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JEL Classification: J6, N33, N93, R12, R23

Keywords: Border effects, economic history, economic integration, Italy, Political Unification, 19th century, spatial inequality

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Internal Borders and Population Geography in the Unification of Italy[1]

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April 2020

Abstract

We examine the economic impact of Italian unification from a micro-geographical perspective, asking whether the abolition of internal borders caused a redistribution of economic activity towards the former border zones, which now enjoyed improved market access. We construct a new geocoded dataset of municipal (*comune*) populations from the pre-unification period through to 1871. Using a difference-in-differences approach and controlling for a variety of geographic correlates including elevation and distances to ports, railway lines, and large cities, we find robust evidence of a relative acceleration in population growth – our proxy for economic activity – in *comuni* near the former internal borders, consistent with our market access hypothesis.

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1 INTRODUCTION

The Italian economy of the early nineteenth century was fragmented. Divided by political boundaries, tariff barriers, linguistic differences, diverse legal institutions, a difficult geography, and multiple monetary systems, seven independent states traded more with distant partners outside Italy than with their immediate neighbours (Federico and Tena-Junguito 2013).[4] Upon unification in 1861, many of these impediments to the movement of goods, people, and money were abolished with the stroke of a pen. Yet an immediate impact on the economy has proved difficult to discern: growth rates remained very slow (Toniolo 2013); the convergence of regional grain prices slowed down (Federico 2007); convergence in *factor* prices was negligible (Federico, Nuvolari, and Vasta 2019; Conte, Toniolo, and Vecchi 2006; Toniolo, Conte, and Vecchi 2003); interregional freight shipments by rail were limited and displayed no strong trend (Schram 1997). One can reasonably wonder whether the removal of political borders mattered at all, in the decade or two after 1861.

In this paper we examine the effects of unification through a geographic lens, asking whether the distribution of economic activity, considered at a granular level of disaggregation, was affected. Of course, geography has been at the heart of debates about unification from the start, at least in terms of the North-South divide. There is life in that controversy still (Daniele and Malanima 2011). What is different here is a spatial approach, in which distances are fundamental. We ask, more specifically, whether locations near the internal borders benefited disproportionately from their abolition. Places near the old borders had been peripheral, far from the economic centre of gravity of their regional state, facing higher transport costs to reach customers in their domestic market. Meanwhile the border itself had limited access to a close-at-hand "foreign" market. With unification, such marginal places suddenly became central, relative to the larger national market, hence more attractive as production sites. Any number of other factors contributed to a site's attractiveness for production – natural resources, skilled labour, suppliers of inputs, or local institutions – but it was market access that underwent a sudden change in 1861.

[4] Anderson and van Wincoop (2004, 692) present evidence that border-related impediments to trade are significant even today, even among industrialised countries, even though their average tariffs are only about 5%. Border-related costs are equivalent to a 44% tax, attributable to currency barriers, policy barriers, language barriers, information cost barriers, and security barriers (in that order of importance).

We test for border effects by estimating regressions of population growth at the municipal (*comune*) level on various measures of distance from the former borders, controlling for other geographic influences such as elevation or distance to a rail line. To this end, we construct an original dataset of nearly 6,000 municipal populations at standardised *comune* boundaries of 1871, covering mainland *comuni* over the post-unification decade 1861-71. For three states (Piedmont, Tuscany, and the South), we also collected data for the preunification period, linking population growth before and after 1861 on the basis of constant *comune* definitions – to the best of our knowledge for the first time. This database linking pre- and post- unification population data at the *comune* level is one contribution of this paper. In this sample, we can estimate border effects using difference-in-differences. We find a robust positive effect of proximity to Italy's former internal borders on growth following unification.

Reductions in border-related trade impediments have been found to accelerate population growth in border-proximate locations in both modern and historical contexts: between EU member states (Brakman et al. 2012); near Austria's eastern border after the fall of the Iron Curtain (Brülhart, Carrere, and Trionfetti 2012); and near Saxony's borders with other members of the Zollverein after 1834 (Ploeckl 2010). The mirror-image case of new border impositions has also been studied. Nagy (2015) and Kovacs (1989) find slower growth of Hungarian towns near the new borders imposed when the Habsburg Empire was broken up in 1920.[5] These studies trace their roots back to Redding and Sturm's (2008a) influential study of the division of Germany after the Second World War. West German cities near the border grew significantly more slowly than those further from it in the decades after partition. Redding and Sturm attribute this to loss of market access, calibrating a new economic geography model to fit 1939 city populations and simulating division by resetting transport costs to cities in East Germany to prohibitive levels.

Relative to this reference case, we expect more inertia in Italian city populations. Agglomeration forces, and with them the sensitivity of city population to market access, should have been lower, given a lower share of consumption devoted to differentiated, tradable manufactures.[6] Dispersion forces meanwhile should have been

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[5] The cited studies parallel ours in using population as an indicator of economic activity. Other research examines border effects on trade flows, industrial location, and factor prices. Two papers related to national unification, and close in time to the historical period studied here, are Wolf's studies of trade flows in Germany and Poland. Wolf (2009) finds that as late as the interwar period internal German trade was impeded by pre-1871 borders between the former independent states. Wolf (2005) finds that after Polish reunification in 1918, former borders between Prussian, Russian, and Austrian areas continued (with decreasing strength) to impede trade into the 1930s.

[6] A lower consumption share for differentiated manufactures also increases the possibility that the system has multiple equilibria, in which case a border change could, in principle, cause a shift to a new equilibrium.

stronger due to i) the weight of agriculture, tied to immobile land, and ii) the importance even for manufacturing of unevenly distributed, location-specific resources such as water.[7] A further difference concerns the assumption that firms in all locations have access to the same technology, which is not obviously appropriate for businesses operating in separate economies prior to unification, in different institutional settings, and benefiting from different degrees of protection. In this setting, asymmetric effects on either side of an abolished border might be observed: accelerated growth on one side and a deindustrialisation-induced slowdown on the other (market access being a two-way street, with better access to other places implying they have better access to you).

Another issue raised by Redding and Sturm is the potential endogeneity of border changes (which they effectively dismiss for Germany in 1945). The same issue is raised by Wolf, Schulze, and Heinemeyer (2011) in a study of how the breakup of the German, Austrian, and Russian empires after World War I affected trade in Central and Eastern Europe. Though the national borders imposed by the Versailles Treaty did depress trade, the "treatment effect" was small, because the new boundaries were endogenous; they largely coincided with internal divisions that had already been impeding trade even *before* the war. Does the same logic, in reverse, apply to the unification of Italy? Might the abolition of internal borders produce no observable effect because it was fully anticipated, or merely aligned political reality with an already existing economic reality? We turn now to these issues.

Figure 1 shows the resulting border changes. These include not just the abolition of former borders but also the imposition of new ones: between Piedmont[8] and the territories ceded to France as the price for its aid; between Lombardy and Veneto (until 1866), formerly united under the Habsburgs; and between the rump of the Papal State around Rome and its former territories in central Italy (until 1870). With hindsight, unification seems almost inevitable, but this was far from true in 1859. Piedmont's expansionary ambitions were well-known, but so too was the outcome of the previous war against Austria in 1848-49: a decisive defeat. The military support of France, indispensible for another attack on Austria, had been secured only in 1858 at Plombières, in an agreement that

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[7] Redding and Sturm's (2008a) model is a generalisation to many locations of Helpman (1995), in which the primary dispersion force is exerted by fixed local endowments of a nontradable amenity, usually interpreted as housing (with rental income from housing shared equally among all workers, regardless of residence). In Krugman's original (1991) formulation, this role was played by an immobile segment of the labour force ("farmers") producing a homogeneous, zero-transport-cost good ("agriculture") under constant returns to scale. In Puga (1999) agriculture requires land as well as labour but continues to play the same role in the model, as a force for dispersion. Positive transport costs for agricultural goods enhance this effect (Fujita, Krugman, and Venables 1999, ch. 7).

[8] Piedmont is the designation we will typically use for the Kingdom of Sardinia. The modern region of Piemonte was the heart of that state and home to its capital, Turin. The Kingdom, after the Congress of Vienna, further included the modern region of Liguria with the port city of Genova, and the island of Sardinia, which will not be included in our analysis of border effects.

was kept secret. Neither the timing of hostilities nor their successful outcome could have been predicted. Nor could the extent of the new Kingdom proclaimed in 1861. Piedmont's leaders envisioned an enlarged Piedmont in a loose confederation of Italian states. The South had never been part of their plans; it was only the largely autonomous exploits of Garibaldi, and the worry that he might declare a republic or use the South as a base to move on Rome, that brought the former Kingdom of the Two Sicilies into the new Italian state.

The speed and timing of unification may have been unexpected, but was its eventual achievement predictable by economic agents striving to bring it about? An influential tradition associated with Gramsci interpreted national unification as part of a bourgeois revolution. The revolution may have been incomplete, flawed, even a failure, but still represented the rising (northern) capitalist class asserting political control to further its economic interests. Central among these interests was said to be a unified national market. Yet the current historiographical consensus does not support this interpretation. Of course, economics mattered in some sense. As Davis (2000, 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 market was not central to the debate on unification of the nation, and capitalists were by no means at the forefront of the movement. Toniolo (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, 108).

Did political unification, even if neither predictable nor directly based on economic considerations, merely validate a pre-existing economic unification? As noted previously, the peninsula was divided by tariff barriers, mountainous geography, diverse institutional and legal frameworks, a plethora of weights and measures, multiple currencies, and even language. By the 1850s tariffs had been reduced as part of a general move towards trade liberalisation, but remained significant for manufactures, especially in the South.[9] Intra-Italian trade was fundamentally limited by a lack of complementarity between the regional economies – all of them predominantly

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[9] Various plans for a customs unions had been mooted prior to unification, but none came to fruition apart from a short-lived (1853-57) arrangement between the Kingdom of Lombardy-Venetia and the Duchies of Modena and Parma.

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 1 in the online appendix). For larger states, the share of intra-Italian in total trade was generally less than one fifth.[10] Economic integration was thus quite limited on the eve of political unification, and access to what would later become the Italian internal market was of minimal importance in industrial location decisions prior to 1861.[11]

We are not the first to study the link between market access and the location of economic activity in Italy. Findings vary with the level of geographic aggregation, measure of economic activity, and period.[12] In a multi-century study of Italian cities, Bosker et al. (2008) calculate urban potential – a distance-weighted sum of city populations – as a measure of market access.[13] They find that although seaports and cities on navigable waterways (both correlated with access) grow faster, "a city's relative position, measured by its urban potential, is not significant" (p. 124). For the 1871-1911 period, Missiaia (2016; 2019a; 2019b) constructs estimates of market potential for Italy's 16 regions. She finds that the domestic component of market potential was an important determinant of regional GDP per capita, but that the regional location of particular industries was more fundamentally determined by factor endowments. Daniele, Malanima, and Ostuni (2018) show that market potential decisively influenced manufacturing employment at the provincial level in the later period from 1911 to 2001. Also working with province-level data, Basile and Ciccarelli (2018) find that the location of manufacturing production, at least in capital intensive sectors, was driven by domestic market potential from 1871 to 1911.[14]

What is new in this paper are the focus on borders, the degree of disaggregation, and the period. *Comune*-level data enable us to capture micro-changes in the distribution of population associated with small variations in

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[10] And this was an overstatement due to transit trade sometimes being recorded as an export. For example cotton was recorded as an export from Piedmont though none was grown there.
[11] Grain market integration, as measured by the dispersion of wheat prices, was progressing prior to unification (Federico 2007), but any implications for the location of economic activity were minimal. *Factor* markets were poorly integrated even *after* unification (Federico, Nuvolari, and Vasta 2019; Toniolo, Conte, and Vecchi 2003; Conte, Toniolo, and Vecchi 2006).
[12] Market access is in all cases a distance-weighted sum of economic weight, but measures of distance are sometimes aerial distance, sometimes minimum cost distances taking into account transport infrastructure and cost, while economic weight is sometimes population, sometimes GDP (variously estimated).
[13] The urban potential measure used in their regressions excludes own population and is denoted "foreign" urban potential. The authors do not report period-specific estimates of geographic effects on city growth; it is possible that in their final period (1800-61) urban potential did matter.
[14] A'Hearn and Venables (2013) argue that industry was initially (prior to 1890) attracted to endowments, then by domestic market access (to 1950), then by proximity to European markets. Each of these factors, in its period of importance, favoured the North. They do not conduct a formal, econometric test of this hypothesis.

distance to a former border, which would not be possible with more aggregate specifications. Focussing on the period immediately surrounding unification and linking pre- and post-1861 data allows us to estimate the effects using difference-in-differences. Given that *comuni* near the borders initially tended to have below-average rates of population growth, we uncover larger effects of border changes than if we had relied on post-unification sources only.

The remainder of the paper is organised as follows: in Section 2 we describe the sources and construction for our population dataset and geographic controls, and present a descriptive overview of the data; Section 3 presents our results, including robustness checks and some extensions; and in Section 4 we offer some concluding thoughts.

FIGURE 1

2 DATA

2.1 Post-unification population

The Kingdom of Italy conducted censuses at decennial intervals starting from 1861, compiling and publishing population figures for individual municipalities, or *comuni*. A *comune* could be a major urban centre like Turin, but the majority were smaller rural settlements. At the extreme, some *comuni* comprised just a few scattered hamlets and had populations of less than a hundred. The population physically present in each *comune* on the night of the census can be downloaded from the website of Istat*,* Italy's National Statistical Institute; we call this the Sistat database.[15] Using census data for 1861 and 1871, we construct a georeferenced database of *comune* populations at constant 1871 municipal boundaries. To our knowledge, this is the first database of this kind.

Geographical units of analysis are not constant across successive censuses, as *comuni* gain and lose territory, or disappear altogether in mergers with neighbouring municipalities. Name changes and the redrawing of provincial boundaries further complicate matters. To see the type of problems this creates, and our approach to dealing with them, consider the following, comparatively straightforward case. The Lombard *comune* of Farinate was

[15] https://sistat.istat.it. Two definitions of population are used in the Italian censuses: resident population (a.k.a. legal population), and the population physically present on the night of the census. Our data for 1861 and 1871 refer to the physically present population, as can be verified by cross-checks against other sources, but the Sistat database labels them as the legal population. From 1881 onwards (not part of our dataset) Sistat's population numbers do correspond to what is reported in other sources as the resident population.

annexed to Capralba in 1868. In the Sistat database, Capralba has 589 inhabitants in 1861 and 1,083 in 1871. Farinate, meanwhile, is recorded with 381 inhabitants in 1861, and is missing in 1871. Capralba thus has spuriously rapid population growth (84%). To correct for such changes, we use the territorial variations flagged in the Sistat database and more fully documented in the 1951 statistical publication "*Comuni e loro popolazione ai censimenti dal 1861 al 1951*" (Italy. Istituto Cetrale di Statistica 1960).[16] Our final database has constant 1871 borders; therefore, it has no entry for the suppressed *comune* of Farinate, and a record for Capralba with a population of (381+589=) 970 in 1861, and 1,083 in 1871. Using the same sources and similar procedures, we correct 1861 population figures for *comuni* that experienced cessions or annexations of territory by 1871.

An alternative (and labour-saving) approach would be to use an existing Istat compilation reconstructing historical *comune* populations at current boundaries. The earliest of these (Istat 1977) uses the municipal boundaries of 1971. Our database at constant 1871 definitions has two advantages. First and foremost, using historical units of analysis facilitates merging with pre-unification sources. Second, using the ready-made sources for historical analysis can raise statistical concerns due to the modifiable areal unit problem (MAUP). MAUP refers to biases that can be induced by the assembly of spatial subunits into larger aggregates of varying size and shape. There is no standard theory to guide the measurement of such distortions, but the empirical economic geography literature suggests that the problem is important, and recommends (i) maintaining a consistent aggregation process, and (ii) choosing units of aggregation that are relevant for the question asked (Briant, Combes, and Lafourcade 2010). Using today's administrative boundaries for a historical investigation such as ours would violate these rules. Figure 1 in the online appendix helps illustrate the issue by zooming in on a part of North-western Italy, showing both 1871 *comune* population centres and 2014 *comune* boundaries. Many *comuni*, especially in rural areas, have maintained their 1871 definitions to the present day. However, we can count, within the 2014 definition of Genova, more than 20 independent *comuni* of 1871 that were merged into the metropolis at some point between 1871 and 2014. Similarly, there are 4 independent *comuni* of 1871 within today's Pavia, and 14 in today's Milan. Today's large aggregates are unlikely to be meaningful historically, which would violate recommendation (ii). Cities were smaller in the past, with poorly developed local transportation links. Similarly,

[16] The website www.elesh.it is also useful. Elesh compiles the history of boundary changes for Italian municipalities. The site is part of the open data project Apps4Italy, funded by the Italian Ministry of Education for innovative open data projects.

a sample including such large –and historically artificial– aggregations alongside individual *comuni* with unchanged definitions would mean heterogeneous aggregation processes in the data, violating (i).

Our post-unification dataset comprises 7,317 *comuni* within Italy's borders of 1861. (This total includes the islands of Sicily and Sardinia, which will not be in our estimating samples. The regions Veneto and Lazio, annexed in 1866 and 1870 respectively, are excluded.) Of these, 1,357 experienced a name change; 24 were newly created after 1861; 8 lost territory after 1861 and were corrected to smaller, counterfactual boundaries; 85 lost territory in a way we could flag but not correct; 271 gained territory and were corrected to larger counterfactual boundaries (like Capralba); and 73 gained territory in a way that could be flagged but not adjusted.

2.2 Pre-unification population

Finding and working with pre-unification data is challenging precisely because the country was not yet unified. There is no reliable compilation of pre- and post-unification municipal population data.[17] We have digitised pre-unification population figures for three states: the Kingdom of Sardinia (1838 and 1848), Tuscany (1846), and the Kingdom of the Two Sicilies (1828). The same issues that arise in harmonising the censuses of 1861 and 1871 come up again in merging pre-unification data with our 1861-71 database. Our approach is to initially merge using province and *comune* names, then investigate problem cases individually. In this process, we use a wide range of sources, from nineteenth century statistical compilations to online maps and webpages detailing the history of particular *comuni*. We adjust pre-unification *comune* populations to accord with 1871 definitions (e.g. Capralba would be merged with Farinate even before 1861 in our earlier example). The resulting linked, geocoded database of pre- and post-unification municipal population figures is the first of its kind, to the best of our knowledge.

2.2.1 Kingdom of Sardinia

We take pre-unification population data for the former Kingdom of Sardinia from the 1848 census, published in 1852 (*Informazioni statistiche raccolte dalla Regia commissione superiore : censimento della popolazione per l'anno 1848* 1852).

[17] A volume published subsequent to the 1861 census reports "population in preceding years" alongside figures for 1861, but specifies neither the source nor the year to which the pre-1861 data refer (Italy. Ministero di Grazia e Giustizia e dei Culti 1863). In three cases — the former Kingdom of Sardinia, Kingdom of Lombardy-Venetia, and Duchy of Modena — the population figures match those in the pre-unification censuses of 1857/58 reported in (Italy. Ministero d'Agricoltura, Industria e Commercio 1862) for a selection of *comuni* we have checked. This date is too close to the events of the unification itself, to establish a baseline pre-unification growth rate. For the remaining pre-unification territories, with both the source and the year to which the data refer unknown, it impossible to either check for and correct any boundary changes before 1861 or to calculate an annual growth rate for the pre-unification period.

The published census volumes also report *comune* populations from the earlier census of 1838. We can thus compute preunification population growth rates for both 1838-1848 and 1848-1861.

The merging procedure matches all 2,340 *comuni* of 1871 to an 1848 counterpart. In our analysis of pre-unification growth rates, we focus on the 1838-1848 period rather than 1848-61. Inconsistencies between the Piedmontese and the Italian censuses would otherwise cause an overestimate of population loss in Alpine *comuni*. [18]

2.2.2 Tuscany

The pre-unification population estimates for the Grand Duchy of Tuscany are from the 1846 *Introduzione al dizionario geografico fisico storico della Toscana* (Repetti 1846). The data appear to have been collected from the parish priests responsible for vital record keeping in Tuscany and to refer to 1 January, 1846.[19] The merging procedure matches all 283 comuni of Tuscany in 1861 to an 1846 counterpart, the population of both being adjusted to constant 1871 boundaries.

2.2.3 Kingdom of the Two-Sicilies

The pre-unification population figures for the Kingdom of the two Sicilies were compiled from a transcription of the Atlante corografico storico e statistic del Regno delle Due Sicilie (Marzolla 1832). The data are based on official sources and refer to the year 1828.[20] The merging procedure matches 1,833 of 1,838 comuni of 1861 to an 1828 counterpart, both being adjusted to constant 1871 boundaries.[21]

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[18] The pre-unification Piedmontese censuses counted resident population, while we have the population actually present in 1861. Because Alpine municipalities experienced seasonal outmigration, the population physically present can differ from an the legal population. This generates spurious population decreases between 1848 and 1861, as census dates differ. Figure 2 in the online appendix compares the distributions of population growth rates. The distribution for the 1838-1848 period is very comparable to that for 1861-1871, while 1848-1861 clearly differs from both. See also discussion in footnote 15.

[19] Repetti does not specify his sources, the definition of population employed, or the date to which they refer. Yet there are clues. He reports births and deaths for the year 1845, which could only have come from the parishes, which imply the data cover the period right up to the end of 1845. The census of 1841 employed a resident (rather than physically-present) population definition, and the reference period was to be the month of April, though many *comuni* had not yet submitted their data as late as July (Bandettini 1956, III–IV:99–104). Results of the census were never officially published, but population figures from unpublished sources for a selection of *comuni* were made available to us by Roberto Ganau. Comparing *comuni* for which all parishes were reported, Repetti's figures are close to those from the 1841 census, but on average higher (from 2-12 %), consistent with growth cumulated through the end of 1845.

[20] The original source was transcribed by a research team at the University of Bari and can be downloaded in pdf format from http://www.uniba.it/ricerca/centri-interuniversitari/criat/ricerche/ricerche-in-corso/atlante-storico/l2019atlante-corografico-storico-e-statistico-del-regno-delle-due-sicilie-di-benedetto-marzolla. Regarding the date and source of his data, Marzolla stated that they were valid "through 1828 according to information from the Directorate General of the Census" ("a tutto il 1828 giusta le notizie della Direzione Generale del Censimento.")

[21] The unmatched *comuni* were part of the enclaves of Benevento and Pontecorvo, territories belonging to the Papal State before 1861.

2.3 Geographic data

To geocode the 1871 *comuni* we obtain locational data from a detailed file produced by Istat giving the latitude, longitude, and elevation of population centres (*località*) in 2001.[22] The sub-*comune* detail at the level of *località* allow us to match many 1871 municipalities that no longer existed in 2001. A majority of *comuni* can be matched straightforwardly on name and region. 580 defunct *comuni* of 1871 we locate one-by-one using Google Maps and additional information such as webpages on particular *comuni* listing their administrative subdivisions (*frazioni*) or recounting their history in detail.

The locations of borders abolished in 1861 are of fundamental importance. The pre-unification state borders largely align with later province borders, which we obtain from Istat shapefiles for 1861.

We georeference official railway maps from 1861 and 1871 (Ferrovie dello Stato 1911). We also georeference data on the location of the main commercial ports in the Kingdom of Italy. Port data come from published statistical records (Statistica del Regno d'Italia 1866). Since the data include all ports, most of which are very small (median is less than 120 times that of Genoa or Napoli), we define large ports as the top 10% of the distribution of tonnage of ships arriving and departing from that location. This selection results in a map of 27 ports.[23] Elevation rasters are produced by the CIAT.

2.4 Descriptive Statistics and Data Visualization

Table 1 shows descriptive statistics of our variables of interest and controls for all the *comuni* in the sample (column (1)), as well as for the restricted set of *comuni* for which we have pre-unification data (column (2)).

Mean growth over the decade of 1861-1871 is 6.04%, which corresponds to a yearly growth of approximately 0.59%, but there are some stark outliers. To gauge whether there are obvious macro regularities in regional population growth, Figure 2 maps spatially smoothed growth.[24] The map reveals two large swathes of slow-growing *comuni*: in the Alps and their foothills, and in the southern Apennines.

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[22] Obtained from http://geodati.gfoss.it/wiki/index.php/Dati_liberi_-_Località_Istat on 26 August, 2016.

[23] Figure 5 in the online appendix shows the location of the georeferenced ports.

[24] The spatially smoothed growth rate of *comune* i is the weighted average growth of its neighbours: $\sum_j w_{ij} g_j$. The weight w_{ij} is the row-standardized proximity measure $(\mathrm{dis}_{ij})^{-0.5}$ or 0 for *comuni* further than 30 km apart. The measure dis_{ij} the walking time between *comuni* i and j.

The local Moran statistic identifies *comuni* which, in conjunction with their neighbours, exhibit unusual growth patterns. These can be categorised as "Hot-Hot" ("Cold-Cold") clusters when both the *comune* and its neighbours display above-average (below-average) growth, or as "Hot-Cold" local anomalies when an unusually fast-growing municipality is surrounded by slow growers ("Cold-Hot" for the mirror-anomaly). Figure 3 maps *comuni* with statistically significant local Moran values. The map reveals clusters of dark-blue slow-growers and red fast-growers, each including a number of local exceptions. Slow growth clusters are found primarily in the Alpine and southern Apennine areas, consistent with Figure 2. Fast growth clusters are scattered throughout the peninsula: some around major cities (such as Genova) or near former borders (like eastern Piedmont), others far from both (e.g. southern Puglia). The *global* Moran statistic is discussed in Section 3.

TABLE 1

FIGURE 2

FIGURE 3

3 EMPIRICAL ANALYSIS

3.1 Specification

3.1.1 Specification description

The baseline specification for our investigation of border effects is described in equation (1). We estimate the effect of distance to a border (removed, imposed, or maintained) on population growth.

$$\text{growth}_{ct} = m(\text{distance}_c) + \boldsymbol{X}'_c\beta + \lambda_r + \gamma_t + u_{ct} \tag{1}$$

The term growth_{ct} is the population growth of *comune* c, in period t. The term distance_c is the distance between *comune* 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 a set of controls at the *comune* level: initial population; elevation; a binary variable equal to one if the *comune* experienced territorial gains in the period 1861-71 and the associated population growth could not be corrected when standardising municipalities to 1871 boundaries; a binary variable equal to one if the *comune* experienced territorial losses which were not corrected; and distances to the nearest major port, large city, and railway line. λ_r is a region fixed-effect and γ_t is a period fixed-effect.[25]

Throughout the paper, we will estimate this equation both by OLS and employing a semi-parametric approach. In the case of OLS the function $m(.)$ is linear. The OLS approach yields an estimate of the *average* effect on growth of distance to a border. In the semi-parametric approach, the function $m(.)$ is estimated using Robinson's double difference estimator. The semi-parametric approach allows for a flexible effect of distance to a border on growth (while control effects are linear), yielding a graphic visualisation of the estimated effects.

3.1.2 Measuring Distances

Distance to borders (as well as rail lines, ports, and large cities) is measured overland. The concept of border proximity is not clearly defined for islands. For this reason we confine our study to mainland locations, but even here the best way to reach distant locations in the new national market may have been via coastal shipping rather than overland. We address this possibility in our robustness checks.

We experiment with three distance measures.[26] A first possible measure of distance between *comune c* and border *b*, is the aerial distance. This is the shortest straight-line distance between the two objects, and does not account for any irregularities in the terrain: it supposes that the traveller moves as a bird flies. However, given Italy's complex geography and rough terrain, it can be a poor representation of the actual travel cost between two points. This becomes an issue when considering the transport of freight. A solution would be to estimate the freight transportation cost between each point, as done by Donaldson and Hornbeck (2016) who use 19th Century transport cost estimates for the United States from Fogel (1970). However, in the case of Italy, data limitations prevent us from using the same approach. There are very few sources describing accurately the transport network and transport costs in Italy at the time of unification (and even fewer before), and those extant do not cover the entire country. Detailed maps published after our period have the problem that significant infrastructure improvements were completed following unification. Finally, despite significant research, we have found no

[25] Region here means one of post-unification Italy's 12 peninsular *regioni*, excluding Veneto and Lazio. These statistical reporting units had no administrative function at the time. The regions are small enough to allow for considerable variation in underlying economic/demographic growth, a potential confounder, but large enough to allow for meaningful internal variation in border-distance.

[26] Bosker and Garretsen (2010) caution that in estimates of market access effects, the specification of trade costs can have significant impact.

precise accounts of the navigation routes or freight and passenger charges for transport via coastal and internal waterway shipping.

To approximate transport costs in the absence of direct evidence, we employ alternative measures of moving costs, accounting for rough terrain. The first of these is walking-time. To estimate walking-time, we use Tobler's hiking speed function, which specifies a relationship between terrain irregularity and walking speed. Hiking speed W varies relative to approximately 5km/h on a flat surface according to:

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

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 is only advantageous 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. We then calculate the quickest path to a border and record the associated walking time as our measure of distance. In so doing we treat cells crossed by rail lines in service in 1861 as flat, with $W = 5$ km/hr, regardless of actual terrain. We cross-check the validity of this approach by comparing the estimated hiking times with those estimated in Google Maps for a random subsample of *comune* pairs at various distances. Figure 4 in the online appendix plots our estimated times against those found using Google Maps, it shows that, reassuringly, the points in the scatter plot stay very close to the 45-degree line. Our estimated travel times tend to be lower, which could be due Google Maps relying on slightly slower speeds and imposing stricter constraints on possible paths, given their more accurate mapping of roads and walking paths.[27]

A third alternative is *ruggedness cost distance* (RCD). RCD is based on the shortest cost-distance path between two objects, where the cost raster is based on a 1kmx1km grid, with the cost of moving across a cell equal to the ruggedness of its terrain. Because this approach penalizes rugged terrain very strongly, we consider RCD-based estimates a robustness check and report the results in the online appendix.[28] In the text we discuss both aerial and walking time distance effects.

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[27] Google Maps does not publish official information on their calibration parameters, however, common estimates found in Google support groups find that the speed over flat terrain is approximately 3 miles/hour=4.8 km/hour, slightly less than our 5 km/hour..

[28] Using travel time via carriage between points on itineraries between a sample of large cities from Vallardi (1832), we observe that travel cost is more accurately approximated by our estimates of Tobler hiking time than by ruggedness cost

3.2 Border effects after unification

In this section we estimate equation (1) for the period after unification only. Because there is no comparison point, this approach may *not* approximate the causal impact of removing a border on local growth. The next section uses difference-in-differences estimation to gauge that impact. The interest in this preliminary analysis with the post-unification sample is that we can observe patterns of growth across all of Italy, whereas the analysis with pre-unification data is restricted to a subsample of three states. The questions this section seeks to answer are whether *comuni* near a removed border grew faster than average, and whether all borders exhibit similar effects on growth.

Our semiparametric estimate of equation (1)'s $\widehat{m}(.)$ is graphed in Figure 4, while the estimated control effects $\widehat{\boldsymbol{\beta}}$ are presented in the online appendix in Table 2. To avoid comparing places that are too dissimilar and where very different determinants of agglomeration apply, all our estimates focus on *comuni* that fall within a 100 km (aerial) or 40-hour (walking-time) buffer of a border. The results are robust to using alternative sample restrictions based on distance.

The graphs in Figure 4 show that *comuni* near a former border tended to grow at an approximately average rate when considering aerial distances, or faster than average when considering walking times. For walking times, *comuni* located roughly 6-8 hours from a removed border grew a statistically significant 0.05 percentage points p.a. (or by about 10%) faster than average. Beyond 20 hours walking time, growth was significantly slower than average. The control effects (Table 2 of the online appendix) describe an intelligible general pattern. The estimates consistently show that growth was slower in small, mountain *comuni* remote from ports and large cities.

Figures 5(a) to 5(f) show that the pooled estimates for all of Italy mask considerable heterogeneity across individual borders.[29] *Comuni* in both Tuscany and the former Kingdom of the Two Sicilies may have benefited from access to markets in the ex-Papal State: those near the old border grew faster than average, whether we measure distance in aerial km or walking hours. Within the former Papal State, by contrast, municipalities near the old borders enjoyed no such advantage. If anything, they seem to have been at a competitive disadvantage.

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distance. Elasticity of historical travel time via coach with respect to estimated Tobler hiking time is 0.96, vs. 0.47 with respect to RCD.

[29] The three borders chosen for a detailed look are those which were relevant for a large number of *comuni* on both sides.

Recall that these estimates control for other location characteristics and include regional fixed effects (there are three regions in the former Papal State). It is not merely rugged terrain, distance from ports, or demographic behaviour driven by family structure that drive the estimated border effects. Turning to the former division between Piedmont and Lombardy (5(a) and 5(d)), growth is fastest near the border within Piedmont, but slowest within Lombardy.

FIGURE 4

FIGURE 5

TABLE 2

3.3 Differences-in-Differences

This section aims at assessing whether unification *changed* patterns of growth at the local level for *comuni* close to a removed border, which are those that experienced the largest internal market access shock. The analysis thus narrows to the three states for which we have collected both pre-unification and post-unification data, namely Piedmont, Tuscany, and the Kingdom of the Two Sicilies. Difference-in-differences estimates reveal more clearly a meaningfully large and statistically significant positive effect of proximity to the former internal borders.

3.3.1 Semi-parametric estimates

Our semiparametric estimates of equation (1) are computed separately for the period before and after unification. We take this approach because the double difference estimator estimates one non-parametric relationship at a time, and introducing more complex multivariate semiparametric specifications is beyond the scope of this paper. The goal of this sub-section is to assess visually whether there is a change in the effect of proximity to a removed border before and after unification.

The graphs in Figure 6 show the nonparametric border-distance – growth relationship when we pool the data for all three pre-unification states. Conditional on the controls and fixed effects in equation (1), *comuni* close to a removed border grow significantly faster than average after unification. This is consistent with findings in Figure 4. The patterns are observed for both distance measures, but they are more robust for walking time distances. The new lesson in Figure 6 is that *before* unification, municipalities near the border tended to grow *slower* than average. Unification thus seems to have significantly accelerated population growth for *comuni* close to a removed border, with a much bigger impact than the post-unification data alone suggest.[30] The graphs indicate a growth acceleration of between 0.2 and 0.3 percentage points (the next section estimates average treatment effects).

Figures 7 to 9 present the same analysis separately for Piedmont (Figure 7), Tuscany (Figure 8) and the Kingdom of the Two Sicilies (Figure 9). Again, it is clear that the pooled result hides heterogeneity. In Tuscany, we see a generalised acceleration in growth. The only evident regularity relating to former-border proximity is a slowdown at the furthest distances. While consistent with our hypothesis, we do not emphasise this finding, which may be a statistical artefact, at least in part.[31] Piedmont offers stronger evidence. It appears that, conditional on controls, unification significantly increases population growth for *comuni* close to the border but not immediately adjacent to it (the acceleration is greatest at a distance of approximately 40 km or 10 hours walking time). The southern case exhibits the most striking effect. Prior to 1861, *comuni* near the country's northern border grew substantially and statistically significantly slower than average, whether distance is measured as the crow flies or by walking distance. After unification growth accelerates quite dramatically near the former border: by as much as 0.7 percentage points per annum within an hour or two's walk or ten kilometres. Further from the frontier, growth increased by perhaps 0.2 percentage points.

FIGURE 6

FIGURE 7

FIGURE 8

FIGURE 9

3.3.2 OLS Regressions

We now turn to estimating the *average* effect of removing national borders on local population growth. We estimate equation (1) using OLS, now defining $m(.)$ as the following linear function of distance:

$$m(\text{dis}_c, t) = \mu_1 \text{dis}_c + \mu_2 \text{post}_t \times \text{dis}_c \quad (3)$$

[30] Not only the switch to a difference-in-differences specification but also the absence from the sample of the former Papal State *comuni* contribute to the more decisive result here.

[31] This result can be due to large seasonal migration in the Grosseto province, where malaria was high. Adding a dummy in the semiparametric regressions reduces, but does not eliminate the pre-unification pattern in Figure 8.

Post_t is a binary variable equal to 1 if the observation dates from the post-unification period. The coefficient $\widehat{\mu_2}$ is the estimated "treatment effect". Standard errors are clustered at the *comune* level. Our identification assumption supposes that *comuni* close to the border have the same pre-unification trends in population growth as those farther away. We can test for the existence of pre-trends in the case of Piedmont, where we can compute yearly growth rates at two points before unification 1828-48, and 1848-61.[32] Figure 13 in the online appendix shows that, at least in the case of Piedmont, there is no evidence of pre-unification differences in trends.

Table 2 reports the estimates of an OLS regression pooling the three states. The table shows that the estimated distance treatment effect $\widehat{\mu_2}$ is negative and statistically significant. In column (1), the estimated treatment effect $\widehat{\mu_2}$ is equal to -0.005; in terms of magnitude, it implies that moving 20 km farther from the border is associated with 0.10 points less growth after unification compared to before. This represents 18.24% of the sample average growth. Similarly, from column (3), the estimated treatment effect is equal to -0.020, which implies that a 4 hour increase in walking time to a removed border is associated with 0.082 points less growth after unification compared to before. This represents 13.48% of the sample average growth. Columns (2) and (4), which present estimates when growth rates are "winsorised," show that these results are not driven by outliers.

While distance to the border had a statistically significant positive impact on growth before unification, the total post-unification effect, $\widehat{\mu_1} + \widehat{\mu_2}$, becomes negative and statistically significant across all specifications. In other words, *proximity* to a removed border is associated with a growth penalty before 1861, and a growth *premium* after unification. In terms of magnitude, the aggregate growth penalty of moving 20 km away from the border after unification is approximately of 8.5% of the sample average growth.

Table 3 shows the results when equation (1) is estimated separately for Piedmont (panel A), Tuscany (panel B) and the South (panel C). In every case, the estimate $\widehat{\mu_2}$ is negative and statistically significant, thus showing that our results are not only driven by one particular state.

In Piedmont (Table 3, panel A), the estimated treatment effect is equal to -0.003 (aerial distance, column (1)) or -0.015 (walking time, column (3)). This implies that a 20 km (resp. 4 hours) increase in aerial distance (resp.

[32] As explained in the data section, data collection procedures differ before and after unification in Piedmont, which biases population growth rates for 1848-61 downward, especially in Alpine regions. The graph thus excludes populations with altitude above 700m (approx. 15% of Piedmontese *comuni*).

walking time) to a removed border is associated with 0.06 points (resp. 0.06) less growth after unification compared to before. This represents 9% of the sample average in both cases.

In Tuscany (Table 3, panel B), the estimated treatment effect is equal to -0.022 (aerial distance, column (1)) -0.097 (walking time, column (3)). This implies that a 20 km (resp. 4 hours) increase in aerial distance (resp. walking time) to a removed border is associated with 0.44 points (resp. 0.39) less growth after unification compared to before. This represents approximately 60% of the sample average in both cases.

In the South (Table 3, panel C), the estimated treatment effect is equal to -0.005 (aerial distance, column (1)) -0.017 (walking time, column (3)). This implies that a 20 km (resp. 4 hours) increase in aerial distance (resp. walking time) to a removed border is associated with 0.10 points (resp. 0.068) less growth after unification compared to before. This represents approximately 18% (resp. 13%) of the sample average.

TABLE 2

TABLE 3

3.4 Robustness checks

3.4.1 Alternative treatment specification

Table 4 reports DiD estimates of the OLS regression described in equation (1), when the treatment is defined as a binary variable instead of a continuous distance measure. In other words, m is the following function:

$$m(\text{dis}_c, t) = \theta_1 (\text{border<D})_c + \theta_2 \text{post}_t \times (\text{border<D})_c \tag{4}$$

The variable $(\text{border<D})_c$ equals 1 if *comune* c is located within distance D of a removed border. We set D at 25 km for aerial distance or 5 hours for walking time. The estimated treatment effect $\widehat{\theta_2}$ indicates that *comuni* in the vicinity of a removed border experienced an increase in growth of 0.18 (column (1)) to 0.20 (column (3)) percentage points p.a., relative to *comuni* further away. This premium represents up to 30% of the sample mean. Figure 14 in the online appendix shows that the results are robust to using other distance cut-offs for the buffers.

TABLE 4

3.4.2 New borders

Unification also meant redrawing some borders with neighbouring countries. Of special interest is Piedmont, which following the Treaty of Turin in March 1860 had to cede the provinces of Nice and Savoy to France in exchange for its support in the war against Austria. In the case of Nice, we observe a slowdown in average growth after unification, but it is only weakly associated with proximity to the new border (Table 5, columns 1 and 2). In the case of Savoy, however, it appears that whereas *comuni* near the future border had higher than average growth before unification, this trend is reversed after unification (Table 5, columns 3 and 4). The semiparametric estimates are shown in the online appendix, figures 15 and 16.

When comparing the results between Nice and Savoy, it is worth noticing that *comuni* near Nice arguably experienced a smaller loss of market access than those in Savoy. The former retained good access to the coast, thus explaining why the new border did not impose the same penalty on growth.

TABLE 5

3.4.3 Spatial correlation

Our analysis discusses the effects of distances, which are geographic variables. We thus have to be mindful of the spatial structure in the data: ignoring this issue can result in substantial upward bias in *t*-statistics (Kelly 2019). As the maps in the figures 2 and 3 suggest, post-unification population growth turns out to be significantly positively spatially autocorrelated. Figure 17 in the online appendix shows simulated distributions of the global Moran and Geary statistics based on a permutation exercise that reshuffles sample growth rates across locations. The actual values of I and C lie well outside the extreme tails of the estimated distributions, equivalent to a p-value close to zero.

Let us note first that our regressions focus on the *change* in growth, and not the levels. It is not obvious how such a change could be driven by spurious spatial correlation. Second, we implement two alternative methods of adjusting standard errors to address issues of spatial correlation. The results are reported in the online appendix Table 3. First, we cluster standard errors at the province level. This higher clustering level accounts for the fact that *comuni* inside the same administrative division can have correlated errors. Second, we use Conley standard errors with a 100 km threshold, using the code by Hsiang (2010).[33] The resulting standard errors are larger, but the p-values remain well below 0.01.

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[33] The t-statistics for the variable of interest remain unchanged when using larger or smaller thresholds. Figure 18 in the online appendix plots the *t*-statistics found using different distance cutoffs (from 30 to 300km). The estimates always remain statistically significant. The figure also shows that 100 km is the most conservative distance threshold.

3.4.4 Alternative distance measures

As mentioned earlier, we experimented with a third distance measure aiming at capturing terrain irregularities, *ruggedness cost distance* (RCD, defined in section 3.1.2). This approach penalises rugged terrain very strongly. Semi-parametric estimates of border-distance effects based on RCD can be seen in graphs 6 to 12 in the online appendix. Although the estimates are noisier, the patterns shown are consistent with those described in section 3.3.1.

3.5 Channels and extensions

3.5.1 Ports: Access to foreign markets

Our focus thus far has been on domestic markets. But unification also entailed a shock to *foreign* market access, as the liberal commercial policy of Piedmont was extended to the entire Kingdom, and tariffs were cut (Federico and Tena-Junguito 1998). It is possible that in our period foreign market access was more important than the research on later years has found (Basile and Ciccarelli 2018; Daniele, Malanima, and Ostuni 2018; Missiaia 2016; 2019a; 2019b). In the era before inexpensive ground transport, foreign market access was primarily through seaports (Fenoaltea 1983).[34] Proximity to a seaport is thus a potential confounding influence, as well as a growth factor of substantive interest.

Distance to the nearest seaport has been a control variable in all regressions reported thus far. We now allow its effect to vary before and after unification. Tables 6 and 7 report OLS estimates of the DiD specification adding distance to a port as an additional treatment of interest. The estimating sample includes all *comuni* in columns (1) and (2), *comuni* within 100 km of the coast in (3) and (4), and *comuni* within a 100 km buffer around a removed border in (5) and (6). Table 6 reports results with aerial distances and Table 7 with walking times.

The estimates in columns (5) and (6) show that the border-distance effects discussed in section 3.3 (Table 2) are robust to a more flexible treatment of port-distance as a control. Based on the same sample, they show the same sign, magnitude, and statistical significance. Regarding port distance, we can first remark that the baseline post-unification treatment effect is small in magnitude and not statistically significant (4th line in the table). However, when interacted it with dummy variables for the individual states, it becomes negative and statistically significant

[34] Italy's most important trading partner in our period was France. The Fréjus and St. Gotthard tunnels to France and Switzerland were completed in the 1880s.

for both Tuscany and the South, which unlike Piedmont experienced a foreign market access shock upon unification due to the change in trade policy.

TABLE 6

TABLE 7

3.5.2 Migration and natural increase

Faster population growth in *comuni* with improved market access could occur via natural increase or in-migration; both are plausible channels in our context. Birth and death rates were certainly sensitive to economic conditions in nineteenth-century Italy. Taking a one-standard deviation change in wheat prices as an economic shock, we find this was associated with a more than 50% change in the rate of natural increase: a move of 3.5 per thousand relative to a mean of 5.6.[35] Fertility was the primary driver of this behaviour in the sample period, 1800-1880. Studies based on longitudinal microdata covering these years confirm the aggregate finding (Breschi, Derosas, and Manfredini 2004; Bengtsson and Dribe 2010; Breschi et al. 2014; Derosas et al. 2014). Since temporary shocks can simply displace in time events that would happen anyway, this evidence may not generalise to the enduring changes in fortune of interest here. Nonetheless, it is strongly suggestive of the potential impact of natural increase.

Turning to migration, there is a tendency to assume that in a somnolent, deeply traditional, agrarian world of the mid-nineteenth century, migration must have been minimal. Yet the modernisation paradigm, in which migration is interpreted as a break with the past – cultural as much as economic – caused by urban industrialisation, has been discredited. Right across western Europe mobility was an integral part of pre-modern social life.[36] It is true that long-distance, permanent migration was limited in mid-19th century Italy. Statistics for the Papal State in 1853 indicate that only 1.6% of the population had been born outside the state (Stato Pontificio 1857). 93% of the Papal State's population lived in the same province where they had been born. Studies of major cities that acted as immigrant magnets in the early nineteenth century (Torino, Roma, and Napoli) indicate that very few incomers originated beyond state borders (Arru and Ramella 2003). But two types of internal geographic mobility have

[35] This estimate results from a regression of the rate of natural increase for North-Central Italy (Galloway 1994) on the price of wheat in Milan (Jacks 2004; 2005) over the period 1800-1880 (p-value < 0.000).
[36] A much-cited classic in the newer migration history literature is Moch (1992); summary statements can be found in Lucassen and Lucassen (2009), Fornasin et al. (2015), or Jackson and Moch (1989).

been shown to be important. The first was medium-distance seasonal migration linked to the agricultural production cycle, typically connecting mountainous areas with lower-lying plains, often malarial coastal zones (Gallo 2012 chs. 1-2). In the census of 1861, 185,000 individuals declared themselves to be regular seasonal migrants.

The second type of mobility involved transfers of legal residence to a new *comune*, usually over short distances. According to the census of 1861, 14.7 per cent of the native population resided outside their birthplace. In several regions of the North-Centre, this share exceeded 20 per cent (see online appendix Table 5). Demographic historians studying individual *comuni* have found surprisingly high rates of turnover in rural areas. Just after unification, the village of Casalecchio di Reno, near Bologna, experienced annual gross flows of both in- and out-migration of 6.9 per cent. This was a "circulatory migration," with 75 to 80 per cent of moves involving *comuni* within 15 kilometres of Casalecchio, and high rates of return migration. Rural-rural, urban-rural, and rural-urban migration were all observed, though the first of these predominated (Hogan and Kertzer 1985; Kertzer and Hogan 1985; 1990).

Recent work has found similar patterns before 1861. Casalguidi, a rural *comune* near Pistoia in Tuscany, experienced annual rates of household in- and out-migration of 3.5 and 3.4 per cent over the years 1819-59 (Breschi, Manfredini, and Fornasin 2011, 500). Here too return migration was common and the range of movement was generally short. In periods of economic distress, proxied by high grain prices, households owning neither land nor a home were most likely to emigrate. Casalecchio and Casalguidi were both located in regions where sharecropping prevailed. Nani (2012) studies a very different context: Ferrara province, where large estates worked by landless labourers dominated the scene. Here too mobility was the norm already before 1861.

Seasonal migration established reliable networks across which information about the demand for labour in relatively distant locations could flow. Short-range transfers of residence accustomed individuals and families to the idea of repeated moves over the life course. Together, these two types of migration generated a well-developed "culture of mobility" in Italy: an *animus migrandi*, in the words of Gallo (2012, 8). In this context, labour could be expected to flow freely in response to the spatial reallocation of production towards former border zones.

3.5.3 Size Effects

As discussed in section 2, Italian municipalities varied widely in size: from less than 100 to more than 100,000 in 1861. Although we have included initial population as a control variable in our regressions, we have otherwise treated *comuni* of all sizes alike, as equally affected by changes in market access. This simplification is unrealistic in two ways. First, within the context of new economic geography models, a town's own population provides much of its potential market, with the implication that large towns experience a smaller proportional change in market access when transport costs fall or borders come down. Redding and Sturm (2008b) verify this corollary prediction of the model for post-division Germany. Second, the model itself, based on trade in differentiated manufactures, may not be appropriate for small settlements producing only agricultural or locally-consumed handicrafts and services. Monocentric models of an individual city and its hinterland typically have all manufacturing concentrated in the central city, while rural settlements supply it with agricultural goods (Fujita, Krugman, and Venables 1999, ch. 6). In this spirit, Ploeckl (2017) proposes an interesting criterion for distinguishing villages from towns: villages are those settlements – below some threshold size – whose populations are predicted by agricultural endowments, while towns are those centres for which endowments have no predictive power. For Saxony in 1834, he estimates this threshold at approximately 3,000 inhabitants (at roughly the 75th percentile of our Italian 1861 municipalities).

In Table 8 we add to the basic difference-in-differences specification of section 3.3 a binary variable and an interaction term flagging the 10% smallest municipalities (1861 populations less than 440), all those below the median (1,495 inhabitants in 1861), and the 10% largest (populations over 5,495). The triple-interaction term is statistically insignificant and very close to nil for both tiny and below-median *comuni*. The term is negative and of larger magnitude for larger *comuni*, suggesting a possible amplification effect for larger towns. However, this triple-interaction is only significant at the 10% level and in only one specification (aerial distance, column (3)). These results do not align with Redding and Sturm's prediction that smaller towns should be the most affected, and illustrate that historical reality was more complicated than the models. The stability of our main effect estimates reassures us, however, that our pooling of *comuni* of all sizes is not distorting our results.

TABLE 8

3.5.4 Spatial inequality

The larger population gains near former borders for bigger municipalities could imply they attracted population from smaller settlements nearby. More generally, one can imagine a process by which productive activity relocates towards former borders in discrete units of some minimum mass, inducing selective growth in a few places rather than a smooth acceleration everywhere. In such case, unification could have increased the spatial inequality of growth near the ex-borders. We undertake a preliminary exploration of this issue by replacing the dependent variable in our difference-in-differences regressions with the square and absolute value of growth. The estimates in Tables 6 and 7 of the online appendix offer some support for the hypothesis of increased dispersion in growth near the former borders: post-unification border-distance treatment effects are correctly signed and statistically significant for both the square and absolute value of growth.

4 CONCLUSIONS

The decade after 1861 saw the political unification of Italy largely completed. The institutional foundations for economic unification were also laid, with a common legal system, trade policy, currency, and fiscal regime in place. Yet the substantive integration of previously independent national economies was halting at best, and one looks in vain for dramatic cases of economic restructuring, industrial take-off, or national scale enterprise.

Our new *comune*-level population dataset spanning the decades before and after 1861 allows us to examine unification from a micro-geographic perspective. From the experience of thousands of anonymous municipalities, a pattern emerges following unification: *comuni* near the abolished internal borders underwent an acceleration of population growth of between 0.2 and 0.3 percentage points compared with more distant locations. Relative to mean growth of roughly 0.6 per cent per annum, this previously unremarked effect was large.

The finding is robust to different estimation techniques, samples, definitions of key variables, and treatment of spatial correlation. It is plausibly causal, given the difference-in-differences strategy our data allow us to implement, and could plausibly have operated through both variation in rates of natural increase and variation in migration rates. Our results support the interpretation that market access via overland transport was an important locational consideration, and that internal borders effectively impeded intra-Italian trade before 1861.

Even in a largely agrarian, apparently quiescent economy, on the ground and at the local level things were moving. Even in the South, where the evidence is the strongest. Even in the short-run, over the first decade following unification. Quietly, incrementally, the integration of markets was already beginning to remake Italy's economic geography.

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Tables and Figures

Table 1: Summary statistics of *comune* characteristics

	All sample		Pre-unification sample	
	mean	sd	mean	sd
Yearly growth after unification	0.60	0.88	0.57	0.92
Aerial dis to removed border, km	139.77	159.27	147.86	141.19
Walking time to removed border, hours	26.31	31.62	36.86	35.85
Population 1861	2974.42	8301.28	3073.43	9102.36
Population 1871	3161.37	8662.85	3267.32	9391.18
Aerial dist to port, km	93.93	54.49	78.28	49.78
Aerial dist to city (20M), km	35.23	24.16	41.08	25.23
Aerial dist to rail, km	38.61	76.73	19.29	18.04
Elevation	377.39	281.70	416.99	296.03
Uncorrected admin change: gained territory	0.01	0.10	0.01	0.10
Uncorrected admin change: lost territory	0.01	0.11	0.01	0.11
Yearly growth before unification			0.48	0.82
Population before unification			2699.21	7156.96
Observations	7317		4083	

Notes: This table reports summary statistics. The first two columns show averages and standard deviations from the entire sample. The second two columns show figures for Piedmont, Tuscany, or the South, which are the states in our pre-unification sample.

Table 2: Diff in Diff, pooled regression across all removed borders

	Aerial		Walking Time	
	(1) b/se	(2) b/se	(3) b/se	(4) b/se
Aerial dis to removed border, km	0.00215***	0.00185***		
	(0.00068)	(0.00061)		
Post x Aerial dis to removed border, km	-0.00482***	-0.00444***		
	(0.00089)	(0.00078)		
Walking time to removed border, hours			0.00916***	0.00812***
			(0.00272)	(0.00249)
Post x Walking time to removed border, hours			-0.02065***	-0.01983***
			(0.00361)	(0.00320)
Post	0.33382***	0.30790***	0.34842***	0.33032***
	(0.04817)	(0.04338)	(0.04809)	(0.04324)
Observations	4026	4026	4020	4020
R-sq	0.060	0.053	0.059	0.052
Mean growth	0.609	0.597	0.608	0.596
Sd growth	0.880	0.765	0.880	0.765
Censored growth	No	Yes	No	Yes

Notes: * p<0.10, ** p<0.05, *** p<0.01. The Table reports OLS estimates. The unit of observation is the comuni. The sample pools pre and post unification data for Piedmont, Tuscany, and the South. The dependent variable is yearly population growth in columns (1), (3), and (5); and censored yearly population growth (5% cutoff) in columns (2), (4), and (6). Standard errors are clustered at the comune level. Controls are described in the text.

Table 3: Diff in Diff, all removed borders per state

	Aerial		Walking Time	
	(1)	(2)	(3)	(4)
	b/se	b/se	b/se	b/se
Panel A: Piedmont				
Aerial distance to removed in Piem, km	0.00006	-0.00024		
	(0.00072)	(0.00066)		
Post x Aerial distance to removed in Piem, km	-0.00301***	-0.00243***		
	(0.00098)	(0.00087)		
Walking time to removed in Piem, hours			0.00236	0.00151
			(0.00292)	(0.00274)
Post x Walking time to removed in Piem, hours			-0.01544***	-0.01392***
			(0.00394)	(0.00359)
Post	0.18976***	0.15074***	0.22644***	0.19633***
	(0.05753)	(0.05063)	(0.05722)	(0.05054)
Observations	2840	2840	2836	2836
Mean growth	0.614	0.603	0.613	0.602
Sd growth	0.859	0.747	0.858	0.746
R-sq	0.052	0.048	0.053	0.050
Panel B: Tuscany				
Aerial distance to removed in Tusc, km	0.01630***	0.01534***		
	(0.00381)	(0.00347)		
Post x Aerial distance to removed in Tusc, km	-0.02220***	-0.02084***		
	(0.00494)	(0.00461)		
Walking time to removed in Tusc, hours			0.07117***	0.06672***
			(0.01579)	(0.01442)
Post x Walking time to removed in Tusc, hours			-0.09683***	-0.09012***
			(0.02179)	(0.02029)
Post	1.00947***	0.98484***	1.05896***	1.02508***
	(0.13971)	(0.13243)	(0.15154)	(0.14384)
Observations	542	542	540	540
Mean growth	0.658	0.657	0.659	0.658
Sd growth	0.966	0.876	0.966	0.876
R-sq	0.200	0.202	0.212	0.215
Panel C: South				
Aerial to Papal/Sicily, km	0.00570***	0.00568***		
	(0.00229)	(0.00218)		
Post x Aerial to Papal/Sicily, km	-0.00491**	-0.00582***		
	(0.00225)	(0.00197)		
Walking time to Papal/Sicily, km			0.01235	0.01175
			(0.00817)	(0.00788)
Post x Walking time to Papal/Sicily, km			-0.01689*	-0.02095***
			(0.00925)	(0.00797)
Post	0.50764***	0.52536***	0.47693***	0.50211***
	(0.12802)	(0.12020)	(0.13142)	(0.12185)
Observations	644	644	644	644
Mean growth	0.544	0.529	0.544	0.529
Sd growth	0.897	0.784	0.897	0.784
R-sq	0.120	0.105	0.095	0.072
Censored growth	No	Yes	No	Yes

Notes: * $p<0.10$, ** $p<0.05$, *** $p<0.01$. The Table reports OLS estimates. The unit of observation is the comuni. The dependent variable is yearly population growth in columns (1), (3), and (5); and censored yearly population growth (5 and 95 % cutoff) in columns (2), (4), and (6). Standard errors are reported in brackets and clustered at the comune level. Controls are described in the text.

Table 4: Diff in Diff, pooled regression across all removed borders with binary treatment

	Aerial		Walking Time	
	(1)	(2)	(3)	(4)
	b/se	b/se	b/se	b/se
Border $<$ 25km	-0.06281	-0.04956		
	(0.04189)	(0.03831)		
Post x Border $<$ 25km	0.18146***	0.16288***		
	(0.05761)	(0.05118)		
Border $<$ 5 hours			-0.07155	-0.05699
			(0.04565)	(0.04182)
Post x Border $<$ 5 hours			0.19689***	0.17265***
			(0.06208)	(0.05491)
Post	0.06019*	0.05721**	0.06864**	0.06571***
	(0.03372)	(0.02840)	(0.03192)	(0.02724)
Observations	4026	4026	4020	4020
R-sq	0.056	0.049	0.054	0.046
Mean growth	0.609	0.597	0.608	0.596
Sd growth	0.880	0.765	0.880	0.765
Censored growth	No	Yes	No	Yes

Notes: * $p<0.10$, ** $p<0.05$, *** $p<0.01$. The Table reports OLS estimates. The unit of observation is the comuni. The sample pools pre and post unification data for Piedmont, Tuscany, and the South. The dependent variable is yearly population growth. The treatment is a binary variable indicating that the comuni is located within 25 km (resp. 5 hour walk) to a removed border. Standard errors are clustered at the comune level.

Table 5: Diff in Diff, New borders

	Nice		Savoy	
	(1)	(2)	(3)	(4)
	b/se	b/se	b/se	b/se
Aerial dis to new	0.00047		-0.00216*	
	(0.00153)		(0.00117)	
Post x dis to new	-0.00067		0.00522***	
	(0.00153)		(0.00149)	
Walking time to new		0.00912*		-0.00727**
		(0.00485)		(0.00341)
Post x Walking time to new		-0.01029*		0.01590***
		(0.00599)		(0.00484)
Post	-0.13283	0.00401	-0.35146***	-0.35354***
	(0.09351)	(0.10392)	(0.09788)	(0.10456)
Observations	1578	1576	1898	1898
R-sq	0.086	0.083	0.061	0.059
Mean growth	0.555	0.554	0.456	0.456
Sd growth	0.845	0.846	0.820	0.820

Notes: * $p<0.10$, ** $p<0.05$, *** $p<0.01$. The Table reports OLS estimates. The unit of observation is the comuni. The dependent variable is yearly population growth. Standard errors are reported in brackets and clustered at the comune level. Controls are described in the text.

Table 6: Diff in Diff with ports per state, aerial distances

	All		Port < 100km		Border < 100km	
	(1)	(2)	(3)	(4)	(5)	(6)
	b/se	b/se	b/se	b/se	b/se	b/se
Aerial dist to port, km	-0.00058*	-0.00058*	-0.00325***	-0.00338***	-0.00190***	-0.00177***
	(0.00036)	(0.00033)	(0.00075)	(0.00071)	(0.00042)	(0.00039)
Aerial dis to removed border, km	0.00067***	0.00063***	0.00080***	0.00076***	0.00228***	0.00188***
	(0.00015)	(0.00014)	(0.00016)	(0.00015)	(0.00070)	(0.00063)
Post=1×Aerial dis to removed border, km	-0.00075***	-0.00061***	-0.00056***	-0.00046**	-0.00509***	-0.00450***
	(0.00023)	(0.00021)	(0.00024)	(0.00021)	(0.00094)	(0.00083)
Post=1×Aerial dist to port, km	-0.00002	0.00019	0.00082	0.00156	-0.00022	-0.00003
	(0.00052)	(0.00045)	(0.00124)	(0.00104)	(0.00063)	(0.00054)
Post=1×South×Aerial dist to port, km	-0.00213**	-0.00194***	-0.00253*	-0.00295**	-0.00657**	-0.00554**
	(0.00094)	(0.00083)	(0.00148)	(0.00127)	(0.00320)	(0.00265)
Post=1×Tuscany×Aerial dist to port, km	-0.00328*	-0.00381**	-0.00408*	-0.00515***	-0.00485***	-0.00503***
	(0.00201)	(0.00165)	(0.00230)	(0.00190)	(0.00199)	(0.00166)
Post=1	0.03464	0.00352	-0.03996	-0.09355	0.30540***	0.24800***
	(0.06065)	(0.05047)	(0.08298)	(0.06772)	(0.09086)	(0.07464)
South	-0.50853***	-0.48526***	-0.69656***	-0.67572***	-0.52325**	-0.51291**
	(0.06578)	(0.06145)	(0.07874)	(0.07420)	(0.25562)	(0.25149)
Tuscany	-0.12021	-0.20102*	-0.26923*	-0.35395***	-0.33856**	-0.37808***
	(0.15203)	(0.12368)	(0.15579)	(0.12748)	(0.15211)	(0.12684)
Observations	8158	8158	6512	6512	4026	4026
R-sq	0.056	0.055	0.062	0.061	0.066	0.061
Mean growth	0.527	0.520	0.542	0.533	0.609	0.596
Sd growth	0.876	0.778	0.881	0.777	0.880	0.765
Censored growth	No	Yes	No	Yes	No	Yes

Notes: * p<0.10, ** p<0.05, *** p<0.01. The Table reports OLS estimates. The unit of observation is the comuni. The sample pools pre and post unification data for Piedmont, Tuscany, and the South. The dependent variable is yearly population growth in columns (1), (3), and (5); and censored yearly population growth (5 and 95 % cutoff) in columns (2), (4), and (6). Standard errors are reported in brackets and clustered at the comune level. Controls are described in the text.

Table 7: Diff in Diff, borders and ports per state, walking time

	All		Port < 100km		Border < 100km	
	(1)	(2)	(3)	(4)	(5)	(6)
	b/se	b/se	b/se	b/se	b/se	b/se
Walking time to port, hours	-0.00344***	-0.00354***	-0.00629**	-0.00731***	-0.00910***	-0.00838***
	(0.00147)	(0.00138)	(0.00319)	(0.00303)	(0.00180)	(0.00169)
Walking time to removed border, hours	-0.00504***	-0.00507***	-0.00535***	-0.00544***	0.01018***	0.00884***
	(0.00088)	(0.00083)	(0.00098)	(0.00092)	(0.00286)	(0.00258)
Post=1 × Walking time to removed border, hours	-0.00236***	-0.00190***	-0.00148*	-0.00112	-0.02255***	-0.02099***
	(0.00088)	(0.00078)	(0.00090)	(0.00080)	(0.00380)	(0.00337)
Post=1 × Walking time to port, hours	-0.00149	-0.00056	0.00167	0.00471	0.00018	0.00079
	(0.00214)	(0.00185)	(0.00527)	(0.00439)	(0.00262)	(0.00226)
Post=1 × South × Walking time to port, hours	-0.00394	-0.00353	-0.00525	-0.00714	-0.02259**	-0.01825*
	(0.00373)	(0.00330)	(0.00604)	(0.00517)	(0.01171)	(0.00978)
Post=1 × Tuscany × Walking time to port, hours	-0.02912***	-0.02816***	-0.03219***	-0.03334***	-0.03408***	-0.03220***
	(0.00874)	(0.00700)	(0.00998)	(0.00806)	(0.00877)	(0.00705)
Post=1	0.05708	0.02431	-0.03042	-0.08549	0.30155***	0.25768***
	(0.05905)	(0.04938)	(0.08671)	(0.07052)	(0.08254)	(0.06880)
South	-0.24682***	-0.23014***	-0.26468***	-0.25533***	-0.52596**	-0.50013**
	(0.06601)	(0.06169)	(0.08342)	(0.07825)	(0.23752)	(0.23338)
Tuscany	-0.45707***	-0.47808***	-0.51104***	-0.54032***	-0.60105***	-0.58393***
	(0.14009)	(0.11799)	(0.14534)	(0.12327)	(0.13956)	(0.11951)
Observations	8118	8118	6472	6472	4020	4020
R-sq	0.068	0.068	0.072	0.073	0.070	0.065
Mean growth	0.527	0.520	0.542	0.533	0.608	0.595
Sd growth	0.875	0.777	0.880	0.777	0.880	0.764
Censored growth	No	Yes	No	Yes	No	Yes

Notes: * $p<0.10$, ** $p<0.05$, *** $p<0.01$. The Table reports OLS estimates. The unit of observation is the comuni. The sample pools pre and post unification data for Piedmont, Tuscany, and the South. The dependent variable is yearly population growth in columns (1), (3), and (5); and censored yearly population growth (5 and 95 % cutoff) in columns (2), (4), and (6). Standard errors are reported in brackets. Controls are described in the text.

Table 8: DiD, pooled regression across all removed borders, by population size

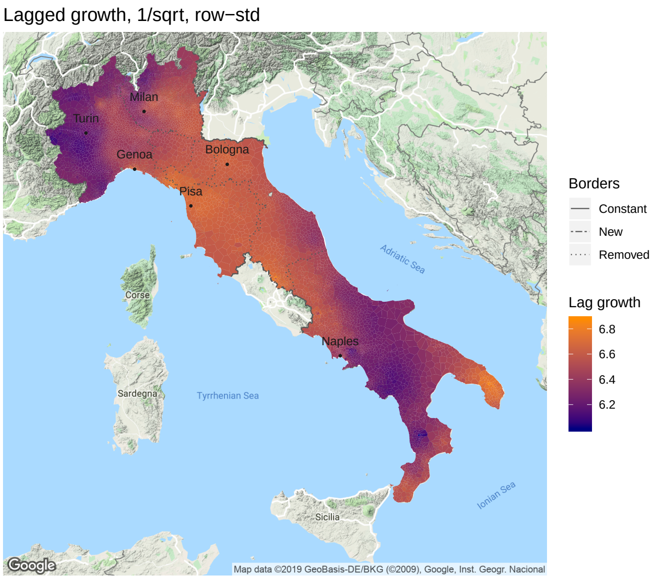
	Aerial			Walking Time		
	(1)	(2)	(3)	(4)	(5)	(6)
	b/se	b/se	b/se	b/se	b/se	b/se
Distance	0.00225***	0.00225***	0.00228***	0.00914***	0.00920***	0.00932***
	(0.00066)	(0.00067)	(0.00067)	(0.00265)	(0.00267)	(0.00267)
Post x Distance	-0.00481***	-0.00487***	-0.00469***	-0.02067***	-0.02057***	-0.02028***
	(0.00091)	(0.00097)	(0.00089)	(0.00369)	(0.00405)	(0.00360)
Post	0.33383***	0.33393***	0.33790***	0.34842***	0.34834***	0.35342***
	(0.04810)	(0.04819)	(0.04847)	(0.04809)	(0.04818)	(0.04852)
Post x Distance x tiny	-0.00003			0.00021		
	(0.00167)			(0.00646)		
Tiny	0.02463			0.02263		
	(0.06652)			(0.06778)		
Post x Distance x medn		0.00011			-0.00012	
		(0.00087)			(0.00364)	
Medium		-0.02775			-0.02357	
		(0.03578)			(0.03567)	
Post x Distance x big			-0.00252*			-0.00970
			(0.00147)			(0.00637)
Big			0.08498			0.08236
			(0.06659)			(0.06711)
Observations	4026	4026	4026	4020	4020	4020
R-sq	0.060	0.060	0.061	0.061	0.061	0.061
Mean growth	0.609	0.609	0.609	0.608	0.608	0.608
Sd growth	0.880	0.880	0.880	0.880	0.880	0.880
Censored growth	Yes	Yes	Yes	Yes	Yes	Yes

Notes: * p<0.10, ** p<0.05, *** p<0.01. The Table reports OLS estimates. The unit of observation is the comuni. The dependent variable is censored yearly population growth. Standard errors are reported in brackets and clustered at the comune level. Controls are described in the text. Effects of distance are interacted with the size of the comuni. "Tiny" refers to the 10% smallest comuni, "Medium" refers to those with population below the median, and "Big" to the 10% largest.

Figure 1: Borders removed, newly imposed, and maintained

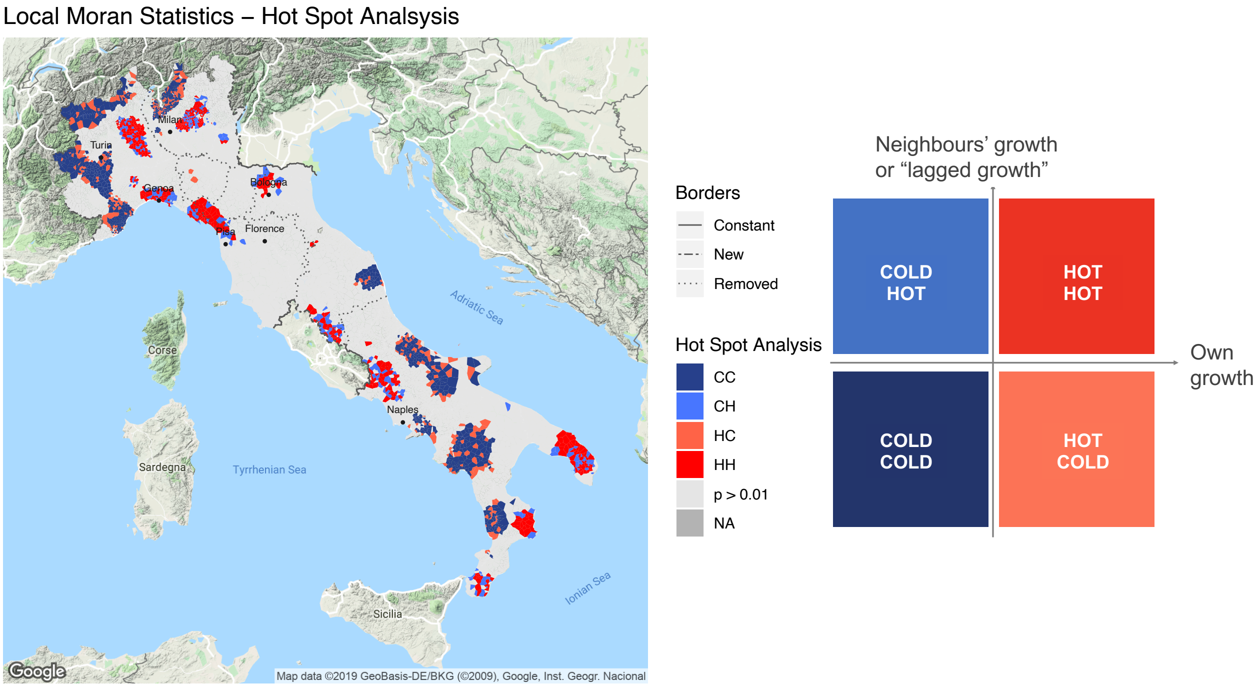
Notes: This map shows the borders that were removed, newly imposed, and maintained after unification and before 1871.

Figure 2: Population growth, geographical smoothing



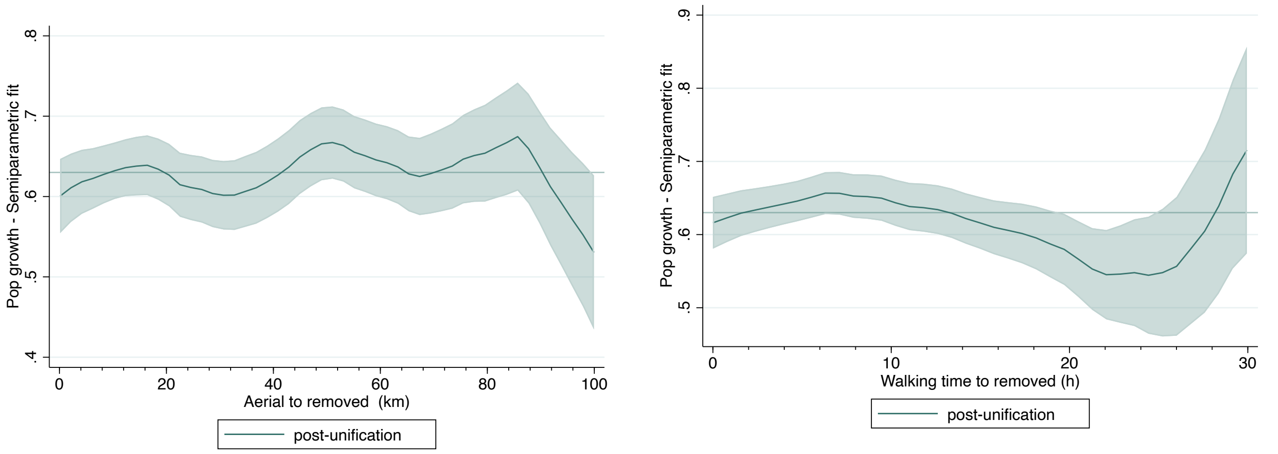
Notes: This map shows the spatially smoothed population growth rates across Italian comuni in the aftermath of unification. The weights are row-standardized and computed with proximity measure $1/\sqrt{w_{ij}}$, where w_{ij} is the walking time between comuni i and comuni j. The weight is 0 if i and j are further than 30km apart.

Figure 3: Hot spot analysis: local Moran statistic



Notes: The left hand side 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 computed with proximity measure $1/\sqrt{w_{ij}}$, where w_{ij} is the Tobler hiking time between comuni i and comuni j. The righ-hand side diagram represents the types of spatial associations that can be found in a Moran scatter plot.

Figure 4: Smoothed yearly growth after unification and distance to removed border, pooled regression

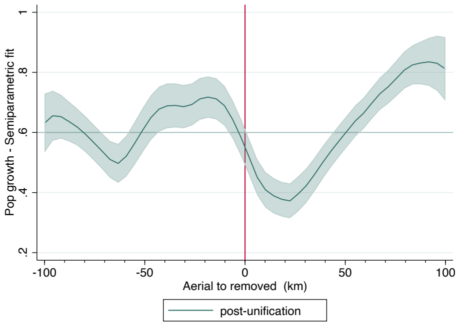


(a) Aerial distance to all removed borders

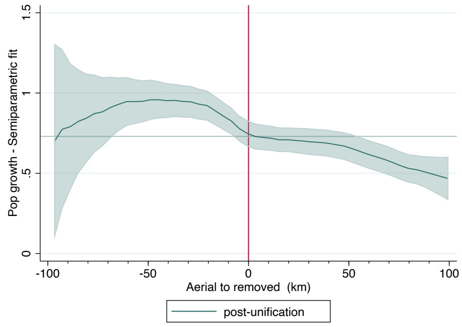
(b) Walking time to all removed borders - Zoom to 30 hour walking time around the border

Notes: These graphs illustrate the effect of distance to a removed border on yearly growth, after unification. All regions of continental Italy are included. We limit the analysis to comuni that are not too far from the border (restriction can be read on the x-axis), as confidence intervals become extremely large outside those ranges. The average growth in the samples is indicated with the horizontal pastel-colored lines. The sample is restricted to comuni within a 100 km buffer from the removed border. Figure c shows the results from the same estimation as the one in Figure b, only cutting the figure below the 30 km threshold to improve visibility (the sample is then the same in both figures).

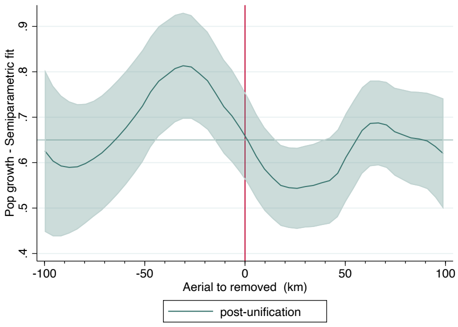
Figure 5: Smoothed yearly growth and distance to removed border in different states



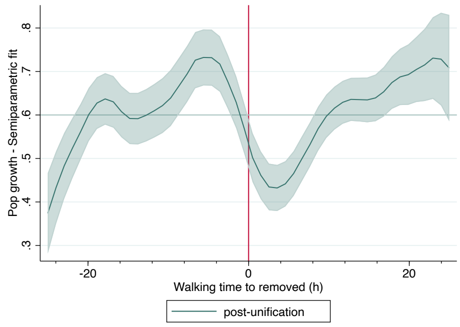
(a) Aerial: Piedmont (≤ 0)-Lombardy (> 0)



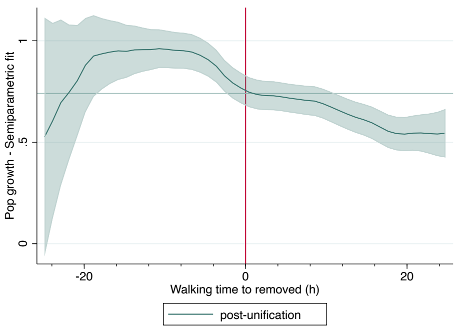
(b) Aerial: Tuscany (≤ 0) - Papal States(> 0)



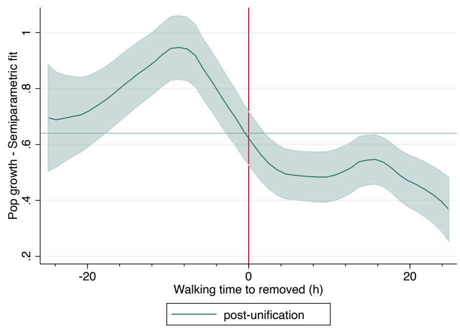
(c) Aerial: South(≤ 0)-Papal States (> 0)



(d) Walking: Piedmont (≤ 0)-Lombardy (> 0)



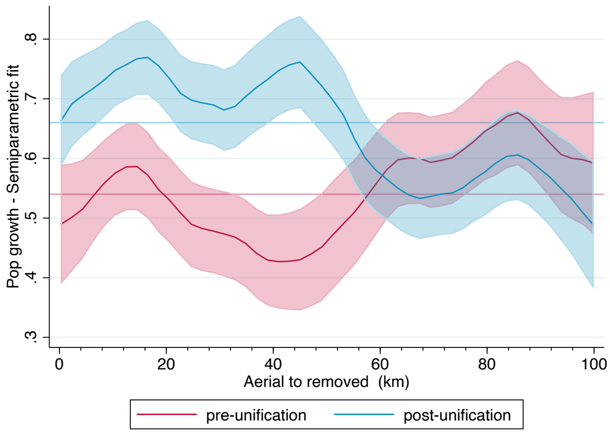
(e) Walking: Tuscany (≤ 0) - Papal States(> 0)



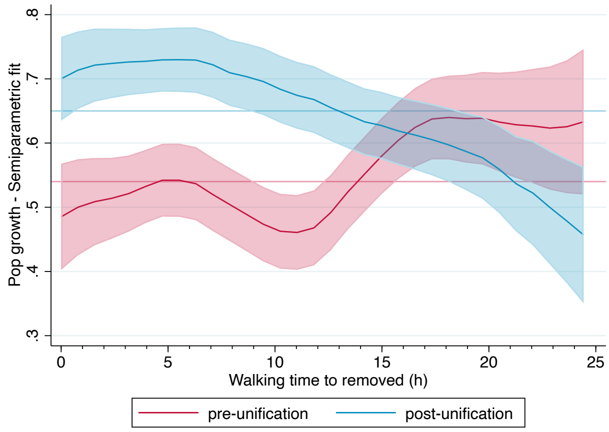
(f) Walking: South(≤ 0)-Papal States (> 0)

Notes: These graphs illustrate the effect of distance to a removed border on yearly growth after unification. The average growth in the samples (pre and post-unification) is indicated with the horizontal pastel-colored lines. In the three graphs, the sample is restricted to comuni within a 100 km buffer from the removed border.

Figure 6: Smoothed yearly growth and distance to removed border, pooled regression



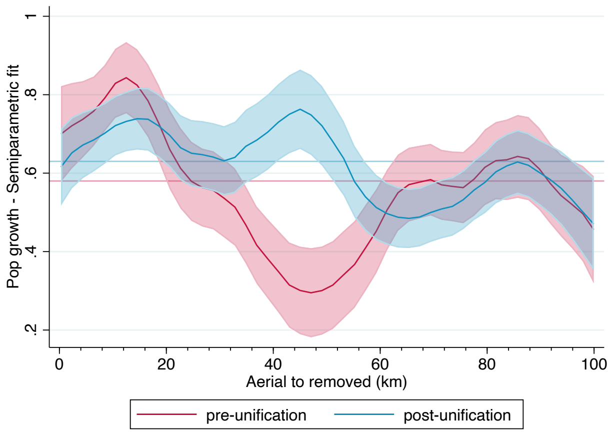
(a) Aerial distance to all removed borders



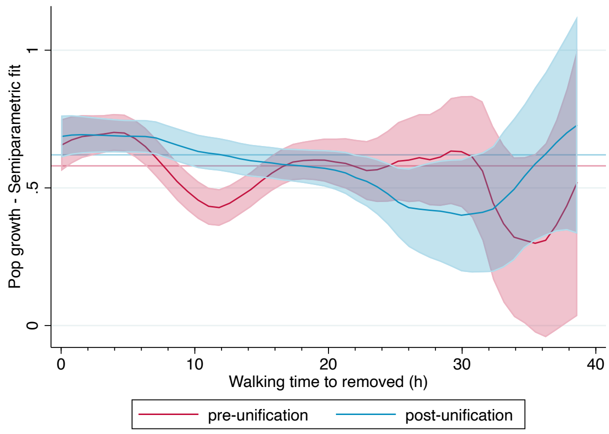
(b) Walking time to all removed borders- Zoom to 30 hour walking time around the border

Notes: These graphs illustrate the effect of 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. The sample is restricted to comuni with a 100 km buffer from the border.Figure c shows the results from the same estimation as the one in Figure b, only cutting the figure below the 25 km threshold to improve visibility (the sample is then the same in both figures).

Figure 7: Smoothed yearly growth and distance to removed border in Piedmont



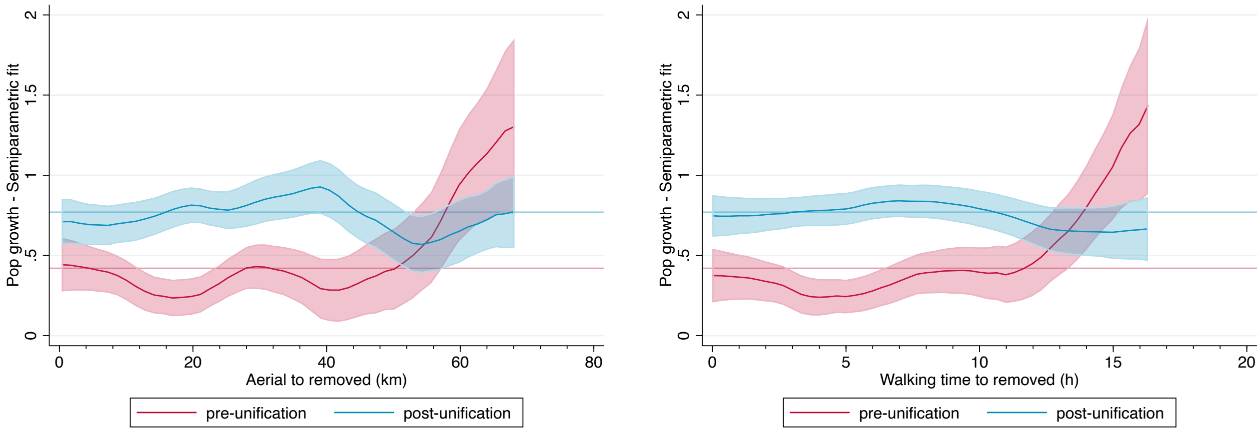
(a) Aerial distance to all removed borders in Piedmont



(b) Walking time to all removed borders in Piedmont

Notes: These graphs illustrate the effect of 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-coloured lines. The sample is restricted to comuni with a 100 km buffer from the border.

Figure 8: Smoothed yearly growth and distance to removed borders in Tuscany

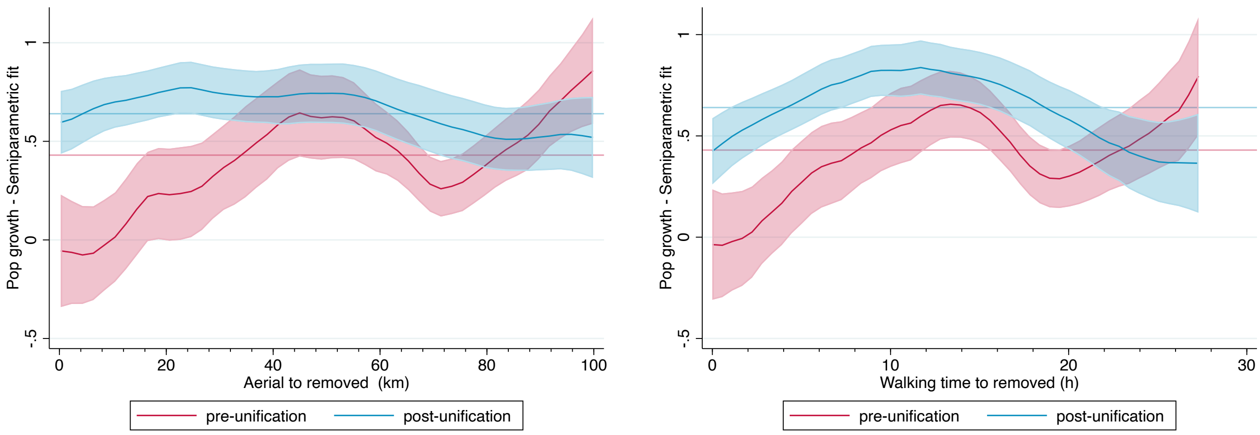


(a) Aerial distance to removed border in Tuscany

(b) Walking time to removed border in Tuscany

Notes: These graphs illustrate the effect of distance to the removed borders in Tuscany 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. The sample is restricted to comuni with a 100 km buffer from the border.

Figure 9: Smoothed yearly growth and distance to removed borders in the South



(a) Aerial distance to removed border in the South

(b) Walking time to removed border in the South

Notes: These graphs illustrate the effect of distance to the removed borders in the South 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. The sample is restricted to comuni with a 100 km buffer from the border.