Political unification and geographic economic disparities in Italy, 1861-1871*

Brian A'Hearn† Valeria Rueda‡

Preliminary draft

Work in progress

ABSTRACT

What is the effect of removing national borders on local economic activity? This article studies this question in a unique historical setup: The Italian unification. The Italian peninsula went from being a patchwork of independent states throughout the entire first half of the 19th century, to an almost completely-unified state in 1861, and fully unified one in 1870. This article investigates the effect of this sudden and unexpected geopolitical change on the spatial distribution of local population growth, a proxy for economic activity. Using a difference-in-difference approach, we show that proximity to a removed border is, on average, associated with an increase in population growth. This average result masks important heterogeneities. First, there can be asymmetric effects on each side of a same border. Second, Piedmont, which endured the least institutional changes is the state with the largest increase in growth. Finally, proximity to the border is also associated with increased variability, an indication of reallocation of economic activity.

KEYWORDS

Border Effects, Economic History, Economic Integration, Italy, Political Unification, 19th Century, Spatial inequality

JEL

J6, N33, N93, R12, R23

---

* We thank the participants of the Paris School of Economics Economic History seminar, the Tinbergen Institute Labour, health and development seminar, and the Oxford-Warwick-LSE economic history workshop for their helpful comments.
The authors would like to acknowledge the use of the University of Oxford Advanced Research Computing (ARC) facility in carrying out this work. http://dx.doi.org/10.5281/zenodo.22558.
† Pembroke College, Economic and Social History Group, University of Oxford.
brian.ahearn@pmb.ox.ac.uk
‡ Pembroke College, Economic and Social History Group, University of Oxford.
valeria.rueda@pmb.ox.ac.uk

INTRODUCTION

What is the effect of removing national borders on local economic activity? This article studies this question in a unique historical setup: The Italian unification in 1861. We estimate the consequences of removing and imposing national borders, drastic shocks on market access, on population growth.

Throughout the first half of the 19th Century, the Italian peninsula was a patchwork of independent states, ruled mostly by autocratic monarchies dominated by the French and the Austro-Hungarian Empires. This situation changed in a rapid turn of events, when a successful series of military campaigns from 1859 to 1861 led to the proclamation of Vittorio Emanuele II, previously King of Sardinia, as ruler of the newly declared Kingdom of Italy in 1861. The formerly independent Kingdom of Sardinia, Lombardy, the Central Duchies, and the Kingdom of the two-Sicilies merged in 1861. Veneto and the Papal States would be annexed in 1866, and 1870, respectively. In this process, the geopolitical configuration of the Italian peninsula thus drastically changed; 9 national borders were removed and 3 new national borders were imposed. To illustrate this process, Figure 1 contains two maps of Italy, one in 1848, after the Piedmontese defeat against the Austro-Hungarian army in 1848, and one after the Expedition of the Thousand in 1861 (Bosisio, 1956). Figure 2 maps the borders that are removed, maintained, and abolished as a result of the unification up to 1861. The Italian unification is thus an unprecedented shock in the geopolitical configuration of the peninsula. Comuni located near a removed border went from being towns in the periphery to central locations in the newly formed state. In other words, they experienced a positive market access shock. Symmetrically, comuni near newly imposed borders in Piedmont and Lombardy experienced a negative market access shock (see Figure 2). This article first investigates the short-run effect of the border changes on the spatial distribution of population growth, a proxy for economic activity, at the local level.

Our first contribution is to establish that the removal of national borders is associated with an average increase in population growth around the border. On average, comuni near a removed border experienced an increase in yearly population growth of around 0.2 percentage points compared to the pre-unification period. This increase represents approximately 30% of the sample average, so it is a meaningful increase.[1] Such result is consistent with previous findings establishing the positive relationship between market access and growth (Redding & Sturm, 2008). We also observe a symmetric decrease in population growth for the comuni neighbouring the newly imposed borders between Piedmont and France in the former County of Nice and Duchy of Savoy. The effects are robust across a range of different specifications, accounting for Italy's rough terrain and allowing flexible effects of distance on growth. Taken together, these patterns show that even in a pre-industrial country, with an economy that has been described as "dormant" in the period of interest (Zamagni, 1993), market access shocks resulting from changes in national borders had sizeable and statistically significant effects on local population growth. For those who believe that the past can inform us about the present, the rapid political unification of Italy is also a crucial comparison point for the European Union, which has aimed at consolidating an integrated European market through political efforts (Toniolo, Conte, & Vecchi, 2003).

---

[1] This varies with the specification and the state considered.

A subsequent question to investigate is whether this average increase is evenly distributed across space, or whether we observe the emergence of new patterns of spatial inequality. In other words, do the gains from political unification benefit, on average, all the *comuni* within border regions, or do we observe the emergence of winners and losers from the newly formed state? Our preliminary results suggest that the average increase in growth is concentrated in a few regions, and within those regions, in a few winning *comuni*, thus evidence of spatial reallocation of activity.

To estimate border effects, we use two approaches. First, using data for the first decade after unification (1861-1871), we investigate whether regions close to a historical border have larger growth. We observe a moderate nation-wide effect (one percentage point) that masks important heterogeneities. While some border regions do seem to experience larger growth, in particular comuni in the Piedmontese border with Lombardy, some others are significantly shrinking. For instance, comuni in the Lombard border with Piedmont grow up to 2 percentage points slower than the mean. This pattern is suggestive of significant migration from one side to the border (Lombardy) to the other (Piedmont).

Second, we aim at determining whether the patterns observed are actually consequences of the unification. We thus use a differences-in-differences (DiD) approach in for a subset of states for which we have collected, digitized, and geocoded local-level pre-unification data that we have merged to our post-unification data. These states are Piedmont, Tuscany, and the Kingdom of the two-Sicilies. The DiD also estimates increased population growth near abolished borders and decreased growth around newly imposed ones. The DiD approach also allows to capture convergence patterns that are not immediately evident from the post-unification data. For instance, the while the Southern border regions do not seem to be growing faster than average after unification, the comparison with pre-unification trends shows that these regions tended to have significantly *lower* growth before unification. There is thus evidence of convergence in growth for the comuni in the southern border.

The Italian unification also represents a major institutional transformation; it is the end of the *ancien régime*. A common market was established, as trade barriers between former independent states are abolished, and a common currency and foreign trade policy were adopted. Moreover, the institutions adopted by the new Kingdom of Italy were dominantly the Piedmontese ones. Piedmont had more liberal institutions than the other states, as it had adopted a constitution, the *Statuto Albertino* in 1848. The *Statuto* introduced a degree of separation between the executive and the legislative. The King directed the executive and foreign affairs on the one hand, and the Senate and Chamber were in charge of the legislative on the other. The *Statuto* also granted civic liberties and political rights to the citizens, such as the rights of *habeas corpus*, and freedom of cult (while Roman Catholicism remains the official religion). The Piedmontese constitution, and its administrative and judicial systems are extended to become the national ones at unification (Lecce, Ogliari, & Orlando, 2017). The institutional unification is thus sometimes referred to as the *Piedmontisation* of the state (Guichonnet, 1961). This "institutional extension" is interesting because it can be seen as an asymmetric institutional shock. For Piedmont, the consolidation of the Kingdom of Italy is indeed a much lesser institutional shock than for the rest of the territory. To gauge the short-term effect of the institutional shock, we can compare Piedmont and to the rest of the states.

We then also discuss the short-run consequences of institutional changes. Our data shows that while growth increased in most states before and after unification, the change is biggest for Piedmont, despite it having faced both positive and negative market access shocks (border removal and border impositions). The patterns suggest that *in the short run*, the effect of increasing market access for border areas was much more important than the adoption of liberal institutions. This does not mean that institutional changes were not important, nor that they did not matter over a longer time horizon. Rather, it illustrates that institutional shocks take time to have significant effects.

To conduct our analysis, we have produced the first historical geocoded database of population at the comuni level for the period of unification, using 1871 administrative units. This database is constructed using several historical sources. The post-unification data uses records from the Italian 1861 and 1871 censuses. While the Italian statistical institute (Istat) has produced time series of population levels at the comuni level, these series are constructed projecting backwards modern administrative units (1951 or 2001). Our database keeps the historical unit of analysis. This effort also permits a more accurate linking with pre-unification sources, which we do for Tuscany (Repetti, 1846), the Kingdom of Sardinia (Fabi, 1853, 1855)[1], and the Kingdom of the two-Siciles (Marzolla, 1828, 1848)[2]. This database is also a contribution to historical and demographical research.

Our research adds to the literature on the economic history of Italian integration, the literature on the impact of borders on demographic changes, and the effect of institutional transitions on growth.

First, there has been substantial work aiming at determining whether unification had any effect on the Italian market integration. Using aggregate trade flows between old states, Zamagni claims that there is no real market integration in Italy in the first decades after unification (Zamagni, 1983). Federico shows that there is evidence of price convergence for certain commodities, both before and after unification, but that the convergence is more likely to be due to the integration of local markets with international ones through maritime trade than to the consolidation of an Italian market (Federico, 2007). Since we have geocoded data at a fine level of disaggregation, we can infer spatial patterns of economic activity, instead of focusing on aggregate indicators (price levels, trade flows). Moreover, the patterns of local growth we observe show the existence of clusters of growth and shrinkage, some of which are localized at the vicinity of removed and newly imposed borders. These findings depict a more dynamic image of the Italian population than what the previous economic history of the period did.

In the broad literature on the impact of political borders on economic activity, we focus on the particular question of whether removing or imposing a new border affects demographic dynamics. If removing a border increases market access, it can then have two opposite effects on population growth. On the one hand, the "cost of living" and the "home market" effects act as agglomerating forces. The "cost of living effect" is the increase in real wages resulting from decrease in prices as

[1] The Sardinian source uses the data from 1838 and 1848.
[2] The 1848 source uses data from the census conducted in 1811 under Joachim Murat and re-published by Martuscelli (1979).

competition increases. This "cost of living" effect acts as an agglomeration force for workers. The "home market effect" is the increase in nominal wages resulting from firms facing larger expenditure on their goods. On the other hand, increased competition acts as a dispersion force.

The empirical investigation of the effect of market access on growth is subject to endogeneity issues because border changes are often the result of lengthy processes that can reflect economic transformations (Redding & Sturm, 2008). In other words, borders changes can be tied to economic conditions; the explicit conditionality on favourable economic outcomes to join the European Union exemplifies this endogeneity. For this reason, historical examples of faster border changes, resulting from nationalism or violent conquest can be better case studies to assess the role of market access on growth. Using the case of the German division in the aftermath of World War 2 and its subsequent unification in 1989 Redding & Sturm (2008) find that the increased (resp. decrease) in market access driven by the removal (resp. imposition) of the West-East border lead to an increase (resp. decrease) in economic activity, especially for smaller cities. Similar results have been established for the opening of the eastern Austrian border in 1990 (Brülhart, Carrère, & Trionfetti, 2012), and the integration of Saxony into the Zollverein (the custom unions between German states) in 1834 (Ploeckl, 2008). Our case study has two specificities compared to the previous literature. First, the scale of unification is unmatched: The *Risorgimento* entails the removal of 9 borders and the imposition of 3 new ones (see Figure 2). Second, Italy in the 1860s is a pre-industrial society with weak transport infrastructure. Our results illustrate that border changes can also have sizeable and significant effects in a developing region.

Thirdly, if we acknowledge the Italian unification as a moment of institutional transformation, then our research can also provide a discussion about the effect of liberalizing institutions on local growth. We complement work such as the one by Michalopoulos & Papaioannou (2016), who point-out that in the case of ethnicities partitioned between different sub-Saharan African countries, national institutions are only a significant predictor of urbanization and income (as proxied by luminosity) for areas close to capital cities. In our data, Piedmont, where institutions did not change, appears to be the state with the largest increase in yearly growth before and after unification. Similarly, depending on specifications, the effect of unification can be mostly captured by areas close to a removed border. These two patterns hint that in the short term, changes in market access were more important in determining growth than institutional changes, which is a similar conclusion to the one reached by Redding and Sturm (2008). This does not mean that institutional changes were not important, nor that they did not matter in a longer horizon. Institutional changes after unification indeed faced resistance (Lecce, Ogliari, & Orlando, 2017), and even without such resistance, they are likely to have taken time to be implemented. Our results are akin to Michalopoulos & Papaioannou (2016) in that they show the difficult implementation of institutional changes in contexts of weak state capacity.

Finally, we can also have a novel perspective on the long-lasting debate regarding the "southern question". There is a tradition dating the origins of the Italian North/South divergence to unification. Grasmci described the South as having being reduced to an "exploitable colony" by the Northern bourgeoisie as a result of unification (Gramsci, 1926). Our data allows to compare patterns of growth at the local level between the North and the South. In the aftermath of unification, there are little significant differences in growth between the North and the South at the vicinity of the border. However, the DiD results indicate a statistically significant border effect.

These results can be taken together as preliminary evidence of convergence of the comuni at the south of the border, opposing the view of initial similarity between the North and South.

FIGURE 1

FIGURE 2

HISTORICAL CONTEXT

The history of unification

Italian unification was achieved suddenly, by force of arms. In 1859 allies Piedmont and France provoked and won a war with Austria, leading to Piedmont's annexation of Lombardy. Veneto, according to the terms of a peace negotiated separately by France, remained part of the Habsburg Empire until 1866 (when Piedmont joined Prussia in another war against Austria). The price of French support was Piedmont's cession of Nice and Savoy to France. Meanwhile, abandoned by their Habsburg-tied rulers or Austrian garrisons, the Papal Legations and duchies of Parma, Modena, and Tuscany voted in 1860 plebiscites for annexation to Piedmont. In the same year, Garibaldi's thousand volunteers unexpectedly defeated Bourbon forces in the South in just a few months, and Piedmontese forces invaded the Papal territories of the Marches and Umbria. Plebiscites were again arranged to request annexation. (The large province of Rome remained in the Pope's hands and under French protection until the Franco-Prussian War of 1870 caused Napoleon III to withdraw the French garrison.) By early 1861 the first Italian parliament was meeting in Turin, declaring Vittorio Emanuele King of Italy on 17 March.

Two features of this process are important for our purposes. First, though most internal borders came down, those between the province of Rome and Tuscany (to the north of Rome), as well as the one between Rome and the former Kingdom of the Two Sicilies (in the south of the Rome), remained until 1870 (Figure 2). And several *new* barriers went up: between Piedmont and its former possessions of Nice and Savoy, between Lombardy and Veneto (until 1866), and between the province of Rome and the rest of the former Papal State (until 1870). Second, the outcome was unexpected. Piedmont's expansionary ambitions were well-known, but so too was the outcome – defeat – of their last war on Austria, in 1848-49. The indispensable support of France was secured only in 1858, in the secret Plombières agreement. Neither the timing of hostilities nor their successful outcome could have been predicted. Nor could have been the extent of the new Kingdom proclaimed in 1861. Piedmont and its allies had envisioned an enlarged Piedmont and a loose confederation of Italian states. The South in particular had never been part of Piedmont's plans; it was only Garibaldi's largely autonomous exploits, and the worry that he might declare a republic or use it as a base to move on Rome, that brought the former Kingdom of the Two Sicilies into the new state.

The speed and timing of unification may have been unexpected, but was it exogenous, from an economic point of view? An influential tradition associated with Antonio Gramsci interpreted national unification as part of a bourgeois revolution. The revolution may have been incomplete, flawed, even failed, but still represented the rising capitalist class asserting political dominance to further its economic interests, which included a unified national market. Yet the current historiographical consensus does not support this interpretation. Of course, economics mattered

in some sense. As Davis (2000, p. 235) writes, "economic liberalism played a critical role in rallying the Italian propertied classes to the Piedmontese monarchy …, while the social unrest provoked by … economic change in the countryside contributed directly to the collapse of the legitimist autocracies." But unification of the national market was not central to the debate on unification of the nation, and capitalists were by no means at the forefront of the movement. Tonoiolo (1998) relates that "all in all, the participation of manufacturing interests in the Risorgimento was almost non-existent, and leadership of the movement was assumed by the moderate representatives of agrarian interests in Piedmont and Tuscany, and numerous middle-class professionals" (pp. 81-82; our translation). A recent survey concludes "there was no economic logic behind unification, so economic growth and the development of unitarian nationalism in Italy must be seen as entirely distinct processes" (Riall 2009, p. 108).

If political unification was neither predictable nor directly based on economic considerations, what can be said about the progress of economic integration? The preunification states were divided by mountainous geography and inadequate infrastructure; different institutional and legal frameworks; a plethora of weights and measures; linguistic differences[1]; multiple monetary systems; and tariff barriers. Regarding monetary systems, every pre-unification state had its own: some were bimetallic, others a silver standard; some were decimal, others based on twelves and twenties; some had note-issuing quasi-central banks, others not. Nowhere was the use of banknotes or other "modern" means of payment widespread, and even in 1862 there were some 270 different legal-tender coins in circulation (Toniolo et al. 2006). As for tariffs, reliable data are lacking, but Table 1, drawn from a contemporary source, gives some sense of the situation circa 1858. Plans for possible customs unions had not come to fruition, apart from a short-lived 1853-57 arrangement between the Kingdom of Lombardy-Venetia and the Duchies of Modena and Parma, but the situation in 1858 reflected a general move towards trade liberalisation. It is clear in Table AA that raw material imports were lightly taxed but manufactures were still protected, particularly in the South. After unification, the lower Piedmontese tariffs were extended to the entire Kingdom. Some regions thus experienced a double shock of liberalisation, opening to both Italian and external commerce.

Intra-Italian trade was limited not only by tariffs and other impediments, but also by a lack of complementarity between the regional economies – all of them predominantly agricultural, all of them exporters of Mediterranean primary products such as silk, olive oil, wine, or citrus. On the recent estimates of Federico and Tena-Junguito (2013), even the small, landlocked Duchies of Modena and Parma traded more with external partners than with their neighbours (Table 2). For larger states, the share of intra-Italian in total trade was generally less than one fifth (and this total includes some transit trade, such as exports of raw cotton – not grown in Italy – recorded for Piedmont).

Upon unification, internal tariffs were abolished, the Italian lira proclaimed as a national currency with legal tender status, and Piedmont's commercial law was extended to the entire country. The

[1] De Mauro (1963, p. 43) estimated that 600,000 individuals in a population of over 25 million could read and write Italian at the time of unification, most of them in Tuscany.

new state prioritised the construction of a national rail network to knit the new kingdom together (militarily, as much as economically). Figure ZZ illustrates the evolution of the rail network. Already before unification, in the 1850s, a rudimentary network linking the port of Genova, the major cities of Turin and Milan, and a number of smaller centres, had been constructed. Elsewhere, rail lines were few and disconnected. By 1871 total kilometres of track had grown from 2,500 to 6,300 km, and the peninsula's most important cities had been linked. Fenoaltea (1983) argues that the new North-South trunk lines neither unified the market nor earned an adequate rate of return, as they were not competitive with cheaper coastal shipping over long distances. Schramm's (1997, p. 151) rough guess is that the ton-kilometres moved by coastal shipping were nearly three times shipments by rail as late as 1881. It was the secondary lines constructed after 1880, linking minor provincial centres in the interior to the network, that had a greater impact on transport costs according to Fenoaltea: here the railway competed with oxcarts on rough surface roads.

What of economic integration? Ironically, it becomes more difficult to estimate trade flows once the former independent states become regions of a single country. For the period 1867-84, Schram (1997) estimates trade flows from data on freight shipped by the Società per le Ferrovie dell'Alta Italia, operator of the Northern rail network. Imports and exports are inferred from freight tonnage passing through transit stations at the external borders and between the Northern network and those further South, plus a share of rail shipments to and from the major ports (above all Genova). The South's share of Northern imports, on this measure, averages only about 10%, with a gently rising trend. Its share of Northern exports is a higher at around 25%, but without any clear trend. For a later period, around 1911, Zamagni (1983) estimated net interregional trade flows on the basis of regional production figures, educated guesses about regional consumption, and international trade data. Her conclusion is that a half-century on from unification, "internal traffic within the Northwest zone was intense, some substantial flows of exchange existed between the Northwest and the Northeast-Centre, while both commerce between the South and the rest of the country and commerce within the South remained extremely modest." (1983, p. 1648; our translation)

Historical data on prices are more abundant. Federico (2007) has shown that the wheat market in post-unification Italy was quite efficient. Interestingly, the convergence in wheat prices across 13 Italian markets began well *before* 1861, through greater exposure to or integration with external markets, as a result of falling maritime transport costs. The convergence process actually stalled in the decade after unification. Turning from commodities to the labour market, new estimates of real wages in agriculture and construction by Federico, Nuvolari, and Vasta (2017) show scant convergence between 1863 and 1871, with the coefficient of variation quite high and stable at 0.30 to 0.29. As late as 1911, half a century after unification, the CV remained 0.26. The authors write that an initial gap between the Northwest and the South only grew over the period. As for the capital market, comparable interest rate data are scarce, but Toniolo, Conte, and Vecchi's (2003) have studied weekly Italian government bond prices across six stock markets, beginning in 1863. Surprisingly, they find that even for this perfectly homogeneous financial instrument, traded regularly in thick markets linked by telegraph, the law of one price did not hold. The dispersion of prices across markets fell only slowly until 1887 (when institutional changes that undermined the local market power of stock brokers came into effect).

The evidence on economic integration in the aftermath of political unification is thus ambiguous. Internal trade was increasing, prices of commodities and factors of production converging; but slowly, and without much evidence of an acceleration after 1861. The picture of aggregate economic performance is similarly mixed. Change was underway as public finances were brought under control, infrastructure was constructed, and institutions built. But real GDP per capita grew at less than half of one per cent per year in the first decade after 1861, and only 0.8 per cent from 1871 to '81. In this muddled context an economic geography perspective may yield new insights into the impact of unification.

TABLE 1

TABLE2

DATA

Post-unification data

The Kingdom of Italy conducted decennial censuses starting from 1861, which report population levels for each comune and are available through Istat. Using 1861 and 1871 sources, we construct a geolocated database of population levels and population growth with 1871 constant geographic units of analysis. To the extent of our knowledge, this is the first database of this kind, and its construction is a contribution to the literature.

Geographical units of analysis are not constant over time, as towns gain or lose territory. When establishing a data series at the level of geographical units of analysis, it is important to maintain a constant unit. Constant units are crucial because empirical results are sensitive to zoning choices, a problem also known as Modifiable Areal Unit Problem (MAUP) (Briant, Combes, & Lafourcade, 2010).

To illustrate the challenge of areal changes in our data, we can consider an example. The Lombard comune Farinate was annexed to Capralba in 1868. In the records as they are reported in Istat, Capralba has 589 inhabitants in 1861 and 1083 in 1871. Farinate has 381 and a missing value in 1871 as it no longer is a comune at that time. If we do not correct this areal change, Capralba would record an artificially high level of population growth that is just due to changes in administrative boundaries. To account for these changes we use the recorded territorial variations in Istat and also summarized in the 1951 statistical publication "Comuni e loro popolazione ai censimenti dal 1861 al 1951" (Repubblica Italiana Istituto Cetrale di Statistica, 1960). The goal is to create a database with 1871- constant units of analysis, so that it now does not enter the record for Farinate, and the record for Capralba shows a population of 381+589=970 in 1861, and 1083 in 1871.

An alternative and labor-saving approach would have been to use one of the available compilations from Istat that re-create the decennial population series from 1861 to the present day, using 1951, 2001, or 2014 constant units of analysis. However, we preferred to construct the constant-1871 units of analysis for two main reasons. First, using historical units of analysis facilitates merging procedures with pre-unification sources. Second, using the ready-made sources for historical

questions can raise estimation concerns due to MAUP. There is not a standard theory allowing the measurement of estimation biases due to MAUP, and it is not the scope of this paper to establish it. However, empirical economic geography contributions suggest that estimation biases can arise at large levels of aggregation, and recommend (i) maintaining a consistent aggregation process, and (ii) choosing units of aggregation that are relevant for the question asked (Briant, Combes, & Lafourcade, 2010). Using today's administrative boundaries for a historical question such as ours could fail to follow these two recommendations. Figure 6 is a zoom over Northen Italy showing both 1871 and 2014 administrative comuni, and can help us illustrate the issue. Many comuni, especially in rural areas, have maintained their 1871 definitions. However, we can count, within the 2014's administrative definition of Genova, more than 20 individual comuni in 1871 that were merged to the city of Genova at some point between 1871 and 2014. Similarly, there are 4 individual 1871-comuni in today's Pavia, and 14 in today's Milan. These large aggregates are unlikely to be meaningful historically, which would violate recommendation (ii). Cities were indeed smaller in the past, and transportation costs at the end of the 19th century was not the same as today: car ownership was not democratized, and metropolitan transportation systems were rudimentary. Similarly, a sample including such large –and historically artificial- levels of aggregations around cities, as well as individual comuni for those with unchanged definitions would be akin to having heterogeneous sizes in the units of analysis within the sample, which would violate (i).

FIGURE 4

FIGURE 5

Pre-unification data

To establish whether there is a change in growth patterns due to unification, a comparison with pre-unification growth is needed. Finding and working with pre-unification data is challenging precisely because the country was not unified yet. We collected data from different sources, at different points in time. Because these sources were not produced by the Italian State (since it did not exist), they are also unmatched to Istat's database. We thus cannot rely on administrative codes to merge them to our post-unification database. We merged the sources using province and comuni names, and rely on historical work to deal individually with all the mismatchs, administrative changes, duplicates, missing, and new comuni in the datasets. In this process, we use a diversity of sources, including Wikipedia and the website www.elesh.it. Elesh compiles the history of boundary changes for Italian municipalities. This website is part of the open data project Apps4Italy that awarded funds from the Italian Ministry of Education to innovative open data project.

We digitized and merged pre-unification population estimates for the Kingdom of Sardinia (1838 and 1848), Tuscany (1846), and the Kingdom of the Two-Sicilies (1828). The resulting pre-unification and early post-unification geocoded database we have compiled is the first of this kind.

Kingdom of Sardinia

The pre-unification population estimates for the old Kingdom of Sardinia are from the 1848 census, published in 1852 as *Informazioni statistiche raccolte dalla commisione superiore: censimento della*

popolozione per l'anno 1848. The published census also records population levels at the comuni level from the 1838 census. We can thus compute preunification population growth levels for 1838-1848 and 1848-1861.

The merging procedure matches 2336 comuni; all the comune in the post-unification data that fall in the geographical area of the old Kindom of Sardinia are merged to a 1861 counterpart from which we computer 1871 constant dministrative boundaries. Figure 1 in the appendix shows that the resulting dataset exhibits a very strong correlation between 1838 and 1861 population levels. The outliers are the largest cities, and they diverge in a pattern that is consistent with what is observed in a comparison between 1838 and 1848 population levels. These findings suggest that our data is satisfyingly merged.[1]

Figure 2 in the appendix compares the distributions of yearly population growth levels. While the distribution of the 1838 to 1848 is very comparable to the one of 1861 and 1871, there is a difference for the 1848 to 1861. This difference results from different strategies for counting populations in the pre-unification and the post-unification data. In particular, the pre-unification data count registered individuals in a given location, as opposed to the ones actually living there (in other words, the pre-unification data does not come from a real census). This is particularly problematic for alpine regions, which had important outmigration. In our data, these alpine comuni are indeed much more likely to register decreases in population growth from 1848 to 1861. To avoid issues resulting from changing counting strategies and from seasonal migration patterns, our analysis for Piemonte will compare yearly growth rates from 1838 to 1848 to those of 1861 to 1871, as each one of them will be internally consistent.[2]

Tuscany

The pre-unification population estimates for the Kingdom of Tuscany are from the 1846 *Introduzione al dizionario geografico fisico storico della Toscana* (Repetti, 1846). The merging procedure matches all the 283 comuni of Tuscany in 1846 to a 1861 counterpart. Figure 2 in the appendix shows that the resulting dataset exhibits a very strong correlation between 1846 and 1861 population levels.

Kingdom of the Two-Sicilies

The pre-unification population estimates for the Kingdom of the two Sicilies are from 1828 and were compiled using the *Atlante corografico storico e statistic del Regno delle Due Sicilie* (Marzolla, 1832). The merging procedure matches all but 6 comuni in 1861 to a 1828 counterpart. Figure 3 in the appendix shows that the resulting dataset exhibits a very strong correlation between 1828 and 1861 population levels.

---

[1] More robustness checks can be shown if requested.

[2] There is an exception for the island of Sardegna. Population growth from 1838-48 has a few outliers. The 1838 population estimates from these are not computed by the statisitcal administrations of the Kingdom of Sardegna, but come from numbers estimated by the church at the parrochial level. This is specified in the footnote (2) of the census publication (Informazioni statistiche raccolte dalla commisione superiore: censimento della popolozione per l'anno 1848, 1852). Since the island of Sardegna is not included in our analysis of the border effects, this shortcoming is not a major issue.

Geographical and additional historical data

We collect and geolocate additional information to construct control and distance variables. Elevation rasters are produced by the CIAT (Jarvis, Reuter, Nelson, & Guevara, 2008). We georeference official railway maps and port locations from 1861 and 1871 to compute distances to transportation systems and cost-distance between points of interest (Ferrovie dello Stato, 1911).

EMPIRICAL ANALYSIS

Specification

The baseline specification is a semi-parametric estimate of the effect of distance to a border (removed or maintained) on population growth. The identifying equation can be written as follows:

$$\text{growth}_c = \alpha + m(\text{distance}_c) + \boldsymbol{X}_c'\beta + \lambda_r + u_c \quad (1)$$

The term growth_c is the population growth of the comuni c, distance_c is the distance between comuni c and a border (either the closest removed border or the closest newly imposed border, depending on the specification). The vector $\boldsymbol{X}_c'$ contains the controls at the comuni level: initial population levels, elevation, a binary variable equal to one if the comuni experienced administrative "gains" (received parts of another comuni), a binary variable equal to one if the comuni experienced "losses" (lost parts to another comuni), and distances to a port, to a major city, and to a railway. λ_r is the region fixed-effect. The non-parametric effect of distance on growth is the function $m(.)$, which we estimate using Robinson's double difference estimator. This approach allows for a flexible effect of distance to a border on growth, and also permits to simply graphically visualize our estimated effects.

Measuring distances

A first possible measure of distance between comuni c and border B, is the aerial distance. This is the shortest distance between the two objects, and does not account for terrain irregularities. It supposes that the traveller moves as a bird flies. As the simplest geographical representation of proximity, this is a useful benchmark measure. However, given Italy's complex geography and rough terrain, it can be a poor representation of the travel cost between two points. This is particularly problematic when considering the transport of freight. A solution would be to estimate the freight transportation cost between each point, as done by Hornbeck & Donaldons (2015) who use 19th Century transport cost estimates for the United States from Fogel (1979). However in the specific case of Italy, data limitations prevent us from using the same approach. There are indeed very few sources giving exact accounts of the transport network in Italy at the time of unification (and even fewer so before). The ones found do not cover the entire country. Using later-published maps bears the problem that significant infrastructure improvements were conducted during unification. Finally, the geography of Italy predicts that water-transport would have been mostly done by sea, rather than river transport, and despite significant research, we have not found no precise accounts of the navigation routes used to transport people and goods.

We thus propose two alternative measures of distance that capture the cost of moving through rough terrain but that differ from the standard calculation method used in Hornbeck & Donaldson

(2015). First, we calculate *ruggedness cost distance* (RCD), which is the estimated shortest path between two objects accounting for the cost of moving through rough terrain. The path is computed through a 1kmx1km grid, and for each cell we attribute a cost of moving equal to the ruggedness of the terrain. The cost-distance measure is then the minimum possible cumulative cost (in km- equivalents) between the two points. Figure 6 maps the RCD to a removed border for all the points in mainland Italy. This approach strongly penalizes rugged terrain. A second approach is to estimate a walking-time cost of moving through uneven terrain. This approach is a more precise estimation of travel-cost for people. To estimate the walking-time cost of moving through a cell, we use Tobler's hiking speed function. Tobler's hiking function determines a relationship between terrain irregularity and walking speed. It assumes that we walk at approximately 5km/h on a flat surface. With this assumption, it states that the hiking speed W is:

$$W = 6e^{-3.5\left|\frac{dh}{dx}+0.05\right|} \quad (2)$$

The slope $\frac{dh}{dx}$ is the change in elevation ("rise") over the aerial distance covered ("run"). The function is roughly symmetrical because going downhill will only be an advantage when the slope is not too steep. For each cell, we estimate the travel time using as the average of walking uphill and downhill through that cell.

Tobler's hiking speed gives a good estimate of the cost of travel for people through mainland Italy. For most Italians, during the period considered, walking would have been the only affordable means of transportation. RCD gives an estimate of freight transportation cost.

FIGURE 6

Results

Post-unification

First, we estimate whether there are different growth patterns at the comuni at the vicinity of removed and newly imposed borders. We first run the analysis for the post-unification period only, because this is the only time-period for which we can consider the entire sample. Figures 9 and 10 present the first results.

Figure 9 shows the estimated effect of distance to a removed border on population growth, for both RCD (Figure 9.a), and aerial distance (Figure 9.b). In both cases, proximity to a removed border is associated to a statistically significant increase in population growth, which is around 1 percentage point higher than the sample mean.

Figure 10 focuses on specific borders and highlights that the average effects reported in Figure 9 mask important heterogeneities. First, Figure 10.a shows that there are sharp asymmetries at the Piedmont and Lombard border. Whilst the comuni near the removed border in Piedmont seem to be growing significantly faster, an almost symmetric shrinking is happening on the other side of the border. The Piedmontese border region experiencing an increase in population is the rice-producing area of Piedmont, which suggests that unification attracted migrants to work on this activity. Figure 10.b shows a that the northern areas in the removed border from Southern region are also experiencing higher growth (up to 2 percentage points higher), but this effect is noisily

estimated. Finally, no significant pattern emerges in the removed border between Tuscany and the Papal states (Figure 10.c).

The discontinuity between Piedmont and Lombardy is also visible if we assess local clusters in a hot-spot analysis (Figure 8). The Local-Moran indicator of spatial association shows a significant cluster of high-growing regions (Hot-Hot) on the Piedmontese side of the border, and a cluster of shrinking municipalities on the Lombard side. Note that this map is computed without imposing any discontinuities at the border. Despite this flexibility, asymmetric border effects are visible.

Our results suggest that on average, comuni near removed borders tend to grow faster than the rest. There is also evidence of asymmetric effects, that are consistent with the hypothesis of reshuffling of the population.

FIGURE 8

FIGURE 9

FIGURE 10

Before and after unification: difference-in-difference

To gauge whether the patterns observed are linked to unification, as opposed to pre-existing patterns, this section investigates the change in the effect of distance to a border before and after unification. To first graphically visualize the change in the non-parametric effect of distance to a removed or a newly imposed border, we estimate the semi-parametric regression (1) separately for before and after unification. Second, we estimate a simple difference-in-difference regressions of the following form:

$$\mathrm{growth}_{ct} = \alpha + \gamma_1 \mathrm{Pre}_t + \gamma_2 \mathrm{Pre}_t \mathrm{Treat}_c + \gamma_3 \boldsymbol{X}_c' \beta + \lambda_r + u_c \qquad 3$$

The variables λ_r and $\boldsymbol{X}_c'$ are the same as before; growth_{ct} is the yearly growth in comuni c during the period t. Pre_t is a binary variable equal to 1 if the period t is the pre-unification period. Treat_c is the treatment variable for comuni c, which is either a measured distance to the border (continuous treatment), or a binary variable equal to 1 if comuni c falls within a buffer of proximity to the relevant border studied (binary treatment). The buffer varies depending on the specification.

Piedmont

Removed Borders - Figures 14 to 16 show the semi-parametric estimate of the effect of distance to a removed border on comuni growth before and after unification, using RCD (Figure 14), aerial distance (Figure 15), and Tobler hiking times (Figure 16). In each case, we estimate both the effect of the entire border removal, and the specific case of Piedmont and Lombardy. In the three cases, we see that comuni at the border grow faster after unification than before. Moreover, in the three cases, we observe that before unification (red line), comuni moderately close to the border (appr. 250 RCD flat-km equivalents; 50 km aerial distance; or 10 hours of walking time) experienced a

sharp and statistically significant drop in growth with respect to the sample average.[1] This sharp drop is no longer present during the post-unification period (blue line). These changes in estimated growth as a function of distance to the border occur in combination with almost negligible movements in the average yearly growth in the sample between the two period. These findings are suggestive of population reallocation favouring areas close to a removed border, which experienced a positive increase in market access, in line with Redding & Sturm (2008). In our case, a pre-industrial society during what has been described as Italy's "dormant decade", the results obtained show important demographic changes that had not been documented before.

The OLS estimates of equation 2 are given in tables 2 to 7. The effects are estimated also both for the entire border, and the specific case of Piedmont and Lombardy. Columns (1) and (2) in both tables define Treat_c as a binary variable equal to 1 if comuni c is within a buffer of 250 RCD – km equivalents of a removed border. Figure 11 maps the corresponding treatment region. Columns (3) and (4) give define Treat_c as a continuous treatment equal to the RCD to a removed border. In all cases, the estimated effect $\widehat{\gamma_2}$ suggests that unification led to a statistically significant increase in yearly growth for areas that are closer to the removed border. The results in columns (1) and (2) suggest that comuni in a buffer close to the removed border ("treated comuni") experience a statistically significantly increase in yearly population growth of approximately 0.2 units (which represents approximately 30% of the sample mean). The patterns are consistent across different distance measures (aerial distances: tables 3 and 6; walking times: tables 4 and 7).

FIGURE 11

FIGURE 14

FIGURE 15

FIGURE 16

TABLE 2

TABLE 3

TABLE 4

TABLE 5

TABLE 8

TABLE 9

Newly imposed borders – Before unification, Piedmont was part of the Kingdom of Sardinia. After the *Campagne d'Italie* in 1859*,* parts of it were annexed to France. Therefore, certain comuni in Piedmont experienced, following the Unification, the imposition of a new political border with France, as the County of Nice and the Duchy of Savoy were split between the Kingdom of Italy and France (see map in Figure 1). The case of Piedmont gives us the possibility of investigating

[1] A visualisation of what 250 RCD actually represents can be seen in Figure 11.

the effect of border removals and impositions at the simultaneously. To the best of our knowledge, this is the first paper to investigate a setup of this kind.

Figures 17 to 19 show the semi-parametric estimate of the effect of distance to a newly imposed border on comuni growth before and after unification, using RCD (Figure 17), aerial distance (Figure 18), and Tobler hiking times (Figure 19). In each case, we estimate separately the effect of the imposed border with France in the old Duchy of Savoy (a), and the County of Nice (b). Because these borders, especially in the case of Savoy, are in mountainous areas, there are very few observations right at the border and hence very large standard errors. In regions moderately close to the border (appr. 3000 RCD flat-km equivalents; 50 km aerial distance; or 15-20 hours of walking time), we observe a sharp drop in growth after unification (blue line), mostly in the case of the old County of Nice. These drops are not visible before unification (red line). The patterns thus also suggest that the negative market access shock experienced in those areas as a result of unification caused statistically significant decreases in population growth.

The OLS estimates of equation 2 are given in tables 8 (Nice) and 11 (Savoy). Columns (1) and (2) in both tables define Treat_c as a binary variable equal to 1 if comuni c is within a buffer of 1250 RCD – km equivalents of a removed border. Figure 11 maps the corresponding treatment regions. Columns (3) and (4) give define Treat_c as a continuous treatment equal to the RCD to the new border. In all cases, the estimated effect $\widehat{\gamma_2}$ suggests that unification led to a statistically significant decrease in yearly growth for areas that are closer to the new border. The results in columns (1) and (2) suggest that comuni in a buffer close to the removed border ("treated comuni") experience a statistically significantly increase in yearly population growth of approximately 0.2 units (which represents approximately 30% of the sample mean). The effects are thus roughly symmetric to what was observed in the previous section. The patterns are consistent across different distance measures (aerial distances: tables 9 and 12; walking times: tables 10 and 13).

FIGURE 17

FIGURE 18

FIGURE 19

TABLE 8

TABLE 9

TABLE 10

TABLE 13

TABLE 14

TABLE 15

Tuscany

From 10.C, that shows the smoothed post-unification growth as a function of distance to the removed border, it did not seem that removing a border had significantly positive effects on growth for Tuscany. The estimated function $\hat{m}(.)$ is indeed a flat line on the Tuscan side.

Figures 20 to 22 show the semi-parametric estimate of the effect of distance to a removed border on comuni growth before and after unification, using RCD (Figure 20), aerial distance (Figure 21), and Tobler hiking times (Figure 22). In the three cases, we see an upward shift in the estimated yearly growth after unification. The results from figures 20 and 22 suggest that in the case of RCD and walking time estimates, the flat relationship between distance to a removed border and growth is not present before unification. At a moderate distance from the border (approx. 250 RCD flat-km equivalents, or 12 hours walking time), we could observe a decrease in growth unification that is "compensated" with unification. If we consider the geography of Tuscany, comuni far from the border are also more likely to be closer to the coast, thus in a favourable location, while the comuni at the border were the periphery (see map in Figure 1). This coast/periphery distinction seems to have vanished with unification. Figure 20, showing the effect of aerial distances on growth, does not who a decrease at a moderate distance from the border. However, it describes a pattern of increased border as we move away from the border, which is compensated out after unification.

The OLS estimates of equation 3, which can be seen in Table 14, are consistent with the interpretation that unification increased growth for comuni at the border, *which were slow growers before unification.* Comuni in regions close to the border are indeed either slower growers (columns (1) and (2)) or not statistically significant from the rest (columns (3) and (4)). However, their growth is slower in the period before unification (only statistically significantly so in the case of continuous treatment). Notice that the lack of statistical significance can be due to the fact that Tuscany is a small state, therefore, we only observe a small number of treated comuni (148). The patterns are consistent across different distance measures (aerial distances: Table 15; walking times: Table 16).

FIGURE 12

FIGURE 20

FIGURE 21

FIGURE 22

TABLE 16

TABLE 17

TABLE 18

The South

Figures 23 to 25 show the semi-parametric estimate of the effect of distance to a removed border on comuni growth before and after unification, using RCD (Figure 23), aerial distance (Figure 24), and Tobler hiking times (Figure 25). Depending on the specification, we observe that after

unification (blue line) comuni at near the removed southern border either grew slightly slower than average (Figure 23), or at the average level (Figure 24), or faster (Figure 25). In the three scenari, these patterns of post-unification growth at the removed border contrast with the statistically significantly much lower growth of these same comuni in the period before unification. In other words, it appears that pre-unification slow growers are either catching-up (Figure 23), or even outpacing (Figure 25) the other comuni. This is evidence of significant convergence for comuni that were previously slow growers.

The OLS estimates of equation 2 are given in Table 17. Columns (1) and (2) in both tables define Treat_c as a binary variable equal to 1 if comuni c is within a buffer of 1500 RCD – km equivalents of a removed border. Figure 13 maps the corresponding treatment region. Columns (3) and (4) give define Treat_c as a continuous treatment equal to the RCD to a removed border. In all cases, the estimated effect $\widehat{\gamma_2}$ suggests that unification led to a statistically significant increase in yearly growth for areas that are closer to the removed border. The results in columns (1) and (2) suggest that comuni in a buffer close to the removed border ("treated comuni") experience a statistically significantly increase in yearly population growth as a result of unification of approximately 0.3 units (which represents approximately 60% of the sample mean). The patterns are consistent across different distance measures (aerial distances: Table 18; walking times: Table 19).

FIGURE 13

FIGURE 20

FIGURE 21

TABLE 19

TABLE 20

TABLE 21

Border effects on variation

FIGURE 7

FIGURE 8

DISCUSSION

Our results suggest that unification lead to a sizable and significant increase in growth for comuni near removed borders. Similarly, comuni near newly-imposed ones experienced a decrease in growth. These results are robust across a variety of different measures of distance accounting for Italy's complex terrain. The patterns we uncover could not have been visible by just observing post-unification data. Indeed, many of the comuni that are growing faster were initially slower growers. This is particularly the case for those that were peripheries given the pre-unification

national borders and become more central with unification. These are the comuni near the abolished borders in Tuscany and the Kingdom of the Two Sicilies.

Moreover, average growth across is not systematically higher after unification. The gains are concentrated in regions near the border. These results suggest that in the short-term, there are no evidence large-scale gains of unification on average; the gains are concentrated for the comuni that experience an increase in market access. Therefore, in the short run, the removal of national borders and the subsequent integration of formerly peripheral comuni seems to matter more for growth than the institutional transformation brought about by the abolition of the *ancien régime.*

Finally, in light of the later growing regional disparities in Italy, our results do not support the hypothesis according to which the north and the South divergence was initiated at unification. If anything, it seems that the *Risorgimento* enabled certain comuni to converge to higher levels of growth. Our future work will look more closely at the mechanisms driving our results. In particular, we aim at establishing the changes in spatial variability of growth in the period of interest, with the hope of knowing whether our results are evenly distributed across comuni or if they mask spatial inequality. In other words, we aim at establishing whether significant losers emerged from the national consolidation.

REFERENCES

Bevilacqua, P. (1996). New and Old in the Southern Question. *Modern Italy, 1*(2), 81-92.

Bosisio, A. (1956). *Testo Atlante Storico per la Scuole Medie.* Milan: Antonio Vallardi Editoire.

Briant, A., Combes, P.-P., & Lafourcade, M. (2010). Dots to boxes: Do the size and shape of spatial units jeopardize economic geography estimations? *Journal of Urban Economics, 67*, 287-302.

Brülhart, M., Carrère, C., & Trionfetti, F. (2012). How wages and employment adjust to trade liberalization: Quasi-experimental. *Journal of International Economics, 86*, 68-69.

Commisione superiore di statistica. (1852). *Informazioni statistiche raccolte dalla Regia commissione superiore: censimento della popolazione per l'anno 1848.* Torino: Stamperia Reale.

Coughlin, C. C., & Novy, D. (2016). Estimating border effects: the impact of spatial aggregation. *CEPR Discussion Papers Series*(DP11226).

De Mauro, T. (1963). *Storia Linguistica Italiana.* Bari: Laterza.

Dizionario Statistico De' Paesi del Regno delle Due Sicile (4 ed.). (1848). Tipografia dell' industria.

Fabi, M. (1852). *La Lombardia descritta Dizionario Statistico, Amministrativo, Storico ed Ecclesiastico.* Milano: Carlo Scapin.

Fabi, M. (1855). *Dizionario Storico Statistico di tutte le provinie, distretti, comuni e frazioni della Lombardia.* Milano: la Ditta Pirotta.

Federico, G. (2007). Market integration and market efficiency: the case of 19th century Italy. *Explorations in Economic History*, 293-316.

Ferrovie dello Stato. (1911). *Ferrovie Italiane.* Torino: Ferrovie dello Stato.

Fogel, R. W. (1979). *Railroads and American Economic Growth: Essays in Econometric History.* Baltimore: John Hopkins University Press.

Giovanni, F., & Tena-Junguito, A. (2013). *The ripples of the Industrial revolution: exports, economic growth, and regional integration in Italy in the early 19th Ccentury.* Madrid: Universidad Carlos III Working paper.

Gramsci, A. (1926). *Some aspects of the Southern question.* Guernica.

Guichonnet, P. (1961). *L'unité italienne.* Paris: Presses Universitaires de France.

Hornbeck, R., & Donaldons, D. (2015). Railroads and American Economic Growth. *American Economic Review*, 799-858.

Informazioni statistiche raccolte dalla commisione superiore: censimento della popolozione per l'anno 1848. (1852). Torino: Stamperia Reale.

Jarvis, A., Reuter, H. I., Nelson, A., & Guevara, E. (2008). *Hole-filled seamless SRTM.* International Center for Tropical Agriculture.

John, D. (2000). *Italy in the Nineteenth Century.* Oxford: Oxford University Press.

Lecce, G., Ogliari, L., & Orlando, T. (2017). *Resistance to institutions and cultural distance: brigandage in post-unification Italy.* Working Paper, Cowles Foundation, Yale University, New Haven.

Martuscelli, S. (1979). *La popolozione del Mezzogiorno nella statistica di Re Murat.* Napoli: Guida.

Marzolla, B. (1832). *L'Atlante corografico storico e statistico delle Due Sicilie.* Napoli: Reale Litografia Militare.

Michalopoulos, S., & Papaioannou, E. (2016). The Long-Run Effects of the Scramble for Africa. *American Economic Review*, 1802-48.

Ploeckl, F. (2008). *Borders, Market Size and Urban Growth, the Case of Saxon Towns and the Zollverein in the 19th Century.* Yale University Mimeo.

Redding, S. J., & Sturm, D. M. (2008). The Costs of Remoteness: Evidence from German Division and Reunification. *American Economic Review*, 1766-11797.

Repetti, e. (1846). *Introduzione al dizionario geografico fisico storico della Toscana.* Firenze: Gio Mazzoni.

Repubblica Italiana Istituto Cetrale di Statistica. (1960). *Comuni e loro popolazione ai censimenti dal 1861 al 1951.* Roma: Azienda Beneventana Tipografica Editoriale.

Riall, L. (1994). *The Italian Risorgimento.* Routledge.

Schram, A. (1997). *Railways and the formation of the Italian state in the nineteenth century.* Cambridge: Cambridge University Press.

Toniolo, G., Conte, L., & Vecchi, G. (2003). Monetary Union, Institutions and Financial Market Integration, Italy 1862-1905. *Explorations in Economic History*, 443-461.

Tonoiolo, G. (1998). Europe's Golden Age, 1950-1973: Speculations from a Long-run Perspective. *Economic History Review, 61*(2), 252-267.

Tonoiolo, G. (1998). *Europe's Golden Age, 1950-1973: Speculations from a Long-run perspective.* Economic History Review.

Zamagni, V. (1983). Ferrovie e integrazione del maercato nationale nell'Italia post-unitaria. In *Studi in onore di Gino Barbieri* (pp. 1635-49). Pisa: IPEM.

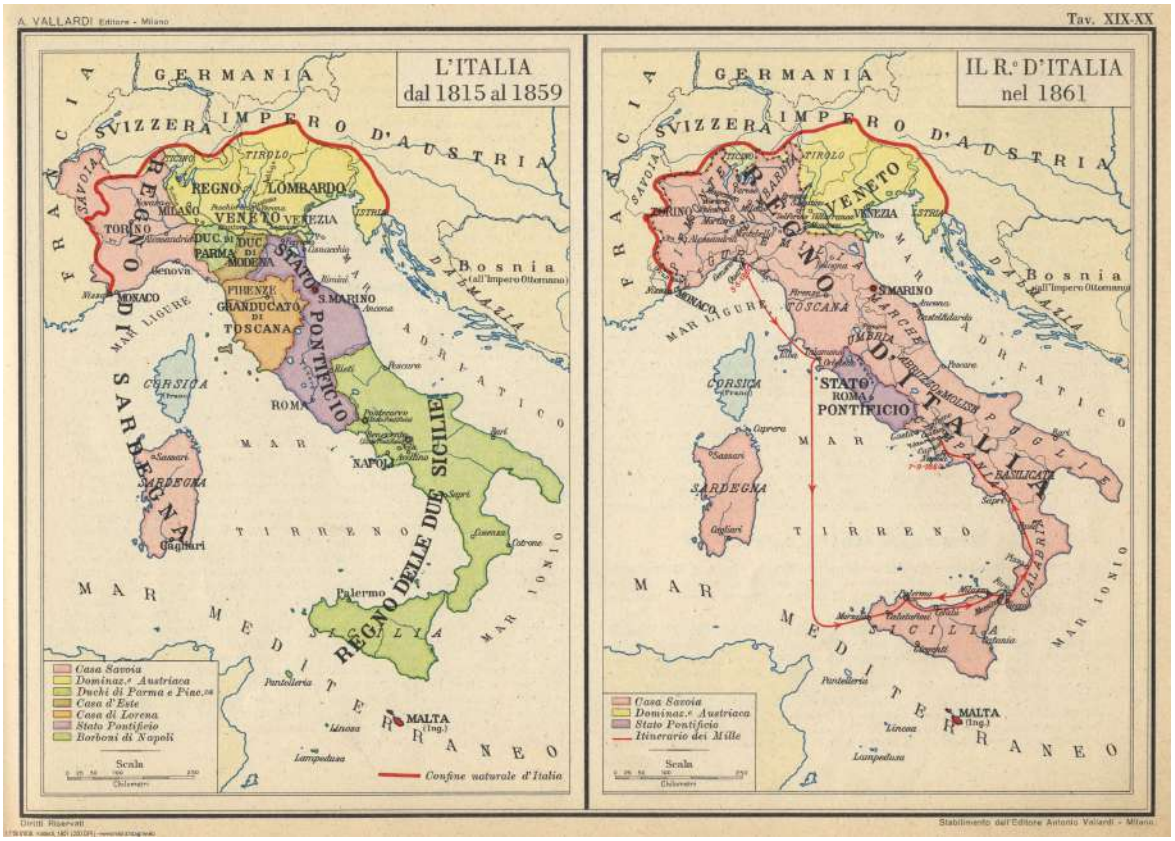
Zamagni, V. (1983). Ferrovie e integrazione del mercato nell'Italia post-unitaria. In *Studi in onore di Gino Barbieri* (pp. 1635-49). IPEM Edizioni.

Zamagni, V. (1993). *The Economic History of Italy 1860-1990.* Oxford University Press.

Figures and Tables

1 Figures

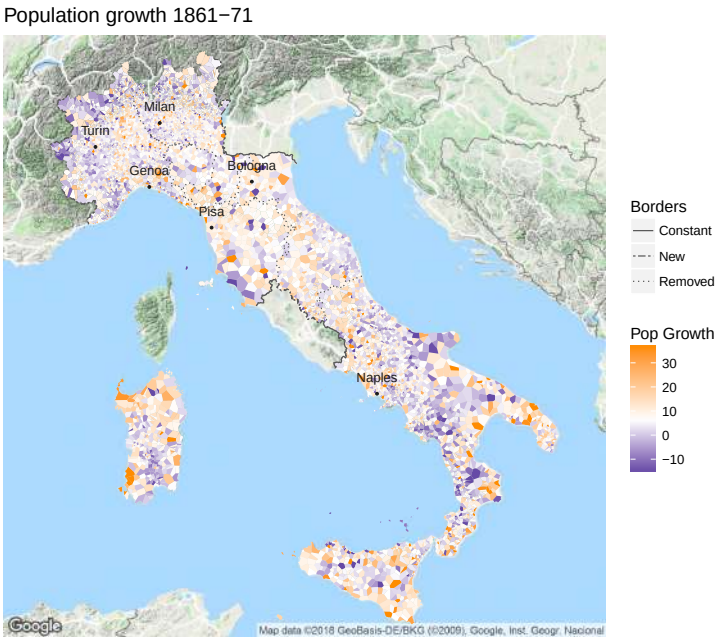
Figure 1: The Italian peninsula before and after unification



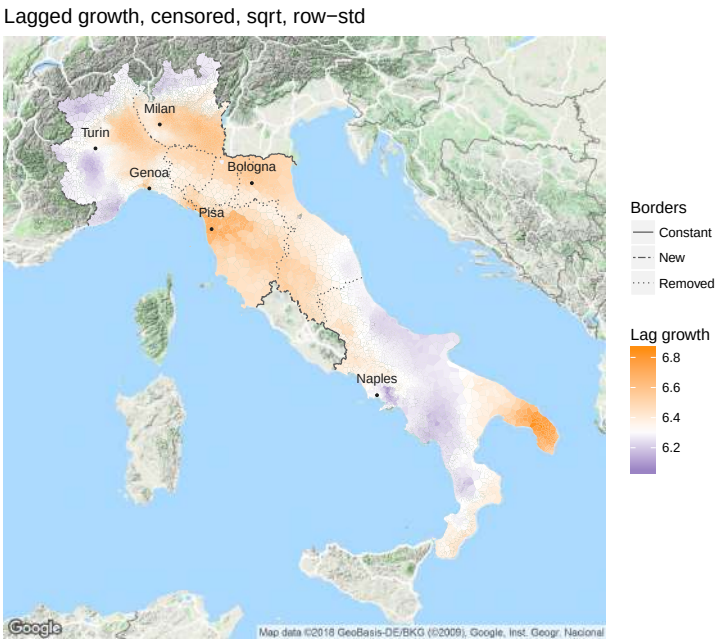
Notes: This map was published in 1951 in the *Atlante Storico*, Vallardi (1956). It representes Italy after the Congress of Vienna in 1848 and in the aftermath of the Expedition of the Thousand in 1861.
Bosisio, Alfredo (1956), *Testo Atlante Storico per la Scuole Medie*, Antonio Vallardi Editoire (ed)

Figure 2: Borders removed, newly imposed, and maintained

Figure 3: Population growth across Italian comuni (1861-71)



(a) Population growth



(b) Population growth, geographical smoothing

Notes: These maps show the population growth rates across Italian comuni in the aftermath of unification. Figure 3a maps the raw numbers, while figure 3b maps the spatial weighted average of growth rates. The weights are row-standardized and comupted with proximity measure $1/\sqrt{w_{ij}}$, where w_{ij} is the ruggedness cost distance (RCD) between comuni i and comuni j.

Figure 4: Distribution of population growth 1861-1871

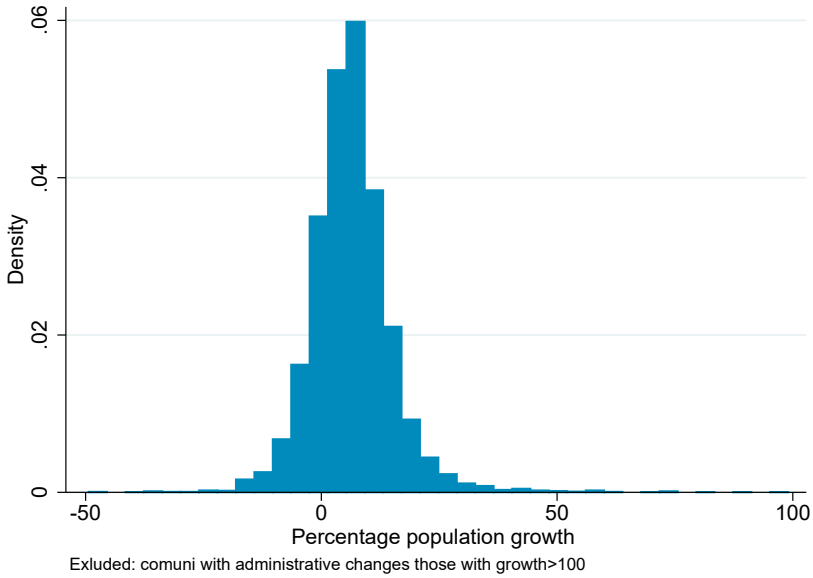
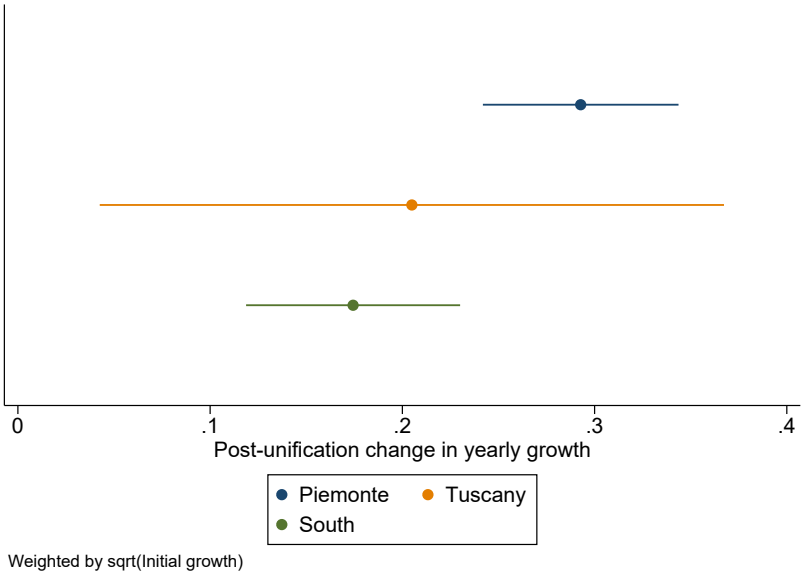
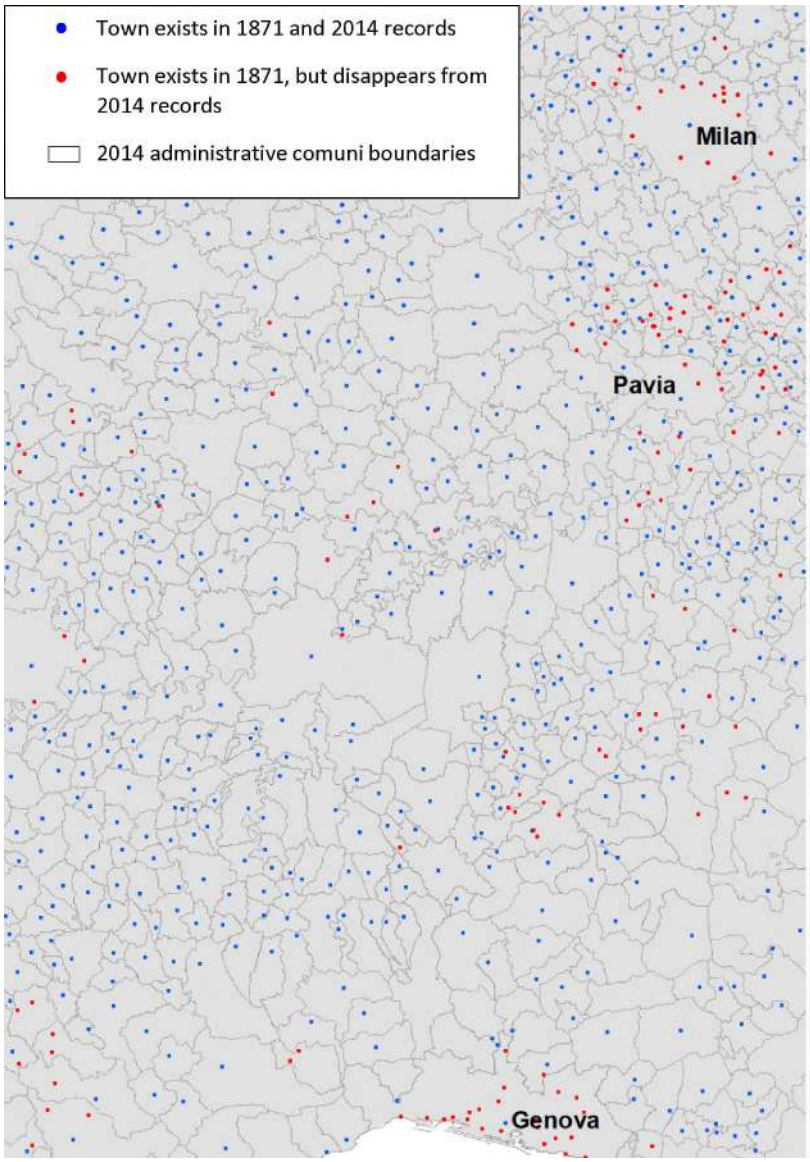


Figure 5: Population growth before and after unification



Notes: The graph gives the differences in yearly growth before and after unification. They are estimated in an OLS regression of the yearly growth rate on a binary variable equal to one if the period considered is 1861-71. We use analytic weights (the square root of the initial population) to account for heteroskedasticity.

Figure 6: Changes in administrative boundaries



Notes: This maps compares the location of comuni from our dataset, with 1871 constant boundaries with the modern (2014) comuni boundaries

Figure 7: Ruggedness cost distance to a removed border

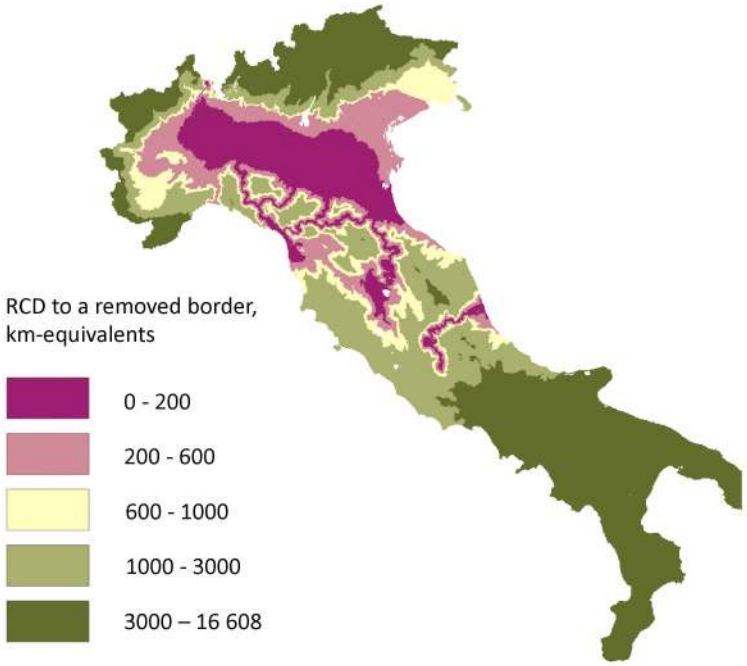
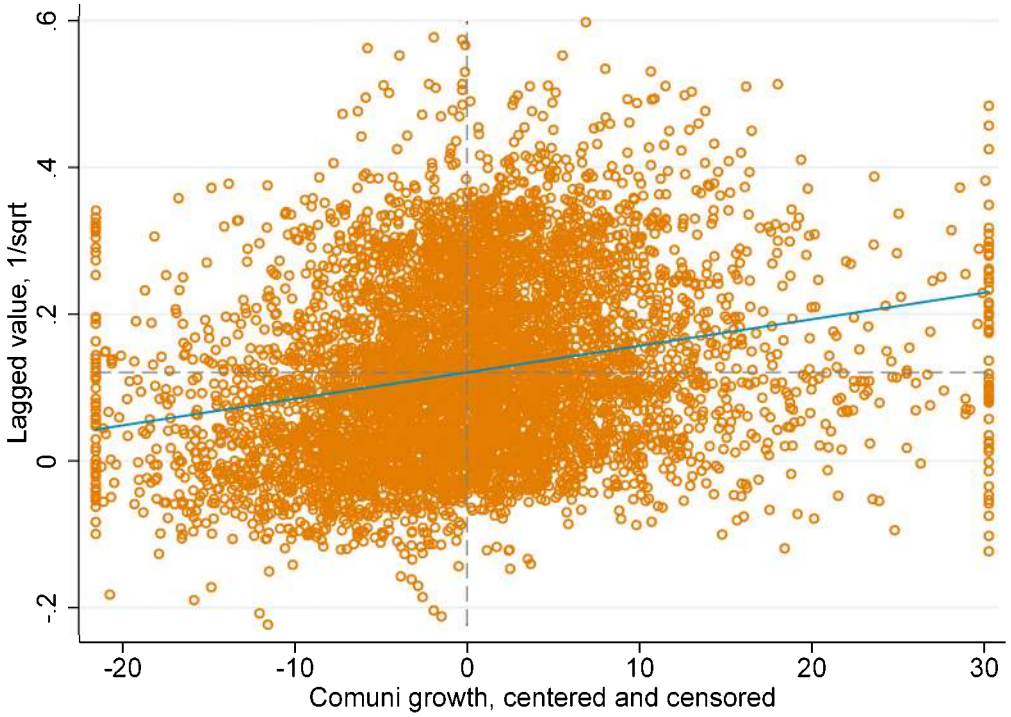
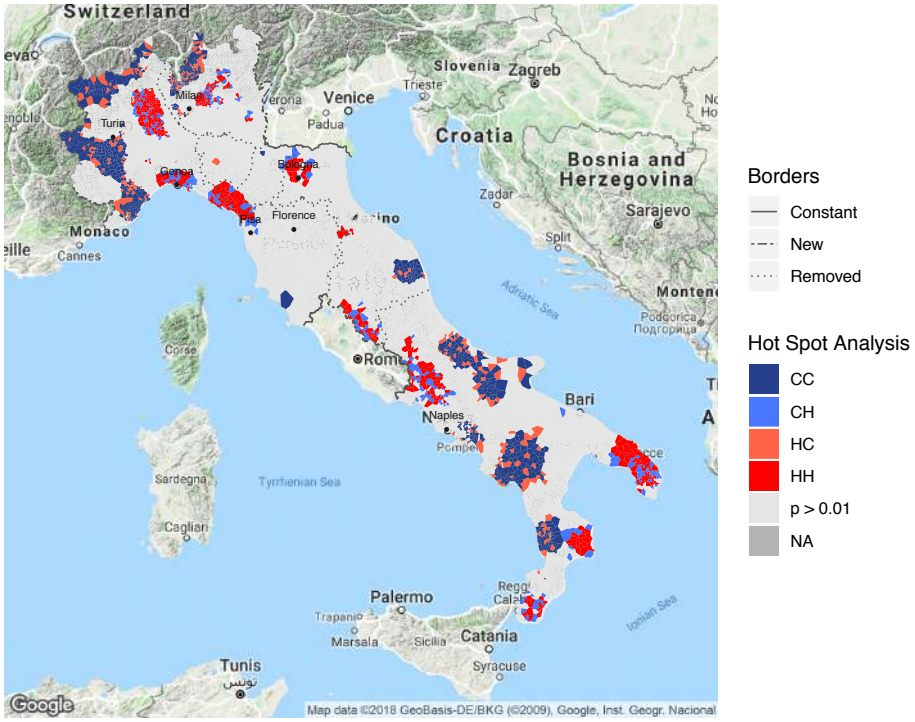


Figure 8: Moran scatter plot

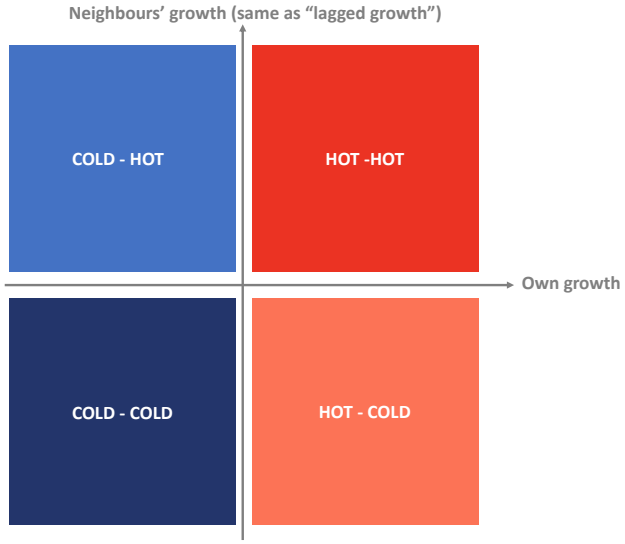


Notes: This graph shows the Moran scatter plot for all the comuni in mainland Italy. The weights are row-standardized and comupted with proximity measure $1/\sqrt{w_{ij}}$, where w_{ij} is the ruggedness cost distance (RCD) between comuni i and comuni j. The growth rates are censored at the 1^{st} and 99^{th} percentiles.

Figure 9: Hot spot analysis: local Moran statistic



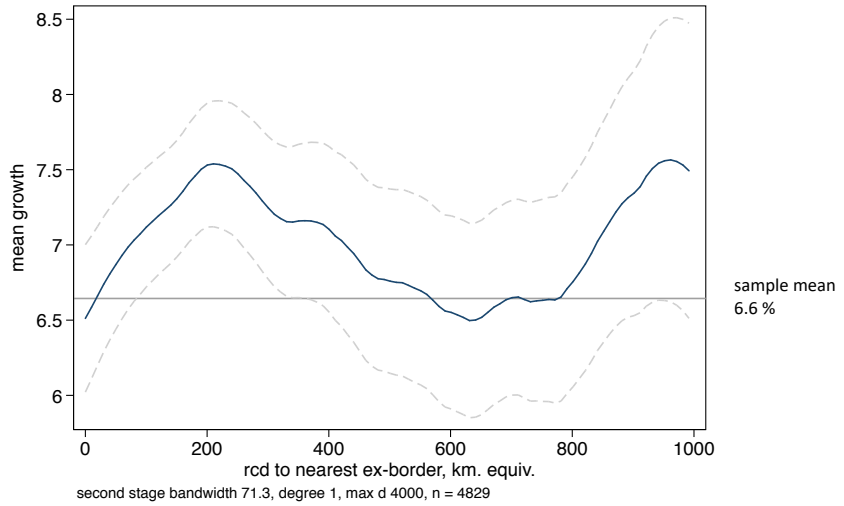
(a) Local Moran statistic at the comuni level



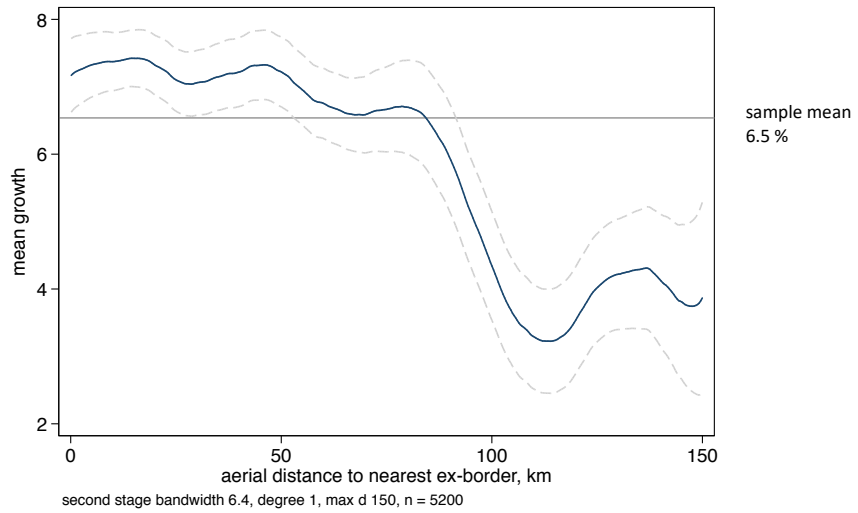
(b) Representation of zones in a Moran scatterplot

Notes: Figure 9a maps the statistically significant clusters found when computing a local indicator of spatial association (LISA) at the comuni level. The indicator used is the local Moran statistic. The weights are row-standardized and comupted with proximity measure $1/\sqrt{w_{ij}}$, where w_{ij} is the ruggedness cost distance (RCD) between comuni i and comuni j. The diagram 9b represents the types of spatial associations that can be found in the Moran scatter plot.

Figure 10: Border effects at the national level: semi-parametric estimates



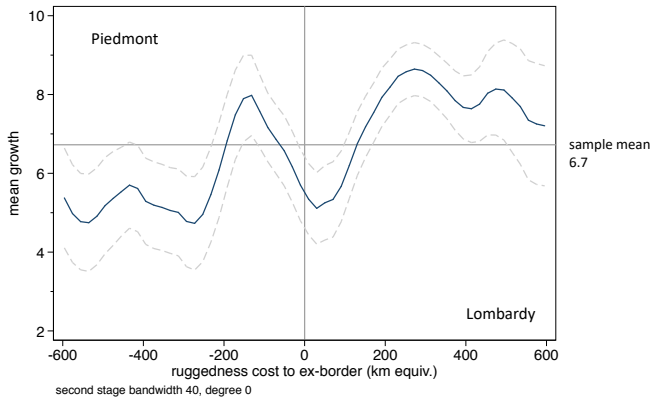
(a) Ruggedness cost distance



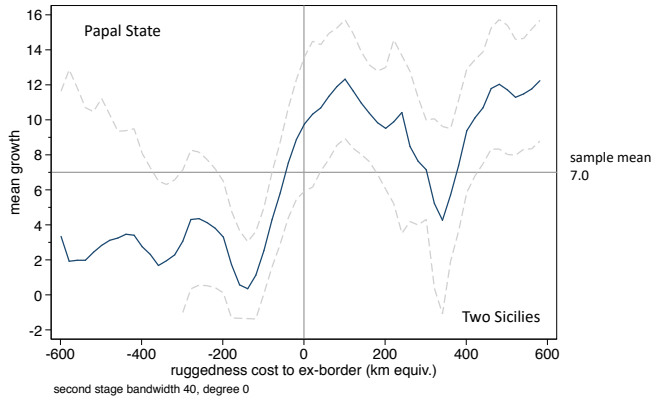
(b) Aerial distance

Notes: The figures give semi-parametric estimates of population growth. The variable of interest is either ruggedness cost distance (figure 10a) or aerial distance (figure 10b). Models contain regions FE. Controls are described in the text.

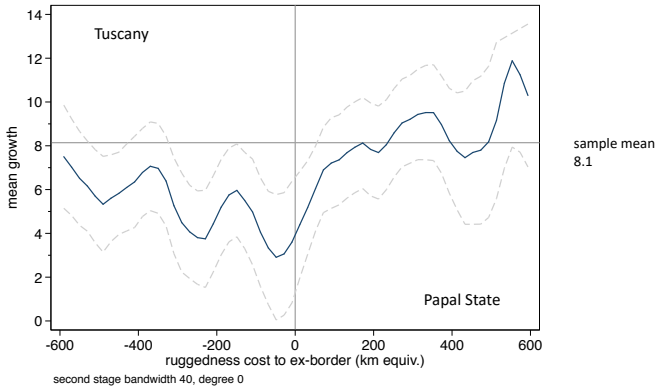
Figure 11: Border effects at specific borders using RCD: semi-parametric estimates.



(a) Piedmont and Lombardy



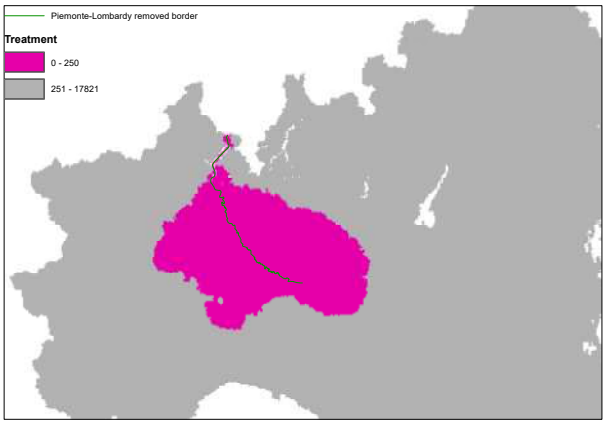
(b) North and South



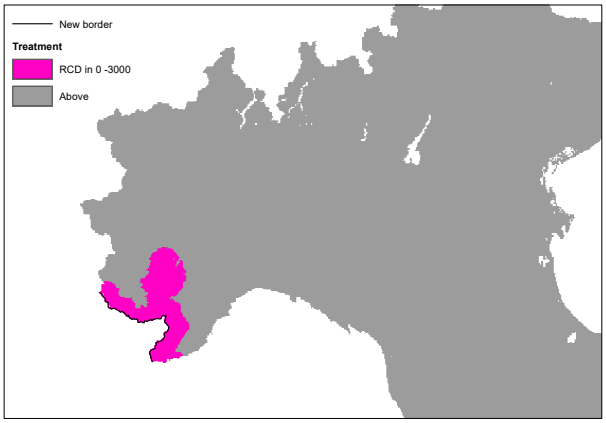
(c) Papal States and Tuscany

Notes: The figures give semi-parametric estimates of population growth. The variable of interest is the ruggedness cost distance. Models contain regions FE. Controls are described in the text.

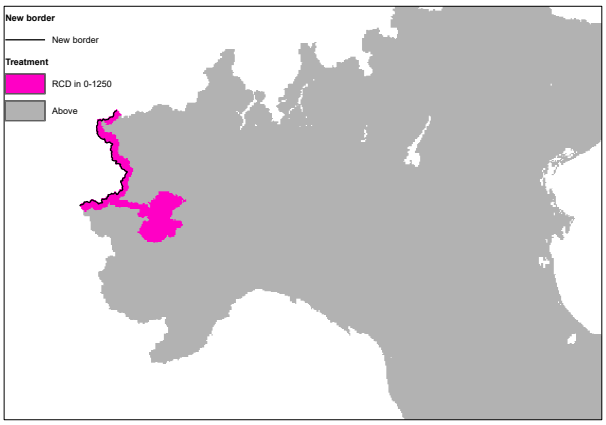
Figure 12: RCD treatment regions for DiD - Piedmont



(a) Removed border: Piedmont and Lombardy



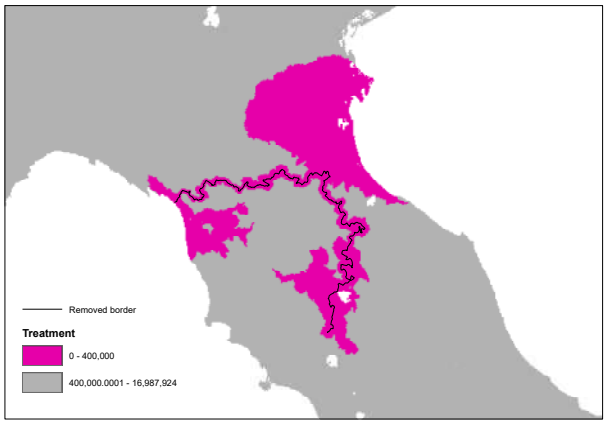
(b) New border: Piedmont and Nice



(c) New border: Piedmont and Savoy

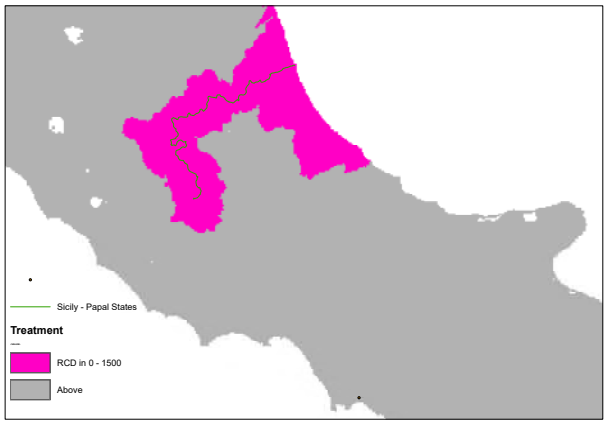
Notes: These maps illustrate the regions define as the treatment group for the DiD regressions. Comuni falling inside the pink area are considered treated.

Figure 13: RCD treatment regions for DiD - Tuscan removed borders



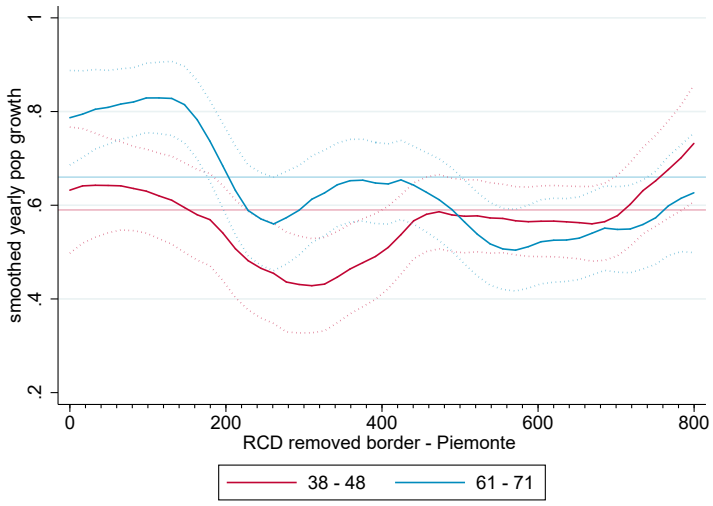
Notes: These maps illustrate the regions define as the treatment group for the DiD regressions. Comuni falling inside the pink area are considered treated.

Figure 14: RCD treatment regions for DiD - Removed southern border

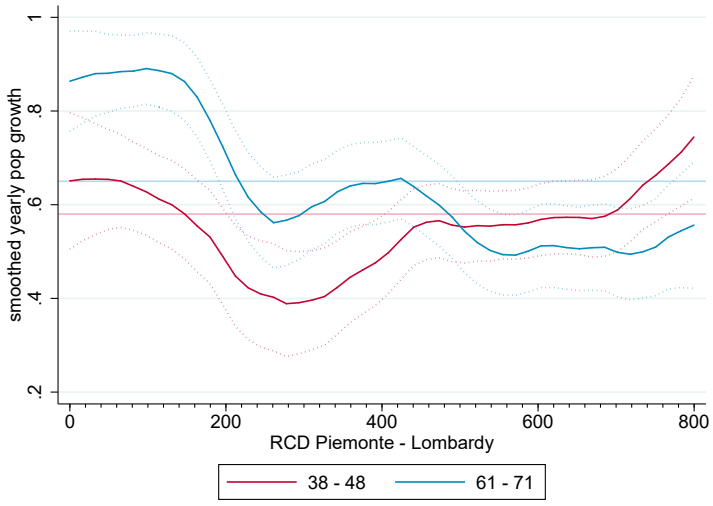


Notes: These maps illustrate the regions define as the treatment group for the DiD regressions. Comuni falling inside the pink area are considered treated.

Figure 15: Smoothed yearly growth and RCD to removed border in Piedmont, before and after unification



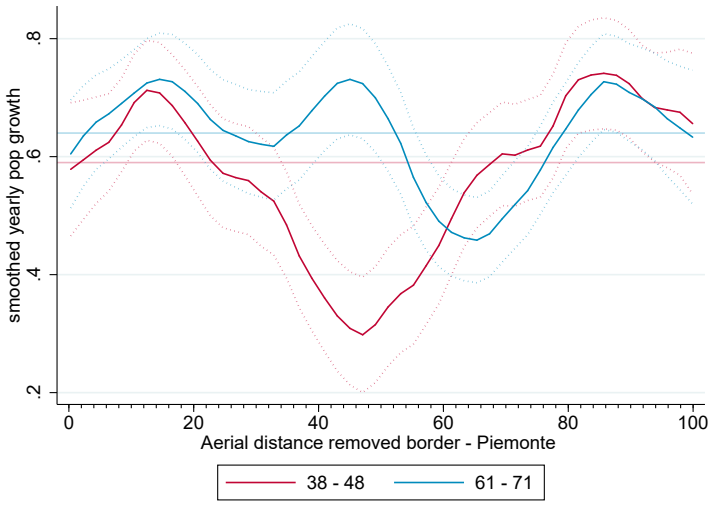
(a) All removed borders in Piedmont



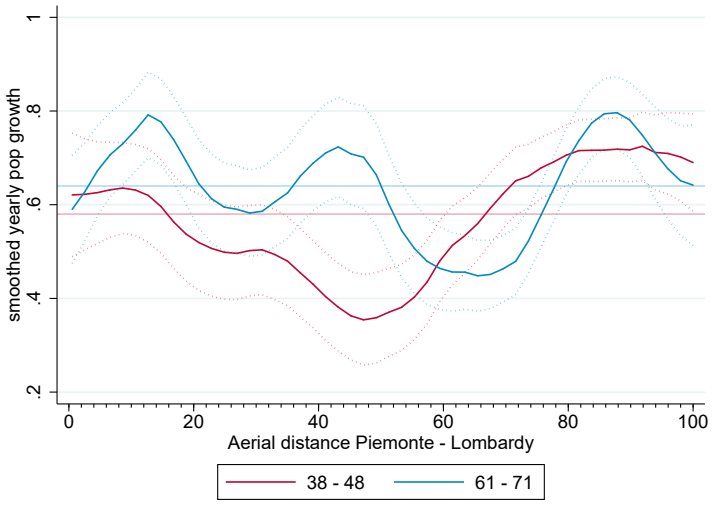
(b) Removed border Piedmont/Lombardy

Notes: These graphs illustrate the change in effect of RCD to a removed border on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

Figure 16: Smoothed yearly growth and aerial distance to removed border in Piedmont, before and after unification



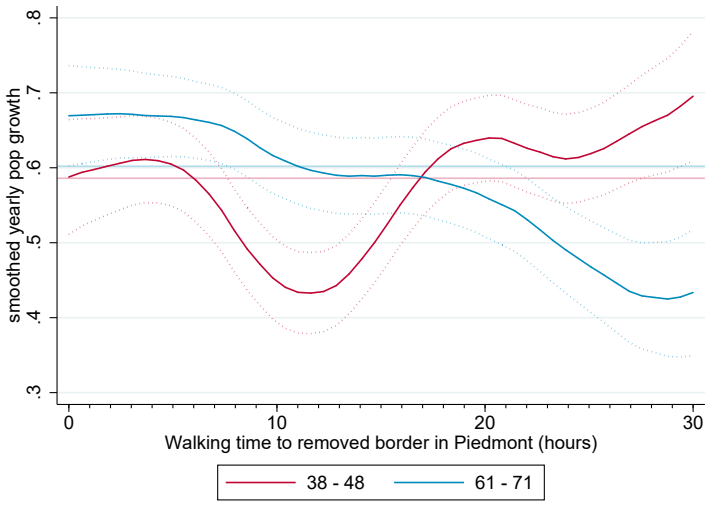
(a) All removed borders in Piedmont



(b) Removed border Piedmont/Lombardy

Notes: These graphs illustrate the change in effect of aerial distance to a removed border on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

Figure 17: Smoothed yearly growth and walking time to removed border in Piedmont, before and after unification

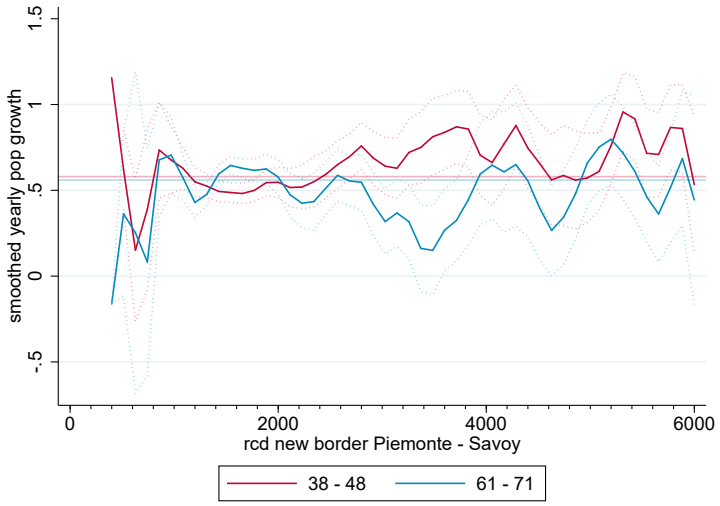


(a) All removed borders in Piedmont

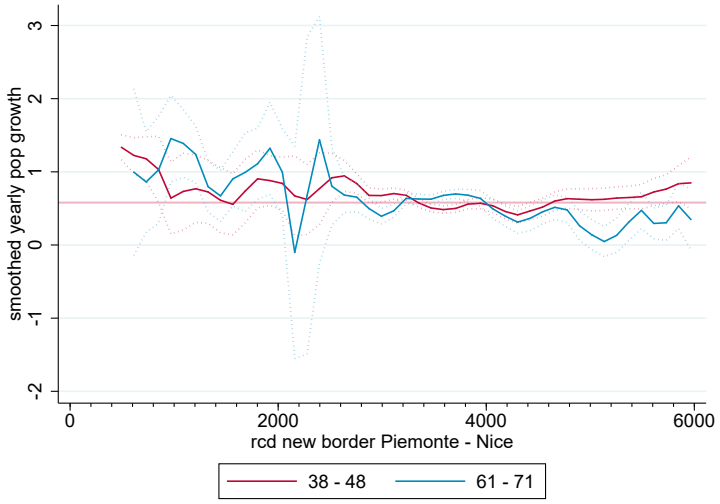
(b) Removed border Piedmont/Lombardy

Notes: These graphs illustrate the change in effect of walking time to a removed border on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

Figure 18: Smoothed yearly growth and RCD to new border in Piedmont, before and after unification



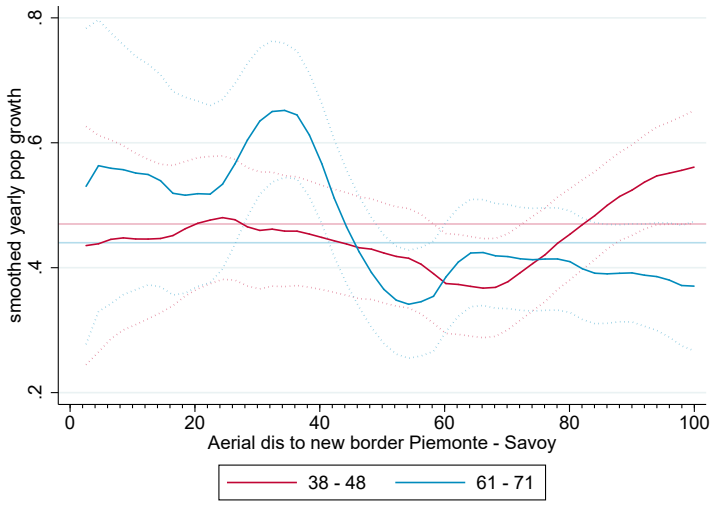
(a) New border Piedmont and Savoy



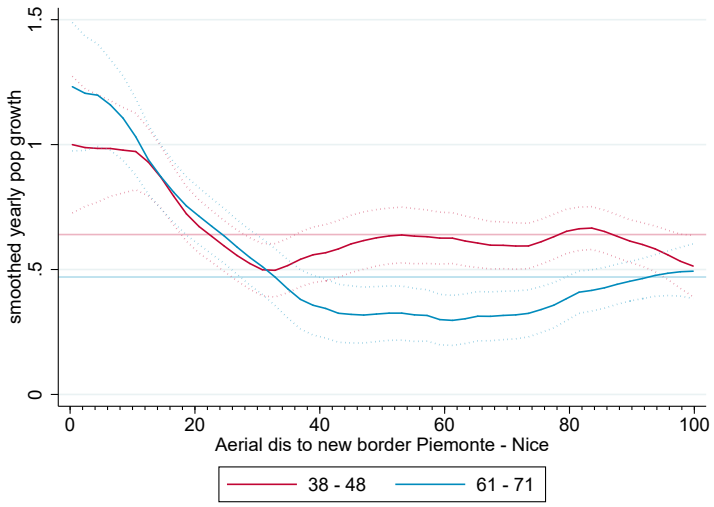
(b) New border Piedmont and Nice

Notes: These graphs illustrate the change in effect of RCD on yearly growth before and after unification

Figure 19: Smoothed yearly growth and aerial distance to a new border in Piedmont, before and after unification



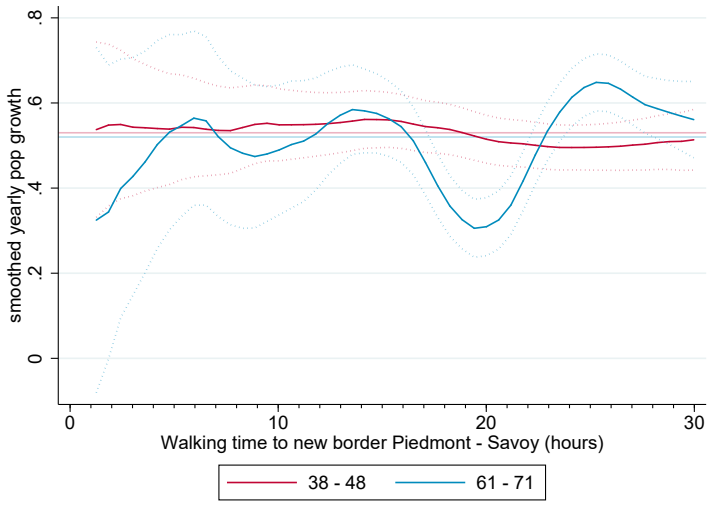
(a) New border Piedmont and Savoy



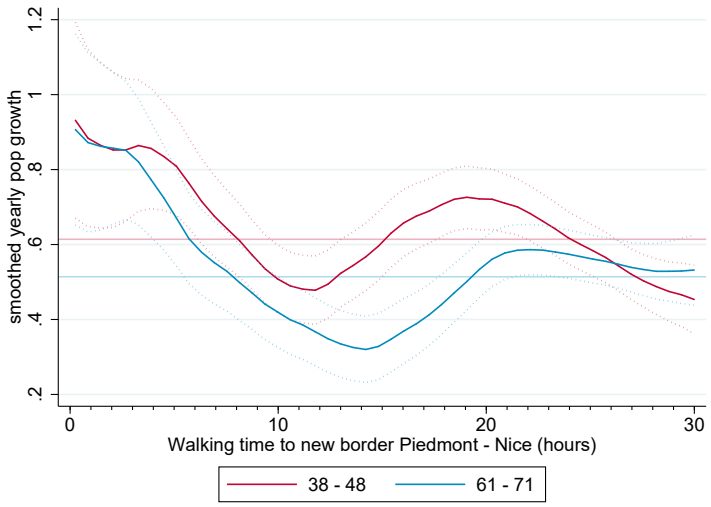
(b) New border Piedmont and Nice

Notes: These graphs illustrate the change in effect of aerial distance to a new border on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

Figure 20: Smoothed yearly growth and walking time to a new border in Piedmont, before and after unification



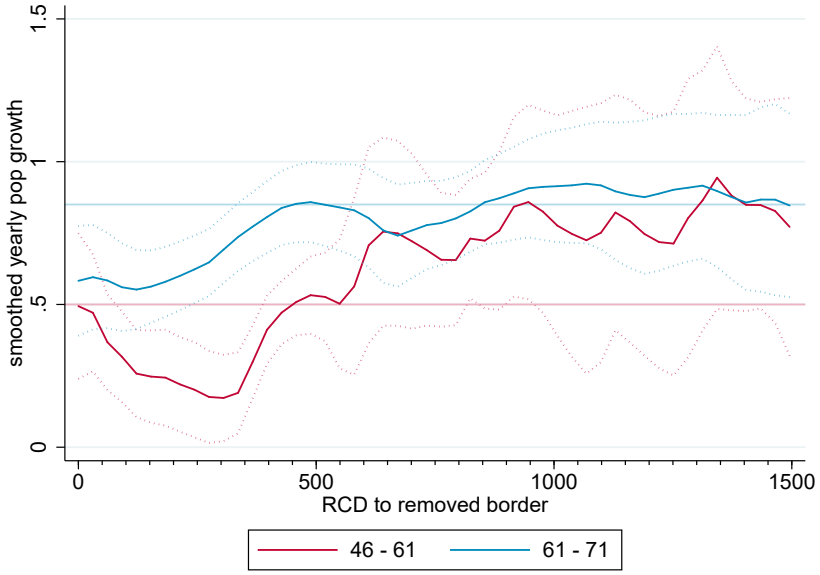
(a) New border Piedmont and Savoy



(b) New border Piedmont and Nice

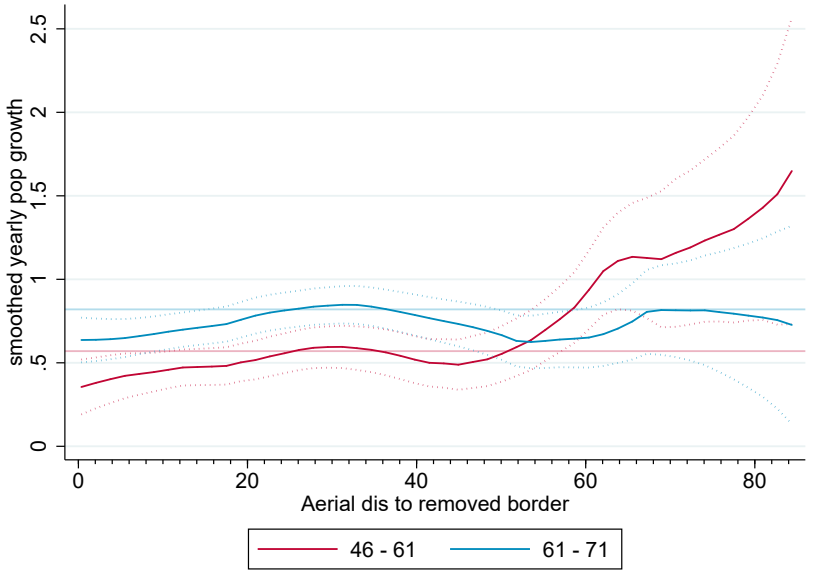
Notes: These graphs illustrate the change in effect of walking time to a new border on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

Figure 21: Smoothed growth and RCD to removed border in Tuscany, before and after unification



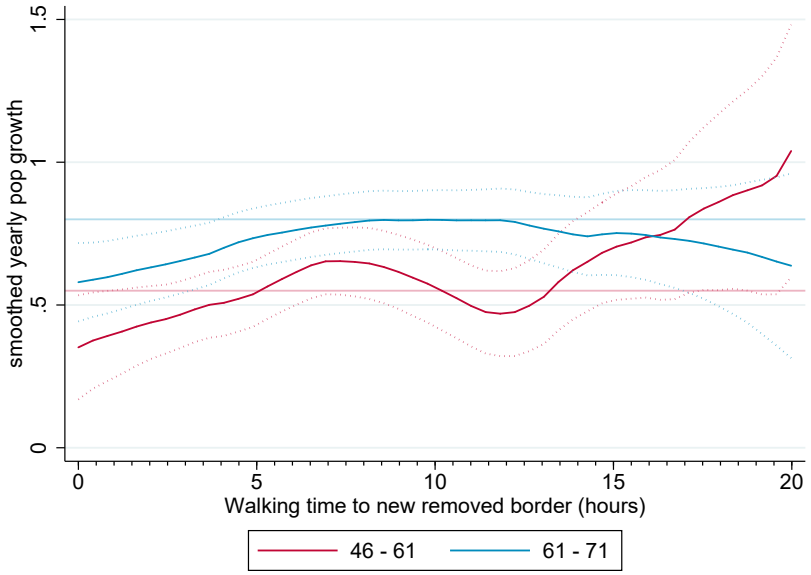
Notes: These graphs illustrate the change in effect of RCD to a removed on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

Figure 22: Smoothed growth and aerial distance to removed border in Tuscany, before and after unification



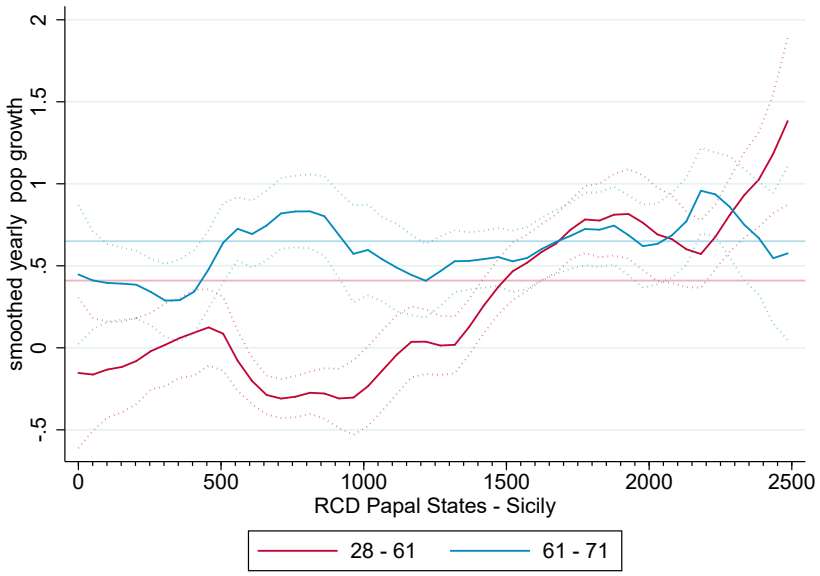
Notes: These graphs illustrate the change in effect of aerial distance to the removed Tuscan-Papal States border on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

Figure 23: Smoothed growth and walking time to removed border in Tuscany, before and after unification



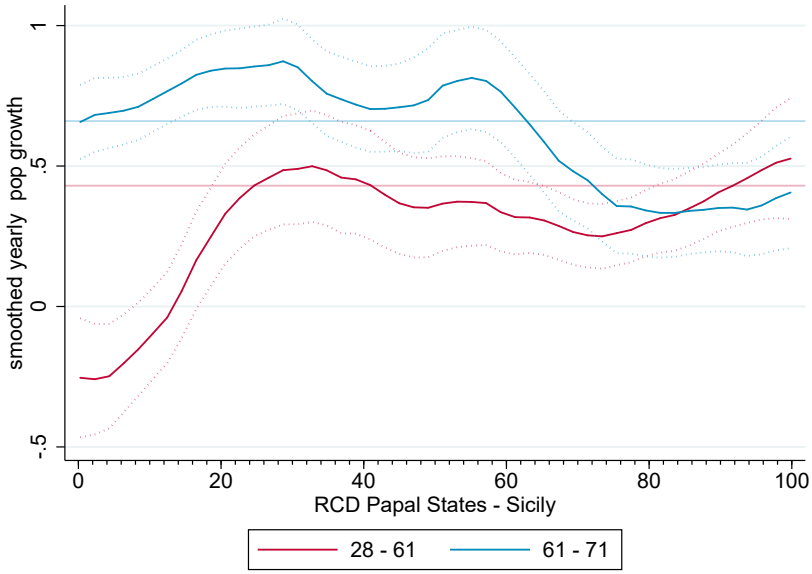
Notes: These graphs illustrate the change in effect of walking time to the removed Tuscan-Papal States border on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

Figure 24: Smoothed growth and RCD to removed border in the South, before and after unification



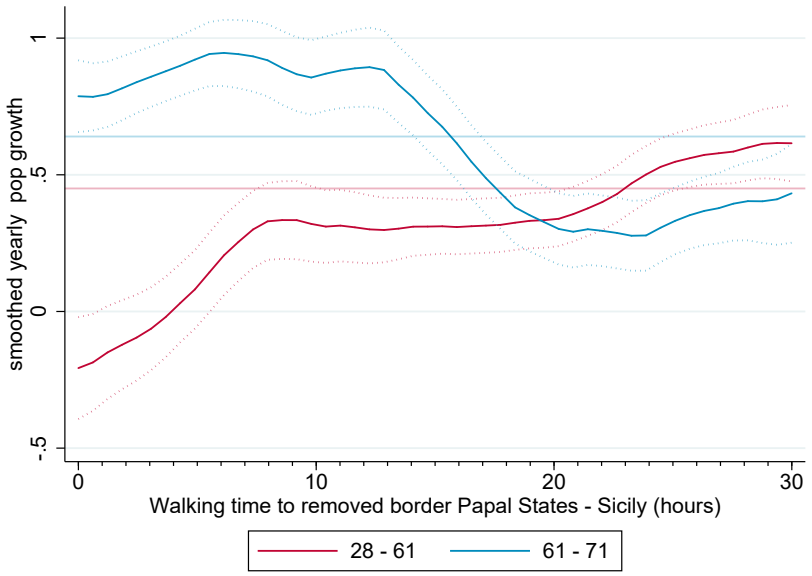
Notes: These graphs illustrate the change in effect of RCD to a removed on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

Figure 25: Smoothed growth and aerial distance to removed border in the South, before and after unification



Notes: These graphs illustrate the change in effect of aerial distance to the removed North- South border on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

Figure 26: Smoothed growth and walking time to removed border in the South, before and after unification



Notes: These graphs illustrate the change in effect of walking time to the removed North-South border on yearly growth before and after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines.

2 Tables

Table 1: Maximum and minimum tariffs on imports ca. 1858, lire / kg.

		Piedmont	Lombardy	Modena	Parma	Tuscany	Papal State	Two Sicilies
wine*		8-10	6-65	14-30	3-20	3-15	31-40	29
oils		5-10	4-65	3-10	3-20	2-4	9-16	17-3820
wax		13-40	21	5	3-20	19-44	5	72-86
soap		10-60	16	10	10	11	24	57-191
oil seeds		1	0	0	1	0	1	2-276
cheese		14	26	5-10	6-12	15	39	47
livestock		0	0-10	0-8	0-5	0-2	1-27	0-542
	raw	0	4	0	1-2	0-21	3	10-22
hides	other	20-100	13	20-40	20-90	6-92	47-94	1-174
	raw	1-3	26	0	1-7	1	2-5	8-24
hemp & linen	yarn	10-30	13-65	5-20	12-20	5-19	78-125	48-119
	cloth	20-250	8-1305	8-400	15-750	61-242	53-312	3-12750
	raw	0	3	0-2	3	2	2	26-48
cotton	yarn	20-80	26-65	5-15	12-30	3-6	15-45	81-95
	cloth	75-250	209-1305	50-300	60-750	1-225	95-250	29-12750
	raw	0-6	0-4	0-3	3	2	9-39	11-29
wool	yarn	60-80	26-65	6-20	12-30	12	62-140	167-215
	cloth	200-500	39-522	20-400	25-750	180-337	273-782	81-2890
	raw	0	39	1-30	10	21	155	43-200
silk	yarn	0-300	78	50	100-300	21-100	155-310	669-797
	cloth	300-1500	783-1305	10-500	200-750	562-2200	469-1560	286-12750
wheat*		0	2	0	1	0	(a)	5-10 (b)
other grains*		0	1	0	1	1-25	(a)	5-10 (b)
flour		0	4	0	1	1	(a)	5-24 (b)
paper		10-30	4-78	10-50	6-25	12-62	38-47	48-478
haberdashery		40-100	261-1305	60-400	100-750	1-494	78-469	96-1432
	raw	0	0	1	5	0	0	22-26
pig iron	worked	0-6	2-5	3-10	0-18	2-13	31	10-96
	raw	5	10	3-25	5	12	12	22-26
wrought iron	worked	12-15	26-131	3-35	8	3-25	55	10-96
copper & brass		0-20	4-39	3-35	3-12	0-37	8-156	17-797
lead		0-8	5-21	0-6	2-10	0-8.6	0-78	2-24
sulphur		0-6	0	1	1	0-8	8-21	3-14
crockery		1-25	2-209	3-100	3-100	1-49	31-78	3-143
glass & crystal		8-15	8-78	0-30	6-20	14-35	55-63	0-67

Notes: From Cappellari della Colomba (1866)

Table 2: External trade of the Italian economies, 1850-58

	Imports			Exports		
	total (millions)	per cap.	share Italy (%)	total (millions)	per cap.	share Italy (%)
Piedmont	31.8	7.17	18.1	17.5	3.94	12.9
Lombardo-Veneto	22.4	4.38	17.7	27	5.29	15.9
Duchies	5.4	4.95	37.3	4.5	4.16	46.8
Tuscany	11.9	6.72	8.7	8.2	4.62	23.6
Papal State	5.9	1.91	16.1	6.1	1.97	8.8
South	8.7	1.26	15.1	7.8	1.14	27
Sicily	5.8	2.61	8.9	9	4.03	4.6
Italy	91.9	3.74	17	80.2	3.27	18.4

Notes: From: Federico and Tena-Junguito (2013), Tables 3 and 5.
Note: Units for total and per capita trade are dollars of 1913.

Table 3: Controls in the regression for the overall border effect on population growth

	(1) Growth 1861-1871	
	b	se
Population 1861	-0.0000***	(0.000)
RCD to port	-0.0020	(0.001)
RCD to city	0.0060***	(0.001)
RCD to railway	-0.0051**	(0.002)
Elevation	-0.0007	(0.002)
Administrative gain	17.9784***	(1.267)
Administrative loss	-9.6698***	(0.928)
Observations	2,732	
R-sq	0.14	
Fixed Effects	Yes	

Table 4: Diff in Diff, all removed borders in Piemonte

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
D.RCD in 0-250	0.135**	0.184***		
	(2.08)	(4.03)		
D.RCD in 0-250 x D.38-48	-0.202***	-0.225***		
	(-2.82)	(-3.65)		
RCD to all removed			-0.000179*	-0.000233***
			(-1.96)	(-2.90)
RCD to Piem/Lom x D.38-48			0.000418***	0.000412***
			(3.86)	(4.21)
D.38-48	0.00272	0.0229	-0.244***	-0.227***
	(0.06)	(0.67)	(-3.78)	(-4.20)
Observations	2544	2544	2544	2544
R-sq	0.056	0.050	0.057	0.049
Mean growth	0.610	0.593	0.610	0.593
Sd growth	0.796	0.664	0.796	0.664
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Mean and sd aerial dis in bin : 25.34 (22.28)
Mean and sd RCD : 461.48 (267.39)
Sample : RCD $<$ 1000
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Diff in Diff, all removed borders in Piemonte, aerial

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Dist in 0-15	0.168**	0.131***		
	(2.53)	(3.00)		
Dist in 0-15 km x D.38-48	-0.171*	-0.108*		
	(-1.94)	(-1.72)		
Aerial dis to Piem/Lom, km			-0.000831*	-0.00103***
			(-1.76)	(-2.72)
Dist to removed border x D.38-48			0.00276***	0.00241***
			(4.68)	(4.51)
D.38-48	0.0284	0.0338	-0.177***	-0.139***
	(0.95)	(1.27)	(-3.64)	(-3.33)
Observations	3742	3742	3742	3742
R-sq	0.066	0.056	0.069	0.059
Mean growth	0.572	0.555	0.572	0.555
Sd growth	0.810	0.701	0.810	0.701
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Sample : dist $<$ 150
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Diff in Diff, all removed borders in Piemonte, walking time

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Walking time in 0-10 h	0.119***	0.128***		
	(2.59)	(3.22)		
Walking time in 0-10 h x D.38-48	-0.173***	-0.142***		
	(-2.75)	(-2.72)		
Walking time to removed border			-0.00928***	-0.0100***
			(-3.53)	(-4.14)
Walking time to removed Piem x D.38-48			0.0181***	0.0162***
			(5.05)	(5.38)
D.38-48	0.0446	0.0516	-0.265***	-0.220***
	(1.15)	(1.52)	(-4.40)	(-4.71)
Observations	3292	3292	3292	3292
R-sq	0.064	0.053	0.070	0.059
Mean growth	0.600	0.581	0.600	0.581
Sd growth	0.812	0.695	0.812	0.695
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Sample : dist $<$ 150
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Diff in Diff, removed border between Piemonte and Lombardy

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
D.RCD in 0-250	0.178***	0.200***		
	(3.11)	(4.06)		
D.RCD in 0-250 x D.38-48	-0.229***	-0.233***		
	(-3.06)	(-3.52)		
RCD to Piem/Lom, km			-0.000271**	-0.000335***
			(-2.17)	(-3.16)
RCD to Piem/Lom x D.38-48			0.000563***	0.000566***
			(3.97)	(4.35)
D.38-48	0.0182	0.0235	-0.279***	-0.276***
	(0.41)	(0.61)	(-4.16)	(-4.56)
Observations	2152	2152	2152	2152
R-sq	0.051	0.050	0.052	0.051
Mean growth	0.603	0.590	0.603	0.590
Sd growth	0.789	0.675	0.789	0.675
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Mean and sd aerial dis in bin : 21.95 (14.94)
Mean and sd RCD : 406.80 (226.15)
Sample : RCD $<$ 800
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Diff in Diff, removed border between Piemonte and Lombardy, aerial

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Dist in 0-15	0.163**	0.129***		
	(2.45)	(2.92)		
Dist in 0-15 km x D.38-48	-0.172*	-0.108*		
	(-1.94)	(-1.72)		
Aerial dis to Piem/Lom, km			-0.00133**	-0.00184***
			(-1.98)	(-4.01)
Dist to removed border Piem/Lom x D.38-48			0.00330***	0.00349***
			(4.79)	(5.81)
D.38-48	0.0290	0.0344	-0.233***	-0.231***
	(0.95)	(1.25)	(-4.52)	(-4.88)
Observations	3558	3558	3558	3558
R-sq	0.068	0.057	0.072	0.065
Mean growth	0.579	0.562	0.579	0.562
Sd growth	0.810	0.698	0.810	0.698
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Sample : dist $<$ 150
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Diff in Diff, removed border between Piemonte and Lombardy, walking times

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Walking time to removed Piem/Lom in 0-10h	0.126***	0.145***		
	(2.89)	(3.73)		
Walking time to Piem/Lom in 0-10 h x D.38-48	-0.221***	-0.222***		
	(-3.82)	(-4.13)		
Walking time to Piem/Lom			-0.00790***	-0.00928***
			(-2.86)	(-3.82)
Walking time to Piem/Lom x D.38-48			0.0175***	0.0182***
			(5.21)	(5.80)
D.38-48	0.0622*	0.0712**	-0.269***	-0.270***
	(1.68)	(2.20)	(-4.90)	(-5.30)
Observations	3230	3230	3230	3230
R-sq	0.053	0.050	0.057	0.056
Mean growth	0.591	0.577	0.591	0.577
Sd growth	0.783	0.693	0.783	0.693
Censored growth	No	Yes	No	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Diff in Diff, new border between Piemonte and Nice

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
D.RCD in 0-3000	0.0119	-0.0190		
	(0.14)	(-0.26)		
D.RCD in 0-3000 x D.38-48	0.265**	0.266***		
	(2.46)	(2.69)		
RCD to Piem/Nice, km			-0.0000258	-0.0000412***
			(-1.17)	(-3.32)
RCD to Piem/Nice x D.38-48			0.00000250	0.0000194
			(0.11)	(1.34)
D.38-48	-0.0131	0.00119	-0.00496	-0.0614
	(-0.46)	(0.05)	(-0.05)	(-0.94)
Observations	3930	3930	3930	3930
R-sq	0.061	0.052	0.059	0.052
Mean growth	0.570	0.554	0.570	0.554
Sd growth	0.814	0.703	0.814	0.703
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Mean and sd aerial dis in bin : 25.15 (16.77)
Mean and sd RCD : 4299.27 (1632.43)
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Diff in Diff, new border between Piemonte and Nice, aerial

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Dist in 0-20 km	0.400***	0.343***		
	(3.86)	(4.59)		
Dist in 0-20 km x D.38-48	0.152	0.167*		
	(1.28)	(1.73)		
Aerial dis to Piem/Nice, km			0.000603	0.000529
			(1.63)	(1.64)
Dist to Piem/Nice x D.38-48			-0.00215***	-0.00191***
			(-4.26)	(-4.41)
D.38-48	-0.000294	0.0136	0.241***	0.229***
	(-0.01)	(0.56)	(3.97)	(4.25)
Observations	3930	3930	3930	3930
R-sq	0.068	0.060	0.063	0.054
Mean growth	0.570	0.554	0.570	0.554
Sd growth	0.814	0.703	0.814	0.703
Censored growth	No	Yes	No	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Diff in Diff, new border between Piemonte and Nice, walking times

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Walking time to Piem/Nice in 0-10 h	0.160**	0.134**		
	(2.16)	(2.14)		
Walking time ino-10 h x D.38-48	0.118	0.120		
	(1.30)	(1.48)		
Walking time to Piem/Svy			0.00142	0.000789
			(0.85)	(0.60)
Walking time to Piem/Nice x D.38-48			-0.00687***	-0.00557***
			(-2.99)	(-3.12)
D.38-48	-0.00410	0.0102	0.202***	0.179***
	(-0.14)	(0.41)	(2.97)	(3.14)
Observations	3930	3930	3930	3930
R-sq	0.062	0.054	0.061	0.052
Mean growth	0.570	0.554	0.570	0.554
Sd growth	0.814	0.703	0.814	0.703
Censored growth	No	Yes	No	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Diff in Diff, new border between Piemonte and Savoy

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
D.RCD in 0-1250	-0.0365	-0.0692		
	(-0.41)	(-0.85)		
D.RCD in 0-1250 x D.38-48	0.284**	0.271**		
	(2.32)	(2.32)		
RCD to Piem/Nice, km			-0.0000258	-0.0000412***
			(-1.17)	(-3.32)
RCD to Piem/Nice x D.38-48			0.00000250	0.0000194
			(0.11)	(1.34)
D.38-48	-0.0125	0.00275	-0.00496	-0.0614
	(-0.44)	(0.12)	(-0.05)	(-0.94)
Observations	3930	3930	3930	3930
R-sq	0.060	0.051	0.059	0.052
Mean growth	0.570	0.554	0.570	0.554
Sd growth	0.814	0.703	0.814	0.703
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Mean and sd aerial dis in bin : 32.30 (17.42)
Mean and sd RCD : 2740.11 (2013.59)
Sample : RCD $<$ 800
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Diff in Diff, new border between Piemonte and Savoy

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Dist in 0-20 km	-0.208	-0.199*		
	(-1.62)	(-1.84)		
Dist in 0-20 km x D.38-48	0.280*	0.219*		
	(1.94)	(1.74)		
Aerial dis to Piem/Nice, km			0.000603	0.000529
			(1.63)	(1.64)
Dist to Piem/Nice x D.38-48			-0.00215***	-0.00191***
			(-4.26)	(-4.41)
D.38-48	-0.00366	0.0128	0.241***	0.229***
	(-0.13)	(0.53)	(3.97)	(4.25)
Observations	3930	3930	3930	3930
R-sq	0.058	0.050	0.063	0.054
Mean growth	0.570	0.554	0.570	0.554
Sd growth	0.814	0.703	0.814	0.703
Censored growth	No	Yes	No	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Diff in Diff, new border between Piemonte and Savoy

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Walking time to Piem/Svy 0-10 h	-0.262**	-0.223**		
	(-2.18)	(-2.30)		
Walking time in 0-10 x D.38-48 h	0.319**	0.234**		
	(2.34)	(2.06)		
Walking time to Piem/Svy			0.00142	0.000789
			(0.85)	(0.60)
Walking time to Piem/Nice x D.38-48			-0.00687***	-0.00557***
			(-2.99)	(-3.12)
D.38-48	-0.00768	0.0102	0.202***	0.179***
	(-0.27)	(0.42)	(2.97)	(3.14)
Observations	3930	3930	3930	3930
R-sq	0.059	0.050	0.061	0.052
Mean growth	0.570	0.554	0.570	0.554
Sd growth	0.814	0.703	0.814	0.703
Censored growth	No	Yes	No	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Diff in Diff, Removed in Toscana

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
D.RCD in 0-350	-0.260**	-0.248**		
	(-2.43)	(-2.40)		
D.RCD in 0-350 x D.46-61	-0.240	-0.204		
	(-1.51)	(-1.39)		
RCD to removed, km			-0.0000370	0.0000129
			(-0.30)	(0.13)
RCD to removed x D.46-61			0.000496***	0.000440***
			(2.59)	(2.66)
D.46-61	-0.128	-0.146	-0.555***	-0.522***
	(-1.28)	(-1.56)	(-4.02)	(-4.25)
Observations	462	462	462	462
R-sq	0.181	0.192	0.179	0.193
Mean growth	0.657	0.662	0.657	0.662
Sd growth	0.909	0.841	0.909	0.841
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Mean and sd aerial dis in bin : 210.07 (54.97)
Mean and sd RCD : 775.95 (568.76)
Sample : RCD $<$ 1500
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Diff in Diff, Removed in Toscana, aerial

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Dist in 0-20 km	-0.0215	-0.0372		
	(-0.20)	(-0.37)		
Dist in 0-20 km x D.46-61	-0.255*	-0.252*		
	(-1.80)	(-1.87)		
Aerial dis to removed, km			-0.00551**	-0.00529**
			(-2.11)	(-2.08)
Dist to removed x D.46-61			0.0215***	0.0209***
			(5.64)	(5.69)
D.46-61	-0.130	-0.138	-0.929***	-0.917***
	(-1.20)	(-1.38)	(-7.32)	(-7.53)
Observations	462	462	462	462
R-sq	0.154	0.168	0.221	0.241
Mean growth	0.657	0.662	0.657	0.662
Sd growth	0.909	0.841	0.909	0.841
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Mean and sd aerial dis in bin : ()
Mean and sd RCD : ()
Sample : RCD $<$ 1500
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 18: Diff in Diff, Removed in Toscana, walking time

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Walking time in 0-10 h	0.283**	0.238**		
	(2.10)	(2.00)		
Walking time in 0-10 h x D.46-61	-0.669***	-0.620***		
	(-3.59)	(-3.58)		
Walking time to removed			-0.0238**	-0.0221**
			(-2.16)	(-2.07)
Walking time to removed x D.46-61			0.0215***	0.0207***
			(5.75)	(5.77)
D.46-61	0.252	0.212	-0.928***	-0.911***
	(1.54)	(1.39)	(-7.39)	(-7.58)
Observations	462	462	462	462
R-sq	0.176	0.188	0.221	0.240
Mean growth	0.657	0.662	0.657	0.662
Sd growth	0.909	0.841	0.909	0.841
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Mean and sd aerial dis in bin : ()
Mean and sd RCD : ()
Sample : RCD $<$ 1500
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 19: Diff in Diff, Removed border Papal States/ Sicily

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
D.RCD in 0-1500	-0.178*	-0.176*		
	(-1.75)	(-1.89)		
D.RCD in 0-1500 x D.28-61	-0.333***	-0.328***		
	(-2.80)	(-2.98)		
RCD to N/S			0.0000548	0.0000440
			(0.97)	(0.86)
RCD to N/S x D.28-61			0.000124**	0.000129***
			(2.37)	(2.69)
D.28-61	0.0612	0.0660	-0.327***	-0.335***
	(0.86)	(0.99)	(-2.70)	(-2.94)
Observations	884	884	884	884
R-sq	0.081	0.083	0.072	0.074
Mean growth	0.544	0.544	0.544	0.544
Sd growth	0.805	0.756	0.805	0.756
Censored growth	No	Yes	No	Yes

t statistics in parentheses
Mean and sd aerial dis in bin : 459.13 (29.57)
Mean and sd RCD : 2383.41 (1122.09)
Sample : RCD $<$ 1000
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 20: Diff in Diff, Removed border Papal States/ Sicily, aerial

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Dist in 0-20 km	0.156*	0.162*		
	(1.80)	(1.92)		
Dist in 0-20 km x D.28-61	-0.403***	-0.409***		
	(-2.79)	(-2.93)		
Aerial to Papal/Sicily, km			-0.00179***	-0.00173***
			(-5.12)	(-5.12)
Dist to N/S x D.28-61			0.000744	0.000770*
			(1.56)	(1.72)
D.28-61	-0.156***	-0.137***	-0.290***	-0.276***
	(-3.92)	(-4.13)	(-3.86)	(-3.88)
Observations	2300	2300	2300	2300
R-sq	0.037	0.040	0.046	0.051
Mean growth	0.423	0.414	0.423	0.414
Sd growth	0.817	0.721	0.817	0.721
Censored growth	No	Yes	No	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 21: Diff in Diff, Removed border Papal States/ Sicily, walking time

	Binary treatment		Continuous treatment	
	(1)	(2)	(3)	(4)
Walking time in 0-10 h	0.119	0.160**		
	(1.40)	(2.02)		
Walking time in 0-10 h x D.28-61	-0.304**	-0.337***		
	(-2.42)	(-2.86)		
Walking time to N/S			-0.0143***	-0.0143***
			(-4.55)	(-5.09)
Walking time to N/S h x D.28-61			0.00351	0.00429
			(1.08)	(1.64)
D.28-61	-0.145***	-0.119***	-0.285***	-0.287***
	(-2.95)	(-3.14)	(-3.06)	(-3.40)
Observations	1720	1720	1720	1720
R-sq	0.041	0.044	0.050	0.056
Mean growth	0.454	0.442	0.454	0.442
Sd growth	0.821	0.694	0.821	0.694
Censored growth	No	Yes	No	Yes

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$