

GOING POSTAL: STATE CAPACITY AND VIOLENT DISPUTE RESOLUTION

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Abstract

Scholars have long tried to understand the conditions under which actors choose to use violent versus non-violent means to settle disputes, and many argue that violence is more likely in weakly-institutionalized settings. Yet, there is little evidence showing that increases in state capacity lowers the use of violent informal institutions to resolve disputes. Utilizing a novel dataset of violence—specifically, duels—across American states in the 19th Century, we use the spread of federal post offices as an identification strategy to investigate the importance of state capacity for the incidence of violent dispute resolution. We find that post office density is a strong, consistent, and negative predictor of dueling behavior. Our evidence contributes to a burgeoning literature on the importance of state capacity for development outcomes.

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1 Introduction

On July 11, 1804 in Weehawken, New Jersey, the rivalry between two giants of the American founding generation, the inaugural Secretary of the Treasury, Alexander Hamilton, and Vice President, Aaron Burr, came to a bloody apex. Bitter political foes, the enmity between the two culminated on this day with a duel by pistols. Following standard dueling protocol, Burr challenged Hamilton to a duel, having been offended by Hamilton's successful campaign to defeat Burr's bid for the governorship of New York. At the same location that Hamilton's son was killed in a duel three years earlier by a Burr supporter, Burr mortally wounded Hamilton. While dueling was illegal in both New York (their home state) and New Jersey, the latter was chosen on the grounds that New Jersey was less likely to prosecute either for engaging in the activity. Although both states charged Burr with murder and a grand jury in New Jersey indicted him, the charges were ultimately dropped ([Winfield, 1874](#)). Burr would go on to complete his term as Vice President without prejudice.

Clearly, such a bloody affair was an inefficient resolution to a long-standing conflict between these two men. Moreover, the failure of the state to adequately punish Burr maintained an unfortunate precedent, as many more duels would be fought on this spot in the subsequent years.¹ Does this event, and the pervasiveness in this period of dueling to solve conflicts, reflect a long-ago "culture of violence"? Did duels serve as the "[rules] that [were] neither promulgated by an official source, such as a court of a legislature, nor enforced by threat of legal sanctions, yet [were] regularly complied with" ([Posner, 1997](#), p. 365)? Or does the weakness of the early republic's political institutions better explain the pervasiveness of this violent informal institution?

Answering this question is important to our understanding of the incidence of violence and peaceful conflict resolution across societies. Indeed, scholars have long argued that

¹The "Weehawken dueling grounds" was the site of 18 documented duels and likely many unrecorded ones between 1700 and 1845.

a society's ability to resolve disputes efficiently and non-violently is essential to not only maintaining order but a critical pillar of development.² In weakly-institutionalized societies, informal institutions and norms play a more central role in dispute resolution (Milgrom and North, 1990). Yet, societies that can rely on formal institutions to adjudicate disputes and credibly enforce its rules are less prone to break down into violence, especially when reputation and commitment problems are present (Bates, 2001; North et al., 2009).³

For any formal system to be effective, however, the state must have the capacity to not only adjudicate disputes fairly but also enforce compliance to its ruling. Scholars in comparative political economy have increasingly focused on the importance of the state's capacity to enforce its rule as an important determinant of economic development (e.g., Besley and Persson, 2009; Michalopoulos and Papaioannou, 2013; Dincecco and Katz, 2014; Acemoglu, Garcia-Jimeno and Robinson, 2015; Dell, Lane and Querubin, 2018). Despite the prominence of this view, there is a paucity of comparative empirical evidence that identifies the effects of state strength on minimizing violence, especially informal institutions to resolve conflicts. There is even less empirical evidence using panel data measuring within-unit changes in state capacity on changing rates of the use of violence to resolve disputes.

In this paper, we investigate the role that state capacity had on the incidence of dueling using a panel of US states over the 19th Century. Like many developing countries, the

²That is, mechanisms to resolve disputes non-violently are seen as critical for expanding the scope of impersonal exchange by lowering transaction costs and credibly protecting property rights (e.g., Besley and Persson, 2009; Knight, 1992; North, 1990; North et al., 2009).

³It is commonly argued that bargains that avoid costly violence that are struck in weakly-institutionalized societies without centralized third-party enforcement lack credibility (Bardhan, 1993). Ellickson (2009), among others, however, emphasizes the importance and efficiency of informal institutions and norms even in strong states. A large literature has emerged on the costliness of relying solely on third-party enforcement (Gintis et al., 2003) and there is strong evidence of at least the complementarities of formal and informal institutions as necessary to enforce cooperation, maintain order and resolve disputes non-violently.

pre-20th-Century U.S. states were in the early stages of political and economic development and, especially in the early 19th Century, remained an overwhelmingly pre-industrialized and agriculture-based society.⁴ Hence, an institutional environment of weak states, which continues to characterize many societies in the world today, also characterized many of the U.S. states in this period. Yet, in critical ways, as we discuss below, the degree of institutional and economic development varied significantly across states and time. Exploiting these contextual features, we investigate the relationship between state capacity and the spatial and temporal incidence of dueling in a panel of all states using a novel dataset consisting of all duels that occurred in the 19th Century as reported in over 1,000 newspapers (Byron, 2008).

Following Acemoglu, Moscona and Robinson (2016), we use the number of federal post offices in existence at the state level as a proxy of the extent of state capacity. This not only provides a plausibly exogenous source of variation across states and time in state capacity, as post office locations were determined by the federal government, it is also a good measure of the extent of the federal government in the early Republic. For instance, in 1831, approximately 76% of all civilian federal employees worked for the post office, a figure that was greater than the size of the country’s military (John, 2009, p. 3). A recent literature has demonstrated the crucial economic and political role that post offices played in spreading information and creating a network that connected the large and sparsely populated country (e.g., John, 2009; Acemoglu, Moscona and Robinson, 2016; Rogowski et al., 2017). Given that mail was only transported from post office to post office until the late 19th Century, proximity to a post office was vital to being connected to the country’s political and economic life. Perhaps, more critically, post offices were the primary “infrastructural capacity” of the

⁴For instance, according to the 1820 Census, the share of Americans living in cities of at least 2,500 people was 7.2%; and, in no state did this exceed 25%.

federal government in this period, especially in the country’s vast interior.⁵ As a result, [Acemoglu, Moscona and Robinson \(2016, p. 62\)](#) claim that the “presence of a post office is indicative of a much broader state presence and functionality, for example, via legal services and regulation, access to land, and security of other forms of property rights.”

Using American states in a panel model allows us to minimize many of the omitted factors that bias cross-national empirical studies. Namely, the states shared the same colonial history, and did not vary as significantly as countries in terms of cultural, linguistic, and religious diversity. Our empirical strategy also allows us to control for variation across states in a number of institutional factors that could explain the reliance on formal institutions and which are often observed jointly with increases in state capacity. Namely, we control for the timing in which states removed economic suffrage restrictions on adult white men, political party competition, and whether state-level judges were given lifetime appointments (and therefore plausibly insulated from local politics). Furthermore, we also control for development and other regional factors that could influence the incidence of dueling. Even after accounting for these confounding factors, we find that state capacity has a large, negative effect on dueling propensity; that is, states with a larger capacity (as measured by the number of post offices) have lower incidence rates of dueling. This is true whether or not the duel took place in the South, a region in which dueling’s pervasiveness is often explained by a prevailing “culture of honor” (e.g., [Greenberg, 1990](#)). Our results also survive a series of robustness tests including controlling for state fixed effects and using different measures of state capacity (such as per capita state tax revenues).

These findings provide one of the first comparative designs that show that increases in state capacity reduce the use of violent informal institutions to resolve disputes. Furthermore,

⁵We use the famous conception of capacity by [Mann \(1984\)](#), who defined a state’s “infrastructural power” as the “institutional capacity of the state to actually penetrate civil society, and to implement logistically political decisions throughout the realm” (p. 189).

our data and strategy of using federally-determined post offices allow us to identify the effects of state capacity independently of other state-level institutional factors that might influence the use of dueling. Not only does this contribute to the recent literature on the importance of early investments in state capacity on later development outcomes (e.g., [Michalopoulos and Papaioannou, 2013](#); [Dincecco and Katz, 2014](#)), our evidence also suggests that one critical channel by which this happens is through the reduction of violent informal institutions to resolve disputes.

2 The Institution of Dueling

Dueling is a premeditated form of violence between two combatants with matching weapons, and usually in accordance with agreed upon, and highly ritualized, rules of engagement. It was a common practice in Europe, and was brought by European settlers to British North America during the colonial era (1607-1775). By the time of American Independence, the “affair of honor,” as dueling was known, was a prevalent form of conflict resolution throughout the original 13 states, and spread west with the rapidly enlarging country. Although dueling is often considered to be a Southern institution, the number of recorded duels in the North was similar in the early 19th Century. While dueling remained an integral extralegal form of dispute resolution in the South until the U.S. Civil War (1861-1865), it declined rapidly in the North in the early 19th Century. By the early 20th Century, recorded duels had essentially disappeared everywhere in the U.S.

Although dueling was illegal in nearly every state, [Wells \(2001, p. 1831\)](#) argues “their enforcement [relied] too heavily on men deeply embedded in the very social practices the laws sought to overturn.” Given the duel’s prevalence and its near formal status as a method of dispute resolution, scholars have developed several theories to explain the prevalence of its use in the 19th Century. Perhaps the most common explanations focus on cultural determinants.

In particular, the US South is argued to have embodied a “culture of honor” in which reputation and honor were paramount, and precluded legal remedies to disputes (Greenberg, 1990). To settle a case of libel in the court system and accept monetary compensation for personal insult was for “women, cowards, and those religiously opposed to engaging in the more speedy process” (Johnson, 1937, p. 45). This emphasis on a highly individualistic extralegal method of dispute resolution is epitomized in the North Carolinian proverb, “Every man should sheriff his own hearth.”

This culture of honor could certainly be endogenous to a society’s institutional quality. In a society with weak third-party enforcement of contracts, economic exchange will be heavily dependent on reputation. Therefore, protecting one’s honor through costly dueling, could be a strong signal of one’s integrity and social capital (Allen and Reed, 2006). Similarly, it has been argued that the prevalence of duels in the South was due to the fact that credit markets were less formal and more based on personal ties in the South (Kingston and Wright, 2010). Without the institutional capacity to determine who was worthy of some financial service, such as a loan, and punish fraud, another screening process was necessary (i.e. the duel). By dueling a man shows his willingness to defend his honor, thus highlighting his trustworthiness and integrity. Each argument raises the possibility that the incidence of dueling is endogenous to institutional development, and we should see a decline in violence as formal state institutions improve.⁶

3 Data

In this section, we describe the variables we use to test the importance of state capacity on dueling incidence. The sample for the panel is by state-decade between 1800 and 1900. The

⁶See, for instance, Beck, Demirgüç-Kunt and Levine (2003), who argue that legal institutions influence the development of financial systems.

summary statistics for each variable are presented in Appendix Table A-1.

3.1 Measuring State Capacity: Post Offices

For our primary measure of state capacity, we use the number of post offices in each state per decade. In doing so, we follow [Acemoglu, Moscona and Robinson \(2016\)](#) who use the number of post offices to test the relationship between post office expansion and patents filed. While often associated with patronage, [John \(2009\)](#) and other historians have recently argued that the post office was perhaps the federal government’s primary state-building policy in this period. Furthermore, he argues that in the lives of most Americans, the post office was the only visible arm of the government ([John, 2009](#), p. 4).

The use post offices is a measure of state capacity is appropriate in this context for a number of reasons. For one, it was the primary tool used by the federal government to connect the far-flung and often remote residents of the US. At the time of the U.S. Constitution’s adoption (1788), there were 75 post offices, mostly in the country’s few coastal towns. With the landmark Postal Service Act of 1792, and many subsequent important pieces of legislation thereafter, Congress created a network that in words of noted political theorist, Francis Lieber, was “one of the most powerful agents of civilization” (as cited in [John, 2009](#), p.13). The expansion of this network was swift, and by 1860, there were nearly 29,000 post offices from coast to coast. A key to the argument on the importance of post offices is that mail was not delivered to residential addresses until late in the period of our study. Thus, proximity to a post office was crucial to having access to most of the country’s economic and legal institutions ([Acemoglu, Moscona and Robinson 2016](#)). Second, the postal service comprised an enormous share of the federal bureaucracy. To wit, by 1841, nearly 80% of the entire civilian federal work force was employed by the postal service. In the words of one New York Times columnist in 1852, the postal service was the “mighty arm of civil government” ([John, 2009](#), p. 10).

This argument on the importance of post offices in building state capacity in the U.S. is consistent with recent work by [Rogowski et al. \(2017\)](#) who show that post offices are not only a good metric of state capacity within the United States but globally as well. Despite the findings that the expansion of post offices spurred development in the U.S. and elsewhere, we may still be concerned that this relationship reflects reverse causality (i.e., post office incidence reflects development and not vice versa). The policy by which new post offices were created assuages some of these concerns. According to [Acemoglu, Moscona and Robinson \(2016, p. 62\)](#), “the expansion of the postal network reflected a range of idiosyncratic factors and motivations”. One factor was that the goal of the postal service was to create an information network that connected a vast and largely rural nation ([John, 2009](#)). As a result, and while the postal service was supposed to balance the choice to open new routes with concerns over their commercial viability, offices were frequently opened in remote and unprofitable locations. That is, federal politics tended to trump local economic conditions when opening post offices.

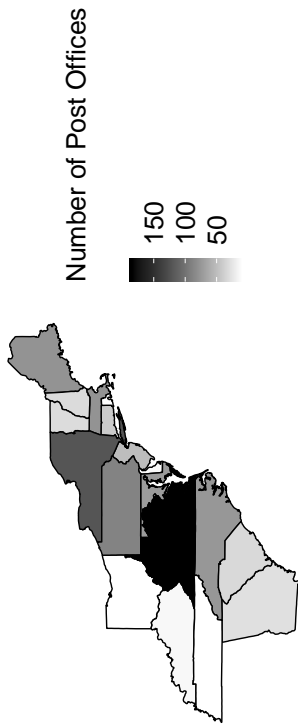
To construct this variable, we consult the official records of the United States Postal Service and create a dataset of the number of post offices in existence across states and decades. For our measure, in each state, we count the number of post offices in existence at the beginning of each decade of our dueling data. Following [Acemoglu, Moscona and Robinson \(2016\)](#), we transform this variable by taking the logarithm of the number of post offices plus one.⁷ Figure 1 shows the growth of the United States Postal Service over time across states. Consistent with [John \(2009\)](#), the number of post offices grows almost exponentially over time (which can be seen by examining the shifting scales of shading for each map). In 1800, Virginia had the most post offices with 184. By 1890, Pennsylvania had the most with 4,780.

We supplement our primary proxy of state capacity with additional measures. For one,

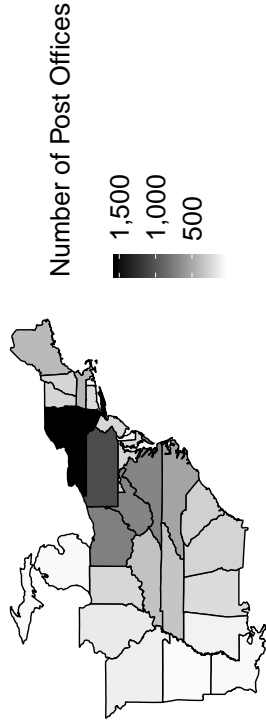
⁷All results presented below remain significant with the unlogged scale.

Figure 1: Growth of Post Offices, 1800–1899

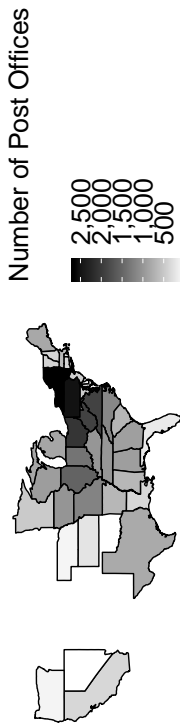
(a) 1800s



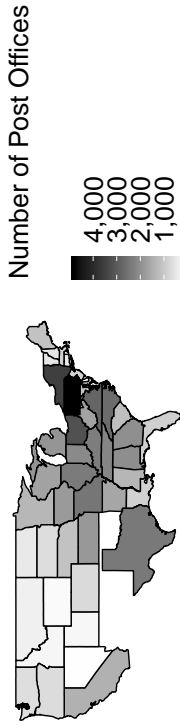
(b) 1830s



(c) 1860s



(d) 1890s



we test two separate constructions of post-office incidence in our panel specification: 1) post offices per 1,000 square miles and 2) post offices per capita, respectively. Second, we use an alternative measure of state capacity, namely, per capita state tax revenues. These variables and the results are discussed below in Section 5.

3.2 Controls

3.2.1 Controlling for Institutional Quality

We want to estimate the influence of state capacity independent of other institutional factors that might influence the incidence of dueling. We include three such measures. Given the theories claiming that the prevalence of violent norms of conflict resolution may be related to the perceived impartiality of the state’s judicial system, we include a measure of judicial independence. Specifically, we measure whether a state’s judges were appointed for lifetime terms in that decade. We derive this measure from the American Judicature Society (AJS) and, therein, note all formal changes to each state’s judicial system from inception to 1900.⁸ This method of judicial selection was one of three major methods of selection used in the 19th Century—the other being elections and selection for fixed terms. The introduction of judicial elections by voters was initially one of the Jacksonian-era political reforms designed to wrest control of the judiciary from elites and place it in the control of the masses (Nelson, 1993). Although perhaps well-intentioned, some scholars have argued that an elected judiciary is even more prone to corruption than lifetime appointees (e.g., Rose-Ackerman, 2007).

Second, we include a measure of how inclusive access to political power was across states. We create a variable measuring whether a state had any economic restrictions on suffrage for adult white males. While most states removed all restrictions over the first half of the

⁸The data for this are available at the AJS’s website: http://www.judicialselection.us/judicial_selection/reform_efforts/formal_changes_since_inception.cfm?state=.

19th Century, there was significant variation in the timing. Moreover, a few states even maintained tax-paying restrictions over the entire period of our data. We code the timing in which state's removed these restrictions according to [Keyssar \(2009\)](#).

Finally, we also consider the importance of political competition. [Alt and Lassen \(2008\)](#) argue that the propensity for corruption is *higher* in U.S. states where one party dominates. Thus, higher political competition should capture states with less corruption. Building on this insight, we construct a variable measuring the effective number of political parties representing each state at the federal level during each decade in our data using the [Laakso and Taagepera \(1979\)](#) formula.⁹ Since each Congress is a two-year period, we pool together the delegations for each of the five Congresses during the decade. The effective number of parties tells us whether or not there is substantial electoral competition in the state. As a robustness check, we also include an alternative, and perhaps more appropriate, measure of political competition: the number of effective political parties in the state legislatures (as collected by [Dubin \(2015\)](#)). However, we only use this as a robustness check because, for the early decades of our sample, this information is largely unavailable.¹⁰

3.2.2 Controls for Development

In addition to these variables, we also consider four other explanatory variables that may have additional influence on the frequency of dueling. One concern is that economic development could explain both increases in the number of post offices and declines in dueling. While federal policy of creating postal routes before they were commercially viable mitigates some

⁹According to this formulation, the effective number of parties is $1/\sum_i p_i^2$, where p_i is the fraction of seats held by party i .

¹⁰Re-running the models described below using state legislative data for years in which we have it (approximately 1830-1900) produces substantively similar results.

of this concern, we include two controls for development.¹¹ Unfortunately, state income per capita is only available for a few years of the sample. Yet, in this era of pre-industrialized economies, changes in urbanization should capture increasing economic development.¹² We therefore include the U.S. Census’ measure of the share of each state’s population living in towns of at least 2,500 residents. Second, in all models that we consider below, we account for state population using the total number of inhabitants by state and decade. In the American context in which the native population was killed or removed and otherwise not counted in the Census, rapid changes in population reflect to some extent development through the channel of in-migration (both domestically and internationally). Therefore, if population growth alone determined the expansion of the postal network (contra the arguments of John (2009)), it is important to control for changes in population.¹³ This concern is further mitigated by showing that our estimates are robust to measuring state capacity as the number of post offices per capita (see Table 3 below).

3.2.3 Other Controls

Lastly, we include two different regional dummies—one for whether or not one of the state belongs to the South (the eleven states of the Confederacy) and another for whether the state entered the Union during the decade in question. These dummies capture fundamentally different aspects about the role of geography and dueling.¹⁴ Since one explanation for dueling is that it was about a culture of honor, the *South* dummy controls for the region in which

¹¹See [Acemoglu, Moscona and Robinson \(2016\)](#) for additional evidence that post office expansion was not driven by economic development

¹²In 1800, the first year of our sample, the country’s urbanization rate was 6% and tiny Rhode Island had the highest rate at 20%. By 1900, the last year of our sample, the country’s urbanization rate was nearly 40%, and three states exceeded 70%.

¹³That is, the population of rapidly developing states, such as New York, grew much faster than more economically stagnant states, such as in the South.

¹⁴For the South dummy, the results hold if all 15 slave states are included.

honor played a key role in societal interactions (Grosjean, 2014). For the *New State* dummy, the logic is related to the discussion of state capacity above. At the time of independence, there were 13 states, each of which was largely arrayed on along the Atlantic Coast. New states were added periodically as they came to be settled. By 1900, the last year of our sample, there were 45 states. New states should be less institutionally developed than older states and, as such, we should expect more violence in these locales. As an additional robustness check, we consider model specifications that omit these dummies and replace them with state fixed effects.¹⁵

3.3 Measuring Violence: Dueling Incidence

While dueling was a well-chronicled and highly-ritualized institution of the early Republic, lists of duels in the U.S. are notoriously hard to come by. As a result, most extant data sources massively undercount the number of duels. To ameliorate this, Byron (2008) combed through more than 1,000 newspapers (both digitized and microfilm) from all regions in the United States for the period of 1783 to 1899. Using this newspaper-culling approach, Byron found 734 duels. For the vast majority, he was able to find the names of the duelists, the date of the duel, the state in which each duel occurred, and whether a duelist was injured or killed. While certainly an undercount, newspapers—including small, local ones—are the single best resource available to identify the occurrence of duels.¹⁶

While measurement error in the dependent variable is a concern, the bias likely works against our estimates. For one, newspaper coverage was almost certainly correlated with post office incidence. One of the key provisions of the aforementioned Postal Service Act of 1792

¹⁵These results are presented in Table 3.

¹⁶Prior to Byron's (2008) work, the only other comprehensive list of duels came from Sabine (1859). Sabine's (1859) list—which ended in 1859—included 353 duels. In our data, for the same period of time, we have 468. This suggests that Byron's data, albeit incomplete, is far more comprehensive.

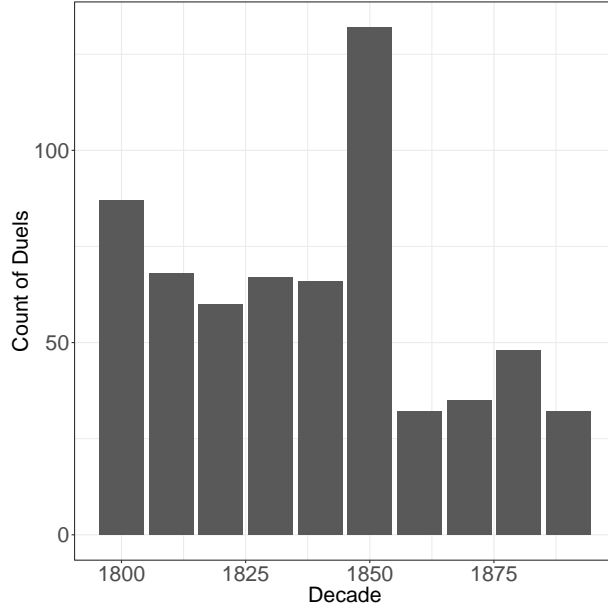
was the highly subsidized rates charged to mailed newspapers, especially local ones (John, 2009). Hence, post offices indirectly subsidized local newspapers. If post offices also predict the likelihood that dueling was reported, then any estimates of the relationship between state capacity and dueling frequency should be downwardly biased.¹⁷ We provide evidence for this claim using Grosjean’s (2014) measure of the number of newspapers by state in 1840. As shown in Appendix Figure A-2, our post office measure of institutional capacity is quite highly correlated with this measure of newspaper incidence.

For our empirical models, we operationalize this database by aggregating the number of duels across states decennially; that is, we count the number of duels that took place in each decade from 1800–1899 in each state. Based on this metric, Figure 2 shows the evolution of dueling aggregating across states over time. In this figure, we notice that dueling is relatively steady, albeit falling, in the early 19th Century, rises prior to the Civil War, and mostly declines thereafter. This spike in dueling was driven by the nation’s expansion westward, in general, and the California Gold Rush, in particular. The non-monotonic nature of this data provides us with the temporal variation, along with the great spatial variation in the incidence of dueling, to test state capacity’s role in driving this trend.

Further to this point, we examine the evolution of duelists’ professions and social status across time in Figure 3. We complemented Byron’s data by performing extensive digital archive searches for the profession, education, wealth, and other demographic information of each duelist in his dataset. Elites here are defined as lawyers, doctors, plantation owners, merchants, and—importantly—politicians. As the figure shows, during the early years of our data, dueling was predominantly an activity of elites. However, beginning around 1850, the share of duels involving elites fell dramatically. Recall from Figure 2 that the number of duels spiked at this very moment. Indeed, the rise of dueling in 1850 and its continued existence through the end of the 19th Century was driven, in large part, by the democratization of the

¹⁷Appendix B offers a more formal walk-through of this argument.

Figure 2: Duels Over Time



duel.

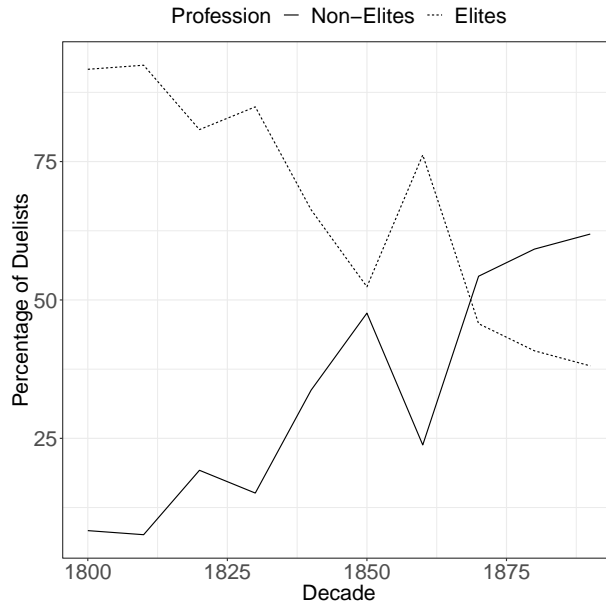
4 Empirical Evidence

To test the relationship between state capacity and dueling, we run a series of cross-sectional panel regressions.¹⁸ The unbalanced panel is by decade-year, and the sample consists of each state that exists in each decade between 1800 and 1900. Across all models, our goal is to model the relative incidence rate of dueling, offset by the total state population during the decade in question. In these regressions, the general specification is of the form

$$\begin{aligned}
 \mathbb{E}[\text{Duels}_{s,d}] &= \exp\{\gamma_0 + \gamma_1 \log(\text{post offices}_{s,d} + 1) + \gamma_2 \% \text{ Urban}_{s,d} + \gamma_3 \text{South}_s \\
 &+ \gamma_4 \text{Lifetime Judges}_{s,d} + \gamma_5 \text{New State}_{s,d} + \gamma_6 \text{Number Eff. Parties}_{s,d} \\
 &+ \gamma_7 \text{Suffrage Restrictions}_{s,d} + \gamma_8 d\}
 \end{aligned} \tag{1}$$

¹⁸Summary statistics for our data around found in Table A-1 in the Appendix.

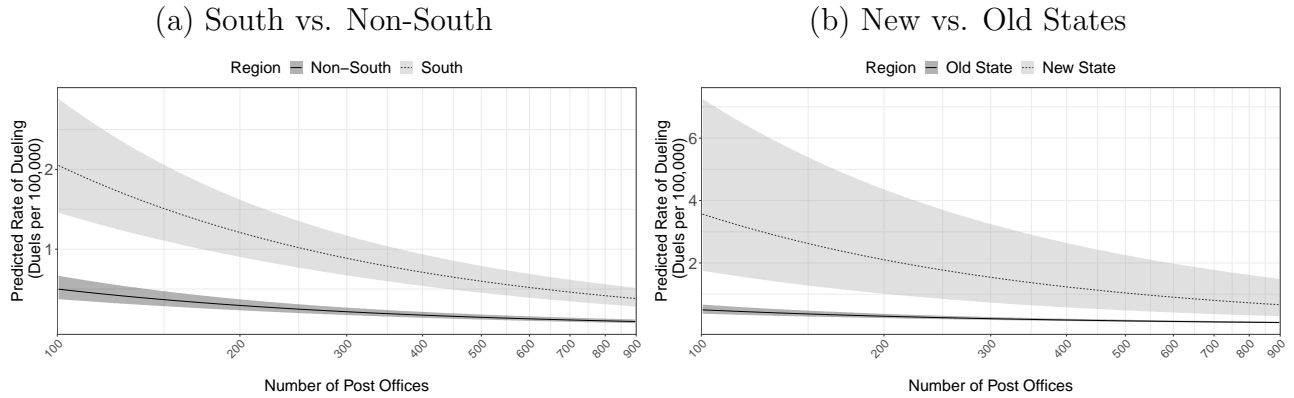
Figure 3: Duelists by Profession



Each variable is as described above save for the final one, a control variable for the secular decline in duels seen above in Figure 2. Our main parameter of interest is that for post offices. Note that all variables, save for the South dummy, vary by both states and time. Also note that, the dependent variable is the number of duels during decade d while *all* other time-varying covariates are measured at the start of the decade; for example, the number of post offices is the count of post offices in state s at the beginning of decade d . Given the number of duels is a count variables with potential over-dispersion across panel units, the Negative Binomial model is our preferred approach to capturing the data generating process. That said, we also consider linear models and, as we will show, the results are substantively similar.

The first set of general results are presented in Table 1, which is organized into two groups. The first group uses the counts of duels as the dependent variable and treats the (log of) population in the state-decade as a control variable. The second group *offsets* the number of counts by population, thereby allowing us to model the rate of duels per unit of

Figure 4: Predicted Number of Duels per 100,00 Population



population. Within each group, the first two columns use a linear regression framework (with the dependent variable equal to the logged number of duels plus one) and the second two use Negative Binomial specifications. The first and third columns only control for the key variable of interests—the number of post offices—whereas the other two include all relevant controls.

Across all specifications, the number of post offices is negative and precisely estimated; the more post offices in a state, offset by population, the lower the incidence of dueling in that state. The dummy for whether or not the state entered the data in the decade in question is also large and significant across specifications. Since this is, in effect, another measure of state strength, the combined effect of the lack of post offices and being in a newly-formed state is large. By comparison, the control for the South is positive but comparatively smaller in magnitude. This suggests that, while that region does have a larger incidence of dueling, state capacity seems to be a much stronger predictor of violence. None of the other controls are consistently significant across specifications.

Given the logged nature of the variables and our preference for the Negative Binomial specifications, it is much easier to get a sense of the magnitude of the effects of post offices on dueling by using marginal effects. We use the final model—the fully-specified Negative

Table 1: Predicting the Rate of Dueling by State, 1800-1899

<i>Model Type</i>	Counts			Rates (offset by population)		
	OLS	OLS	Pooled NB	OLS	OLS	Pooled NB
Intercept	-2.561*** (0.439)	-2.416*** (0.766)	-8.463*** (1.221)	-7.174*** (0.155)	-7.372*** (0.226)	-7.244*** (0.311)
Pop. (logged)	0.412*** (0.053)	0.381*** (0.092)	1.150*** (0.141)			
Post Offices (logged + 1)	-0.365*** (0.052)	-0.326*** (0.102)	-1.039*** (0.125)	-0.874*** (0.027)	-0.958*** (0.042)	-0.914*** (0.054)
% Urban		0.014 (0.387)	-0.127 (0.889)		-1.457*** (0.342)	-0.017 (0.748)
South		0.723*** (0.096)	1.403*** (0.198)		0.473*** (0.095)	1.414*** (0.186)
Lifetime Judges		-0.024 (0.101)	-0.086 (0.216)		0.025 (0.108)	-0.091 (0.214)
New State		0.542** (0.237)	1.940*** (0.480)		0.741*** (0.252)	1.967*** (0.466)
Num. Eff. Parties		0.019 (0.043)	0.107 (0.088)		0.059 (0.045)	0.104 (0.086)
Suffrage Restrictions		-0.121 (0.110)	-0.414* (0.231)		-0.153 (0.118)	-0.410* (0.231)
Decade Counter		-0.035 (0.034)	-0.098 (0.076)		0.124*** (0.027)	-0.109* (0.059)
R ²	0.145	0.354		0.751	0.770	
Adj. R ²	0.140	0.335		0.750	0.764	
Num. obs.	358	314	358	358	314	314
RMSE	0.732	0.650		0.847	0.696	
AIC			1165.899			1164.855
BIC			1181.421			1176.496
Log Likelihood			-578.949			-495.405
Deviance			318.256			295.007

Note: cell entries are either OLS or Negative Binomial coefficient estimates with standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The first four models treat state population as a control variable and the next four models offset the counts of dueling by state populations. For OLS models, the dependent variable is the log of the number of duels plus one whereas, for the Negative Binomial models, the dependent variable is the number of counts.

Binomial with a population offset—to generate predicted rates of dueling per 100,000 inhabitants.¹⁹ Figures 4a and 4b present such predicted rates, varying the number of post offices from the first to the third quartiles (and returning to the un-logged scale for ease of interpretation) and region—either South vs. non-South in the former or new vs. old state in the latter. All other covariates are held at typical values. We can see in these figures that the expansion of state capacity is strongly associated with a drastic reduction in the rate of dueling. For Southern states with few post offices, the dueling rate is about 2 per 100,000 residents; for non-Southern states, it is just over 0.5. As state capacity increases, the gap between the two shrinks to near zero. The differences are even starker when comparing new and old states. New states with low state capacity have a dueling rate nearly equivalent to the contemporary homicide rate in New York City.²⁰

Table 2 reports the estimates by additional sub-samples of the data. In each of these columns, we split the data temporally (pre- and post-1850), regionally (South vs. non-South), and based on state age (states in existence by 1800 and those formed after). Across all of these data slices, we find that post office presence is always statistically significant and precisely estimated. Interestingly, the effect size for Southern and non-Southern states is virtually the same; that is, even in the region dominated by a “culture of honor,” state capacity nevertheless mattered for the presence or absence of violent dispute resolution. Also of note: the effect of being a new state was not statistically significant prior to 1850 but, after is strongly correlated with dueling propensity. While this no doubt is due in part the lack of news reporting along the remote frontiers of the early Republic, it also likely reflects the geography of Western expansion. New states formed after 1850 were increasingly farther from Washington, D.C., and therefore increasing the cost to the central government

¹⁹This choice was not arbitrary, as contemporary rates of homicides and other crimes are typically portrayed this way.

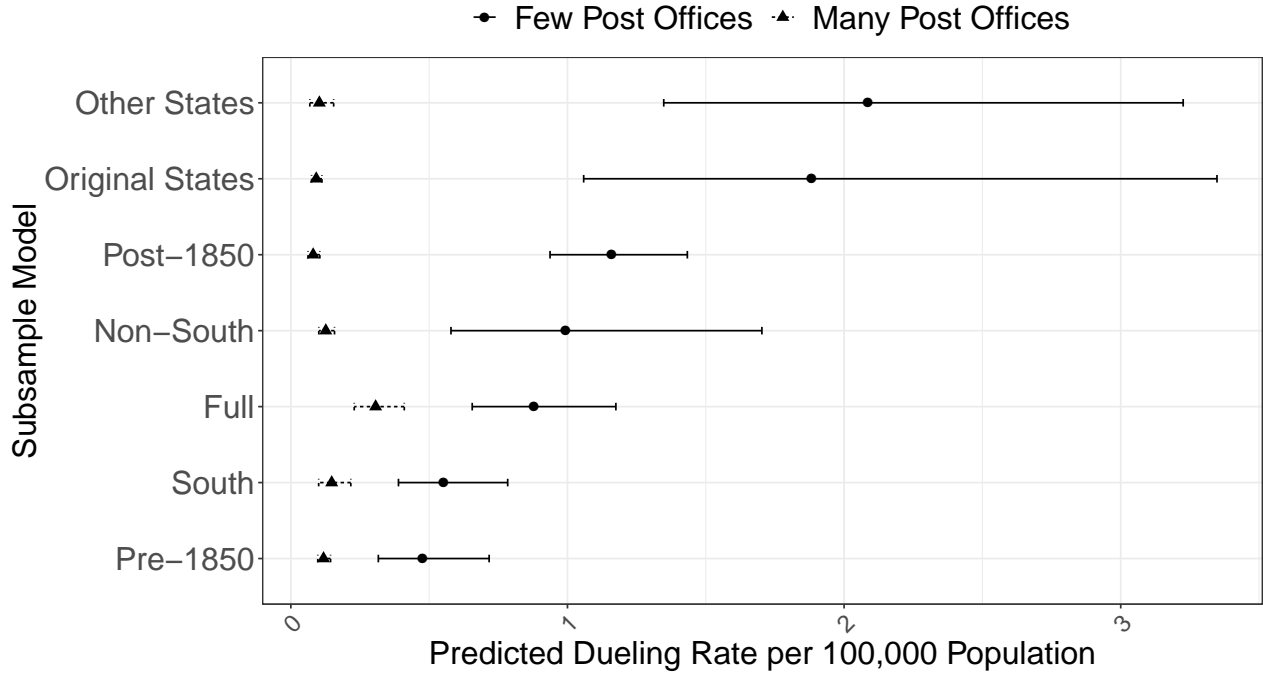
²⁰New York City’s homicide rate in 2016 was estimated at 3.9 per 100,000 residents. See <https://www.brennancenter.org/analysis/crime-2016-final-year-end-data>.

Table 2: Predicting the Rate of Dueling by State (Alternate Specifications), 1800-1899

<i>Data Split</i>	Pre-1850	Post-1850	South	Non-South	Original States	Other States
Intercept	-8.494*** (0.512)	-8.359*** (0.964)	-7.246*** (0.643)	-8.497*** (0.631)	-9.161*** (0.500)	-4.665*** (1.237)
Post Offices (logged + 1)	-0.793*** (0.097)	-0.916*** (0.135)	-0.738*** (0.149)	-0.683*** (0.124)	-0.567*** (0.111)	-1.117*** (0.188)
% Urban	0.982 (1.498)	-0.012 (0.857)	3.527** (1.681)	-0.640 (1.010)	-0.967 (0.896)	2.932* (1.694)
South	1.255*** (0.253)	1.581*** (0.265)			1.138*** (0.225)	1.488*** (0.353)
Lifetime Judges	0.088 (0.247)	-0.313 (0.454)	-0.217 (0.338)	-0.006 (0.292)	-0.024 (0.225)	0.593 (0.693)
New State	-0.696 (1.104)	2.067*** (0.613)	-0.339 (0.793)	2.349*** (0.630)		0.655 (0.594)
Num. Eff. Parties	0.054 (0.101)	0.227 (0.164)	0.061 (0.135)	0.078 (0.112)	0.034 (0.094)	-0.220 (0.231)
Suffrage Restrictions	-0.247 (0.258)	-0.852 (0.588)	-0.117 (0.361)	-0.575* (0.315)	-0.313 (0.235)	-1.594* (0.851)
Decade Counter			-0.121 (0.092)	-0.144* (0.081)	-0.141** (0.069)	-0.292** (0.144)
AIC	486.777	530.777	472.782	537.374	738.779	265.106
BIC	511.789	560.234	495.767	567.876	769.483	290.104
Log Likelihood	-234.389	-256.388	-227.391	-259.687	-360.389	-122.553
Deviance	128.660	168.775	108.699	180.826	221.457	72.245
Num. obs.	119	195	95	219	224	90

Note: cell entries are Negative Binomial coefficient estimates with standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All models offset the counts of dueling by state populations.

Figure 5: Predicted Dueling Rate Across Models



of effectively penetrating and controlling all of its vast territory.²¹

Putting this all together, Figure 5 compares the predicted number of duels per 100,000 population for the fully Negative Binomial model from Table 1 (the final column) as well as all data splits considered in Table 2. In this plot, all covariates are held a typical values and the number of post offices is varied between the 25th and 75th percentile. For simplicity, we order the models from largest to smallest effects of low state capacity. In this plot, we see that, for all models, the cases in which state capacity is low have significantly higher predicted dueling rates than those in which state capacity is high. Even in the model for the Southern states—the one in which the gap between low and high capacity is the smallest—the dueling rate in low capacity states is more than triple the rate in high capacity states.

²¹Famous movies set in the “Old West”, such as the *Searchers and Unforgiven*, may provide a visual backdrop to this remote context. For a recent scholarly inquiry into this, see [Couttenier, Grosjean and Sangnier \(2017\)](#).

5 Robustness Checks

Despite the consistency of the findings across model specifications found above, our central measure of state capacity—the number of post offices—might be seen as being problematic for a few reasons. For one, using counts of post offices as our primary measure could be partly capturing geography: larger states may simply have more post offices because of their size. Thus, we also create a variable for each state-decade measuring the number of post offices per 1,000 square miles. As we see in Appendix Figure A-3, this measure also demonstrates that the footprint of the federal government is much greater in the Northeastern states than in the new, Western states. Similarly, as shown in the first column of Table 3, the results are unchanged when we run the same main model specification presented above using this measure of state capacity.

Going further, it seems plausible that just as the number of post offices might be driven by physical geography, it may also be related to *human* geography. That is, post office deployment could be influenced by population movements and, as such, our measure is partly capturing changes in population. Just as with the concern of physical geography above, we reconstitute our measure of post offices by dividing the number of post offices by the total number of inhabitants in the state at the start of each decade. The 2nd column of Table 3 shows that when we re-run our principal model using this reformulation the substantive results remain unchanged.

As one final robustness check, we also consider an alternate and more direct measure of state capacity: per capita state tax revenues. We construct this measure using the incomplete annual state-level dataset of state revenues and expenditures, as collected by [Sylla, Legler and Wallis \(1993\)](#).²² This measure is relevant as scholars have shown that legal and fiscal capacity are complements, and the ability to raise revenue is critical to the state’s ability to

²²For some states, there is nearly complete data on the amount of tax revenues collected each year; while in a few others, there is little-to-no data.

make investments in institutional capacity ([Besley and Persson, 2009](#)). Interestingly, and as shown in Appendix Figure A-1, there is an extremely tight correlation between this measure and our post office variable. This not only provides confidence in our more complete post offices measure, but suggests that our measure of post offices, which is solely determined by the federal government, is accurately capturing local levels in state capacity. Furthermore, state-level taxation is a more direct measure of a state government's capacity for enforcing its order. Fortunately, as shown in Table 3, rising state taxation per capita is also negatively correlated with dueling incidence.

Lastly, the final two columns of Table 3 report the estimates when decade and state decade fixed effects, respectively, are included in the primary models. As is evident, our findings remain strongly negative.

6 Discussion

Our evidence suggests that rising state capacity - as proxied by the expansion of federal post offices - explains a significant amount of variation in the frequency of dueling. This violent informal institution, which despite its illegality was widespread across all regions of the early Republic, was largely extinct by the end of the 19th Century. Our data suggests that this was far from inevitable. While dueling has the reputation of being an activity that was particular to elites, the nation's westward expansion coincides with the democratization of the duel in the second half of the 19th Century. Hence, the rapid expansion of the federal government into these remote areas may have been critical in quelling this violent informal institution.

Thinking more broadly, our findings suggest something not only about dueling but rather about the state's ability to enforce its laws. [Acemoglu, Moscona and Robinson \(2016\)](#) find that increasing state capacity via post offices increased patents and, as a result, fostered

Table 3: Robustness Regressions: Varying Specifications

	Postal Offices per. Sq. Mi.	Postal Offices per Pop.	Alternative State Capacity Measure	Decade Fixed Effects	State & Decade Fixed Effects
Intercept	-14.769*** (0.658)	-8.075*** (1.803)	-9.310*** (1.203)	-8.283*** (0.462)	-7.364*** (0.488)
Post Offices per Sq. Mi. (logged + 1)	-0.579*** (0.084)				
Post Offices per Pop. (logged + 1)		-1.086*** (0.219)			
State Revenues (logged)			-0.185* (0.097)		
Post Offices (logged + 1)				-0.834*** (0.092)	-0.944*** (0.103)
% Urban	0.912 (0.828)	-0.264 (0.880)	1.601* (0.956)	-0.167 (0.726)	-3.389*** (0.863)
South	1.167*** (0.199)	1.368*** (0.201)	1.577*** (0.247)	1.309*** (0.180)	
Lifetime Judges	-0.006 (0.234)	-0.094 (0.215)	0.188 (0.281)	-0.037 (0.208)	0.327 (0.219)
New State	1.698*** (0.514)	1.172** (0.510)	4.732*** (0.575)	1.493*** (0.477)	
Num. Eff. Parties	0.065 (0.090)	0.152* (0.088)	-0.029 (0.113)	0.137 (0.135)	0.065 (0.104)
Suffrage Restrictions	-0.216 (0.248)	-0.345 (0.238)	-1.059*** (0.303)	-0.333 (0.221)	-0.128 (0.228)
Decade Counter	-0.254*** (0.056)	0.009 (0.073)	-0.339*** (0.067)		
Pop. per Sq. Mi. (logged)		-0.045 (0.079)			
AIC	1020.570	1018.392	753.917	1014.145	885.433
BIC	1058.064	1059.635	788.254	1081.634	1110.397
Log Likelihood	-500.285	-498.196	-366.959	-489.072	-382.717
Deviance	292.449	295.923	217.932	302.406	249.253
Num. obs.	314	314	229	314	314

Note: cell entries are Negative Binomial coefficient estimates with standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All models offset the counts of dueling by state populations.

economic development and innovation. Complementing this work, [Rogowski et al. \(2017\)](#) find that, looking cross-nationally, the existence of post offices is a significant long-run predictor of GDP and economic growth. Combined with our evidence, the growth of the US Postal Service did not simply make sending letters across the nation possible. Rather, it fostered economic development and, perhaps just as importantly, made peaceful and legal dispute resolution a more viable strategy for ordinary citizens.

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Appendix A: Supporting Figures and Tables as cited in the text of the paper

Figure A-1: State Tax Revenue Per Capita and the Number of Post Offices

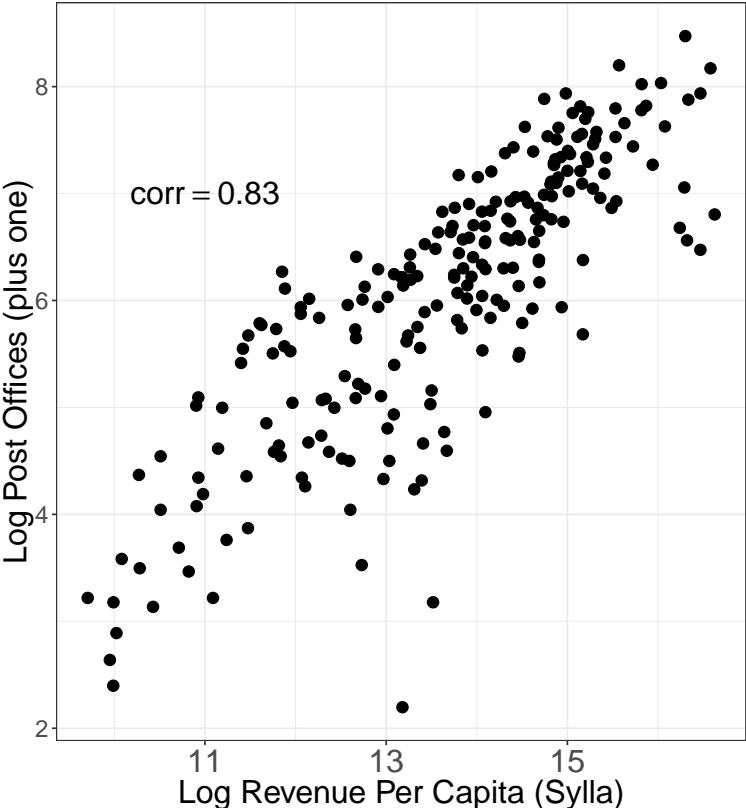


Figure A-2: State-level Number of Newspapers (1840) and Post Offices in 1840

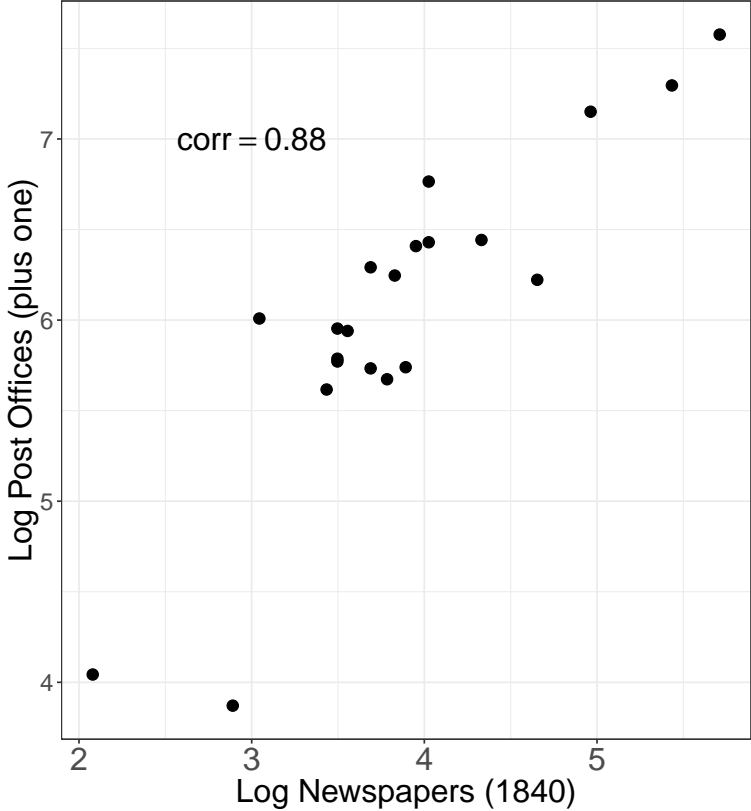
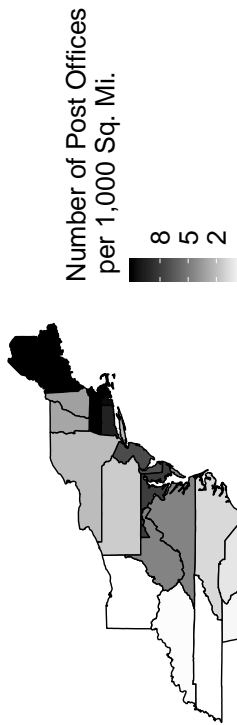
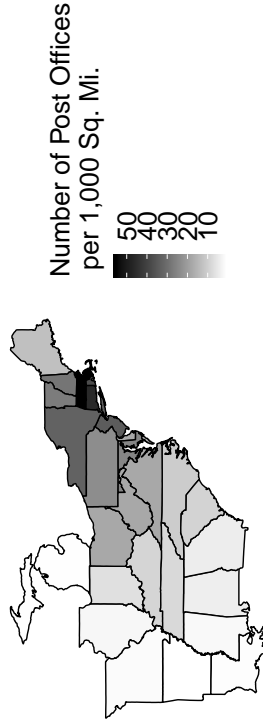


Figure A-3: Growth of Post Offices, 1800–1899 (per 1,000 Square Miles)

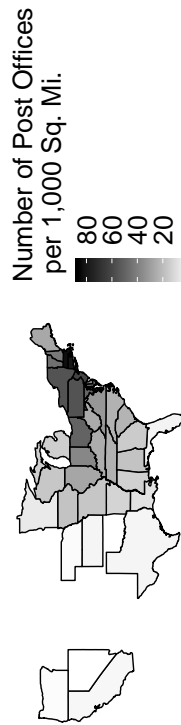
(a) 1800s



(b) 1830s



(c) 1860s



(d) 1890s

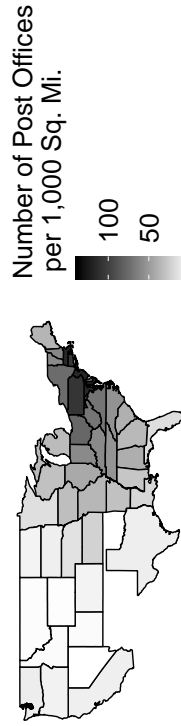


Table A-1: Summary Statistics

Variable	N	Mean	St. Dev.	Min	Max	Source
Number of Duels	358	1.777	3.886	0	50	Byron (2008)
State Population	358	719,589.600	879,854.800	1,062	6,003,174	U.S. Census
Urbanization	356	0.142	0.161	0.000	0.853	U.S. Census
Number of Post Offices	358	629.190	738.081	0	4,780	U.S. Postal Service
Lifetime Judges	358	0.260	0.439	0	1	American Judicature Society
Number of Effective Parties	316	1.922	0.976	1.000	5.882	Poole and Rosenthal (1997)
Suffrage Restrictions	358	0.215	0.411	0	1	Keyssar (2009)

Appendix B: Proof that the Attenuation Bias is Downward

One concern about our results may be biased by the fact that our dependent variable of interest comes from newspaper reports. If newspaper existence is related to state capacity (e.g., [Grosjean, 2014](#)), then our findings about the influence of state capacity on dueling might be attenuated. In this appendix, we show that such concerns are not problematic and, if anything, suggest our estimates are downwardly biased.

To make this clear, suppose that y_i^{true} is the “true” number of duels for cross-sectional unit i . Suppose further that x_i is the state capacity for unit i . Our regressions are of the form

$$y_i^{true} = \beta x_i + \varepsilon_i, \tag{2}$$

where $\varepsilon_i \sim N(0, \sigma_\varepsilon^2)$. However, we do not observe y_i^{true} . Rather, we observe y_i^{obs} such that

$$y_i^{true} = y_i^{obs} + y_i^{miss}, \tag{3}$$

where $y_i^{miss} \geq 0$ is the (potentially) missing number of duels. It seems logical to think that the number of missing duels is also related to state capacity, i.e.,

$$y_i^{miss} = \gamma x_i + \nu_i, \tag{4}$$

where $\nu_i \sim N(0, \sigma_\nu^2)$. Based on this setup, both β and γ should be negative.

In our statistical models, we run regressions on the (potentially) misspecified model

$$y_i^{obs} = y_i^{true} - y_i^{miss} \tag{5}$$

$$= (\beta - \gamma)x_i + (\varepsilon_i - \nu_i) \tag{6}$$

$$= \rho x_i + \eta_i. \tag{7}$$

Based on standard OLS results, the expected value of the estimate of the effect of x_i on y_i^{obs} is

$$\mathbb{E}[\hat{\rho}] = \mathbb{E} \left[\frac{\sum_i x_i y_i^{obs}}{\sum_i x_i^2} \right] \quad (8)$$

$$= \mathbb{E} \left[\frac{\sum_i x_i (y_i^{true} - y_i^{miss})}{\sum_i x_i^2} \right] \quad (9)$$

$$= \mathbb{E} \left[\frac{\sum_i x_i (\beta x_i + \varepsilon_i - \gamma x_i - \nu_i)}{\sum_i x_i^2} \right] \quad (10)$$

$$= \mathbb{E} \left[\frac{\sum_i (\beta - \gamma) x_i^2 + x_i (\varepsilon_i - \nu_i)}{\sum_i x_i^2} \right] \quad (11)$$

$$= (\beta - \gamma) + \mathbb{E} \left[\frac{\sum_i x_i (\varepsilon_i - \nu_i)}{\sum_i x_i^2} \right] \quad (12)$$

$$= (\beta - \gamma). \quad (13)$$

Since $\beta < 0$ and $\gamma < 0$ by construction, the bias in our estimated quantity relative to the true value will be towards zero.