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**Working Paper**

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GLO Discussion Paper, No. 1315

**Provided in Cooperation with:**

Global Labor Organization (GLO)

*Suggested Citation:* Harka, Elona; Nunziata, Luca; Rocco, Lorenzo (2023) : The Alabaster Ceiling: The Gender Legacy of the Papal States, GLO Discussion Paper, No. 1315, Global Labor Organization (GLO), Essen

This Version is available at:

<https://hdl.handle.net/10419/273582>

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# The Alabaster Ceiling: the Gender Legacy of the Papal States\*

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First draft: September 8, 2021

This draft: July 30, 2023

## Abstract

We examine the gender legacy of past institutions by comparing Italian municipalities located in a narrow band across the borders between the former Papal States on the one hand, and the former Grand Duchy of Tuscany and the Duchy of Modena on the other. Our results show that a century after the dissolution of these pre-unification states, the municipalities once governed by the Papacy have lower female labor market participation and employment than their counterparts in Tuscany and Modena, while we find no discontinuity for males. We interpret these findings as the lingering effects of a deep-rooted conservatism that characterized the Papal States relative to the other pre-unification states, as confirmed by the analysis of the incidence of religious marriages, and voting patterns for a confessional political party and in two referenda on divorce and abortion rights. Our results also suggest that such a legacy is not permanent, although it takes centuries to dissipate.

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\*This paper is an extensively revised version of the IZA Discussion Paper number 14719 published in September 2021. We thank Giulia Albanese, Graziella Bertocchi, Alberto Bisin, Paolo Buonanno, Carlo Ciccarelli, Francesco Cinnirella, Marina Della Giusta, James Fenske and Daniele Paserman for their insightful comments and suggestions. We thank Gianluca Russo for generously sharing data on WWI casualties, and the participants to the ASREC conferences in Copenhagen and London, the SEHO conference in London, the “Gender Discrimination” workshop and the annual faculty workshop at the University of Bergamo, and the seminars in Padua, Bologna, and Modena for valuable comments. Financial support from the University of Padua is gratefully acknowledged. The usual disclaimer applies.

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**Keywords:** Papal States, Gender Equality, Female Condition, Women Rights, Religion, Labour Market, Spatial Regression Discontinuity.

**JEL Codes:** J16, J12, N9, P48, Z12, Z13.

# 1 Introduction

According to the World Economic Forum’s Global Gender Gap Report, Italy has a wider gender gap than many other OECD countries in several domains, including health, education, labor and politics ([World Economic Forum, 2020](#)). Despite recent progress, Italy remains one of the worst performers in Europe in terms of gender equality.

As suggested by [Bertocchi and Bozzano \(2019\)](#), part of this disparity can be ascribed to the patriarchal family model that permeated society, reflecting the patriarchal cultural norms promoted by the Catholic Church ([Bokenkotter, 2004](#); [Seguino, 2011](#)). In Italy in particular, the influence of the Church was profound. Not only did it shape people’s values and religious beliefs, as it did in many other Catholic countries, but it also maintained direct rule over a significant part of the peninsula in the form of the Papal States until 1870.

In this paper, we investigate the lasting impact of historical institutions in shaping contemporary gender inequalities by exploiting a distinctive natural experiment - the prolonged coexistence of the Papal States and the Grand Duchy of Tuscany in Central Italy. These two pre-unification states exhibited substantial differences in terms of women’s rights and social status. Our analysis examines various dimensions of gender inequality within these territories more than a century after they ceased to exist.

Italy embodies considerable heterogeneity in terms of values, dialects, and economic and social patterns. This diversity underpinned the political fragmentation that persisted until the second half of the 19th century. Amid this diverse landscape, the Papal States was a prominent political entity that endured for approximately a thousand years, until its full integration into the Kingdom of Italy. The Papal States were an example of a theocracy, an independent secular power ruled by a high prelate, the Pope, who is the head of the Catholic Church.<sup>1</sup> This ecclesiastical imprint significantly influenced the political, economic, and social institutions of the Papal States. The traditional exclusion of women from the male-dominated hierarchy of the Catholic Church, combined with the overlap of secular and religious institutions, relegated women to a social condition inferior to their counterparts in other parts of Italy and Europe.

Of course, discrimination against women was not exclusive to the Papal States during the Middle Ages and the Modern Era, but it was certainly less pervasive elsewhere. In fact, it was

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<sup>1</sup>This contrasts with the situation in England after the English Reformation, where a lay ruler, the king, also became the head of the Anglican Church.



not uncommon for women either to rule their own countries (e.g., Isabella of Castile, Elizabeth of England, Catherine of Russia, Victoria of England, Maria Theresa of Austria) or to wield significant public influence as the wife of a king (e.g., Catherine de Medici in France). There were also a number of prominent female historical public figures in Italy, such as Matilda of Canossa, who ruled a large territory in Central and Northern Italy and was also a military leader, and Isabella d'Este and Lucrezia Borgia, who ruled alongside their husbands in Mantua and Ferrara, respectively. In addition, all kingdoms and principalities had a queen, whether ruling or consort, whose public profile could serve as a role model for other women. In addition, women played an important role at court, in networks, and in the patronage system. None of these features were present in the Papal States, where queens could not exist and the court was composed primarily of male high prelates who were forbidden to marry.

On the other hand, the Grand Duchy of Tuscany, successor to the merchant Republic of Florence, was traditionally characterized by relatively liberal institutions and policies, quite different from those of the Papal States. Between the 13th and the 16th century, Tuscany was a major center of industry, trade, and finance, and women commonly participated in family businesses and were often educated for that purpose. Despite the economic decline that began in the 17th century, Tuscany maintained its relative liberalism, providing a clear comparison to examine the historical legacy of significantly different social norms regarding gender equality.

Our goal is to examine whether the longstanding subordinate role of women in the Papal States, relative to Tuscan society, survived the demise of these states and persisted to some degree into the modern era. Taking advantage of the geographical discontinuity created by the pre-unification border, and using a robust regression discontinuity design as suggested by [Cattaneo et al. \(2020\)](#), we test whether gender inequality remains more prevalent in municipalities located in the former Papal States than in those located in Tuscany, even a century after their dissolution.

Among the many former borders of the Papal States, the one with the Grand Duchy of Tuscany offers several unique advantages. First, both states have existed for centuries, and their borders have remained largely stable over time. Second, the border with Tuscany is the longest and provides the opportunity to use a relatively large sample of municipalities. As shown in the map of the states before unification in 1850 in [Figure 1](#), this border stretches for hundreds of kilometers in central Italy, covering the territories of five modern regions (a quarter

of the total number of Italian regions), namely Emilia-Romagna, Tuscany, Marche, Umbria, and Lazio. Third, the other main former borders of the Papal States that extend over a relatively long distance, i.e. those with the Kingdom of Lombardy-Venetia and the Kingdom of the Two Sicilies, mostly follow an east-west direction. This could complicate the interpretation of our results, as differences across the border could reflect the well-known Italian north-south divide in various socio-economic outcomes, which is the result of a complex historical stratification. In contrast, the border with the Grand Duchy of Tuscany is situated in a broad and fairly economically homogeneous area in central Italy, and follows an arc that runs longitudinally across the peninsula.

In the literature on gender gaps, there is a common focus on gender-specific labor force participation and employment rates. To these dimensions we add gender-specific entrepreneurship rates. All of these labor market outcomes are the result of a complex process that depends on personal preferences, societal values and norms, and opportunities. These processes involve decisions at both the individual and household levels, and are influenced by employers and institutions. Moreover, the decision to become an entrepreneur is often linked to a quest for autonomy and self-determination ([McClelland, 1967](#)).

All outcomes are measured at the municipality level, and we compare municipalities within a narrow band across the former border. We observe outcomes from the early 1950s to the early 1970s, a period that predates the establishment of Italian regions as local administrative authorities. This approach avoids the problem of compound treatments, as regional boundaries largely (though not perfectly) coincide with those of the pre-unification states. Although the regions do not have jurisdiction over family or employment matters, they could potentially have indirect effects through their jurisdiction in other domains. To overcome this potential problem, we extend the analysis by considering the border between the Papal States and the Duchy of Modena, which runs through the Emilia-Romagna region and hence does not suffer from the problem of compound treatments. In this case we can extend the analysis to 2011, i.e. well after the transfer of administrative power from the central government to the modern regions in the second half of the 1970s.

Our results show that, within an optimally determined bandwidth, female labor force participation, employment, and entrepreneurship are significantly lower in the municipalities belonging to the former Papal States compared to their Tuscan counterparts (by 4.6, 4.2, and

0.4 percentage points, respectively). Such a gap is not found for men, for whom the estimated differences are practically zero.

These findings are not driven by discontinuities in economic specialization across areas, as the share of employment by economic sector is well balanced across the border. We also find no discontinuity in education for either gender, demographics, or internal migration.

We interpret these findings as evidence of the persistence of the values of the Papal States in favor of a traditional submissive role for women. This unique cultural context was the product of the Papal States' confessional regime and male-centered institutions, and its lack of a modern class of industrious merchants, in contrast to the Grand Duchy of Tuscany, which was traditionally characterized by more favorable attitudes toward women and higher female participation in the labor market.

We provide indirect evidence in support of this view. In the former Papal States we find a 1.4 percentage point higher share of religious marriages, a proxy for both religiosity and traditional values. Consistent with this, the vote share for the confessional and conservative Christian Democracy party in the general elections of the 1970s was 5.5 percentage points higher in the municipalities of the former Papal States. Moreover, we find that in a key 1974 referendum on the right to divorce, which was a milestone for women's emancipation and social modernization in Italy, the pro-divorce vote share was 6.7 percentage points lower in the former Papal States than in Tuscany. Similarly, in another referendum on abortion rights, the pro-choice vote was 4.7 percentage points lower in the former Papal States. This suggests that traditional gender norms, supported by Catholicism, have persisted in the former Papal States, where they were deeply rooted, probably through a process of intergenerational transmission of cultural norms and religious beliefs ([Guiso et al., 2016](#)).

To validate our findings, we conducted a series of balancing tests on predetermined variables. They all support the hypothesis that the areas across the border are homogeneous in terms of geography and prior historical stratification. We conducted the usual battery of robustness checks typical of spatial regression discontinuity designs (RDD), and we tested several placebo borders, finding no evidence of discontinuity.

Our results are largely confirmed by extending the analysis to the border between the Papal States and the Duchy of Modena. Again, municipalities located in the former Papal States are characterized by lower female participation and employment than municipalities located

in the former Duchy of Modena, while no discontinuity is found for males. Similarly, we find less support for the Christian Democracy party and a lower proportion of pro-divorce and pro-choice votes. Since the border with the Duchy of Modena is immune to the problem of compound treatments, we extend the analysis to more recent data collected after the establishment of the modern regions. Our analysis shows that the gender gap across the border began to narrow in recent decades and finally disappeared in the early 2000s, suggesting that the historical persistence of institutional and cultural factors is a reversible process. However, such a transformation took more than a century after the fall of the Papal States to fully materialize.

The rest of this paper is organized as follows: Section 2 reviews the relevant literature. Section 3 provides a brief historical background. The data used in our study are detailed in Section 4, while the empirical strategy is discussed in Section 5. Our empirical results and a number of robustness checks and specification tests are presented in Section 6. Section 7 discusses the mechanisms behind our results, while Section 8 extends the analysis to the border between the Papal States and the Duchy of Modena. Finally, Section 9 concludes.

## 2 Related Literature

Our study contributes to the field of gender inequality by demonstrating the enduring impact of historical institutions on contemporary gender roles and societal norms. In particular, we analyze the long-lasting influence of the different gender conditions in the Papal States and Tuscany, highlighting the legacy of historical context on contemporary gender disparity.

In doing so, our work relates to the large body of literature that explores the historical roots of gender inequality. For example, [Alesina et al. \(2013\)](#), show that societies that adopted ploughing agriculture in pre-industrial times, thereby increasing male labour productivity, now have lower female participation in the labour force, politics and entrepreneurship. Similarly, [Fredriksson and Gupta \(2020\)](#) draw a link between the historical use of irrigation systems and contemporary lower female labour force participation.

[Hansen et al. \(2015\)](#) suggest a compelling relationship between the early adoption of the Neolithic Revolution – the prehistoric shift from hunter-gatherer to agricultural societies – and contemporary lower female labour force participation, among other indicators of gender inequality.

In sub-Saharan Africa, [Teso \(2018\)](#) shows that communities that experienced severe male population losses due to the transatlantic slave trade between the 15th and 19th centuries now display higher female employment rates, lower fertility, and a stronger female role in household decision-making. This suggests that the forced taking of tasks traditionally performed by males during slavery had a long-term impact on gender norms. These intergenerational influences, transmitted from parents to children, are further substantiated by [Fernández et al. \(2004\)](#) and [Fernández \(2007\)](#), who assert that working or more empowered mothers tend to shape their children's attitudes towards more egalitarian gender roles.

Finally, [Anderson \(2018\)](#) explore the lingering effects of colonial institutions on contemporary gender issues in sub-Saharan Africa. They find that areas formerly governed by civil law regimes, which are typically characterized by stronger women's rights (e.g. recognition of domestic work, joint ownership of marital property, and protection for wives in the event of marital dissolution), now have significantly lower female HIV prevalence than regions formerly governed by common law regimes.

[Bertocchi and Bozzano \(2020\)](#) identify three major factors in the historical gender gap in education. First, the growth of trade and financial development in the modern era increased the demand for skills such as literacy and numeracy, thereby encouraging women's education. Particularly in merchant communities, women often managed business affairs during their husbands' or fathers' long business travels, which required some education.<sup>2</sup> Second, marriage institutions significantly influenced parental investment in human capital. The emergence of consensual marriage norms promoted cultural values that supported gender equality. This led women to marry later in life, giving them more opportunities to acquire education and participate in the labor market. In contrast, in patriarchal societies, where parents typically arranged marriages and women moved from their birth families to their husbands' families, parents were often less inclined to invest in their daughters' education. Finally, religious practices and beliefs played a significant role in shaping women's education. The Protestant Reformation's emphasis on individual Bible reading promoted women's education, while the Catholic tradition's reliance on sermons provided less impetus for women to learn to read. In addition, religious texts, including the Bible, often portray women as subordinate to men, which throughout history has influenced parents' decisions to invest more in sons than daughters. This dynamic

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<sup>2</sup>See also [Bertocchi and Bozzano, 2016b](#).

is particularly prevalent in religions with deeply patriarchal and hierarchical structures, such as Catholicism, which is closely tied to the traditional male breadwinner model (Algan and Cahuc, 2006).<sup>3</sup>

Furthermore, Bertocchi (2011) and Bozzano (2017) show how Catholicism has played a profound role in opposing women’s rights and maintaining traditional gender roles, with Bozzano (2017) demonstrating a strong negative correlation between religious marriages and women’s representation in political office and high-ranking jobs in Italy. This finding suggests a tendency toward more conservative perceptions of women’s traditional roles within the family and society as religiosity increases.

Our contribution aligns with these established historical narratives and provides a new lens through which to view the lasting impact of past institutions on gender inequality. By examining the institutional, socioeconomic, and cultural histories of Tuscany and the Papal States, our research sheds light on the complex interplay of these factors and their enduring influence on the social roles of women in these regions.

In terms of methodology, many previous papers have used a spatial regression discontinuity design to analyze the long-lasting effects of historical institutions. For example, Dell (2010) examined the enduring influence of the mining labor system on household consumption and child well-being in South America. Meanwhile, Lee and Schultz (2012) investigated the socioeconomic effects of British and French colonization in Cameroon. Similarly, Becker et al. (2016) demonstrated how territories within the historical borders of the former Habsburg Empire in Central Eastern Europe today demonstrate higher levels of trust in local public services and lower levels of corruption.

Furthermore, Bukowski (2019) exploited the historical partition of Poland between Austria, Prussia, and Russia to show the connection between the Austrian Empire’s promotion of Polish identity and improved student test scores today. In a similar vein, Fujiwara et al. (2019) showed how the legacy of slavery has influenced modern income inequality in Brazil. They exploited the border discontinuity between the historical Portuguese domains, where slavery was permitted, and the Spanish domains, where slavery was abolished around 1600.

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<sup>3</sup>According to Bertocchi and Bozzano (2020), “Specific religious denominations have been among the most relevant retarding and constraining forces affecting female education.” Inglehart (1981) finds that women in Catholic countries tend to be less engaged in political discussion, and Wilcox (2006) finds that Catholic affiliation is a significant predictor of opposition to gender equality and that Catholic countries tend to be much less supportive of gender equality. Similar results are found by Wilcox and Felen (1993).

Our work is most closely related to [Guarnieri and Rainer \(2018\)](#), who used a similar spatial discontinuity method to study the effects of the different British and French colonial regimes on the condition of women in post-independence Cameroon. They found that women in the more liberal and gender-equal former British territories were 30 percent more likely to be employed than women in the traditionally more elitist and male-dominated former French territories. However, they also found evidence of a ‘male backlash’ effect, where women in the former British territories were 30 percent more likely to experience domestic violence.

Through our research, we aim to contribute to this literature by examining the long-lasting effects of the historical social, economic, and institutional differences between the Papal States and Tuscany on the gender gap in the labor market.

The unique added value of our analysis lies in its exploration of the enduring effects of long-gone political entities that, despite their geographic proximity and shared traditions in language, religion, and climate, embodied markedly different norms and opportunities with respect to gender. This juxtaposition provides a near-perfect natural experiment that is unparalleled in the European context. The close geographic arrangement of these two pre-unification states provides a nearly controlled environment in which the effects of historical gender norms and opportunities can be observed, relatively free of the confounding influences that often plague comparative studies.

### 3 Historical and Institutional Background

In the 19th century, before the political unification of 1861, Italy was divided into several smaller political entities.<sup>4</sup> Among these pre-unification states, the Papal States stood out as a distinct sovereign entity governed by the supreme authority of the Catholic Church. This unique entity, which blended religious and secular administration, was adjacent to the Grand Duchy of Tuscany, a state that had its origins in the Republic of Florence, a major commercial and industrial center in Europe between the 12th and 15th centuries.<sup>5</sup>

The Papal States and the Grand Duchy had different historical trajectories. The former was characterized by an agrarian economy and strongly influenced by the fact that it was the

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<sup>4</sup>Additional territories were incorporated into the Kingdom of Italy at later dates: Venezia Euganea in 1866, Lazio in 1870, and Trentino-Alto Adige and Venezia Giulia in 1918-1919.

<sup>5</sup>A brief history of the Papal States and the Grand Duchy of Tuscany can be found in [Appendix A](#).



seat of the Pope, one of the most influential powers in Europe. The latter experienced centuries of economic, financial and cultural development, followed by at least two centuries of decline and stagnation. Both ended their existence in 1859 and 1870, respectively, in conditions of backwardness, although the Grand Duchy maintained a slight advantage over the Papal States.

The Papal States and Tuscany also showed remarkable differences in their legal, social and economic institutions, including those governing gender roles. [Porri and Schiavoni \(1988\)](#) note that the legal institutions of the Papal States, deeply influenced by their Catholic foundation, generally distrusted women and viewed them as potential sources of moral problems. Bishops' courts had the power to imprison anyone, especially women, for alleged immorality without a full trial. They believed that women, because of their *infirmetas* (weakness) and *levitas animi* (lightness of spirit), needed protection from themselves. Consequently, their autonomy was limited and they were placed under the supervision of their father or husband ([Feci, 2004](#)).<sup>6</sup>

Tuscany, on the other hand, was somewhat more progressive. From the fifteenth century, women could inherit up to a quarter of the family property, although this was more likely in rural areas and among less wealthy families ([Emigh, 2003](#)). However, [Delmedico \(2016\)](#) shows that women's property rights were considerably limited in the Papal States. Women couldn't inherit property and were only given a dowry upon marriage, the value of which was determined by the bride's social class.

The expansion of trade that characterized the Tuscan economy in the late 13th and 14th centuries pushed the development of skills required by merchants, such as arithmetic, book-keeping, reading, and writing. As documented by [Bertocchi and Bozzano \(2016b\)](#), using data from [Black \(2007\)](#) and [Ulivì \(2008\)](#), Tuscany was known for the widespread presence of abacus merchant schools that taught these essential skills up until the 16th century.<sup>7</sup> During this period, women were often responsible for managing family businesses while their husbands were away on extended business trips. This situation required investment in education, which was typically provided for girls from wealthy families in the so-called *conservatori*.<sup>8</sup> Three centuries

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<sup>6</sup>This resulted from a strict interpretation of the Holy Scriptures. For example, St. Paul's letter to the Ephesians says: "Wives, submit yourselves to your own husbands as to the Lord. For the husband is the head of the wife, just as Christ is the head of the church, his body, and is himself her Savior. As the church submits to Christ, so also should the wives submit to their husbands in everything" (Ephesians 22-24).

<sup>7</sup>[Daniele \(2019\)](#) reports that the illiteracy rate at the Unification of 1861 was lower in Tuscany (74%) than in any of the former regions of the Papal States, i.e. Emilia-Romagna (77.6%), Marche (83%) and Umbria (83.8%).

<sup>8</sup>These were special institutions run by nuns that did not require religious vows.



later, in the first half of the 19th century, the proportion of schools for girls was highest in the Grand Duchy of Tuscany (47%) (Vigo, 1971).

Nothing of the sort occurred in the Papal States, where the only path for women to obtain higher education was to take religious vows (Groppi, 2002). Moreover, while universities existed in all major Italian cities by the 13th century and women were technically allowed to attend and even potentially hold academic positions (although in practice very few women did so), this was usually not the case in the universities of the Papal States.<sup>9</sup>

Ciccarelli and Weisdorf (2018) estimate that in 1851 the ratio of female to male literacy in Tuscany was 54 percent, compared to 45 percent in the neighboring regions of Marche and Umbria in the Papal States.<sup>10</sup>

The industrial and commercial tradition of Tuscany, in contrast to the agricultural focus of the Papal States, was still evident at the end of the 19th century. According to Felice (2011), the share of employment in agriculture in 1891 was 56 percent in Tuscany, compared to 69 and 73 percent, respectively, in the neighboring regions of Marche and Umbria.<sup>11</sup> Ciccarelli and Fenoaltea (2013) show that in 1871 in Tuscany the ratio between the share of industrial value added (out of the national industrial value added) and the share of adult male population (out of the national male population) was 1.07. This value indicates a degree of specialization in the industrial sector. The same index was much lower in Marche and Umbria, with 0.83 and 0.68 respectively, and 0.96 in the province of Rome. In 1871, at the beginning of modern industrialization in Italy, Tuscany was second only to the relatively developed northwestern regions of Piedmont, Lombardy, and Liguria.

According to the post-unification census of 1871, the female-to-male ratio in the clergy was 0.38 in the former Papal States compared to 0.21 in Tuscany. This suggests that entering a convent was a much more attractive option for women in the Papal States than in Tuscany, probably due to a lack of alternative opportunities. While the female-to-male ratio in agriculture was somewhat similar in the two areas (0.55 in the Papal States vs. 0.49 in Tuscany), the differences in other sectors were significant: 0.45 vs. 0.60 in industry, 0.01 vs. 0.04 in public

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<sup>9</sup>Interestingly, the University of Bologna, a city that did not join the Papal States until 1506, appointed the world's first female university professor, Laura Bassi. This extraordinary event was the result of pressure from Prospero Lambertini, the Archbishop of Bologna (later Pope Benedict XIV), who noticed Bassi's talent and became her patron.

<sup>10</sup>Not surprisingly, in Rome, the seat of the highest echelons of the clergy and monastic orders, this ratio was higher at 58 percent.

<sup>11</sup>The share of employment in agriculture in the province of Rome, by contrast, was 53 percent.

administration, and 1.09 vs. 1.41 in education.<sup>12</sup> Finally, the female-to-male inactivity ratio was 2.23 in the former Papal States compared to 2.17 in Tuscany.

These different socio-economic conditions led to the development of contrasting attitudes toward women in Tuscany and the Papal States, which were transmitted through the generations, generating a characteristic pattern of institutional persistence over the centuries (Bertocchi and Bozzano, 2016a).

## 4 The Data

Our study uses contemporary census and administrative data from the Italian municipalities that were once part of the Papal States and the Grand Duchy of Tuscany. An illustrative representation of these states, along with their 1850 boundaries, is shown in Figure 1. We note that the historical boundary used in our analysis largely, though not entirely, coincides with the administrative boundaries of five present-day regions: Emilia-Romagna, Tuscany, Marche, Umbria, and Lazio. These modern regions didn't begin to function until 1972, and it wasn't until the reforms of 1975 and 1977 that they achieved full operational capacity, overseeing the local economy, social welfare, health care, vocational training, urban planning, local police, and cultural affairs.<sup>13</sup>

To avoid the complications of compound treatments due to the establishment of regions, we focus on labor force participation and employment rates for females and males in 1951, 1961, and 1971, and on entrepreneurship in 1971.<sup>14</sup> These outcomes are measured at the municipal level.<sup>15</sup>

Table C1 in Appendix C presents the summary statistics by state, for the municipalities located within 25 km from the former border between the Papal States and the Grand Duchy of Tuscany. Panel A shows a slightly higher labor force participation and employment rate for females in Tuscany, but not for males. The rate of entrepreneurship is slightly higher for both

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<sup>12</sup>Public administration in the province of Rome included only 25 women and almost 7,000 men.

<sup>13</sup>The Constitution adopted the regional boundaries drawn by Pietro Maestri in 1860. As the head of the Statistical Office at the time, Maestri intended to divide the nation into subregions for statistical analysis. He therefore called these regional divisions "statistical compartments". His classification evolved from earlier divisions based on both geographical and ethnolinguistic criteria.

<sup>14</sup>We focus specifically on entrepreneurs operating in non-agricultural sectors. This is mainly because the prevalence of individuals working on family land complicates interpretation. It is only possible to identify non-agricultural entrepreneurs in 1971.

<sup>15</sup>In Italy, the municipality is the lowest level of government.

genders, but the difference is more pronounced for women.

Municipality-specific and gender-specific data on employment rates and labor force participation are not available before 1951, but some indicators of educational attainment by gender and municipality can be traced back to the early years of the Kingdom of Italy. These are shown in Panel B. The proportion of female students enrolled in primary education, relative to all students in primary education, is derived from a report by the Ministry of Agriculture, Industry and Trade on the conditions of primary education during the school year 1862-1863.<sup>16</sup> The percentage of literate females, relative to the literate population, is derived from the 1911 census.<sup>17</sup> It is worth noting that shortly after unification, the proportion of female students was higher in Tuscany, while about 50 years later, in 1911, the proportion of literate females was about 44 percent in both areas. The national census of 1971 confirms the absence of disparities in the proportion of literate females, and the average years of education seem to be comparable in the two regions for both genders. Using the same census data, we computed the ratio of women with at least an upper secondary education to the total population with at least such a qualification. We note that this measure is slightly higher in the former territories of the Papal States.

To capture indicators of religious and ethical values, we consider the share of religious marriages (relative to all marriages) in 1971 and the electoral support for the confessional party Christian Democracy (DC) in the parliamentary elections from 1972 to 1979 (derived from the Historical Elections Archive). Both measures are significantly higher in the former Papal States than in Tuscany (panel C).

We also look at votes in favor of divorce and votes in favor of the right to abortion (again from the Historical Elections Archive). In a 1974 national referendum, Italian citizens were asked whether they wanted to repeal Law 898/1970, which had introduced the right to divorce into the Italian legal system in 1970. Those who voted “no” were against repealing the law.<sup>18</sup> Thus, the proportion of votes in favor of divorce is thought of as the proportion of valid votes against repeal (i.e., the ratio of “no” votes to valid votes).

In 1981 there were two referendums on abortion, one proposed by the Movement for Life and the other by the Radical Party. We will focus primarily on the first, which sought to

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<sup>16</sup>This publication is entitled “Istruzione elementare pubblica per comuni, anno scolastico 1862-1863”.

<sup>17</sup>The 1911 census is the first census to include data on literacy at the municipality level.

<sup>18</sup>Figure B.1 in the appendix presents an example of the ballot used in the referendum.

overturn the main provisions of Law 194/1978, which had decriminalized abortion in Italy. Following a similar rationale as in the divorce referendum, those who voted “no” were in favor of maintaining the right to abortion, and our variable is therefore defined as the ratio of “no” votes to valid votes.

On average, the proportion of votes in favor of both divorce and abortion is higher in the municipalities formerly associated with the Grand Duchy of Tuscany compared to those in the former Papal States, as shown in Panel C.

Other key characteristics of municipalities include indicators of economic specialization and demographic indicators. The former are defined as the share of employment in industry and services and the share of employment in agriculture from 1951 to 1971. The data show that, on average, the employment share in agriculture is lower in Tuscany, with a greater emphasis on industry and services (panel D). The latter include gender ratio, population, share of population under 6 years of age, family size and net internal migration rate. Population is slightly higher in Tuscany, and while both areas have a negative net migration rate, it is a little more pronounced in the former territories of the Papal States (Panel E).

Predetermined variables used to test balancing across the border include a set of geographical indicators, i.e. altitude, a terrain ruggedness index, annual precipitation, annual temperature, a binary variable indicating areas of medium to high seismic activity, another indicator of seismicity (peak ground acceleration), the presence of rivers, land cover, and the proportion of the municipal area at high risk of landslides (Table C2 - Panel A). In addition, we consider a set of predetermined historical characteristics related to the Roman period: the presence of Roman roads within the municipality, the distance from a Roman road, whether the municipality was a Roman city, the distance from the nearest Roman city, and the distance from the nearest Roman port. Detailed data definitions and sources are provided in Table C3 in Appendix C.

Our analysis focuses on a subset of municipalities located within a specific optimal and outcome-dependent distance from the border between the two pre-unification states. Therefore, the actual set of municipalities used in the analysis varies for each outcome, as detailed in the estimation tables. For example, Figure 2 delineates the municipalities included in the optimal bandwidth when considering the female employment rate.

## 5 Research Design

Our investigation focuses on whether the subordinate status of women in the Papal States, which was more pronounced than in the Grand Duchy of Tuscany, persisted to some degree in the contemporary period. To this end, we adopt a spatial regression discontinuity design. This approach allows us to identify the relative influence of the former institutions of the Papal States compared to those of Tuscany by examining municipalities located within an optimally determined narrow band across the historical border.

The border between the Papal States and the Grand Duchy of Tuscany was the result of a simultaneous and independent process of territorial expansion and consolidation that took place between the 12th and 16th centuries. The Republic of Florence gradually annexed other Tuscan city-states, beginning with Fiesole in 1125 and culminating with Siena in 1557.<sup>19</sup>

At the same time, the papacy gradually gained *de facto* control over territories that it had received *de jure* through a series of gifts from Pepin - King of the Franks - Charlemagne, and later the German emperors between the 8th and 12th centuries. These gifts contributed to the formation of the “Patrimony of St. Peter”, which was governed by a series of local lords under various personal and feudal ties to the Pope, often quite loose and nominal.

Beginning with Pope Innocent III in 1198, the papacy began a policy of recuperation, i.e., regaining full control over areas that were nominally part of the Papal States. This resulted in a progressive strengthening of papal power.<sup>20</sup> In 1198, the Duchy of Spoleto (roughly equivalent to modern Umbria) was placed under papal control. The recuperation of the Marche was slower and was not completed until 1631, when the Duchy of Urbino was returned to the Pope after the extinction of the Della Rovere family. Finally, the cities of Romagna were subjugated in the first half of the 1500s after a series of successful military campaigns.

The papacy never had formal legal claims to Tuscany, nor did Florence ever attempt to expand beyond its own region. However, the Popes intervened in the succession of Florentine rulers, and during the 16th century three members of the Florentine Medici family ascended to the papacy. Both sides also frequently fomented rebellions in each other’s territories and

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<sup>19</sup>Other minor territories were added later.

<sup>20</sup>During the Avignon period (1309-1377), most of the progress in this direction was initially lost, but was eventually regained between 1350 and 1364, thanks to Cardinal Albornoz. The latter also issued the *Constitutiones Sanctae Matris Ecclesiae*, which established the administrative organization of the Papal States and remained in force until 1816.

engaged in open warfare. Despite these conflicts, the border between Tuscany and the Papal States remained unchanged for centuries.

In essence, the two independent processes of expansion – the Florentine advance into Tuscany and the papal drive along the diagonal from Rome to Ravenna – met their natural end when the borders between the states finally met. Territories did not self-select into either state based on their characteristics, a fact confirmed by a series of balancing tests showing no differences in terms of geography, climate, distance from major trade routes, or ancient settlements, which we discuss in detail in Section 6.

From an empirical point of view, the border between the Papal States and the Grand Duchy of Tuscany offers several advantages for our analysis. Not only has it remained stable for centuries, but its length also offers the possibility of using a relatively large sample of municipalities. It is located in an area of central Italy that is relatively homogeneous, and it generates mainly an east-west divide, reducing concerns that our results could be influenced by Italy’s pronounced north-south development gradient.

We adopt an optimal bandwidth spatial regression discontinuity design with robust inference, following the method described by Cattaneo et al. (2020). This technique, also used in recent work by Fujiwara et al. (2019) and Burgess et al. (2019), differs from more traditional approaches, such as those implemented by Dell (2010), Becker et al. (2016), Dell et al. (2018) and Guarnieri and Rainer (2018), in two main ways.

First, the bandwidth is optimally determined rather than arbitrarily chosen. The optimal choice strikes a balance between two conflicting goals. On the one hand, the bandwidth should be as narrow as possible to minimize the approximation error introduced by using a polynomial instead of the unknown function that relates the current variable to the possible outcomes. Conversely, the bandwidth should be as wide as possible to increase the number of observations and minimize the sampling variance. The optimal bandwidth mitigates this trade-off by minimizing the sum of the squared approximation bias and the sampling variance, i.e., the mean squared error (MSE). Figure 2 illustrates the optimal bandwidth when the outcome of interest is the female employment rate.

With respect to the second difference, because the approximation bias is not fully eliminated, the inference should be adjusted accordingly. In particular, confidence intervals should be centered around the RDD point estimate, net of the estimated bias, and must account for the

fact that the estimated bias itself embodies a sampling error. This bias is estimated using a local polynomial RDD based on a different MSE optimal bandwidth. The resulting confidence intervals are referred to as robust confidence intervals.

Formally, our baseline empirical specification is as follows:

$$y_m = \alpha + \beta PS_m + \tau f(\text{DIST}_m) + \rho PS_m \times f(\text{DIST}_m) + \delta_b + \gamma X_m + \epsilon_m \quad (1)$$

where  $y_m$  is the outcome of interest for municipality  $m$ . The dummy  $PS_m$  is equal to one if municipality  $m$  is located in the former Papal States and zero otherwise.  $f(\text{DIST}_m)$  denotes the polynomial of the distance from the border, whose effect is allowed to be different on either side of the border.  $X_m$  represents a vector of control variables at the municipality level including altitude, seismic classification, precipitation, distance from Rome, and an indicator of whether a major ancient Roman road passed through the municipality area. Finally,  $\delta_b$  is a vector of 5, equal-length, border segment dummies that account for possible unobserved heterogeneity along a border that is several hundred kilometers long. Such heterogeneity may be generated by local customs, traditions and local dialects.

The model is fitted using a local linear regression with a triangular kernel. This approach gives greater weight to observations closer to the border, and the bandwidth, as previously mentioned, is determined to be MSE optimal. To rule out the possibility of confounding the effects of historical institutions with the differences in regional policies, we measure all outcomes prior to the full operational status of the regions.

## 6 Empirical Findings

### 6.1 Baseline Estimates

We examine gender-specific labor market outcomes, focusing on labor force participation, employment, and entrepreneurship rates. We start with a visual inspection of the data. In [Figure 3](#), for each outcome, we plot the nonparametric conditional expectation of the outcome at each distance from the border and the corresponding linear prediction derived from a parametric model.<sup>21</sup> Each analysis refers to the set of municipalities that lie within the optimal band

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<sup>21</sup>Conditional expectations are not adjusted for any control variables. This further adjustment is left to the main parametric analysis.

across the border. The figure shows clear discontinuities in female labor force participation, employment, and entrepreneurship rates. In all cases, the results are lower in the former Papal States than in the former Grand Duchy of Tuscany. Conversely, we find no discontinuity in any of the male labor market outcomes.<sup>22</sup>

This pattern is fully confirmed by our robust RDD analysis. As shown in [Table 1](#), the female labor force participation rate and the female employment rate are 4.6 and 4.2 percentage points lower, respectively, in the former Papal States than in the former Grand Duchy of Tuscany, and are statistically significant at the 5 percent level. The robust p-values are 0.041 and 0.037, respectively. In contrast, we do not observe a statistically significant difference for males. The effects are substantial, given that the mean outcomes for female participation and employment are 20.6 and 19.7 percent, respectively.<sup>23</sup>

We also find marginal evidence of a significant discontinuity in the female entrepreneurship rate, which is 0.4 percentage points lower in the Papal States. Again, the effect is large given that the average female entrepreneurship rate is only 0.7 percent. In line with previous findings, no significant effect is found for male entrepreneurship.

The areas analyzed on both sides of the border also exhibit homogeneity in their geographic, climatic, and predetermined historical characteristics. Using a strategy similar to that used in the baseline analysis, in [Table 2](#) we test for discontinuities in any of these covariates across the border. We find no evidence of discontinuity in altitude, ruggedness of terrain, annual precipitation, temperature, seismicity, peak ground acceleration, presence of rivers, land cover, and high landslide risk, as shown in Panel A. In addition, in Panel B, we find no discontinuity in predetermined historical characteristics dating back to Roman times that might have influenced subsequent historical development.<sup>24</sup>

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<sup>22</sup>Labour force participation and employment tend to be slightly lower around the border. This is because the border typically follows the course of the Apennine ridge, where economic activity is typically less intense than in the valleys or plains. The average altitude is about 500 meters at the border and about 250 meters 25 km from the border, on both sides.

<sup>23</sup>When we estimate the discontinuity at the border for participation and employment rates, where multiple observations per municipality are available, we add year fixed effects to the model and we cluster standard errors by municipality.

<sup>24</sup>Any further economic or social indicator measured after the establishment or even the dissolution of the Papal States and the Grand Duchy could be the result of the institutions adopted by these states. Therefore, these type of indicators are not suitable for the balancing test.



## 6.2 Specification Tests and Robustness Checks

We provide a comprehensive set of robustness checks to confirm the validity of our findings. The results of alternative specifications of our regression discontinuity model are reported in Appendix D.

In Table D1 we replace the triangular kernel with a uniform kernel, while in Table D2 we specify  $f(DIST)$  in equation (1) as a quadratic polynomial. In Table D3, we estimate a semi-parametric RD model as proposed by Dell (2010), where we include a linear polynomial in latitude and longitude (panel A) or a quadratic polynomial (panel B). To further increase the flexibility of the model, these polynomials are interacted with the border fixed effects. In both cases, we use the same bandwidth as in our baseline results shown in Table 1. All of our baseline findings are confirmed by these specification changes, except that the effect on the female entrepreneurship rate becomes statistically insignificant when we use a quadratic polynomial.

For our baseline estimates, we use a common mean square error (MSE) optimal bandwidth selector. In Table D4 we provide some alternative bandwidth specifications. In panel A, we use a common Coverage Error Rate (CER) optimal bandwidth selector, while in panel B we use two different MSE optimal bandwidth selectors. Our results are robust to all these alternative specifications, except for the effect on the female entrepreneurship rate, which becomes statistically insignificant at different bandwidths.

To assess the effect of potential spatial correlation on inference, we use Conley (1999) standard errors and allow for spatial correlation up to 25 km or 50 km from the border. The estimated standard errors do not change significantly (Table D5).

As an additional check, we consider the possibility of cross-contamination or diffusion across the border. Reasons for this could include migration, intermarriage between neighboring towns, and imitation patterns. While these phenomena can potentially contaminate our identification, they work against our finding of a significant difference between the former Papal States and Tuscan areas, as they tend to make municipalities across the border more similar. To assess the relevance of this issue, we use a donut-hole approach, excluding from the sample on both sides those municipalities adjacent to the border. Using different donut-hole radii, we start by excluding municipalities within 0.5 km of the border and repeat the exercise up to 3 km. Point estimates and robust confidence intervals for each outcome are plotted in Figure 4 and confirm

our baseline findings for all labor market outcomes.

A related concern is whether selective migration in recent years could account for the gender imbalances observed in the data. Unfortunately, the only information available on migration at the municipality level in the 1970s is the net internal migration rate, while origin-destination (O-D) matrices are available at a more aggregated level. However, the majority of internal migration flows in Italy occurred either within provinces to the provincial capital as a result of urbanization or from the South to the large northern cities, fueling the rapid industrialization process of the postwar period.<sup>25</sup> In our border sample, the median municipal population in 1971 is 3,400 inhabitants, and only three municipalities exceed 100,000 inhabitants. Moreover, our sample does not include any large industrial centers. As a robustness check, we remove municipalities with more than 100,000 inhabitants.<sup>26</sup> The results of this exercise are consistent with the baseline, as reported in [Table D6](#).

A concern for our identification arises from the historical formation of the Papal States and Tuscany. The territories that became part of the Papal States came largely from the emperor's donation of former Byzantine possessions, while the territories that became the Grand Duchy were part of the Lombard Kingdom. As a result, the border between the Papal States and the Grand Duchy coincides to some extent with the former border between the Byzantine Empire and the Lombard Kingdom, as shown in [Figure D.1](#). Although these ancient states ceased to exist about 13 centuries ago, one could argue that it is difficult to distinguish the relative effect of the Papal States versus the Grand Duchy from the former relative effect of the Byzantine Empire versus the Lombard Kingdom.

To do this, we take advantage of the fact that, fortunately, the historical borders do not completely overlap. In particular, the former Duchy of Spoleto, once ruled by the Lombards, later became a significant part of the Papal States' territories. This historical trajectory allows us to test the effect of the Byzantine Empire versus the Lombard Kingdom on gender-related outcomes, while separating out the effect of the Papal States, which is common to both areas. This scenario is depicted in [Figure D.1](#), where we show the Byzantine territories in green and the

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<sup>25</sup>Using the O-D matrix by region for 1969, we count that only about 35,000 people moved into Tuscany from other regions, i.e. about 1 percent of the population, and of these only about 6,500 came from Lazio, Umbria and Marche. Viceversa, Lazio, Umbria and Marche together received 80,000 inhabitants, i.e. 1.2 percent of the population, but only about 5,700 came from Tuscany.

<sup>26</sup>The largest municipality is Prato with 143,000 inhabitants, which is also a relatively important industrial hub.

Lombard territories in yellow, both of which were part of the Papal States. The RD estimates across the Byzantine-Lombard border, using the same estimator as in our main analysis, are shown in [Table 3](#). The results show no significant effect of the Byzantine Empire on gender-related labor market outcomes, suggesting that our main findings do not depend on influences that predate the Papal States and the Grand Duchy.

Similarly, we conduct a test of the influence of other ancient institutions, the Roman provinces within the Roman Empire, using the ancient border of the Roman province of Etruria, which roughly coincides with modern Tuscany and part of Lazio (see [Figure D.2](#)). In this case, the border does not overlap with the border of the former Papal States, but lies in neighboring areas. As shown in [Table 3](#), there is no significant discontinuity in this case either.

To further strengthen the robustness of our results, we conduct a falsification test using placebo borders obtained by shifting the original border 30 km in and out of the Papal States' territories, as depicted in [Figure D.3](#).<sup>27</sup> The estimates when we move the border 30 km inward and outward of the Papal States are reported in [Table 4](#).<sup>28</sup> These movements result in a comparison between two areas, both belonging to the Papal States or the Grand Duchy of Tuscany, which are located across the placebo border. For all of our outcomes of interest, we find no evidence of significant discontinuities at the two placebo borders.

## 7 Testing the Mechanisms Behind Our Findings

In this section, we consider several plausible mechanisms that could explain the discontinuity in female labor market outcomes across the Papal States-Tuscany border.

First and foremost, this difference in employment and participation could be due to different economic specializations. The Grand Duchy, with its origins in the mercantile republics, could potentially have stimulated the growth of industry and services, sectors in which work is less physically demanding compared to agriculture and thus more suitable for women, and in which the returns to education are higher. Such circumstances could have led to a more favorable scenario for female employment in the Grand Duchy than in the Papal States. To verify this

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<sup>27</sup>Given the longitudinal placement of the border and the relatively narrow shape of the Italian peninsula, larger shifts would dramatically reduce the number of observations on either side of the border, limiting the power of the placebo test.

<sup>28</sup>Due to the narrow shape of the Italian peninsula, we are forced to exclude the upper part of the placebo border in order to perform the exercise inside the Papal States.

hypothesis, we tested for possible discontinuities in the share of workers in industry and services and in the share of workers in agriculture for the years 1951 - 1971. However, no discernible discontinuity was found along the border (see [Table 5](#)), suggesting that our findings are not due to divergent trajectories of economic development.

Second, lower female labor force participation could be due to demographic factors, such as an unbalanced gender ratio, which in turn affects the marriage market and changes the bargaining power between genders. In addition, it could be influenced by the extent of family care responsibilities, which is inherently related to the number of offspring and the size of the family unit. Nevertheless, we found no statistically significant difference in the male-to-female ratio, the proportion of the population under six years of age relative to the total population, and family size recorded between 1951 and 1971, as shown in [Table 5](#). This result is in line with expectations, since female emancipation in the 1970s was not generally associated with a decline in fertility; this correlation only materialized in the following decades ([Kertzer et al., 2009](#)). Finally, population and net migration rates do not statistically differ, confirming that migration should not be a major concern for our analysis ([Table 5](#)).

Third, labor market participation is significantly affected by educational attainment. Less educated workers, faced with lower wage prospects, are more likely to remain on the margins or outside the labor market altogether. Historically, the Papal States devoted fewer resources to female education, a point discussed in [Section 3](#). This is evidenced by the proportion of female students among all students enrolled in primary education shortly after unification in 1862. If we focus on the municipalities along the border, the percentage of female students in primary education is significantly lower in the Papal States than in Tuscany ([Table 6](#)-column 1).<sup>29</sup> Some 50 years later, in 1911, half a century after unification, the proportion of literate women among all literate inhabitants remains lower in the Papal States, although the gap has narrowed since 1862 ([Table 6](#) - column 2). The process of convergence in education continued, so that by 1971 the RD estimate for the same measure drops from 1.8 percentage points to 0.6 ([Table 6](#) - column 3). Furthermore, there are no differences in the share of women with at least upper secondary education among all residents with at least upper secondary education, as reported in column 4. Finally, we find no discontinuity in average years of schooling across

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<sup>29</sup>Data are from the census of the new Kingdom of Italy. The municipalities of Lazio are not included, as this area did not join the kingdom until 1870.

the border for either gender.

This is probably due to the equalizing effect of the policy of compulsory education first introduced by the Kingdom of Italy and later enforced by the Republic.<sup>30</sup>

Fourth, participation in the labor market may be influenced by adherence to traditional values and levels of religiosity across the border, both of which are inextricably linked to perceptions of women’s roles in the household and society. To test this hypothesis, we use four proxies for values and beliefs and test for discontinuities across the border. The results are presented in [Table 7](#).

In column 1, we analyze the proportion of religious marriages in 1971, a proxy for religiosity also used in the studies by [Checchi \(2008\)](#) and [Bozzano \(2017\)](#). Our results show that municipalities within the former Papal States are significantly characterized by a higher proportion of religious marriages (1.4 percentage points), thus confirming the hypothesis of more deeply rooted religious customs in these areas.

In column 2, we evaluate the vote share for the Christian Democracy Party during the period 1972-1979. This party’s political ideology was firmly rooted in Catholicism and traditionally advocated the preservation of Catholic values in society. Again, we find a higher vote share (5.5 percentage points) in the municipalities that were part of the former Papal States, which is 16 percent lower than the sample mean.

In column 3, we examine support for divorce as measured by the proportion of votes in favor of the right to divorce in a critical referendum held in Italy in 1974. The referendum marked an important milestone in Italy’s secularization process and the culmination of a long political and cultural shift toward women’s emancipation. The right to divorce signified the dissolution of the traditional, indissoluble institution of marriage, which was strongly tied to the persistence of traditional gender roles, with the husband as head of the family and the wife in a subordinate role. This sacred view of marriage was part of the official doctrine of the clerical Papal States and was likely more deeply embedded in the values of individuals living in these areas than elsewhere. Our results show that the pro-divorce vote share is about 6.7

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<sup>30</sup>Under the Coppino Law, introduced in the Kingdom of Italy in 1877, primary education of three years became compulsory for both boys and girls. The duration of compulsory education was gradually extended, reaching a total of eight years after the 1963 reform, and it became the main determinant of individual education during this period. Indeed, in 1971 and for at least the next decade, the vast majority of Italians typically limited their education to the compulsory level. According to the 1971 census, only 10.7 percent of school-age residents in central Italy had attained a level of education beyond compulsory schooling, either a high school diploma or a bachelor’s degree.

percentage points lower in regions that were formerly part of the Papal States than in Tuscany, i.e. 10 percent lower than the sample mean; this difference is highly statistically significant.

Finally, in column 4 we consider a similar ethical issue, represented by the outcome of a referendum on whether to maintain the right to abortion, a key advance in the process of Italian women’s emancipation and autonomy. The referendum was held in 1981 due to the efforts of the “Movimento per la Vita” (Movement for Life), a conservative Catholic organization that strongly opposed the right to abortion. The pro-right-to-abortion vote in the 1981 referendum was 4.7 percentage points lower in the former Papal States (6.5 percent lower than the sample mean).

These voting results embodied a progressive stance that was traditionally advocated and supported by Italian left-wing parties. In particular, the Italian Communist Party (and its successors) dominated the so-called red regions (Emilia-Romagna, Tuscany and Umbria) from the 1970s until recently. During the 1970s and 1980s, this party secured more than 50 percent of the vote and controlled virtually all local institutions in these regions. Remarkably, the Communist Party’s support in these regions was higher than in the industrial and proletarian northwest.

One possible source of concern is that our estimates inadvertently reflect a differential penetration of the Communist Party, a factor that we have no reason to associate with reunification institutions. In a recent paper, [Acemoglu et al. \(2022\)](#) note that the initial support for anti-war leftist parties was related to the number of soldiers who died in World War I between 1915 and 1918, and it happened that the casualty rate was exceptionally high in central Italy, as shown in [Figure E.1](#).

We examine whether the First World War casualty rate is balanced across the border between the Papal States and Tuscany. Since we find no discontinuity, as shown in [Table E1](#), we conclude that the differential penetration of the Communist Party cannot explain our results.

The evidence presented in this section, although indirect and tentative, suggests that the differential participation of women in the labor market in municipalities of the former Papal States compared to Tuscan municipalities is likely rooted in a difference in gender norms and preferences embedded in the population and transmitted across generations. It does not seem that the result is driven by labor demand factors (economic specialization) or labor supply factors (demographics and education).

## 8 Extension: Papal States vs the Duchy of Modena

In this section we extend our analysis by examining an alternative border, that between the Papal States and the Duchy of Modena. This is the only other border of the Papal States that creates an east-west divide and is not affected by the north-south socio-economic gradient. This border is much shorter than the one with Tuscany and therefore includes a much smaller number of municipalities (see [Figure 1](#) and [Figure E.2](#)).

A unique advantage of this border is that it runs throughout Emilia-Romagna, and thus doesn't encounter the compound treatments problem that necessitated limiting the analysis in the previous section to years prior to the establishment of the regions. In addition, both the Papal States and the Duchy of Modena municipalities are characterized by the same dialect, Emiliano, making the two areas extremely culturally homogeneous.<sup>31</sup>

The Duchy of Modena was a small state that emerged as an independent signoria under the Este family in the late 13th century. From the late 16th century, it retained the borders it had when it was annexed to the Kingdom of Italy in 1859. Located in the Po Valley, it was primarily an agricultural economy, taking advantage of its fertile, drained and irrigated soil, which allowed for high productivity.

In this section, we replicate the baseline analysis for the border between the Papal States and the Duchy of Modena. Our regression discontinuity (RD) estimates, presented in [Table 8](#), confirm the baseline findings. Namely, we observe a statistically significant lower female participation rate and employment in the Papal States compared to the Duchy of Modena, corresponding to -3.3 and -3.4 percentage points, respectively. We observe no discontinuity in male participation and employment, nor in entrepreneurship rates for either gender.

The differences in social norms and values also hold in this scenario: the electoral support for the Christian Democracy Party is 4.7 percentage points higher in the Papal States than in Modena (see [Table 9](#)), the share of votes in favor of the right to divorce is 5.2 percentage points lower, the share of votes in favor of the right to abortion is 4.7 percentage points lower.<sup>32</sup>

Taking advantage of the peculiarity that the border between the Papal State and the Duchy

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<sup>31</sup>Along the border with Tuscany, various dialects can be found, such as Tuscan in Tuscany, Emiliano and Romagnolo in Emilia-Romagna, Gallico-Marchigiano in the Marche, and Italo-Mediano in the other central Italian areas of the Papal States. These cultural differences are accounted for in our primary analysis by the border fixed effects.

<sup>32</sup>No statistically significant discontinuity is detected for religious marriages.

of Modena does not coincide with any existing regional border, we can extend our analysis to the present day. This is because the emergence of the Emilia-Romagna region in the 1970s affected both sides of the border equally.

Figure 5 shows a comprehensive set of regression discontinuity (RD) empirical results for labor market participation and employment, for both women and men, estimated over different time horizons. Specifically, we start with our baseline estimates for the period 1951-1971 and then move the time horizon forward by ten years at a time, considering 1961-1981, 1971-1991, 1981-2001, and 1991-2011. Our estimates document a statistically significant discontinuity in labor market outcomes for women and no discontinuity for men. However, the differences across the border tend to gradually disappear over time, becoming statistically insignificant in recent years.

This finding seems to suggest that historical persistence is indeed a dynamic concept, and that current policies and the evolution of cultural patterns can play a role in mitigating and, in some cases, eradicating socioeconomic persistence due to historical factors. In this case, the marked social and cultural transformations that Italian society has undergone since the late 1960s, together with policies aimed at reducing gender inequalities, have finally succeeded in eradicating the legacy of the Papal States with regard to women's conditions. However, such a social transformation took more than a century after the fall of the Papal States to fully materialize.

## 9 Conclusions

Our work adds to the burgeoning literature that investigates the historical factors influencing gender inequality by providing evidence of the enduring impact of the Papal States on the status of women in Italy. The Papal States, which represented the temporal jurisdiction of the Pope - the head of the Catholic Church - served as a unique instance of a European theocracy and was the oldest state in nineteenth-century Italy. The ecclesiastical imprint deeply shaped the political, economic, and social institutions of the state, resulting in various forms of discrimination against women. These forms of discrimination were generally more pervasive and severe than those found elsewhere in Italy and Europe, and included restrictions on women's personal freedoms, limitations on their access to inheritance rights, and a diminished role in a



court composed primarily of celibate male high prelates.

On the other hand, the Grand Duchy of Tuscany, born of a long tradition of commerce and industry since the 13th century, was subject to a more liberal government throughout the centuries. As a result of its mercantile culture, traditionally more inclusive of women, and the less dominant influence of the Catholic Church compared to the neighboring Papal States, the Grand Duchy of Tuscany exhibited a certain degree of social and economic emancipation of women.

Our research examines whether the longstanding marginalization of women in the society of the Papal States, as compared to the Grand Duchy of Tuscany, persisted after their collapse and still resonates to some extent in the present. Using spatial regression discontinuity analysis, we provide evidence from about a century after the dissolution of these two pre-unification states that women’s labor force participation, employment, and entrepreneurial activity rates were significantly lower in the areas formerly under the jurisdiction of the Papal States than in those of the former Grand Duchy of Tuscany. We do not find differences among men. This divergence in women’s labor market outcomes thus appears to be the result of different institutional traditions of gender equality rather than a mere by-product of different levels of economic development.

Our baseline regressions use the robust inference procedure recommended by [Cattaneo et al. \(2020\)](#) and our results withstand a number of checks and tests, including checks for discontinuity at placebo borders.

We apply the same analysis to an alternative border of the Papal States - that shared with the Duchy of Modena - in an area known for its unified linguistic traditions and belonging to the same modern administrative region of Emilia-Romagna. Our estimates yield very similar results, and we again observe lower participation and employment for women, with no corresponding discontinuity for men.

We interpret our findings as a legacy of the Papal States’ rigid religious traditions and patriarchal institutions. We provide some indirect evidence for these mechanisms by highlighting that in two referenda held in 1974 and 1981, support for the right to divorce and abortion was significantly lower in the former Papal States than in the Grand Duchy of Tuscany and the Duchy of Modena. Moreover, the municipalities that were formerly under the jurisdiction of the Papal States showed greater support for the Christian Democracy Party than the munici-

palities of the other two pre-unification states, reinforcing the notion that Catholic values were more deeply rooted in the former Papal States.

Our research thus adds to the growing body of evidence that past institutions have lasting effects on modern socioeconomic outcomes, particularly with respect to gender equality and gender roles. While Italy has made steady progress toward gender equality, our findings suggest that entrenched cultural norms and values governing the condition of women, typically passed down through generations, tend to resist such historical progress and persist for centuries.

However, our study also shows that the influence of history is not unlimited. Indeed, the analysis of the border with the Duchy of Modena, which can be extended until 2011 since this border does not overlap with any current regional boundaries, reveals a statistically significant discontinuity for female labor market outcomes that dissipates over time, losing its statistical significance in the most recent years.

This observation suggests that the profound social and cultural transformations that have swept through Italian society since the late 1960s, combined with policies aimed at bridging the gender gap, have finally neutralized the legacy of the Papal States. It is important to note, however, that such a transformative shift took more than a century after the fall of the Papal States to fully materialize.

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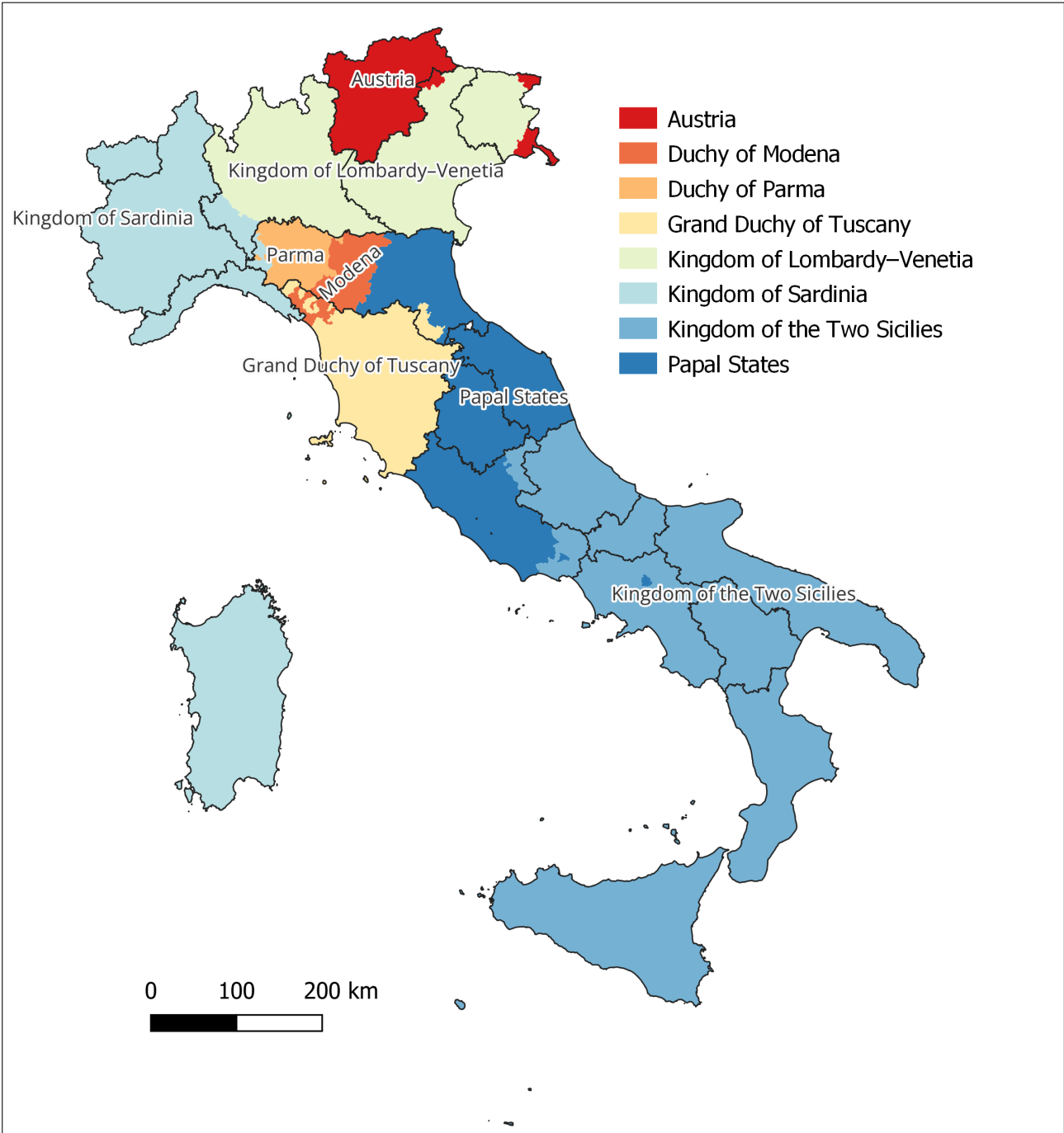
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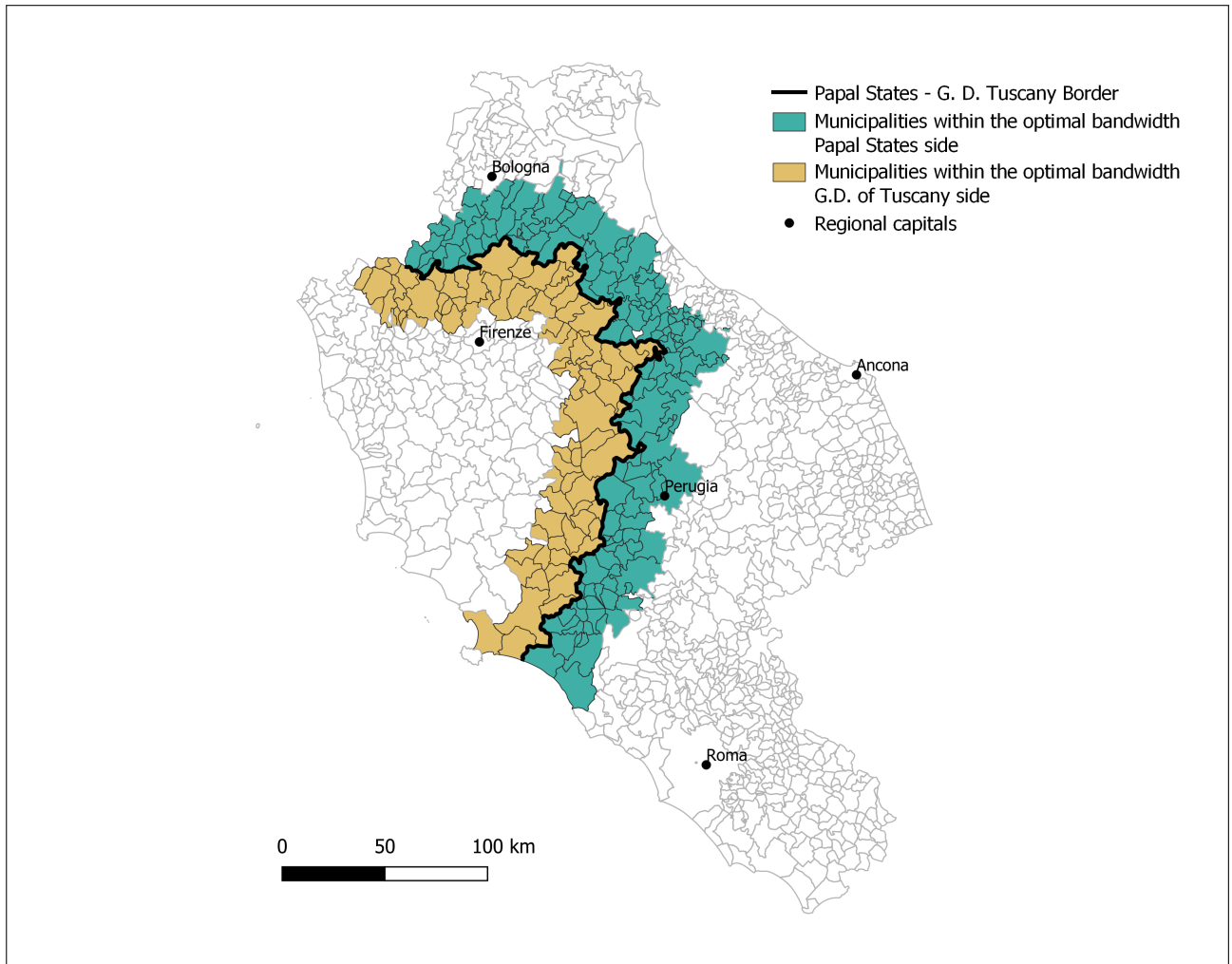
# Figures

Figure 1: Italian states before unification



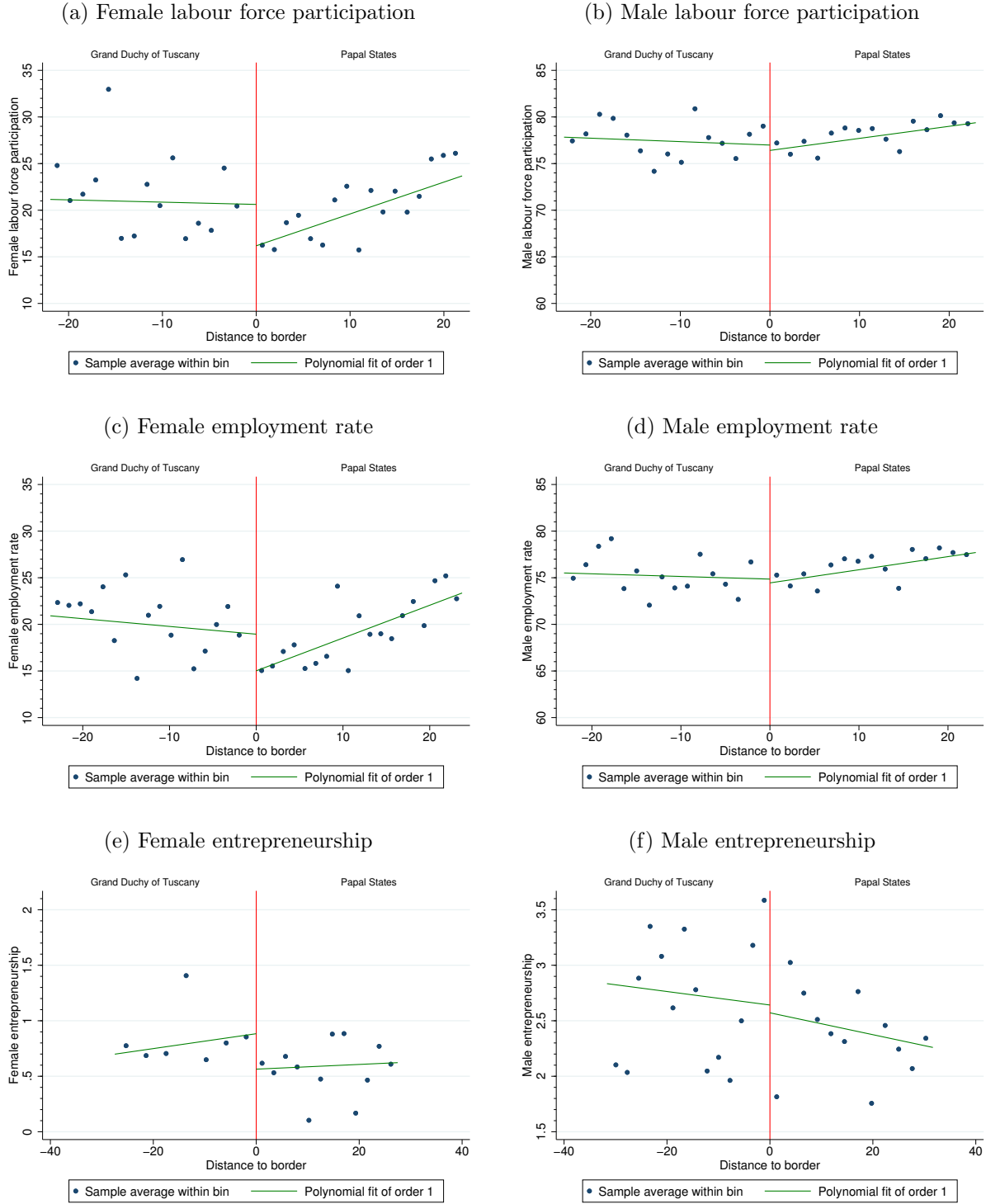
*Note:* The map shows the pre-unification Italian states in 1850. Source: Own elaboration.

Figure 2: Municipalities at the border between the Papal States and the Grand Duchy of Tuscany



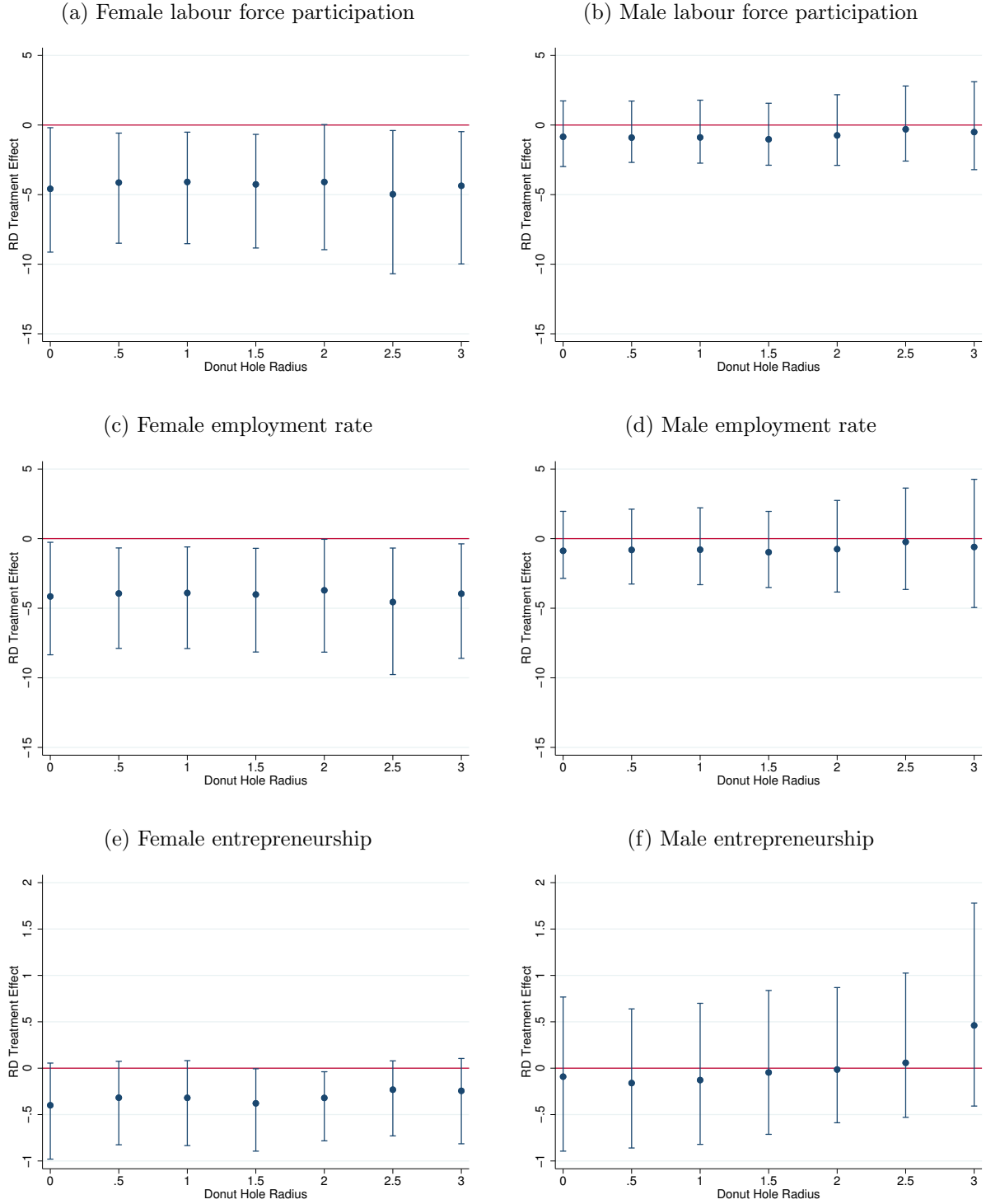
*Note:* The map illustrates the municipalities within the optimal bandwidth when the outcome of interest is the female employment rate. Municipalities on the Papal States side are shown in green, while those on the Grand Duchy of Tuscany side are depicted in yellow. The solid black line represents the former border between the two states, while the black dots indicate the regional capitals.

Figure 3: Regression discontinuity plots



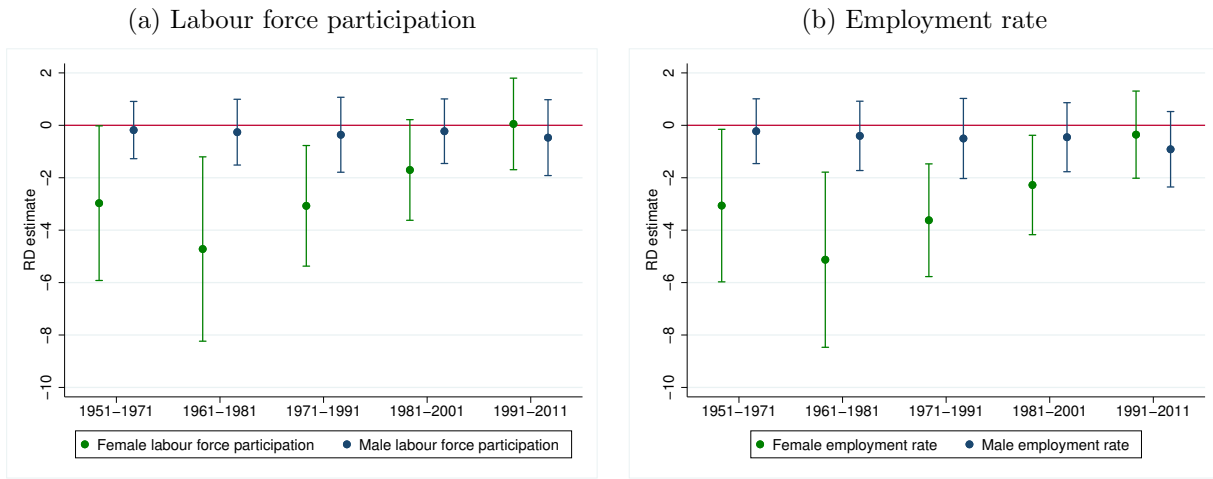
*Note:* The figure shows the RD plots for the labour market outcomes. Panels (a) and (b) show the RD plots of female and male labor force participation, while panels (c) and (d) show the RD plots of female and male employment rates. Panels (e) and (f) show the RD plots of female and male entrepreneurship, respectively. The green lines show the linear polynomial fit without including any of the control variables for the optimal bandwidths reported in [Table 1](#) and a triangular kernel. The dots show the observed averages within each bin. Plots obtained with the `rdplot` command from [Cattaneo et al. \(2020\)](#).

Figure 4: The donut-hole approach



*Note:* The figure shows the RD estimates and robust confidence intervals for the donut hole radii ranging from 0.5 to 3 km. For reference, we have also reported the baseline RD estimate and robust confidence intervals.

Figure 5: Dynamic effects at the border between Papal States and Duchy of Modena



*Note:* The figure shows the RD estimates and confidence intervals for the periods starting from 1951-1971 to 1991-2011, carried out at the border between the Duchy of Modena and the Papal States. Panel (a) shows the point estimates for female (in green) and male (in blue) labor force participation. Panel (b) shows the point estimates for female (in green) and male (in blue) employment rates.

## Tables

Table 1: Baseline RD estimates – The gender legacy of the Papal States in the labour market

	Labour force participation		Employment rate		Entrepreneurship	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Papal States	-4.584** (1.826)	-0.844 (0.972)	-4.155** (1.658)	-0.854 (1.086)	-0.400* (0.214)	-0.0911 (0.342)
Robust CI	[-9.132 ; -.191]	[-2.983 ; 1.733]	[-8.348 ; -.264]	[-3.271 ; 1.985]	[-.98 ; .055]	[-.894 ; .767]
Robust p-value	0.041	0.603	0.037	0.631	0.080	0.881
Bandwidth	21.94	22.97	23.74	23.13	27.48	31.66
Observations	612	642	681	642	258	295
Mean Outcome	20.56	77.73	19.67	75.75	0.68	2.53
Border FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes		
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Note:* The table shows the RD estimates at the border between the Papal States and the Grand Duchy of Tuscany. All outcomes are defined at the municipality level. Labor force participation and employment rates are from the census of 1951, 1961 and 1971, while the entrepreneurship rate is from the census of 1971. See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and border fixed effects. All regressions are estimated with a triangular kernel and optimal bandwidth. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. In columns (1)-(4), standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

Table 2: Balancing of the predetermined covariates

	RD Estimate	Conv. se	Robust p-value	Robust CI	N
<b>A. Geographical covariates:</b>					
Altitude	61.28	65.47	0.268	[-61.188 ; 220.061]	110
Terrain ruggedness index	-0.991	1.437	0.638	[-3.819 ; 2.34]	143
Annual precipitation	-2.605	74.73	0.821	[-139.417 ; 175.765]	98
Annual temperature	0.000369	0.362	0.764	[-.885 ; .65]	97
Seismicity	-0.150	0.135	0.285	[-.452 ; .133]	153
Peak ground acceleration	-0.00828	0.0122	0.607	[-.033 ; .019]	98
Presence of rivers	-0.0178	0.122	0.852	[-.292 ; .241]	236
Land cover	0.370	0.886	0.736	[-1.616 ; 2.289]	119
High landslide risk	-3.039	3.310	0.455	[-9.904 ; 4.436]	253
<b>B. Roman period covariates:</b>					
Roman roads	-0.119	0.159	0.519	[-.474 ; .239]	119
Distance Roman roads	2.198	3.177	0.559	[-4.969 ; 9.195]	143
Roman city	-0.148	0.163	0.333	[-.517 ; .175]	157
Distance Roman city	2.741	2.955	0.304	[-2.929 ; 9.39]	138
Distance Roman ports	3.088	4.459	0.408	[-5.454 ; 13.431]	150

*Note:* The table shows the RD estimates for the geographical and Roman period covariates at the border between the Papal States and the Grand Duchy of Tuscany. See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and border fixed effects. All regressions are estimated with a triangular kernel and optimal bandwidth. Conventional standard errors are reported in column (2). Robust p-value and Robust CI refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).



Table 3: Falsification test – The absence of discontinuities at the Byzantine Empire-Lombard Kingdom border and Etruria province border

	Labour force participation		Employment rate		Entrepreneurship	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
<b>Panel A</b>						
Byzantine Empire	-0.607 (2.707)	-1.009 (0.924)	-0.793 (2.690)	-1.456 (1.128)	0.0722 (0.226)	0.570 (0.473)
Robust CI	[-7.583 ; 7.464]	[-3.629 ; .984]	[-7.776 ; 7.155]	[-4.722 ; .889]	[-.603 ; .574]	[-.894 ; 1.664]
Robust p-value	0.988	0.261	0.935	0.181	0.961	0.555
Bandwidth	26.06	21.26	25.99	20.70	27.96	29.16
Observations	560	446	554	434	197	204
Mean Outcome	29.32	78.64	28.25	76.64	0.588	2.556
<b>Panel B</b>						
Etruria province	0.140 (1.337)	-0.259 (0.678)	0.207 (1.323)	-0.698 (0.836)	-0.277 (0.368)	-0.0807 (0.461)
Robust CI	[-2.3 ; 3.68]	[-2.012 ; 1.086]	[-2.262 ; 3.742]	[-2.928 ; .84]	[-1.195 ; .552]	[-1.317 ; .895]
Robust p-value	0.651	0.558	0.629	0.277	0.471	0.708
Bandwidth	30.04	23.37	29.27	23.17	25.85	31.65
Observations	1018	797	994	791	299	366
Mean Outcome	20.00	76.97	18.77	74.54	0.810	2.494

*Note:* Panel A shows the RD estimates at the border between the Byzantine Empire and the Duchy of Spoleto (see panel (b) of [Figure D.1](#)). See [Table C3](#) for a description of the variables. Estimations include the linear distance to the border and 2 equal-length, border segment dummies. Panel B shows the RD estimates at the Etruria border (see [Figure D.2](#)). Estimations include linear distance to the border and 5 equal-length, border segment dummies. In both panels regressions are estimated with a triangular kernel and optimal bandwidth. In all regressions we control for altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. In columns (1)-(4), standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

Table 4: Placebo borders – Moving the border inward and outward Papal States

	Labour force participation		Employment rate		Entrepreneurship	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Panel A						
RD Estimate Inward	-1.335 (2.375)	0.326 (0.766)	-0.902 (2.371)	0.620 (0.813)	0.0636 (0.308)	1.113 (0.677)
Robust CI	[-6.093 ; 5.506]		[-5.463 ; 6.089]		[-6.777 ; .892]	
Robust p-value	0.921		0.915		0.789	
Bandwidth	11.86		11.56		10.94	
Observations	300		297		96	
Mean Outcome	19.89		18.74		0.705	
Panel B						
RD Estimate Outward	0.379 (2.901)	-0.523 (1.004)	-0.114 (2.748)	-0.196 (1.275)	0.185 (0.252)	-0.0962 (0.361)
Robust CI	[-5.634 ; 8.27]		[-6.008 ; 7.283]		[-4.474 ; .871]	
Robust p-value	0.710		0.851		0.563	
Bandwidth	9.825		10.30		7.909	
Observations	272		281		79	
Mean Outcome	23.86		22.54		0.680	

*Note:* Panel A shows the RD estimates when we move the border between the Papal States and the Grand Duchy of Tuscany inward the Papal States. Panel (B) shows the RD estimates when we move the border outward the Papal States. See [Table C3](#) for a description of the variables. All estimations include the linear distance to the placebo border and border fixed effects. All regressions are estimated with a triangular kernel and optimal bandwidth. In all regressions we control for altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. In columns (1)-(4), standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

Table 5: Mechanisms – Economic specialization and demography.

	Occupation structure		Demographic structure				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Ind. & Serv.	Industry	M/F ratio	Population	Pop less 6	Family size	Net migration
Papal States	-0.439 (3.113)	1.951 (3.604)	1.717 (1.153)	-2.444 (2.085)	0.284 (0.308)	-0.0371 (0.0811)	1.292 (4.137)
Robust CI	[-7.148 ; 7.783]	[-7.891 ; 9.239]	[-1.231 ; 4.432]	[-8.067 ; 1.518]	[-.459 ; 1.027]	[-.236 ; .158]	[-6.373 ; 12.827]
Robust p-value	0.934	0.877	0.268	0.181	0.453	0.700	0.510
Bandwidth	23.09	22.68	21.78	27.49	20.52	21.30	19.78
Observations	642	633	606	774	549	582	353
Mean Outcome	43.62	48.04	101.58	7.74	8.68	3.87	-17.95
Border FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note:* The table shows the RD estimates for the occupation and demographic structure at the border between the Papal States and the Grand Duchy of Tuscany. See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and border fixed effects. All regressions are estimated with a triangular kernel and optimal bandwidth. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. Standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

Table 6: Mechanisms – Educational attainment from unification to 1971

	Years of education					
	(1)	(2)	(3)	(4)	(5)	(6)
	Female primary schooling 1862	Female literate 1911	Female literate 1971	Female upper sec. educ. 1971	Female	Male
Papal States	-16.25*** (5.681)	-1.828* (1.030)	-0.630* (0.337)	0.441 (1.450)	-0.0716 (0.145)	-0.0955 (0.119)
Robust CI	[-28.981 ; -6.34]	[-4.935 ; -.13]	[-1.626 ; -.001]	[-3.609 ; 3.156]	[-.46 ; .24]	[-.411 ; .151]
Robust p-value	0.041	0.039	0.050	0.896	0.537	0.364
Bandwidth	24.73	25.16	26.98	22.40	27.62	35.52
Observations	201	246	256	209	261	333
Mean Outcome	32.18	44.21	49.10	44.76	3.37	4.18
Border FE	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Note:* The table shows the RD estimates of the educational attainment at the border between the Papal States and the Grand Duchy of Tuscany. See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and border fixed effects. All regressions are estimated with a triangular kernel and optimal bandwidth. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

Table 7: Mechanisms – Religious marriages, support for the Christian Democracy, divorce and abortion rights

	(1)	(2)	(3)	(4)
	Religious marriages	Christian Democracy vote share	Pro-divorce vote share	Pro-right-to-abortion vote share
Papal States	1.445** (0.574)	5.498** (2.166)	-6.664*** (2.325)	-4.725** (2.050)
Robust CI	[.425 ; 3.121]	[.744 ; 10.957]	[-12.511 ; -1.167]	[-9.701 ; .293]
Robust p-value	0.010	0.025	0.018	0.065
Bandwidth	34.02	33.85	32.67	32.69
Observations	316	954	307	307
Mean Outcome	98.40	33.52	63.33	72.44
Border FE	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes

*Note:* The table shows the RD estimates for our proxies of religiosity and adherence to traditional values at the border between the Papal States and the Grand Duchy of Tuscany. See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and border fixed effects. All regressions are estimated with a triangular kernel and optimal bandwidth. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parentheses. In column (2) standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

Table 8: Extension – The gender legacy of the Papal States in the labour market at the Papal States-Duchy of Modena border

	Labour force participation		Employment rate		Entrepreneurship	
	(1)	(2)	(3)	(4)	(5)	(6)
	Female	Male	Female	Male	Female	Male
Papal States	-3.334** (1.593)	-0.559 (0.653)	-3.440** (1.556)	-0.732 (0.709)	0.0449 (0.218)	0.186 (0.244)
Robust CI	[-8.88 ; -.319]	[-1.974 ; 1.254]	[-8.913 ; -.531]	[-2.235 ; 1.303]	[-.615 ; .546]	[-.331 ; .93]
Robust p-value	0.035	0.662	0.027	0.606	0.908	0.352
Bandwidth	36.95	45.53	37.13	44.50	42.60	39.68
Observations	401	480	401	471	154	144
Mean Outcome	30.63	79.54	29.30	77.93	0.63	2.18
Border FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes		
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Note:* The table shows the RD estimates at the border between the Papal States and the Duchy of Modena (see [Figure 1](#) and [Figure E.2](#)). See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and 2 equal-length, border segment dummies. All regressions are estimated with a triangular kernel and optimal bandwidth. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. In columns (1)-(4), standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

Table 9: Extension – Religious marriages, support for Christian Democracy, divorce and abortion rights at the Papal States-Duchy of Modena border

	(1)	(2)	(3)	(4)
	Religious marriages	Christian Democracy vote share	Pro-divorce vote share	Pro-right-to-abortion vote share
Papal States	0.143 (0.677)	4.751** (1.990)	-5.230** (2.345)	-4.695** (2.099)
Robust CI	[-1.454 ; 2.103]	[-1.504 ; 9.953]	[-11.103 ; 2.453]	[-9.77 ; 1.45]
Robust p-value	0.721	0.148	0.211	0.146
Bandwidth	32.67	31.09	37.05	31.46
Observations	120	351	135	119
Mean Outcome	98.19	31.17	65.98	76.22
Border FE	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes

*Note:* The table shows the RD estimates for our proxies of religiosity and adherence to traditional values at the border between the Papal States and the Duchy of Modena. See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and 2 equal-length, border segment dummies. All regressions are estimated with a triangular kernel and optimal bandwidth. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. In column (2) standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

# Appendix

## A A Brief History of the Papal States and Tuscany

### A.1 Papal States

The “Status Pontificius”, or Papal States as it’s commonly known, was the oldest state in Italy in the 19th century, existing in various forms from about 757 to 1870.

The Church, in its capacity as a private landowner, began to accumulate property on the Italian peninsula following Emperor Constantine I’s Edict of Milan. With the fall of the Roman Empire, the role of the Pope slowly changed from a primarily religious figure to one of political authority. This transition was formalized when Charlemagne granted the Pope the duchies of Rome and Ravenna, among other territories.

The Papal States underwent various historical transformations, marked by incessant conflicts with the Empire over issues of sovereignty. However, with the end of the Hohenstaufen dynasty, the Papal States gained substantial de facto independence. The conflicts between the Guelphs and the Ghibellines culminated in the Treaty of Venice in 1177, which officially granted the Papal States independence from the Holy Roman Empire.

The promulgation of the *Constitutiones Sanctae Matris Ecclesiae* in 1357 established a uniform civil code for all the states, which remained in force until 1816. After territorial expansions during the Renaissance, the Papal States became the largest in Italy.

In the 18th century, the Papal States were the most backward territories in Italy, operating under an almost feudal system. The low-lying swampy areas were plagued by malaria, and other social problems such as banditry and begging were widespread.

After the upheavals of the Napoleonic era and the Restoration from 1796 to 1814, the Pope regained control of the Papal States. He then embarked on a series of regressive policies.

Garibaldi’s “Mille” expedition, which proved victorious against the Bourbons in southern Italy, sparked numerous rebellions within the Papal States. This eventually led to the establishment of a unified Kingdom of Italy under the rule of the Savoy dynasty in 1861. However, the entire region of Lazio, which included Rome, remained under papal jurisdiction until it was incorporated in 1870. The Pope then retired to the Vatican Hill, where he remained until the establishment of the State of Vatican City by the Lateran Treaty with Italy in 1929.



Compared to other pre-unification Italian states, the Papal States were characterized by the extent to which the clergy maintained control. Clerical authorities appointed secular administrators, held key political positions, and enjoyed a variety of privileges. Ministers' decisions required the Pope's approval. In addition, the Papal States were characterized by a notable lack of individual liberties and a reputation for inefficient and corrupt administration (Daniele, 2019).

This is how the French magistrate, philosopher and politician Charles de Brosses describes Rome in one of his letters to his family, written in Italy between 1739 and 1740 (De Brosses, 1946):

*The form of government is the worst imaginable. Nicolò Machiavelli and Tommaso Moro conceived a utopia; here reality is the exact opposite. Imagine what can come out of [...] A population made up of a third of priests, a third of people who don't work very much, and a third of people who don't work at all; a state without agriculture, trade or industry, but in the middle of a fertile land and on a navigable river; a state whose sovereign, always old, whose government is short-lived, often incapable of acting individually, is surrounded by siblings who are as concerned as possible with their own interests; and a state in which [...] new thieves replace those who are already satisfied; a state that guarantees impunity to anyone who might disturb the social order, as long as he is a friend of a powerful person or is in a sacred asylum.*

Throughout its centuries-long history, the Papal States remained a relatively backward economy, largely agrarian and dominated by low-productivity large estates. The capital city, Rome, stood out and largely benefited from being the heart of Catholicism. Nevertheless, the papal administration, both in the capital and in the provinces, was traditionally rather inefficient.<sup>33</sup>

To some extent, this economic stagnation and ineffective governance can be linked to the “universal” role of the Pope. As head of the Church, the Pope was a major player in international affairs, far beyond the capacity, size, and resources of the small state he governed.

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<sup>33</sup>Colonel Serristori, who compiled a statistical compendium of the pre-unification states in 1839, wrote “We deem it convenient to inform the reader that no research or inquiry has been spared to obtain accurate and complete information for the compilation of the statistics of the Papal States, but that most of our efforts have been unsuccessful.” (Serristori, 1839).

The Pope was involved in financing wars between foreign powers, directly waging war against other Italian states and foreign powers, financing and organizing crusades to the Holy Land, and providing loans and support to Catholic monarchs throughout Europe (Partner, 1980).<sup>34</sup> As a result, the papal court in Rome consumed a significant portion of the total budget to keep up with the larger European powers (Märtl, 2010).

The international role of the papacy also brought financial benefits to the state, as large amounts of gold flowed to Rome from believers, churches, and monasteries throughout Europe. However, these revenues began to dwindle in the 17th century due to the Protestant Reformation, and the Pope increasingly resorted to borrowing money on international markets. The debt continued to grow to the point that by 1798, debt service exceeded 50 percent of annual revenues (Korten, 2018), up from an already high 30 percent in the 16th century (Partner, 1980). Despite this, the Papal States rarely defaulted on their loans and managed to keep the exchange rate stable, allowing them to consistently borrow money at low interest rates (Strangio, 2013). This was mainly due to increasing taxes and deflationary policies, which made public debt a more profitable and safer investment than private companies for both local elites and domestic and foreign bankers (Partner, 1980).

These factors prevented the emergence of a modern merchant class comparable to those in other pre-unification states, and the ruling class of the state remained traditionally composed of the clergy and associated old feudal nobility.<sup>35</sup>

## A.2 Tuscany

The Grand Duchy of Tuscany is the heir to the Republic of Florence, founded in the 12th century, which gradually established itself as the leading power in Tuscany. The Medici, a famous family of merchants and patrons of artists and scientists, ruled Florence from the 15th century until 1737. Tuscany's mercantile traditions, the ambition of its economic actors, its extensive international relations, and its cultural renaissance made the region the epicenter of the European Renaissance. The stability of the Tuscan institutions, from the reign of the

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<sup>34</sup>For example, the war waged by Paul IV against Spain in 1556-7 is estimated to have cost between two and three years of the Papal States' income for that period.

<sup>35</sup>For example, the failed attempt of Cola di Rienzo to establish a free and autonomous commune in Rome in the 14th century was supported mainly by merchants and cattle breeders seeking greater power (Sanfilippo, 2001). It wasn't until the fall of the Papal States that the country's merchants emerged as a new economic bourgeoisie in a vastly changed economic context.

Medici to the end of the duchy, was underpinned by a compromise between the aristocracy and the emerging social classes in the public professions (Carpanetto and Ricuperati, 1994).

Regarding religion, while Catholicism was the official state religion, the Medici rulers advocated religious tolerance. As a result, non-Catholic communities such as Jewish, Protestant, and Muslim groups had a significant presence in cities such as Florence and Livorno.

In 1737, the Medici line was succeeded by the House of Habsburg-Lorraine, which continued the enlightened rule. Leopold, Maria Theresa's son, championed many important economic, financial and judicial reforms. He also proposed an ambitious set of reforms in ecclesiastical policy, inspired by the juridical principles that advocated the separation of secular and religious powers.<sup>36</sup> In 1786, in a historic move, the Grand Duchy of Tuscany became the first state in the world to outlaw torture and capital punishment.

The distinction between spiritual and temporal power was a major driving force behind Leopold's policies. Here's what Scipione de' Ricci, Jansenist bishop and counselor to Leopold, wrote to the Grand Duchy in 1786:

*It will be established as a principle that in all the schools of the Grand Duchy the Catholic doctrine will be taught on the ground of the distinction of the two powers, since Jesus Christ did give to the Church purely spiritual power, and temporal power is given by God to sovereigns independently of it.*

The Napoleonic era represented a temporary political interruption for Tuscany, as it did for the Papal States. After the Restoration, however, the Habsburg-Lorraine dynasty returned to power. Unlike many areas during this period, Tuscany was not plagued by persecutions and purges, and the House of Habsburg-Lorraine maintained its reform-minded approach.

Ferdinand III repealed the Napoleonic Code, but took care to refine the earlier codes established by Leopold. He also introduced reforms in the commercial and fiscal systems, thus ensuring a degree of institutional continuity in pre-unification Tuscany. These actions highlight the contrast between the enlightened and progressive governance of Tuscany and the conservative, reactionary nature of the Papal States, shaping the unique legacies left by each.

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<sup>36</sup>These reforms included the dissolution of religious orders that were not of public interest, restrictions on ecclesiastical property, state control of clerical education, and the abolition of the Inquisition. Although Leopold attempted to declare Tuscan the official language for public religious acts and denounced the worship of relics, he was forced to withdraw his efforts in the face of public opposition.

From the 13th century, Tuscany became an important center of industry, trade and finance. It produced and exported woollen textiles and imported raw wool from as far away as Britain and northern Europe. Banking and financial services were highly developed, and several Tuscan cities were home to important banks. Bertocchi and Bozzano (2016b) show that the cities of Arezzo, Florence, Pisa, and Siena were located on important trade routes, while Florence, Pistoia, Lucca, and Siena were the homes of banking institutions.<sup>37</sup>

In the 17th century, however, the Tuscan economy faced serious challenges. Increasing competition from England, France, and the Netherlands, coupled with significant exogenous shocks, led to a sharp decline in the textile industry, exports, and financial services, marking the end of Tuscan prosperity.(Cipolla, 1952).<sup>38</sup>

## B The 1974 Referendum on Divorce

Rapid economic progress and the spread of civil rights movements after World War II catalyzed a gradual transformation of family structures and women's roles in Italy (Inglehart and Norris, 2003). However, this change was not evenly distributed throughout the country; the central regions led the way, while the northern and southern regions lagged behind.

One of the most significant changes in Italian family law was the introduction of divorce, which was equally available to both partners. This development signaled the virtual end of patriarchal families and promoted gender equality. The law was passed in 1970 with the support of the secular socialist and liberal parties (Law 898/70).

This new legislation directly challenged a fundamental principle of Catholicism - the indissolubility of the sacred marriage bond. As a result, it met with fierce opposition from the Catholic hierarchy and many of the faithful. Shortly thereafter, in 1971, as permitted by the Italian Constitution, well over one million citizens submitted their signatures in support of a referendum to repeal the law.

The conservative Christian Democracy (Democrazia Cristiana - DC) and the right-wing Italian Social Movement (Movimento Sociale Italiano - MSI) parties campaigned for a "yes"

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<sup>37</sup>In the Papal States, only Rome and Perugia were located on trade routes, although Ferrara and Senigallia hosted international fairs.

<sup>38</sup>During the so-called Castro Wars, the Grand Duchy managed to defeat Pope Urban VIII in 1643. However, the considerable cost of the war, borne by the Tuscan public finances, led to a collapse of the economy.

vote, which would lead to the repeal of the law. The Catholic Church, along with media outlets sympathetic to the Vatican, also strongly supported the “yes” vote.

However, opinions among Italian Catholics were divided. Various Catholic movements, including grassroots Christian communities and democratic Catholics, supported freedom of choice and opposed the imposition of Church doctrine on Italian society as a whole. Several priests who supported the “no” vote faced punitive measures from the Church, including suspension a divinis, which effectively deprived them of all or part of the benefits of their office.

In Venice, the Catholic Patriarch dissolved the Association of Catholic University Students for opposing the Church’s position. The National Council of Catholic Action, an important Catholic association, issued a document supporting divorce, which was immediately censored by the Bishops’ Conference.

The first referendum in the history of the Italian Republic, which was founded in 1946, was held on May 12, 1974. This event marked a critical period of political discord in the country. The final voting results indicated that 40.7% voted “yes” and 59.3% voted “no,” upholding the right to divorce and contributing to the ongoing process of secularization of customs and social norms in the country.

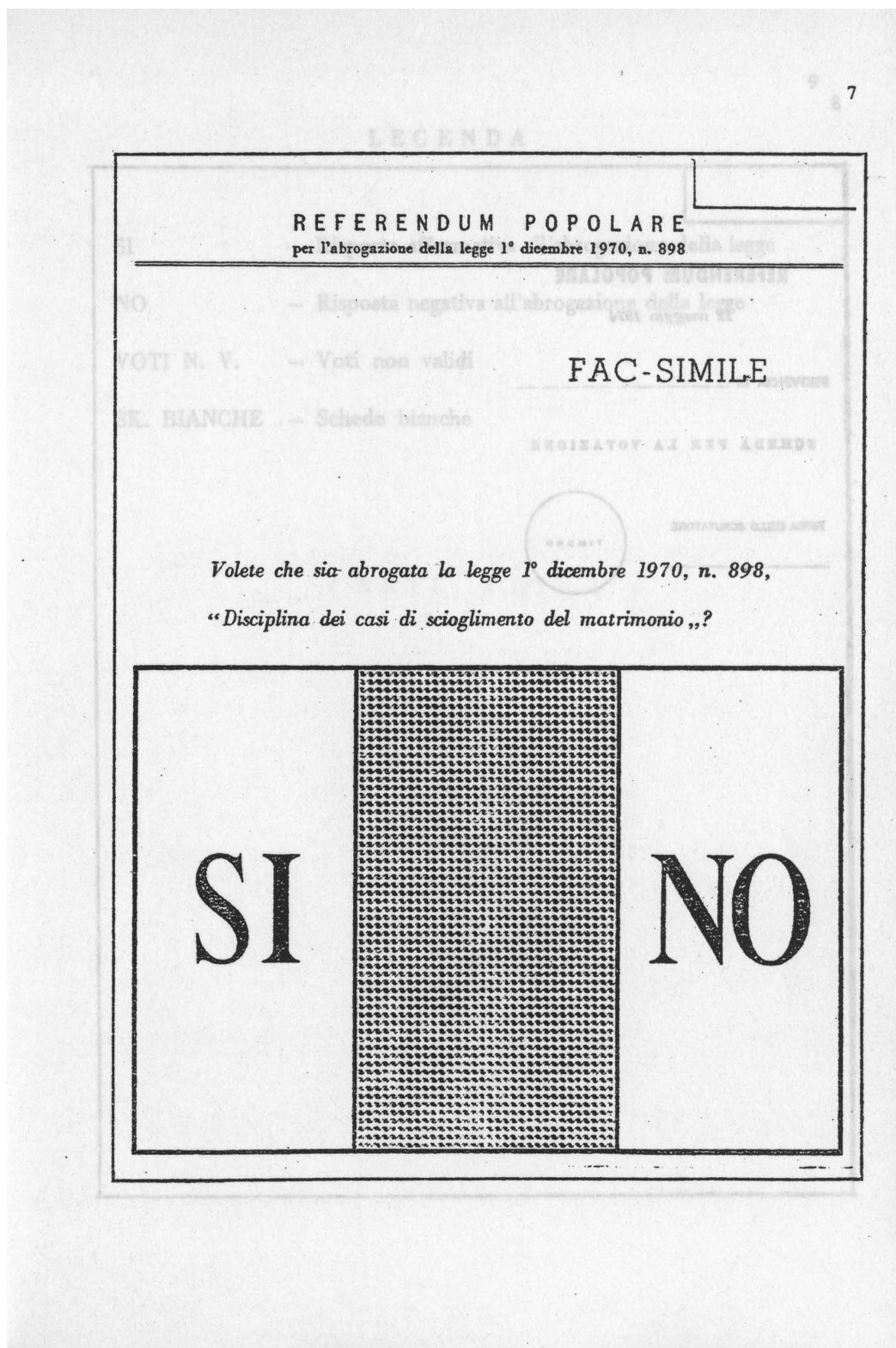
A majority of women voted “no,” seeing this as an opportunity to advance women’s emancipation in a society still characterized by deeply entrenched gender inequality. One such manifestation of this inequality was an antiquated rule known as “delitto d’onore” (honor killing), which was not abolished until 1981. This rule allowed men to kill their wives or lovers if they caught them in the act of adultery, or in cases where the woman was “dishonoring” the family and the man—who was considered the legitimate protector of the family honor—was facing relatively light punishments.<sup>39</sup> Even today, evidence from the Italian Statistical Institute shows that the vast majority of divorces are filed by women ([Istat, 2018](#)).<sup>40</sup>

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<sup>39</sup>Italian legislation considered the crimes of sexual assault and violence to be crimes against public morality, not against an individual, until 1996 (Law 66, promulgated on November 15, 1996). Punishments for these crimes were indeed very mild, as were those for related crimes such as “*ratto a fine di matrimonio*” (kidnapping for marriage) and “*ratto a fine di libidine*” (kidnapping for libido).

<sup>40</sup>Similar patterns of divorce are found in other countries such as the US ([Brinig and Allen, 2000](#)) and the UK ([Office for National Statistics, 2012](#)).

Figure B.1: Ballot of the referendum on divorce



*Note:* The figure shows the ballot of the 1974 referendum on divorce. Italian citizens were asked to vote on whether they wished to repeal Law 898/1970, which had introduced the right to divorce into the Italian legal system in 1970. Those who voted "no" were against the repeal of the law (i.e., in favor of the right to divorce). Source: Ministry of Interior (1977) "Referendum Popolare del 12 Maggio Risultati".

## C Data sources and Descriptive Statistics

Table C1: Descriptive statistics by state

	G.D Tuscany		Papal States	
	Mean	sd	Mean	sd
<b>Panel A: Labour Market</b>				
Female labour force participation (1951-1971)	21.38	8.775	20.43	8.961
Male labour force participation (1951-1971)	77.69	6.955	77.95	7.203
Female employment rate (1951-1971)	20.14	8.550	19.24	8.728
Male employment rate (1951-1971)	75.51	6.956	76.12	7.430
Female entrepreneurship (1971)	0.770	0.714	0.584	0.844
Male entrepreneurship (1971)	2.807	1.330	2.440	1.251
<b>Panel B: Education</b>				
Share of females students in primary schooling (1862)	35.76	25.59	30.15	21.28
Share of literate females (1911)	44.07	5.383	44.27	5.065
Share of literate females (1971)	49.42	1.469	48.89	1.363
Share of females upper secondary education (1971)	43.37	4.533	45.72	5.709
Female years of education (1971)	3.462	0.690	3.330	0.677
Male years of education (1971)	4.251	0.579	4.098	0.549
<b>Panel C: Values</b>				
Religious marriages (1971)	98.41	3.089	98.71	2.569
Christian Democracy vote share (1972-1979)	33.21	9.029	35.02	10.67
Pro-divorce vote share (1974)	65.09	8.826	61.31	10.34
Pro-right-to-abortion vote share (1981)	74.22	7.604	70.88	9.219
<b>Panel D: Occupation structure</b>				
Industry & Services (1951-1971)	49.32	19.98	40.62	17.42
Agriculture (1951-1971)	41.23	22.44	51.82	19.87
<b>Panel E: Demographic structure</b>				
Male/female ratio (1951-1971)	100.2	4.431	102.3	4.671
Population (1951-1971)	8.870	15.66	7.220	14.93
Population less than 6 years old (1951-1971)	8.283	1.659	8.949	1.961
Family size (1951-1971)	3.934	0.737	3.854	0.566
Net internal migration rate (1960-1970)	-11.44	20.81	-18.66	22.30
WWI soldier casualties	2.187	0.599	2.164	0.548

*Note:* The table shows the summary statistics of labour market outcomes (Panel A), educational attainment variables (Panel B), proxies of religiosity and adherence to traditional values (Panel C), occupation and demographic structure (Panel D and E) for municipalities located within 25 km of the border between the Papal States and the Grand Duchy of Tuscany. In brackets is indicated the period in which the variables are measured. See [Table C3](#) for a description of the variables.



Table C2: Descriptive statistics of predetermined covariates by state

	G.D Tuscany		Papal States	
	Mean	sd	Mean	sd
<b>Panel A:</b> Geographical covariates				
Altitude	382.3	234.5	360.4	200.6
Terrain ruggedness index	14.12	6.140	11.29	5.458
Annual precipitation	1048.5	356.7	804.2	252.1
Annual temperature	12.19	1.505	12.77	1.017
Seismicity	0.640	0.482	0.711	0.455
Peak ground acceleration	0.174	0.0362	0.180	0.0287
Presence of rivers	0.580	0.496	0.606	0.490
Land cover (% of artificial surfaces and constructions)	7.091	6.433	5.990	3.337
Area high landslide risk	16.84	13.45	16.61	16.67
<b>Panel B:</b> Roman period covariates				
Roman roads	0.110	0.314	0.225	0.419
Distance Roman roads	12.26	9.222	12.16	9.497
Roman city	0.0800	0.273	0.134	0.342
Distance Roman city	16.34	7.728	11.17	7.259
Distance Roman ports	59.38	20.82	48.18	22.90

*Note:* The table shows the summary statistics for the geographical and Roman period covariates for municipalities within 25 km of the border, by state. See [Table C3](#) for a description of the variables.

Table C3: Variables definitions and data sources

Variable	Definition & Source
A. Labour Market	
Female labour market participation	Active female population divided by the female population in the same age group (%), <i>National Censuses of 1951, 1961, 1971, National Institute of Statistics (ISTAT)</i>
Male labour market participation	Active male population divided by the male population in the same age group (%), <i>National Censuses of 1951, 1961, 1971, National Institute of Statistics (ISTAT)</i>
Female employment rate	Employed females divided by the female population in the same age group (%), <i>National Censuses of 1951, 1961, 1971, National Institute of Statistics (ISTAT)</i>
Male employment rate	Employed males divided by the male population in the same age group (%), <i>National Censuses of 1951, 1961, 1971, National Institute of Statistics (ISTAT)</i>
Female entrepreneurship	Female entrepreneurs in non-agricultural sectors divided by the female population employed in non-agricultural sectors, <i>National Census of 1971, National Institute of Statistics (ISTAT)</i>
Male entrepreneurship	Male entrepreneurs in non-agricultural sectors divided by the male population employed in non-agricultural sectors, <i>National Census of 1971, National Institute of Statistics (ISTAT)</i>
B. Education	
Share of females students in primary schooling	Number of female students divided by the total number of students in the school year 1862-1863 (%), <i>“Istruzione elementare pubblica per comuni, anno scolastico 1862-1863”, Ministry of Agriculture, Industry and Trade</i>
Share of literate females (1911)	Number of females aged 6 and over who can read divided by the literate population in the same age group (%), <i>“L’alfabetismo della popolazione presente”, Census 1911, Ministry of Agriculture, Industry and Trade</i>
Share of literate females (1971)	Number of females aged 6 and over who can read and write divided by the literate population in the same age group (%), <i>National Census of 1971, National Institute of Statistics (ISTAT)</i>

Table C3 (continued):

Share of females upper secondary education	Number of females aged 6 and over with at least upper secondary education divided by the population with at least upper secondary education in the same age group (%), <i>National Census of 1971, National Institute of Statistics (ISTAT)</i>
Female years of education	Average years of education of female population aged 6 and over, <i>National Census of 1971, National Institute of Statistics (ISTAT)</i>
Male years of education	Average years of education of male population aged 6 and over, <i>National Census of 1971, National Institute of Statistics (ISTAT)</i>
C. Values	
Religious marriages	Number of religious marriages divided by the total number of marriages in 1971 (%), <i>National Institute of Statistics (ISTAT)</i>
Christian Democracy vote share	Number of votes for the Christian Democracy party divided by the number of valid votes (%) in the 1972, 1976 and 1979 national elections, <i>Historical Elections Archive, Ministry of Interior</i>
Pro-divorce vote share	Number of votes in favor of retaining the right to divorce in the 1974 referendum divided by the number of valid votes (%), <i>Historical Elections Archive, Ministry of Interior</i>
Pro-right-to-abortion vote share	Number of votes in favor of retaining abortion rights in the 1981 referendum divided by the number of valid votes (%), <i>Historical Elections Archive, Ministry of Interior</i>
D. Occupation structure	
Industry & Services	Employment in industry & services (% of total employment), <i>National Censuses of 1951, 1961, 1971, National Institute of Statistics (ISTAT)</i>

Table C3 (continued):

Agriculture	Employment in agriculture (% of total employment), <i>National Censuses of 1951, 1961, 1971, National Institute of Statistics (ISTAT)</i>
Male/female ratio	E. Demographic structure Male population divided by female population (%), <i>National Censuses of 1951, 1961, 1971, National Institute of Statistics (ISTAT)</i>
Population/1000	Municipal resident population scaled by 1000, <i>National Censuses of 1951, 1961, 1971, National Institute of Statistics (ISTAT)</i>
Population less than 6 years old	Population under 6 years of age divided by total population (%), <i>National Censuses of 1951, 1961, 1971, National Institute of Statistics (ISTAT)</i>
Family size	Resident population in households divided by the number of households, <i>National Censuses of 1951, 1961, 1971, National Institute of Statistics (ISTAT)</i>
Net internal migration rate	Number of persons canceling the residence in the municipality minus number of persons registering the residence in the municipality divided by the population at the beginning of the year (per 1,000 inhabitants), “ <i>Popolazione residente dei comuni al 31 Dicembre 1959 e 1960. Movimento anagrafico e superficie nel 1960</i> ” from the series “ <i>Popolazione e Circoscrizioni Amministrative dei Comuni</i> ” and “ <i>Popolazione e movimento anagrafico dei comuni</i> ”, Vol. XVI, 1970; <i>National Institute of Statistics (ISTAT)</i>
WWI casualties	Number of soldier casualties during World War I divided by the municipal population in 1911 (%), <i>Istituto per la Storia della Resistenza e della Società contemporanea in provincia di Reggio Emilia (ISTORECO)</i>
Altitude	F. Geographical data Altitude of centre of the municipality, <i>National Institute of Statistics (ISTAT)</i>
Terrain ruggedness index	Terrain ruggedness index, <i>Own elaboration based on elevation data from Jarvis et al. (2008)</i>

Table C3 (continued):

Annual precipitation	Average precipitation for the years 1970-2000, <a href="#">Fick and Hijmans (2017)</a>
Annual temperature	Average temperature for the years 1970-2000, <a href="#">Fick and Hijmans (2017)</a>
Seismicity	Indicator equal to 1 for the municipalities with medium to high seismicity and zero otherwise, <i>National Institute of Statistics (ISTAT)</i>
Peak ground acceleration	Maximum ground acceleration, <i>National Institute of Statistics (ISTAT)</i>
Presence of rivers	Indicator equal to 1 if a river crosses the territory of the municipality and zero otherwise, <i>Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA)</i>
Land cover	Percentage of artificial surfaces and constructions, <i>Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA)</i>
Area high landslide risk	Percentage of municipal area at high and very high landslide risk, <i>National Institute of Statistics (ISTAT)</i>
G. Roman period data	
Roman roads	Indicator equal to 1 if a major Roman road traversed the territory of the municipality and zero otherwise, <a href="#">McCormick et al. (2013)</a>
Distance Roman Roads	Distance (km) from the nearest Roman road, <a href="#">McCormick et al. (2013)</a>
Roman city	Indicator equal to 1 if a municipality was a Roman city and zero otherwise. <a href="#">Hanson (2016b,a)</a>
Distance Roman city	Distance (km) from the nearest Roman city, <a href="#">de Graauw (2014)</a>
Distance Roman ports	Distance (km) from the nearest Roman port, <a href="#">de Graauw (2014)</a>

## D Specification Tests and Robustness Checks

### Tables

Table D1: Specification test – Alternative kernel function

	Labour force participation		Employment rate		Entrepreneurship	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Papal States	-4.165** (1.634)	-0.921 (0.762)	-3.850** (1.516)	-0.664 (0.900)	-0.301* (0.172)	-0.0502 (0.327)
Robust CI	[-8.598 ; -.01]	[-2.384 ; 1.182]	[-7.881 ; .116]	[-2.325 ; 1.862]	[-.786 ; .072]	[-.929 ; .814]
Robust p-value	0.0495	0.509	0.0570	0.828	0.103	0.897
Bandwidth	20.85	31.63	22.03	29.55	36.96	28.13
Observations	564	881	618	839	356	264
Mean Outcome	20.18	78.15	19.37	76.16	0.660	2.559
Border FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes		
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Note:* The table shows the RD estimates at the border between the Papal States and the Grand Duchy of Tuscany using a uniform kernel function. See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and border fixed effects. All regressions are estimated with an optimal bandwidth. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. In columns (1)-(4), standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

Table D2: Specification test – Alternative polynomial in the distance to the border

	Labour force participation		Employment rate		Entrepreneurship	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Papal States	-4.887** (2.009)	-0.653 (1.045)	-4.524** (1.920)	-0.566 (1.175)	-0.403* (0.221)	-0.139 (0.403)
Robust CI	[-10.234 ; -85]	[-3.317 ; 1.804]	[-9.714 ; -435]	[-3.54 ; 2.18]	[-.92 ; .141]	[-1.209 ; .785]
Robust p-value	0.021	0.563	0.032	0.641	0.150	0.677
Bandwidth	39.80	45.12	41.09	45.02	59.99	54.16
Observations	1129	1276	1165	1273	538	498
Mean Outcome	22.39	78.29	21.25	76.32	0.68	2.53
Border FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes		
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Note:* The table shows the RD estimates at the border between the Papal States and the Grand Duchy of Tuscany using a quadratic polynomial in the distance to the border. See [Table C3](#) for a description of the variables. All estimations include border fixed effects. All regressions are estimated with a triangular kernel and optimal bandwidth. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. In columns (1)-(4), standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).



Table D3: Specification test – Two dimensional spatial regression discontinuity design

	Labour force participation		Employment rate		Entrepreneurship	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
<b>Panel A: Linear</b>						
Papal States	-3.827** (1.550)	-1.476 (1.007)	-3.775** (1.454)	-1.631 (1.106)	-0.458** (0.227)	-0.356 (0.396)
<b>Panel B: Quadratic</b>						
Papal States	-4.577*** (1.574)	-1.302 (1.123)	-4.156*** (1.499)	-1.408 (1.221)	-0.398 (0.251)	-0.278 (0.446)
Bandwidth	21.94	22.97	23.74	23.13	27.48	31.66
Observations	612	642	681	642	258	295
Mean Outcome	20.56	77.73	19.67	75.75	0.68	2.53
Border FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Note:* The table shows the RD estimates at the border between the Papal States and the Grand Duchy of Tuscany using polynomials in latitude and longitude as proposed by Dell (2010). Estimations in panel (A), include a linear polynomial in latitude and longitude ( $lat + long$ ). Estimations in panel (B), include a quadratic polynomial in latitude and longitude ( $lat + long + lat^2 + long^2 + lat \times long$ ). See Table C3 for a description of the variables. All estimations include border fixed effects. All regressions are estimated with a triangular kernel and using the optimal bandwidth as in Table 1. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. In columns (1)-(4), standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table D4: Specification test – Sensitivity to the bandwidth choice

	Labour force participation		Employment rate		Entrepreneurship	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
<b>Panel A: Cerrd</b>						
Papal States	-5.065** (2.433)	-1.021 (1.218)	-4.507** (2.247)	-1.212 (1.350)	-0.412 (0.297)	-0.298 (0.421)
Robust CI	[-10.427 ; .126]		[-9.483 ; .205]		[-1.084 ; .196]	
Robust p-value	0.056	0.508	0.061	0.470	0.174	0.560
Bandwidth	15.51	16.24	16.78	16.35	19.43	22.39
Observations	440	455	470	458	173	208
Mean Outcome	19.32	77.22	18.27	75.25	0.69	2.56
<b>Panel B: Msetwo</b>						
Papal States	-4.055** (1.764)	-1.056 (0.958)	-3.687** (1.582)	-1.008 (1.060)	-0.303 (0.203)	-0.0543 (0.346)
Robust CI	[-8.124 ; .451]		[-7.375 ; .333]		[-.878 ; .108]	
Robust p-value	0.079	0.343	0.073	0.445	0.126	0.919
Bandwidth (left)	21.98	20.00	24.30	20.14	25.83	29.12
Bandwidth (right)	42.74	38.86	42.67	46.10	48.03	52.31
Observations	983	860	1019	992	373	415
Mean Outcome	22.08	78.32	20.87	76.27	0.66	2.51

*Note:* The table shows the RD estimates at the border between the Papal States and the Grand Duchy of Tuscany using alternative optimal bandwidth selectors. Panel A shows the RD estimates using a common Coverage Error Rate (Cerrd) optimal bandwidth selector, while Panel (B) shows the RD estimates using two different MSE optimal bandwidth selectors (Msetwo). See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and border fixed effects. All regressions are estimated with a triangular kernel and optimal bandwidth. In all regressions we control for altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. In columns (1)-(4), standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

Table D5: Accounting for spatial correlation

	Labour force participation		Employment rate		Entrepreneurship	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Papal States	-4.584	-0.844	-4.155	-0.854	-0.400	-0.0911
Conley se (25km)	(1.593)***	(0.924)	(1.468)***	(0.999)	(0.265)	(0.394)
Conley se (50km)	(1.445)***	(0.831)	(1.368)***	(0.855)	(0.306)	(0.346)
Bandwidth	21.94	22.97	23.74	23.13	27.48	31.66
Observations	612	642	681	642	258	295
Mean Outcome	20.56	77.73	19.67	75.75	0.68	2.53
Border FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Note:* The table shows the baseline RD estimates at the border between the Papal States and the Grand Duchy of Tuscany using [Conley \(1999\)](#) standard errors. In brackets is shown the distance at which spatial correlation is assumed to fade away. Standard errors are computed using Stata module by [Colella et al. \(2020\)](#). See [Table C3](#) for a description of the variables. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

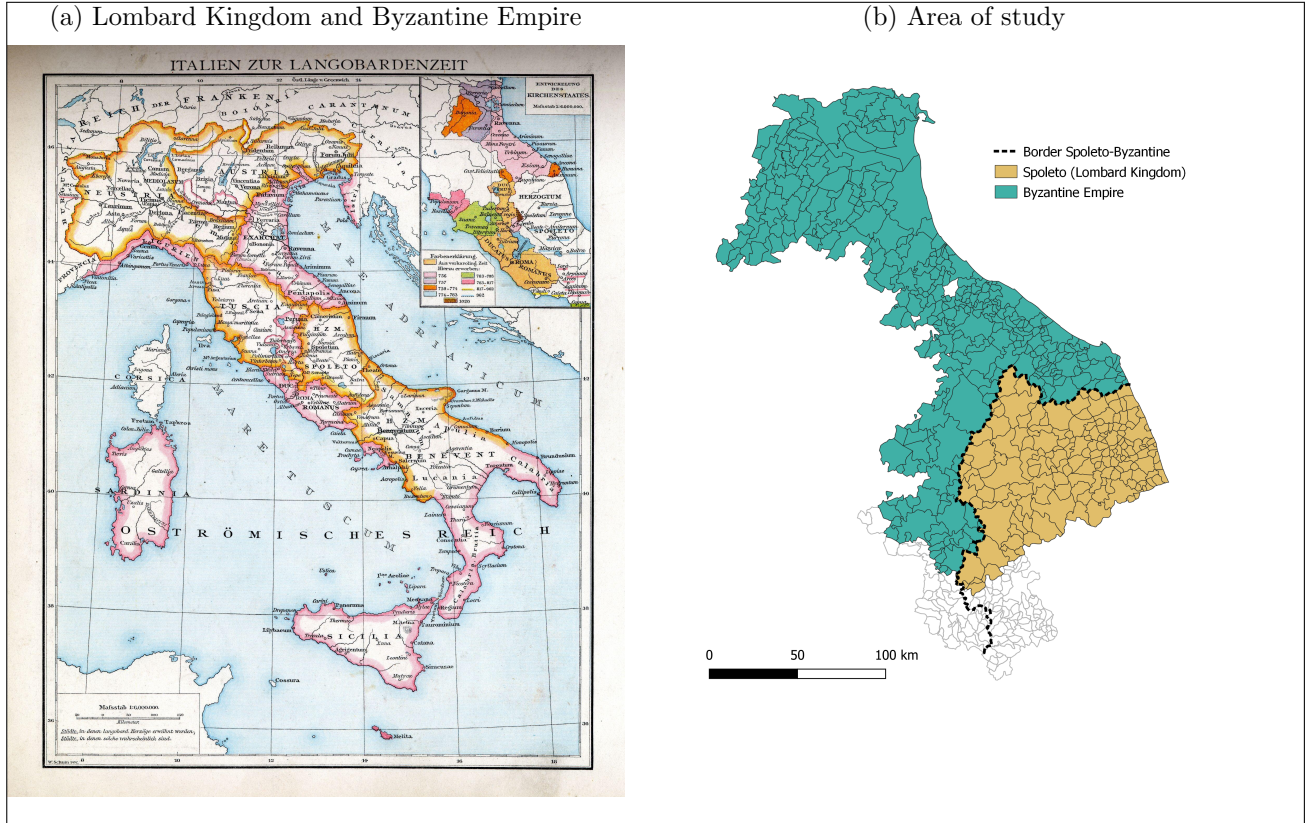
Table D6: Further robustness checks – Baseline RD Estimates excluding the municipalities with more than 100,000 inhabitants

	Labour force participation		Employment rate		Entrepreneurship	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Papal States	-4.574** (1.815)	-0.841 (0.975)	-4.159** (1.656)	-0.851 (1.097)	-0.400* (0.214)	-0.0911 (0.342)
Robust CI	[-9.116 ; -.223]	[-2.999 ; 1.743]	[-8.381 ; -.316]	[-3.328 ; 2.004]	[-.98 ; .055]	[-.894 ; .767]
Robust p-value	0.040	0.604	0.035	0.626	0.080	0.881
Bandwidth	22.08	22.92	23.79	22.79	27.48	31.66
Observations	615	636	675	630	258	295
Mean Outcome	20.52	77.74	19.64	75.74	0.68	2.53
Border FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes		
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes

*Note:* The table shows the RD estimates at the border between the Papal States and the Grand Duchy of Tuscany when municipalities with more than 100,000 inhabitants are excluded from the sample. See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and border fixed effects. All regressions are estimated with a triangular kernel and optimal bandwidth. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. In columns (1)-(4), standard errors are clustered at the municipality level. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

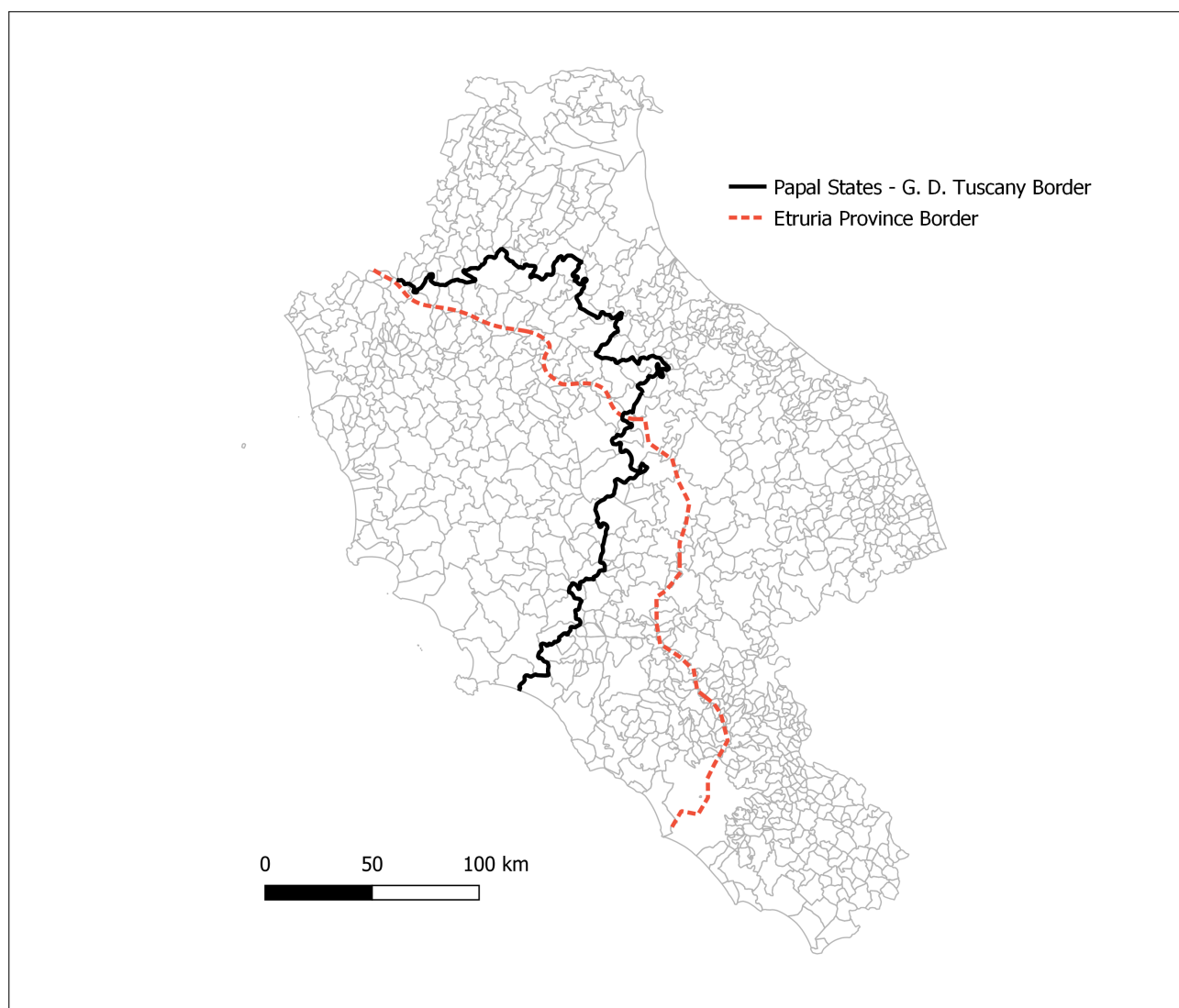
## Maps

Figure D.1: The borders between the Byzantine Empire and the Lombard Kingdom



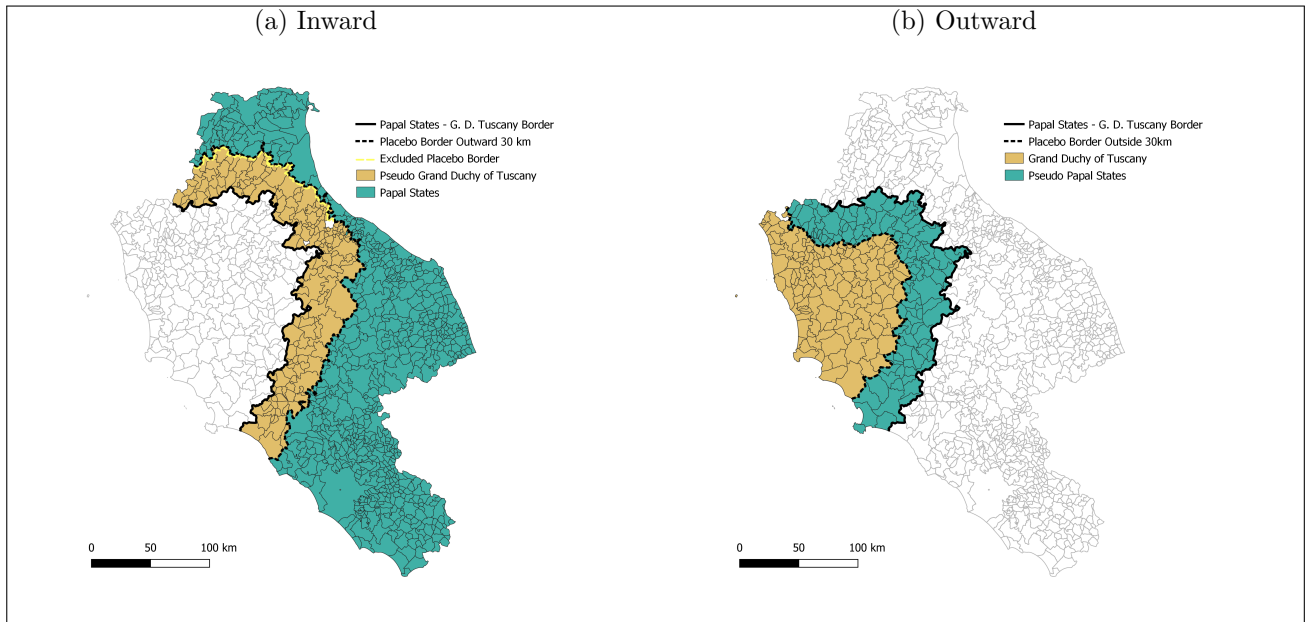
*Note:* The map in Panel (a) shows the borders between the Byzantine Empire and the Lombard Kingdom. Source: "G. Droysens Allgemeiner historischer Handatlas: in sechsundneunzig Karten, mit erläuterndem Text". Panel (b) shows the border between the Duchy of Spoleto and the Byzantine Empire, which we exploit for the estimates shown in [Table 3](#).

Figure D.2: Etruria province border



*Note:* The map shows the border of the Roman province of Etruria (dashed red line shows). The black line indicates the former border between the Papal States and the Grand Duchy of Tuscany. Source: Authors' elaboration based on data on Roman provincial boundaries from the Ancient World Mapping Center.

Figure D.3: Moving the border inward and outward Papal States



*Note:* The maps show the placebo borders used for the estimates reported in [Table 4](#). The solid black line represents the border between the Papal States and the Grand Duchy of Tuscany. The dashed lines show the placebo borders when we move the border 30 km inward and outward the Papal States.



## E Other tables and figures

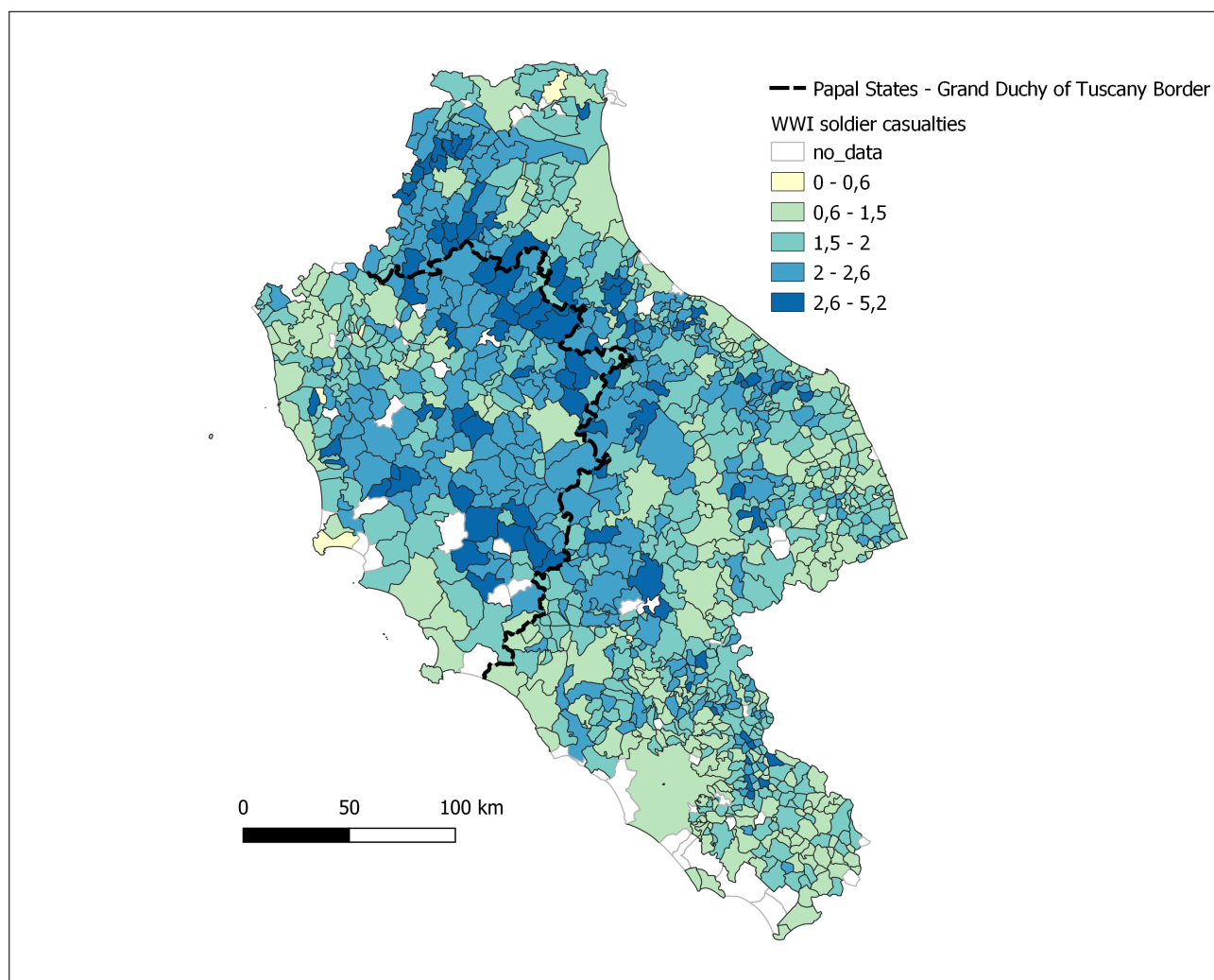
Table E1: Balancing of WWI soldier casualties

	(1)
	WWI soldier casualties
Papal States	-0.0325 (0.127)
Robust CI	[-.275 ; .337]
Robust p-value	0.843
Bandwidth	26.95
Observations	259
Mean Outcome	2.17
Border FE	Yes
Other Controls	Yes

*Note:* The table shows the RD estimates of soldier casualty rate during the World War I at the border between the Papal States and the Grand Duchy of Tuscany. See [Table C3](#) for a description of the variables. All estimations include the linear distance to the border and border fixed effects. All regressions are estimated with a triangular kernel and optimal bandwidth. Other controls include: altitude, seismic classification, precipitation, distance from Rome, and Roman roads. Conventional standard errors are reported in parenthesis. Significance levels: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Robust CI and Robust p-value refer to confidence intervals and p-value under robust inference as described in [Cattaneo et al. \(2020\)](#).

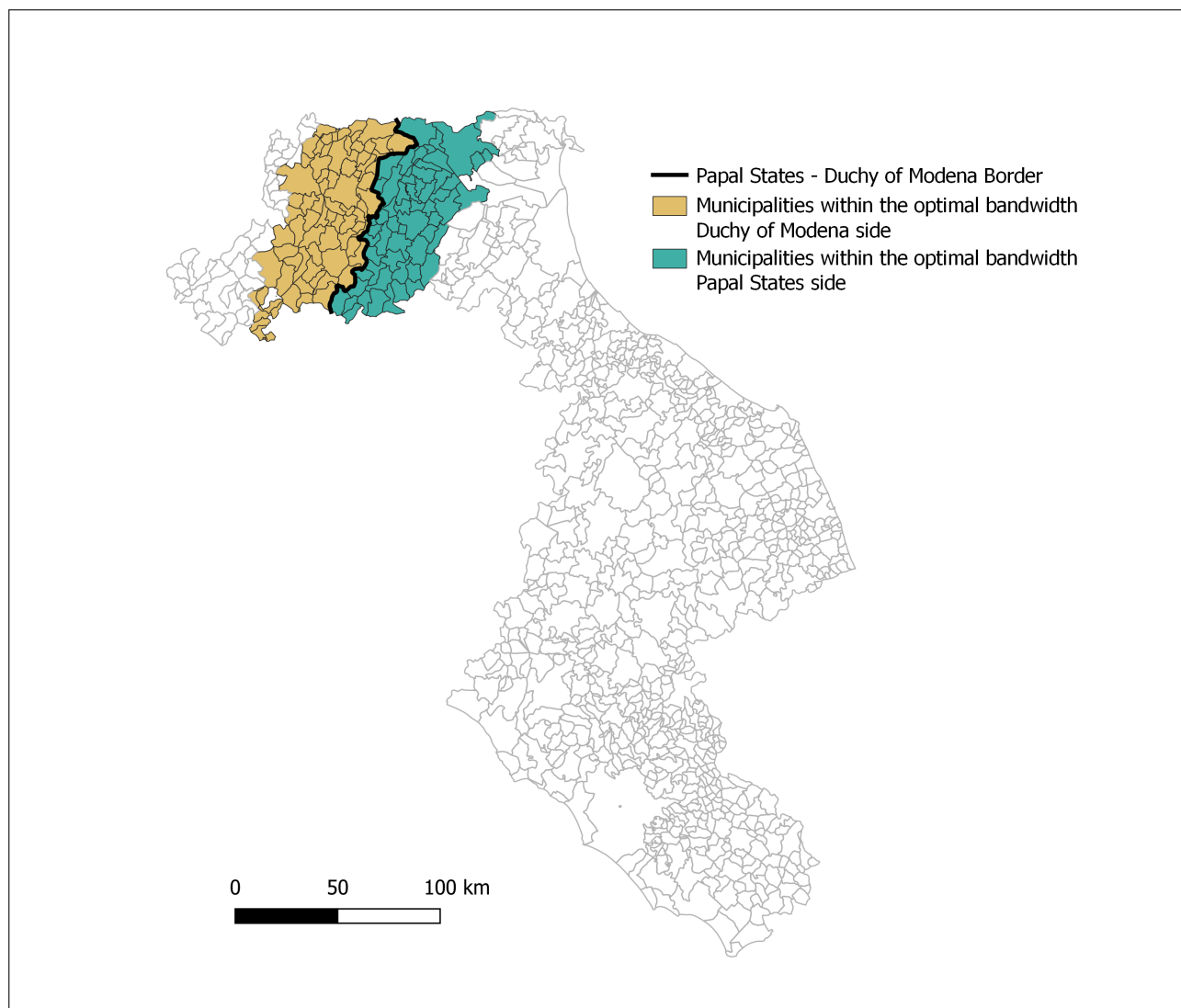


Figure E.1: WWI soldier casualties



*Note:* The map show the WWI soldier casualties. The black line represents the border between the Papal States and the Grand Duchy of Tuscany. Source: Istituto per la Storia della Resistenza e della Società contemporanea in provincia di Reggio Emilia (ISTORECO)

Figure E.2: Municipalities at the border between Papal States and Duchy of Modena.



*Note:* The map illustrates the border between the Papal States and the Duchy of Modena and municipalities within the optimal bandwidth when the outcome of interest is the female employment rate. Municipalities on the Papal States side are shown in green, while those on the Duchy of Modena side are depicted in yellow.