Extractive Taxation and the French Revolution*

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Abstract — We study the fiscal determinants of the French Revolution, exploiting plausibly exogenous variation in the incidence of the salt tax—one of the most extractive institutions of the *Ancien Régime*. We first implement a Regression Discontinuity design (RDD), and find that revolts against the monarchy were both larger and more frequent where the salt tax was higher. These effects already appeared in the 1750s, but became stronger over time, peaking in the 1780s. Then, combining the RDD with temporal and spatial variation in weather shocks, we document that the effects of extractive taxation were amplified by wheat price increases. In the second part of the paper, we connect our results to the French Revolution. First, we show that riots spread across space through a process of contagion. Second, we provide evidence that areas burdened by a higher tax rate reported more complaints against taxation in the list of grievances collected by the king in the spring of 1789. Third, we document that newly elected members of the National Assembly representing areas with a higher tax burden were more likely to vote to overthrow the monarchy and sentence the king to death.

Keywords: Extractive taxation, regime change, French Revolution, state capacity.

JEL codes — D74, H20, H31, O23

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"The Old Regime [. . .] perished because its tax system struck only the inferior classes."

— Norberg (1994), p. 256

1 Introduction

A longstanding idea in the historical literature is that extractive taxation was a prominent cause of the French Revolution (Norberg, 1994).[1] The fiscal system of the French *Ancien Régime* placed disproportionate burdens on the peasantry, while exempting the nobility and the clergy. Extractive taxation, together with the lack of public goods provision, deepened popular resentment and eroded the legitimacy of the monarchy. Mounting fiscal pressure and soaring grain prices fueled citizens' discontent. By the summer of 1789, widespread riots against the French monarchy had exploded. Despite its prominence, to the best of our knowledge, no systematic evidence exists on the hypothesis that extractive fiscal institutions were an important determinant of the French Revolution.

In this paper, we seek to fill this gap, exploiting geographic variation in the incidence of the *gabelle du sel* (or, the salt tax), one of the most "iniquitous institutions of the *Ancien Régime*" (Sands and Higby, 1949). First introduced as a temporary measure in the mid-13th century, and then made permanent one century later, in 1780 the salt tax accounted for about 22% of the royal revenues (Touzery, 2023). The salt tax varied across regions, along 22 different tax borders—creating large and long-lasting discontinuities in tax rates. Because public goods provision was minimal and centered around royal prerogatives, such as national defense and justice, a higher tax burden did not correspond to higher redistribution.

Leveraging the sharp discontinuities in tax borders, we test whether municipalities subject to a higher salt tax experienced a higher number of revolts against the monarchy in the years leading up to the French Revolution. We retrieved and geolocalized data on all historical salt tax borders from the Digital Archives of the National Library of France, which we cross-referenced with newly hand-collected information on the salt tax rate prevailing in each jurisdiction on the eve of the French Revolution. We combine these data with a comprehensive dataset assembled by Chambru and Maneuvrier-Hervieu (2024) that provides a fine-grained localization of uprising events before, during, and after the French Revolution.

We deploy a non-parametric Regression Discontinuity (RD) approach with optimal bandwidth and polynomial order selection following Calonico et al. (2014) around the salt tax borders.[2]

[1] For a detailed discussion of the multifaceted causes of the French Revolution, see Lefebvre (1951); Ladurie (1971); Lefebvre (1973); Shapiro et al. (1998); Neely (2008) among others.

[2] Proximity to the border is derived using the optimal bandwidth selection strategy proposed in Calonico et al. (2014, 2020).

We find that crossing the salt tax border leads to a discontinuous increase in the number of riots. The effects of the salt tax appear already in the 1750s, but grow over time, peaking in the 1780s. According to our estimates, crossing the border from a low to a high tax municipality increases riots by 17% of a standard deviation. Crossing the tax border also increases the probability that at least one riot occurs and leads to events that, on average, involve a larger number of participants. Decomposing riots into different categories, we find that results are driven by tax-related riots. Instead, the salt tax does not lead to changes in riots related to other domains—such as food scarcity or labor conditions.

Results are robust to a large number of checks. First, we document that the sample of municipalities around the tax border is balanced along several variables. Via extensive balance tests, we formally show that local characteristics (such as altitude, presence of a river, presence of Roman or 18^{th} century infrastructure, soil fertility) vary smoothly around the salt tax borders. Second, we perform a placebo exercise to verify that there are no changes in riots when redrawing "artificial" borders, just a few kilometers away from the actual ones. Third, we present both qualitative and formal evidence that the salt tax borders do not systematically overlap either with other administrative borders or with other features that might directly impact citizens' propensity to protest (such as ancient Roman or religious borders, provincial boundaries, etc.). For each salt tax border, we describe the process that led to its placement and perform robustness tests by alternatively excluding borders with similar origins. Reassuringly, our results are not driven by any specific border or any specific origin type. Fourth, we replicate the analysis including different controls and degree polynomials, using alternative bandwidths, and implementing a "global approach." Finally, we show that results are unchanged when excluding riots related to smuggling. This is important to rule out concerns that our estimates may pick up the effects of the government's attempts to curb illicit salt smuggling—something that increased conflict between the citizens and the state (Davoine et al., 2024).

The salt tax was in place for centuries, and, by the 1780s, areas burdened by a higher salt tax were less developed (Giommoni and Loumeau, 2022). One may thus wonder if we are capturing the direct effects of extractive taxation or, instead, its indirect effects, mediated by the fact that citizens were poorer where the salt tax was higher. Note that, even if we were partially capturing an income effect, our main interpretation would still hold: citizens may oppose the state and extractive taxation because of extrinsic motivations. However, to reduce concerns that our estimates entirely reflect the impact of the salt tax on economic development, our baseline specification controls for 1780 municipality population—the best, though admittedly imprecise, proxy for economic development at the time.

To further address the potential concern that our estimates may be entirely driven by the

negative effects of the salt tax on economic development, we leverage time and spatial variation in wheat prices. During the 1780s, a series of droughts destroyed the harvest, and led to a significant increase in wheat prices. This, in turn, generated widespread discontent and triggered riots throughout France (Lefebvre et al., 1947; Waldinger, 2021). Using local weather shocks as an instrument, we augment the baseline RD model by interacting (instrumented) wheat prices with the gap in the salt tax rate between bordering municipalities. This approach allows us to control for municipality fixed effects, thereby absorbing any municipality time-invariant feature, including economic development.

In a first step, we show that weather shocks—in particular, higher than average temperatures in the growing season—lead to higher wheat prices. Then, we document that higher wheat prices trigger more riots in municipalities historically burdened by a higher salt tax, as compared to neighboring municipalities subject to the same wheat price increase but on the "lower side" of the tax border. According to our estimates, comparing a high-tax to a bordering low-tax municipality (exposed to the same price shock), a 10% increase in wheat prices increases riots by 9% of a standard deviation.

These results may also help explain why, even though the salt tax had been in place for centuries, its effects on popular protests intensified after 1780. By then, France had entered a political and economic crisis, due to the confluence of multiple factors, such as an extractive and inefficient taxation system, the growing need to finance military expenses, and the spread of the Enlightenment (Kaiser and Van Kley, 2010; Touzery, 2023). Our findings suggest that negative economic shocks re-activated and amplified citizens' opposition to the regime, which had been fed by centuries of extractive taxation. This is consistent with the literature on the French Revolution (Neumann, 1977; Lefebvre, 1983; Neumann and Dettwiller, 1990; Waldinger, 2021), and resonates with the evidence presented in other settings on how sudden economic or cultural shocks may re-activate latent attitudes or ideology (Voigtländer and Voth, 2012; Cantoni, Hagemeister and Westcott, 2019; Fouka and Voth, 2023).

While the riots of the 1780s eventually culminated in the French Revolution (Chambru and Maneuvrier-Hervieu, 2024), the results described thus far do not allow us to directly link the salt tax to the fall of the *Ancien Régime*. In the second part of the paper, we seek to make progress on this issue. First, we apply techniques commonly used in statistics and machine learning to define clusters of events that were geographically and temporally close to each other.[3] We show that these clusters were larger where the salt tax was higher, and that otherwise similar

[3]Formally, we make use of BDSCAN (Density-Based Spatial Clustering of Applications with Noise). This is a clustering algorithm that identifies arbitrarily shaped clusters, naturally isolate outliers (i.e., "noise"), and avoid the need to specify the number of clusters in advance.

riots diffused more quickly and to a larger extent across municipalities subject to a higher salt tax. We further document that "super-spreader" events (i.e., riots that were followed by a large increase in riots in the surrounding areas) were more likely to originate in municipalities subject to a higher salt tax.

Second, we leverage historical information from the *cahiers de doléances* (literally the "lists of grievances"). Between January and April 1789, the King asked the nobility, the clergy, and the Third Estate to collect the list of grievances concerning any topic related to the public sphere broadly defined. These were aggregated to the *bailliage* level, and then transmitted to Paris during the *États Généraux* of May 1789.[4] We use data from Shapiro et al. (1998) to obtain the number and type of grievances submitted by the Third Estate at the *bailliage* level. Estimating cross-sectional regressions, we document that areas burdened by a higher salt tax rate expressed more complaints against taxation, and the salt tax in particular. Due to their correlational nature, these results should be interpreted with some caution. However, they complement our main findings by providing more direct evidence on the link between extractive taxation and citizens' discontent at the onset of the French Revolution.

Finally, we collected data on newly elected members of the *Assemblée Législative* (the legislature of the Kingdom of France from October 1, 1791, to September 20, 1792) from the National Assembly's archives. Estimating individual-level regressions, we test whether exposure to the salt tax in the region of origin predicts legislators' political leaning during and after the French Revolution. We find that members of parliament (MPs) who represented areas subject to a higher salt tax were more likely to support the abolition of the monarchy. Moreover, using newly digitized data on the votes cast in January 1793 by members of the *Convention Nationale*, we document that legislators originating from high salt tax regions were more likely to support the death penalty for the French King.

Our paper is related to different strands of the literature. First, a vast historical literature has explored the causes of the French Revolution (Tocqueville, 1856; Marion, 1921; Lefebvre et al., 1947). Recent work in economics has shown that weather shocks triggered social conflicts in pre-industrial France and during the Revolution (Furet, 1981; Chambru, 2019; Waldinger, 2021) and that exposure to the American Revolution increased support for the French Revolution a decade later through a process of ideological transmission (Jha and Wilkinson, 2023; Ottinger and Rosenberger, 2023). To the best of our knowledge, our paper is the first to provide systematic evidence on the hypothesis proposed by Marcel Marion that "The Old Regime [...] perished

[4] During the *Ancien Régime*, the *bailliage* (in the north of France) or *sénéchaussée* (in the south) referred to a local administrative, financial, and judicial district—just above the parish. In 1789, France had 435 *bailliages* (Gay et al., 2024).

because its tax system struck only the inferior classes" (Norberg, 1994).[5]

Second, our results complement the literature on state capacity. Several papers have documented the importance of mass warfare for the rise of modern nation states and their ability to collect tax revenues (Tilly, 1990; Gennaioli and Voth, 2015; Stasavage, 2016). Others have linked the development of efficient taxation systems and the implementation of inclusive policies to state capacity, showing that the latter promotes economic growth (Besley and Persson, 2010; Cantoni, Mohr and Weigand, 2019; Chambru et al., 2021). However, not all state-building experiences have been successful. Related to our paper, Davoine et al. (2024) show that, when the French monarchy cracked down against illicit salt smuggling in the 1740s in an attempt to raise tax revenues, violent revolts erupted. Unable to to set up effective taxation systems, weak states may engage in rent-seeking behavior, levying extractive taxes—such as the salt tax—to maximize short-term revenues (Besley and Persson, 2009). Extractive taxation may erode the legitimacy of the state, induce citizens to withdraw their support, and eventually lead to the fall of the regime. This idea goes back to the notion of the "social contract" proposed in moral and political psychology (Locke, 1690; Rousseau, 1762; Hobbes, 1651), and has been discussed in several important works in history and political science (Tilly, 1985; Levi, 1997). To the best of our knowledge, ours is one of the first papers in economics to provide formal and systematic evidence in support of this idea, focusing on the French *Ancien Régime*—an archetypical example of a weak and extractive state.

Finally, we complement the literature on institutional change and regime transition. Acemoglu and Robinson (2000) argue that the elites extend the franchise as a commitment for redistribution, under the threat of a revolution. Other papers have linked the emergence of democracy to broader trends in economic development (Lipset, 1959) as well as to negative economic shocks (Huntington, 1993; Gasiorowski, 1995; Brückner and Ciccone, 2011). We complement these papers by documenting that, consistent with Acemoglu and Robinson (2000), if the elites do not democratize when the revolution threat binds, the regime may be overturned by violent revolts. More broadly, our work provides evidence of the fiscal determinants of regime change and revolutions.

The remainder of this paper is organized as follows. Section 2 describes the historical background. Section 3 presents the data. Section 4 presents main results on the effects of extractive taxation on riots. Section 5 provides evidence on the link between the salt tax and the French Revolution. Section 6 concludes.

[5] A large literature has also examined the economic consequences of the French Revolution (Acemoglu et al., 2011; Squicciarini and Voigtländer, 2016; Chambru et al., 2021; Giommoni and Loumeau, 2022; Loumeau, 2023).

2 Historical background

2.1 Fiscal institutions during the Ancien Régime

Before the Revolution, the French monarchy raised approximately 80% of the royal revenues through taxes, while the remaining 20% came from the royal domain (about 7%) and tariffs (about 13%). Direct taxes included the *Taille*, the *capitation*, the *vingitème*, and the *dixième*; indirect taxes consisted of the *Gabelle* (i.e., the salt tax), *taxes on goods* such as tobacco, a *stamp tax*, and the *octroi*. Representing 12% of revenues in its early years, the salt tax became more important over time, accounting for as much as 22% of total revenues during the 18th century. The rising importance of the salt tax was due to two factors. First, the level of direct revenues from the royal domain remained stable over time. Hence, as the Kingdom expanded geographically and prospered economically, the relative share of the royal domain in the overall Kingdom budget diminished. Second, salt consumption increased between the 13th and the 18th centuries, as both the population and the economy grew. Figure A1 displays the decomposition of royal revenues over time from the 13th century to the French Revolution.[6]

Representing about 2% of the population, the aristocrats and the clergy were often exempted or offered preferential treatment when facing taxes. These exemptions were a source of frustration for the Third Estate (i.e., the remaining 98% of the population). Figure A2 shows a popular caricature from 1789 representing the hard-working Third Estate carrying both the nobility and the clergy on its back. The first item mentioned in the pockets of the nobility is "sel et tabac" (salt and tobacco). The legend reads "A faut espérer q[u]'eu jeu là finira b[i]entôt" ("Hopefully, this game will be over soon"). This echoes Norberg (1994)'s idea that the extractive tax system in place was an important driver of the French Revolution.

The administrative division of the *Ancien Régime*, largely inherited from Roman and medieval institutions, was complex. A key feature of the system was that different administrative entities with non-overlapping boundaries fulfilled state functions at the local level (e.g., raising royal or church taxes; administering justice; etc.). Public goods provision was minimal, and revenues raised by the Crown through taxes were used for traditional royal prerogatives—military, monetary, justice, infrastructure, and police—which were either uniform or varied smoothly across space. A complete description of *Ancien Régime*'s administrative functions is beyond the scope of this paper. In the interest of space, in the next two sections, we focus on the institutions governing the salt tax. For a more comprehensive description, see also Nordman et al. (1995).

[6] See Touzery (2023) for further details.

2.2 *The salt tax: An extractive form of taxation for 550 years*

The *Gabelle du Sel*, or the salt tax, was first introduced as a temporary tax in 1246 by Philip IV the Handsome to finance crusading ambitions in the Middle East.[7] The initial motivation for the tax was that the non-crusading peasantry would participate in this "holy enterprise" by providing financial support. In 1318, aware of "the displeasure they cause our people," French King Philippe le Bel published an *ordonnance* (displayed in Figure A5) to reassure the public about the temporary nature of the salt taxes:[8] *"Firstly, regarding the fact that our subjects doubted whether the salt tax (gabelle) [...] would last in perpetuity; we made it known and declared to them that it was not our intention for the said gabelle [...] to last forever."*[9]

Despite "the displeasure" generated to the people, the salt tax became permanent under Charles V in the second half of the 14th century, and remained in place until its abrogation after the French Revolution in 1789.[10] In 1680, French King Louis XIV acknowledged that the "prosperity of my people" remained a priority, but also added that the salt tax was necessary to finance the "Great and Glorious War."[11] After the Revolution, Napoleon reinstated the salt tax in 1806, making it both spatially uniform and lower than the one prevailing during the *Ancien Régime*. The salt tax was abrogated in 1945.

The salt tax was highly unpopular, and is considered "one of the iniquitous institutions of the Ancien Régime" (Sands and Higby, 1949). For one, as most other taxes, it burdened disproportionately the Third Estate, while the clergy and the aristocrats were excepted or given preferential treatment. Moreover, even though the salt tax was proportional to the quantity of salt purchased and was added to the final price, the tax varied substantially across space. Figure 1 plots the variation in salt tax rates across regions, reproducing the 1781 *Cartes des Gabelles*. In the *pays de grandes gabelles* area (literally, the "country of high salt tax"), as the region around Paris was referred to, the salt tax rate was so high that the sale price of salt was nine to ten times its net cost. According to Beaulieu (1903), in 1662, the wholesale price of a given quantity of salt in Paris was 4 livres and 10 sous, while the price to the consumer was 42 livres, 4 sous, and 7 deniers, implying a tax rate close to 1000%. In other parts of the Kingdom, the consumer

[7] Salt has often been a target of taxation since ancient times (see also Schryver et al., 1987; Mente et al., 2021; Touzery, 2023). Records of salt taxation can be found in the Roman, Chinese, and Russian Empires, as well as in India, the United Kingdom, and France (Gale, 1930; Moxham, 2001).

[8] Authors' own translation from: "pour la déplaisance qu'elles font à notre peuple" (*Source:* Ordonnances faites par le roi Philippe le Bel, le 25 fevrier, l'an 1318, touchant la gabelle, aides et impositions; see also Figure A5).

[9] Authors' own translation from: "Premièrement, sur ce que nos sujets doutoient, que la gabelle du sel [...] durasse à perpétuité; Nous leur fismes dire et déclarer, que notre intention n'etoit pas, que lesdites gabelles [...] durassent toujours" (*Source:* Ordonnances faites par le roi Philippe le Bel, le 25 fevrier, l'an 1318, touchant la gabelle, aides et impositions; see also Figure A5).

[10] Royal ordinances in 1366, 1372, and 1379 made the salt tax permanent (Sands and Higby, 1949).

[11] Authors' own translation from: "le soulagement de nos peuples" and from "La Grande et Glorieuse Guerre" *Source*: Ordonnances de Louis XIV. roy de France et de Navarre, sur le fait des gabelles & des aydes, 1680 (see also Figure A6).

price of the same quantity of salt was much lower—from 2.5 livres in Bretagne to 13 livres in Normandie to 7 livres around Bordeaux. Figure A4 presents graphically the discontinuity in the final price of salt across bordering regions. On average, the price of salt jumped from 13 livres per minot to about 40 livres for the same quantity. Notably, since public goods provision was minimal, a higher tax burden did not imply more redistribution.

The exact location of the tax borders depended on various historical factors, each shaped by specific events and circumstances. In Section 3 and Appendix C, we provide a detailed, segment-by-segment account of the historical processes that determined the positioning of these borders. There, we also conduct a series of robustness tests to address potential concerns about endogeneity arising from strategic considerations in border placement. These tests provide evidence that the tax borders do not systematically overlap with other features that may, in turn, influence the citizens' propensity to revolt against the state.

Besides its spatial inequality, a feature made the salt tax particularly obnoxious to people. In high tax areas, people were forced to purchase a fixed quantity of salt: one minot per year for 14 people over eight years old (corresponding to 3.4 kg per person). This amount was close to the estimated yearly need for an adult (including usage for production and agriculture), implying that the salt tax was essentially a *forced* method of taxation. Since few alternatives to salt existed and because even in low tax areas the price of salt was high, historians estimate that individuals living in regions with a low salt tax rate consumed between 3.5 and 4 kg of salt per year on average. For this reason, the effective consumption of salt did not differ much around the tax border.

Illustrating the large, and spatially heterogeneous burden of the salt tax, Morineau (1972) estimates that the average household in the high tax area paid about 13% of its annual income in salt tax, as compared to 2.5% in the low tax area. Back of the envelope calculations indicate that, in 2021, the incidence of the tax for the average French household would range from 805 (low tax) to 4,189 Euros (high tax). The cost incurred by households in the high salt tax areas would be similar to the sum of healthcare and transport expenditures for the average household in 2018.[12]

To closely monitor the price and purchase of salt, citizens were assigned to a royal salt storehouse, based on their residence. Salt storehouses (*grenier à sel*, in French) had a monopoly on salt sales, and were evenly spread across the Kingdom at approximately 10 km to 15 km to guarantee that tax collectors (*gabelous*, in French) could complete a round-trip within the same day.[13] Yearly

[12] Data on 2021 net household disposable income and 2018 households' budget come from the OECD and INSEE, household budget, 2018, respectively.

[13] Figure A3 illustrates the location of the salt storehouses along the Loire River between Tours and Orléans.

household-level monitoring minimized the probability of household size under-reporting in high tax areas. Tax collection was centrally organized: from Paris, the King sent tax collectors to the different regions. We are not aware of evidence indicating that regions differed in the methods and tools used to collect the salt tax.

Finally, the salt tax was heavily opposed because collection methods were vexatious, the monitoring system in place was stringent, and fraud was heavily penalized, with common sentences including the death penalty. As Chanel et al. (2015) puts it, "[...] the Fermes générales developed a rigid system of surveillance and coercion backed by drastic penal codes." The rigor of the control methods was such that it inspired a well-known rhyme: "Ils sont partout, les Gabelous! [*The tax collectors are everywhere!*]" (Touzery, 2023).

2.3 Cracks in the System

Over centuries, extractive fiscal institutions generated latent discontent among the French people. Analyzing the *cahiers de doléances*, a lists of grievances drawn up between January and April 1789 at the King's request, Shapiro et al. (1998) show that taxes, and the salt tax in particular, were a central point of frustration for the Third Estate. Complaints about taxes represented to 25% of all grievances submitted by the Third Estate. Against this backdrop, a series of events in the late 18th century triggered social discontent and fueled revolts against the monarchy. As shown in Figure 2, around 100 riots occurred across France in each year in the 1750s and 1760s. The yearly number of riots increased slightly in the following two decades, with peaks around 1768 and 1775, and the in 1788 and 1789, when more than 800 riots were recorded.[14]

The description of riots reported in Chambru and Maneuvrier-Hervieu (2024) illustrates well the frustration of the people against the salt tax in those years. In Bons-en-Chablais, on April 4, 1779, a riot is described as a "conflict between the population and salt tax guards on a fair day." Similarly, in Caen, on March 3, 1781, the following event took place: "During a house search, the salt tax officers were initially attacked by 4 to 5 individuals, who then rallied others, soon forming a group of 15 to 20 people from outside the house." This last riot shows, that despite the high punishment risk, an initial event attracted broader support by nearby individuals.

A severe drought hit France in 1788, leading to significant underproduction of grain. Consequently, prices of grain—especially wheat—soared by 40% in 1789 relative 1788 (see also Figure 3). Historians and economists have argued that the drought and its impact on wheat prices were a key determinant of the French Revolution (Labrousse, 1944; Ladurie, 1971; Lefebvre,

[14]The 1765-69 increase in riots was due to a series of shocks to the price of wheat, while that of 1775 corresponds to the "Flour wars." Figure 2 plots the number of riots classified as "economic and political" by Chambru and Maneuvrier-Hervieu (2024). See Section 3 for more details.

1973; Neumann, 1977; Neumann and Dettwiller, 1990; Waldinger, 2021). Interestingly, Figure 3 documents that the surge in riots was higher in municipalities burdened by a an above-median salt tax rate. This suggests that the drought and subsequent price increases may have acted as a spark on land already parched by salt taxation. In Section 4, we provide systematic evidence in support of this idea.

In 1781, Louis XVI's finance minister Jaques Necker made public his *Compte rendu au Roi*. The document represented the first general overview of the Kingdom's finances available to the public, and about 100,000 copies were sold in a just few weeks. The report publicly revealed both the spatial disparities in tax burden and the lists of pensions to nobles, including the names and amounts paid by the State. Moreover, the report painted an overly positive picture of the Kingdom's finances, omitting the loans contracted by the French State in support of the American War of Independence. As soon as the real degree of indebtedness of the Kingdom emerged, confidence in the solvency of the State plummeted.

2.4 The French Revolution

Facing a dire financial situation, on January 24, 1789, the King summoned the *Etats Généraux*: "We need the support of our loyal subjects to help us overcome the various difficulties we are currently facing, particularly with regard to the state of our finances." The *Etats Généraux*, which had been last convened in 1614, brought together representatives from all the parts of the Kingdom, belonging to the three estates of society: the clergy, the nobility, and the Third Estate. Their opening session in Versailles on May 5, 1789, is often considered as the beginning of the French Revolution. The King's opening speech was criticized for lacking serious intentions to implement any structural reform, and focuses solely on raising taxes. Dissatisfied, aware of the country's economic and political expectations, and after a month of negotiations, on June 17, the deputies of the Third Estate, asserting that they represented "at least ninety-six percent of the nation," declared themselves as the *Assemblée nationale*.

The Storming of the Bastille in Paris on July 14 accelerated a series of transformative measures enacted by the National Assembly. Among these were the abolition of feudal privileges, which dismantled the economic and social structures of the *Ancien Régime*, the establishment of state control over the Catholic Church's vast wealth and influence, and the adoption of the *Declaration of the Rights of Man and of the Citizen*, which laid the ideological groundwork for modern democracy and economic liberalization. The subsequent three years were marked by intense political conflict and economic instability. After a short-lived constitutional monarchy, Louis XVI was overthrown on August 10th, 1792. The French *Première République* was created and a constituent assembly, the *convention nationale*, was elected in September 1792. Examining

33 charges against Louis Capet (the name adopted to call the King as a citizen), the National Convention sentenced the former King to death in January 1793.

3 Data

This section describes the data and presents the summary statistics for the main variables considered in our analysis. The corresponding descriptive statistics are reported in Tables A1 and A2.

Geo-localized historical fiscal data. We exploit newly hand-collected information on the evolution of the fiscal institutions before and after the French Revolution. Relying on historical records from the Archives of the National Library of France, we geo-referenced the map of all salt tax discontinuities.[15] The primary source of local information comes from the 1781 Necker's map of the salt tax zones in France (see also Figure 1). Even though the map includes both the zones and the tax rate in place, it is is imprecise at high spatial resolutions, as those needed when implementing our analysis below. To obtain precise spatial trace of the salt tax borders, we combined novel geo-referenced maps of the *Ancien Régime* institutions provided by Gay et al. (2024) with the precise list of the salt tax rate levied in all locations across the Kingdom available in the *Ordonnances de Louis XIV. roy de France et de Navarre, sur le fait des gabelles & des aydes* (1680, see also Figure A6).[16] As such, for each tax zone, we additionally hand-collected the tax rate in place. The comparison of the tax rates applied in 1680 and 1781 shows a very high level of persistence of the rates.[17] Figure A7 shows the resulting variation in the salt tax rate at the level of the *bailliage* (Gay et al., 2024).

Riots. Data on the number and characteristics of riots over time come from Chambru and Maneuvrier-Hervieu (2024). The dataset covers more than 20,000 episodes of violence across countries from the year 1,000 AD onwards. Using information on the reason for the uprising reported in the original data, we classify riots in two broad groups: political and economic riots.[18] This classification excludes events that lack any description or that, given their description, are unlikely to capture citizens' uprising. In our analysis, we restrict the attention to political and economic riots occurring in contiguous France between 1750 and 1789. We also leverage

[15] Online access to historical map archives can be found here: https://gallica.bnf.fr/html/und/cartes/cartes?mode=desktop.

[16] Full title of raw document is: *Ordonnances de Louis XIV. roy de France et de Navarre, sur le fait des gabelles & des aydes. Données à S. Germain en Laye aux mois de may & juin 1680. Registrées en la Cour des Aydes les 11. may & 21. juin 1680.* Publicly available online from the National Library of France, BnF.

[17] The absolute difference is largely below 5% of the 1680 tax rate level.

[18] More specifically, we identify as economic riots those classified in the original dataset as tax-, food- or labor-related protests; moreover, we identify as political riots the events classified as protests against the authority, against the feudal institutions or the political uprisings.

additional information provided by Chambru and Maneuvrier-Hervieu (2024) to decompose the economic and political riots into different sub-categories, such as riots related to: taxation, food scarcity and labor conditions. As discussed below, we analyze the exact text of tax-related riots to exclude specific events (e.g., those related to salt smuggling) or to classify riots in more granular categories.[19] Focusing on the 1780-1789 decade, Figure A8 displays the number of riots across France. The figure shows that riots occurred in most parts of the country, but also suggests that they were somewhat more concentrated around the salt tax borders. We return to this point later, when discussing the mechanisms.

Wheat prices and weather shocks. In Section 4 below, we combine information on the salt tax rate with that on wheat prices and local weather shocks. Data on wheat prices (expressed in grams of silver per litre) at the géneéralité level from 1756 to 1789 was collected and prepared by Chambru (2019), who used original records from Labrousse (1933). We measure variation in local weather using data from Luterbacher et al. (2004). The original data records temperature and precipitation from 1500 at grid level, for each season, which we project to the province level for the period 1750-1800.

Citizens' complaints. We measure the complaints expressed by the French population at the onset of the French Revolution using the *Cahiers de doléances*. Literally the "lists of grievances," the *Cahiers de doléances* were the result of a survey commissioned by King Louis XVI in the spring of 1789. The King asked the nobility, the clergy, and the Third Estate to collect the list of grievances concerning any topic related to the public sphere broadly defined. The *Cahiers de doléances* were aggregated to the *bailliage* level, and then transmitted to Paris during the *États Généraux*. Similar to Waldinger (2021), we rely on the data assembled by Shapiro et al. (1998), to obtain the number and type of grievances submitted by the Third Estate at the *bailliage* level.

Events in Paris and behavior of members of Parliament. From the National Assembly's archives, we collected novel data on the political color and department of origin of each member of the Legislative Assembly, i.e., the legislature of the Kingdom of France from October 1, 1791, to September 20, 1792.[20] Moreover, we extracted a novel database on the vote cast by members of the *convention nationale* in January 1793 to decide over the death penalty of the King. As shown in Figure A9, the MPs were asked three questions: first, is the former King guilty? Second, shall the people vote on the final sentence? Third, shall the king be sentenced to the death penalty? The vast majority of the MPs (98.8%) answered "*oui*" (yes) to the first question. The second question displays more variation, as moderates MPs still hoped to spare the king

[19] See Appendix B.1 for more details on the data cleaning process.

[20] We classify the following political groups as "Pro-change:" *Gauche*, *Constitutionnels*, *Montagne*, *Girondins*, *Constitutionnels modérés*, *Extréme gauche*.

from the death penalty and viewed a public referendum as a way to counter the influence of the most extreme factions on the trial. For each MP, we observe their exact vote on the three questions and their department of origin.

Additional variables. We complement the datasets described above with a series of local demographic and economic control variables. These come from The National Institute of Statistics and Economic Studies and Cagé and Piketty (2023) for demographic outcomes, as well as from the National Institute of Geographic and Forest Information for spatial data.

4 The salt tax and riots

In this section, we examine the relationship between the salt tax and riots in the decades leading up to the French Revolution. First, estimating a Regression Discontinuity (RD) model, we find that municipalities subject to a higher salt tax rate experienced both more and larger riots (Section 4.1). Second, we combine the RD model with yearly-variation in wheat prices induced by weather shocks, and document that the same price increase triggered more riots in municipalities with a higher salt tax rate (Section 4.2).

4.1 Regression discontinuity analysis

Empirical strategy. We implement a static RD analysis that relies on the comparison of similar and spatially close municipalities, which were subject to the different salt tax rates, as described in Section 2, for several centuries. Let $i \in I$ be a municipality, defined by its centroid, $\boldsymbol{c}_i = (c_i^x, c_i^y)$. Consider $\overline{\boldsymbol{B}}$ as the infinite set of border points constituting the salt tax borders, and define the subset $\boldsymbol{B} \in \overline{\boldsymbol{B}}$ of border points $\boldsymbol{b}_i = (b_i^x, b_i^y)$ such that the euclidean distance to the salt tax border $d_i = ||\boldsymbol{c}_i - \boldsymbol{b}_i||$ is minimized. Let the two zones $\mathscr{A}^+$ and $\mathscr{A}^-$ be the treatment (i.e., the municipality with the higher tax rate, compared to the nearest tax border) and the control (i.e., the municipality with the lower tax rate, compared to the nearest tax border) areas, respectively. A location is assigned to one and only one tax border (the nearest).

Location, relative to the nearest salt tax border, acts as the forcing variable. Assignment into treatment is a function of a municipality's location relative to the border. Treatment status T_i of municipality i is defined as $T_i = 1\big[\boldsymbol{c}_i \in \mathscr{A}^+\big]$. Denote the outcome vector by $\boldsymbol{Y}$. The discontinuity of the expected outcomes at the geographical border can be expressed as:

$$\tau(\boldsymbol{d}) \equiv \mathbb{E}[\boldsymbol{Y}_1 - \boldsymbol{Y}_0 | d_i = 0] = \lim_{\boldsymbol{d} \to 0}[\boldsymbol{Y} | \boldsymbol{c} \in \mathscr{A}^+] - \lim_{\boldsymbol{d} \to 0}[\boldsymbol{Y} | \boldsymbol{c} \in \mathscr{A}^-]. \tag{1}$$

We omit municipalities in the bottom quartile of the tax gap distribution. These are municipalities for which the discontinuity in the salt tax rate is minimal (less than 10 pound per minot),

and thus unlikely to be salient, or even visible, to local residents.[21] We estimate the following empirical model:

$$Y_i = \beta_0 + \beta_1 T_i + f(d_i) + \boldsymbol{\eta}_{b_i} + \boldsymbol{X_i'}\boldsymbol{\gamma} + \varepsilon_i, \qquad \text{if } -h \leq d_i \leq h. \tag{2}$$

The dependent variable, Y_i, is the number of all riots (i.e. political and economic) that occurred in municipality i in different periods of time. The main regressor of interest, T_i, is the border treatment variable defined above. The regression also includes different polynomial orders of the distance to the border, $f(d_i)$, salt tax border fixed effects, $\boldsymbol{\eta}_{b_i}$, and additional municipal controls (coordinates, soil fertility, and 1780 population), $\boldsymbol{X_i'}$.[22] Standard errors are clustered at the bailliage level. Because standard local polynomial estimators may be sensitive to the specific bandwidth (h) used, we employ mean squared error optimal bandwidths, which are valid given the robust approach in Calonico et al. (2014).

Importantly, we formally test whether the salt tax rate varies discontinuously at the tax border. In Figure 4, we present the RD plot corresponding to a regression similar to that in equation (2), where the dependent variable is the salt tax rate. The salt tax rate jumps at the border, moving on average from 12 to 40 pounds per minot.[23]

Validity. We now turn to the main identifying assumption behind our empirical strategy: only the salt tax rate, and not other variables that might influence citizens' propensity to protest, should vary discontinuously at the tax border. One specific concern is that some segments of the salt tax border coincided with other administrative borders or with geographical features, such as rivers, soil suitability, or the presence of salt mines. Section 3 already discussed in detail the origin of the salt tax borders, presenting both anecdotal and more formal evidence in support of the notion that the exact placement of salt tax borders was plausibly exogenous. Also and importantly, as previewed in Section 3, all tax borders were far from local salt production sites, and the municipalities in our sample are at least 50 km away from salt sources (i.e., salt mines or salt marshes). Therefore, to further corroborate our identification strategy, we examine whether the sample of municipalities is balanced around the border.

As shown in Giommoni and Loumeau (2022), the salt tax had negative, persistent effects on

[21] However, among the robustness checks, we show that results are robust to including all borders.

[22] In the baseline specification, we use second-order polynomials. When including covariates, we follow the approach in Calonico et al. (2019). Soil fertility is measured with three variables: an indicator of soil fertility obtained from the European Soil Database, the average silt content in the soil (at 100-200cm depth), and the average nitrogen content in the soil (at 30-60cm depth).

[23] The figure is obtained by pooling together all the borders (and excluding the borders with tax gap in the bottom quartile of the distribution). We obtain similar results, not reported for brevity, when considering each border separately. Figure A11 shows that, as expected, the discontinuity in the salt tax rate is much smaller when considering municipalities in the bottom quartile of the tax gap distribution.

economic development, which first emerged with the introduction of the tax in the middle age. This complicates the interpretation of balance checks on characteristics measured after the salt tax was introduced. For this reason, we focus on characteristics that are either pre-determined relative to the salt tax or time-invariant. In Figure A12, we consider the presence of a Roman road, a city or a road reported in the Cassini map, and a diocese or an archidiocese (Panels A to E), as well as municipal surface, altitude, soil fertility, and the presence of a river (Panels F to I).[24] In Figure A13, we consider different soil characteristics, including soil's silt and nitrogen level (important proxies for land's intrinsic suitability for agriculture). Reassuringly, coefficients are quantitatively small and imprecisely estimated, suggesting that the sample is balanced along these characteristics.

Results in Giommoni and Loumeau (2022) raise a separate issue, namely whether the estimates from equation (2) can be interpreted as the direct effect of extractive taxation on citizens' discontent or if they, at least in part, reflect the downstream economic consequences of the salt tax. We seek to tackle this issue by controlling for 1780 municipality population—a key proxy for economic development for this time period. However, we acknowledge that this (or any similar) control is not perfect and that fully isolating the effect of the salt tax on riots from its impact on economic development is very challenging. However, we argue that this is not a major problem for our analysis. First, extractive taxation may trigger citizens' discontent because of its negative economic effects, when people respond to extrinsic motivations. Second, in Section 4.2, we combine the static RD design presented in equation (2) with time-variation in wheat prices driven by weather shocks. This allows us to absorb any remaining difference in municipality characteristics, including economic development, through the inclusion of municipality fixed effects.

Main results. Figure 5 reports a standard RD plot from equation (2) with a focus on the second half of eighteenth century, 1750-1789. Results indicate that the number of riots jumps when moving from the "low tax" (coded with negative distance) to the "high tax" side of the border (coded with positive distance). As explained above, our baseline model includes border fixed effects, geographic coordinates, 1780 population, and soil fertility. In Table 1 (column 1), we show numerically the results of this RD analysis. According to our preferred specification, moving from the low to the high tax side of the border increases the number of riots by 9.5% of a standard deviation, corresponding to an increase of approximately 87% relative to the mean of the dependent variable. The point estimate is statistically significant at the 5%.

As a second inspection, we study the effect over time to explore whether its dynamics may be

[24]The Cassini Map or Academy's Map is the first topographic and geometric map made of the Kingdom of France as a whole. It was compiled by the Cassini family in the 18th century.

compatible with the emergence of the French Revolution. To conduct this analysis, we regroup the riot data by decennial bins from 1750 to 1809. Dating exactly the Revolution itself remains a debate among historians; yet, the decade between 1780 and 1789 is generally considered as the last years of the *ancien régime*. Therefore, this decade will be the one of interest in our analysis.

Figure 6 shows the results and it reports six distinct RD analysis for each period. A positive and significant effect emerges in the 1760s to gradually increase until the last decade of the *ancien régime* (1780-1789). In this period the municipalities subject to a heavier taxation witness significantly more revolts, compared to the control group. The magnitude of the effect in the decade of our interest, 1780-1789, is large and precisely estimated: more specifically, moving from the "low tax" to the "high tax" area increases riots by 17.1% of a dependent variable standard deviation, which corresponds to an increase larger than the dependent variable average value. Interestingly, this differential animosity around the tax border completely disappears after the Revolution, as there is no difference in the occurrence of riots in the 1790s and 1800s. These results are reported numerically in columns 2-7 of Table 1. These results appear to confirm that the largest effects of extractive taxes on riots emerged in the 1780s. Given this compelling evidence, we will focus on this decade in the subsequent analyses.

Importantly, these results remain consistent across multiple robustness checks, as reported in Table A3. Specifically, the impact of the salt tax remains large and precisely estimated under various specifications: when riot events related to salt smuggling are excluded from the sample (column 1); when all tax borders are included regardless of the tax gap (column 2); when we use a broader definition of riots (column 4);[25] when big cities are removed from the sample (column 6); and when the sample is not constrained to a specific bandwidth (column 8). Finally, the results are still robust if we estimate a Poisson regression model (column 5), and if we express the dependent variable in logarithm (column 7).

Finally, Figure A14 shows the sensitivity analysis in which we arbitrarily modify the optimal bandwidth of the RD analysis between 0.5 and 1.5 the optimal bandwidth. Moreover, Figure A15 displays the analysis conducted on a fake border, obtained permuting the actual border $\pm 10/20/30/40$ km. In both these analyses the focus is on political and economic riots, and on the period of the revolution, 1780-1789, and the results are always robust.

Additional analysis. In this paragraph we present a set of additional analyses to further explore the effect of the salt tax on the occurrence of riot events.

First, we try to disentangle the intensive and the extensive margin of the main result. Table A4, column 2, focuses on the extensive margin, and it shows that moving from the "low tax"

[25] This broader definition of riots also includes religious riots, riots related to the slave trade and those labeled as "other riots".

to the "high tax" side of the border increases the probability of having a riot event by 2.9%, which correspond to a 65.9% increase, compared to its average value. Moreover, column 3 of Table A4 studies the intensive margin, and it documents that the salt tax led to a significant increase in the number of participants who took part in the uprising event. Also in this case the marginal effect is precisely estimated and large, as it amounts to an increase by 21.4% of a standard deviation.

Second, we estimate the main model decomposing the dependent variable by types of riots. Figure 7, Panel A, reveals that the main effect displayed in Figure 6 is mostly driven by economic riots, rather than by political riots. This result is in line with the type of border in analysis, which marks a significant difference in the economic treatment of people. Moreover, Figure 7, Panel B, focuses on the effect on economic riots and it decomposes it by type of riot, distinguishing between tax-related riot, food-related riot and labour-related riot. As we may expect, what emerges is that the jump in riot around the tax border seems to be entirely driven by tax-related revolts.[26]

Third, we want to quantify the elasticity of riots, which represents a measure of the change in the number of riots as a result of a one unit increase in the salt tax around the border. Figure 8 shows a binscatter analysis where we regress the number of economic riots on the tax rate differential for the municipalities in a vicinity of the tax borders, for the period 1780-1789.[27] The figure shows a positive and significant relation between the occurrence of the protests and the tax differential around the salt tax borders. Moreover, this analysis allows us to estimate an elasticity of 0.35%, suggesting that a one unit increase in the salt tax, in difference around the border, leads to a 0.35% increase in riot standard deviations. This means that a standard deviation increase in salt tax rate differential (which amounts to 37.92 units) leads to an increase in economic riots of 13.2% of a standard deviation, which is a significant leap.

4.2 The role of wheat price shocks

The previous section provides causal evidence on the impact of salt tax on riot events in French *ancien régime*, relying on tax borders. In this section, we provide a more robust empirical strategy with the goal of exploring why the impact of the salt tax escalated in the 1780s. With this goal, we combine the RD model with yearly-variation in wheat prices to estimate a difference-in-discontinuity model which relies on local wheat price shocks, induced by local weather fluctuations.

[26] Numerical results for this analysis are reported in Table A5.

[27] Importantly, to be consistent with the previous RD analysis, the specification adopted is the same as the one in model 2, with the inclusion of the distance to the tax border, as well as the sample in analysis. Similarly, the adopted bandwidth is the optimal bandwidth in the main RD analysis, displayed in column 5 of Table 1, rounded to 30 km. Corresponding numerical results are reported in Table A4, column 4.

Evolution of wheat price and riot events We begin with a graphical inspection of the relation between wheat prices and riot events in the second half of the eighteenth century. Figure 3 shows the evolution of the average wheat price, expressed in grams of silver per litre, across French généralité for the period 1756-1790. Wheat prices exhibit substantial fluctuations over time but follow a steadily increasing trend from the early 1780s, peaking in 1789. This peak appears to coincide with a sharp rise in the number of riots, which significantly increased in 1789. Notably, the figure also reveals that this surge in protest was more pronounced in areas subject to a high salt tax compared to regions where the salt tax was relatively modest.

This initial motivating evidence seems to suggest that fluctuations in wheat prices, combined with salt taxation, had a significant impact on the dynamics of riots, particularly in the second half of the eighteenth century. To explore this relationship more formally, we now estimate a difference-in-discontinuity model that leverages these local variations in wheat prices.

Empirical strategy The estimated model is as follows:

$$Y_{it} = \alpha + \beta_0 Wheat_{i,t} + \beta_1 Tax_i \cdot Wheat_{i,t} + \beta_2 Wheat_{i,t} \cdot Dist_i + \\ + \beta_3 Tax_i \cdot Wheat_{i,t} \cdot Dist_i + \gamma_i + \delta_t + \epsilon_{it} \quad (3)$$

where the dependent variable, Y_{it}, captures the number of political and economic riots in municipality i in year t, expressed in standard deviations. Tax_i is the salt tax rate in the Bailliage where the municipality is located (as described in section 2). $Wheat_{i,t}$ is the yearly wheat price in the corresponding généralité, and $Dist_i$ measures the distance, in km, between the municipality i and the closest salt tax border. Moreover, γ_i and δ_t represent municipality and year fixed effects, respectively, and the standard errors are clustered at the municipal level. Importantly, given the potential endogeneity of the evolution of local wheat prices, we also present a more robust version of model 3 in which we instrument wheat prices (as well as all the double and triple interaction terms) with a measure for weather shocks (Waldinger, 2021). This new model allows us to provide more robust estimates taking into account more consistently the potential endogenous evolution of wheat prices.[28]

[28]To define the weather shocks we rely on the recent literature (e.g. Waldinger, 2021), which identifies the important role of droughts as determinants of peasants outbreaks in the second half of eighteenth century France. Specifically, we follow the approach of Waldinger (2021), and define droughts as the ratio between growing-season temperature/precipitation in a certain year over the long-run growing-season temperature/precipitation mean (1750 to 1800). Moreover, given the link between current living conditions and the weather condition in the previous growing season, we always use a lagged version of the defined weather shock in the analysis. The temperature and precipitation shocks, for locality i in year t, are defined as follows:

$$Temperature\ Shock_{i,t} = \frac{Temperature_{i,t}}{\frac{1}{51}\sum_{y=1750}^{1800} Temperature_{i,y}} \quad (4)$$

We will estimate model 3 with a focus on the last decade of the *ancien régime*, 1780-1789. Moreover, similarly to the analysis discussed in section 4.1, the sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. Importantly, to be consistent with the previous RD analysis of section 4.1, we always rely on the optimal bandwidth (rounded to 30 km). However, it is important to mention that we show among the robustness checks that the results are consistent if we perform a global analysis, with no bandwidth specified.

The coefficient β_1 provides the difference-in-discontinuity estimate of our interest, capturing the impact of wheat price on the emergence of political and economic riots for different levels of the salt tax rate. Therefore, this interaction terms indicates the extent to which the tax burden is able to amplify or attenuate the impact of wheat prices on the occurrence of riot events.

Results Table 2 presents the main results from the estimation of model 3. Column 1 reports the main OLS analysis showing the coefficient of the interaction term of interest between the tax rate and the wheat price. The coefficient is positive and precisely estimated, suggesting that wheat price shocks have an amplified effect on riots when in combination to a heavy salt tax burden. In column 2, we present the findings of the main IV analysis, in which we instrument wheat prices with weather shocks, as discussed in the previous paragraph. Also in this case the impact of wheat prices on riot, differential by salt tax rate, is large and precisely estimated. According to this estimate, a 10% increase in wheat price, compared to its mean, leads to an increase in riot by 8.9% of a SD, comparing municipalities in the high and low tax areas. This implied magnitude is large and it corresponds to an increase of more than one and a half times the dependent variable average value. Importantly, the set of instruments is not weak as indicated by the F-statistics and the Sanderson-Windmeijer multivariate F-statistics reported in the bottom part of column 2.[29]

Moreover, columns 3-5 of Table 2 show a set of additional analysis that further confirm the main IV results. In particular, column 3 shows that the results are robust to controlling for the precipitation shock, column 4 presents the findings using the wheat prices in logarithm

$$Precipitation\ Shock_{i,t} = \frac{Precipitation_{i,t}}{\frac{1}{51}\sum_{y=1750}^{1800} Precipitation_{i,y}} \tag{5}$$

It is important to mention that, as reported in Table A6 (column 1), the temperature shocks seem to be a valid predictor of the evolution of wheat prices, differently from the precipitation ones, which appear unable to predict the depentent variable. Therefore, given this evidence, we will only rely on temperature shocks as an instrument in the main analysis. Moreover, columns 2-4 of Table A6 shows that the impact of temperature shocks on wheat prices remains robust when the dependent variable is expressed in logarithm, and when the analysis is global (i.e. no bandwidth is specified).

[29] Moreover, it is important to mention that also the results of the corresponding reduced form estimates are consistent and precisely estimated, as documented by Table A7, column 1.

and column 5 shows the global analysis, without applying any bandwidth. In these cases the coefficient of interest is always positive and statistically significant.[30] Finally, several robustness checks corroborate the main IV results. These tests are presented in Table A8.[31]

5 The salt tax and the French Revolution

In this section, we aim to connect the previous evidence that the salt tax led to an increase in riot events to the onset of the French Revolution in 1789. With this aim, we provide three key evidences. First, we show that a higher tax burden led to larger clusters of revolts which diffused more quickly and to a larger extent across space (Section 5.1). Second, we document that those areas subject to a larger salt tax rate expressed more complaints against taxation, and the salt tax in particular, as reported in 1789 *cahiers de doléances* (Section 5.2). Finally, we show that the members of the National Assembly in 1791 and 1793, who represented regions with a higher salt tax, were more likely to support the King's removal and vote in favor of his execution (Section 5.3).

5.1 Contagion

To study the spread of rioting activity, we apply an unsupervised learning algorithm to retrieve clusters of riots. Formally, we apply BDSCAN (Density-Based Spatial Clustering of Applications with Noise) which identifies arbitrarily shaped clusters without needing to specify the number of clusters in advance. This algorithm is able to naturally isolate outliers to focus on a set of clearly defined clusters. To ensure that we obtain meaningful clusters, we impose that each cluster must contain at least three riots; a smaller threshold risks over-splitting events, whereas a larger threshold risks overlooking smaller but still significant clusters.

Clusters are defined across space and time. As such, we require that riots within a cluster be separated by $\epsilon = 0.05$ standard deviation in the dimension considered: standardized time, latitude, and longitude. In the period considered (1780-1789), 0.05 standard deviations correspond to 56 days in time, 9 km in longitude, and 11 km in latitude. Figure A16 shows the derived clusters. A different color identifies each cluster. Gray crosses mark the location of

[30] The corresponding tests for the reduced form are shown in Table A7, columns 2-4. Moreover, column 5 of Table A7 shows the results of an augmented model in which, beyond the main set of regressors, we also include a set of variables with lagged weather shocks (expressed in $t-2$ and $t-3$), with current weather shock (in t), and with lead weather shock (in $t+1$). The coefficient of the main treatment variable remains large and significant, differently from the new set of regressors.

[31] More specifically, Table A8 reports the results of the IV model, i) controlling for the covariate set we adopted in the RD analysis (subsection 4.1) differential by year, in column 1; ii) controlling for precipitation shock, interacted with the salt tax and the distance to the border, in column 2; iii) using a version of the weather shock which is constructed on the whole year (not just on the growing season–as in the main analysis), in column 3; iv) adopting different bandwidths, in particular, two times and half the optimal bandwidth, in columns 4 and 5, respectively. The coefficient of interest remains always large and statistically significant.

single riots which are not part of a cluster. We label "super spreader" the initial riot of a cluster.

Table A9 shows the results of the linear regression of the size of the cluster, measured in the number of riots within the cluster, in columns (1)-(3), and an indicator variable for being a super-spreader riot in column (4) on the standardized salt tax rate. Column (1) looks at all clusters, whereas columns (2) and (3) study only clusters with an initial riot against the state and against poverty, respectively. We observe that cluster size increases with the salt tax rate. This is the case even after conditioning on the type of initial riot. We also find that the salt tax rate is positively related to the likelihood of being a super spreader riot.

5.2 Impact on the "Cahiers de doléances"

We now examine the link between the salt tax and the grievances against taxation, as expressed in the *cahiers de doléances*. As discussed in Section 2, between January and April 1789, the King asked the nobility, the clergy, and the Third Estate to collect the list of grievances concerning any topic related to the public sphere, including tax-related issues. We now relate this data on the number and type of grievances to the salt taxation.[32]

Table 3 shows the main results of this analysis. Column 1 reports the baseline finding and shows a positive and precise effect of the salt tax rate on the number of grievances against the salt tax which were expressed. The effect is large as a 10% increase in the salt tax, compared to its mean, leads to 0.23 more grievances, equal to an increase of 7.6%, compared to the dependent variable mean. A similar results emerges also in a series of additional tests, reported in columns 2-5 of Table 3. More specifically, this result is robust when the dependent variable is in logarithm (column 2), is binary (column 3), and is expressed as the ratio on all the other grievances (column 4). Finally, similar results emerge in a Poisson pseudo maximum likelihood regression (column 5). These results reinforce our main findings by offering more direct evidence of the link between extractive taxation and public concern.

5.3 Impact on the regime change in Paris

Finally, we analyze whether the voting behavior of the members of National Assembly is affected by their exposure to the salt tax. To conduct this analysis, we rely on newly collected data on legislators' characteristics and voting pattern in the first National Assembly of 1791 and 1793, as described in Section 2. Using information on their electoral constituency, we can link each legislator to the salt tax rate in their area of origin and examine whether it influences their

[32] Given the level of aggregation of this data, which vary at the bailliage level, we cannot exploit the tax border analyzed in Section 4.1. Therefore, we rely on an OLS model, enriched with a set of covariates. Importantly, the dataset in analysis is an unbalanced panel because i) for a given bailliage, we could have a general complaint, a complaint from the Third Estate in that bailliage, or both, and ii) only the data of a subset of bailliages are available. Importantly, as documented in Table A10, the availability of the data on the *cahiers de doléances* in a certain bailliage is orthogonal to the salt tax in that locality.

voting behavior.[33]

Table 4 reports the main results of this analysis. Column 1 shows that the probability that an Assembly member was part of a pro-change political group is significantly larger for legislators coming from a department with a lager salt tax rate.[34] The effect is sizable and precisely estimated: a 10% increase in the salt tax, compared to its mean, leads to a 0.6% increase in the probability of being part of a pro-change group, equal to an increase of 4.1%, compared to the dependent variable mean. Moreover, this result is robust to the exclusion of the moderate groups (column 2), as well as the aristocratic legislators from the sample (column 3).

Finally, columns 4 and 5 of Table 4, focus on the assembly that determined the fate of the King in 1793. These results show that legislators from departments with higher salt tax rates were significantly more likely to vote in favor of the King's execution (column 4), and less likely to delegate the decision to the people (column 5), who were considered to take a more lenient approach toward the King, differently from the more radical sans-culottes in Paris. In both cases the coefficients are large and precisely estimated.

6 Conclusion

The French Revolution was a watershed moment in history, marking the collapse of the *Ancien Régime* and the emergence of modern political and economic institutions (Acemoglu et al., 2011; Chambru and Maneuvrier-Hervieu, 2024). While its causes were complex and multifaceted, a longstanding idea in the historical literature is that extractive taxation played a crucial role in fueling discontent and accelerating the collapse of the monarchy (Norberg, 1994; Touzery, 2023). To the best of our knowledge, ours is the first paper to provide systematic empirical evidence in support of this hypothesis.

We exploit plausibly exogenous variation in the borders of one of the most extractive taxes of the *Ancien Régime*: the *gabelle du sel*, or salt tax. Using a Regression Discontinuity (RD) approach, we document that, on the eve of the French Revolution, revolts against the monarchy were both larger and more frequent where the salt tax was higher. Augmenting the RD model with temporal and spatial variation in weather shocks, we find that the effects of the salt tax were amplified by wheat price increases. We then link the salt tax to the French Revolution more explicitly. First, we show that the riots spread over time and across space through a process of contagion. Second, relying on the list of grievances collected by the monarchy in the spring of

[33] After the Revolution, departments were established as the new electoral constituencies. Therefore, in the following analysis, we rely on the average salt tax rate at the department level.

[34] We classified as pro-change the following political groups: *Gauche*, *Constitutionnels*, *Montagne*, *Girondins*, *Constitutionnels modérés*, *Extréme gauche*.

1789, we provide evidence that areas burdened by a higher tax rate reported more complaints against taxation. Finally, we document that newly elected members of the National Assembly representing areas with a higher tax burden were more likely to vote to overthrow the monarchy and sentence the king to death.

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Tables

TABLE 1 – RIOTS AROUND THE SALT TAX BORDER

Dep. var.: Economic and political riots	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Period: 1750-1789	Specific decade					
		1750	1760	1770	1780	1790	1800
High tax area	0.095**	0.037	0.073**	0.099*	0.171**	-0.068	-0.023
	(0.041)	(0.031)	(0.036)	(0.055)	(0.075)	(0.068)	(0.028)
N	50,608	12,402	12,910	11,990	13,113	10,205	13,935
Bandwidth (in km)	31.66	30.68	32.68	29.19	33.49	23.01	37.01347
Border fixed effects	✓	✓	✓	✓	✓	✓	✓

Notes: The table show non-parametric RD estimates following Calonico et al. (2014) under optimal bandwidth and polynomial order selection, according to model 2. The dependent variable captures the number of political and economic riots, over different periods of time and it is standardized. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. Finally, standard errors are always clustered at the bailliage level.

TABLE 2 – IMPACT OF WHEAT PRICE ON RIOTS (1780-1789)

Dep. var.: Political and economic riots	(1) OLS	(2)	(3)	(4) IV	(5)
	Baseline	Baseline	Controlling precipitation	With log wheat prices	Global analysis
Wheat prices * Salt tax rate	0.0002**	0.0012***	0.0012***	0.0318***	0.0011***
	(0.000)	(0.000)	(0.000)	(0.010)	(0.000)
N	113320	113320	113320	113320	236510
Bandwidth	30	30	30	30	global
KW F-stat		185.4	136.8	92.1	326.2
SW F-stat (comp. 1)		3922.0	1364.8	2892.2	9613.9
SW F-stat (comp. 2)		2466.3	967.9	1701.3	3634.3
SW F-stat (comp. 3)		6494.3	5865.5	4055.2	11307.0
SW F-stat (comp. 4)		2341.8	1160.8	1490.2	3868.3

Notes: The table shows the results from the estimation of model 3. The dependent variable is always standardized and it captures political and economic riots. "Wheat prices" captures the year wheat prices at the Generalite level, and "Salt tax rate" indicates the salt tax rate in a certain Bailliage. The specification always includes municipal and year fixed effects and the error term is clustered at the municipal level. The analysis covers the period 1780-1789 ans a bandwidth of 30km is always applied. In the specification the set of endogenous regressors (the triple interaction between wheat price, salt tax rate and distance to the border, with all the double interaction and the uninteracted terms) are instrumented with time-varying temperature shock (the triple interaction between temperature shock, salt tax rate and distance to the border, with all the double interaction and the uninteracted terms). The temperature shock is defined for the harvest season (spring and summer) of the previous year. The specification always includes municipality and year fixed effects. In column 3, the specification also controls for the precipitation shock. In column 4 wheat prices are expressed in logarithm. Column 5 shows the global analysis, without specifying any bandwidth. The sample always includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution.

TABLE 3 – SALT TAX AND GRIEVANCES AGAINST IT

Dep. var.:	(1)	(2)	(3)	(4)	(5)
No. of grievances	Baseline	log(0.01+x)	1[at least 1]	Relative to /All Comp.	PPML
Salt Tax	0.078***	0.050***	0.008***	0.018***	0.024***
	(0.013)	(0.007)	(0.001)	(0.003)	(0.003)
Observations	225	225	225	225	225
R-squared	0.610	0.400	0.232	0.415	
Pseudo R2					0.501
Mean dep. var.	3.036	-0.590	0.729	0.814	3.036
Mean Salt Tax	29.66	29.66	29.66	29.66	29.66

Notes: The table shows the results from the estimation of OLS models, in columns (1) to (4), and a PPML model, in column (5) in which the dependent variable is regressed on the Bailliage's salt tax rate. The units of observation are the number of observations from an Estate at the Bailliage level. All specifications include a dummy for whether the complaints come from the Third Estate, on top of average fertility, silth and soil content, agglomeration population in 1780, and distance from the tax border. Robust standard errors in parentheses, standardized betas in square brackets. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

TABLE 4 – IMPACT OF SALT TAX ON NATIONAL ASSEMBLY

Dep. var.:	(1)	(2)	(3)	(4)	(5)
	Pro-change political group			Vote "yes"	
	Baseline	Excluding moderates	Excluding aristocrats	Death of the King	Decision based on a popular vote
Salt tax rate in origin department	0.002**	0.003**	0.002*	0.006**	-0.008***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)
N	706	579	596	617	623
Dep. var. mean	.147	.177	.134	.632	.401
Dep. var. sd	.354	.382	.341	.482	.490

Notes: The table shows the results from the estimation of an OLS model in which the dependent variable is regressed on the salt tax rate at the department level (computed as a weighted average of the tax rate at the municipal level, which uses municipal population as weight). The unit of observation is the member of the national assembly in 1791 and 1793. The tax rate is the average tax level in the department of origin of the member of the assembly, weighted by population in 1780. The following political groups are classified as "Pro-change": *Gauche*, *Constitutionnels*, *Montagne*, *Girondins*, *Constitutionnels modérés*, *Extréme gauche*. The variables "Death of the King" and "Decision based ona popular vote" indicate the share of members of the Assembly voting "yes" for that specific question. The specification always includes coordinates fixed effects, number of mandates fixed effects (only in columns 1-3), and a set of controls varying at the department level (soil fertility population in 1780, distance to the closest salt tax border and a dummy indicating the presence of a roman road). Finally, the error term is clustered at the department level.

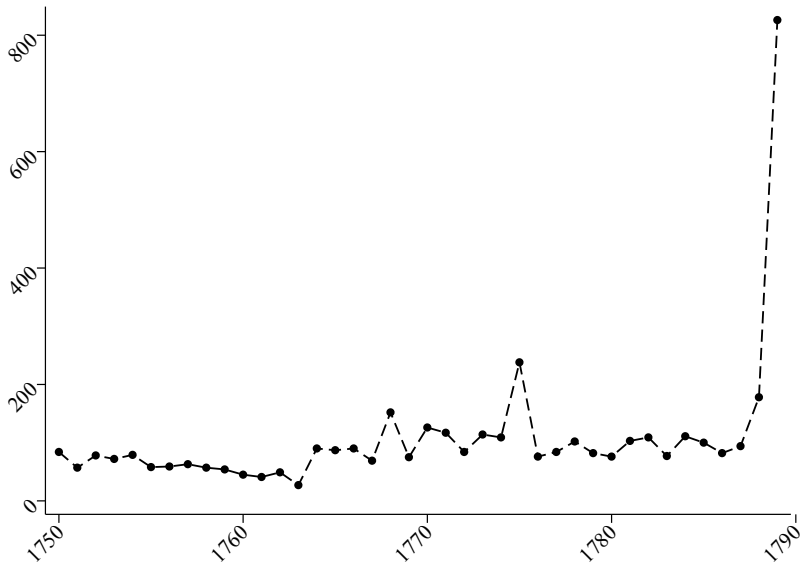
Figures

FIGURE 1 – SALT TAX MAP (NECKER, 1781)



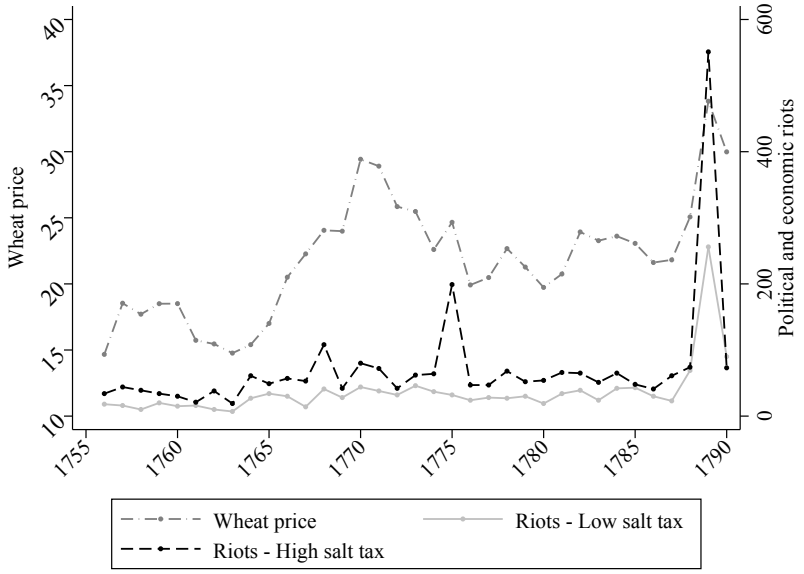
Notes: The figure shows the map of the gabelle in 1788 and it highlights the areas marked by a different tax rate, that generate the 22 tax border in analysis. Source: National Library of France, BnF.

FIGURE 2 – NO. OF RIOTS OVER TIME



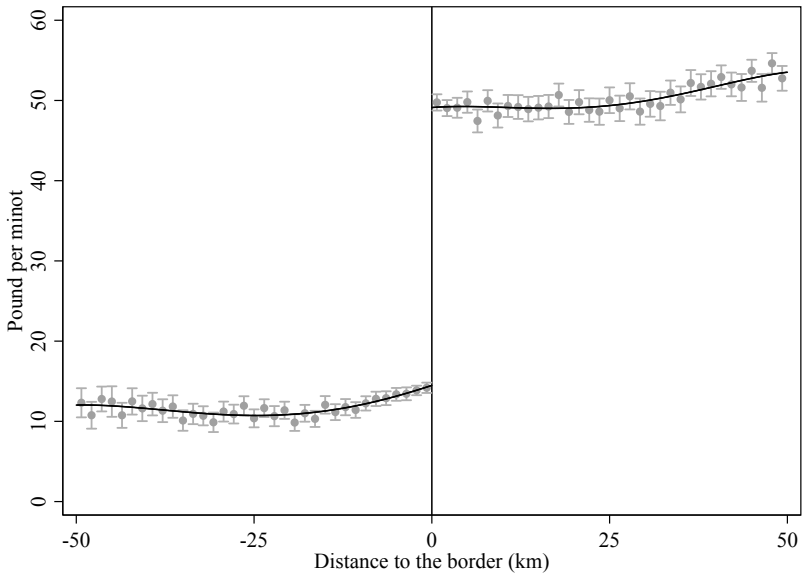
Notes: Figure shows the number of riots across the Kingdom of France (borders of 1789), in the period 1750-1789, with a focus on political and economic riots using the classification by Chambru and Maneuvrier-Hervieu (2024).

FIGURE 3 – WHEAT PRICE SHOCK AND RIOTS



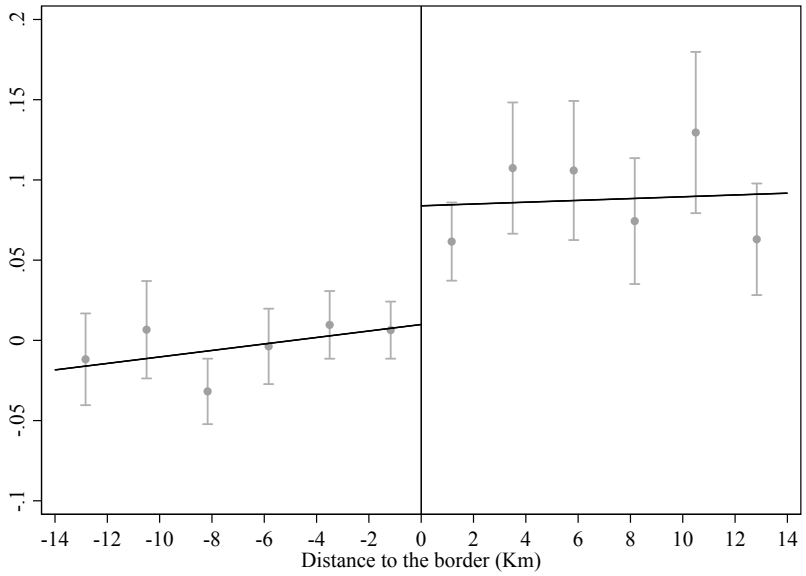
Notes: The figure shows the evolution of wheat prices and riots in the period 1756-1790. Wheat prices are expressed in grams of silver per litre and they are based on the original records from Labrousse (1933). "Riots - High salt tax" indicates the riot events that took place in the areas located in high tax side of the salt tax border, while "Riots - Low salt tax" those that took place in the low tax side of the border. The riot data are based on the classification by Chambru and Maneuvrier-Hervieu (2024).

FIGURE 4 – FIRST STAGE: SALT TAX AROUND THE BORDER



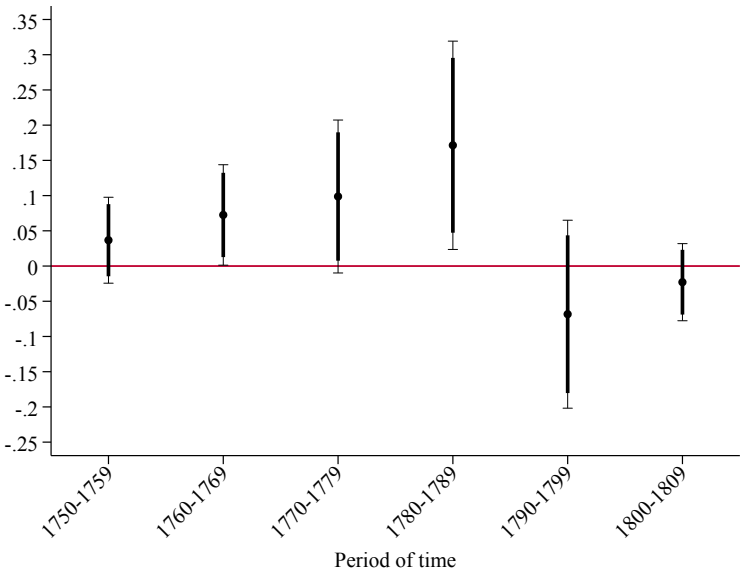
Notes: The plot shows non-parametric RD estimates following Calonico et al. (2014). The dependent variable is the salt tax rate (expressed in pound per minot) according to Figure A7. The focus is on the tax borders in the second, third and fourth quartile of the tax differential. The treatment area (i.e., the area with a higher tax rate, compared to the nearest tax border) is coded positively.

FIGURE 5 – RIOTS AROUND THE SALT TAX BORDERS (1750-1789)



Notes: The plots show non-parametric RD estimates following Calonico et al. (2014) under optimal bandwidth and polynomial order selection, according to model 2. The dependent variable is political and economic riots, in the period 1750-1789, and it is standardized. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. Finally, the error term is clustered at the bailliage level. The coefficient is .0948 (with a standard error of .0410).

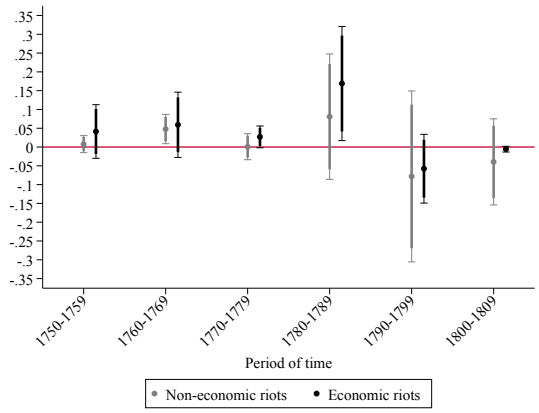
FIGURE 6 – RIOTS AROUND THE SALT TAX BORDERS



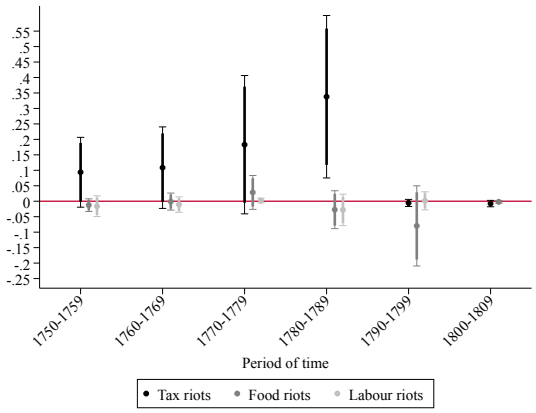
Notes: The plot shows non-parametric RD estimates following Calonico et al. (2014) under optimal bandwidth and polynomial order selection, according to model 2. The dependent variable is political and economic riots, for different periods of time (bins of 10 years), and it is standardized. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. Finally, the error term is clustered at the bailliage level.

FIGURE 7 – RIOTS AROUND THE SALT TAX BORDERS: TYPE OF RIOT

(A) ECONOMIC AND NON-ECONOMIC

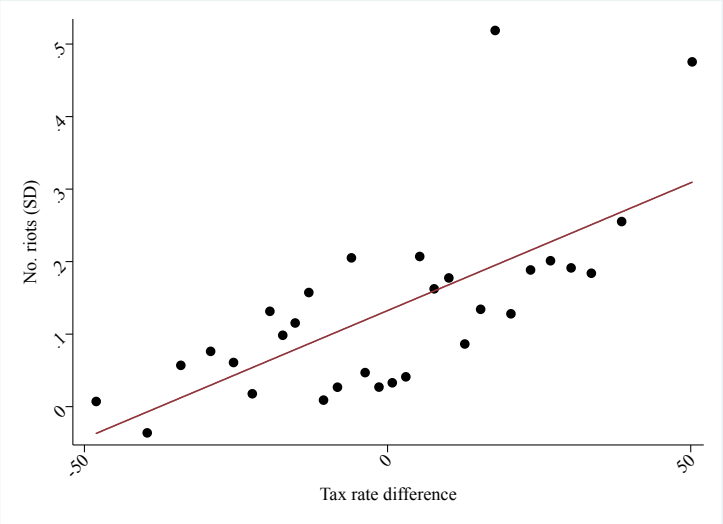


(B) TYPES OF ECONOMIC RIOTS



Notes: The plots show non-parametric RD estimates following Calonico et al. (2014) under optimal bandwidth and polynomial order selection, according to model 2. Panel A shows the analysis using as dependent variable the number of political riots and economic riots. Panel B displays the analysis using as dependent variables tax riots, food riots and labour riots. The dependent variable is always displayed for different periods of time (bins of 10 years), and it is standardized. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. Finally, the error term is clustered at the bailliage level.

FIGURE 8 – ELASTICITY OF RIOTS MARGIN



Notes: The figure shows the binscatter analysis. The dependent variable captures the number of political and economic riots, it covers the period 1780-1789 and it is standardized. The treatment is the salt tax rate differential for the closest tax border. The specification includes border fixed effects as well as a set of municipal controls (distance to the tax border, population in 1780, coordinates and soil fertility). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. A bandwidth of 30km is applied. Finally, the error term is clustered at the bailliage level. The coefficient is .0035 (with a standard error of .0011). The corresponding numerical estimate is reported in TableA4, column 4

Online appendix (not copy-edited or formatted) for: T. Giommoni, G. Loumeau and M. Tabellini. *"Extractive Taxation and the French Revolution"*.

Online appendix for
"Extractive Taxation and the French Revolution"

T. Giommoni, G. Loumeau and M. Tabellini

A Supporting material

A.1 Tables

A.2 Figures

B Data

B.1 Text analysis on riots description

C Salt tax borders

C.1 Historical background of main borders

C.2 Border placement tests

A Appendix: Supporting material

A.1 Tables

TABLE A1 – DESCRIPTIVE STATISTICS

	Baseline sample (bandwidth 30 km)			Entire sample (no bandwidth)		
	Mean	SD	No. obs.	Mean	SD	No. obs.
Panel A: RD analysis						
Salt tax rate	30.32	22.24	12,559	35.39	23.27	25,564
Tax rate diff	.098	37.92	12,559	9.39	38.34	25,564
Political and Economic riots (1750-1789)	.037	.342	50,236	.031	.286	102,256
Political and Economic riots	.064	.475	12,559	.051	.391	25,564
Political and Economic riots w/t smuggle	.024	.231	12,559	.013	.168	25,564
Political and Economic riots - Binary	.044	.205	12,559	.034	.183	25,564
Political and Economic riots - No. participants	2.34	46.09	12,559	3.40	103.03	25,564
Economic riots	.041	.423	12,559	.033	.345	25,564
Political riots	.022	.164	12,559	.017	.145	25,564
Tax riots	.026	.243	12,559	.014	.177	25,564
Food riots	.013	.242	12,559	.016	.235	25,564
Labor riots	.002	.099	12,559	.001	.075	25,564
Mun. population 1780	4291.23	18822.11	12,557	19615.6	117725.4	25,561
Mun. soil fertility	1.30	.611	12,558	1.27	.609	25,562
Soil silt content	437.79	92.72	12,521	444.29	90.08	25,353
Nitrogen silt content	143.84	41.29	12,521	150.21	44.49	25,353
Panel B: Dynamic RD analysis						
Political and Economic riots	.006	.105	125,590	.005	.094	255,640
Wheat price	22.90	4.96	113,330	23.00	4.98	236,540
Temperature shock	1.01	.065	125,580	1.01	.065	255,610
Precipitation shock	.946	.177	125,580	.948	.184	255,610

Notes: This table reports descriptive statistics. The time span covered is 1780-1789 if not differently specified. The sample in analysis are the municipalities located around the 22 salt tax borders according to Figure A7. The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. The first three columns uses a bandwidth is 30 km, while the second three columns do not use any bandwidth. The variables are reported in different windows of time, as reported in the table. Panel A, shows the statistics for the RD analysis and the time aggregation is decade, Panel B shows the statistics for the dynamic RD and the time aggregation is year. The salt tax rate is expressed in pound per minot. The wheat price is expressed in grams of silver per litre. The temperature/Precipitation shock is defined as the growing season temperature/precipitation in deviation from the long-run mean (1750-1800).

TABLE A2 – DESCRIPTIVE STATISTICS: NATIONAL ASSEMBLY

	Mean	SD	No. obs.
Panel A: Political group analysis (1791)			
Pro-change political group	.152	.359	775
Salt tax rate (origin dept.)	29.96	21.63	707
No. mandates in Assembly	1.59	1.01	775
Panel B: Death penalty of the king (1793)			
Vote "yes": Death of the king	.636	.481	682
Vote "yes": Decision popular vote	.388	.487	689
Salt tax rate (origin dept.)	30.48	21.42	627

Notes: This table reports descriptive statistics for the analysis on the National Assembly. The unit of observation is the member of the national assembly in 1791 and 1793. The tax rate is the average tax level in the department of origin of the member of the assembly, weighted by population in 1780. The variable Pro-change political group is a dummy indicating the following political groups: *Gauche*, *Constitutionnels*, *Montagne*, *Girondins*, *Constitutionnels modérés*, *Extréme gauche*. The variables "Death of the King" and "Decision based ona popular vote" indicate the share of members of the Assembly voting "yes" for that specific question.

TABLE A3 – RIOTS AROUND THE SALT TAX BORDER (1780-1789): ROBUSTNESS CHECKS

Dep. var.:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Economic and political riots	Baseline	Excluding salt smuggle riots	Baseline - All borders	Baseline - All riots	Poisson	Excluding big cities (top 5%)	Outcome in logarithm	Global analysis
High tax area	0.171**	0.300**	0.101**	0.159**	0.574***	0.143**	0.175**	0.121**
	(0.075)	(0.117)	(0.050)	(0.073)	(0.216)	(0.066)	(0.077)	(0.058)
N	13,113	13,881	14,995	13,188	13,096	13,454	12,832	24,733
Bandwidth	33.49	36.79	22.71	33.77	33.4	34.91	33.80	250

Notes: The table show non-parametric RD estimates following Calonico et al. (2014) under optimal bandwidth and polynomial order selection, according to model 4.1. The dependent variable captures the number of political and economic riots in the period 1780-1789 and it is standardized. The dependent variable does not include salt smuggle related riots in column 2. In column 4 all types of riots are included (not just political and economic events). The dependent variable is expressed in logarithm in column 7. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. With the exception of column 3, in which all French municipalities are included. Big cities are excluded from the sample in column 6: those are cities that belong to the top 2.5 percentile (with population above 51,517 inhabitants). A global analysis, in which the bandwidth is not specified, is reported in column 8. The analysis displayed in column 5 is a Poisson regression. Finally, standard errors are always clustered at the bailliage level.

TABLE A4 – RIOTS AROUND THE SALT TAX BORDER (1780-1789): ADDITIONAL ANALYSIS

Dep. var.:	(1)	(2)	(3)	(4)
Economic and political riots	Baseline	Binary outcome	No. participants	OLS analysis
High tax area	0.171**	0.029**	0.214**	
	(0.075)	(0.013)	(0.088)	
Tax rate diff.				0.0035***
				(0.0012)
N	13,113	13,403	13,601	12,217
Bandwidth	33.49	34.69	35.52	30

Notes: The table show non-parametric RD estimates following Calonico et al. (2014) under optimal bandwidth and polynomial order selection, according to model 4.1. The dependent variable captures the number of riots, defined in different ways, it covers the period 1780-1789 and it is standardized. In column 2 the dependent variable is a dummy variable capturing whether a riot event took place and in column 3 it captures the number of participants in the riot events, expressed in logarithm. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. The analysis reported in column 4 does not apply any bandwidth and it covers the entire country (bandwidth of 250 km). The analysis of column 5 is a standard OLS model where the dependent variable is regressed on the tax rate difference around the tax border. Finally, standard errors are always clustered at the bailliage level.

TABLE A5 – RIOTS AROUND THE SALT TAX BORDER (1780-1789): TYPE OF RIOTS

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var.:	Economic and political riots	Economic riots	Political riots	Tax riots	Food riots	Labour riots
High tax area	0.171**	0.169**	0.081	0.338**	-0.027	-0.028
	(0.075)	(0.077)	(0.085)	(0.134)	(0.031)	(0.026)
N	13,113	12,790	11,688	13,439	11,300	11,261
Bandwidth	33.49	32.20	28.02	34.82	26.73	26.58

Notes: The table show non-parametric RD estimates following Calonico et al. (2014) under optimal bandwidth and polynomial order selection, according to model 4.1. The dependent variable captures the number of riots, defined in different ways, it covers the period 1780-1789 and it is standardized. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. Finally, standard errors are always clustered at the bailliage level.

TABLE A6 – IMPACT OF TEMPERATURE SHOCK ON WHEAT PRICE (1780-1789) – ANALYSIS WITH GENERALITE AGGREGATION

	(1)	(2)	(3)	(4)
Dep. var.: Wheat price	Main: Temperature	Main: with Temperature shock		
	and Precipitation shocks	Baseline	With log prices	Global analysis
Temperature shock	18.3981**	22.1064***	1.0090***	20.6337**
	(7.031)	(7.532)	(0.358)	(7.913)
Precipitation shock	-3.3414			
	(2.153)			
N	260	260	260	280

Notes: The table shows the results from the estimation of model X. The dependent variable is wheat price at the generalite level. "Temperature shock (harvest period)" indicates the temperature shock, at the generalite level, which is defined for the harvest season (spring and summer) of the previous year. The analysis covers the period 1780-1789 and a bandwidth of 30km is always applied, with the exception of the analysis of column 4 which includes all municipalities. The specification always includes generalite and year fixed effects. In column 2, the specification also controls for the precipitation shock. In column 3 wheat prices are expressed in logarithm. Column 4 shows the global analysis, without specifying any bandwidth. The sample always includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution.

TABLE A7 – IMPACT OF TEMPERATURE SHOCK ON RIOTS (1780-1789)

	(1)	(2)	(3)	(4)	(5)
Dep. var.: Political and economic riots	Main	Controlling for precipitation shock		Global analysis	Analysis with lags/leads
		Naive	All interactions		
Temperature shock * Salt tax rate	0.0091***	0.0091***	0.0102***	0.0073***	0.0135***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.004)
Precipitation shock		-0.0071	-0.0091		
		(0.063)	(0.050)		
Precipitation shock * Salt tax rate			0.0014		
			(0.001)		
Temperature shock (lag 3) * Salt tax rate					-0.0076
					(0.005)
Temperature shock (lag 2) * Salt tax rate					0.0007
					(0.003)
Temperature shock (current) * Salt tax rate					-0.0067
					(0.004)
Temperature shock (lead 1) * Salt tax rate					-0.0037
					(0.004)
N	113320	113320	113320	236510	113320
Bandwidth	30	30	30	30	global

Notes: The table shows the results from the estimation of model X. The dependent variable is always standardized and it captures political and economic riots. "Temperature shock (harvest period)" indicates the temperature shock, at the municipal level, which is defined for the harvest season (spring and summer) of the previous year. The analysis covers the period 1780-1789 and a bandwidth of 30km is always applied. The specification always includes municipality and year fixed effects. In columns 2 and 3 the specification also controls for the precipitation shock and the interaction between precipitation shock, salt tax rate and distance to the tax border (with all double interactions and uninteracted terms), respectively. Column 4 shows the global analysis, without specifying any bandwidth. In column 5 the analysis including several lags and leads is displayed. The sample always includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution.

TABLE A8 – IMPACT OF WHEAT PRICE ON RIOTS (1780-1789): ADDITIONAL ANALYSIS

Dep. var.:	(1)	(2)	(3)	(4)	(5)
Political and economic riots	IV				
	With main controls	Control for precipitation shock interacted	Using year shock	With 2*h	With h/2
Wheat prices * Salt tax rate	0.0013***	0.0017**	0.0011**	0.0014***	0.0016***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
N	112990	113320	113320	167640	69770
Bandwidth	30	30	30	60	15
KW F-stat	336.2	3.4	26.6	22.5	123.3
SW F-stat (comp. 1)	4405.2	30.5	150.3	737.4	1834.9
SW F-stat (comp. 2)	3623.9	15.6	1083.7	392.8	1349.0
SW F-stat (comp. 3)	5139.6	187.6	347.3	1335.1	3864.7
SW F-stat (comp. 4)	2854.9	19.2	1297.4	246.1	1747.7

Notes: The table shows the results from the estimation of model 3. The dependent variable is always standardized and it captures political and economic riots. "Wheat prices" captures the year wheat prices at the Generalite level, and "Salt tax rate" indicates the salt tax rate in a certain Bailliage. The specification always includes municipal and year fixed effects and the error term is clustered at the municipal level. The analysis covers the period 1780-1789 ans a bandwidth of 30km is always applied. In the specification the set of endogenous regressors (the triple interaction between wheat price, salt tax rate and distance to the border, with all the double interaction and the uninteracted terms) are instrumented with time-varying temperature shock (the triple interaction between temperature shock, salt tax rate and distance to the border, with all the double interaction and the uninteracted terms). The temperature shock is defined for the harvest season (spring and summer) of the previous year. The specification always includes municipality and year fixed effects. In column 3, the specification also controls for the precipitation shock. In column 4 wheat prices are expressed in logarithm. Column 5 shows the global analysis, without specifying any bandwidth. The sample always includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution.

TABLE A9 – SALT TAX, RIOT CLUSTERS AND "INITIAL" RIOTS

	(1)	(2)	(3)	(4)
Dep. var.:	Cluster size: # of riots in cluster			1["super spreader" riot]
	All clusters	Initial: against State riot	Initial: poverty riot	–
Salt tax	0.344***	0.133***	0.502***	0.0017***
	(0.035)	(0.019)	(0.048)	(0.0003)
N	519	111	389	34221

Notes: The table shows the results from the estimation of OLS models in which the dependent variable is regressed on the salt tax rate at the cluster level in columns (1)-(3), and at the municipal level in column (4). Column (1) looks at all clusters, whereas columns (2) and (3) study only clusters with an initial riot against the state and against poverty, respectively. All specifications include the average fertility, silt and soil content, agglomeration population in 1780, and distance from the tax border. Robust standard errors in parentheses, standardized betas in square brackets.

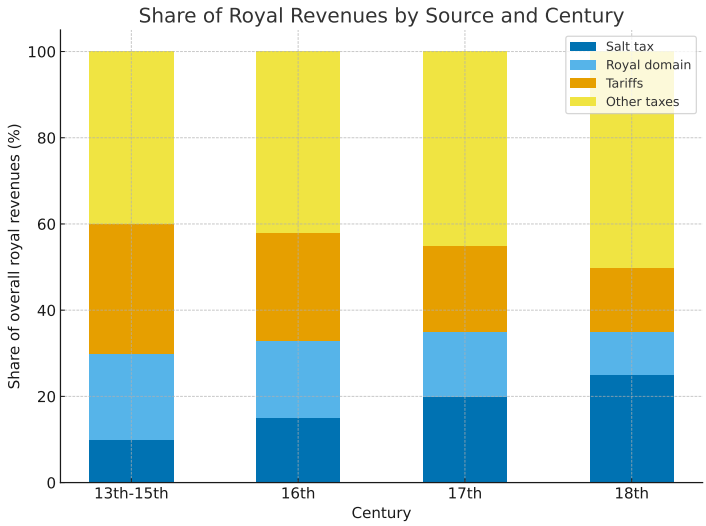
TABLE A10 – MISSING CAHIER DATA AND SALT TAX

Dep. var.:	(1)	(2)	(3)	(4)
	1[Missing Cahier Data]			
Salt Tax	0.002	0.002	-0.001	-0.004
	(0.001)	(0.001)	(0.003)	(0.005)
Observations	417	417	417	417
R-squared	0.005	0.019	0.177	0.295
Mean dep. var.	0.540	0.540	0.540	0.354
Mean Salt Tax	30.99	30.99	30.99	30.99

Notes: The table shows the results from the estimation of an OLS model in which the dependent variable, a dummy taking value 1 when there are no grievances from a Bailliage, is regressed on the Bailliage's salt tax rate. The unit of observation is the Bailliage. In column (2), we include agglomeration population in 1780; in (3), we add Generalite fixed effects. Lastly, in column (4), we weight by agglomeration population. Standard errors are clustered at the Generalite level.

A.2 Figures

FIGURE A1 – IMPORTANCE OF SALT TAX FOR ROYAL REVENUES INCREASES OVER TIME



Source: Touzery (2023) and the official royal public finance records from the National Library of France, BnF.

FIGURE A2 – SATIRE OF THE THIRD ESTATE CARRYING THE NOBILITY AND THE CLERGY (1789)



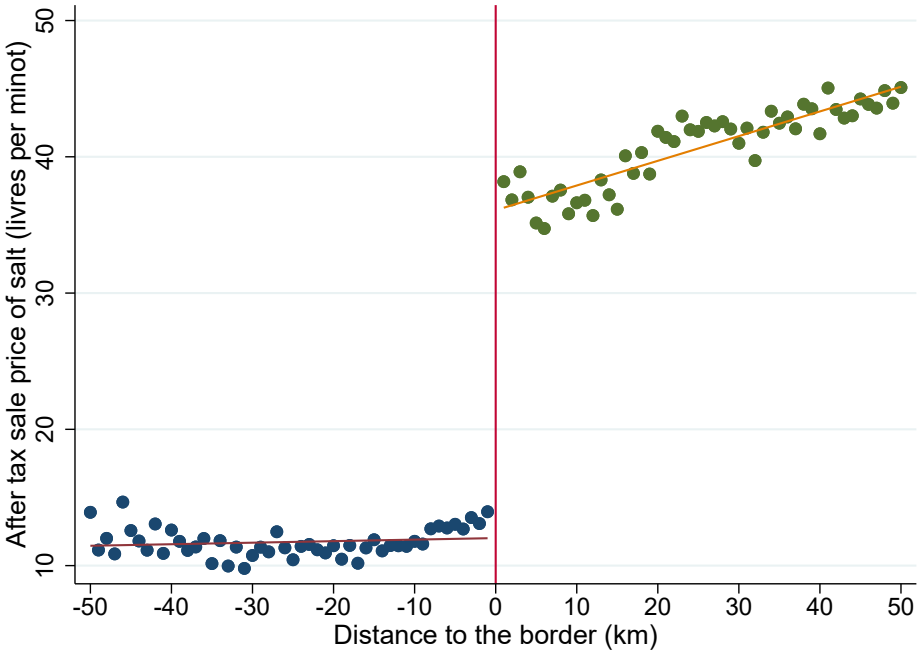
Notes: Popular caricature representing the hard-working Third Estate carrying the nobility and clergy. The legend reads "A faut espérer q[u]'eu jeu là finira b[i]entôt" ("Hopefully, this game will be over soon"). Out of the nobility's "full" pocket, the first item listed is "sel" ("salt").

FIGURE A3 – THE ROYAL SALT STOREHOUSES (1709)



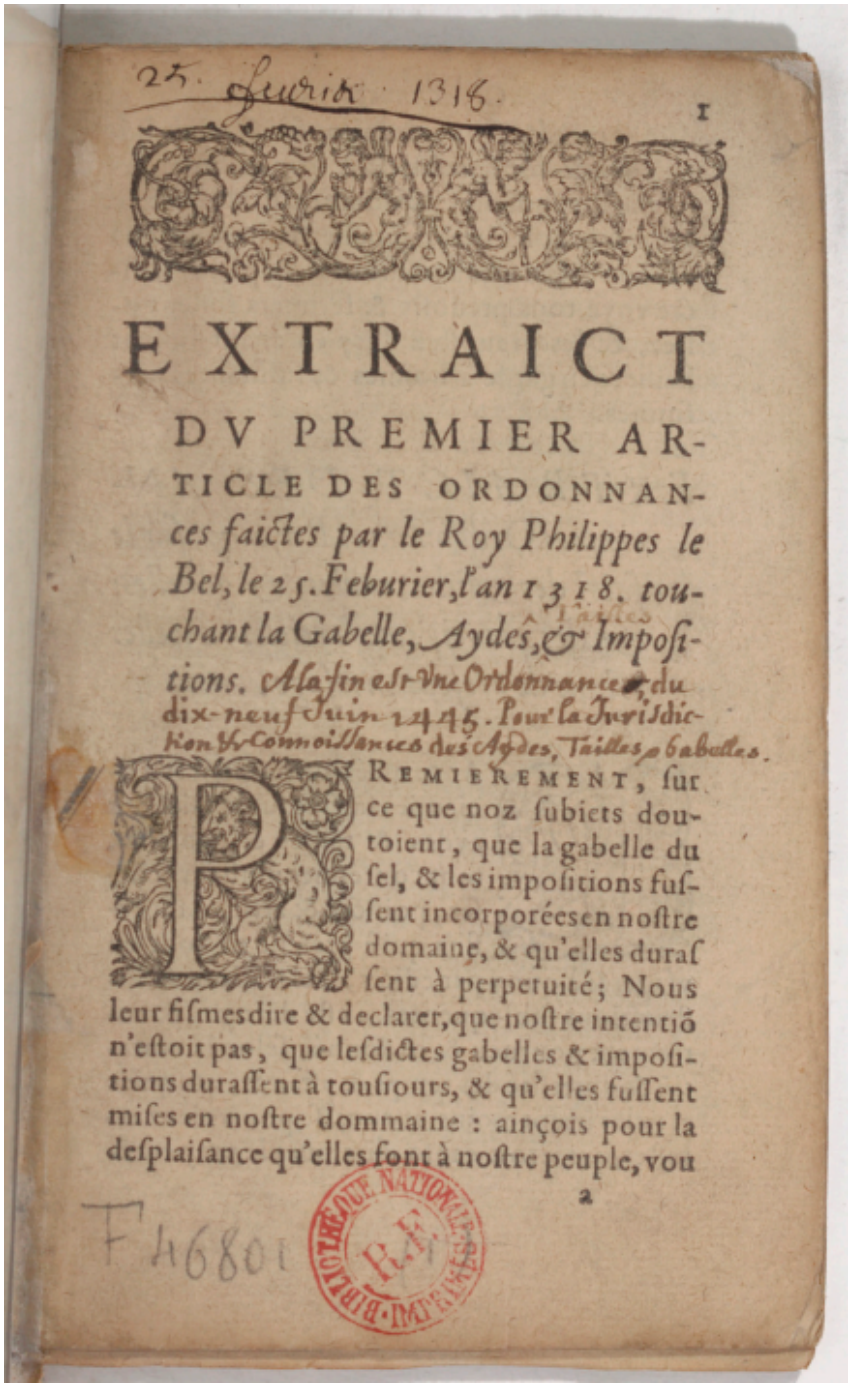
Notes: Squared shields indicate the location of a salt storehouses. Tours and Orléans are approximately 100km apart. *Source:* National Library of France, BnF.

FIGURE A4 – AFTER TAX PRICE OF SALT JUMPS AT THE BORDER



Notes: Authors' own computation based on novel local public finance data on salt taxation in the *Ancien Régime*.

FIGURE A5 – ROYAL *ordonnances* ON SALT TAX, 1318



25. Feurier 1318.

I

EXTRAICT

DV PREMIER ARTICLE DES ORDONNANCES faictes par le Roy Philippes le Bel, le 25. Feburier, l'an 1318. touchant la Gabelle, Aydes, & Impositions. A la fin est vne Ordonnance du dix-neuf Juin 1445. Pour la Jurisdiction & Cognoissances des Aydes, Tailles & Gabelles.

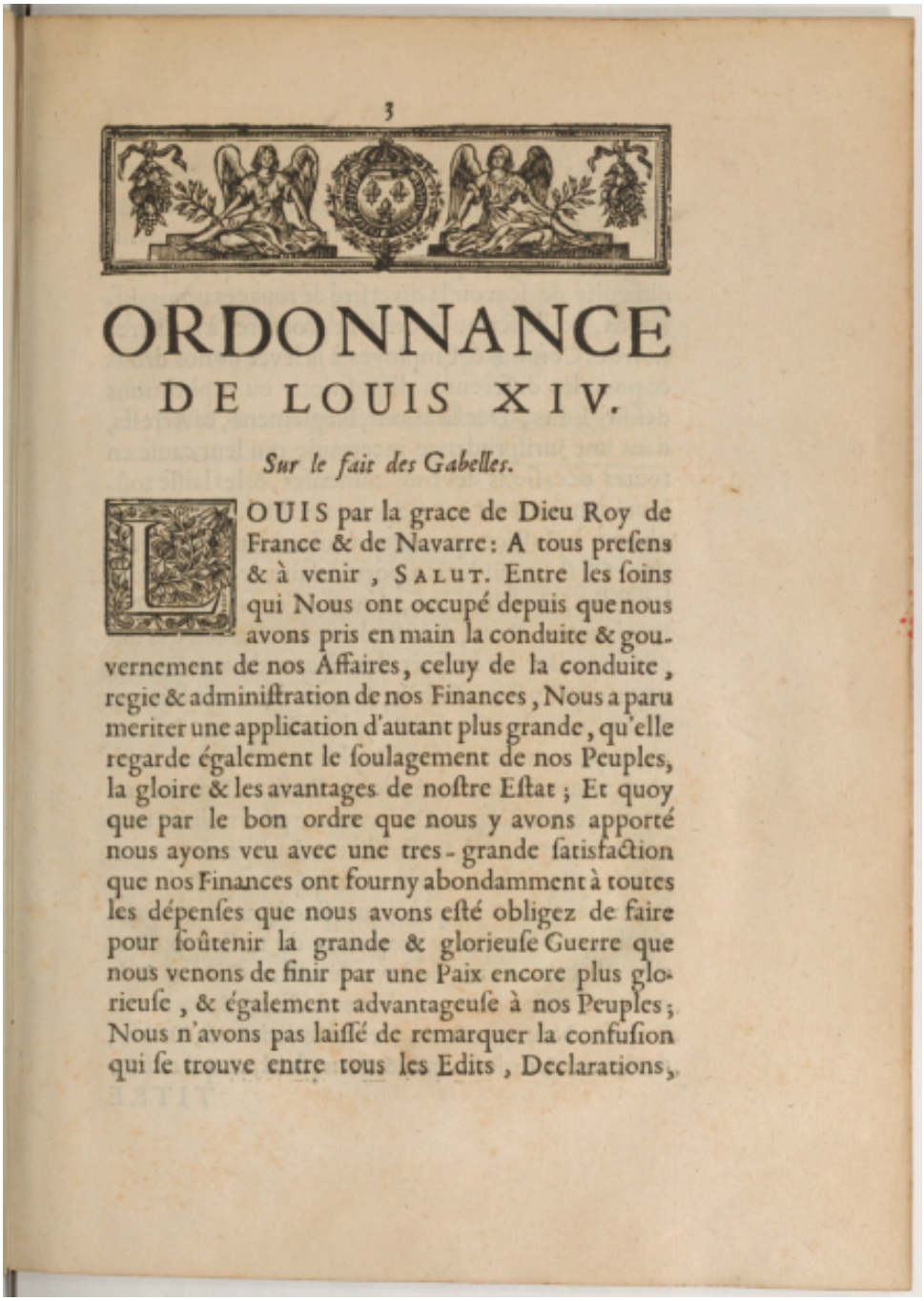
PREMIEREMENT, sur ce que noz subiets doutoient, que la gabelle du sel, & les impositions fussent incorporées en nostre domaine, & qu'elles durassent à perpetuité; Nous leur fismes dire & declarer, que nostre intentiõ n'estoit pas, que lesdictes gabelles & impositions durassent à tousiours, & qu'elles fussent mises en nostre dommaine : ainçois pour la desplaisance qu'elles font à nostre peuple, vou

a

F 16801 BIBLIOTHÈQUE NATIONALE R.F.

Source: Extraict du premier article des ordonnances faites par le roi Philippes le Bel, le 25 fevrier, l'an 1318, touchant la gabelle, aides et impositions. National Library of France, BnF.

FIGURE A6 – ROYAL *ordonnances* ON SALT TAX, 1680



3

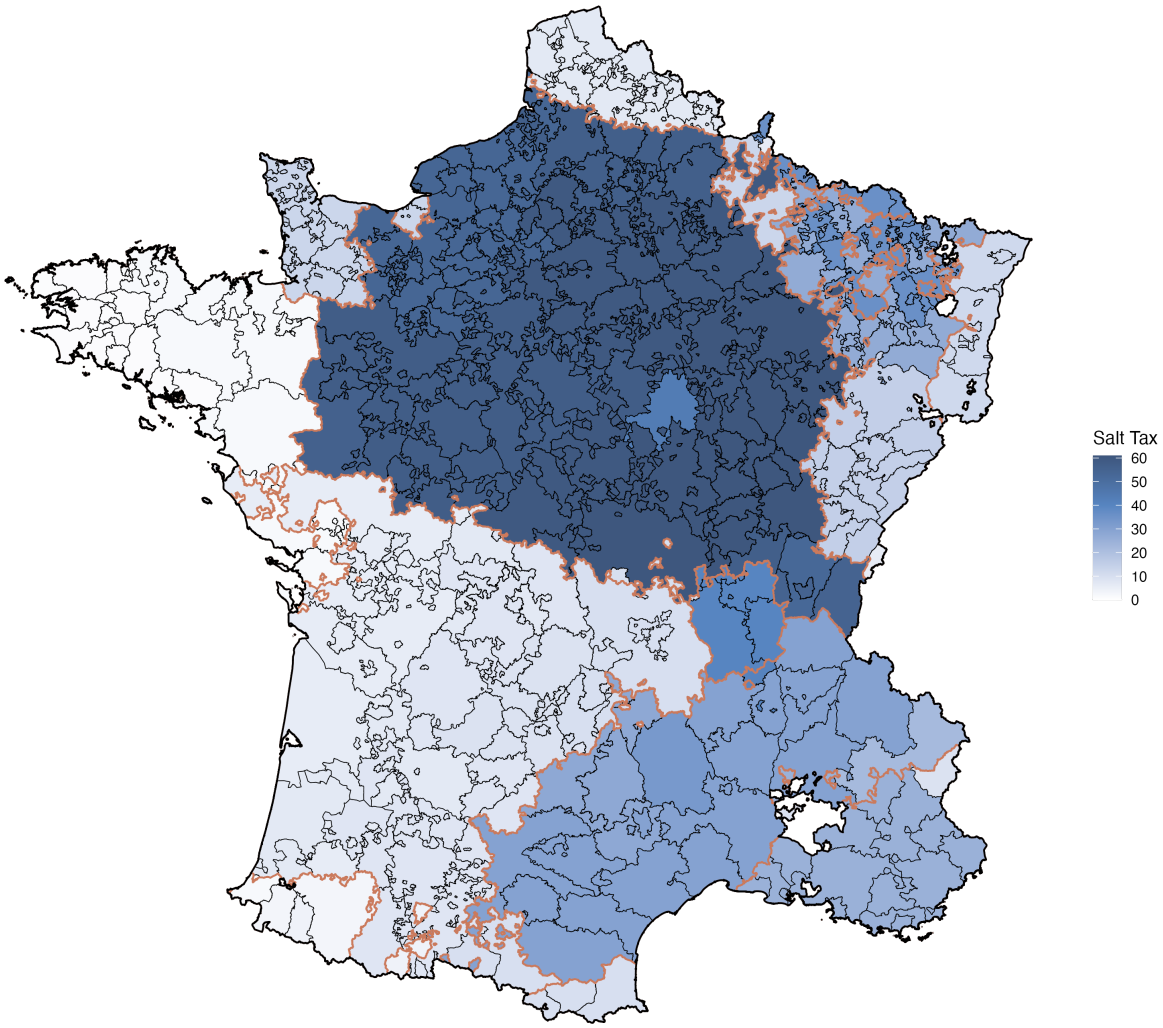
ORDONNANCE
DE LOUIS XIV.

Sur le fait des Gabelles.

LOUIS par la grace de Dieu Roy de France & de Navarre: A tous preſens & à venir, SALUT. Entre les ſoins qui Nous ont occupé depuis que nous avons pris en main la conduite & gouvernement de nos Affaires, celuy de la conduite, regie & adminiſtration de nos Finances, Nous a paru meriter une application d'autant plus grande, qu'elle regarde également le ſoulagement de nos Peuples, la gloire & les avantages de noſtre Eſtat; Et quoy que par le bon ordre que nous y avons apporté nous ayons veu avec une tres-grande ſatisfaction que nos Finances ont fourny abondamment à toutes les dépenſes que nous avons eſté obligez de faire pour ſoûtenir la grande & glorieuſe Guerre que nous venons de finir par une Paix encore plus glorieuſe, & également advantageuſe à nos Peuples; Nous n'avons pas laiſſé de remarquer la confuſion qui ſe trouve entre tous les Edits, Declarations,

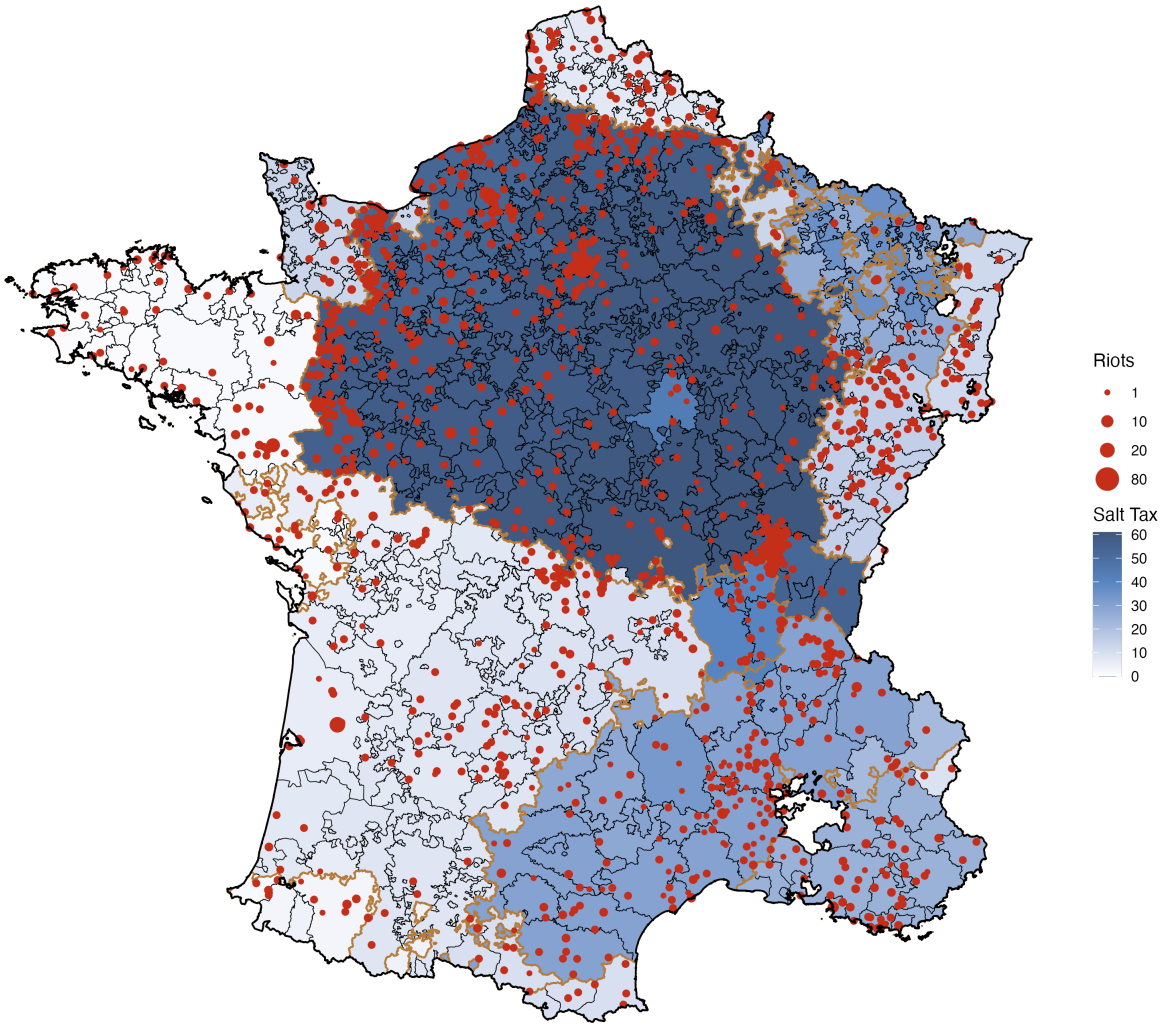
Source: Ordonnances de Louis XIV. roy de France et de Navarre, sur le fait des gabelles & des aydes. Données à S. Germain en Laye aux mois de may & juin 1680. Registrées en la Cour des Aydes les 11. may & 21. juin 1680. National Library of France, BnF.

FIGURE A7 – SALT TAX AT *bailliage* LEVEL



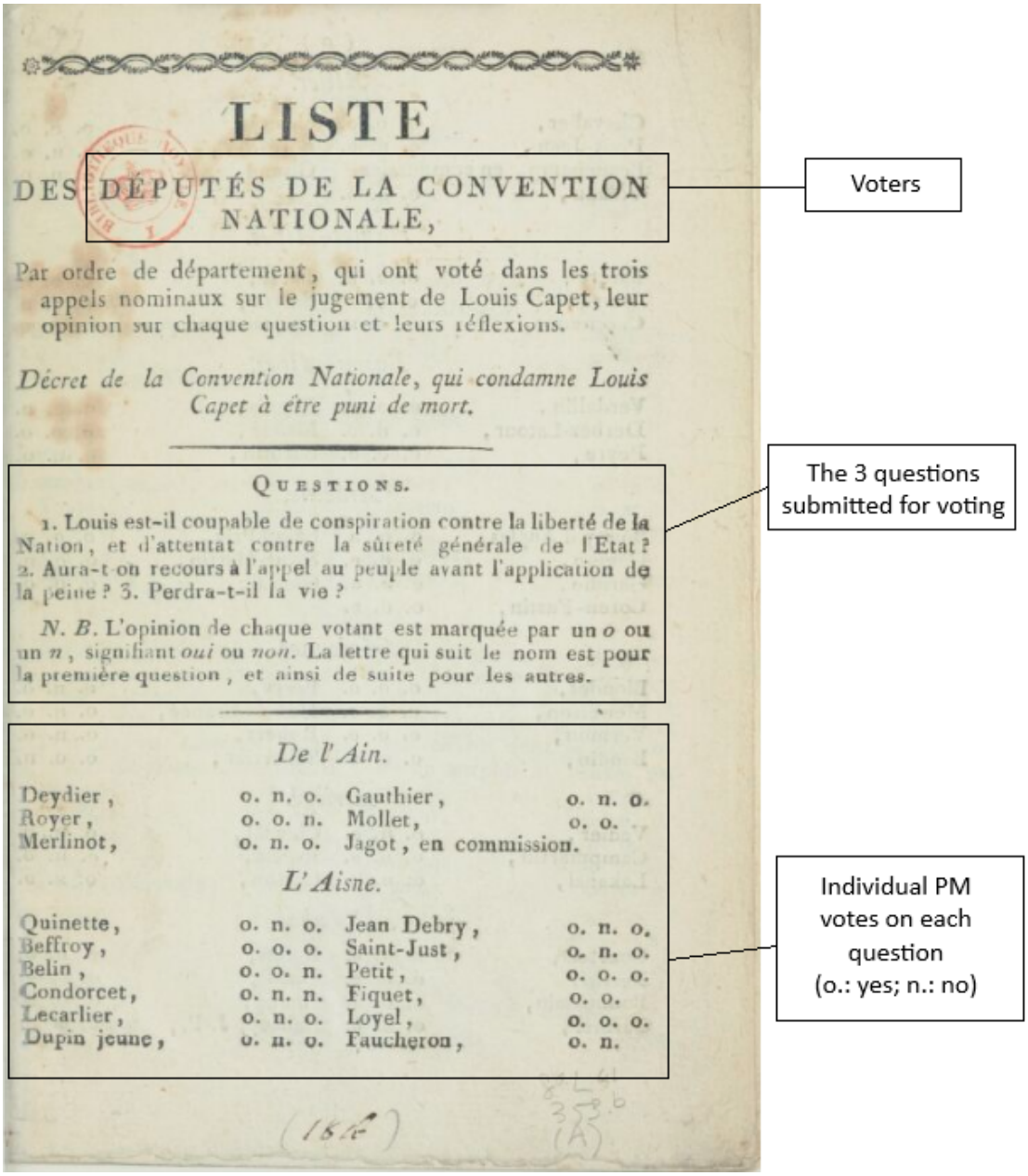
Notes: The figure plots the salt tax at the *bailliage* level, together with the salt tax border highlighted in yellow.

FIGURE A8 – SALT TAX AT *bailliage* LEVEL AND RIOTS



Notes: The figure plots the salt tax at the *bailliage* level, together with the salt tax border highlighted in yellow and the location of riots (1780-1789) in red; greater dots indicate a greater number of riots in that location.

FIGURE A9 – DECREE DEATH PENALTY KING



LISTE

DES DÉPUTÉS DE LA CONVENTION NATIONALE,

Par ordre de département, qui ont voté dans les trois appels nominaux sur le jugement de Louis Capet, leur opinion sur chaque question et leurs réflexions.

Décret de la Convention Nationale, qui condamne Louis Capet à être puni de mort.

QUESTIONS.

1. Louis est-il coupable de conspiration contre la liberté de la Nation, et d'attentat contre la sûreté générale de l'Etat? 2. Aura-t-on recours à l'appel au peuple avant l'application de la peine? 3. Perdra-t-il la vie?

N. B. L'opinion de chaque votant est marquée par un *o* ou un *n*, signifiant *oui* ou *non*. La lettre qui suit le nom est pour la première question, et ainsi de suite pour les autres.

De l'Ain.

Deydier,	o. n. o.	Gauthier,	o. n. o.
Royer,	o. o. n.	Mollet,	o. o.
Merlinot,	o. n. o.	Jagot, en commission.	

L'Aisne.

Quinette,	o. n. o.	Jean Debry,	o. n. o.
Beffroy,	o. o. o.	Saint-Just,	o. n. o.
Belin,	o. o. n.	Petit,	o. o. o.
Condorcet,	o. n. n.	Fiquet,	o. o.
Lecarlier,	o. n. o.	Loyel,	o. o. o.
Dupin jeune,	o. n. o.	Faucheron,	o. n.

(184)

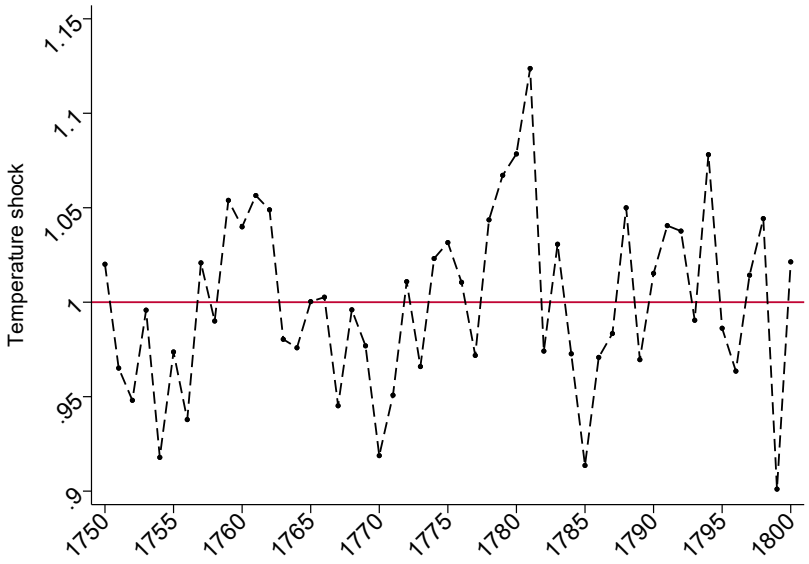
Voters

The 3 questions submitted for voting

Individual PM votes on each question (o.: yes; n.: no)

Notes: Source: National Library of France, BnF.

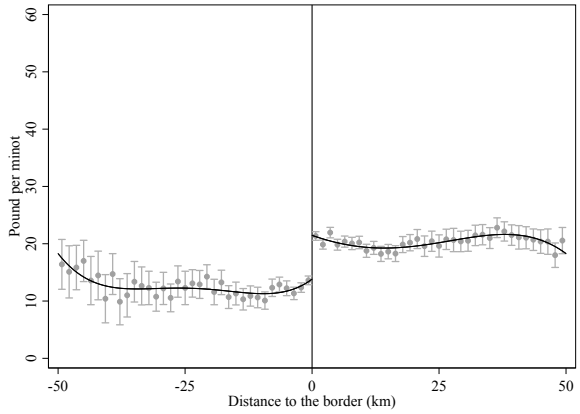
FIGURE A10 – EVOLUTION OF THE AVERAGE TEMPERATURE SHOCK



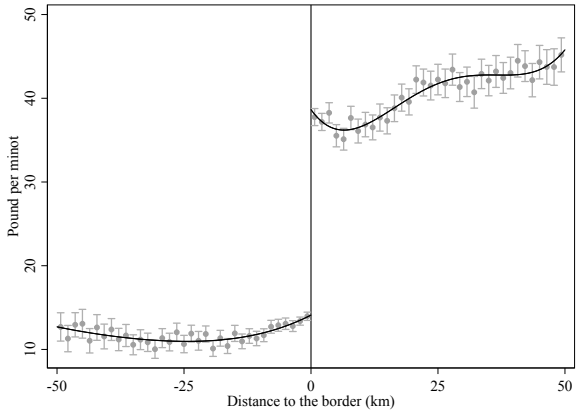
Notes: The figure shows the evolution of the temperature shock averaged across French municipalities. The shock is constructed as the temperature in the growing season (spring and summer) in deviation from the long-term mean, in the period 1750-1800.

FIGURE A11 – FIRST STAGE: SALT TAX AROUND THE BORDER

(A) ONLY FIRST QUARTILE TAX GAP

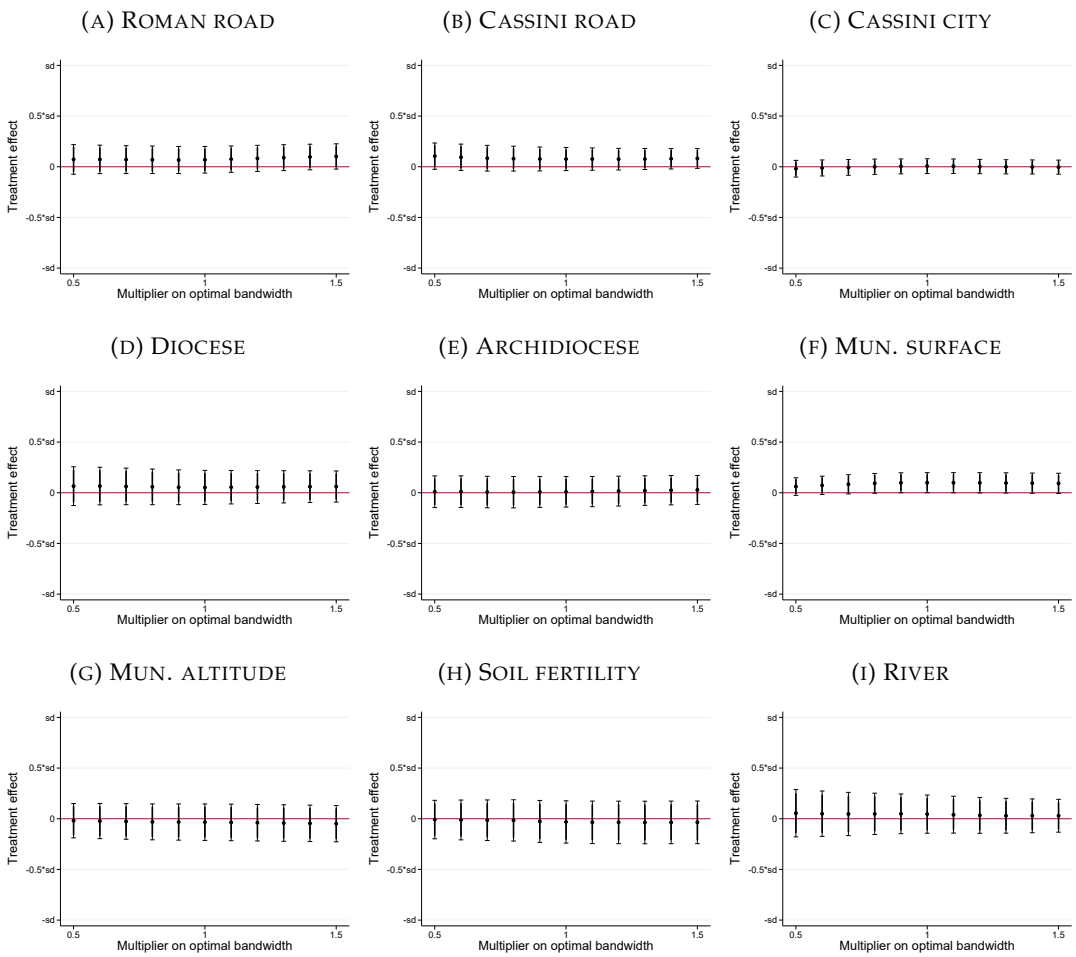


(B) ALL TAX BORDERS



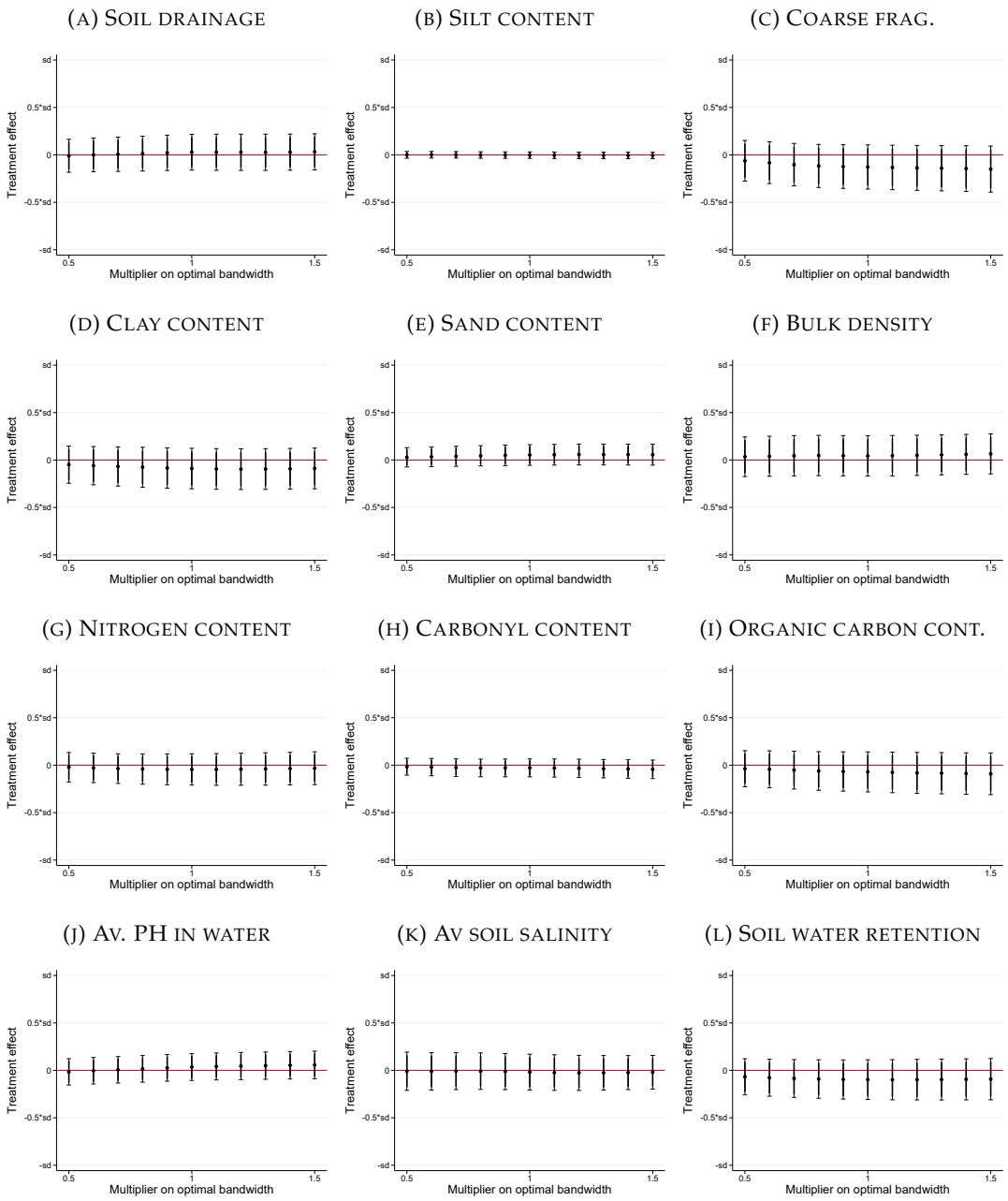
Notes: The plot shows non-parametric RD estimates following Calonico et al. (2014). The dependent variable is the salt tax rate (expressed in pound per minot) according to Figure A7. Panel A focusing on the borders in the first quartile of the tax gap dirferential and Panel B on all the tax borders. The treatment area (i.e., the area with a higher tax rate, compared to the nearest tax border) is coded positively.

FIGURE A12 – BALANCE CHECKS: MUNICIPAL CHARACTERISTICS



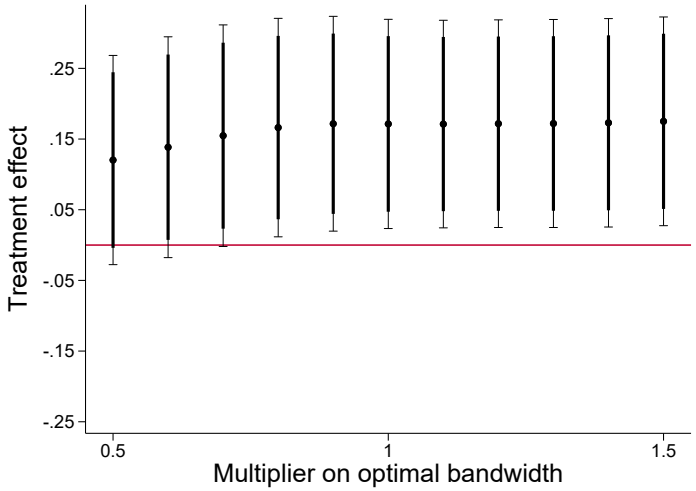
Notes: The figure shows the balance checks run on historical or geographic municipal characteristics. The analysis is a non-parametric RD estimates following Calonico et al. (2014) under optimal bandwidths and polynomial order selection, according to model 2. For each outcome the coefficient estimated on several bandwidth is reported. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility – this last covariate is not included in the analysis of panel H). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. Finally, standard errors are always clustered at the bailliage level.

FIGURE A13 – BALANCE CHECKS: SOIL CHARACTERISTICS



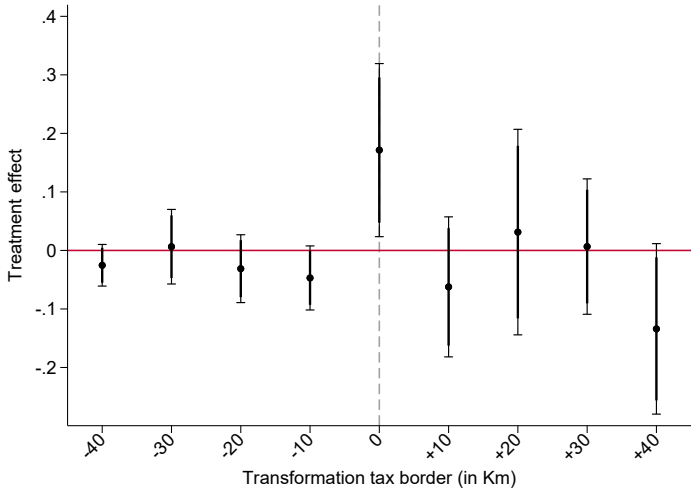
Notes: The figure shows the balance checks run on soil characteristics at the municipal level. The analysis is a non-parametric RD estimates following Calonico et al. (2014) under optimal bandwidths and polynomial order selection, according to model 2. For each outcome the coefficient estimated on several bandwidth is reported. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility – this last covariate is not included in the analysis of panels B and G). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. Finally, standard errors are always clustered at the bailliage level.

FIGURE A14 – RIOTS AROUND THE SALT TAX BORDER: BANDWIDTH SENSITIVITY



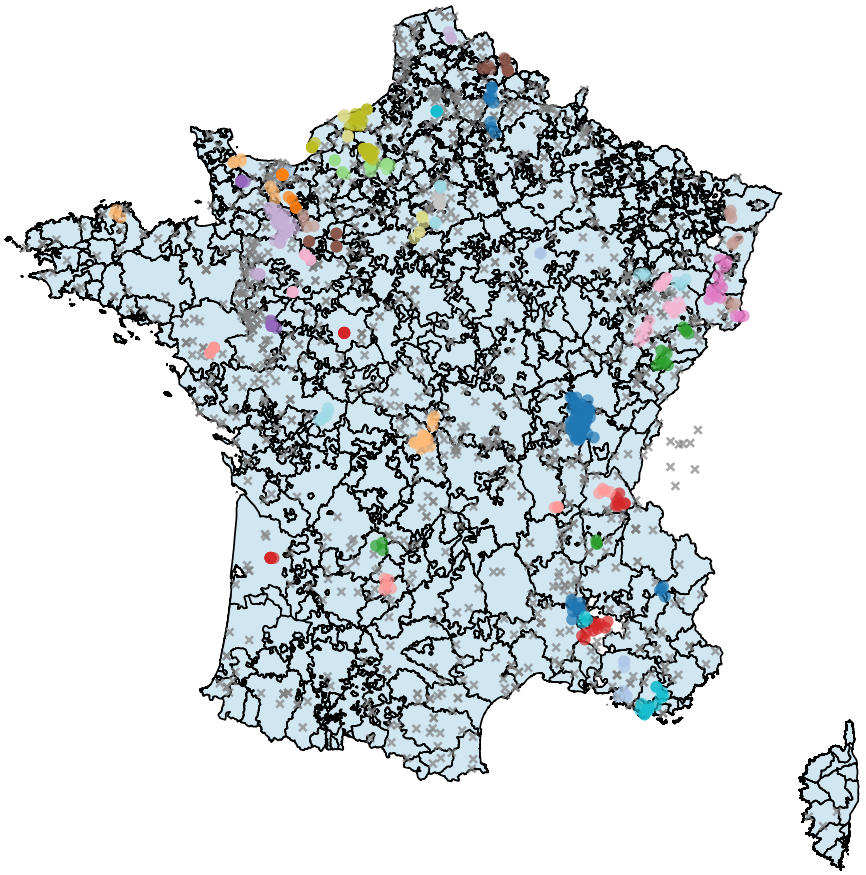
Notes: The plots show non-parametric RD estimates following Calonico et al. (2014) under optimal polynomial order selection, according to model 2. The bandwidth of the analysis are arbitrarily modified between 0.5 and 1.5 of the optimal bandwidth. The dependent variable is economic riots , for the period 1780-1789, and it is standardized. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. Finally, the error term is clustered at the bailliage level.

FIGURE A15 – RIOTS AROUND THE SALT TAX BORDER: FAKE BORDERS



Notes: The plots show non-parametric RD estimates following Calonico et al. (2014) under optimal polynomial order selection, according to model 2. The graph shows placebo analysis in which the tax border has been permuted by $\pm 10/20/30/40$ km. The dependent variable is economic riots , for the period 1780-1789, and it is standardized. The treatment captures the municipalities in the area with a higher rate, compared to the control group. The specification includes border fixed effects as well as a set of municipal controls (population in 1780, coordinates and soil fertility). The sample includes all French municipalities with the exception of those whose closest tax border displays a very small jump, as it belongs to the bottom quartile of the tax differential distribution. Finally, the error term is clustered at the bailliage level.

FIGURE A16 – CLUSTERS OF RIOTS (DBSCAN) (1780-1789)



Notes: Choice of DBSCAN (Density-Based Spatial Clustering of Applications with Noise) as the clustering algorithm is motivated by its ability to identify arbitrarily shaped clusters, naturally isolate outliers (i.e., "noise"), and avoid the need to specify the number of clusters in advance. The minimum cluster size is set to 3 so that each cluster must contain at least three observations; a smaller threshold risks over-splitting events, whereas a larger threshold risks overlooking smaller but still significant clusters. The parameter $\epsilon = 0.05$ is chosen in the standardized feature space (time, latitude, and longitude, all standardized by their respective standard deviations) based on qualitative inspection of the data. Larger ϵ values were found to merge distinct events into excessively large clusters that spanned too far in space and time. Interpretation of ϵ in real-world units is achieved by converting 0.05 standard deviations back to days and kilometers for each subset of data. In the period considered (1780-1789), 0.05 standard deviations corresponds to roughly 56 days in time, approx. 9 km in longitude, and approx. 11 km in latitude.

B Appendix: Data

B.1 Text analysis on riots description

C Appendix: Salt tax borders

C.1 Historical background of main borders

We

Provinces Rédimées The rationale behind the *provinces rédimées* is entirely different. The precise placement of the border between the *provinces rédimées* and the *pays de grandes gabelles* is based on the border of the Duchy of Aquitaine when it first joined the French Kingdom in 1137 following the marriage of Alienor of Aquitaine and the French king. However, long before 1137 and until 1472, the exact placement of the border between Aquitaine and France had continuously changed. The political and military instability of the area is a consequence of its topology (Kitamura and Lagerlöf, 2019).[35] When the region finally joined the Kingdom of France in 1472, it was offered preferential treatment in terms of salt taxation. A tax was still levied but with a much lower rate than in the *pays de grandes gabelles*. Then, between 1537 and 1544, the King attempted to uniform (from above) the salt tax rate. This led to large social unrest in the future *provinces rédimées*. To ease the situation and given the financial pressure imposed on the Kingdom's finances by the Italian Wars, the King offered the region the possibility to pay a large lump sum fee in exchange for a reduced salt tax in the future. Hence, in 1553, the region redeemed itself from the "large" salt tax by paying the king a one-time fee of 1,194,000 livres.[36]

[35] More specifically, it coincides with what geologists call the *Seuil du Poitou*, i.e., where the *Paris* (Northeast) and *Aquitaine* (Southwest) sedimentary basins meet, and hence where we observe a gap between the ancient mountain ranges *Massif Armoricain* (Northwest) and the *Massif Central* (Southeast).

[36] The burden of the fee was carried by those that would have otherwise paid the salt tax. Yet, the fee paid by the clergy and aristocrats appears small in proportion of their economic importance. As such, this should have an attenuation effect on the salt tax border effect, if at all.

FIGURE C1 – FRANCE AFTER THE TREATY OF BRETIGNY (1360)

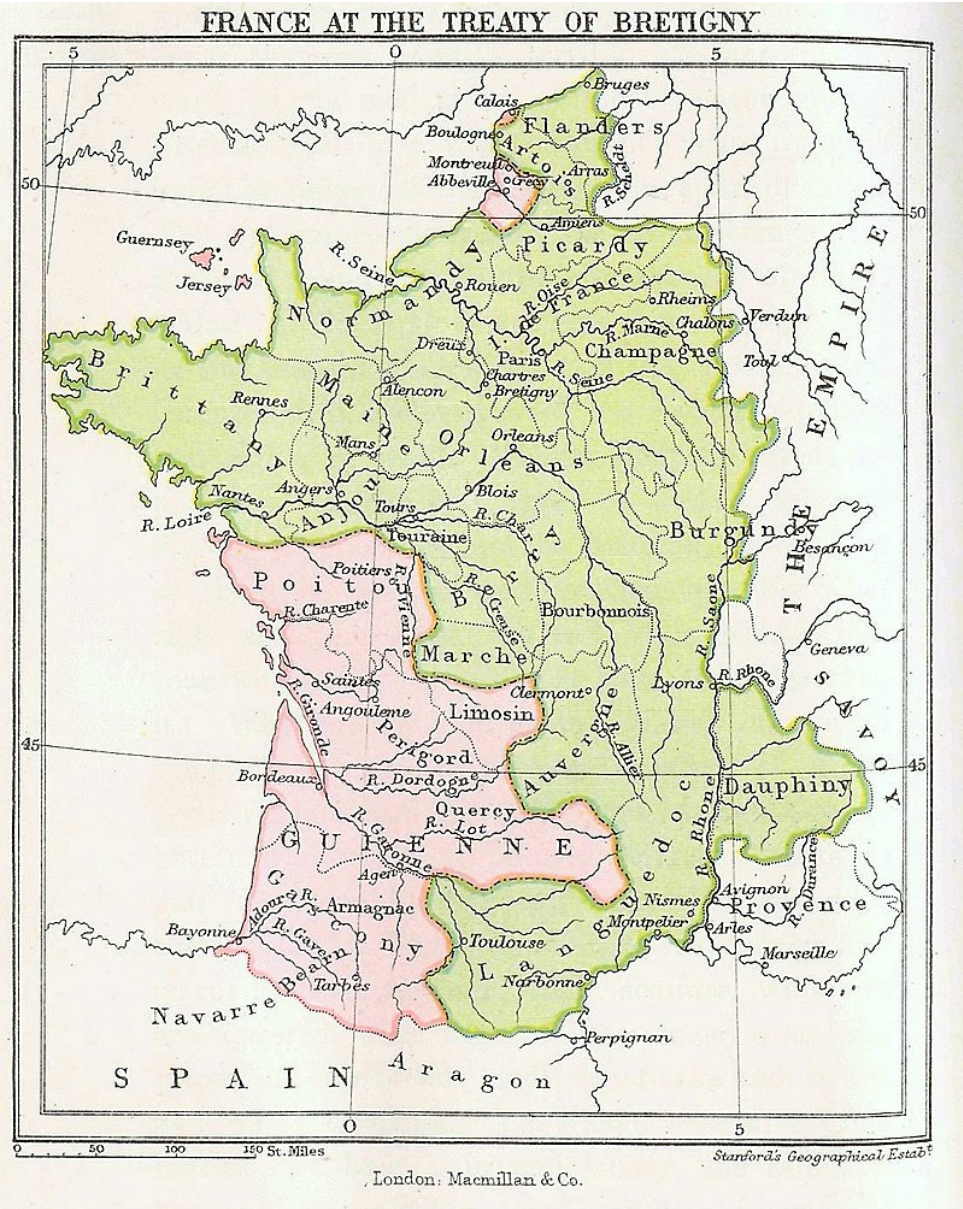
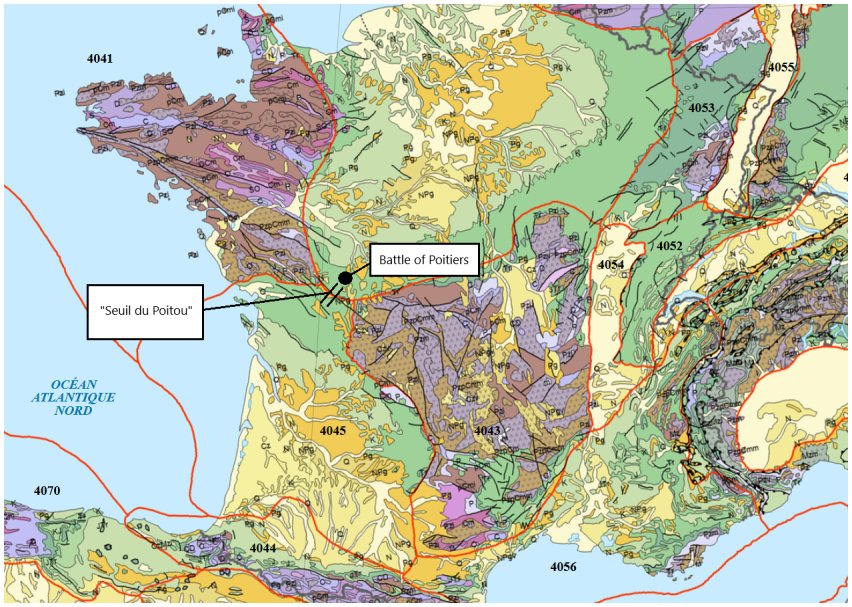
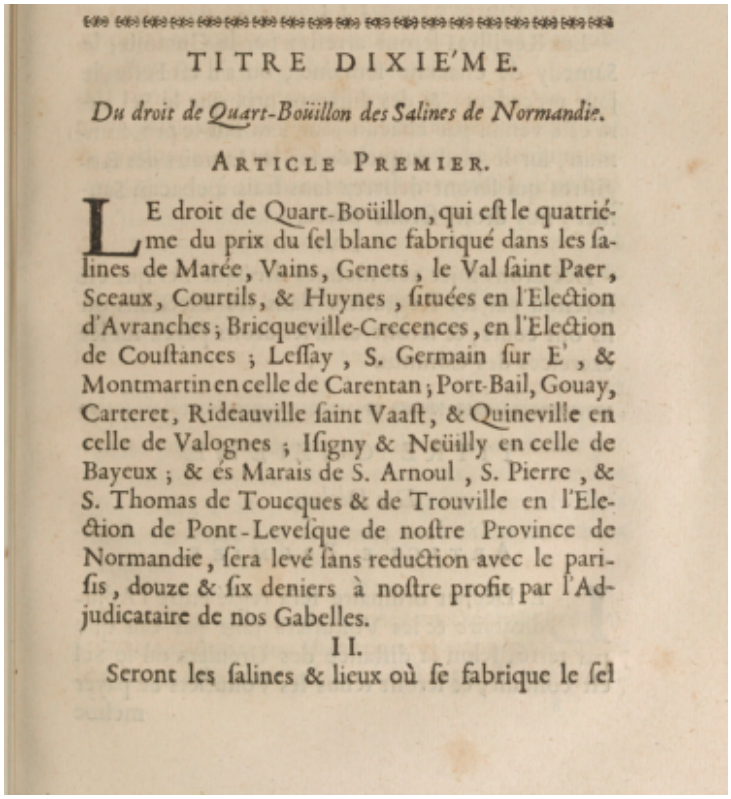


FIGURE C2 – LOCATION OF THE BATTLE OF POITIERS (1356)



Quart-Bouillon The border of the *quart-bouillon* area traces two large pseudo-circular arcs around highly productive salt marshes. This area famously includes the Mont-Saint-Michel salt marshes. Instead of paying a very large salt tax, one quarter of the local salt production was transferred to the King: hence, the name "quart-bouillon". It can literally be translated to "quarter of the stock". Salt was then sold for 13 livres (per minot). Given a wholesale price of about 4 livres, this leads to a 300% tax rate, which is large but much smaller than the 1000% rate in the HTA. The ceased salt was then sold throughout the kingdom. Importantly, the main salt marsh locations where salt was produced are not within the bandwidth in the estimations. Hence, the results are unlikely to be driven by the economic benefits of salt production.

FIGURE C3 – DECREE ON SALT TAX RATE AT LOCAL LEVEL (1680)



TITRE DIXIE'ME.

Du droit de Quart-Boüillon des Salines de Normandie.

ARTICLE PREMIER.

LE droit de Quart-Boüillon, qui eſt le quatriéme du prix du ſel blanc fabriqué dans les ſalines de Marée, Vains, Genets, le Val ſaint Paer, Sceaux, Courtils, & Huynes, ſituées en l'Election d'Avranches; Bricqueville-Crecences, en l'Election de Couſtances; Leſſay, S. Germain ſur E', & Montmartin en celle de Carentan; Port-Bail, Gouay, Carteret, Rideauville ſaint Vaaſt, & Quineville en celle de Valognes; Iſigny & Neüilly en celle de Bayeux; & és Marais de S. Arnoul, S. Pierre, & S. Thomas de Toucques & de Trouville en l'Election de Pont-Leveſque de noſtre Province de Normandie, ſera levé ſans reduction avec le pariſis, douze & ſix deniers à noſtre profit par l'Adjudicataire de nos Gabelles.

II.

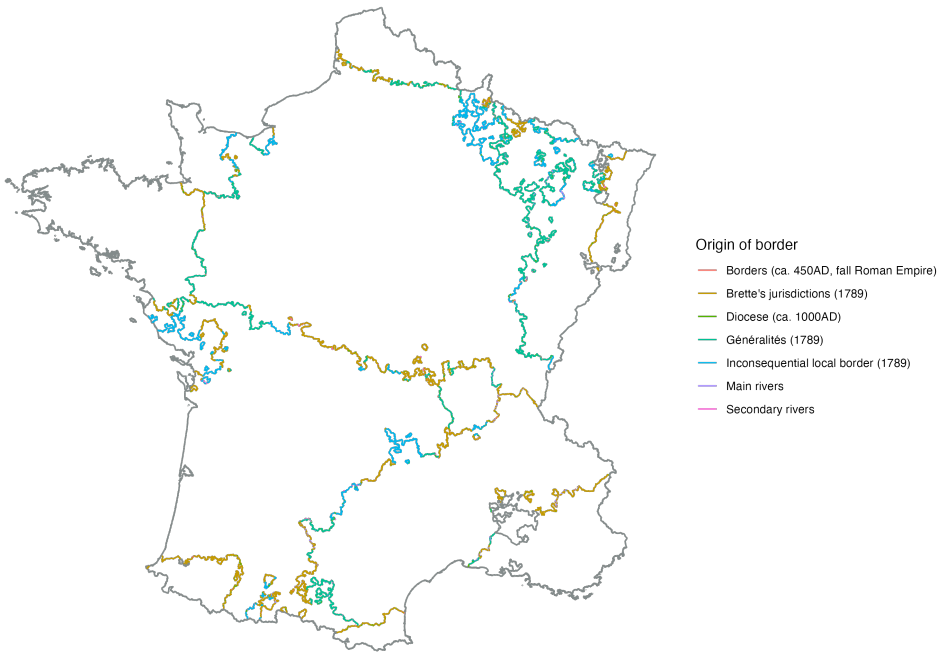
Seront les ſalines & lieux où ſe fabrique le ſel

Notes: XXX Source: National Library of France, BnF.

Pays de salines The placement of the borders of the *pays de salines* was directed by the underground salt density. Similarly, the *pays de salines* – literally "Country of Salines" is a region where salt is highly concentrated in the underground. *Saline* – a mixture of salt and water – naturally flows close to the surface. The border between the *pays de salines* and the *pays de grandes gabelles* contours the natural sources of saline around the current region of Jura close to the French-Swiss border. It is important to mention that whereas the probability of finding salty water when digging is higher in the *pays de salines*, this probability is smooth around the tax border. This probability increases smoothly following water infiltration patterns as one moves closer to the Alps.

C.2 *Border placement tests*

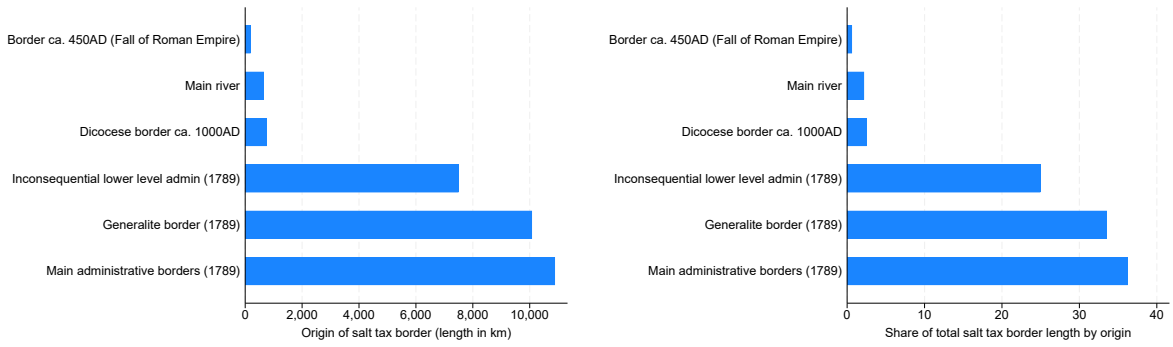
FIGURE C4 – ORIGIN OF THE SALT TAX BORDERS (BY 1KM SEGMENTS)



Notes: XXX.

FIGURE C5 – DECOMPOSITION BORDER SEGMENTS BY ORIGIN

(A) BY LENGTH (IN KM) (B) BY SHARE (%)



Notes: