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PAPER

Title: Regional privileges? The Foral Taxation System and Education in Spain during the 19th and early 20th Centuries

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Abstract: *This paper engages in the historical determinants of education. During the 19th and early 20th centuries in Spain coexisted two different fiscal regimes, foral and common. In the territory under the foral system, state taxes were not applied, which led to a lower taxation burden. By exploiting this difference along the foral border, I explore if towns belonging to the foral system were able to locally provide more public schools and if individuals in these municipalities could reach a higher level of human capital formation. The results show that, despite a higher literacy level in foral towns in 1860, there was a decreasing impact of the foral tax system until 1920. Moreover, there was not a clear foral effect in the provision of schools in 1903. Thus, these results indicate that the school provision requirements that the Educational Law of 1857 imposed nationwide, were beneficial for towns under the common tax system, as it reduced the initial differences in local school provision, enhancing schooling and human capital formation in common towns.*

Keywords: *education, history, Spain, foral provinces, 19th century,*

JEL codes: N33, N93, H52, H75

Regional privileges? The *Foral* Taxation System and Education in Spain during the 19th and early 20th Centuries

Adrián Palacios-Mateo[1]

Abstract

1. Introduction

The factors that affected the historical evolution of education, both its provision (schools) and its output (literacy rates or the number of students), are still in debate. In economic history, inequality has been one of the key factors that have emerged to explain literacy or school provision differentials (Beltrán Tapia and Martinez-Galarraga 2018; Galor et al. 2009; Saaritsa and Kaihovaara 2016; Vollrath 2013). Moreover, the industrialization process, especially during the late 19th and early 20th centuries, has been described as an important factor in enhancing human capital formation due to the demand for skilled workers (Goldin and Katz 1998; Galor 2011; Galor and Moav 2004, 2006). Additionally, cultural factors such as religion played an important role in education during this period (Becker and Woessman 2009).

Nevertheless, it has been stressed that the development of modern Nation-States during the 19th was a key element in the expansion of education (Boli et al. 1985; Ramirez and Boli 1987). This literature argues that to create the idea of Nations and to secure the role of the new State apparatus, a standardized and homogeneous education should be provided to the population (Alesina et al. 2021; Bandiera et al. 2018).[2] This argument could be seen in Westberg et al. (2019), as in Europe, education laws that fostered mass schooling were mainly implemented under new Nation-States during the 19th century.

Following this literature, this study uses a spatial regression discontinuity design to compare nearby Spanish towns that belonged to the two different taxation systems, *Foral* and *Common*, that existed in Spain during the 19th and early 20th centuries. Thus, this analysis will shed some light on how legal and fiscal systems affected local education provision and the consequences of these systems on individuals' education decisions. In this regard, the Spanish case is particularly interesting because of these two different taxation systems that coexist until 1936, and also because public schools were provided

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[2] See also Weber (1976).

locally until 1902. The regression discontinuity design would show how *foral* and *common* town councils provided education, and how individuals behave under these different education provisions, and different taxation restrictions.[3] Thus, I argue that, as *foral* towns did not have to impose State taxes on their inhabitants, these municipalities could raise higher local taxes, leading to higher revenues and higher expenditures on public goods, such as schools. Moreover, the general (local and State) lower tax burden for *foral* inhabitants could be translated into higher private expenditures and savings, which could lead to higher demand and use of public goods.

Therefore, this paper explores how different tax systems, and their effect on town councils and population, affected human capital formation from two perspectives. Firstly, I study the relationship between local revenues and the provision of public education, trying to look at the determinants of the local provision of education. The results for the education provision in the early 20th century show that despite *foral* towns having higher local taxes than towns under the common tax system, there was no clear evidence pointing to a higher provision of public schools in *foral* towns. Additionally, *foral* municipalities did not have a higher probability to comply with the Educational Law of 1857 that issued nationwide the number of schools that town councils had to provide according to their population level. This indicates that local provision of public schools might be inelastic to the expansion of local revenues. Once the (legal) school provision was reached, income expansion due to *foral* privileges, more efficient tax collection, or a more complex tax system was independent of the number of schools already built and provided, as town councils might have other expenditure priorities.

Secondly, this study shows how the tax burden might affect human capital formation. As inhabitants under the *common* tax system had to face twice the tax burden of their counterparts in *foral* towns, this was reflected in education. Both males and females in *foral* towns were more educated than those living in *common* towns on the other side of the *foral* border from 1860 to 1920. Higher consumption taxes, the main income source for local and state governments, directly affected individuals, as a higher share of their incomes had to be transferred to taxes, reducing the expenditure on goods such as education. For instance, for low-income families facing higher taxes and therefore

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[3] Foral and common in italics will be used through the paper as the adjective describing those towns, provinces, territories, individuals or families that were in one of those two taxation and legal regimes in Spain.

higher budget restrictions, education might be considered a luxury good, as pointed out by Basu and Van (1998) and Fan (2011). Moreover, as primary education was only funded and provided by local authorities until 1902, the state taxes paid by the *common* population were not translated into local public education infrastructures. Thus, higher taxes in these towns were not *per se* related to more provision of education. Finally, the absence of taxes on private companies and industries in the *foral* towns during much of the period (until the early 20th century), could also affect the location of new industries and companies, affecting the local labour market. This would make *foral* towns attractive for skilled migrants as these companies might offer better remunerations.

Nevertheless, the positive *foral* effect on literacy rates decreased through the period. This might indicate that, besides the effect of taxes on individuals' decisions on education, an earlier difference in schools' provision was affecting the gap between *foral* and *common* towns. Before the Educational Law of 1857, the provision of schools for girls was not mandatory, and therefore only towns with the budgetary capability and willingness to provide it would do it. The huge gap seen in 1860 for female literacy rates between *foral* and *common* towns, indicates that the former were able to provide education for girls. However, the reduction in the gap, and the absence of education provision in 1903, after 46 years of the issue of the Educational Law, show that this Law was able to reduce the educational differences that the two different taxation systems created throughout the century.

The structure of the paper is as follows. Section 2 explains the historical background, giving a general overview of Spain, and a more detailed account of the *Foral* tax and legal system. Section 3 describes the data and the methodology used. Section 4 presents the results, while Section 5 concludes.

2. Historical Background

During the 19th century, European Nation-States were developing in parallel with the industrialization process (Magnusson 2009; Dincecco 2009; Cardoso and Lains 2010; Dincecco et al. 2011; Dincecco 2015).[4] The growth of state bureaucracy and national power in these industrialized and more complex societies brought about the provision of

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[4] This process started during the late 18th-century after decades of revenues from trading, followed by the incomes from the new industries, that allowed some countries to develop a modern state (Tilly 1990; Gennaioli and Voth 2015; and Cox and Dincecco 2021)

new public services such as sanitation or education (Lindert 2004; Durevall and Henrekson 2011).[5] For instance, during the 19th century, and especially in the second half of the century, European and American states passed nationwide education laws to establish mass schooling and improve the population's education (Westberg et al. 2019).[6]

During this period, Spain was behind other European countries on the transition to the modern Nation-State due to the persistent instability until the 1840s (Pro Ruiz 2019).[7] This lack of State formation during the first decades of the century made that the first liberal laws in the 1840s onwards, the municipalities were configured as the frontline institutions, as they were the only administrative body effectively present in the nation (del Moral Ruiz 2007, pp. 72-85; Pro Ruiz 2007, pp. 532-540). For instance, due to the lack of state civil servants and infrastructures, municipalities were in charge of collecting local and state taxes (Pro Ruiz 2007, pp. 539-541). This implied that the expansion, and efficiency of the State and its bureaucracy, were dependent on the capacity of the town council to collect and transfer taxes.

Furthermore, this lack of State capacity during the 19th century was not only reflected in public finances but also the provision of public services (del Moral Ruiz 2007, pp. 76-77).[8] For instance, the first Spanish Liberal Constitutions (1812) issued that municipalities had to fund with local revenues boys' primary education, which was confirmed by the Moyano Law of 1857, extending mandatory education provision for girls for the first time.[9] Despite the decentralized funding, the Law of 1857 established nationwide a series of requirements that had to be fulfilled by all Spanish municipalities. For instance, articles from 100th to 102nd established the thresholds of how many schools

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[5] For an analysis of the development and effects of the public sanitation development see García Gómez (2018), Harris and Helgertz (2019), Helgertz and Önnerfors (2019), de Looper et al. (2019), Peltola and Saaritsa (2019) or Chapman (2019).

[6] The expansion of education to an increasing number of people during the 19th and early 20th centuries is depicted by some authors as a complementary tool to the creation of the nation-state during this decades (Boli et al. 1985; Ramirez and Boli 1987; Hobsbawn 1990, pp. 80-92; Green 2013, pp. 115-169; Bandiera et al. 2018; and Alesina et al. 2021)

[7] Following the French invasion in the first decade of the century, the defeat of the Napoleonic troops brought back the *Ancien Régime* under Ferdinand VII in 1814, and it was followed by several coup d'états to restore absolutism or liberalism regimes, and the First Carlist War (1833-1840).

[8] This reliance of the State on towns for public services could be linked to the *Ancien Regime* (Ramírez Bernal 2017)

[9] This educational law would last with some modifications until 1970. Spain was not the only European State which had the primary education decentralized (for Austria, Cvrcek and Zajicek 2019; and for Italy, Cappelli and Vasta 2020).

the municipalities had to fund according to their population.[10] This law was complemented by the municipality's legislations, where primary education was established as one of the mandatory expenditures in the municipality's budget, among others such as the upkeep of local roads, street lightning or sewers.[11]

However, as the State's capacity increased and its ability to oversee and provide services increased, some of the decentralized public services were assumed by the central government (del Moral Ruiz 2007, pp. 117-154). This was the case with primary teachers' salary and teaching materials expenditure since 1902.[12] However, in Biscay, Gipuzkoa, Alava, and Navarre (the *foral* provinces from now on, and displayed within the red border in Figure 1) this centralization was not implemented until 1912.[13] This was due to the special financial agreement that these territories had with the Central Government. This relationship made those *foral* provinces able to develop a parallel regional treasury and fiscal system, in comparison to the centralization and development of the Nation-State that was taking place during the 19th and early 20th centuries in the provinces under the *common* law.
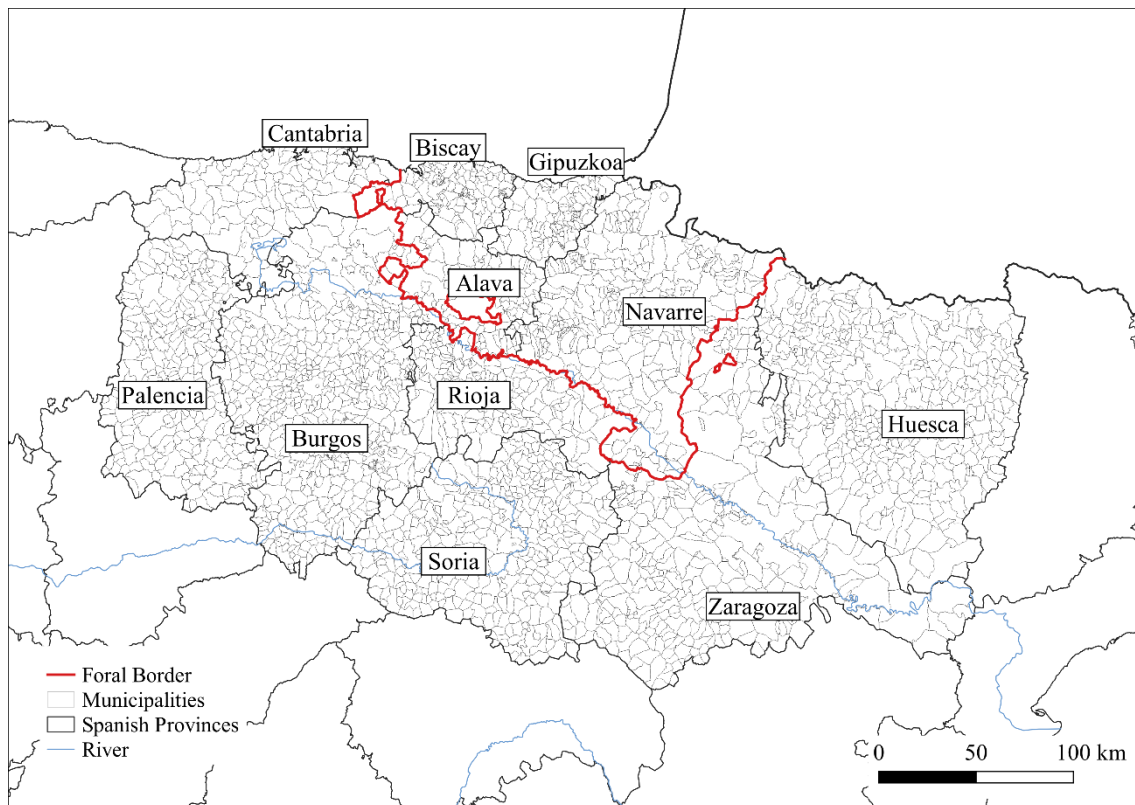
Figure 1. Foral Border and Spanish Provinces

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[10] For instance, article 100th said that all towns with a population of 500 had to have at least one school for boys and another for girls, in the next article with 2000 inhabitants the town had to fund 2 schools for boys and another two for girls (Ley de Instrucción Pública de 9 de Septiembre de 1857, Gaceta de Madrid, n. 1710., p. 2).

[11] For instance, in the Law of 1845 (article 93rd) or in the Law of 1877 (article 73rd), see Orduña Rebollo and Cosculluela Montaner (2008, p.699 and p.1033)

[12] In 1900 a Royal Decree centralized wages and other minor expenses from municipality to State's budget. However, it was not until the budget of 1902 that the transference took place (Real Decreto de 21 de Julio de 1900, Gaceta de Madrid, n. 204, p.319, 1900) (Real Decreto de 26 de Octubre de 1901, Gaceta de Madrid, n. 303, pp. 497-499, 1901). Despite this centralization, municipalities had to fund the maintenance of schools and the construction of new ones until 1920 (see López Martín ,1997).

[13] In the Royal Decree of 1901 that centralized education expenditures, Article 10° says that Biscay, Gipuzkoa, Alava, and Navarre were excluded from the application of this law (Ferrer y Rivero 1915, pp. 205-206). The centralization in the four provinces was implemented by the Law of December 30th of 1912 (Ferrer y Rivero 1915 p. 206)

Figure legend:
- Foral Border
- Municipalities
- Spanish Provinces
- River

Map labels: Cantabria, Biscay, Gipuzkoa, Alava, Navarre, Palencia, Rioja, Burgos, Huesca, Soria, Zaragoza

Scale: 0 — 50 — 100 km

2.1. Different Spanish taxation systems during the 19th century

The relationship between the new Spanish Liberal State in the 19th century with the *foral* provinces could be traced, following Grafe (2012, pp. 118-120), to the legitimacy of the Crown and its relationship with these territories in the 18th century. During this century the Bourbon kings had to swear to respect the local traditions and privileges that formed the Spanish kingdom in order to gain legitimacy before the population in these territories (Grafe 2012, pp. 127-128). This made that during the 18th century, the *foral* provinces enjoyed some legal freedoms. For instance, the *foral* regional governments could access the *pase foral*, a legal tool which allowed them to veto a national law that was against the *Fuero*, which was a series of regional laws and regulations similar to a constitution (Grafe 2012, pp. 125-126).

Therefore, with the advent of the Nation-State and the liberal governments during the early 19th century, this relationship had to be articulated within the liberal principles. However, the instability of the first decades of the 19th century made that *foral* provinces retain their legal and economic particularities. For instance, until the 1840s the regional government of the *foral* territories maintained the *pase foral* which allowed them to accept, reject or modify the new liberal state regulations (Agirreazkuenaga and Ortiz de

Orruño Legarda 1988, pp. 78-87; and Alonso Olea 1995a). For instance, the reform of the Spanish financial system during the 1840s was not fully implemented in the *foral* region, as new taxes were not introduced in these territories.[14] Moreover, until the mid-1870s these four provinces only contribute to the central government with a small periodical donation, which amounts to less than 1% of the total regional revenues collected by the four provinces in the 1860s (Agirreazkuenaga and Ortiz de Orruño Legarda 1988, p. 87).

However, after the defeat of the Carlists in the third Carlist war (1872-1876), who had important support in the *foral* territories, the political autonomy of the four provinces was repealed (Estecha y Martínez, 1902, pp. 95-97). Under the Bourbon Restoration, the Central Government established a new economic arrangement between the *foral* provinces and the State, trying to make the four provinces' financial contribution equal to the rest of the Spanish provinces. However, *foral* politicians, industrialists and the Regional Governments managed to obtain an arrangement that assured their economic autonomy, the *Concierto Económico* (Agirreazkuenaga 1987, pp. 533-564; Alonso Olea 1995a, pp. 82-83; and Estecha y Martínez 1902, pp. 251-260).

Under the *Concierto Económico*, *foral* regional governments had to collect a quota to cover the state budget. However, instead of a top-down process like with the other provinces, this amount was bargained between the central and *foral* governments periodically. This contribution had to be collected via the taxes that the central government ceded to the four provinces. Although the State retained some taxes such as mining royalties, or customs duties, the main taxes, such as the consumption tax, the tax over rural property and production, or the industrial and commercial tax were transferred to the *foral* governments (Alonso Olea 1995a, pp. 89-123). Moreover, it was not mandatory for the four regional governments to collect these transferred taxes, they just had to pay the bargained amount to the central government, which could be collected using whatever method they wanted (Estecha y Martínez 1902, pp. 251-260). This meant that some taxes were not effectively applied in these four territories, as these regional governments had other income sources. For instance, the regional government of Biscay did not implement the tax that charge the limited companies' benefits until 1911, although it was applied in Spain in 1900 (Alonso Olea 1995b).

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[14] See Alonso Olea 1995a pp. 79-81.

As it has been explained in the previous section, town councils were the institutions that collect state taxes, as the quota established for a certain province was divided among the municipalities in that territory. Thus, besides the local taxes, the population in the *common* provinces had to pay state taxes, also collected by local authorities. However, under the *Concierto Económico,* as most state taxes were not implemented, *foral* inhabitants were under less tax pressure. This could be seen in Figure 2, which represents the density distribution of the taxes collected per capita in 1887 for all the municipalities in two *common* provinces (Rioja and Palencia) and one *foral* (Biscay).[15] The results when comparing the two tax systems are clear. When only local taxes are considered (bold lines), the municipalities had a similar level of local taxes, with *foral* towns having a slightly higher average (12.3 pesetas/pc in comparison with 6.9 and 10.9 pesetas/pc in *common* provinces). This difference was reflected in the local expenditure per capita, displayed in Figure 3, as Biscay towns in 1887 spent more on public goods than their *common* counterparts.[16] Therefore, town councils were able to charge higher local taxes, making them also able to have higher expenditure on public services.[17]

However, Figure 2 also displays the effect of including state taxes in *common* provinces, represented in dashed lines.[18] When state and local taxes are included, the averages of both *common* provinces were more than twice the level with only local taxes (from 6.9 and 10.9 pesetas/pc to 21.5 and 24.2 for Palencia and Rioja, respectively). These state revenues, which were transferred to the State and accounted for 42.7% of the state income in 1887, imposed a burden that was not present in *foral* towns.[19] During a period

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[15] The data comes from the municipality archives of each Biscay town for the fiscal year 1887-1888, and from the *Boletín de Oficial de la Provincia de Palencia,* in the year 1887, numbers 166, 170, 202, 216, 277, 289, 50 and 76, for the fiscal year 1886-1887, and *Boletín de Oficial de la Provincia de Logroño,* year 1889, numbers 200 and 209, for the fiscal year 1887-1888. The only revenues that have been included are the rents from *propios* and *montes* (commons), which usually include fees on the use of the public slaughterhouse, or other public infrastructures, and taxes such as consumption taxes, or incomes from the tariffs on industrial and commercial activities.

[16] Only expenditure on town council (such as office materials), police and security, upkeep of public facilities (public buildings, streets, commons, street lightning, sewers…), public education and public charity are included.

[17] The Pearson correlation coefficient for the sample including all the municipalities in 1887 between taxes/pc and expenditure/pc is 0.7 statistically significant at 1%.

[18] Data for the quota that each municipality had to collect in *Boletín de Oficial de la Provincia de Palencia, jueves 4 de Junio de 1887, num. 278*, and *Boletín de Oficial de la Provincia de Logroño, martes 3 de Enero de 1888, num. 151.*

[19] Data from *Intervención general de la Administración del Estado- Teneduría de Libros. Balance correspondiente al ejercicio 1886-1887. Diario de Sesiones de Cortes de 3 de abril de 1888. Apéndice nº8, p. 169.*

when, according to the law, most of the public services were provided by local or regional institutions, these state revenues would not be directly translated into public services. In fact, most of the public goods provided by the State such as the army and navy, police (*Guardia Civil* and *Carabineros*), or customs, education and labour inspections were equally provided in *foral* and *common* provinces.[20]

Figure 2. Taxes per capita in 1887
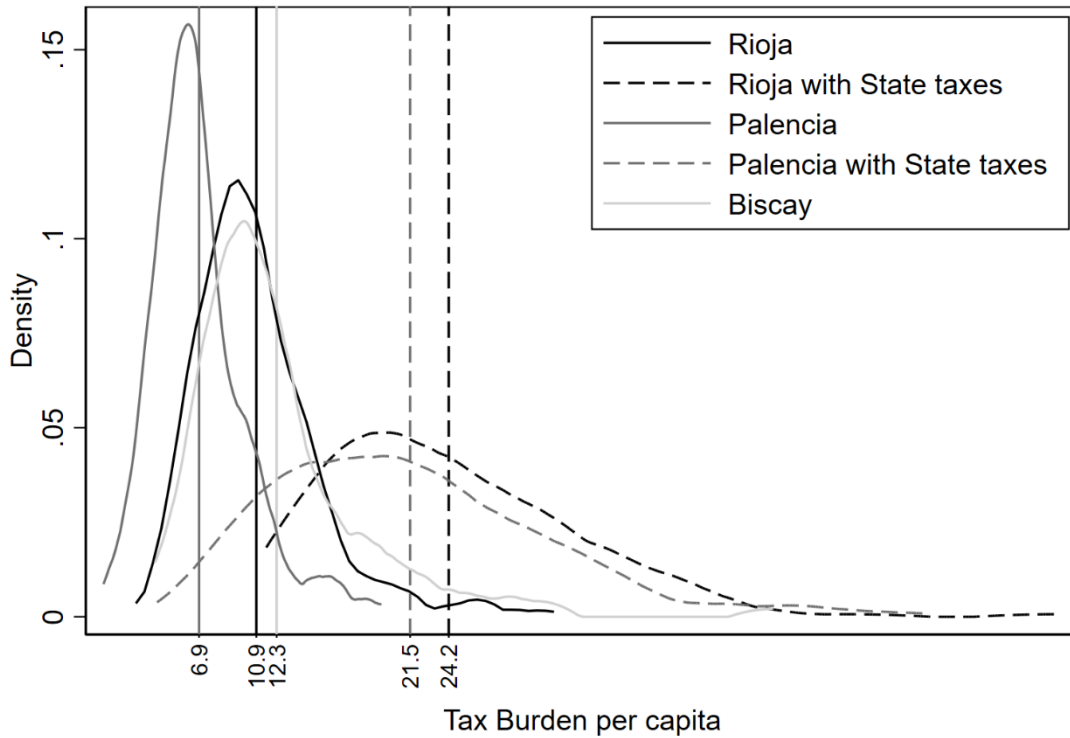
Note: spikes show means

Figure 3. Expenditure per capita in 1887

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[20] For instance, the Army and the Navy accounted for 22.1% of the expenditure in 1887 and they were also present in the *foral* region. Data from *Intervención general de la Administración del Estado-Teneduría de Libros. Balance correspondiente al ejercicio 1886-1887. Diario de Sesiones de Cortes de 3 de abril de 1888. Apéndice nº8, p. 169.*
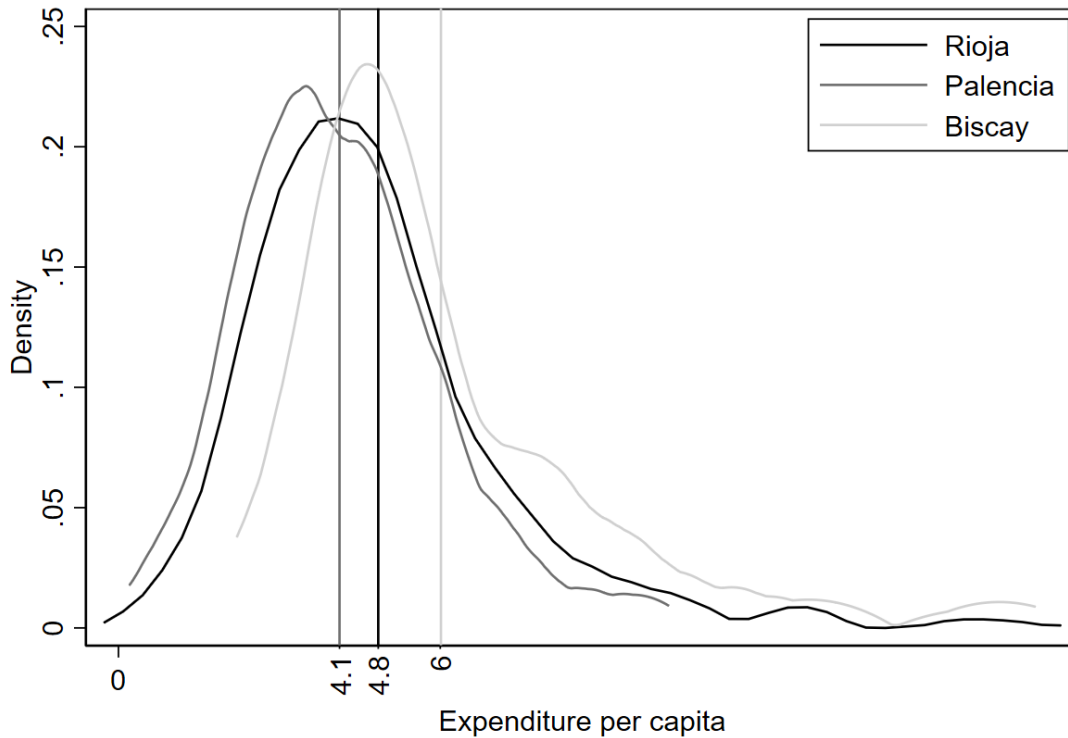
Note: spikes show means

Moreover, this difference in the tax system between *foral* and *common* municipalities had a direct effect on individuals. As Figure 2 shows, on average, each inhabitant of the *common* provinces had to pay twice the taxes as the *foral* population, which would have an impact on the budget and expenditure decisions made by individuals living under the *foral* and *common* tax systems. For instance, a male day labourer in the *common* provinces of Burgos or Palencia during the late 1880s, earning 1.5 to 2 pesetas per day, would have to work between 10 to 14 days each year to pay his taxes (both local and state).[21] However, a *foral* day labourer, earning the same daily wage, would have to work only between 6 to 8 days. These differences are exacerbated when families are analysed. Table 1 presents two hypothetical scenarios comparing *foral* and *common* families.

Table 1. Households and *Common* and *Foral* taxes

Family Members	Daily Earnings (ptas)[22]	Days Working		Yearly Earnings (ptas)	
Male Adult (Father)	2	200	300	400	600

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[21] Data from *Informción oral y escrita practicada por la Comisión de Reformas Sociales.*

[22] Wage data obtained for Palencia in the late 1880s from *Informción oral y escrita practicada por la Comisión de Reformas Sociales.*

Female Adult (Mother)	1	200	300	200	300
Male Young (Son)	1	200	300	200	300
2 Children (Offspring)	0	0	0	0	0
		Yearly Family Budget (ptas)		800	1200
Common taxes yearly paid/pc	21.5 ptas/pc	Total taxes yearly paid by Family in pesetas (% of family budget)		107.5 (*13.4%*)	107.5 (*9%*)
Foral taxes yearly paid/pc	12.3 ptas/pc	Total taxes yearly paid by Family in pesetas (% of family budget)		61.5 (*7.7%*)	61.5 (*5.1%*)

Assuming that in a five-member household both parents and the oldest children were employed, either in formal or informal jobs, and two children were not able to work, the different effects of the *foral* tax system on the household's budget could be seen in two different aspects. Firstly, in the last two rows, it can be seen that a *common* family paid as much taxes as a *foral* family of nine members would contribute.[23] Secondly, in order to dismiss the impact of taxes on family budget (around 10% of the budget in *common* families went to taxes) and reach the rate of *foral* families (around 6%), *common* families would have to send their other two offspring to work, in the case that they were able to do it. Assuming a wage of 1 daily peseta for the two children, this decision would decrease the share of taxes on family budget to 9% (working 200 days), or 6% (working 300 days). Although this decision would decrease the share of paid taxes, it would have a direct effect on the human capital formation of the two children, as their jobs might be incompatible with schooling.

This *foral-common* taxation difference was also affecting workers, companies, and property. Until the early 20th century most of the commerce, industrial and property taxes were not applied in *foral* territories. Additionally, once they were applied the levels were generally lower than in *common* provinces. For instance, in 1911 in Biscay, the rate imposed on the limited companies' benefits was 5%, whereas in Spain was 7% (Alonso Olea 1997). Thus, individuals and companies in *foral* territories had to face none or lower business and property charges than in *common* provinces. For instance, as the tax that charged industrial and commercial activities was transferred to the regional governments of Biscay, Gipuzkoa, Alava, and Navarre, but not effectively implemented, those living in *foral* municipalities did not pay this tax. Considering in 1911 a wholesale trader of steel living in Baracaldo (Biscay), the *foral* tax system made that she/he did not pay any contribution for her/his commercial activity. However, if the same trader would live in

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[23] Nine-members *foral* family would pay 110.7 pesetas (9*12.3).

Castro Urdiales, 25 km. away from Baracaldo, but in the province of Cantabria, she/he would have to pay annually to the central government 915.6 *pesetas* (Vila Serra 1911, pp. 126-128). To take into account this difference, the average primary teacher's annual salary in 1911 in Baracaldo was 1,300 *pesetas*.[24]

In conclusion, although the *foral* territories lost part of their autonomy after 1876, the new agreement with the Central Government (*Concierto Económico*), was beneficial for the *foral* governments and their inhabitants. The absence of state taxes allowed town councils to have higher tariffs and therefore more expenditure on local public services. Moreover, *foral* individuals and companies established in these territories faced a lower tax burden, which would allow them to have higher savings, expenditure, and consumption. This would have a direct impact on education. Higher expenditure capacity of town councils could derive into more and better public schools. Furthermore, a lower tax burden on families could mean more spending on education, or that fewer offspring were required to engage in the labour market at an early age, allowing them to attend school. Additionally, the location of companies in *foral* territories due to lower taxes could be translated into higher demand for skilled labour, or a higher variety of jobs, which could incentive households' human capital investment.

3. Data and Methodology

3.1. Data

In order to analyse the impact of the *foral* system on education, this article relies on local information for those municipalities that were close to the *foral* border. The availability of population and education information from 1860 onwards allowed me to retrieve municipal data for 1860, 1887, 1900, 1910 and 1920 from the population censuses, including information on male and female literacy levels, as well as on other demographic variables. Moreover, the issue in 1903 of a school census with information at the local level, permits to contrast the effect of the *foral* regime, not only on literacy rates but also in the provision of public schools, which were funded and provided by town councils.

Literacy. Population Censuses from 1860 to 1920

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[24] Data from the Baracaldo's municipality budget for 1911, expenditures budget, chapter IV, item 1, *Instrucción Pública, Personal* (Archivo Foral de Bizkaia, Archivo Administrativo, R-00732/01).

The population censuses provide information on the Spanish municipalities that existed from 1860 to 1920. The main variable of interest is the literacy rate, gathered for each municipality in the provinces of Biscay, Alava, Gipuzkoa and Navarre (*foral* region), and in Palencia, Cantabria, Burgos, Rioja, Soria, Zaragoza and Huesca (*common* territory). I also classified literacy by gender, representing the percentages of individuals who knew how to read and write in the total population of the municipality.[25] The use of the literacy rates for 1860, 1877, 1887, 1900, 1910 and 1920 by gender allows to have a deep understanding of the dynamics that the *foral* system could have before the *Concierto Economico* (year 1860 and 1877), during the economic autonomy period (1887, 1900 and 1910), and after the centralization of teachers expenditures in the *foral* territories (1920).

Figure 4 shows the literacy rates for males (left) and females (right), in 1860, 1900 and 1920, representing the four colours of the distribution in quantiles for each year and gender. In *foral* territory the distribution for males was similar in the three years, showing that there was not a clear tendency within this territory. The highly male literacy levels in Alava or north-eastern Navarre, contrast with the low rates of Gipuzkoa or northern Navarre. In fact, Navarre shows a high degree of heterogeneity as some parts were during all the period in the first quartile, while others were in the last one. In the *common* provinces, the pattern is somewhat clear. The two Aragonese provinces included presented lower male literacy rates throughout the period than the Castilian region, except for the municipalities in north-western Huesca.

Regarding female literacy rates, the three maps show a similar pattern in male literacy rates. Within *foral* territory, there was a significant heterogeneity, although it was less clear than for males as there were fewer *foral* towns in the last quartile. Thus, besides the clear spatial pattern and the gender gap that Figure 4 depicts, the maps show heterogeneity in literacy levels within *foral* and *common* provinces which might indicate that the *foral* system was not affecting human capital formation during this period.

As well as indicating the literacy level of the local population, the population censuses provide other relevant information. Population size is gathered from each census in order to account for the potential population dynamics affecting human capital

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[25] Although a better measure of the literacy rate would not use the whole population (as children too young to attend school are included in our rate), the census does not classify the population by age and literacy at the municipality level.

formation. Moreover, population density is also obtained to address potential effects that population size could not capture.

Figure 4. Quantile distribution of Literacy rates
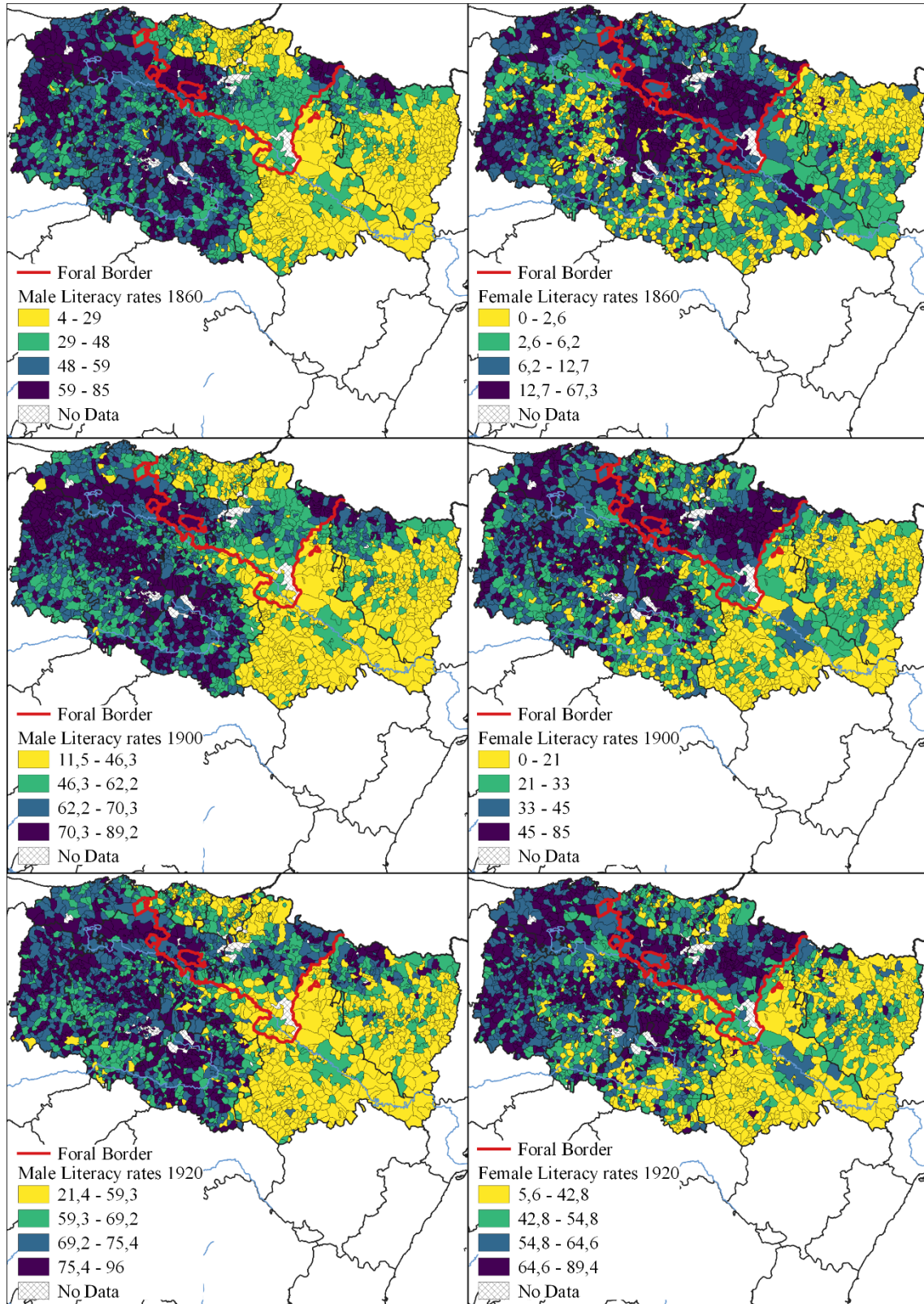
Public Schools. School Census of 1903

The second main variable of interest is gathered from the Schools Census of 1903 (*Censo Escolar de España llevado a efecto el día 7 de marzo de 1903, Tomo Primero*).[26] This volume was published in 1904 and recorded all the public schools that existed in March 1903.[27] Following the Education Act of 1857, the School Census recorded every public school that was funded totally or partially with public funds, religious or private charities.[28] Although only public schools were included in this Census, they represented more than 80% of the primary education provision during the period under study.[29] Therefore, this data records the importance, capacity and willingness of Spanish municipalities to fund primary education as local institutions were in charge of funding it until 1902.[30]

The information provided by the School Census is completed with the population census of 1900 to obtain the number of schools per 10,000 inhabitants in each town. Moreover, a second variable is created, taking the square root of the number of public schools, to harmonize it and to be able to compare without using population. Similarly, a third variable is created using the population thresholds that the Educational Law of 1857 established to indicate the number of public schools that a town council must provide. For municipalities below 500 inhabitants, only one school was required, between 500 and 2,000, the Law mandated the provision of at least two schools. Above 2,000 inhabitants, town councils had to provide two additional schools for every 2,000 people.

Figure 5 shows the number of schools per 10,000 inhabitants in each town, with the colours (except red) representing the quartile distribution. When comparing the male literacy rates in Figure 4 and the provision of schools in Figure 5, it seems clear that there was a correlation. Those regions, both within and outside *foral* territory, with the higher

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[26] Although it was meant to be more volumes with information about teachers or students, this information at was never published.

[27] Ferrer y Rivero (1915, pp. 205-212).

[28] It also includes the schools that were erected by private companies, as a law enacted in 1900 mandated industries to erect and fund schools if there was no easy access to other education facilities for the children of their workers (Ferrer y Rivero 1915, p. 18).

[29] In 1908 the official Statistics recorded that public schools were 82.7% of the tota schools in Spain (Anuario Estadístico de España, Año I.-1912, Primera Enseñanza, 1913 pp. 198-199).

[30] Nevertheless, in this year only public teachers' wages were centralized as construction and upkeep of primary public schools remained in charge of municipalities until 1920. Thus, a town without a school did not benefit from the centralisation, because it had to build a school before the central government would pay for the teachers' wages. Moreover centralisation was not implemented in Navarre and the Basque country until 1912; and as Azar and Espuelas (2021) showed, the government spending was politically influenced, thus, distorting the effects of the centralization process in the primary schools provision.

provision of public schools, were also in the higher quartile of male literacy. Moreover, and similar to literacy rates, within *foral* borders, there was a heterogeneous provision of public schools, with Alava and Central Navarre presenting the higher numbers.

Figure 5. Quantile distribution of Public Schools per 10,000 inhabitants
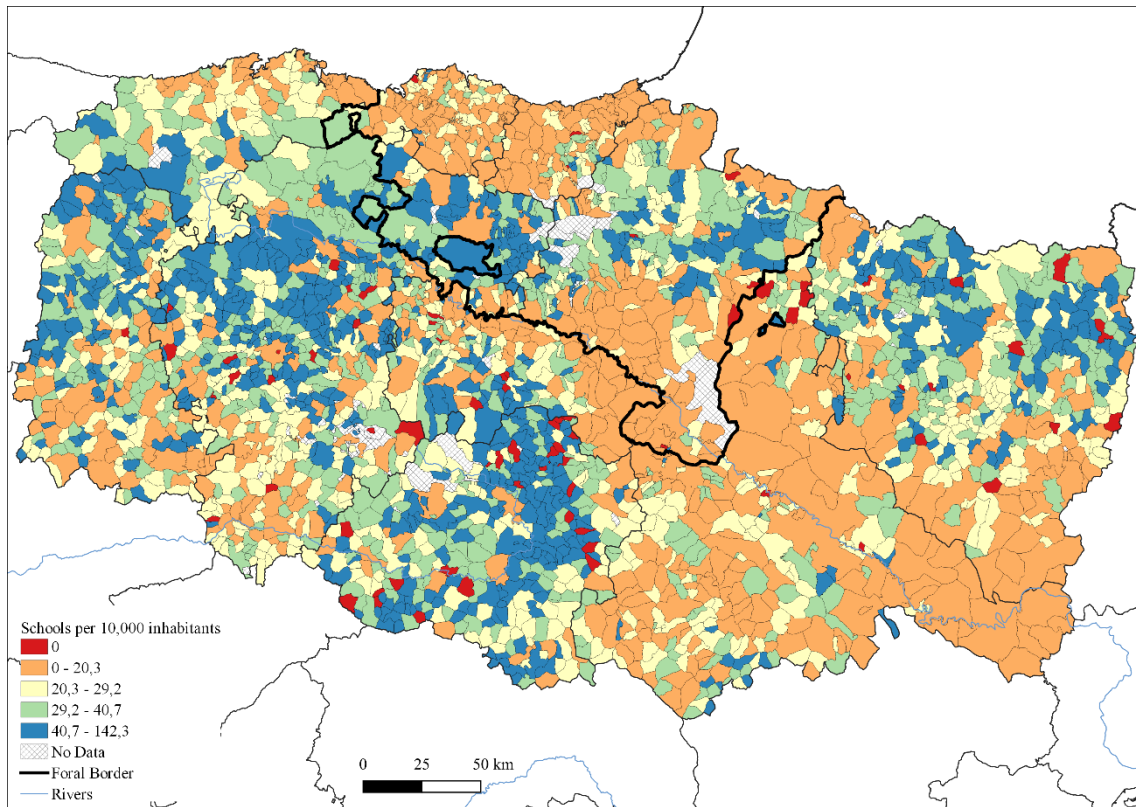
Descriptive Statistics

Table 2 provides the summary statistics for the main variables for the 11 Spanish provinces in Panel A. Nevertheless, Panel B reproduces the summary statistics for those towns that were at 20 kilometres to the *foral* border, which is the bandwidth used for the econometric analyses, as will be explained in the next section. In this subsample, as in the rest of the towns in the 11 provinces, there was an important improvement in literacy rates, despite the significant gender difference. However, some human capital indicators were higher along the border than in the rest of the territory. Female literacy was higher, or the average number of schools was higher in those towns close to the border, as well as the percentage of *foral* towns (around 40%). In opposition, the number of schools per 10,000 was lower in these municipalities, and the male literacy rates were slightly below the average for the whole region.

Table 2. Summary statistics

Panel A (whole sample)	N	Mean	SD	Min	Max
Male Literacy					
1860	2,566	44.6	17.5	4.1	85
1877	2,566	51.1	17.8	3.9	85.3
1887	2,566	54.3	16.8	6.5	90.2
1900	2,566	58.2	15.3	11.5	89.2
1910	2,566	61.3	14.5	11.5	90.5
1920	2,566	66.4	12.4	21.4	96
Female Literacy					
1860	2,566	8.9	8.5	0	67.3
1877	2,566	16.8	11.8	0	74
1887	2,566	23.3	13.1	0	81.6
1900	2,566	33.4	15.5	0	85.2
1910	2,566	42.6	17.5	1.6	98.4
1920	2,566	52.8	15.4	5.6	89.4
Foral (dummy)	2,566	.2	.4	0	1
Number of schools in 1903	2,566	2.1	2.5	0	58
Number of schools (sq. root) in 1903	2,566	1.3	.6	0	7.6
Comply with the Education Law in 1903	2,566	.9	.3	0	1
Schools per 10,000 inhabitants in 1903	2,566	32.4	18.5	0	183.5
Panel B (towns within 20km to *foral* border)					
Male Literacy					
1860	451	44.8	15	4.1	83.5
1877	451	50.3	14.6	14	85.3
1887	451	53	14	18.5	83.1
1900	451	56.6	13.2	21.4	89.1
1910	451	59.9	12.2	21.5	83.4
1920	451	65.7	10.8	22.7	93.7
Female Literacy					
1860	451	13.2	9.2	0	51.2
1877	451	21.3	11.2	0	56.4
1887	451	27.2	12.2	.6	64.6
1900	451	36.7	13.5	2.4	77.2
1910	451	45.3	14.1	2.7	86
1920	451	54.7	13.1	6.3	81
Foral (dummy)	451	.4	.5	0	1
Number of schools in 1903	451	2.6	3.3	0	43
Number of schools (sq. root) in 1903	451	1.5	.7	0	6.6
Comply with the Education Law in 1903	451	.9	.3	0	1
Schools per 10,000 inhabitants in 1903	451	28.6	16.6	0	99.5

3.2. Methodology. Spatial Discontinuity Regression

Following Dell et al. (2018), this study implements a discontinuity regression design in order to understand how the *foral* system might affect education. Moreover, as spatial correlation was present in the dependent variables under study (see Figures 4 and 5), I implement a spatial econometric model, following the approach to spatial discontinuity regressions used by Oto-Peralias (2020).[31]

The spatial discontinuity regression design, therefore, follows this specification:

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[31] An OLS model has been used obtaining similar results, although the spatial dependence makes the OLS coefficients not trustworthy. See Anselin (1988, 2003) for the spatial econometric model.

$$Educ_i = \alpha_i + \beta_1 Foral_i + \beta_2 Geographic\ location_i + \beta_2 segment_i + \rho W_D Educ_{i-D}$$
$$+ \beta_X X_i + \epsilon_i \qquad (1)$$

$$\epsilon_i = \sigma W_D \mu_{i-D} + v_i \qquad (2)$$

$$Comply_i = \alpha_i + \beta_1 Foral_i + \beta_2 Geographic\ location_i + \beta_2 segment_i + \beta_X X_i$$
$$+ u_i \qquad (3)$$

$$u_i = \sigma province + v_i \qquad (4)$$

Where in equation (1) the dependent variable *Educ* is the number of schools per 10,000 inhabitants in each town, the square root of the number of schools, or the literacy rate for each gender, female and male, depending on the specification. *Foral* is the variable of interest and takes 1 if the town *i* was in one of the four *foral* provinces. Additionally, following Dell et al. (2018) $Geographic\ location_i$ is the linear polynomial in distance to the *foral* border, and $segment_i$ represents the sector to which each town *i* belong. This variable emulates a fixed effect as the boundary has been divided into 25 kilometres segments in order to ensure that the model compares similar municipalities belonging to the same segment. Equation (3) reproduces the model but uses a Logit specification, as the dependent variable, in this case, *complying with the school provision*, is a dummy variable. For this equation, the error term is clustered by province.

The spatial analysis developed in equation (1) relies on different Spatial Weighted Matrix (W_D), where *D* represents the different thresholds in kilometres.[32] In particular, two elements characterise the spatial dimensions of the model. First, the model accounts for the spatial effect (coefficient ρ) that the literacy rates of neighbouring municipalities *i-D* exerted on the literacy rate of municipality *i*. As Figure 4 shows, there were important high and low literacy rate clusters; thus, this effect is expected to be statistically significant. Finally, this specification also accounts for a spatial error term, presented in

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[32] The W_D is constructed as follows, taking 25 kilometres as *D*: each municipality (observation) has a row, assuming our matrix with 2,566 rows, each row (municipality) has as many columns as municipalities (observations), again 2,566 columns, thus, our W_D is a 2,566x2,566 matrix. As the threshold is set at 25 km, each row/municipality will have each of its columns different from zero if that column (municipality/observation) is within 25 km of that row/municipality, then assuming the value of that column is 1/d, and d is the distance in kilometres. For example, let us say that between Town A and Town B there are 15 kilometres, and between Town A and Town C there are 30 kilometres. The values of the first row (corresponding with Town A) of W_D will be: zero, as between Town A and itself there is no distance; 1/15, as 15 kilometres is the distance between A and B; and zero, as Town C is farther than 25 kilometres way.

equation (2), that reflects spatial autocorrelation in the disturbance due to omitted variables. For both the dependent spatial effect (coefficient ρ) and the error spatial effect (coefficient σ), the threshold used for the W_D is 50 kilometres, following Ashraf and Galor, (2011) and Beltrán Tapia and Martinez-Galarraga (2018).[33]

Equations (1) and (3) also include X_i as a set of the following set of control variables: population (density and natural logarithms), speaking euskera, geographic variables (altitude, roughness and distance to major river), crops' suitability (using wheat, olive and potato), and distance to railroads. Thus, these control variables attempt to control for unobserved factors, that might be biasing the results.

The key assumption is that all relevant factors besides being *foral* change smoothly at the border. Figure 6 displays the coefficients of the *Foral* variable in equation (1), using altitude, roughness, wheat suitability, distance to a major river, average yearly temperature, and average yearly precipitations to check at which bandwidth *foral* towns were geographically different from *common* municipalities. The graphs show that there was a statistically significant difference between *foral* and *common* towns in altitude and wheat suitability when the sample is expanded to higher thresholds, and for all bandwidths in precipitations. Therefore, following these results, the bandwidth is set to 20 kilometres to the *foral* border.[34] Although *foral* towns seem to have more precipitations, this bandwidth will allow having a subsample of towns close to the *foral* border that were similar to each other, which together with the segment fixed effects, provide more robust results for the *Foral* variable.

Figure 6. Geographical check. Coefficients of *Foral*

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[33] I analysed the data with a distance matrix ranging from 25 to 200 kilometres, and the results were similar to those presented here for 50 kilometres. The only difference was that the coefficients for the error and dependent variable lags decreased from the minimum distance to the maximum distance, confirming that the spatial correlation (for both the error and the dependent variable) is weaker, as broader regions were taken into account (municipalities within 25 kilometres would affect each other at a higher level than municipalities within 200 kilometres).

[34] Nevertheless, bandwidths from 10 to 60 kilometres have been used getting similar results.
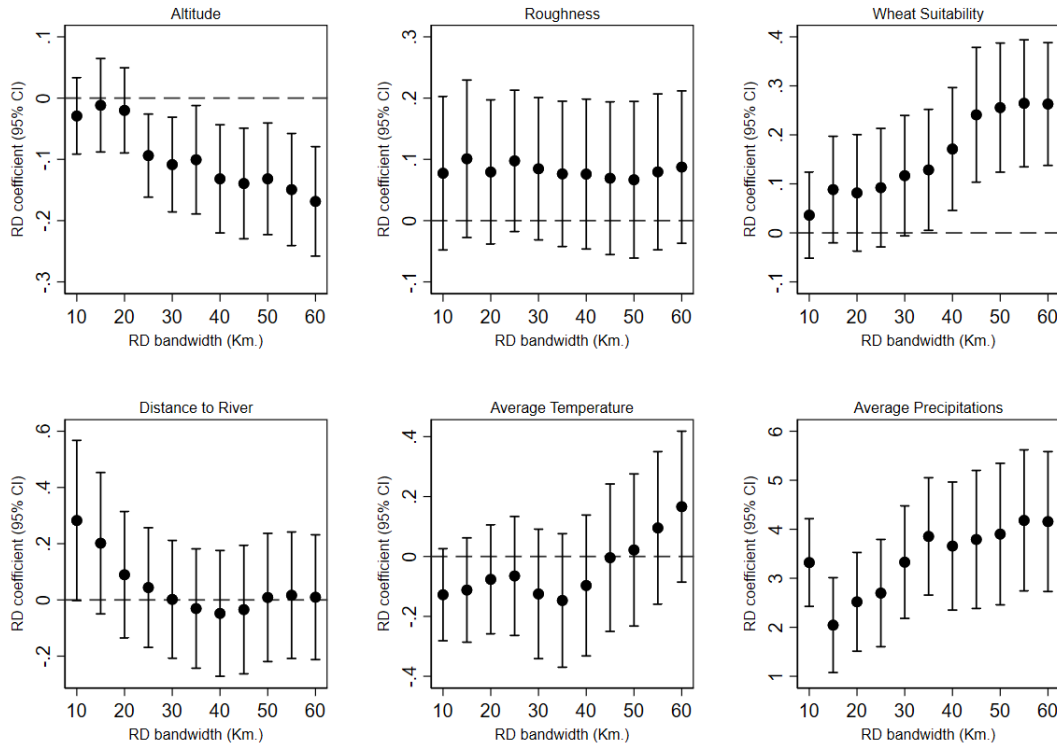
4. Results

This section examines the effect of the *foral* system on education through the 19th and early 20th centuries. Table 3 reports the results for equation (1), in the models from (1) to (14), and for specification (15), using equation (3). Panels A and B present the coefficients for female and male literacy rates respectively, while panel C provides insights into the *foral* impact on education provision.

Table 3. Foral Effects on Education

Panel A	Female Literacy Rates					
	1860	1877	1887	1900	1910	1920
	(1)	(2)	(3)	(4)	(5)	(6)
Foral	4.602***	5.644***	7.470***	9.179***	6.399***	6.553***
	(0.707)	(1.016)	(1.075)	(1.177)	(1.346)	(1.168)
Obs.	451	451	451	451	451	451
Pseudo-r^2	0.553	0.537	0.522	0.537	0.482	0.486

Panel B	Male Literacy Rates					
	1860	1877	1887	1900	1910	1920
	(7)	(8)	(9)	(10)	(11)	(12)
Foral	6.657***	5.872***	5.536***	6.277***	5.348***	4.409***
	(1.190)	(0.988)	(1.034)	(1.040)	(1.076)	(0.994)
Obs.	451	451	451	451	451	451
Pseudo-r^2	0.658	0.718	0.707	0.646	0.562	0.507

Panel C		Schools in 1903		
	Sq. Root Schools		Schools per 10,000	Comply with Law

	(13)	(14)	(15)
Foral	0.090*	2.498*	0.035
	(0.049)	(1.351)	(0.026)
Obs.	451	451	366
Pseudo-r^2	0.713	0.545	0.178

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The results for literacy rates show that considering the control variables, spatial correlation, and segment fixed effects, *foral* towns had significantly higher levels of education than *common* towns on the other side of the border, throughout the period under study. In panel A, there was an interesting evolution of the coefficient. During the 19th century, when *common* towns had to pay teachers' wages, *foral* municipalities seemed to increase their initial advantage from having 4.6 percentage points more literate women in 1860, to 9.2 in 1900. Nevertheless, considering the average female literacy in both years (in Table 2, panel B, 13.2% in 1860 and 36.7% in 1900), the overall effect decreases from 34.9% over the average in 1860, to 25.1% in 1900. In the following years, during the centralization of education expenditures, the *foral* coefficient decreases, and by 1920 *foral* towns "only" had a female literacy rate 12% higher than the average. A similar pattern could be seen in male literacy rates. *Foral* towns had on average a literacy level 14.9% higher in 1860, however, by the turn of the 20th century this advantage had decreased to 11.1%, and in 1920 it was 6.7%.

Despite the diminishing *foral* effect on human capital formation, it is clear that *foral* towns had significantly higher literacy rates than *common* towns throughout the period. The absence of state taxes allowed men and women who lived in the *foral* territory to have a higher share of the budget for their own consumption. Thus, families might rely less on extra incomes coming from children, allowing them to attend school. The results seem to point out that this was particularly important for women. As there was a less clear relationship between getting a better job for literate women than for literate men, families in *common* towns might decide to send their daughters to work to get an extra income, keeping their sons at school, neglecting the education of the former.

In contrast with the positive results for literacy rates, education provision seems to not be clearly affected by the *foral* system. The *Foral* coefficient is only statistically significant for the number of schools (both measured by the squared root and per 10,000) at 10%, and in the Logit regression in model (15), the *foral* towns had no higher probabilities to comply with the law. This indicates that, by the early 20th century, towns

on both sides of the border provided a similar quantity of local public education. Despite *foral* towns might have higher local taxes than *common* towns, the legal requirements, which were common to all towns in Spain, seem to positively affect *common* towns.

Although there is no local information on the school provision prior to the approval of the Educational Law of 1857, the results for literacy rates and school provision seem to point to a smoothening of the educational gap between *foral* and *common* towns through the period. The diminishing of the literacy gap, and the absence of a clear difference in education provision, might indicate that by 1860, the *foral* system was a clear advantage for this territory in human capital formation. However, as the Educational Law of 1857 obligated towns to provide education, for males, and females for the first time, through the rest of the 19th century, *common* towns seem to increase their education provision to comply with the Law. Thus, the increasing provision of local schools in *common* towns might be a factor in the decreasing effect of the *foral* system seen in literacy rates.

In conclusion, despite that, a higher tax burden might have an impact on education decisions within *common* households, the imposition of a common standard level of school provision for men and women in all of Spain since 1857 played in favour of the initially less educated *common* inhabitants. Although the differences were still present in 1920, probably due to the effects of the decentralization of school provision and the effects of the lower tax burden in *foral* towns, *common* towns managed to close the gap with the other side of the border.

5. Conclusion

Using a spatial discontinuity regression design, this paper tries to disentangle the determinants of education from a historical perspective. The *foral* border in Spain, which divided the country into two different taxation systems, allowed me to assess how fiscal factors and educational laws affected education provision and demand. *Foral* inhabitants had to bear fewer taxes, as state tariffs were not applied in this territory, which allowed them to have higher spending and savings than *common* individuals. Moreover, *foral* town councils were able to have slightly higher local taxes than *common* towns, as their population only had to pay local taxes. Therefore, as most of the public services were provided at the local level, *foral* towns, with higher revenues, could have higher expenditure on these public goods.

The results of this study add to the literature that explores the historical factors of education formation, such as Becker and Woessman (2009), Beltrán Tapia et al. (2021), or Cappelli and Vasta (2020), by expanding the understanding of how decentralized public services, but with a common standardized regulation, and different taxation systems could affect provision and demand for education. Following the exploration into the education decision making within town councils in Westberg (2017), this paper shows that education provision was independent of the local revenues system. A nationwide Educational Law which mandated the number of schools that had to be provided according to the population levels was more important than the potential income benefits of the *foral* system. Thus, despite education having to be funded by town councils with local revenues, the absence of an advantage in *foral* towns depicted in this paper, indicates that legal obligations might be more important for education provision.

Regarding individuals' decisions, and the demand for education, this paper shows that budget constraints were an important factor in human capital formation. The higher tax burden in *common* towns led low-income families to rely on extra-incomes from formal and informal family labour. Nevertheless, the increasing provision of schools in *common* provinces fostered education formation, which indicates that, besides individuals' demand determinants, access to schools was essential to human capital formation.

However, this paper has at least two pitfalls. Firstly, education provision has been only studied for one year, which severely restricts the analysis of the evolution of the *foral* effect through the period. For instance, the initial advantage in literacy rates could come from a higher provision of public schools due to higher local revenues for *foral* town councils. This initial advantage could be reduced in *common* towns throughout the century in parallel with the development of the Nation-State during the second half of the 19th century and the increasing importance and efficiency of schools or tax inspections. Therefore, the inclusion of other years, around 1860 and 1920, could shed some light on the evolutionary effect of the *foral* system as seen in literacy rates. Secondly, literacy is not a perfect measure for the measurement of the individual or family's demand for education. For instance, school attendance could be a better measure both for child labour and the value that families gave to schooling.

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