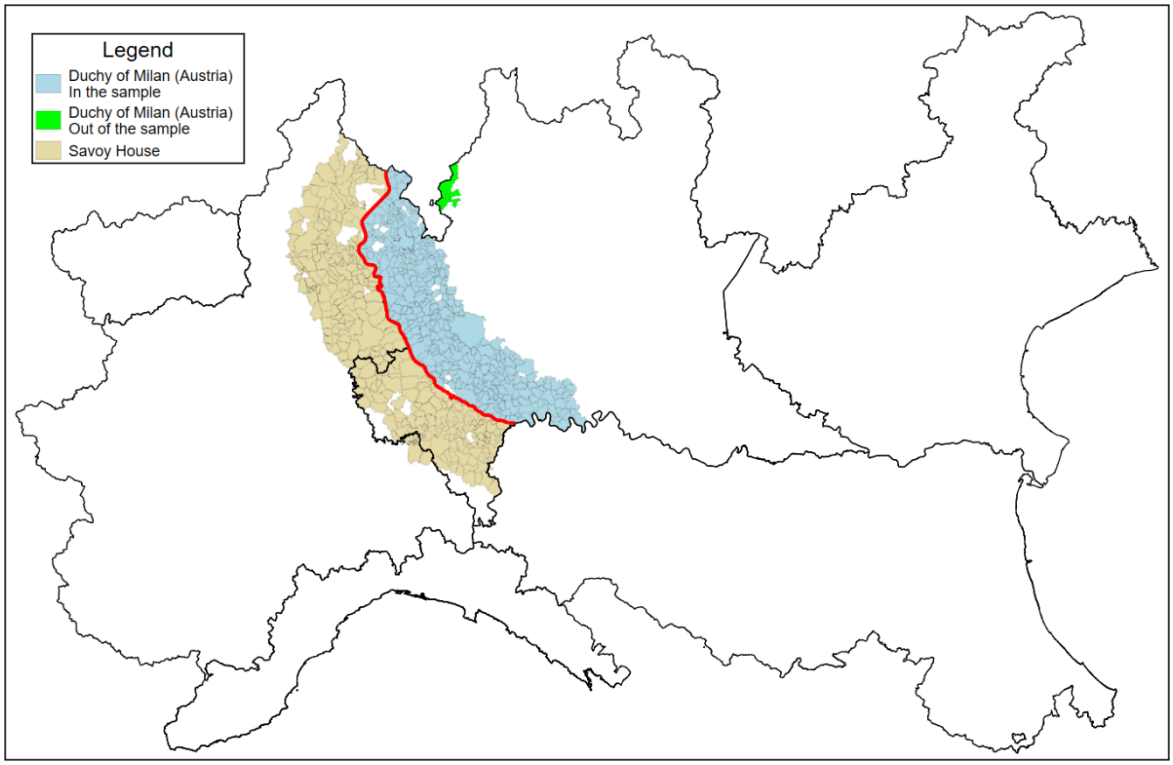
Table F1: Border specification with 30 km bandwidth around the frontier including only statistically significant controls from Table E1.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.308****	-0.072	0.648****
	(0.060)	(0.052)	(0.114)
R^2	0.21	0.08	0.30
Selected Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	657	657	657
No. Treated Municipalities	371	371	371
No. Control Municipalities	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. Selected controls are: land area; distance to regional capital city; income per taxpayer; population density; share of tertiary-educated population. The dependent variables are log-transformed. All specifications include a constant term.

Appendix G. Sample modifications

Figure G1: Estimation sample within 30 km on either side of the frontier excluding non-contiguous treated municipalities in the current NUTS-3 region of Como.



Notes: The map displays estimation sample municipalities lying within 30 km on either side of the frontier. The light-blue area denotes municipalities of the Duchy of Milan under Habsburg domination starting from the 1748 Treaty of Aix-la-Chapelle. The light-khaki area denotes municipalities ruled by the Savoy House starting from the same year. The bright green area denotes the 9 non-contiguous municipalities in the current NUTS-3 region of Como (Duchy of Milan under Habsburg domination) lying within 30 km of the 1748 frontier. The red line identifies the frontier established in 1748 between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. The black lines identify the borders of the current Italian NUTS-2 regions.

Table G1: Border specification with 30 km bandwidth around the frontier excluding non-contiguous treated municipalities in the current NUTS-3 region of Como.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.271****	0.019	0.551****
	(0.055)	(0.078)	(0.099)
R^2	0.28	0.13	0.35
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	648	648	648
No. Treated Municipalities	362	362	362
No. Control Municipalities	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The dependent variables are log-transformed. All specifications include a constant term.

Table G2: Border specification with 30 km bandwidth around the frontier excluding municipalities that were part of the Principality of Masserano.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.267****	0.019	0.541****
	(0.054)	(0.079)	(0.099)
R^2	0.28	0.13	0.35
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	652	652	652
No. Treated Municipalities	371	371	371
No. Control Municipalities	281	281	281

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The dependent variables are log-transformed. All specifications include a constant term.

Table G3: Border specification on the whole sample.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.281	-0.039	0.600
	(0.041)****	(0.068)	(0.064)****
	[0.031]****	[0.067]	[0.054]****
	{0.026}****	{0.058}	{0.042}****
	⟨0.023⟩****	⟨0.050⟩	⟨0.034⟩****
R^2	0.16	0.15	0.21
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	2,093	2,093	2,093
No. Treated Municipalities	803	803	803
No. Control Municipalities	1,290	1,290	1,290

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors corrected for spatial dependence: in parentheses with distance cut-off set at 60 km; in brackets with distance cut-off set at 120 km; in braces with distance cut-off set at 180 km; and in angle brackets with distance cut-off set at 240 km. The dependent variables are log-transformed. All specifications include a constant term.

Table G4: Border specification on the whole sample excluding municipalities that were part of the Principality of Masserano and/or the Duchy of Mantua.

Excluded 1700 Dominant State	Principality of Masserano	Duchy of Mantua	Principality of Masserano and Duchy of Mantua
Dependent Variable	Administrative Efficiency		
Duchy of Milan (Austria)	0.281****	0.279****	0.279****
	(0.041)	(0.041)	(0.041)
R^2	0.16	0.16	0.16
Dependent Variable	Administrative Efficiency – Expenditure		
Duchy of Milan (Austria)	-0.039	-0.035	-0.035
	(0.069)	(0.068)	(0.068)
R^2	0.14	0.15	0.15
Dependent Variable	Administrative Efficiency – Services		
Duchy of Milan (Austria)	0.600****	0.596****	0.596****
	(0.064)	(0.064)	(0.064)
R^2	0.21	0.20	0.20
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	2,072	2,013	1,992
No. Treated Municipalities	803	723	723
No. Control Municipalities	1,269	1,290	1,269

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The dependent variables are log-transformed. All specifications include a constant term.

Table G5: RD specification including only statistically significant controls from Table E1.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.251***	-0.131	0.616****
	(0.091)	(0.098)	(0.171)
R^2	0.22	0.08	0.31
Selected Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	657	657	657
No. Treated Municipalities	371	371	371
No. Control Municipalities	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. Selected controls are: land area; distance to regional capital city; income per taxpayer; population density; share of tertiary-educated population. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table G6: RD specification excluding non-contiguous treated municipalities in the current NUTS-3 region of Como.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.228****	-0.035	0.517****
	(0.062)	(0.094)	(0.134)
R^2	0.28	0.13	0.36
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	648	648	648
No. Treated Municipalities	362	362	362
No. Control Municipalities	286	286	286

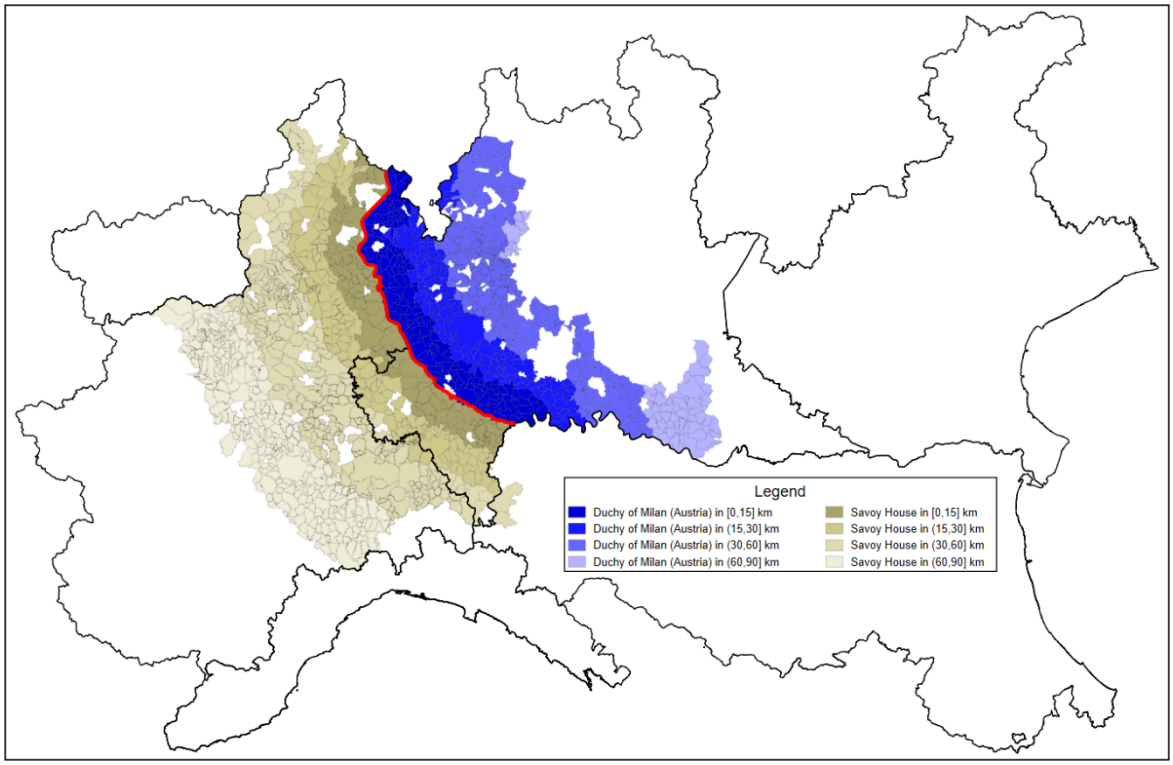
Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table G7: RD specification excluding municipalities that were part of the Principality of Masserano.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.250****	-0.023	0.544****
	(0.067)	(0.095)	(0.136)
R^2	0.28	0.13	0.35
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	652	652	652
No. Treated Municipalities	371	371	371
No. Control Municipalities	281	281	281

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Figure G2: Estimation sample by distance band on either side of the frontier.



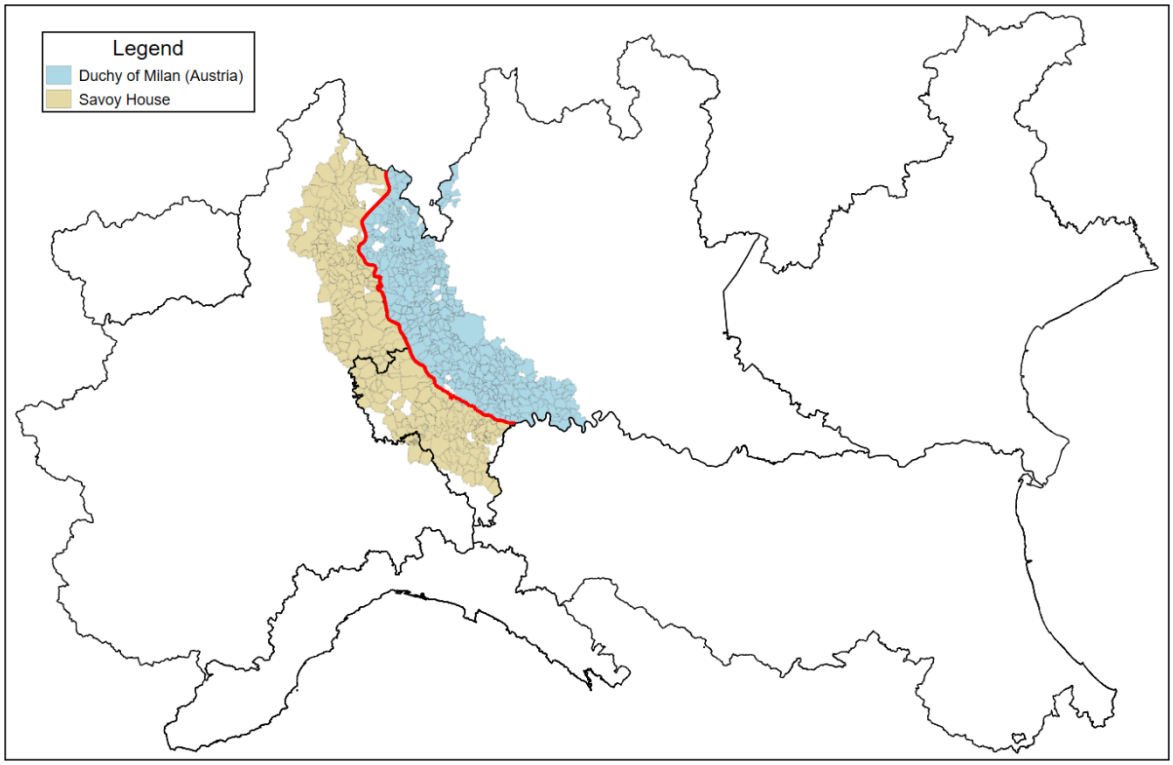
Notes: The map displays estimation sample municipalities grouped by distance band (0 to 15 km, 15 to 30 km, 30 to 60 km, and 60 to 90 km) within 90 km on either side of the frontier. The blue-shaded areas denote municipalities of the Duchy of Milan under Habsburg domination starting from the 1748 Treaty of Aix-la-Chapelle. The khaki-shaded areas denote municipalities ruled by the Savoy House starting from the same year. The red line identifies the frontier established in 1748 between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. The black lines identify the borders of the current Italian NUTS-2 regions.

Table G8: RD specification with 60 km and 90 km bandwidths around the frontier excluding municipalities that were part of the Principality of Masserano and/or the Duchy of Mantua.

Excluded 1700 Dominant State	Principality of Masserano	Duchy of Mantua	Principality of Masserano and Duchy of Mantua
Bandwidth		60 km	
Dependent Variable		Administrative Efficiency	
Duchy of Milan (Austria)	0.262****	0.262****	0.262****
	(0.049)	(0.049)	(0.049)
R^2	0.19	0.19	0.19
Dependent Variable		Administrative Efficiency – Expenditure	
Duchy of Milan (Austria)	0.025	0.023	0.025
	(0.062)	(0.061)	(0.062)
R^2	0.09	0.10	0.09
Dependent Variable		Administrative Efficiency – Services	
Duchy of Milan (Austria)	0.531****	0.533****	0.531****
	(0.086)	(0.085)	(0.086)
R^2	0.26	0.25	0.26
No. Municipalities	1,218	1,238	1,217
No. Treated Municipalities	687	686	686
No. Control Municipalities	531	552	531
Bandwidth		90 km	
Dependent Variable		Administrative Efficiency	
Duchy of Milan (Austria)	0.295****	0.294****	0.294****
	(0.053)	(0.053)	(0.053)
R^2	0.17	0.17	0.17
Dependent Variable		Administrative Efficiency – Expenditure	
Duchy of Milan (Austria)	0.032	0.033	0.035
	(0.062)	(0.062)	(0.063)
R^2	0.10	0.10	0.10
Dependent Variable		Administrative Efficiency – Services	
Duchy of Milan (Austria)	0.566****	0.565****	0.564****
	(0.093)	(0.093)	(0.093)
R^2	0.22	0.22	0.22
No. Municipalities	1,566	1,562	1,541
No. Treated Municipalities	748	723	723
No. Control Municipalities	818	839	818
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes

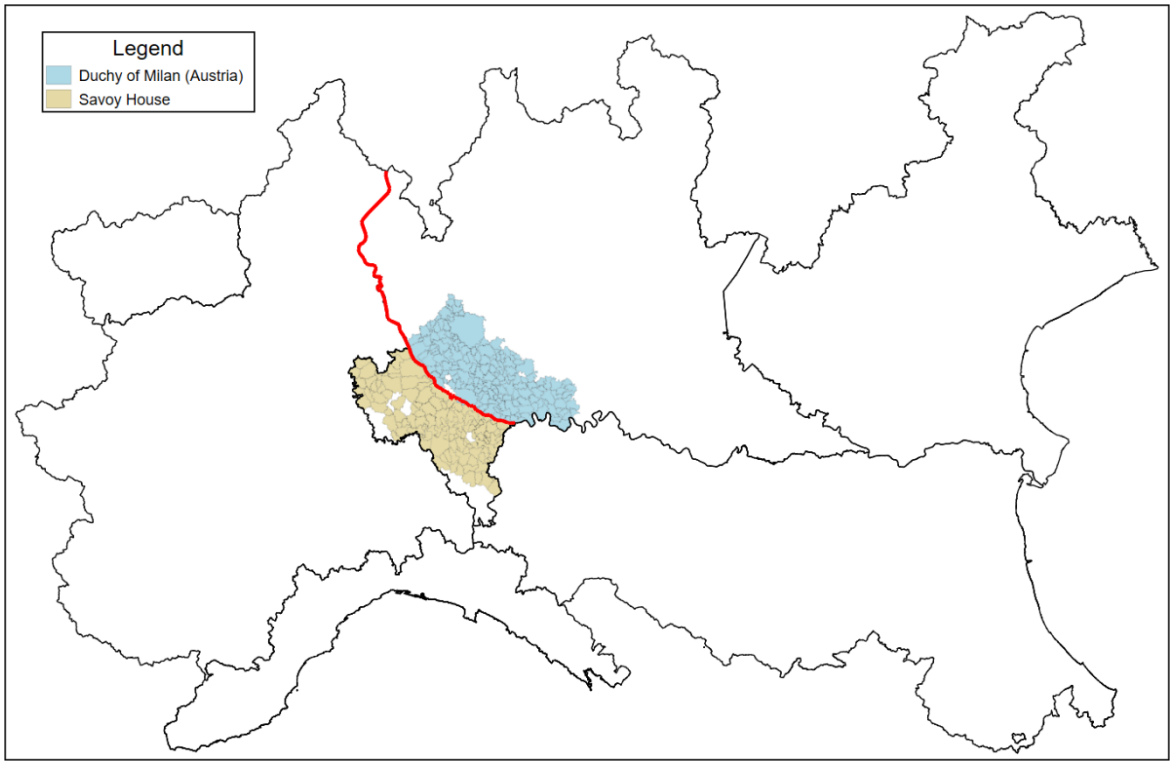
Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Figure G3: Estimation sample within 30 km on either side of the frontier including only municipalities that were part of the Duchy of Milan in 1700.



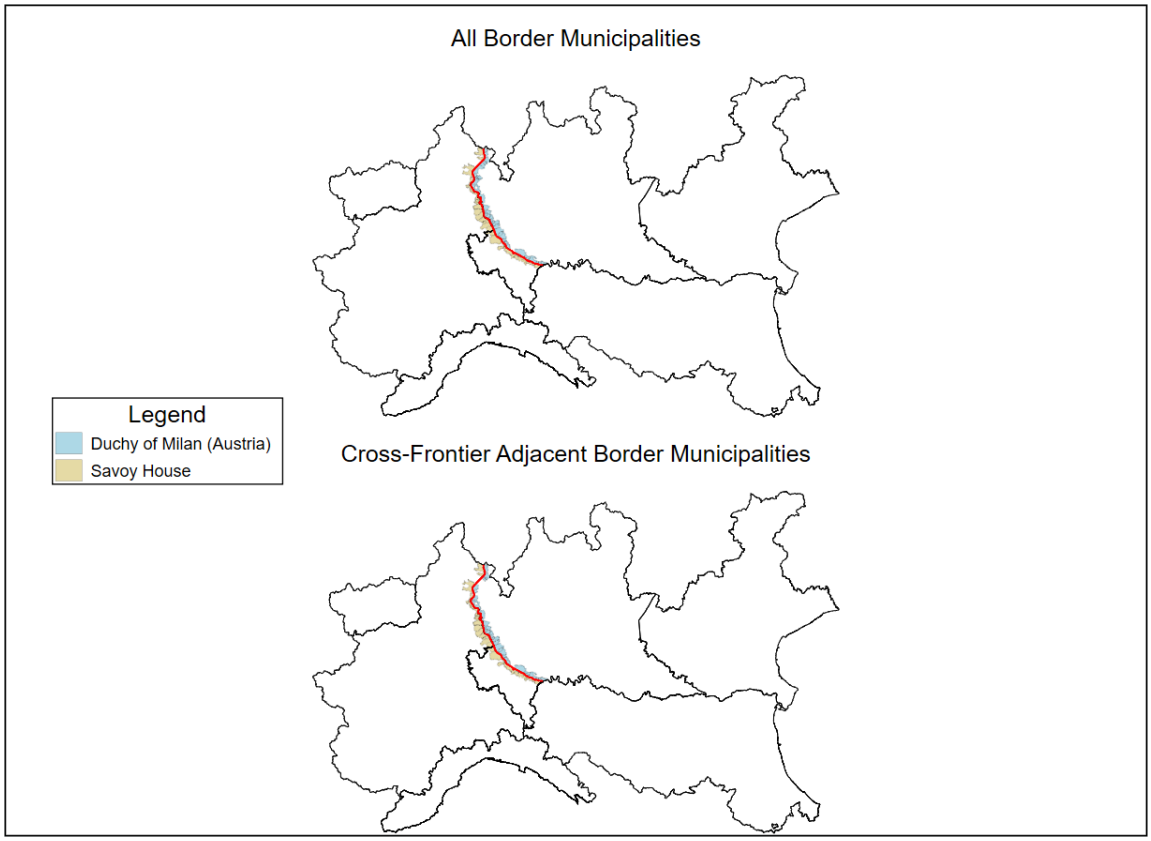
Notes: The map displays estimation sample municipalities that were part of the Duchy of Milan in 1700, and lying within 30 km on either side of the frontier. The light-blue area denotes municipalities of the Duchy of Milan under Habsburg domination starting from the 1748 Treaty of Aix-la-Chapelle. The light-khaki area denotes municipalities ruled by the Savoy House starting from the same year. The red line identifies the frontier established in 1748 between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. The black lines identify the borders of the current Italian NUTS-2 regions.

Figure G4: Estimation sample of Lombardy municipalities within 30 km on either side of the frontier.



Notes: The map displays estimation sample municipalities belonging to the current NUTS-2 Lombardy region and lying within 30 km on either side of the frontier. The light-blue area denotes municipalities of the Duchy of Milan under Habsburg domination starting from the 1748 Treaty of Aix-la-Chapelle. The light-khaki area denotes municipalities ruled by the Savoy House starting from the same year. The red line identifies the frontier established in 1748 between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. The black lines identify the borders of the current Italian NUTS-2 regions.

Figure G5: Estimation sample of border municipalities.



Notes: The map displays estimation sample municipalities located along the 1748 frontier. The first map displays all border municipalities, while the second map excludes 5 border municipalities of the Habsburg-ruled Duchy of Milan without an adjacent municipality on the other side of the frontier. The light-blue area denotes municipalities of the Duchy of Milan under Habsburg domination starting from the 1748 Treaty of Aix-la-Chapelle. The light-khaki area denotes municipalities ruled by the Savoy House starting from the same year. The red line identifies the frontier established in 1748 between the Habsburg-ruled Duchy of Milan and the Savoy House's territories. The black lines identify the borders of the current Italian NUTS-2 regions.

Appendix H. Robustness tests

Table H1: Various robustness tests on the baseline RD specification.

Robustness Test	NUTS-3 Instead of NUTS-2 FEs			Excluding NUTS-3 Capital Cities		
Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.151****	-0.012	0.304****	0.278****	0.025	0.559****
	(0.038)	(0.080)	(0.077)	(0.073)	(0.102)	(0.139)
R^2	0.32	0.18	0.42	0.28	0.15	0.35
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region FE	No	No	No	Yes	Yes	Yes
NUTS-3 Region FE	Yes	Yes	Yes	No	No	No
Dominant State in 1700 FE	Yes	Yes	Yes	Yes	Yes	Yes
No. Municipalities	657	657	657	651	651	651
No. Treated Municipalities	371	371	371	367	367	367
No. Control Municipalities	286	286	286	284	284	284
Robustness Test	Controlling for Distance to the Own Provincial Capital City			Controlling for Distance to Milan		
Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.250****	-0.022	0.546****	0.234****	-0.061	0.543****
	(0.065)	(0.093)	(0.136)	(0.062)	(0.098)	(0.133)
R^2	0.28	0.14	0.35	0.28	0.14	0.35
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes	Yes	Yes	Yes
No. Municipalities	657	657	657	657	657	657
No. Treated Municipalities	371	371	371	371	371	371
No. Control Municipalities	286	286	286	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The dummy variables for bishop (historical controls) and provincial capital city (geographical controls) are omitted when considering the sub-sample of non-provincial (i.e., NUTS-3) capital cities due to collinearity. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Table H2: RD specification without log-transforming the dependent and control variables.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	1.203****	-0.379	2.259****
	(0.321)	(0.464)	(0.629)
R^2	0.26	0.12	0.31
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	657	657	657
No. Treated Municipalities	371	371	371
No. Control Municipalities	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. All specifications include a constant term.

Table H3: RD specification winsorizing dependent variables.

Winsorizing at	1% and 99%		
Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.244****	-0.022	0.546****
	(0.064)	(0.096)	(0.135)
R^2	0.28	0.14	0.35
Winsorizing at	5% and 95%		
Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.206****	-0.022	0.546****
	(0.048)	(0.096)	(0.135)
R^2	0.27	0.14	0.35
Winsorizing at	10% and 90%		
Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.178****	-0.035	0.439****
	(0.040)	(0.077)	(0.121)
R^2	0.26	0.13	0.33
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	657	657	657
No. Treated Municipalities	371	371	371
No. Control Municipalities	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Appendix I. 1884 budget data.

Table I1: Baseline RD specification on 1884 estimation sample.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.239****	-0.032	0.529****
	(0.070)	(0.098)	(0.143)
R^2	0.29	0.14	0.35
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	606	606	606
No. Treated Municipalities	337	337	337
No. Control Municipalities	269	269	269

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Appendix J. Day care services.

Table J1: Baseline RD specification on 2013 nursery estimation sample.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.249****	-0.021	0.543****
	(0.066)	(0.096)	(0.134)
R^2	0.28	0.14	0.36
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
No. Municipalities	656	656	656
No. Treated Municipalities	371	371	371
No. Control Municipalities	285	285	285

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. All specifications include a constant term.

Appendix K. Controlling for civic capital and voting preferences

Table K1: Baseline RD specification controlling for civic capital and voting preferences.

Dependent Variable	Administrative Efficiency	Administrative Efficiency – Expenditure	Administrative Efficiency – Services
Duchy of Milan (Austria)	0.250****	0.001	0.525****
	(0.065)	(0.100)	(0.137)
R^2	0.29	0.15	0.37
Historical Controls	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes
Demographic and Economic Controls	Yes	Yes	Yes
Border Segment FE	Yes	Yes	Yes
NUTS-2 Region FE	Yes	Yes	Yes
Dominant State in 1700 FE	Yes	Yes	Yes
Civic Capital	Yes	Yes	Yes
Voting Preferences	Yes	Yes	Yes
No. Municipalities	657	657	657
No. Treated Municipalities	371	371	371
No. Control Municipalities	286	286	286

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$. The bandwidth is set at 30 km around the frontier. Standard errors (in parentheses) are corrected for spatial dependence: the distance cut-off is set at 60 km. The one-dimensional RD polynomial is specified as an interacted linear polynomial in distance to the frontier. The dependent variables are log-transformed. The set of control variables for civic capital includes log-volunteering and the average voter turnout at the referendum held on June 2011 (questions #1, #2, and #3). The set of control variables for voting preferences includes the average percentage of 'yes' votes at the referendum held on June 2011 (questions #1, #2, and #3), and the average percentage of blank votes at the same referendum (questions #1, #2, and #3). The three questions of the referendum held on June 2011 are as follows: question #1 concerns the entrusting and management of local public services with economic relevance; question #2 concerns the determination of the integrated water service tariff based on an adequate return on invested capital; question #3 concerns the production of nuclear electric power on the national territory. All specifications include a constant term.

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