Distillers and Chemists: Capture by Eligibility in the Bottled-in-Bond Act of 1897*

Jacob R. Smith†

October 2026

Abstract

The Bottled-in-Bond Act of 1897 created a federal strip stamp certifying single-distillery, single-season whiskey aged at least four years in bond. In 1893 a revenue official had proposed, and a House committee endorsed, a cheap stamp for every bottle, marking original packages and compounds alike. The Act confined the stamp to four-year whiskey. On newly digitized Internal Revenue accounts by state and year, rectified output rose 43 percent after the Act and did not fall relative to straight output. If the years just before the Act are a valid baseline, the design rules out a relative contraction of the rectifying trade above about 15 percent. The Act instead created a certified segment, fast-growing after 1902 amid a cultivated demand campaign and drawn in Kentucky and Pennsylvania in proportion to their stocks in bond. That fits a neutral rule too. The capture lies in the eligibility term, a four-year floor where a printed date would have answered deception. Capture can be identified by whom eligibility was written around, not only by rivals' losses.

JEL Codes: N41, L51, L15, D72, D82, K23 **Keywords:** bottled-in-bond, regulatory capture, rent-seeking, credence goods, certification, whiskey

---

*This paper is the first chapter of my dissertation at Middle Tennessee State University. I thank my dissertation committee, Daniel J. Smith, Adam Rennhoff, and Nicholas A. Jensen, for their guidance, and Tony Carilli of Hampden-Sydney College, who first set me on this research agenda and encouraged the digging that led to it. I gratefully acknowledge a summer 2026 graduate fellowship from the American Institute for Economic Research, which supported the writing and presentation of this paper. All errors are my own.

†Ph.D. candidate in Economics, Department of Economics and Finance, and Ph.D. Fellow, Political Economy Research Institute, Middle Tennessee State University. MTSU Box 190, 1301 E. Main Street, Murfreesboro, TN 37132. Telephone: 804-245-7706. Email: jacob.rand.smith@gmail.com. Website: jacob-smith-r.github.io.

1 Introduction

A bottle of bonded whiskey carried a green strip stamp across its cap, printed by the Treasury and bearing the distiller's name, the season of distillation, the proof, and the years the spirit entered and left a federal bonded warehouse. Counterfeiting it was a federal crime. The Bottled-in-Bond Act of 1897, which created it, reads like disinterested consumer protection: a government guarantee, in an age of adulteration, that the bottle held what the label promised. That is how the reporting committee described it and how the measure is usually remembered. But the Act emerged from a decade-long fight between two trades—the straight distillers of Kentucky and Pennsylvania, who aged single-distillery whiskey for years under bond, and the rectifiers, who compounded cheaper neutral spirit and sold it under names borrowed from the aged article. The puzzle is why a consumer-protection statute was the instrument the straight distillers reached for, and what it did once it passed.

This paper reads the Act as capture that worked through eligibility rather than foreclosure. The straight distillers pursued a raising-rivals'-costs strategy for two decades and said so in writing. On the margin they cared most about, the legal boundary of "whiskey," they lost in 1909 (Coppin and High, 1999; Online Appendix E). What they obtained in 1897 was a federal certification whose terms only aged bonded inventory could meet, and they held most of it. Whiskey quality—age, single-distillery origin, freedom from adulteration—cannot be verified by the buyer, which makes it a credence attribute (Darby and Karni, 1973), and the cheaper article drives out the dearer (Akerlof, 1970). The private remedy, a brand sustained by a quality-assuring premium (Klein and Leffler, 1981), was exposed because whiskey moved in barrels that dealers could refill under counterfeited labels (Section 2.1). Voluntary disclosure could not unravel the asymmetry (Grossman, 1981; Milgrom, 1981), because a rival could make the straight distiller's claim word for word on a refilled barrel. The Act made the signal excludable: a Treasury stamp rivals could not counterfeit without committing a federal offense (Leland, 1979).

The question a public-choice reader must put to such a statute is how to tell capture from a public-interest certification that would leave the same marks in the data (Posner, 1974). This episode supplies a dated answer. In February 1893, four years before the Act, the Deputy Commissioner of Internal Revenue told a House Judiciary subcommittee that the revenue laws could, "with very little additional expense, brand all bottled goods with a stamp" showing whether a bottle came from a distiller's original package or was compounded, "simply to allow the people to take their choice," and the committee endorsed government labels for bottles (Section 2.2). The 1897 Act used the same kind of stamp but confined it to straight whiskey aged four years and bottled inside a bonded warehouse. Verification explains bottling in bond, since the Treasury could warrant only whiskey it held. It does not explain the four-year floor. Printing the date, as the 1893 stamp would have, answers age deception, while the floor withheld the certificate from younger whiskey, which on 1 July 1897 was nearly two-thirds of the bourbon and rye in bond.

The episode also yields a market test. If the Act foreclosed the rectifying trade, rectified output should have fallen relative to straight output and a scarcity rent should have opened in the relative price of certified whiskey. If it instead created a certified tier, the bonded segment should have grown from a near-zero base without the rectifying trade contracting. I test these predictions on a newly digitized by-state panel from the *Annual Reports of the Commissioner of Internal Revenue* (U.S. Office of the Commissioner of Internal Revenue, 1877–1920), validated against the printed totals, with a common-treatment-date event study and difference-in-differences over FY1887–1908, the window in which straight and rectified output share one definition. The panel has no firm identifiers, so the quantitative evidence is market-level. Intent, which no coefficient recovers, comes from the legislative and archival record, paired with the data as an analytic narrative in the sense of Bates et al. (1998). That record's mass sits after enactment (Online Appendix A), so the 1893 hearings carry most of the pre-enactment weight.

The rectifying trade did not contract. National rectified output averaged 43 percent more

over FY1897–1908 than over FY1887–96. On the within-state straight-minus-rectified log gap, the difference-in-differences is −0.177 (standard error 0.193) against FY1894–96, the reference for 1897's own effect. Against the whole pre-period it is −0.337 (0.171), a level contrast whose drop comes in FY1896, before enactment. Neither shows the shift toward straight whiskey that foreclosure predicts. If FY1894–96 is a valid baseline, the design rules out a relative contraction of the trade larger than about 15 percent at the volume floor of record and 25 percent at any positive floor tried, but it has no power against the few hundredths of a log point the certified channel could have displaced (Section 5.3). What the Act created is visible directly. The certified sub-segment grew from 0.54 million gallons in 1898 to 4.79 million by 1908, flat through FY1902 and then accelerating, and over FY1898–1908 Kentucky and Pennsylvania took 92.3 percent of bonded bourbon and rye withdrawals while holding 83.9 percent of the whiskey in bond.

The paper makes three contributions. First, it states and tests a public-choice proposition, that capture can operate through the eligibility terms of a quality certification and leave rivals' output intact. Theory predicts as much when foreclosure is costly, since transfers to an organized interest can take a form that looks like a public good (Coate and Morris, 1995), and regulation can favor incumbents through which firms its terms fit (Buchanan and Tullock, 1975; Marvel, 1977; Maloney and McCormick, 1982). The canonical tests identify capture by who wins the regulatory contest and at whose expense (Stigler, 1971; Peltzman, 1976; Becker, 1983). Carpenter (2013) asks what evidence shows capture rather than assumes it, and the answer offered here is the eligibility rule, the broader instrument it narrowed, and who collected under it. The market priced aged whiskey before 1897. The lobbying and demand-building that secured a certified channel for that price are the cost Tullock (1967) identified. Second, the paper brings a by-state market-outcome panel to a literature on Progressive-Era food and drug regulation that rests on legislative and administrative behavior: roll calls on the 1906 Act (Law and Libecap, 2006), state pure-food laws read as answers to adulteration (Law, 2003), a test that finds the public-interest rationale for its whiskey provisions weak

(Smith and Scheck, 2023), as the provenance record here does, and the strategic use of the purity campaign (High and Coppin, 1988; Wood, 1985). Clay and Troesken (2002) bring finer quantitative evidence to this industry, but on the Whiskey Trust before the Act, and the nearest structural analog, federal meat inspection, is contested on the question this panel can answer, whether certification expanded the market or redistributed it (Libecap, 1992; Olmstead and Rhode, 2015). Third, the bonded stamp is the American counterpart of the European appellation, built in the same decades for a contest over provenance between producers and merchant houses (Simpson, 2005; Meloni and Swinnen, 2013), and here its distributional half can be measured in certified volumes.

2 Background: Straight Distillers, Rectifiers, and the Road to 1897

2.1 Two Trades

By the 1890s American whiskey had divided into two trades. The straight distillers distilled grain in a single distillery and season and aged the spirit for years in charred oak under federal bond. The leading Kentucky and Pennsylvania houses had made it a recognized premium article (Veach, 2013). The rectifiers bought neutral spirit, compounded it with coloring, flavoring, and some aged whiskey, and sold it at a fraction of the cost. Theirs was a large and legitimate trade, but also the vehicle for cheap spirit sold under names borrowed from the aged article. The straight distillers bore the carrying cost of bonded inventory while rectifiers captured part of the willingness to pay that aging created.

The remedy theory prescribes is a brand sustained by a quality-assuring premium (Klein and Leffler, 1981), and the trade tried it. By about 1890 the *Wine and Spirit Bulletin* printed a "Standard Brand Register" admitting brands "made by the actual owners of distilleries, an[d] the whisky is stored in the U. S. Bonded Warehouses owned and ... controlled by the

distillers of same" (Wine and Spirit Bulletin, 1890b). Its tests were distillery ownership and distiller-controlled bonded storage, the observables the 1897 bill would select on. Scheck and Smith (2026) argue the private mark worked (Online Appendix E). It was still exposed, because dealers refilled branded barrels, counterfeited labels, and traded on names the distiller could not police down the chain. Federal trademark law offered no remedy. The Supreme Court struck down the first federal trademark statute in 1879, and its successor reached only marks used in foreign commerce and with the Indian tribes until 1905.[1] A Kentucky editorial of November 1891 asked instead for "an official inspection of whisky," because "[t]he noted brands are being widely imitated" (The Commonwealth (Covington, KY), 1891). The injury it named was to brands before consumers, and the remedy it sought was an *official* mark.

With a private signal rivals could copy, the straight distillers had a strong interest in one the state would make excludable for them (Leland, 1979). The aim predates the purity movement. At the Kentucky distillers' convention of May 1888, as *William Mida's Criterion* reported it, E. H. Taylor Jr. moved that the Commissioner of Internal Revenue be asked to rule that "New Process" whiskies "should be so branded." He sought a compulsory federal mark on a rival method, by ruling, for the benefit of "the trade" (Taylor-Hay Family Papers, 1886–1916). The same papers cut against so tidy a lineage. Taylor in 1912 dated the stamp to the House Judiciary Committee of 1893 (next subsection), and in February 1888 his firm had asked Congress to *shorten* the bonded period (Online Appendix B).

2.2 The 1893 Alternative

The device the Act used was proposed four years earlier, by a regulator, for a different purpose. In February 1893 a House Judiciary subcommittee investigating the Whiskey Trust watched a former essence-house salesman turn neutral spirit, rye whisky essence, prune juice, raisin oil, and coloring into "1-year old" and then "3-year-old" whiskey at the committee table. It

[1] *Trade-Mark Cases*, 100 U.S. 82 (1879); Act of Mar. 3, 1881, ch. 138, 21 Stat. 502; Act of Feb. 20, 1905, ch. 592, 33 Stat. 724.

then heard Harvey W. Wiley, chief chemist of the Department of Agriculture, testify that compounds made from clean spirit contained no injurious bodies. In Wiley's account, "the chief objection . . . would lie in the unjust competition with those that are ripened naturally," and in selling a buyer the compounded article "when he supposes he is getting the drink which has been aged by natural processes." The Deputy Commissioner of Internal Revenue, G. W. Wilson, was asked what change in the revenue laws would protect consumers against compounded goods. He answered that the laws could "with very little additional expense, brand all bottled goods with a stamp so that the consumer would know whether or not he was using goods from a distiller's original package, or whether it was a compounded package." His device was an adhesive strip stamp, bought by any bottler, naming the distiller, package, and date of production, or the compounder. "It simply gives the people an opportunity to take their choice." The committee "earnestly indorse[d]" the recommendation. Foreclosure was proposed as well. The salesman urged abolition of rectifiers' licenses and a criminal ban on essences, and Representative Ray's separate views called for a ban or prohibitive tax on imitation liquors. None of it was enacted.[2] The 1897 Act used the same kind of stamp and narrowed who could use it to straight whiskey of one distillery and season, aged four years, bottled at 100 proof inside a bonded warehouse.

The proposal had two halves, and they fared differently. Its compounder's label, the half that would have marked rivals' goods and that the straight distillers sought in 1888 and again from 1904, was dropped. The Senate later widened the privilege to wholesale owners (Section 2.3), so the statute was a compromise. Its universal eligibility to certify was narrowed, and the capture argument rests on that half alone. Verification explains bottling in bond. A stamp sold to any bottler would have certified what refilled barrels (Section 2.1) could not warrant. It does not explain the four-year floor. Age deception, the harm Wiley described, is answered by printing the date, as Wilson proposed. A floor instead withholds

[2]U.S. House, Committee on the Judiciary, *Whisky Trust Investigation*, H.R. Rep. No. 2601, 52d Cong., 2d Sess. (1893), pp. iv, viii–ix, 14–15, 67–74, 96–98.

the stamp from younger whiskey however it is labeled.

The floor bit on which whiskey and which firms could qualify. On 1 July 1897 nearly two-thirds of the 116.8 million gallons of bourbon and rye in bond was too young for the stamp; Kentucky, whose distillers had halved their deposits after 1893, held 67 percent of that stock and 72 percent of what qualified (Table A5). An entrant could qualify only four years after entry. A quality floor can raise welfare when quality is hidden, but one set by the industry tends to be set too high (Leland, 1979). Its predicted losers are entrants and eligible producers unable to carry four years' inventory, a margin the capacity data cannot isolate (Section 5.4). Before 1894 whiskey could stay in bond only three years, so the floor sat just beyond the margin the 1894 extension had opened. The committee report gives no reason for four years. The 1893 witness who sought a longer bond asked for five years so that fine whiskies could "ripen." That is a reason to permit long bonding, which 1894 did, not to deny a dated younger whiskey the stamp. The record does not show who drafted the 1896 bill's terms or whether the drafters had the 1893 proposal in view, though Taylor later dated the stamp to that committee.

2.3 From Bill to Act

The Act was the second of two bonding-policy gains the straight distillers won. In 1894 the Wilson–Gorman tariff let whiskey stay untaxed in bond for eight years rather than three, lowering the cost of carrying aged inventory.[3] H.R. 8582, "to allow the bottling of distilled spirits in bond," was reported on 2 May 1896 by Representative Walter Evans of Louisville. The report records the approval of the Secretary of the Treasury and the Commissioner and gives a rationale of consumer purity and protection against Canadian bottled spirits.[4] It passed the House under suspension of the rules, which barred amendment. Asked whether it was not "the same old story of giving the large manufacturers the monopoly

[3]Act of Aug. 27, 1894, ch. 349, 28 Stat. 509.

[4]U.S. House, Committee on Ways and Means, H.R. Rep. No. 1595, 54th Cong., 1st Sess. (1896).

of the business," Evans defended its twenty-bushel capacity floor, written into the statute's first sentence, as the Commissioner's judgment. In the Senate, Finance inserted "owner" wherever "distiller" appeared, extending the privilege to wholesale houses holding whiskey in bond, and the Act was approved on 3 March 1897.[5] By an interested wholesale dealers' account (*Cincinnati Enquirer*, 6 Mar. 1897, p. 4), Finance imposed the amendment over the Distillers' Association's refusal (Louisville Free Public Library, 1893–1913). The Kentucky association had found the bill as reported "unsatisfactory to the distillers" because it let bottlers onto their premises (Online Appendix B). The capture reading therefore rests on whom the terms fit. The margin dividing the trade in 1896 was control of bottling. No roll call was taken at any stage, so the intent evidence is qualitative.

2.4 Who Sought It, and Who Supplied the Justification

Passage and exploitation drew on different coalitions. The beneficiaries were the straight distillers, a small, well-organized bloc—not monolithic, and with Taylor its most persistent rather than an uncontested leader (Online Appendix B)—allied with the Treasury offices that endorsed the bill and set its capacity floor. Against them stood a dispersed wholesale and rectifying interest whose Senate remonstrances ran through houses in five cities (Online Appendix B). Olson (1965) predicts this collective-action asymmetry. A newspaper report preserved in Taylor's papers gives the aim. In April 1904 the "makers of whisky unite to destroy rectifiers' plans," seeking to compel rivals to label their products "as neutral spirits" (*Louisville Herald*, 19 Apr. 1904; Taylor-Hay Family Papers, 1886–1916). That is raising rivals' costs in the sense of Salop and Scheffman (1983), the strategy Marvel (1977) finds in English factory legislation written on observables the large mills already met.

No moral constituency organized for passage in 1897. Temperance sentiment ran partly *against* the bill (Online Appendix B), and its public face was the committee's purity-and-protection framing and the Treasury's endorsement. The record of the chemists' active role

[5] Act of Mar. 3, 1897, ch. 379, 29 Stat. 626; 28 Cong. Rec. 5377–5380 (1896); 29 Cong. Rec. 2223 (1897).

begins in 1903. The bootleggers-and-Baptists pattern, in which a concentrated interest rides alongside a constituency supplying its public justification (Yandle, 1983; Smith and Yandle, 2014), fits the exploitation of 1903–09, when the purity chemists supplied that justification (Section 2.5). The opposing case, including the blenders' better chemistry and Taft's 1909 ruling on "whiskey," is in Online Appendix E.

2.5 The Chemists

The record of the Taylor–Wiley relationship is almost entirely post-1902, the bulk in 1903–10, so it documents how the purity apparatus was enrolled to build demand for the certification *after* it existed. Wiley supplied the authority that turned a commercial quarrel into a question of consumer safety (Young, 1989), and straight distillers, Taylor among them, met with him to enlist his support (High and Coppin, 1988). In May 1904 a member of the Secretary of Agriculture's Foods Standard Commission wrote privately to Taylor, "I hope you will persist in making it uncomfortable for the rectifiers" (Taylor-Hay Family Papers, 1886–1916).

The chemists mattered as a demand-side instrument. The stamp's value depended on buyers believing uncertified whiskey was suspect. Distillers cited Wiley in advertising, and Taylor's broadside told buyers that "[t]he imitation cannot get this stamp." The firm's April 1904 letter records that it "agreed to help finance the National Pure Food Exhibit," whose bottled-in-bond division the firm's own Edmund W. Taylor presided over (Taylor-Hay Family Papers, 1886–1916). The authority was enrolled, and its effect ran through demand. I describe that channel but do not estimate it.

3 Data

The empirical work rests on the *Annual Reports of the Commissioner of Internal Revenue* (U.S. Office of the Commissioner of Internal Revenue, 1877–1920), which tabulate, for each

fiscal year ended June 30 (April 30 for rectified output in the early years; Online Appendix A), the federal accounting of the distilled-spirits industry by collection district, kept with the precision of a tax authority protecting its largest revenue source.

3.1 Construction and Validation

I digitized the relevant tables from full-view scans on HathiTrust for fiscal years 1877 through 1920. The estimating sample is narrower because the source does not carry one definition of straight whiskey across that span. The canonical panel begins with FY1887. From FY1909 the Circular No. 723 reclassification replaces bourbon and rye with a single "whisky" class that also absorbs corn and malt whiskies, so the reallocation margin is estimated on the FY1887–1908 panel, one definition throughout. Bourbon and rye deposits by collection district and rectified output by state reach back to FY1878 and enter as a longer pre-period in the robustness checks.

I treat digitization as reconciliation. Each table's row identities and printed totals must reconcile internally, state rollups must match the national aggregate, and a chain of cross-year witnesses links each year's figures to the adjacent years' carry-forwards. The checker passes 459 assertions over 43 fiscal years with zero failures, 90 of them cross-year carry-forward checks. The assembled panel reconciles to within a gallon against 59 national control totals, 27 of them printed in the reports (Online Appendix A describes the three adjusted targets and the uncovered years). Where a printed table is validated complete, a state absent from it enters as a true zero. Missing values are reserved for state-years in which the source publishes no consistent definition or, for the capacity brackets, a recovered table leaves the operated cells blank. Those rows are kept missing, and coding them zero is reported as a sensitivity (Online Appendix D).

3.2 Variables

For each state and fiscal year the panel and its companion files record whiskey deposited into bonded warehouse, tax-paid withdrawals, July 1 stocks in bond, spirits rectified, distilleries registered and operated, the distribution of distilleries across grain-mash capacity brackets, and special-tax payers by class. From FY1898 it also records withdrawals under the bonded strip stamp. Coverage by variable family is in Table A1.

The central constructed quantity is the within-state log gap between certifiable straight output and rectified output,

$$d_{st} = \ln(\text{straight}_{st}) - \ln(\text{rectified}_{st}), \tag{1}$$

where s indexes the state and t the fiscal year. A state-year enters only if both trades reached 1,000 proof gallons, about twenty barrels. Below that the gap records one distiller's season, and cells of a few gallons would otherwise dominate it (Online Appendix D reports other floors). Foreclosure of the rectifying trade would raise d_{st} after 1897, toward straight whiskey. A certified tier added to the trade would leave it roughly unchanged. "Certifiable straight" is all bourbon and rye deposited in bond, the class from which the Act certified straight, aged, single-distillery whiskey. The series observes neither age nor the twenty-bushel floor, and no bonded label existed before 1897. Rectified and blended spirits, which could not meet those conditions, are the comparison. The categories overlap, because rectified gallonage includes aged straight whiskey that re-passed through rectifier houses as blending stock, and the overlap attenuates movements in d_{st} in either direction. A miscellaneous class of other whiskies, which could take the stamp, supplied about 2.5 percent of bonded withdrawals. It is excluded, so states whose whiskey was mostly corn enter little. Before FY1903 two districts also entered high-proof spirit in it. Without them, counting the class narrows the national post-Act fall by about two-fifths (Online Appendix A). The second constructed quantity is the bonded share of tax-paid withdrawals of bourbon and rye, held on one basis

across the FY1903 change in the composition of the withdrawal table (Online Appendix A).

The volume series measure the rectified trade, the statute's excluded production class, so the no-foreclosure conclusion is scoped to that trade rather than to the wholesale bottlers whose business the 1896 remonstrances defended (Section 2.4). The special-tax counts allow a direct test on the number of wholesale dealers, which do not fall after the Act in absolute terms or relative to retail dealers (Table A8). The volume of their bottling business is in no digitized source.

3.3 Archival and Price Sources

The documentary evidence of Section 2 comes from 1,292 coded document records drawn from the Taylor-Hay papers at the Filson Historical Society, Bureau of Chemistry correspondence at the National Archives, the *Wine and Spirit Bulletin*, the University of Louisville Archives, and clipping files. Online Appendix A describes the corpus and its temporal distribution.

Prices are the weak record. No source furnishes a panel-wide series of whiskey transaction prices by type for this period, so the price evidence rests on roughly two hundred hand-collected quotes, concentrated in Kentucky and in part advertised rather than transaction prices (Online Appendix C). They support a cross-sectional premium, but the certifiable–uncertified difference-in-differences they allow is uninformative. One pre-Act source prices age. An 1890 trade price-current quotes, brand by brand, young whiskey beside the same house's older stock (Wine and Spirit Bulletin, 1890a). Four-year whiskey sold at about five times the young price on the face of the sheet and three times net of the excise, and the oldest stock at 6.5 and 4.4 times. The gradient is gross of carrying cost, which accounts for most of it, so it prices age and does not measure a rent. It is a single cross-section that enters no regression (Online Appendix C). The market priced age before the stamp existed. What the Act manufactured was a certified channel for that price, a channel whose supply the statute defined and whose demand the chemists later cultivated (Section 5.2).

4 Empirical Strategy

The Bottled-in-Bond Act took effect for the whole industry at once on 3 March 1897, so the design is a common-treatment-date event study, estimated as two-way fixed-effects difference-in-differences on the state by fiscal-year panel of Section 3.

4.1 Identified Objects and Variation

The designs recover the market effects of enactment, not the intent behind it, which rests on the record of Section 2. Three margins carry the test. The first is reallocation, whether output shifted toward certifiable straight whiskey and away from rectified spirits within a state, on the gap d_{st} of Equation (1) and on tax-paid withdrawals. The second is concentration, a descriptive benchmark that asks whether a state's share of certified withdrawals tracks its share of the whiskey in bond. The ratio also reflects the age of the stock, so it describes who used the stamp and does not separate capture from a public-interest rule. The third is the intra-industry margin, where two mechanisms separate. Distilleries below the twenty-bushel floor were statutorily ineligible, while larger ones could qualify but may have lacked capital for four-year bonded inventory. The Commissioner's brackets break at twenty bushels, so eligibility is contrasted by the ten-to-twenty versus twenty-to-forty comparison—adjacent in size, opposite in legal status. A small-versus-large contrast, whose small group is the ineligible one, measures exit by size and cannot separate capital from eligibility.

4.2 Specification

With type i (certifiable straight or rectified), state s, and fiscal year t,

$$y_{ist} = \alpha + \sum_{k \neq 0} \beta_k \left(\text{Certifiable}_i \times \mathbb{1}\left[t = 1896 + k\right]\right) + \delta_{is} + \lambda_{st} + \varepsilon_{ist}, \tag{2}$$

with y_{ist} log output and δ_{is} state-by-type and λ_{st} state-by-year fixed effects. The state-by-year effects remove every shock common to all whiskey types in a state-year—harvest, tax administration, the general excise—so the β_k trace the certifiable-minus-rectified gap relative to FY1896. The leads test parallel trends, and the lags trace the dynamics. With d_{st} as the outcome the type index and state-by-year effects difference out, leaving

$$d_{st} = \alpha + \beta \, \text{Post}_t + \mu_s + \varepsilon_{st}, \tag{3}$$

with μ_s state fixed effects and $\text{Post}_t = \mathbb{1}[t \geq 1897]$. Here β is a before-and-after contrast on one differenced series, unbiased only if d_{st} would have been flat absent the Act. That is parallel trends restated on the differenced series, and the leads of Equation (2) test it. What the differenced form gives up is the ability to attribute a violation to one side.

The panel runs over FY1887–1908 with no missing fiscal year. The Act was approved eight months into FY1897, a partially treated year that the headline retains. Dropping it leaves the estimate little changed (-0.322). The capacity designs, whose stock-of-firms outcomes adjust with a lag, code the post-period from FY1898. States are weighted equally, so the estimand is the average state's gap. Errors cluster by state, the level at which the series are constructed. Twenty-nine states meet the volume floor in some year and twenty-one in both periods, near the boundary of reliable cluster-robust asymptotics. Each interval is referred to $t(G-1)$, with G the states that identify it. That is $t(20)$ for the headline, whose post coefficient only the twenty-one identify, and $t(25)$ for the event study's year coefficients. A restricted, null-imposed wild cluster bootstrap-t with 9,999 replications is the small-sample check (Cameron, Gelbach, and Miller, 2008).

4.3 Secondary Designs

The bonded share is zero everywhere before 1897, so concentration has no pre-period for a synthetic control. Bonded withdrawals could be drawn only from whiskey aged in bond,

so a state's certified share is judged against its share of stocks in bond, digitized by state for FY1888–1908, and of deposits four to eight years earlier, a proxy for the eligible aged stock (Figure A1). The capacity design groups the brackets small and large and interacts the post-Act indicator with the small group, with state-by-size-group and year fixed effects. A window ending FY1903 precedes the Southern state-prohibition wave.

4.4 Threats and Predictions

The principal threats bear on the reallocation design. Section 5.4 reports each test and Online Appendix D sets out the threats in full. The leads may miss a gradual pre-trend, which a linear pre-trend and a Rambachan–Roth sensitivity analysis address. Anticipation could contaminate the FY1896 reference, since the bill passed the House inside FY1896, though no barrel deposited after it became public could yield a certifiable withdrawal before FY1900, and the FY1895 lead checks for movement before passage. The 1894 Wilson–Gorman Act lengthened the bonding period and raised the excise, so FY1894–96 is a different regime from the years before it. The incremental effect of 1897 on an already-lengthened bond is identified only against FY1894–96, and I report that comparison and an 1894 step beside the full-window contrast. A placebo at 1894 tests for a break there. The 1893–97 depression cut straight production more than fivefold while rectified output moved little, so the inventory cycle alone moves d_{st} across the enactment date. A pre-period from FY1878 places these years in the longer record. Straight whiskey was made mainly in Kentucky and Pennsylvania and rectified mainly in Ohio, Illinois, and New York, so a state's gap mixes trades linked across state lines. The national aggregate gap nets that trade out and needs no volume floor. It averages -0.65 over FY1887–93, -0.72 over FY1894–96, and -0.93 over FY1897–1908, falling as d_{st} does. An 1895 Kentucky production-allotment agreement (Online Appendix D) capped straight output and could bias the baseline either way, depending on when it bound, but cannot move the rectified series. A 1906 Kentucky tax on rectified spirits could shift Kentucky's gap toward apparent foreclosure, which a window ending FY1905 and dropping

Kentucky address.

Power sets what the reallocation test can show. With B certified withdrawals and R rectified output, had every certified gallon displaced a rectified one, rectified output would have fallen by $-\ln(1-B/R)$, at most about 0.05 log points nationally by FY1908 and 0.013 in the average state-year. At the headline standard error the two-sided minimum detectable effect at eighty-percent power is 0.50 log points, and 0.58 against the declared FY1894–96 reference. One-sided power against a 0.05 rise in d_{st} is eight percent on either reference. The test can detect a large contraction of the rectifying trade. But displacement through the certified channel is below its reach. Two hypotheses give opposite predictions on that trade.

Hypothesis 1 (Reallocation under foreclosure)**.** *If the Act foreclosed the rectifying trade, after 1897 d_{st} rises and the certifiable–uncertified price gap widens.*

Hypothesis 2 (Segment creation)**.** *If the Act instead created a certified tier, after 1897 the bonded sub-segment grows while d_{st} is flat or falls and the price gap does not widen.*

Neither separates capture from a public-interest certification. That rests on the eligibility terms (Section 2.2).

5 Results

5.1 Adoption and Geographic Concentration

National bonded withdrawals rose from 0.54 million proof gallons in fiscal year 1898, the first year of the strip stamp, to 16.51 million in fiscal year 1917, a thirty-one-fold increase. As a share of tax-paid bourbon and rye withdrawals, on a denominator held consistent across the FY1903 change in the withdrawal table, bonded bourbon and rye rose from 2.8 percent in FY1898 to 14.2 percent in FY1908, the last year that denominator exists (Online Appendix A sets out its construction). Figure 1 plots both series. The segment was real and growing, but not national.

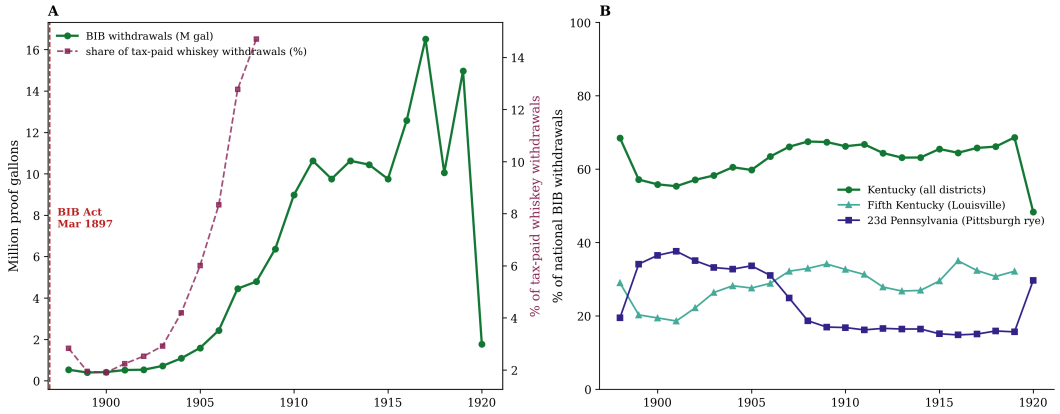


Figure 1: Bottled-in-bond withdrawals and their geographic concentration, FY1898–1920. Whiskey withdrawn tax-paid under the bonded strip stamp, in millions of proof gallons, aggregated from Internal Revenue collection-district tables. *Panel A:* national withdrawals (solid, left axis) and their share of tax-paid whiskey withdrawals (dashed, right axis, to FY1908; constructed as in Online Appendix A, it counts small bonded volumes of other spirits, so it ends at 14.7 percent, against 14.2 in the text). *Panel B:* shares of national bonded withdrawals for Kentucky (all districts), the Fifth Kentucky district (Louisville), and the Twenty-third Pennsylvania district (Pittsburgh). *Source:* Annual Reports of the Commissioner of Internal Revenue, footing-validated against the printed totals (see Section 3).

Table 1 gives the state distribution. Kentucky took 59.3 percent of national bonded withdrawals in 1898–1904 (after February 1899 partly through a consolidated trust; Online Appendix B), then 65.9 and 65.1 percent in the two later periods. Pennsylvania, the rye center, took 32.9 percent in the first period and 16.3 percent by the last. Across 1898–1904 the two together took 92 percent of all bonded spirits, against 6.5 percent for Ohio and Illinois, the rectifying centers and next largest adopters.

Does the concentration merely reflect where the eligible whiskey sat? Bonded withdrawals could be drawn only from whiskey aged in bonded warehouse, so the benchmark is a state's share of the whiskey in bond (Figure A1; Table A2). On one bourbon-and-rye basis over FY1898–1908, Kentucky held 64.3 percent of the national stock in bond and took 64.6 percent of bonded withdrawals, a ratio of 1.00. Pennsylvania held 19.6 percent and took 27.7 percent, a ratio of 1.41. Jointly the ratio is 1.10 (year-bootstrap interval 1.08–1.12), and 1.05 against pre-Act stocks. Uptake was uneven outside Kentucky. Maryland, the other rye state, held 9.7 percent of the whiskey in bond and drew 0.7 percent of bonded withdrawals, while Illinois

Table 1: Bottled-in-bond withdrawals by state

State	1898–1904 (% of US)	1905–1912 (% of US)	1913–1920 (% of US)	Cumulative (M gal)
KY	59.3	65.9	65.1	91.21
PA	32.9	19.3	16.3	25.02
OH	1.8	7.2	8.1	10.58
IL	4.7	3.9	6.0	7.31
IN	0.7	1.0	1.9	2.15
MD	0.7	1.1	1.2	1.55
MO	0.0	0.7	0.4	0.69
NE	0.0	0.3	0.5	0.58
NY	0.0	0.2	0.2	0.30
WV	0.0	0.2	0.2	0.24
WI	0.0	0.2	0.1	0.12
MA	0.0	0.1	0.1	0.10
TN	0.0	0.0	0.0	0.04
GA	0.0	0.0	0.0	0.01
LA	0.0	0.0	0.0	0.01
VA	0.0	0.0	0.0	0.01
Total (M gal)	4.22	49.01	86.71	139.94

Notes: Each cell is a state's share of national bottled-in-bond withdrawals of all spirits in the indicated fiscal-year window, except the final column, which reports cumulative certified volume in millions of proof gallons over FY1898–1920. The bottom row reports national totals. Shares are computed from collection-district withdrawal tables in the Annual Reports of the Commissioner of Internal Revenue; volumes are footing-validated against the printed totals. States are ordered by cumulative volume.

drew three times its stock share from a small aged base, and Pennsylvania's excess survives every denominator. Eligibility was necessary for the stamp and not sufficient for its use, and the record does not explain who chose to bottle under it. Against the stock old enough to qualify, the two states together drew in proportion (Table A5).

A neutral certification would produce the same ratios (compare Law and Kim, 2005). What separates the readings is the restriction of the 1893 stamp (Section 2.2).

5.2 The Expansion Is the Certified Sub-Segment

The bonded series is flat for its first five full years (0.536 million gallons in FY1898, 0.535 million in FY1902) and then grows at roughly 44 percent a year to FY1908, reaching about 3 percent of straight output by 1905. The takeoff coincides with the demand campaign of Section 2.5. It did not follow the supply of qualifying whiskey. Stock four or more years old in bond fell by half between FY1900 and FY1902, as the 1894–97 production trough aged past the floor, and the certified series stayed flat before the fall and grew after it (Figure A3). Across the largest adopters by cumulative volume (Kentucky, Pennsylvania, Ohio, Illinois, and Maryland; Indiana's bonded bourbon and rye passes the volume floor in one year only), I fit state fixed effects over FY1898–1908, the window in which bourbon and rye keep one definition. The log gap between bonded bourbon and rye withdrawals and rectified output grows 0.172 log points a year (standard error 0.050; Webb wild cluster bootstrap $p = 0.023$, a rough guide with five clusters; Webb, 2023). The growth came from the bonded side, since rectified output itself rose from 62.1 million gallons in FY1898 to 103.4 million in FY1908 (Table A6; Figure A4).

The data cannot settle whether the new volume is new whiskey or relabeled straight whiskey. The elasticity of non-bonded with respect to bonded withdrawals is -0.096 (standard error 0.108; ten states), and its $t(9)$ interval, $[-0.340, +0.148]$, covers both zero and the -0.03 to -0.17 band that one-for-one relabeling implies (Online Appendix D). The case for calling the segment manufactured is documentary and dates from 1903–10, when the

chemists ran the campaign and the distillers helped finance it (Section 2.5).

5.3 No Contraction of the Rectifying Trade

If the Act worked by raising rivals' costs and foreclosing the rectifying trade (Salop and Scheffman, 1983), rectified output should have fallen, at least relative to straight output. In absolute terms it rose. National rectified output averaged 43 percent more over FY1897–1908 than over FY1887–96, and straight output 9 percent more (Figure 2, Panel B). That rules out an absolute contraction but does not test the relative prediction. Against its own pre-Act trend, post-Act rectified output ran from 0.26 log points below (trend ending FY1893) to 0.36 above (ending FY1896).

Table 2 reports the difference-in-differences on the within-state log gap between straight and rectified output over FY1887–1908. Against FY1894–96, the reference the design declares for 1897's incremental effect, the coefficient is −0.177 (standard error 0.193), and with a separate step at 1894 it is −0.180 (0.169). Neither is distinguishable from zero. Against the whole pre-period it is −0.337 (0.171; $t(20)$ interval $[-0.694, +0.021]$), a before-and-after contrast in levels whose drop comes in FY1896 (Section 5.4).

What the design can rule out is a relative contraction. If FY1894–96 is a valid reference, the one-sided ninety-five percent upper bound on a rise in d_{st} is 0.16 log points, a contraction of the rectifying trade relative to bourbon and rye of about 15 percent. Across volume floors from 50 to 25,000 gallons it runs from 0.08 to 0.28, or 8 to 25 percent. Against FY1896 alone the post-Act event-study coefficients average +0.006 with an upper bound of 0.43 on the event study's standard errors. Both bounds assume exact parallel trends. The displacement the certified channel could have produced, at most about 0.05, is below them (Section 4.4). Much of the fall in d_{st} is composition. Rectified gallonage tracks consumption, while straight production is an inventory-cycle series that fell from 57.6 million gallons in FY1893 to 10.4 million in the enactment year as the trade held years of aged stock in bond.

Prices are a thin sample (Tables A3 and A4). Bonded whiskey carries a premium of

Table 2: Quantity difference-in-differences: straight versus rectified output

	(1) Production	(2) Ref. FY1894–96	(3) 1894 step	(4) Balanced	(5) Withdrawals	(6) Drop FY1897
Post-1897	-0.337*	-0.177	-0.180	-0.243	-0.322	-0.322*
	(0.171)	(0.193)	(0.169)	(0.146)	(0.265)	(0.174)
95% CI	[-0.69, 0.02]	[-0.59, 0.23]	[-0.53, 0.17]	[-0.55, 0.07]	[-0.87, 0.23]	[-0.69, 0.04]
Bootstrap p	0.041	0.363	0.288	0.091	0.248	0.056
Pre-period	1887–96	1894–96	1887–96	1887–96	1887–96	1887–96
Observations	352	234	352	302	404	338
States	26	24	26	17	27	26
States in both periods	21	16	21	17	21	20

Notes: The dependent variable is $d_{st} = \ln(\text{straight}_{st}) - \ln(\text{rectified}_{st})$; in column 5 the numerator is tax-paid withdrawals, with bonded bourbon and rye added back from FY1903 so the series keeps one definition. The coefficient is on the post-enactment indicator, as in Equation (3), with state fixed effects, FY1887–1908, on state-years reporting both products. Column 2 restricts the pre-period to FY1894–96; column 3 adds an indicator for FY1894 onward; column 4 keeps states first reported no later than FY1893 and last reported no earlier than FY1903; column 6 drops FY1897. Standard errors clustered by state; intervals and stars refer to $t(G-1)$, where G is the column's number of states observed in both periods. Bootstrap p: restricted wild cluster bootstrap-t, 9,999 replications. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. *Source:* Annual Reports of the Commissioner of Internal Revenue (see Section 3).

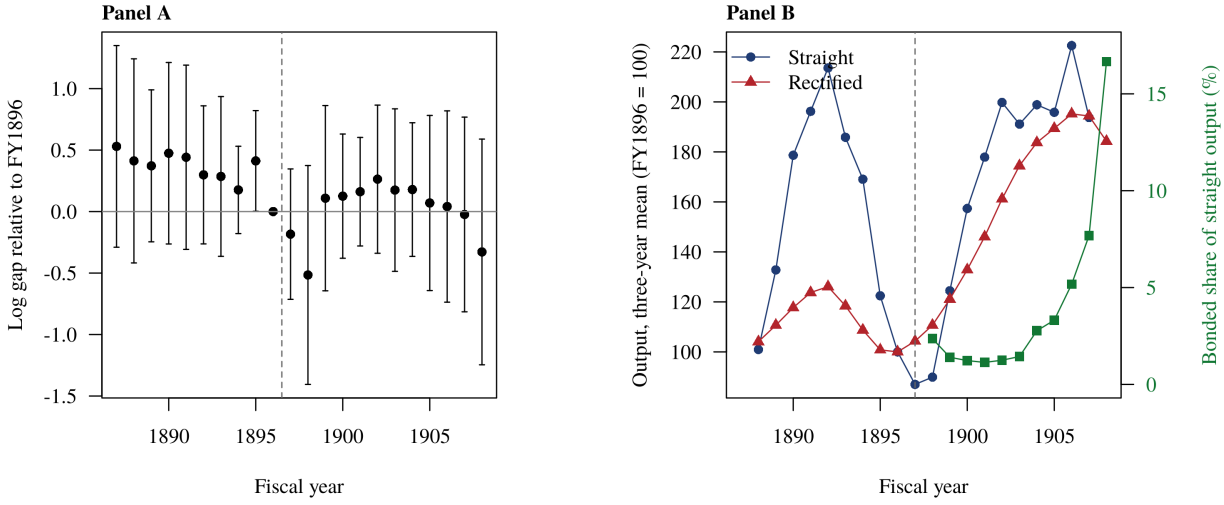


Figure 2: Quantity horse-race, FY1887–1908. *Panel A:* the within-state straight-minus-rectified log gap d_{st} by year relative to FY1896, with ninety-five percent confidence intervals referred to $t(25)$ (Section 4.2); ordinary least squares with state fixed effects and standard errors clustered by state, on the sample of Table 2 (352 state-years, twenty-six states); the dashed line marks the Act. *Panel B:* national straight and rectified output, centered three-year means indexed to the FY1896 mean (= 100), with bonded bourbon and rye withdrawals as a share of straight output on the right axis (its FY1908 spike reflects that year's production collapse in the denominator). *Source:* Annual Reports of the Commissioner of Internal Revenue (see Section 3).

about 10 percent over rectified spirits at a given stated age, but only about two percent over uncertified straight whiskey, so the stamp added little to a quality difference the market already priced (Shapiro, 1983). The price difference-in-differences (-0.218) is uninformative. It rests on eighteen pre-Act certifiable quotes, all from Kentucky and Pennsylvania in 1894–95, and has a state-clustered Webb bootstrap p of 0.66.

5.4 Robustness and the Limits of the Quantity Evidence

Parallel trends. A joint test that the nine FY1887–95 leads equal zero does not reject ($F = 1.02$, $p = 0.45$), but such a test has little power against a monotone drift (Roth, 2022). A linear year term fitted to FY1887–96 is small and imprecise (-0.039 log points a year, standard error 0.041). Extrapolated, it leaves the coefficient near zero ($+0.10$, standard error 0.46 from the trend alone). Letting post-Act violations of parallel trends be as large as $\bar{M}$ times the largest pre-Act one (Rambachan and Roth, 2023), the FY1896-referenced post-Act average excludes zero for no $\bar{M}$, and the upper end of its robust set is 1.58 at $\bar{M} = 0.25$ and 5.20 at $\bar{M} = 1$ (Figure A5). The bounds on a rise hold only under exact parallel trends. With the pre-period extended to FY1878 from the by-district deposit tables, the gap shows no trend (-0.015 a year, standard error 0.031) around a level above FY1896's. The eighteen leads jointly reject zero ($F = 27.8$, descriptive with twenty-six clusters) because the reference year is among the lowest of the pre-Act record (Online Appendix D). The fall in d_{st} comes in FY1896, a year before enactment, as straight production fell toward its FY1897 trough.

Placebo timing and confounds. Pseudo-enactment at FY1888, FY1890, and FY1894, each estimated on the strictly pre-treatment sample, gives -0.31, -0.19, and -0.14 ($p = 0.17$, 0.38, and 0.49; Online Appendix D). A FY1890–93 reference gives -0.306 (0.207) against FY1897–1905. Dropping Kentucky gives -0.329 (0.184) on the full window and -0.156 (0.207) against FY1894–96. Eleven pseudo-dates in the declared estimand's form have a standard deviation of 0.21, and the estimate sits inside them (rank $p = 0.58$).

Inference. The effective cluster count is twenty-one, because eight of the twenty-nine states appear in only one period. A restricted wild cluster bootstrap-t (Cameron, Gelbach, and Miller, 2008) gives a two-sided p on the headline of 0.041 to 0.047 across four draws, against 0.063 on $t(20)$. Dropping one state at a time holds the coefficient between -0.392 and -0.247, and weighting states by pre-Act volume gives -0.183 (0.112). A single common treatment date limits all of this, because state clusters cannot price an aggregate shock coinciding with 1897.

Capacity heterogeneity. Small and large distilleries show no differential change over the Act window (FY1887–1903: -0.018, standard error 0.084), but a group-specific trend moves the estimate to -0.174 (0.137), so the contrast is inconclusive. Over FY1887–1917 small distilleries fall relative to large (-0.588, 0.168). State dry laws account for part of that. In the twenty states with none in force over the window the decline is -0.381 (0.154; Webb bootstrap $p = 0.018$), building from about FY1902, and -0.236 to -0.363 with blank rows read as zero (Online Appendix D). Plants below twenty bushels were barred from bottling in bond, so their decline is not the four-year floor's margin. Local option and consolidation fit it.

The eligibility threshold. The statute barred distilleries below twenty bushels of daily mash capacity, a bracket boundary. Against the ten-to-twenty bracket, the eligible twenty-to-forty bracket's post-1898 interaction is $+0.044$ (standard error 0.095; ninety-five percent interval $[-0.149, +0.237]$) over FY1887–1917 and $+0.028$ (0.111) over FY1887–1903, where foreclosure predicts a positive sign. Pooling every bracket below twenty bushels against every one above gives $+0.310$ (0.091), loading on the post-1903 years, and the neighboring cuts show a positive size gradient (Table A11), so this design too is inconclusive.

No margin supports Hypothesis 1. The levels rule out an absolute contraction, and on the gap every pooled reference and weighting gives a negative coefficient, though against FY1894–96 it is not distinguishable from zero, and without the volume floor that estimate

is +0.14 (Online Appendix D).

6 Conclusion

The straight distillers sought for two decades to have the federal government mark their rivals' product, because a private mark that rivals could copy onto a refilled barrel did not reliably protect the premium for aged whiskey. They lost on the definition of "whiskey" in 1909. What they won in 1897 was narrower: an exclusive federal certification, defined by observables only firms able to carry four years' inventory could meet, that no rival could copy without committing a federal offense, and whose demand the purity chemists promoted after 1903. The instrument itself was not theirs. A revenue official had proposed a stamp in 1893 for every bottle, compounded or straight, so that buyers could choose; the statute kept that kind of stamp and gave it only to aged bonded inventory.

The output data detect no foreclosure. Rectified output rose 43 percent between the decade before the Act and the twelve years after it, and the within-state straight-minus-rectified gap did not shift toward straight whiskey. Against the years just before the Act the change is not distinguishable from zero. If those years are a valid baseline, it rules out a relative contraction of the rectifying trade larger than about 15 percent, but it cannot see displacement as small as the certified channel could have caused. A certified tier reached about 3 percent of straight output by 1905, and Kentucky and Pennsylvania took 92.3 percent of it while holding 83.9 percent of the whiskey in bond. Proportional uptake would also follow from a neutral rule. What makes it capture, on this reading, is that a broader rule was on the record and the term that narrowed it beyond what verification required, a four-year floor where a printed date would have answered deception, favored firms already holding aged inventory. That fit is read from the rule. Across states the floor changed little, and its firm-level incidence is not observed.

The implication concerns how capture is identified. The canonical image is foreclosure, in

a tradition that identifies capture by who wins the regulatory contest and at whose expense (Stigler, 1971; Peltzman, 1976; Becker, 1983). This episode had the intent, the organization, and the access that image requires and produced no detectable foreclosure, as the theory of transfers predicts when foreclosure is costly and a less visible instrument is at hand (Coate and Morris, 1995). Outcome tests alone therefore understate capture. A regulation can address a real information problem and expand the category it governs while still functioning as capture (Akerlof, 1970; Leland, 1979). Capture is better identified by whom an eligibility rule was written around, set against the broader rule that was available, than by the fate of rivals. A rich record of intent, read alone, shows what was attempted (Carpenter, 2013). The same question can be put to the appellations and licensing regimes built on the same device (Simpson, 2005; Law and Kim, 2005).

Two records would show where the rents fell: brand-level prices on both sides of the certification line for 1894–1900, which survive only in physical archives (Online Appendix C), and the holdings of four-year stock by firm in 1897. The paper makes no welfare claim.

References

Akerlof, G. A. (1970). "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism". In: *Quarterly Journal of Economics* 84.3, pp. 488–500. DOI: 10.2307/1879431.

Bates, R. H., A. Greif, M. Levi, J.-L. Rosenthal, and B. R. Weingast (1998). *Analytic Narratives*. Princeton, NJ: Princeton University Press.

Becker, G. S. (1983). "A Theory of Competition among Pressure Groups for Political Influence". In: *Quarterly Journal of Economics* 98.3, pp. 371–400. DOI: 10.2307/1886017.

Buchanan, J. M. and G. Tullock (1975). "Polluters' Profits and Political Response: Direct Controls versus Taxes". In: *American Economic Review* 65.1, pp. 139–147.

Cameron, A. C., J. B. Gelbach, and D. L. Miller (2008). "Bootstrap-Based Improvements for Inference with Clustered Errors". In: *Review of Economics and Statistics* 90.3, pp. 414–427. DOI: 10.1162/rest.90.3.414.

Carpenter, D. (2013). "Detecting and Measuring Capture". In: *Preventing Regulatory Capture: Special Interest Influence and How to Limit It*. Ed. by D. Carpenter and D. A. Moss. Cambridge: Cambridge University Press, pp. 57–68. DOI: 10.1017/CBO9781139565875.006.

Clay, K. and W. Troesken (2002). "Strategic Behavior in Whiskey Distilling, 1887–1895". In: *Journal of Economic History* 62.4, pp. 999–1023. DOI: 10.1017/S0022050702001626.

Coate, S. and S. Morris (1995). "On the Form of Transfers to Special Interests". In: *Journal of Political Economy* 103.6, pp. 1210–1235. DOI: 10.1086/601449.

The Commonwealth (Covington, KY) (1891). *Official Inspection*. Editorial reprinted in the *Wine and Spirit Bulletin*, Louisville, KY, 3 Nov. 1891, p. 25. University of Louisville Archives.

Coppin, C. A. and J. High (1999). *The Politics of Purity: Harvey Washington Wiley and the Origins of Federal Food Policy*. Ann Arbor: University of Michigan Press.

Darby, M. R. and E. Karni (1973). "Free Competition and the Optimal Amount of Fraud". In: *Journal of Law and Economics* 16.1, pp. 67–88. DOI: 10.1086/466756.

Grossman, S. J. (1981). "The Informational Role of Warranties and Private Disclosure about Product Quality". In: *Journal of Law and Economics* 24.3, pp. 461–483. DOI: 10.1086/466995.

High, J. and C. A. Coppin (1988). "Wiley and the Whiskey Industry: Strategic Behavior in the Passage of the Pure Food Act". In: *Business History Review* 62.2, pp. 286–309. DOI: 10.2307/3116002.

Klein, B. and K. B. Leffler (1981). "The Role of Market Forces in Assuring Contractual Performance". In: *Journal of Political Economy* 89.4, pp. 615–641. DOI: 10.1086/260996.

Law, M. T. (2003). "The Origins of State Pure Food Regulation". In: *Journal of Economic History* 63.4, pp. 1103–1130. DOI: 10.1017/S0022050703002547.

Law, M. T. and S. Kim (2005). "Specialization and Regulation: The Rise of Professionals and the Emergence of Occupational Licensing Regulation". In: *Journal of Economic History* 65.3, pp. 723–756. DOI: 10.1017/S0022050705000264.

Law, M. T. and G. D. Libecap (2006). "The Determinants of Progressive Era Reform: The Pure Food and Drugs Act of 1906". In: *Corruption and Reform: Lessons from America's*

Economic History. Ed. by E. L. Glaeser and C. Goldin. University of Chicago Press, pp. 319–342.

Leland, H. E. (1979). "Quacks, Lemons, and Licensing: A Theory of Minimum Quality Standards". In: *Journal of Political Economy* 87.6, pp. 1328–1346. DOI: 10.1086/260838.

Libecap, G. D. (1992). "The Rise of the Chicago Packers and the Origins of Meat Inspection and Antitrust". In: *Economic Inquiry* 30.2, pp. 242–262. DOI: 10.1111/j.1465-7295.1992.tb01656.x.

Louisville Free Public Library (1893–1913). *Kentucky whiskey-trade newspaper clippings and trade-journal files*. Microfilm prints and clipping files, Louisville Free Public Library, Louisville, KY.

Maloney, M. T. and R. E. McCormick (1982). "A Positive Theory of Environmental Quality Regulation". In: *Journal of Law and Economics* 25.1, pp. 99–123. DOI: 10.1086/467009.

Marvel, H. P. (1977). "Factory Regulation: A Reinterpretation of Early English Experience". In: *Journal of Law and Economics* 20.2, pp. 379–402. DOI: 10.1086/466906.

Meloni, G. and J. Swinnen (2013). "The Political Economy of European Wine Regulations". In: *Journal of Wine Economics* 8.3, pp. 244–284. DOI: 10.1017/jwe.2013.33.

Milgrom, P. R. (1981). "Good News and Bad News: Representation Theorems and Applications". In: *Bell Journal of Economics* 12.2, pp. 380–391. DOI: 10.2307/3003562.

Olmstead, A. L. and P. W. Rhode (2015). *Arresting Contagion: Science, Policy, and Conflicts over Animal Disease Control*. Cambridge, MA: Harvard University Press. ISBN: 978-0-674-72877-6.

Olson, M. (1965). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, MA: Harvard University Press.

Peltzman, S. (1976). "Toward a More General Theory of Regulation". In: *Journal of Law and Economics* 19.2, pp. 211–240. DOI: 10.1086/466865.

Posner, R. A. (1974). "Theories of Economic Regulation". In: *Bell Journal of Economics and Management Science* 5.2, pp. 335–358. DOI: 10.2307/3003113.

Rambachan, A. and J. Roth (2023). "A More Credible Approach to Parallel Trends". In: *Review of Economic Studies* 90.5, pp. 2555–2591. DOI: 10.1093/restud/rdad018.

Roth, J. (2022). "Pretest with Caution: Event-Study Estimates after Testing for Parallel Trends". In: *American Economic Review: Insights* 4.3, pp. 305–322. DOI: 10.1257/aeri.20210236.

Salop, S. C. and D. T. Scheffman (1983). "Raising Rivals' Costs". In: *American Economic Review* 73.2, pp. 267–271. URL: https://www.jstor.org/stable/1816853.

Scheck, M. and D. J. Smith (2026). *Assurance of Quality in Early American Whiskey Markets*. SSRN Working Paper. DOI: 10.2139/ssrn.6739990.

Shapiro, C. (1983). "Premiums for High Quality Products as Returns to Reputations". In: *Quarterly Journal of Economics* 98.4, pp. 659–679. DOI: 10.2307/1881782.

Simpson, J. (2005). "Cooperation and Conflicts: Institutional Innovation in France's Wine Markets, 1870–1911". In: *Business History Review* 79.3, pp. 527–558. DOI: 10.1017/S0007680500081435.

Smith, A. and B. Yandle (2014). *Bootleggers and Baptists: How Economic Forces and Moral Persuasion Interact to Shape Regulatory Politics*. Washington, DC: Cato Institute.

Smith, D. J. and M. Scheck (2023). "Examining the Public Interest Rationale for Regulating Whiskey with the Pure Food and Drugs Act". In: *Public Choice* 196.1–2, pp. 85–122. DOI: 10.1007/s11127-023-01061-0.

Stigler, G. J. (1971). "The Theory of Economic Regulation". In: *Bell Journal of Economics and Management Science* 2.1, pp. 3–21. DOI: 10.2307/3003160.

Taylor-Hay Family Papers (1886–1916). *Col. E. H. Taylor Jr. correspondence, circulars, and trade clippings*. Manuscript collection, Mss. A T238d, Filson Historical Society, Louisville, KY.

Tullock, G. (1967). "The Welfare Costs of Tariffs, Monopolies, and Theft". In: *Western Economic Journal* 5.3, pp. 224–232. DOI: 10.1111/j.1465-7295.1967.tb01923.x.

U.S. Office of the Commissioner of Internal Revenue (1877–1920). *Annual Report of the Commissioner of Internal Revenue*. Fiscal years 1877–1920; full-view scans, HathiTrust Digital Library. Washington, DC: Government Printing Office.

Veach, M. R. (2013). *Kentucky Bourbon Whiskey: An American Heritage*. Lexington, KY: University Press of Kentucky.

Webb, M. D. (2023). "Reworking Wild Bootstrap-Based Inference for Clustered Errors". In: *Canadian Journal of Economics* 56.3, pp. 839–858. DOI: 10.1111/caje.12661.

Wine and Spirit Bulletin (1890a). *Quotations on Kentucky Bourbons and Ryes and Eastern Ryes (price current). Wine and Spirit Bulletin*, Louisville, KY. Price current, p. 21 ff.; undated, printed 1890 (Online Appendix C); Louisville Free Public Library.

Wine and Spirit Bulletin (1890b). *Standard Brand Register. Wine and Spirit Bulletin*, Louisville, KY. Date inferred, c. 1890; register pages in a bound volume at the Louisville Free Public Library.

Wood, D. J. (1985). "The Strategic Use of Public Policy: Business Support for the 1906 Food and Drug Act". In: *Business History Review* 59.3, pp. 403–432. DOI: 10.2307/3114005.

Yandle, B. (1983). "Bootleggers and Baptists: The Education of a Regulatory Economist". In: *Regulation* 7.3, pp. 12–16. URL: https://www.cato.org/sites/cato.org/files/serials/files/regulation/1983/5/v7n3-3.pdf.

Young, J. H. (1989). *Pure Food: Securing the Federal Food and Drugs Act of 1906*. Princeton, NJ: Princeton University Press.

Online Appendix

Appendices A–F

A Sources and Source Criticism

This appendix records the provenance problems Sections 2 and 3 could not carry without becoming unreadable. Every item below bears on material used either in the body or in Online Appendix B, which carries the narrative detail behind Section 2 in full; nothing here changes a claim, and several entries weaken one.

The archival corpus. The intent evidence in Section 2 is drawn from a separately assembled documentary corpus, and because the paper makes a claim about its temporal distribution the corpus needs describing. It comprises 1,956 photographed or scanned items read individually—the Taylor-Hay family papers at the Filson Historical Society, Bureau of Chemistry correspondence in Record Group 97 at the National Archives at College Park, a bound run of the *Wine and Spirit Bulletin* at the Louisville Free Public Library, collections at the University of Louisville Archives (about a fifth of the records), and newspaper and trade-journal clipping files—yielding 1,292 document records, each carrying a date where the source supplies one, a legibility rating, and codes for the mechanisms it speaks to and for evidence running against the paper's reading. A second, blind coding of the corpus and an adjudication of the records on which the two codings disagreed most fix the ratings used here, and a photograph filed in more than one collection counts once. Of the 510 records rated strong or centerpiece, 486 carry a parseable four-digit year; of those, 11.5 percent fall in 1897–1902, 43.2 percent in 1906–10, and 17.1 percent before 1897. Forty-six of the 486 years are inferred or bounded ("on or before 1898"); without them the first two shares are 10.7 and 45.2 percent. Lowering to the second coder's rating the remaining records the second coder placed one step below the first, a lower bound on the strong set (422 records), gives

10.5, 45.4, and 16.0 percent. That distribution is why Section 2.5 is framed as documenting post-enactment cultivation of demand rather than the Act's passage. The entries below set out the provenance problems individual documents carry.

Undated and inferred-date items. The *Wine and Spirit Bulletin*'s "Standard Brand Register" (Wine and Spirit Bulletin, 1890b) carries no date; the attribution to about 1890 is inferred from the overlap between its brand set and the price currents bound with it in the same library volume, the first of which its vintage columns place in 1890 (Online Appendix C), and the same inference underlies the seven-year interval between the register and the 1897 Act. The bracketed letter in the quoted entry criteria ("an[d]") completes a word broken at a line end in the original. Two 1896 clippings bearing on the Kentucky Distillers' Association's objections to the Evans bill carry no printed date: "1896" is a pencil annotation on one and an inference from content on the other. Taylor's "National Protection Against Adulterated and Imitation Whiskey" broadside is a signed four-column sheet, undated.

Trade-press reportage treated as such. The account of the 24 May 1888 Louisville convention is a correspondent's letter datelined Cincinnati, 28 May 1888, signed "Experience," printed in *William Mida's Criterion* and preserved in the Taylor papers (Taylor-Hay Family Papers, 1886–1916). It is trade-press reportage of the convention, not a convention minute. The 1913 profile styling R. E. Wathen "President Kentucky Distilleries and Wholesale Liquor Dealers' Association"—a *joint* organization of distillers and wholesale dealers—is a paid trade profile, and the Kentucky body John B. Thompson led in 1898 styled itself the Kentucky Distillers' Association (Louisville Free Public Library, 1893–1913). The joint character is documented for the later period and is not projected back onto 1897. The sentence introducing the Treasury's amended bottling regulations in August 1897 is the *Cincinnati Enquirer*'s lead-in to the circular of 19 August 1897, not language from the circular itself (*Cincinnati Enquirer*, 20 Aug. 1897, p. 5).

The 1904 NWLDA roster. The roster distinguishes association members from subscribers to its Protective Bureau, and the distinction is worth preserving: Stagg, Overholt, Finch, and Dillinger appear as members, while Gaines and Taylor & Williams appear only as Protective-Bureau subscribers; Brown-Forman, Weller, Wathen, Guckenheimer, Schenley, and Hannis appear in both lists. The printed header covers both classes under "Contributing toward the Expenses" (National Wholesale Liquor Dealers' Association of America, 1904). One page of the subscriber list was not photographed, so the roll is longer than the six hundred names recovered. The "Standard Brand Register" pages carrying the "legitimate distillers' brands" certification are not from the same issue as the 1904 roster—they are bound together in one library volume and separated by roughly fourteen years—and the register lists brands, not firms, so the brand-to-proprietor step is mine.

The 1902 external witness to the digitization. A contemporaneous reprint is an external check on the bonded-withdrawal digitization. The Commissioner's returns for the fiscal year ending 30 June 1902, printed in the trade press in May 1903 under a *bottled in bond* heading, report by state: Kentucky 305,220.4 and Pennsylvania 188,137.0 of a national 535,088.0 (*Kentucky Journal*, 15 May 1903, reprinted in the *Wine and Spirit Bulletin*, 1 June 1903, p. 21 (Wine and Spirit Bulletin, 1903)). The panel's FY1902 totals, digitized independently from the collection-district tables, are 305,220.4, 188,137.2, and 535,088.0—exact for Kentucky and for the national total, within 0.2 gallons for Pennsylvania—so the reprint carries the Commissioner's own withdrawal figures and constitutes a decimal-level external check. Its single-year state shares (57.0 and 35.2 percent) differ from the seven-year pooled shares quoted in the body, as a single year should. What it establishes beyond the check is that the concentration was large and visible to the industry at the time.

The 1912 Wiley letter. The document survives as a photographed page on which an opaque slip, laid across the sheet when it was photographed, obscures the ends of the final twelve lines. The figure $15,000, the phrase "still free in all other fields," and the words "us

in the production of Old Taylor whiskey" are legible; the verb governing the figure is entirely covered and is not conjectured here. The page is flagged for re-imaging (Taylor-Hay Family Papers, 1886–1916).

Interested witnesses. Three items drawn from the archival record come from parties with a stake in what they report, and the paper treats them accordingly wherever they are used. The circulars offering compounds to make below-proof spirit pass as proof goods are reproduced, with the pamphleteer's own commentary, in a straight-distiller advocacy pamphlet preserved in the Bureau's files, so the only witness to them is an interested party (U.S. Bureau of Chemistry, 1898–1907). The February 1893 House Judiciary hearings (Section 2.2) are cited from the printed report and testimony, H.R. Rep. No. 2601, 52d Cong., 2d Sess.; an exchange item in the *Ohio County News* (Hartford, Ky.), 22 Feb. 1893, p. 2, first located the compounding demonstration for this project and reports the same session. The salesman who performed it, J. M. Veazey, described himself as a former employee of an essence manufacturer and of a straight-whiskey house; whose interest he served is not established, so his proposals are reported as proposals on the record and not as the straight distillers' position. T. E. McNamara's account of how the "or owner" amendment was obtained comes from an officer of the side that obtained it, describing his own association's victory; the enacted text of §1 independently confirms the outcome if not the account of how it was reached.

Wiley's testimony, and testimony against the capture charge. The Fifty-sixth Congress testimony quoted in Online Appendix E is taken from a reprint in an E. W. Taylor paper of 2 August 1903 (Taylor-Hay Family Papers, 1886–1916); the reprint does not name the chamber and it has not been verified against the printed hearings. The 56th Congress adulteration inquiry was conducted by the Senate committee, not the House. Two contemporaneous witnesses rejected the capture charge against Wiley outright, and one of them was arguing against him at the time. A. L. Meyer of Omaha, petitioning the Secretary of Agriculture in January 1907 to reverse the whiskey ruling, wrote that "[t]here are those who

intimate that the department chemist is subservient to the interests of Kentucky Distillers. I am sure that they are doing a great injustice to an honorable, efficient and zealous public officer" (U.S. Bureau of Chemistry, 1898–1907). Joseph P. Remington, chairman of the Committee of Revision of the *United States Pharmacopoeia*, wrote privately to Wiley the same month that whiskies of different kinds may be mixed and called blends, "but diluted alcohol, artificially colored with caramel or any other coloring, is not whisky" (U.S. Bureau of Chemistry, 1898–1907). Remington had no stake in the whiskey trade, but he was an ally, not a disinterested party, and the same letter records a mutual-support understanding between the two men over the Pharmacopoeia's treatment under the new law, which is why his agreement is not presented as independent corroboration. Against these, an unsigned manuscript annotation in a contemporaneous hand above a February 1905 advertisement in the firm's own scrapbook reports at second hand that "Dr. Wiley objects to the[ir] use of his name in *any* advertisement" (Taylor-Hay Family Papers, 1886–1916). It is hearsay in the beneficiary's own files and is given no more weight than that.

Coverage and edge cases. The variable families do not all begin in the same year, because the Commissioner expanded the published tables over time; Table A1 records which are available in which windows, and only three points matter here. The canonical panel's warehouse-account families—deposits, tax-paid withdrawals, and stocks by state—begin with the FY1887 report. The FY1878–86 reports also print bourbon and rye deposits, withdrawals, and stocks by collection district (FY1884 has no stocks table), and rectified output by state; FY1877 prints no state warehouse tables. Those earlier years are digitized but not merged into the canonical panel, and they enter only the longer-pre-period check of Online Appendix D. Stocks in bond are digitized as each fiscal year's July 1 opening stock of bourbon and rye by state, running FY1888–FY1908 (the source prints no FY1887 opening), and supply the stock-share benchmark used in Section 5.1; Figure A1 plots the national series, which rises from 58.3 million gallons at the FY1888 opening to 211.3 million at the

FY1908 opening. The grain-mash capacity brackets likewise enter by state with the FY1887 report. About a third of state-years carry no bracket entries, almost all of them states with no registered distillery. For states with one, the operated brackets are blank in 41 state-years over FY1887–1908, nine of them in the FY1903 volume; these are recovered tables, not missing ones: in 29 the registered brackets are printed, and in 32 the state's printed count shows no grain distillery operating, so most blanks are zeros. The capacity-bracket analysis nevertheless keeps them missing and reports zero-coded alternatives: reading as zero the blank rows of states with a registered distillery moves the small-distillery coefficient by under 0.04 log points, and reading every blank row as zero moves it by up to 0.15, to −0.236 in the never-dry states (Online Appendix D). Against the by-state register five count cells still disagree (Illinois FY1888, Massachusetts, Montana and Nebraska FY1903, New Jersey FY1916), each with only one witness, so they are left as keyed; on the register's counts the blank rows would number 43 (11 in FY1903), 33 of them with no grain distillery operating, and setting the cells to the register moves the zero-coded never-dry estimate by less than 0.001. The rectified tables printed through FY1891 cover the year ended 30 April, not 30 June, and the reports do not mark when the reference date changes; in those years the reallocation margin's denominator leads its numerator by two months, which the year effects absorb only to the extent that the offset is common across states. Dropping FY1887–91 moves the headline to −0.240 (0.187) and leaves the FY1894–96 coefficient unchanged.

Three edges bound the panel, and none is load-bearing: the Circular 723 reclassification ends the bourbon-and-rye definition with the FY1908 report; the FY1918–1920 wartime reports replace the district tabulations with abbreviated state recaps, thinning the capacity brackets to twelve states in the FY1918 recap and ending them there, and closing the distillery-count family with the same recap (materials continue by state through FY1920), while the bottled-in-bond and rectified series continue through FY1920; and before FY1887 the canonical panel has no state rows. The pre-period the estimates use lies in FY1887–1896 for the reallocation margin and the capacity brackets, with FY1878–86 as a robustness

extension.

Control totals. The checker's 459 assertions include 90 cross-year carry-forward checks over 33 year-to-year links, which witness the files against the printed carry-forward lines; the rest are snapshots of file sums that guard against silent edits, and the comparison with the printed pages is made by the footing checks in each digitization script. Of the 59 national control totals the assembled panel is reconciled against, 27 are printed totals in the reports and 32 check the rectified series against its own digitized input, so the rectified series has no printed-total gate in the panel build; the tolerance is one gallon or less. Three printed targets are adjusted for printing anomalies that two independent readings of the page reproduce: FY1888 and FY1889 straight output, whose bourbon and rye columns do not foot to their printed totals (by 34,430 and 200,000 gallons; the panel carries the row sums), and FY1902 withdrawals, with a 1,000-gallon rye residual. The withdrawal series rests on a second, independent reading of every page, which closes each printed column total; it corrected eleven district cells of the first transcription, ten of them panel cells, the largest Nebraska's FY1890 bourbon (169,476 gallons, read as 109,476). The by-state stocks in bond foot to the printed national total in every year FY1889–1908 (within two gallons in FY1894), and FY1888 to its second witness; the district-to-state allocation is mechanical. For FY1903, FY1904, and FY1908 the withdrawal control is implied—the printed grand total less the printed bonded row. With Hawaii, which has no panel row, the panel reconciles to it in FY1904 and FY1908; in FY1903 it exceeds it by the 5,000-gallon general-bonded-warehouse rye residual the page itself carries. The control set does not cover withdrawals for FY1889, FY1893–94, and FY1898–1901 or straight output in eight of the twenty-two years; those years are checked only through the file-level chain. The FY1878–86 extension used for the longer pre-period has a weaker check: its deposit construction reproduces the panel cell for cell at FY1888, deposits carry chain witnesses only for FY1879 and FY1883, and the rectified series for those years has no chain family. The FY1887 district deposit table is keyed one column off (its

"bourbon" is rye and its "rye" alcohol, summing to 17.65 million gallons against 24.33 million printed), which is why the panel takes FY1887 from the state tables; the FY1878–86 district tables show no such shift on a geography check (bourbon in Kentucky, rye in Pennsylvania and Maryland, almost none in Illinois), and their rectified counterparts agree with the panel at FY1887–88. The same rectified-file family carries a keying error in its FY1893 instance (offsetting Ohio and West Virginia by 20,000 gallons), which no estimate reads. From FY1889 (some groups from FY1890–92) through FY1901 the rectified tables print several small states only as groups: California with Nevada, Colorado with Wyoming, Connecticut with Rhode Island, Louisiana with Mississippi, Maryland with Delaware and the District of Columbia, Montana with Idaho and Utah, Nebraska with the Dakotas, New Hampshire with Maine and Vermont, New Mexico with Arizona, and Oregon with Washington. The panel assigns each group to its first-named state, so the rectified series breaks at FY1902, when the tables list each state separately, by 0.30 log points in Connecticut, 0.31 in Oregon, 0.10 in Maryland, and 1.11 in Montana; states with no panel row (about half a million gallons a year from FY1902) drop out of the national sums. Aggregating every group to one unit in all years, straight and rectified alike, gives −0.349 (0.173) for the headline and −0.182 (0.192) against FY1894–96. Two single cells are anomalous. Tennessee's FY1896 rectified row is blank in print, while the printed national total exceeds the sum of the printed rows by 274,552 gallons, within the range of Tennessee's adjacent years (226,376 and 345,983); the panel codes the cell missing, and assigning the residual to Tennessee changes no estimate, because Tennessee's FY1896 straight output (819.5 gallons) is below the volume floor. Illinois straight output falls tenfold between FY1888 and FY1889, from 1.84 to 0.19 million gallons, almost all of it in the Peoria district, whose deposits had been of the same order in FY1886; the reports do not say whether the change is in reporting or in production, and it coincides with the consolidation of the Peoria distilleries into the Whiskey Trust. Dropping Illinois FY1887–88 gives −0.308 (0.178). The validation reports are in the replication materials.

The bonded-share denominator. The Commissioner's printed tax-paid withdrawal tables carry no separate bottling-in-bond line through FY1902, so bonded withdrawals sit *inside* the published bourbon and rye figure; from FY1903 the tables print the bonded volume as its own national row, and the digitized state series excludes it. Dividing by the published series across that break would put the numerator inside the denominator in one era and outside it in the next, manufacturing a step at exactly FY1903 and raising the FY1908 share to 16.6 percent. The series quoted in Section 5.1 is on one bourbon-and-rye basis throughout: the numerator is bonded bourbon and rye from the collection-district tables, and from FY1903 the same volume is added back to the denominator. The district bourbon-and-rye sums reproduce the printed national bonded row to within a gallon in every year FY1903–08, so the add-back is allocated by state, not imputed. The district series also carries small bonded volumes of other spirits (0.18 million of 4.79 million gallons in FY1908); counting them, as Figure 1 does, gives 14.7 percent in FY1908 against 14.2. Most of that volume is the reports' miscellaneous class, which could take the stamp. The deposit tables print a miscellaneous column beside bourbon and rye, and their last column names what it held: in FY1887 "whisky and high-proof spirits" in the Seventh Indiana district and "proof spirits" in the Second Iowa, and in FY1895 "whisky, corn whisky, malt whisky" in the First Ohio (Cincinnati) district, wheat and malt whisky in Pennsylvania, and corn whisky in South Carolina, Tennessee, Texas, and Virginia. Only the bourbon and rye columns are digitized by district, so the class enters neither the straight series nor the gap, and states whose whiskey was mostly corn whisky—Tennessee's FY1895 deposits are classed entirely so—enter the gap little or not at all; the gap measures the bourbon-and-rye trade. The class supplied a small part of what the stamp certified (with the few other spirits, 2.5 percent of bonded withdrawals over FY1898–1908, though almost all of Indiana's and Tennessee's), but not of deposits. From the printed national Total rows, digitized for FY1886–1908 with every row footing to its printed aggregate and the miscellaneous cell of every printed prior-year row matching the previous volume, the class averaged 31 percent of whiskey deposits (bourbon,

rye, and miscellaneous) over FY1887–93, 39 percent over FY1894–96, and 44 percent over FY1897–1908; it peaked at 69 percent in FY1897, when bourbon and rye deposits collapsed, and ran at about a third in FY1903–07. Much of that path is two districts. In FY1903 the table's neutral-spirits column was retitled "high proof, pure, neutral, or cologne spirits," and between FY1902 and FY1903 the miscellaneous deposits of the Seventh Indiana and Eighth Illinois districts fell by 11.6 million gallons while their neutral-spirits deposits rose by 13.1 million. Their glosses had read "spirits and whisky" and "corn in excess, and spirits," so before FY1903 the class there held high-proof spirit that could not take the stamp, and it grew from 0.6 million gallons in FY1887 to 14.7 million in FY1902. Without those two districts, keyed from the same pages for FY1887–1907, the class held 28, 31, and 35 percent of whiskey deposits over FY1887–93, FY1894–96, and FY1897–1907, and the national gap with it counted shows no break at the reclassification (−0.39 in both FY1902 and FY1903). On that one definition the post-Act change in the national gap (FY1897–1907) is −0.10 against FY1894–96 and −0.14 against FY1887–93, against −0.17 and −0.25 without the class: counting the certifiable class narrows the fall by about two-fifths and does not reverse it. Counting the whole class, which overstates certifiable whiskey before FY1903, leaves the gap flat through FY1902 and 0.05 above its FY1887–93 level, about the size of the displacement ceiling and far below the bound the design rules out. State fixed effects absorb none of this, because the share moved across the Act. Measured instead against straight-whiskey *output*, the bonded share reaches roughly 3 percent by 1905. The two series are not nested—one divides withdrawals by withdrawals, the other withdrawals by production—and in a trade that held whiskey in bond for years the two denominators differ substantially in any single fiscal year.

Variable-family coverage. Table A1 records the fiscal-year window over which each variable family in the panel is available.

Table A1: Variable-family coverage by fiscal-year window

Variable family	First fiscal year	Coverage note
Distilleries registered / operated	1877	By state; runs through the FY1918 wartime recap
Special-tax payers (by class)	1889	By state FY1889–1917; national totals only FY1877–83; none recovered FY1884–88
Production deposited in bond	1878	Panel by state from 1887; by district FY1878–86 (robustness only). Bourbon + rye through 1908; consolidated whisky class FY1909–17 (Circular 723)
Tax-paid withdrawals	1878	Panel by state from 1887; by district FY1878–86. Bonded withdrawals inside the series through FY1902, outside it from FY1903; tax-paid whiskey concept ends with 1908
Stocks in bond	1878	By district FY1878–86 except FY1884; July-1 opening stock by state in the panel's companion file; bourbon + rye FY1888–1908, consolidated whisky FY1909–17 as a separate break-flagged series (Figure A1)
Exports in bond	1878	Digitized in the district tables (FY1878–1917); not carried into the estimating panel
Rectified spirits	1878	Panel by state from 1887; by state FY1878–86 (robustness only); runs to 1920
Grain-mash capacity brackets	1879	By state FY1879–83 and from FY1887 (panel); count family; per-state gaps; last tabulated in the FY1918 recap, for twelve states
Materials consumed	1878	By state through FY1920 (wartime recaps FY1918–20)
Bottled-in-bond withdrawals	1898	First full year of the strip stamp

Notes: Each row is a family of variables in the digitized files and the first fiscal year digitized; the canonical panel itself begins in FY1887. The by-state stock series is each fiscal year's July-1 opening and begins with the FY1888 opening. State-years without a recovered capacity-bracket table enter as missing, not zero. *Source:* Annual Reports of the Commissioner of Internal Revenue, digitized and footing-validated against the printed totals.

Stocks in bond. Figure A1 plots the national July-1 opening stock of bourbon and rye in bonded warehouse, FY1888–FY1908, with the post-break consolidated whisky class drawn as a separate dashed series for FY1909–17. The series runs from 58.3 million gallons at the FY1888 opening to 211.3 million at the FY1908 opening: a dip to 52.0 million at the FY1889 opening, a run-up to 128.0 million by FY1894, a plateau over 1895–1901 spanning the Act, sustained accumulation over 1902–08, and a wartime drawdown after 1915. The by-state distribution of this stock supplies the benchmark against which Section 5.1 measures each state's share of bonded withdrawals.

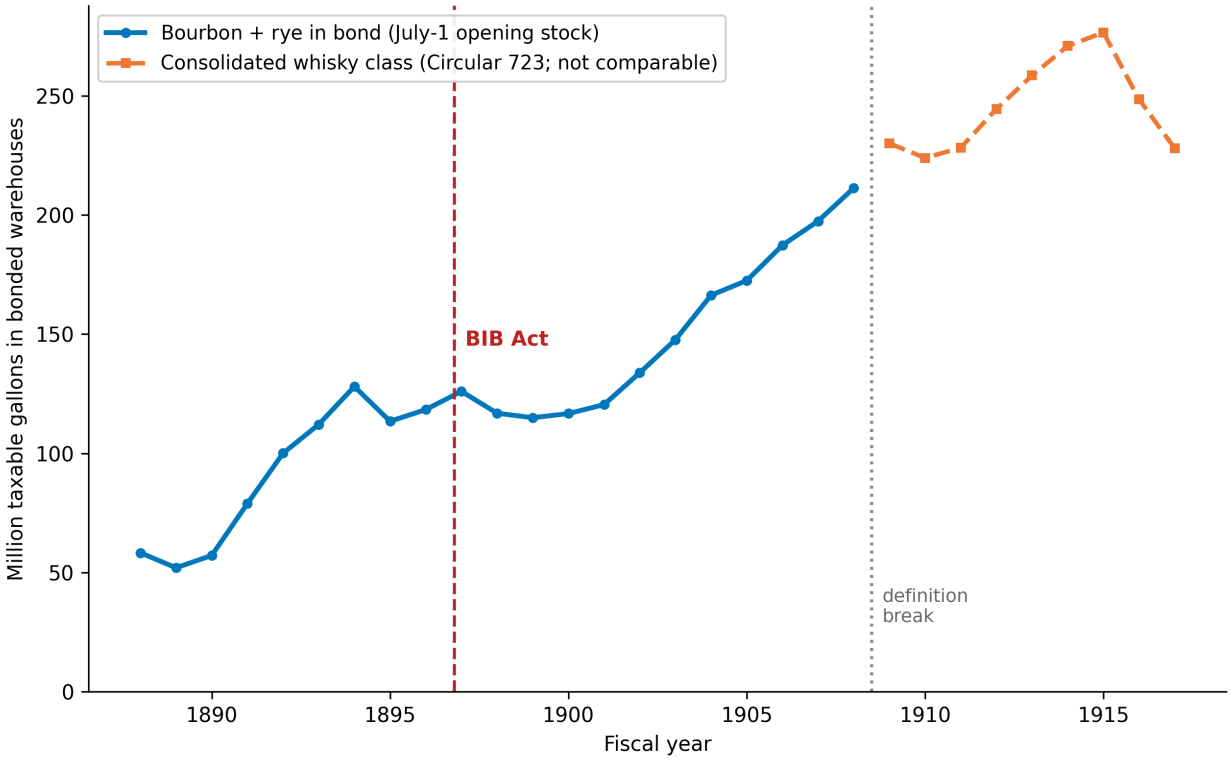


Figure A1: Stocks of whiskey in bonded warehouse, FY1888–FY1917. National July-1 opening stock of bourbon and rye in bonded warehouse (solid line, FY1888–FY1908) and of the consolidated whisky class the Commissioner substitutes for the separate bourbon and rye columns from the FY1909 report (dashed line, FY1909–17). The dashed rule at 1897 marks the Act; the vertical rule at 1908/09 marks the Circular 723 reclassification, and the two segments are different definitions and are never spliced. *Source:* Annual Reports of the Commissioner of Internal Revenue, digitized by state and footing-validated against the printed totals.

Table A2 gives the benchmark of Section 5.1 by state, on bourbon and rye throughout. A ratio of withdrawals to total stock mixes uptake with the age of the stock, since only whiskey

four years old could take the stamp. Against stocks, Kentucky's ratio is 1.00, Pennsylvania's 1.41, and the two states' jointly 1.10; resampling the eleven years with replacement (5,000 draws) gives ninety-five percent intervals of $[0.92, 1.05]$, $[1.24, 1.71]$, and $[1.08, 1.12]$. The resampling treats years as independent, which a persistent stock series is not, so the intervals understate the uncertainty. The column of deposits four to eight years earlier approximates the stock old enough to bottle (deposits are not tabulated by distillery size, so the proxy cannot be confined to eligible distilleries of twenty bushels or more); on it the Kentucky and Pennsylvania ratios are 0.99 and 1.46 and the joint ratio 1.10, so Pennsylvania's excess survives the change of denominator; against pre-Act FY1894–97 stocks, which the bonded regime could not have shaped, the joint ratio is 1.05. Maryland held almost a tenth of the whiskey in bond and drew less than one percent of bonded withdrawals, so eligibility was necessary for the stamp but not sufficient for its use.

Table A2: Bonded withdrawals against stocks in bond, by state

		Stocks in bond		Deposits 4–8 yrs earlier		Pre-Act stocks	
State	Withdrawals	Share	Ratio	Share	Ratio	Share	Ratio
KY	64.6	64.3	1.00	65.2	0.99	68.8	0.94
PA	27.7	19.6	1.41	19.0	1.46	19.1	1.45
OH	3.9	3.2	1.24	3.5	1.13	2.0	1.98
IL	2.4	0.7	3.28	0.6	4.26	0.5	4.88
MD	0.7	9.7	0.07	7.9	0.09	6.9	0.10
All other	0.7	2.6	—	3.9	—	2.6	—
KY + PA	92.3	83.9	1.10	84.2	1.10	88.0	1.05

Notes: Withdrawals: the state's share of national bonded bourbon and rye withdrawals, FY1898–1908. Stocks in bond: its share of the July-1 opening stock of bourbon and rye in bonded warehouse summed over FY1898–1908. Deposits 4–8 years earlier: its share of bourbon and rye deposited in the four to eight fiscal years before each withdrawal year, a proxy for stock old enough to bottle. Pre-Act stocks: FY1894–97. Ratio: withdrawal share over the column's share. States with at least half a percent of withdrawals or two percent of stocks are shown. No by-state age distribution of the stock is published. *Source:* Annual Reports of the Commissioner of Internal Revenue, collection-district tables.

B Archival Material Not Carried in the Body

Seven bodies of evidence bear on the argument of Section 2 without changing it, and are recorded here rather than in the body. A closing block records in full the narrative detail Section 2 states in summary.

Rent-seeking on the state tax margin. Kentucky levied an *ad valorem* state tax on whiskey held in bonded warehouse, assessed per barrel, and in November 1898 a committee of the Kentucky Distillers' Association—Col. Thomas H. Sherley, State Senator Christian Stege, and Col. E. H. Taylor Jr.—traveled to Frankfort to press the State Board of Valuation and Assessment for a reduction from $8 to $5 per barrel.[6] The campaign was partly successful. Addressing the association five weeks later, its president reported that "[t]his association has in the last few days, succeeded in getting the State assessment of $8 per barrel reduced to $7"—an ask of $5 that returned $7.[7] It was the third act of a longer fight: litigation between the sheriff of Franklin County and "E. H. Taylor and Sons" reached the Kentucky Court of Appeals, which ruled against the firm in December 1896 and then, on rehearing in May 1897, reversed itself, holding that taxes on whiskey held in bond need not be paid until the whiskey is withdrawn.[8] The court's reversal is the documented instance of rent-seeking on a specific tax margin. It shows that the straight distillers' political activity extended past the federal certification fight to the local fiscal treatment of the very bonded inventory the green stamp certified.

[6] "Reduction Wanted in Assessment of Bonded Whisky for State Taxes," *Courier-Journal* (Louisville), 11 Nov. 1898, p. 2. The committee did not in the event appear before the board: too few members were present for a meeting to be held, and the association's resolutions were filed with Auditor Stone against a hearing later in the month.

[7] John B. Thompson, President, Kentucky Distillers' Association, address of 15 Dec. 1898, printed in the *Courier-Journal*, 19 Dec. 1898, p. 4 (Louisville Free Public Library, 1893–1913).

[8] *Lexington Herald*, 10 Dec. 1896, p. 2; *Evening Bulletin* (Maysville), 29 May 1897, p. 2 (Louisville Free Public Library, 1893–1913). The May 1897 report identifies the matter only as "the same case" and does not name the parties; the identification with the Taylor litigation follows from the December report.

The firm's own books. The Taylor papers contain the firm's internal production and warehouse record, and it disciplines the mechanism the paper attributes to the Act. A manuscript statement headed "PRODUCTION OF OLD TAYLOR WHISKEY" gives annual barrelage from 1892 for the Old Taylor distillery: output fell to 1,213 barrels in 1894, rose to 4,044 in 1895, was recorded as None in 1896, and stood at 2,115 and 1,491 barrels in 1897 and 1898 before recovering after 1899 (Taylor-Hay Family Papers, 1886–1916). The Act's leading proponent thus registered no measurable output response at this plant in the two years following passage—a firm-level counterpart to the quantity null of Section 5.3. No weight is put on it beyond that: the series is for one distillery rather than the firm's total output, and it is volatile before 1897 as well as after, so plant-specific events explain the 1897–98 figures at least as readily as the statute does. What the series will not support is any account in which the Act delivered an immediate volume rent. What the same records do show is an inventory position. A four-year statement covering 1 July 1904 to 30 June 1908 records 31,455 barrels made against 23,842 withdrawn, and reports that of those crops only 1,841 barrels had been tax-paid by 28 February 1909, "[l]eaving in bond of said crops Feb. 28, 1909 29,614" (Taylor-Hay Family Papers, 1886–1916). The firm's balance sheet was a large untaxed bonded inventory whose value turned on the federal guarantee attaching to it. From December 1908 the firm began registering warehouse receipts against that inventory, and by 1915 it was marketing the resulting position as one no rival could replicate: "[n]o other Distiller in America has its product, covering the entire bonded period, represented by Registered Warehouse Receipts, nor is it now practically possible to register receipts covering any crop of whiskey already made, as a proper registration would have to begin with the date on which the whiskey was entered into bond."[9] The rent is better described as certification and inventory value than as a price or output effect in the years immediately after 1897.

[9]Circular of 8 December 1908 with a postscript dated 29 January 1915; the quoted passage is from the 1915 postscript, and the claim depends on the six years of accumulated registered stock that separate the two dates (Taylor-Hay Family Papers, 1886–1916).

The mechanism ran through the distribution channel. The firm's 1906 solicitations to wholesale houses describe a deliberate policy "to co-operate with the best wholesale trade of the country in making OLD TAYLOR bottled in bond highly profitable to such handlers as yourselves," and report that "200 leading houses have taken hold of this plan" (Taylor-Hay Family Papers, 1886–1916). The concrete terms on offer were a few cents a gallon below the market plus casing at cost, so the letters evidence a stated policy of sharing the bonded margin with the wholesale trade rather than an established magnitude; but the direction is unambiguous, and it is the opposite of foreclosing the middleman. A separate circular of about 1909, announcing a curtailment of the 1910 and 1911 crops, anticipates general overproduction "in the commoner class of whiskey—usually spoken of as 'cheap whiskies'," and observes that "[w]hilst there is little conflict between Old Taylor and this class of whiskey, all manufacture is more or less influenced by surfeits" (Taylor-Hay Family Papers, 1886–1916). Two cautions attach: this is promotional copy with an evident interest in presenting Old Taylor as insulated from a coming glut, and it dates from twelve years after the Act. Even so, it sits awkwardly with an account in which the straight houses were being displaced from their own market by cheaper rivals. The boundary they sought looks less like a defense against an encroaching competitor than like the construction and policing of a premium category—raising rivals' verification costs without excluding them outright.

The 1905 exposé of the exhibition financing. Writing in *Public Opinion* in April 1905, the Washington correspondent Jackson Tinker reported that the state food officials' association had agreed to accept $3,000 from the bottled-in-bond interests to finance the National Pure Food Exhibit, and quoted its secretary R. M. Allen defending the arrangement: "Messrs. George Diehl, A. W. Manck, and Edmund Taylor guaranteed the money ... and later gave notes from six firms desiring to display brands bottled in bond." The same article reports that the "Big Six" straight whiskey companies, "while anxious to have their competitors placed under the ban by the compulsory statement of ingredients used in blending, did not

propose to be compelled to give a true statement of what their own whiskies contained."[10] The entanglement claim in Section 2.5 does not rest on this source. The firm's own letter of April 1904 is first-party and therefore stronger: it is the beneficiary recording that "our representative, with those of other concerns, appeared in Washington, D. C., November 21, 1903, before the Executive Committee of the National Association of State Dairy and Food Departments, and agreed to help finance the National Pure Food Exhibit"—and, in the same letter, that the President of the Board of Control of the exhibit's bottled-in-bond division was the firm's own Edmund W. Taylor (Taylor-Hay Family Papers, 1886–1916). Tinker's account adds a number, a second allegation about asymmetric disclosure, and the fact that the arrangement was publicly controversial at the time. A disclosure rule sought for rivals and resisted for oneself would be the signature of a cost-raising strategy rather than an informational one, but on this evidence it is an allegation in a magazine. The source is an adversarial exposé quoting an official who was at that moment answering a charge that he had sold out his organization, so Allen's words reach us at one remove.

The 1906 return of the monopoly objection. The distributional objection Representative Farish C. Tate of Georgia raised in the 1896 House debate (below) did not die with that debate, and the sharpest statement of it comes from a Kentuckian a decade later. When the pure-food bill returned the question to the House in June 1906, Representative Swagar Sherley of Louisville pressed the point that the bonded stamp certifies provenance and tax payment but not quality: the government's mark, he said, guarantees the distiller, the place, the age, the proof, and "that $1.10 a gallon has been paid; and that only." He offered to vote with the bill's proponents if they could "show me that there is a line as to the quality, not the quantity." He was answered—twice, and at length—but not with any statutory quality pro-

[10] Jackson Tinker, "Who Killed the Pure Food Bill?", *Public Opinion*, 15 April 1905, typescript file copy in the Bureau's records (U.S. Bureau of Chemistry, 1898–1907). Both passages are from this single article. The "Edmund Taylor" named as a guarantor is not distinguished on the page from Edmund W. Taylor, the firm principal who chaired the exhibit's bottled-in-bond division; both are principals of E. H. Taylor Jr. & Sons, and the claim here is only that a principal of the house is named.

vision: Richardson replied by having the Clerk read the 1896 committee report on H.R. 8582 into the record, and then by reciting custody and inspection, four years under government lock and key, and the green stamp. The exchange is a compact demonstration of what the certification actually warrants—provenance, age, proof, and tax paid—and of the fact that when a legislator asked where quality entered, the answer available to the Act's defenders was the assurance language of a committee report. Representative Bartlett of Georgia put the distributional objection in Tate's terms: "Your amendment virtually would mean that you would not have any other kind of whisky except what we call whisky bottled in bond."[11]

The proof and age ceilings. Two mechanical features of the statute bound the segment's size: bottling at 100 proof, and coverage only of spirits within the eight-year bonded period. Both bit. A New Haven wholesaler wrote to the Secretary of Agriculture in December 1906 that "we have in stock some of the best known brands of bottled in bo[n]d whiskies but they are ornamental. The consumers will not drink straight whiskey at 100 proof, consequently, the trade will not buy it" (U.S. Bureau of Chemistry, 1898–1907). The age margin bit in the same way, on the chief beneficiary's own account: E. H. Taylor Jr. & Sons advised the trade in January 1902 that its own older stock "cannot be bottled-in-bond, as the regulations governing said bottling do not extend to whiskey that has outlived the 8 year distillery bonded period" (Taylor-Hay Family Papers, 1886–1916). Both ceilings bit, and on both sides of the trade. A ceiling set by proof and by age is a product-design constraint; it is neither a rent nor a foreclosure result.

Contemporary estimates of the segment's size. In June 1906 Representative Richardson put bottled-in-bond whiskey at "but little over $1\frac{1}{2}$ per cent" of the whiskey sold in the

[11] *The Pure-Food Bill. Imitation Whisky. Speech of Hon. William Richardson, of Alabama, in the House of Representatives, Friday and Saturday, June 22 and 23, 1906* (Washington, 1906), preserved in the Taylor papers (Taylor-Hay Family Papers, 1886–1916). The pamphlet reprints House Report No. 1595 on H.R. 8582 in full, including the Canadian-competition passage, which is how the 1896 report reaches us. Sherley and Bartlett are identified in the pamphlet only as the gentlemen from Louisville and from Georgia; the forenames are supplied. The amendment Bartlett addresses is Richardson's 1906 pure-food amendment, not the 1897 Act, and Richardson of Alabama is not the Richardson of the Kentucky bill taxing rectified whisky.

United States, and a January 1912 trade retrospective recalled that "[f]rom 1897 to 1902 the whole bottling in bond proposition seemed almost at a standstill" (Taylor-Hay Family Papers, 1886–1916)—both from the Act's own proponents, corroborating its smallness; injury to rivals is a separate question.

Narrative detail for Section 2

The material in this block expands what Section 2 states in summary. It supports the body's claims but does not carry them; nothing here is relied on for a conclusion that the body does not state on its own evidence.

The 1888 resolution and the record against a tidy lineage. Three features matter: the resolution seeks a compulsory federal mark on a rival production method, not on the mover's own product; it seeks it from the Commissioner by ruling rather than from Congress by statute; and its stated beneficiary is "the trade," not the consumer. The 1897 Act used the same device, a federal mark, but inverted its target: it marked the movers' own aged product and left rivals' goods unmarked, the half of the 1888 aim the straight distillers pursued again from 1904 and lost in 1909 (Online Appendix E). Reading the Act as a response to 1890s adulteration still understates how long a federal mark had been sought.

The same folders forbid the tidy version. Taylor himself in 1912 attributed the "initial idea of the guarantee stamp" to the House Judiciary Committee in 1893 and to Wiley's testimony rather than to the 1888 convention—a recollection self-serving against the reading advanced here, and borne out by the printed record only in part: the 1893 proposal was the Deputy Commissioner's, for every bottle, and Wiley's testimony that year was that compounds were not injurious (Section 2.2). And in February 1888 Taylor & Sons had asked Congress to *shorten* the bonded period, on the ground that "[o]ur present ills arise from bonded extension," with no consumer, fraud, or purity argument in the letter (Taylor-Hay Family Papers, 1886–1916): the asks were commercial before the purity frame existed, and

Taylor stood on the costly side of the bond-extension campaign the 1894 legislation delivered. Nor was his leadership uncontested (see below).

The floor record of 1896–97. The House took the bill up around 8 May 1896 under suspension of the rules, which required two-thirds and foreclosed amendments. Representative Farish C. Tate of Georgia pressed the objection, asking whether the bill was not "the same old story of giving the large manufacturers the monopoly of the business." Evans pointed to the twenty-bushel-per-day capacity floor, which excluded the smallest distilleries, and defended it as a judgment "fixed by the Commissioner of Internal Revenue" rather than a favor to large producers—the number's origin was administrative, but the floor itself was written into the statute's first sentence (Online Appendix D quotes the operative language). The bill passed by a division vote. The Senate referred it to Finance and passed the amended measure by unanimous consent, over Senator Knute Nelson's objection—relayed from the remonstrances—that the bill "tend[ed] to give the distillers a monopoly of the bottling business, to the detriment ... of the other wholesale dealers in liquors." The floor manager, Senator Joseph C. S. Blackburn of Kentucky, answered that the Finance Committee had removed the objection by inserting the word "owner" wherever "distiller" appeared, and credited Senator Nelson W. Aldrich of Rhode Island with the amendments that "obviate every objection." The amended bill was approved on 3 March 1897.[12]

Authorship of the "owner" amendment. The amendment is the bill's most concrete distributional hinge, and it runs against the tidy capture story: because spirits in bond could be owned by a wholesale house, blender, or speculator rather than the distilling firm, extending the privilege to "the distiller or owner" widened the class of beneficiaries. Three documents narrow the question of authorship, and all three cut against the claim that the

[12]Act of Mar. 3, 1897, ch. 379, 29 Stat. 626. The exchanges drawn on here are at 28 Cong. Rec. 5377–5380 (1896) and 29 Cong. Rec. 2223 (1897). The paragraph on the 1906 return above records the objection's return to the House in 1906, where a Louisville member pressed the point that the stamp certifies provenance and tax payment but not quality.

straight distillers wrote the bill they are said to have authored (Taylor-Hay Family Papers, 1886–1916; Louisville Free Public Library, 1893–1913). The Kentucky Distillers' Association board found the Evans bill "unsatisfactory to the distillers, inasmuch as it permitted the bottler of whisky to enter upon the premises of the distiller without his consent," and sent a committee to Washington to change it; the association's attorney then pressed the distillers' own substitute measure before the Committee on Ways and Means; and the *Cincinnati Enquirer*, reporting the Treasury's amended bottling regulations in August 1897, introduced them by observing that "[c]hanges from the original regulations have been made to meet the objections offered by the distillers." The three together establish that the straight distillers objected to the Evans bill as reported, obtained changes to the implementing regulations, and did not obtain the "or owner" amendment. The wholesale dealers agree, and theirs is the most direct account, though an interested one—an officer of the side that obtained the amendment, not one of the three documents. An officer of the National Wholesale Liquor Dealers' Association told the *Enquirer* three days after enactment that an effort to obtain the amendment "from the Distillers' Association ... was refused. The Senate Finance Committee, however, upon a hearing, refused to recommend the bill without this amendment" (Louisville Free Public Library, 1893–1913). The language was imposed as the price of reporting the bill, not designed by them; the margin dividing the trade in 1896 was distillers against wholesale dealers over who would control bottling, not distillers against rectifiers over purity. Whether it broadened access or merely bought off the better-organized wholesale owners the record does not settle; the Aldrich Papers at the Library of Congress would show who pressed for it (Online Appendix A records the interested standing of the quoted account).

The straight bloc was not monolithic: the 1904 NWLDA roster (Section 2.4). Houses whose brands the *Wine and Spirit Bulletin* certifies as "legitimate distillers' brands" appear on the same journal's 1904 roster of firms contributing to the war chest of the associa-

tion fighting the bonded regime's extension (National Wholesale Liquor Dealers' Association of America, 1904). The *Bulletin*'s printed roster of the National Wholesale Liquor Dealers' Association, dated 1 March 1904, is headed "[t]hese are the Firms that are Contributing toward the Expenses incurred in Protecting the Interests of the Wine and Spirit Trade in State and National Legislation," and runs to more than six hundred names. Among them are W. A. Gaines & Co. of Frankfort, proprietors of Old Crow and Hermitage; the Geo. T. Stagg Co., successor at Taylor's own former O.F.C. works; Brown-Forman; W. L. Weller & Sons; and, in the East, A. Overholt, Jos. S. Finch, Guckenheimer, Schenley, and Hannis. The member/subscriber distinction the roster draws, the one unphotographed page of the subscriber list, and the brand-to-proprietor step are recorded in Online Appendix A. The two interests were overlapping subscriptions rather than separate camps, and the argument does not require a clean cleavage: the collective-action asymmetry runs on the concentration of the core.

The dries, the later coalition, and the 1899 trust. A pure "dries provided cover" story does not fit 1897 either. Representative Elijah Morse of Massachusetts, the most prominent floor opponent on moral grounds, attacked the bill as government complicity in the liquor trade and insisted the stamp gave "no assurance of purity ... of any kind"; temperance sentiment ran partly *against* the Act, ruling out the variant in which dry reformers supply the cover.[13] A bootleggers-and-Baptists reading therefore fits the 1906–09 episode better than 1897. The 1897 public-interest justification came instead from the committee's purity-and-protectionism framing and the Treasury's endorsement; Wiley's 1893 testimony that compounding was unfair competition with aged whiskey was on the record (Section 2.2), but the chemists' active role begins in 1903. The episode is a close cousin of the strategic-behavior account of the 1906 Pure Food and Drugs Act (High and Coppin, 1988; Coppin and High,

[13]The alignment did not hold: by the Pure Food era the organized women's reform bodies had moved to the straight distillers' side, the Woman's Christian Temperance Union on the ground that straight whiskey was at least an unadulterated product (Taylor-Hay Family Papers, 1886–1916); see Veach (2013, p. 75). The reversal bears on how the coalition should be described over time rather than revising the 1896 record.

1999; Smith and Scheck, 2023; Law and Libecap, 2006) and of the political economy that produced the distilling trust (Troesken, 1998; Clay and Troesken, 2002). One fact bounds it: in February 1899 the Kentucky Distilleries and Warehouse Company was incorporated at $32,000,000—the wire reports called it "the Bourbon Whiskey Trust"—and within a month fifty-seven Kentucky whisky companies had entered (Associated Press wire reports, 1899). After 1899 the defense of the bonded regime is at least partly a consolidated asset being protected rather than a small-producer interest resisting a trust; *passage* is unaffected, but later claims must say which they describe.

The "spurious imitation" claim. The figure repeated in the trade press was eighty-five percent, and the distillers' advertising ran on it; but the *Wine and Spirit Bulletin* reported that Wiley denied making the statement (Taylor-Hay Family Papers, 1886–1916). What is documented is that the claim circulated under his name and was commercially exploited, not that he made it in those terms. See also Wiley (1930, pp. 288–322), and, on what Wiley did say about compounding materials, Online Appendix E.

Taylor's leadership was contested (Section 2.4). Taylor's standing in the trade was not the standing of a commander, and houses whose brands met the bonded criteria sat outside his bloc (the 1904 roster above). The account in Section 2 therefore needs an interest that prevailed, not a leader who was obeyed—a distinction that matters because a coalition held together by common interest and one held together by one man's authority imply different counterfactuals for what would have happened had Taylor not acted.

The Senate remonstrance trail in full (Section 2.4). The interests remonstrating against H.R. 8582 before the Senate are named in the record: Delaney & Murphy of Chicago; the National Wholesale Liquor Dealers' Association; the Hannis Distilling Company and other Philadelphia distillers and dealers; Charles M. Pfeifer & Co. of Cincinnati; the Wholesale Liquor Dealers' Association of St. Louis; and merchants of Cleveland. The geographic

spread is the point: the opposition was a dispersed national wholesale interest, which is the collective-action asymmetry the body's reading turns on (Olson, 1965).

Further instances of the strategy (Section 2.4). Besides the 1904 exposition campaign quoted in the body, the Taylor papers preserve a petition to repeal the in-bond blending privilege as "merely governmental sanction of substitution" (Taylor-Hay Family Papers, 1886–1916). The petition and the exposition campaign share the raising-rivals'-costs pattern: the instrument sought is one that raises the cost at which a rival can present his product as comparable. The campaign against Kentucky's *ad valorem* tax on bonded whiskey, documented in the first paragraph of this appendix, is the complement—an instrument that lowered the carrying cost of the very inventory the stamp certified—and together the three show the distillers' political activity working both sides of the margin.

The participants' aims, and a brief that is not theirs (Section 2.4). The *Louisville Herald* of 19 April 1904 reports a meeting in the offices of E. H. Taylor, Jr., & Sons at which the straight houses resolved to seek an amendment to the federal statutes compelling rectifiers to label their products "as neutral spirits," subscribed $5,000 toward the expense of bringing it before Congress, and passed resolutions pledging them "to fight for the exhibition of only pure Kentucky whiskies" at the St. Louis exposition "and to fight against the admission of rectified goods as whisky," a question the Kentucky World's Fair Commission set for a special session on 30 May (Taylor-Hay Family Papers, 1886–1916). The words quoted in the body are the newspaper's headline, a reporter's summary of the meeting. Taylor's papers also preserve page 26 of a printed argument, undated but after 1906, addressed to "This Honorable Court and the Attorney General's office" in defense of Kentucky's pure-food law, which offers the Taylor company as its exhibit: it "has made an enormous fortune by virtue of this law. The blender and adulterater must now put the truth on the label" (Taylor-Hay Family Papers, 1886–1916). The brief is a pure-food advocate's, "this law" is the state food statute, not the 1897 Act, and it presents the fortune as the return to honesty under truthful

labeling. It shows that contemporaries saw the firm profiting from labeling law; it does not state the distillers' motive, and the body does not use it for that.

The 1904 St. Louis endorsement chain (Section 2.5). The purity movement's institutional endorsements are what the campaign the distillers agreed to help finance bought. The National Association of State Dairy and Food Departments took up bottling-in-bond after a hearing before its executive committee on 21 November 1903 at which, by the firm's own 1904 pamphlet, its representative appeared with those of other concerns (Taylor-Hay Family Papers, 1886–1916); the pure-food exhibitions at the 1904 St. Louis exposition then carried a bottled-in-bond division. The first-party record of the financing itself, the firm's April 1904 letter, is quoted under the 1905 exposé above.

C Price Evidence

The price record. The quantity record is administrative and complete; the price record is neither, and the difference governs how far the price results below can be pushed. No source—contemporaneous or archival—furnishes a panel-wide, type-differentiated transaction-price series for whiskey over this period. The trade's price-current of record, *Bonfort's Wine and Spirit Circular*, is freely available only through 1889–1890, so its quotations do not reach the 1894–1900 window that brackets the Act; the financial weeklies that do span the window quote industrial and grain spirits, not bottled beverage whiskey. What is available instead is a set of roughly two hundred whiskey price quotes hand-collected from trade and newspaper sources, concentrated in Kentucky (41 percent of quotes) and in part advertised list prices rather than transaction prices. A separately compiled monthly series of aggregate proof-spirits prices spans the cutoff but carries no type breakdown and enters only as a supply-side cost control.

One archival source prices age before the Act. A trade price-current published seven years earlier quotes brand by brand the current young-vintage price beside the same house's

older vintages (Wine and Spirit Bulletin, 1890a). Four-year whiskey sold at about five times the young price on the face of the sheet and three times on a tax-adjusted basis, the oldest "old whiskies" at 6.5 and 4.4 times. The gradient is gross of interest and evaporation, which at plausible rates account for all but a factor of 1.3 to 1.4, so it shows that the market already priced age, not the size of any rent the stamp protected. This is a single pre-Act cross-section, emphatically *not* part of the FY1887–FY1908 administrative panel that carries the identification; it enters no regression and supports no causal claim.

The limitation shapes the price evidence. The hand-collected quotes support a cross-sectional hedonic estimate of the premium attached to bonded whiskey, and a difference-in-differences too imprecise to show whether the certifiable–uncertified gap widened after the Act; they cannot support a panel-wide causal price effect, and I do not claim one. The quantity evidence—the creation and growth of the certified segment and its geographic concentration—rests on the validated quantity panel.

The price record above uses the *Wine and Spirit Bulletin*'s "Quotations on Kentucky Bourbons and Ryes and Eastern Ryes" to measure the within-brand price of aged whiskey seven years before the Act (Wine and Spirit Bulletin, 1890a). Three properties of the source qualify that use.

First, the identification of the document. The quotations are not from the same volume's "Standard Brand Register," which is a bare alphabetical list of brand names carrying no prices at all. Second, the photographed volume contains three distinct runs of the price current: two carrying the same "Spring 1890" vintage heading but different figures—the second populating a Fall 1890 rye column, and so printed no earlier than the winter of 1890–91—and a third, dated by its column structure to 1894, printed with every price cell blank. The quotations used in the body are from the first run. The disagreement between the first two runs is itself a useful measure of the quotation noise a single trade sheet carries.

Third, the tax-basis correction is an inference, not a property of the source. The quoted prices jump by roughly the prevailing excise across a single vintage boundary, and the federal

rate stood at ninety cents per proof gallon from March 1875 to August 1894, which is why the young column is read as quoted *in bond* and the aged column *tax paid*.[14] But the price current's column headings and notes state only vintage and mash type, and nowhere say "in bond" or "tax paid." The journal's market commentary, which is not among the photographed pages, would settle it. The netting-out correction stands or falls with this inference, which is why the premium is reported here both ways. The quotations are keyed cell by cell from the full-resolution photographs, and two independent readings agree on every cell but one illegible price. Three columns bear on the four-year floor. The Spring 1887 column, three years old at the quotation date and so at the bonding limit, is quoted with a Spring 1890 price by 71 bourbon brands: the median within-brand ratio is 4.7 on the face (interquartile range 4.2–5.2) and 2.6 net of the excise (2.4–2.8). The Spring 1886 column, four years old, is quoted with a Spring 1890 price by 56 brands, at 5.0 on the face (4.5–5.5) and 3.0 net (2.7–3.3). The "OLD Whiskies" column carries mostly the 1881 vintage, seven to ten years old; across the 53 brands quoting it with a Spring 1890 price the median ratio is 6.5 on the face (6.2–7.1) and 4.4 net (4.1–4.8). Old Taylor's ladder runs from 65 cents for Spring 1890 to \$2.65 for 1886 and \$4.00 for 1881, the top of the column, shared with Belle of Nelson and Old Pepper. In that ladder the large jump falls between the 1888 and 1887 vintages, at the three-year bonding limit then in force, consistent with the in-bond and tax-paid reading; across the 20 brands quoting both vintages the median step is \$1.30. Against the break-even price of carrying young stock—interest at six percent, evaporation at two and a half percent a year, and interest on the excise from the third year—the median quoted price is 1.4 times cost at three and four years (1.41 and 1.42) and 1.3 times for the old column (1.2–1.5 across five to seven percent interest and two to three percent evaporation, and before storage and insurance, so an upper bound): most of the gradient is the cost of carrying stock. That the three- and four-year columns stand at nearly the same multiple of cost bears on the floor. On the 38 brands quoting Spring 1890, Spring '87 and Spring '86,

[14]Act of Mar. 3, 1875.

the fourth year's multiple of carrying cost exceeds the third's by a median of 1.9 percent (bootstrap interval 0.1 to 2.8 percent; 0.7 to 3.1 percent across the interest and evaporation grid), against a markup over cost of about 40 percent: the fourth year's multiple of carrying cost rose about 2 percent, a small fraction of the markup, so the statute's four years did not sit at a maturity break the market priced. The 1893 witness who asked for a five-year bond so that fine whiskies could "ripen" (Section 2.2) argued for permitting longer storage; a dated stamp would have let buyers pay for ripening wherever it occurred.

The bonded premium and the price gap. The price evidence is secondary, on the sample described above: with roughly six state clusters cluster-robust asymptotics are unreliable and a wild bootstrap is a rough guide at best, so the price tables report standard errors without significance stars and are read as illustrative and bounding. I make no panel-wide causal price claim.

Bonded whiskey carries a premium of 0.096 log points over rectified spirits, about 10 percent, in a hedonic regression of log price per proof gallon on whiskey type, age, channel, state, and year with rectified spirits as reference (Table A3). Bonded whiskey is 100 proof by statute, but proof is stated for only three of thirty-nine rectified and one of forty straight quotes, so those prices are converted at an assumed 100 proof; a rectified article sold below proof has its per-proof price understated, which biases the premium over rectified upward. The premium is unchanged on the high-confidence specification (0.098) and roughly 1.7 times its standard error.

The omitted category is rectified spirits, so that coefficient combines the value of the federal mark with the underlying quality difference between straight and rectified whiskey. The contrast that isolates certification is bonded against uncertified *straight* whiskey—0.096 against 0.076, about 0.02 log points, or two percent, well inside the standard error of either. A certification premium of that size is modest against the returns reputation theory assigns to a credible quality signal (Shapiro, 1983), which is consistent with the mark certifying a

quality difference the market already priced (see the 1890 price current above). The premium therefore attaches to bonded whiskey over compounded spirit more than to the stamp itself. Recovering the stamp's own premium directly would require brand-level quotes on both sides of the certification line for 1894–1900.

Table A3: Hedonic price regression: the bonded label premium

	(1) ln p	(2) ln real p	(3) ln p, high-conf
Bottled-in-Bond	0.096	0.096	0.098
	(0.058)	(0.058)	(0.058)
Straight	0.076	0.076	0.065
	(0.088)	(0.088)	(0.095)
Branded blend	0.048	0.048	0.019
	(0.075)	(0.075)	(0.058)
Age (years)	0.074	0.074	0.074
	(0.009)	(0.009)	(0.009)
Channel FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	187	187	184
R^2	0.661	0.677	0.665

Notes: The dependent variable is the log price per proof gallon. Whiskey-type coefficients are relative to rectified spirits (the omitted category), so the bonded coefficient combines certification with the straight–rectified quality difference; the bonded-minus-straight contrast, which would isolate certification, is about 0.02 log points (two percent) and is not distinguishable from zero. Column 1 uses nominal prices, column 2 deflates to real prices, and column 3 restricts to high-confidence quotes. Columns 1 and 2 coincide to the reported precision because the year fixed effects absorb a common deflator; column 2 is reported for completeness, not as independent variation. All specifications include channel, state, and year fixed effects. The sample is hand-collected price quotes, concentrated in Kentucky and in part advertised rather than transaction prices (see Section 3). Standard errors clustered by source advertisement in parentheses. No significance stars are reported: the quotes come from six states, so clustering by state leaves too few clusters for asymptotic inference, and these estimates are illustrative rather than a basis for inference. *Source:* hand-collected trade and newspaper price quotes (see Section 3).

The premium is cross-sectional and does not imply that the Act widened the certifiable–uncertified gap over time. Table A4 interacts the certifiable category with the post-1897 indicator. The comparison group is the full uncertified set—rectified spirits, blends, and

generic wholesale whiskey—the partition the statute drew. Its make-up changes across 1897: nine of the thirteen pre-Act uncertified quotes are generic distillers' goods and high wines, mostly wholesale market quotations rather than bottled beverage whiskey, so restricting the control to rectified spirits (column 2) is the cleaner comparison, though it rests on four pre-Act control quotes, and the two agree in sign. The baseline coefficient is −0.218 (standard error 0.138), and it stays negative on the rectified-only control, net of tax, and dropping advertised sale prices (−0.346, −0.179, −0.464), in two cases by several times its standard error. The point estimates do not show the widening a foreclosure rent would produce, and the price event study (Figure A2) hovers near zero with wide intervals. A narrowing as large as columns 2 and 4 show is predicted by neither hypothesis; from six states and eighteen pre-Act certifiable quotes, all from Kentucky and Pennsylvania in 1894–95, it is not read as a finding.

What would identify the certification premium. The hedonic regression of Table A3 cannot separate the value of the federal mark from the straight–rectified quality difference, because the bonded-minus-straight contrast is about 0.02 log points—two percent—against standard errors near 0.06 to 0.09. Two things would change that. The first is a specification with uncertified straight whiskey as the omitted category, which would report the certification contrast and its standard error directly rather than requiring a reader to difference two coefficients. The second is more within-straight price variation than the roughly two hundred hand-collected quotes contain—in practice, the 1894–1900 runs of *Bonfort's Wine and Spirit Circular*, which survive only in physical archives and would supply brand-level quotations on both sides of the certification line for the window that brackets the Act.

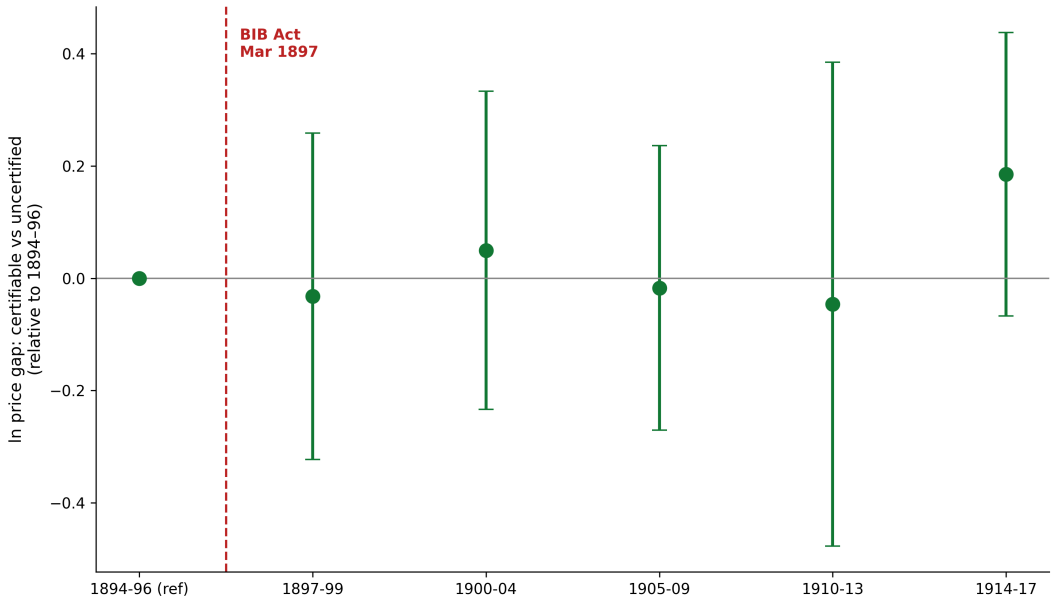


Figure A2: Price event study, certifiable versus uncertified whiskey. Each point is the estimated certifiable–uncertified log-price gap in a fiscal-year window relative to the FY1894–96 reference, with the certifiable category interacted with period indicators; bars are ninety-five percent confidence intervals. The uncertified comparison group is rectified spirits, blends, and generic wholesale whiskey—the statutory partition, not the Commissioner's rectified series alone. Quote-level ordinary least squares with channel, state, and period-bin fixed effects, standard errors clustered by source advertisement; the FY1889–93 bin is omitted because it contains no certifiable quotes. Read the figure as a test of whether the Act opened a price gap: no post-Act window shows the gap widening relative to FY1894–96, the only pre-Act window with certifiable quotes. Estimates are scoped to the Kentucky-concentrated price sample (see Section 3). *Source:* hand-collected trade and newspaper price quotes (see Section 3).

Table A4: Price difference-in-differences: the certifiable–uncertified gap

	(1) Baseline	(2) Rect.-only ctrl	(3) Net of tax	(4) No sale prices
Certifiable × Post-1897	-0.218	-0.346	-0.179	-0.464
	(0.138)	(0.093)	(0.220)	(0.109)
Channel/State/Year FE	Yes	Yes	Yes	Yes
Observations	201	187	201	168
R^2	0.759	0.465	0.859	0.514

Notes: The dependent variable is the log price per proof gallon. The reported coefficient is the interaction of the certifiable-straight category with the post-1897 indicator, that is, the change in the certifiable–uncertified price gap after the Act. Column 1 is the baseline, whose control group is the full uncertified set (rectified spirits, blends, and generic wholesale whiskey); column 2 restricts the control to rectified spirits alone; column 3 nets out the spirits excise; column 4 drops advertised sale prices. All specifications include channel, state, and year fixed effects. The sample is hand-collected, Kentucky-concentrated price quotes; see the price record above. Standard errors clustered by source advertisement in parentheses. No significance stars are reported: the quotes come from six states, and clustered by state the column 1 standard error is 0.119 with a Webb wild cluster bootstrap p of 0.66; these estimates are illustrative and bounding rather than a basis for inference. *Source:* hand-collected trade and newspaper price quotes (see Section 3).

D Additional Robustness

Threats to identification in full

Seven threats bear on the design.

The premise. The leads over FY1887–1896 test the common-trend premise by joint F-test, reported on the full window and on the window without the two earliest years (FY1887–1888, the leads a definitional break would distort first). Placebo timing is estimated on the strictly pre-treatment sample, so the pseudo-post windows cannot straddle the true treatment date. Failing to reject the leads is not the same as affirming flatness—they carry standard errors of 0.17 to 0.40, so the joint test has limited power (Roth, 2022)—which is why the one-sided bound built on that flatness is stated as conditional wherever it is claimed.

Anticipation. The reference year contains the bill's public progress: H.R. 8582 was reported to the House on 2 May 1896 and passed it days later under suspension of the rules (Section 2.3), both inside FY1896 (July 1895–June 1896). A forward-looking straight distiller could therefore have shifted deposits or withdrawals in expectation of certification,

contaminating the FY1896 reference toward the estimated effect. Two features of the setting bound the threat. First, the aging pipeline: certification required four years in bond at a single distillery, so no barrel deposited after the bill became public could yield a certifiable withdrawal before FY1900—an anticipatory supply response cannot reach the outcome until well into the post-period, and the stamp's early volume necessarily drew on stock already aging when the bill passed. Second, the FY1895 lead (+0.412, standard error 0.199) is the direct check on pre-passage movement in the gap: the gap stood above its FY1896 level the year before the bill became public, and the drop comes in FY1896 itself. That drop falls inside the year of the bill's progress, so the data cannot separate anticipation from the production cycle; the aging pipeline argues against an anticipatory supply response, and straight output's fall toward its FY1897 trough is the simpler account. Re-referencing to FY1890–93, which predates the bill, does not isolate anticipation either: it also moves FY1894–96 out of the contrast, and it returns estimates on either side of the headline (−0.306 against FY1897–1905 and −0.402 against FY1897 onward).

A prior treatment. Wilson–Gorman in 1894 extended the bonding period to eight years, a precursor capture the Kentucky distillers won (Section 2.3); effects still unfolding would contaminate the FY1896 and FY1894–96 references alike. The incremental effect of 1897 on an already-lengthened bond is identified only against FY1894–96, and on that reference the reallocation coefficient shrinks by about half and is indistinguishable from zero (Table 2, columns 2 and 3). A placebo at FY1894 does not single that year out, and the FY1878–86 extension below shows where FY1894–96 sits in the earlier record.

The floor's basis. The share of the 1 July 1897 stock too young for the stamp is measured, not bounded: the Commissioner's statement of spirits in distillery warehouses by month of production puts 41.5 million gallons of all kinds distilled before July 1893 against 116.8 million gallons of bourbon and rye in bond, so at least 0.645 of the bourbon and rye was too young (more, to the extent that old spirits other than whiskey are in the numerator). Withdrawals were not oldest-first: in FY1898 the trade drew 32.0 percent of its FY1893

product but 14.5 percent of FY1895's. The district version of the statement gives the same measure by state (Table A5). Two further facts bear on how the stock aged after 1894. The 1894 extension to eight years must have reached whiskey already in bond: the 0.536 million gallons bottled in bond in FY1898 had to be at least four years old, so it entered bond before the extension, and under the old three-year limit it would have left by FY1897. And the stock identity does not close: stocks of 128.0 million gallons on 1 July 1893, plus FY1894–97 deposits of 93.1 million, less the 116.8 million in bond on 1 July 1897, imply an outflow of 104.3 million gallons, against 81.1 million of recorded tax-paid withdrawals. Exports from bond, which the district tables itemize, take 5.6 million of the 23.2 million gap over FY1894–97, leaving about 17.5 million for leakage and evaporation allowances and regauging, which they do not. The exports themselves bear on the ordering: they ran at 2.9 and 4.9 million gallons in FY1893 and FY1894 and fell to 0.1 million in FY1895. Export was the way out of the three-year deadline, and these are the withdrawals of a trade clearing its oldest stock until the extension lifted the deadline.

Table A5: Stock qualifying for the stamp on 1 July 1897, by state

	Stock in bond (%) (1)	Qualifying stock (%) (2)	Own stock qualifying (%) (3)	Bonded withdrawals (%) (4)	Ratio (4)/(2) (5)
Kentucky	66.6	72.5	39	63.6	0.88
Pennsylvania	19.5	17.1	31	26.6	1.56
Kentucky and Pennsylvania	86.2	89.6	37	90.2	1.01
La., Md., Mass., Minn.	7.6	5.6	26	2.2	0.40
All other states	6.2	4.8	28	7.5	1.56
United States, million gallons	116.8	41.5	36	0.94	

Notes: Column 1: share of bourbon and rye in distillery warehouses on 1 July 1897. Column 2: share of spirits of all kinds distilled before July 1893 (four years old or more) in distillery warehouses on that date, from the district statement by month of production; column 3 is that stock as a percentage of the state's bourbon and rye, and exceeds the whiskey share where old spirits of other kinds are held. Column 4: share of national bottled-in-bond withdrawals, FY1898–99. The report groups Maryland with Louisiana, Massachusetts, and Minnesota. *Source:* Annual Reports of the Commissioner of Internal Revenue (see Section 3).

Measured against qualifying stock rather than all stock in bond, Kentucky and Pennsylvania together drew bonded withdrawals in proportion over FY1898–99, the years the 1 July

1897 stock governed (ratio 1.01), so their joint excess over stock shares reflects the age of their stock; within the pair it does not, with Pennsylvania at 1.56 and Kentucky at 0.88. The supply of qualifying whiskey never limited the stamp: stock four or more years old ran at 42 to 47 million gallons at the start of FY1898–1900 and 20 to 24 million over FY1902–05, never less than fifteen times the year's certified withdrawals (Figure A3).

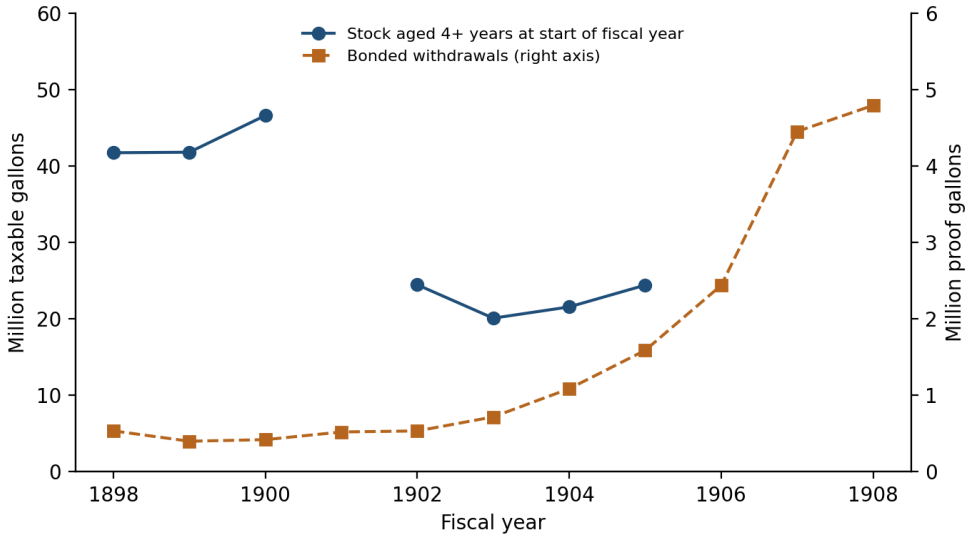


Figure A3: Qualifying stock and bonded withdrawals, FY1898–1908. Spirits in bond aged four years or more at the start of each fiscal year (all kinds, million taxable gallons; the FY1901 report prints no statement, and from FY1900 the statement includes general bonded warehouses), and bottled-in-bond withdrawals (million proof gallons, right axis). *Source:* Annual Reports of the Commissioner of Internal Revenue, statements of withdrawal of products by month of production.

The four-year line in withdrawals. The month-of-production statements for FY1896–1905 (the FY1901 report prints none) give each cohort's withdrawals each year. Against cohorts aged two to three years, the withdrawal log-odds of cohorts crossing four years rose by 0.04 after FY1902 relative to FY1896–97 (95 percent interval $[-0.07, 0.18]$, vintage-cluster bootstrap), and of cohorts aged four to seven years by 0.12 against FY1897, the only pre-Act year with such cohorts ($[-0.08, 0.31]$). Had every certified gallon been an additional withdrawal of four-to-seven-year stock, the second contrast would have risen by about 0.20; the design cannot distinguish that from zero. What moved was the young end: cohorts under two years were withdrawn far less after 1902 (-0.58, $[-0.71, -0.41]$).

Private cartelization. In September 1895 a Kentucky committee circulated for signature an agreement allotting each signer 55 percent of his average FY1890–92 production, for FY1896–98 (Taylor-Hay Family Papers, 1886–1916; Louisville Free Public Library, 1893–1913). Binding in FY1896, the reference year, it would depress straight output in the baseline, lower the reference gap, and bias the estimate *toward* foreclosure (a rise in d_{st}); binding in FY1897–98, toward a fall. Two things bound it: it was conditional—not binding "provided 90 per cent of the capacity of the State is signed hereto," and the report notes it was "not signed by a good many others"—and restricting Kentucky straight output does not mechanically move rectified output, insulating the series that carries the no-foreclosure result. The FY1890–93 reference predates the agreement, and dropping the enactment year leaves the headline little changed (−0.322).

Coincident shocks. The spirits excise rose from $0.90 to $1.10 per proof gallon on 27 August 1894 under the Wilson–Gorman legislation and then held at $1.10 until October 1917.[15] A uniform excise change is in any case what the state-by-year effects absorb, and the net-of-excise specification isolates the tax directly for the price results. In March 1906 Kentucky taxed compounded, rectified, adulterated, and blended spirits at one and a quarter cents per wine gallon, the reported response being relocation: the account has sixty-nine of the state's seventy-one rectifiers operating within a quarter-mile of the state line, and one firm moved from Covington to Lawrenceburg, Indiana.[16] That shifts Kentucky's gap toward apparent foreclosure without moving national rectified output, so the tests are a window ending at FY1905 and dropping Kentucky.

Generic threats. A general shock to distilling in 1897 would register as an effect; the

[15]The rate history is not incidental to the design. The excise increase is the same 1894 statute that extended the bonding period, so the two prior treatments coincide instead of flanking the post-period: what needs handling is one contaminated pre-period. The War Revenue Act of June 1898 raised the beer tax and imposed stamp taxes but left the distilled-spirits rate untouched.

[16]*Frankfort Roundabout*, 31 Mar. 1906 (the statute), and *Breckenridge News*, 11 July 1906 (the relocation), both located through Chronicling America. The relocation account is a county newspaper's editorial defending a legislator's vote, so it is advocacy, and hedges its own figure; it is used for the fact of relocation and the concentration of rectifying capacity near the state line, both checkable against the panel, rather than for the magnitude.

state-by-year effects of Equation (2) absorb exactly such shocks, and in the differenced form the placebo dates of Section 5.4 test whether the gap moves at non-treatment dates. Changing composition of reporting distilleries would contaminate levels, so the analysis works in logs and shares and reports, beside the full panel, the balanced subsample of states whose reporting spans the window. On SUTVA, rectified output falling because certifiable output rose is the mechanism measured, not a violation; the concern is cross-state leakage, so the national aggregate is a bound. The headline weights states equally, so it estimates the average state's change in the gap; weighted by pre-Act volume (mean straight plus rectified output, FY1887–96) it is −0.183 (0.112), and against FY1894–96 −0.104 (0.165) against −0.177. The national aggregate gap, ln straight less ln rectified summed over all states, averages −0.65 over FY1887–93, −0.72 over FY1894–96, and −0.93 over FY1897–1908. Neither weighting nor aggregation shows d_{st} rising; equal weighting is kept for the headline because volume weights concentrate the estimate on the four or five largest producing and rectifying states, the states whose gaps are most exposed to cross-state trade in whiskey.

Category construction. With no bonded label before 1897, the pre-period treated group is a constructed "would-be-certifiable" category defined by the characteristics the Act later required, applied consistently across the window and held fixed. Take-up is endogenous, but for reallocation and adoption that is intended: the object is the market-level shift, and the panel has no firm identifiers.

The battery adds placebo dates at 1888, 1890, and 1894—the last doubling as the precursor probe—and leave-one-state-out re-estimation, since a result living only in Kentucky is consistent with the concentration finding; it does not refute it.

Regression discontinuity in calendar time. A regression discontinuity in calendar time was rejected: one cross-section per year leaves a handful of observations in the bandwidth, continuity is untestable, any 1897 trend is an unremovable confound, and serial correlation invalidates local-linear inference (Lee and Lemieux, 2010; Imbens and Lemieux, 2008; Cat-

taneo, Idrobo, and Titiunik, 2020).

The certified sub-segment

Regressing the log gap between bonded bourbon and rye withdrawals and rectified output on a linear time trend, with state fixed effects, across the largest adopter states of Table 1 (Kentucky, Pennsylvania, Ohio, Illinois, and Maryland) over FY1898–1908, the window in which the bonded series keeps the bourbon-and-rye definition, gives +0.172 log points per year (standard error 0.050, clustered by state; Webb wild cluster bootstrap $p = 0.023$, a rough guide with five clusters). Indiana, fifth by cumulative volume, bonded mostly the miscellaneous class, and its bonded bourbon and rye passes the volume floor only in FY1906, so as a single observation it does not enter. On the five states the bonded tier grew about 19 percent per year *relative to* rectified spirits. Extending the window to FY1917 with all bonded spirits, across the FY1909 reclassification, gives +0.234 (0.029). The relative growth came from the numerator rising: rectified output rose from 62.1 million gallons in FY1898 to 103.4 million in FY1908 and 114.2 million by FY1917 (Figure A4).[17]

Whether that volume is new or relabeled bears on how much of the segment was added output and how much a relabeled channel. The test is run on the withdrawal margin, where the two flows are nested: bonded withdrawals B_{st} are a subset of tax-paid bourbon and rye withdrawals, so non-bonded withdrawals N_{st} are the published series from FY1903 and the published series less B_{st} before. One-for-one relabeling means $\partial N/\partial B = -1$; in logs that null implies an elasticity of $-B/N$, which at the ratios of bonded to non-bonded withdrawals observed in the adopter states over FY1898–1908 (0.030 at the start of the window, 0.174 at its end) is a band between about -0.03 and -0.17, not -1. The sample is every state-year over FY1898–1908 with positive bonded and non-bonded withdrawals: 69 state-years,

[17]The FY1896 base sits in the depression trough: national straight output fell from 57.6 million gallons in FY1893 to 26.1 million in FY1896 and 10.4 million in the enactment year, so index levels are base-dependent. On the centered three-year means the figures plot, straight stands at 196 and rectified at 189 in 1905; on a FY1893 base the order reverses. The body therefore compares period means: rectified output averaged 43 percent more over FY1897–1908 than over FY1887–96, straight output 9 percent more.

Table A6: Bottled-in-bond as a share of straight output

Year	Straight (M gal)	Rectified (M gal)	BIB (M gal)	BIB % of straight
1893	57.6	69.7	—	—
1896	26.1	56.3	—	—
1898	22.3	62.1	0.54	2.36
1900	33.7	74.5	0.42	1.23
1902	41.9	89.2	0.54	1.25
1905	47.2	104.8	1.59	3.32
1908	27.7	103.4	4.79	16.66
1910	—	99.4	8.99	—
1913	—	108.2	10.63	—
1917	—	114.2	16.51	—

Notes: Straight and rectified columns are national output in millions of proof gallons, summed over the analysis panel's states. The bonded column is tax-paid withdrawals of all spirits under the strip stamp, from the collection-district series of Section 5.1. The final column expresses bonded bourbon and rye as a percentage of straight output. The straight and share columns end with FY1908, where the Circular 723 reclassification ends the bourbon-and-rye definition (Online Appendix A); the bonded and rectified series continue. Years shown are representative; the underlying series is annual, FY1893–1917. *Source:* Annual Reports of the Commissioner of Internal Revenue (see Section 3).

of which two are single-year states, leaving ten states that identify the elasticity (Illinois, Indiana, Kentucky, Maryland, Missouri, Nebraska, New York, Ohio, Pennsylvania, and West Virginia). With state and year fixed effects ($n = 67$, clustered by state) the elasticity is -0.096 (standard error 0.108; $p = 0.40$ referred to $t(9)$; interval $[-0.340, +0.148]$), and a restricted wild cluster bootstrap-t with Webb weights over the ten clusters (Webb, 2023), with 9,999 replications, gives $p = 0.57$. The interval covers the whole benchmark band and zero, so the design can apportion the segment between new and relabeled volume no better than it can exclude either. Subtracting bonded withdrawals from current deposits instead, a construction whose two flows are not nested because bonded whiskey was deposited at least four years earlier, gives -0.172 (0.097; bootstrap $p = 0.19$) with the same reading.

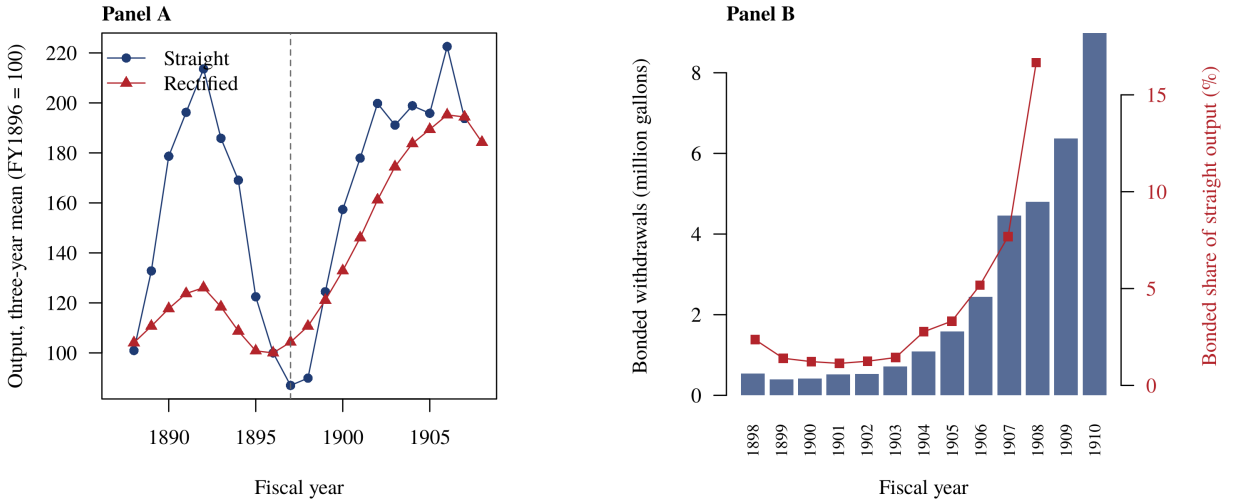


Figure A4: The bottled-in-bond sub-segment against straight and rectified output. *Panel A:* national straight (bourbon and rye) and rectified output, centered three-year means indexed to the FY1896 mean (= 100), over the one-definition window ending FY1908. *Panel B:* bonded withdrawals of all spirits in millions of gallons (bars, FY1898–1910) and bonded bourbon and rye as a share of straight output (line, FY1898–1908; the share ends with the straight-output definition, and its FY1908 spike reflects that year's production collapse in the denominator while withdrawals draw on accumulated stock). The certified series climbs from a near-zero base without a corresponding fall in the rectified series. *Source:* Annual Reports of the Commissioner of Internal Revenue (see Section 3).

The reallocation estimate: reference periods, pre-trend, and inference

Conventions. The small-sample scaling of the cluster-robust variance counts the fixed effects among the regressors either in full (full-K, K the number of estimated parameters) or only when not nested in the clusters (nested-K). Table 2 and every static coefficient quoted below use full-K (headline standard error 0.171); Table A9 and the event-study averages use nested-K (headline 0.165). Eight of the twenty-nine states that pass the volume floor appear in only one period; because the post indicator is constant within them and each carries its own fixed effect, their demeaned regressor is exactly zero and they enter neither the bread nor the meat of the variance estimator. The design is a twenty-one-cluster design, so the headline's intervals, stars, and power statistics refer to $t(20)$, and each other column of Table 2 to its own count of states observed in both periods, less one. On that convention the headline interval is $[-0.694, +0.021]$ and the minimum detectable effect at eighty-percent power is 0.50 log points. The restricted, null-imposed wild cluster bootstrap-t (Cameron, Gelbach, and Miller, 2008) uses Rademacher weights at the state level and 9,999 replications; its two-sided p on the headline is 0.041. The one-sided p of 0.021 comes from a separate draw of the same procedure, whose own two-sided p is 0.045, a Monte-Carlo difference of about two standard errors.

Reference periods. The headline contrasts FY1897–1908 with all of FY1887–96. The 1894 Wilson–Gorman Act lengthened the bond to eight years and raised the excise, so the incremental effect of 1897 is identified only against FY1894–96. On that reference the coefficient is -0.177 (standard error 0.193, sixteen states observed in both periods); with all ten pre-years and a separate indicator for FY1894 onward it is -0.180 (0.169); against FY1887–93 alone, -0.415 (0.210). The event-study path says the same thing in levels: relative to FY1896 the FY1887–93 leads average about $+0.40$, FY1894–96 about $+0.20$, and the post-Act coefficients $+0.006$, so the post-Act average falls below the FY1894–96 average

by 0.190 (0.162). Every pooled reference gives a negative coefficient, and the estimate grows the further back the reference reaches, because the FY1887–93 years sit highest; against FY1896 alone the post-Act average is +0.006. Whether 1897 lowered d_{st} relative to the regime that began in 1894, or left it where FY1896 had already put it, the data cannot say.

A longer pre-period. The FY1878–86 reports print bourbon and rye deposits by collection district and rectified output by state (Online Appendix A). Built the same way as the canonical panel's FY1888–92 rows—a construction that reproduces the FY1888 panel cell for cell—and held to the same volume floor, they add 142 state-years. Over FY1878–96 the gap shows no trend (−0.015 log points a year, standard error 0.031; −0.008, 0.035, over FY1878–93), fluctuating with the 1881–82 overproduction boom at levels between about −0.2 and +1.0 relative to FY1896, highest in the boom. A joint test that the eighteen leads equal zero rejects ($F = 27.8$; a cluster-robust Wald test with eighteen restrictions on twenty-six clusters over-rejects, so the statistic is descriptive), because FY1896, the event study's reference, is among the lowest years of the pre-Act record: of the eighteen leads only FY1879's lies below it. On FY1878–1908 the static coefficient is −0.327 (0.238). Neither the long record nor the FY1887–96 window shows a trend running into the Act; what the event study shows is a drop in FY1896, a year before enactment, as straight production fell toward its FY1897 trough.

Sensitivity. Fitting a linear year term to FY1887–96 gives −0.039 log points a year (standard error 0.041; one-sided $p = 0.18$; 158 state-years on the twenty states that identify it). Extrapolated across the sample's 11.20-year post-minus-pre shift it gives a trend-adjusted coefficient of +0.10, with a standard error of 0.46 from the trend's uncertainty alone, a demonstration that the headline's sign depends on the baseline rather than an estimate. Rambachan and Roth (2023) bound the post-period violation of parallel trends by $\bar{M}$ times the largest pre-period violation; with the post-Act event-study average as the target, zero lies inside the robust set at every $\bar{M}$, including $\bar{M} = 0$, and the smoothness family $\Delta^{SD}(M)$

gives $[-0.739, 0.215]$ at $M = 0$. Both follow from the target itself: the post-Act average is $+0.006$ with a nested-K standard error of 0.246, so zero lies inside the original interval before any violation is allowed. Neither bound is informative about the declared FY1894–96 contrast. Figure A5 plots the bounds.[18]

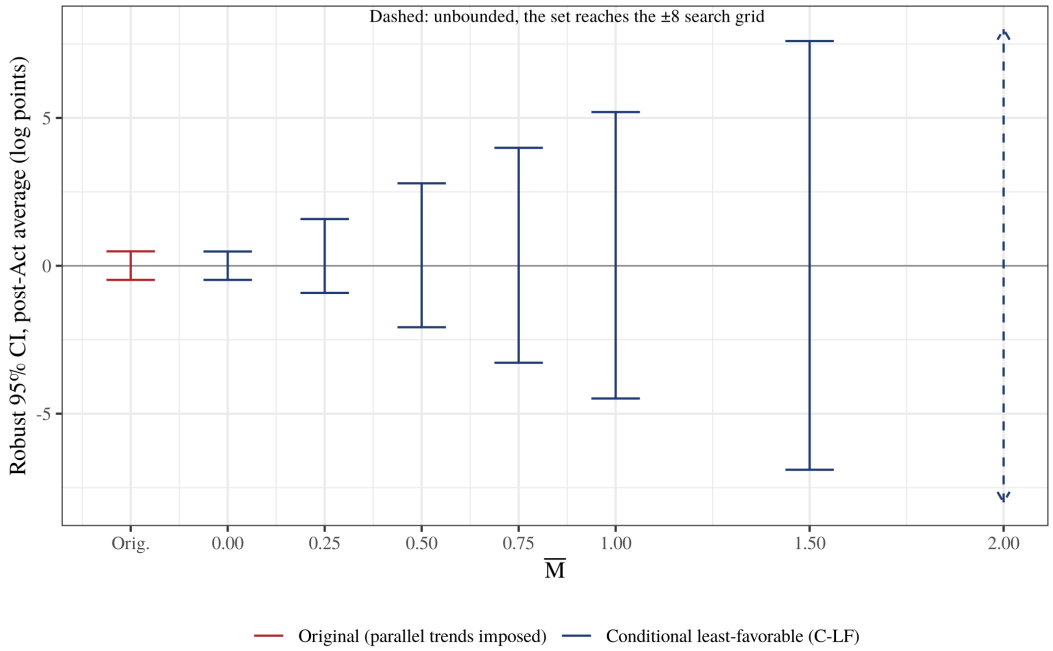


Figure A5: Relative-magnitude sensitivity of the post-Act average effect on the straight–rectified log gap. The vertical axis is in log points of d_{st}. The interval at the left, labelled "Orig." (red), is the original ninety-five percent confidence set under exact parallel trends; each interval to its right (blue), one for each value of $\bar{M}$ on the horizontal axis, is the robust confidence set under $\Delta^{RM}(\bar{M})$, which permits the post-Act violation of parallel trends to be as large as $\bar{M}$ times the largest violation observed across consecutive pre-Act periods. Conditional least-favorable hybrid at the five percent level, on the event-study path of Table A9 and its state-clustered variance–covariance matrix. Read the figure as: zero lies inside every interval, including the original, so the design has no positive breakdown $\bar{M}$; the intervals are finite through $\bar{M} = 1.5$, and the one at $\bar{M} = 2$, drawn dashed with arrowheads, reaches the solver grid at ± 8 and is unbounded. *Source:* the HonestDiD sensitivity analysis in the replication materials.

What the estimate can and cannot show. One-sided against a rise in d_{st}, the headline's ninety-five percent upper bound is -0.041 on $t(20)$ and the bootstrap gives $p = 0.021$,

[18]The bounds are computed in the replication materials from the coefficient vector and clustered variance–covariance matrix of the main event study. The relative-magnitude intervals are finite through $\bar{M} = 1.5$, where the interval is $[-6.90, 7.60]$; at $\bar{M} = 2$ it reaches the ± 8 solver grid and is unbounded.

but both take the whole pre-period as the baseline; against FY1894–96 the bound is +0.161, and the event-study average's is +0.43. Power is the binding limit. Had each certified gallon displaced a rectified one, rectified output would have fallen by $-\ln(1 - B/R)$: nationally 0.009 log points in FY1898, 0.015 in FY1905, and 0.047 in FY1908, and 0.013 in the average state-year of the estimating sample. One-sided power against a 0.05 rise against the declared FY1894–96 reference is eight percent, against 0.20 twenty-four percent, and against 0.415 sixty-five percent (at the headline standard error, eight, twenty-nine, and seventy-five percent). Power passes ninety-five percent only at a rise of about 0.69 log points, a halving of the rectifying trade, and nothing the certified channel could mechanically have produced comes near that. The levels—rectified output 43 percent higher on average after the Act than before—rule out an absolute contraction; the relative margins, price and capacity included, are imprecise.

Placebo enactment dates. Each estimated on the strictly pre-treatment sample, the three pseudo-enactment dates return −0.31 (standard error 0.22; $p = 0.17$) at FY1888, −0.19 (0.21; $p = 0.38$) at FY1890, and −0.14 (0.20; $p = 0.49$) at FY1894. All share the headline's sign and none exceeds it in magnitude, consistent with the mild, imprecise drift of the FY1887–96 leads; no pseudo-date, FY1894 included, stands out. Three dates are a gesture toward a randomization distribution. A fuller one uses the FY1878 record and the declared estimand's form: for each pseudo-date from FY1881 to FY1891, a three-year reference against a post window running to FY1893. The eleven estimates have mean −0.135 and standard deviation 0.214 (range −0.478 to +0.308). That spread is close to the clustered standard error of the declared-reference estimate (0.193), so a single common date does not make the clustered error understate the noise. The estimate itself, −0.177, lies inside the distribution: a one-sided rank p against a rise of 0.58, and the same two-sided. Three features limit the comparison. The pseudo-dates' post windows end at FY1893, so they run from thirteen years down to three, nine of the eleven shorter than the declared estimate's twelve;

the windows overlap, so the eleven draws are fewer than eleven independent ones; and the placebo mean is not zero.

Other checks. The coefficient is little changed without FY1897 (−0.322, 0.174), is −0.243 (0.146) on the seventeen states whose reporting spans the window, and −0.322 (0.265) on tax-paid withdrawals with bonded withdrawals added back from FY1903, which keeps that series on one definition; the published withdrawals series, which excludes bonded volume from FY1903, gives −0.345 (0.266). A leave-one-state-out jackknife holds the headline between −0.392 and −0.247, with the extremes set by Wisconsin and New Jersey. Dropping Kentucky gives −0.329 (0.184) on the full window and −0.156 (0.207) against FY1894–96; ending the window at FY1905, before the 1906 Kentucky tax on rectified spirits, gives −0.289 (0.163) on the full pre-period and −0.158 (0.185) against FY1894–96. A single common treatment date limits all of this inference: state clusters cannot price an aggregate shock that coincides with 1897 (Cameron, Gelbach, and Miller, 2008), and failing to reject a set of leads is not evidence of flatness (Roth, 2022).

The volume floor. The gap enters only state-years in which both trades reached 1,000 proof gallons (Section 3.2). On any positive volume, with no floor, the headline is −0.258 (0.148) and the FY1894–96 coefficient +0.136 (0.307); at 100 gallons they are −0.411 (0.184) and −0.127 (0.237), and at 10,000 gallons −0.277 (0.130) and −0.072 (0.165). The cells that matter are a handful of straight-output entries of under 150 gallons against rectified output of about 100,000 gallons or more, each a gap of about eight to twelve log points below zero: Oregon FY1888 (1 gallon), Georgia FY1887 (47), Connecticut FY1894 and FY1895 (4 and 2), Oregon FY1895 (23), Nebraska FY1895 (143), and Georgia FY1896 (45); a cut at 150 gallons adds an eighth, New Hampshire FY1902 (91 gallons, $d_{st} = -6.6$), though New Hampshire is a single-year state that the state fixed effects absorb, so the cut removes seven cells from the estimation sample. Five of the seven fall in FY1894–96, and of the 41 state-years the 1,000-gallon floor removes, 13 fall in those three years, which is why the

declared-reference coefficient moves most. Rules aimed at these outliers instead of at volume agree in sign: dropping only the five smallest from the unfloored sample gives −0.396 and −0.127, dropping every cell under 150 gallons −0.448 and −0.245, and trimming cells with $d_{st} < -8$ −0.350 and −0.062, with one-sided upper bounds on a rise of 0.284, 0.059, and 0.342; the last rules out a contraction only above 29 percent. The one-sided upper bound on a rise against FY1894–96 is 0.667 with no floor, 0.284 at 100 gallons, 0.161 at 1,000, and 0.220 at 10,000; across nine floors from 50 to 25,000 gallons it runs from 0.081 to 0.284, a ruled-out contraction of 8 to 25 percent, with the 1,000-gallon rule near the middle. At every positive floor every coefficient is negative, and at none is the FY1894–96 contrast distinguishable from zero. Most of the removed cells are Southern and Western state-years—North Carolina, Georgia, Oregon, Colorado; whether the Commissioner's bourbon class there also took in corn whiskey the reports do not say; if it did, the floor partly doubles as a filter on definition.

The capacity and eligibility margins

Capacity heterogeneity. Operated distilleries below twenty bushels of daily mash capacity form the small group, those at forty and above the large group. The small group is statutorily ineligible, so the contrast measures exit by size and cannot isolate the capital channel—eligible distillers unable to carry four years of bonded inventory—which would act just above the twenty-bushel line (the eligibility contrast below). The design is a state × size-group panel of log counts with state-by-group and year fixed effects (Table A7); state-years with no bracket entries, about a third of the panel and almost all in states with no registered distillery, enter as missing, as do the 41 blank rows of states with one (Online Appendix A). Over the window that isolates the Act—FY1887–1903—the post-1898-by-small coefficient is −0.018 (standard error 0.084, $p = 0.83$): for six years after enactment, small distilleries show no differential decline. On its standard error it is the more precise of the two size-margin nulls—the implied minimum detectable effect is about 0.24 log points at

eighty-percent power, and a two-sided equivalence test places the differential inside ±0.20 log points ($p = 0.019$)—but that equivalence is conditional on a flat pre-period, which the data do not supply. The eligibility contrast is less precise (standard error 0.095), and its own leads are uninformative.

Figure A6 dates the divergence that does arrive, and the pre-period needs stating carefully, because the natural reading of the plot is the wrong one. Seven of the nine pre-1896 leads are negative, three of them individually significant at ten percent (FY1892 −0.244, FY1893 −0.215, FY1894 −0.162), and the nine average −0.13. Those are statements about *levels relative to the FY1896 reference*, not about drift. The point estimates of the drift rise: the within-state small-minus-large differential gains +0.019 log points a year across FY1887–96 on the panel (standard error 0.021, $p = 0.36$) and +0.015 a year as the slope of the nine estimated leads. Neither is distinguishable from zero, so the direction of the drift is not established. If it is real, an upward pre-drift extrapolates to a *higher* counterfactual, and detrending moves the Act-window coefficient toward foreclosure. Allowing a group-specific linear trend on the same window returns −0.174 (standard error 0.137, $p = 0.21$) with a trend of +0.019 (0.015), and the ±0.20 equivalence test goes from $p = 0.019$ to $p = 0.42$.[19] I do not read that as evidence of foreclosure: the trend term is itself insignificant, the treatment standard error inflates by more than half, and the trend-augmented minimum detectable effect is 0.38 against 0.24. What it does establish is that the equivalence result depends on imposing a flat pre-period. What survives on this margin is an inconclusive null, which is what the design's power allows. The one positive departure is an FY1897 blip (+0.26, $p = 0.01$), which cuts against foreclosure at exactly the moment foreclosure would begin. The differential turns negative around FY1903–1904 (FY1903 −0.265, $p = 0.09$; FY1904 −0.407, $p = 0.05$), six years after enactment, reaches five-percent significance from FY1905

[19] Computed in the replication materials by a routine that first reproduces the Act-window estimate of Table A7 exactly. The equivalence figures quoted here use the $t(34)$ reference; on the normal quantiles used for the paper's other power statistics the flat-pre-period figure is $p = 0.015$, so the collapse is not a convention artifact.

(-0.564, $p = 0.03$), and deepens to -1.52 log points by FY1915, close to twelve times the mean pre-Act lead. Table A10 reports the full thirty-coefficient path with standard errors and p-values, so every lead and lag quoted here is checkable against the estimate directly.

Geography explains part of the collapse. North Carolina operated 386 small distilleries in FY1903 and three in FY1908, between the 1903 Watts Act and statewide prohibition effective 1909 (Whitener, 1945); Virginia fell from 87 to 3 by FY1910, Georgia from 27 to 4 by FY1908, and South Carolina from 19 to 2 by FY1907, under local-option and statewide statutes (Dills and Miron, 2004; Szymanski, 2003; Beienburg, 2019). Coding a state dry in every fiscal year a statute bound it—the 1903 rural acts in North Carolina, Virginia, and Tennessee; statewide prohibition from Georgia in FY1908 to Nebraska in FY1917; and the earlier statewide spells still in force after FY1886 in Maine, Kansas, Iowa (to the 1894 mulct law), New Hampshire (to 1903), and Rhode Island (to 1889)—a dry-by-small interaction takes -1.72 (0.40) and the post-1898 coefficient is -0.443 (0.134), against -0.588 (0.168) without it. Dropping every state with a dry spell in the window leaves twenty states and -0.381 (0.154, $p = 0.02$); in those states the small-minus-large path is flat through FY1901, drifts down from FY1902, reaches -0.35 ($p = 0.02$) in FY1905, and deepens to about -0.9 by FY1914–15. Through FY1907, before the statewide wave, the coefficient is -0.211 (0.110) on all states and -0.161 (0.126) on the never-dry states.

Two checks bound what this decline can say about the Act. First, it depends on the missing-data convention: the regressions drop state-years whose bracket table is entirely blank, and coding those rows as zero operated moves the never-dry estimate to -0.236 (0.133) and the full window to -0.454 (0.152); coding zero only where the register lists distilleries gives -0.363 (0.159). Second, the small group is the one the statute barred, so its decline is not the four-year floor's margin, and at the statutory cut itself the never-dry states show no step: the eligible twenty-to-forty bracket against the ten-to-twenty gives -0.038 (0.142). County local option, which the state coding misses, and consolidation toward larger plants predict the path; the design cannot apportion it.

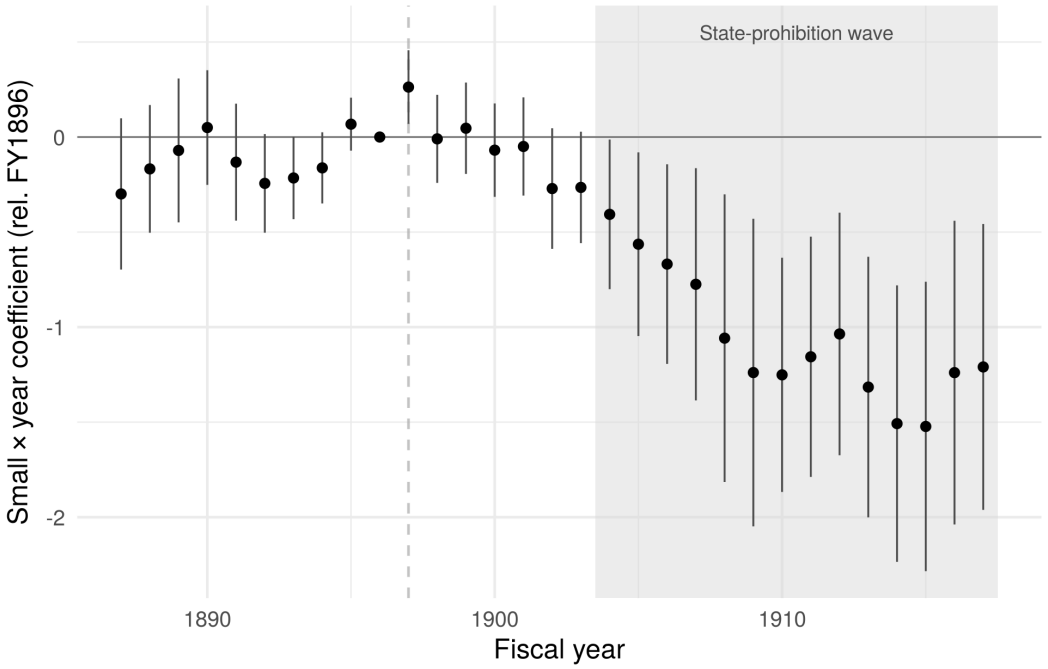


Figure A6: Small versus large distilleries: event-study interactions, FY1887–1917. Coefficients on fiscal-year indicators interacted with the small-capacity group (under twenty bushels of daily mash capacity, against forty and above), relative to FY1896, from a regression of $\ln(1 + \text{operated count})$ on state-by-group and year fixed effects; ninety-five percent intervals from standard errors clustered by state. State-years with no operated-bracket entries are excluded; 1,460 observations, thirty-six state clusters. The dashed line marks the Act; the shaded band marks the Southern state-prohibition wave from FY1904 onward. *Source:* operated-distillery capacity brackets, Annual Reports of the Commissioner of Internal Revenue (see Section 3).

Table A7: Capacity-bracket difference-in-differences: small versus large distilleries

	(1) Full window FY1887–1917	(2) Act window FY1887–1903
Post-1898 × Small	-0.588***	-0.018
	(0.168)	(0.084)
State × size-group FE	Yes	Yes
Year FE	Yes	Yes
Observations	1,460	868
Clusters (states)	36	35
R^2	0.858	0.960

Notes: The dependent variable is ln(1 + operated count) in a state × fiscal-year × size-group panel built from the grain-mash capacity brackets: "small" aggregates the brackets below twenty bushels of daily mash capacity, "large" the brackets at forty bushels and above (the twenty-to-forty bracket enters neither group). "Post-1898 × Small" is the interaction of the small-group indicator with the post-enactment indicator (first clean post-year FY1898). State-years with no operated-bracket entries, almost all in states with no registered distillery, are excluded as missing rather than zero-coded (Online Appendix A). Column 1 uses the full FY1887–1917 window (the analysis stops before the FY1918 wartime recap, which carries brackets for twelve states only); column 2 ends in FY1903, before the Southern state-prohibition wave. Standard errors clustered by state in parentheses. The bracket family is reported for more states than the twenty-nine whose straight and rectified output pass the volume floor, so both cluster counts exceed the reallocation panel's (thirty-six on the full window, thirty-five on FY1887–1903). $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. *Source:* operated-distillery capacity brackets, Annual Reports of the Commissioner of Internal Revenue (see Section 3).

Capacity heterogeneity: groupings and margins. The small-versus-large pattern is not an artifact of the grouping or the outcome margin. Assigning the twenty-to-forty bushel middle bracket to the large group rather than omitting it gives an Act-window coefficient of +0.041 (standard error 0.087) against a full-window −0.458 (0.155), and registered rather than operated counts—exit from the register rather than idling—give +0.071 (0.069) against −0.584 (0.179). In every variant the Act window is null and the full window is negative, which is the identification-hygiene point of Section 5.4: the negative full-window estimate loads on the post-1903 years, where dry laws, local option and consolidation overlap.

The eligibility threshold. Bottling in bond required a daily mash capacity of at least twenty bushels, and the floor sits in the statute's first sentence—eligibility runs to spirits "deposited in the warehouse of a distillery having a surveyed daily capacity of not less than twenty bushels of grain, which capacity or not less than twenty bushels thereof is commonly used by the distiller" (Act of Mar. 3, 1897, ch. 379, 29 Stat. 626)—which Evans defended as the Commissioner's judgment rather than a favor to large producers (Section 2.3). Distilleries below it were *statutorily ineligible*, and the panel's bracket boundaries fall on that floor. Comparing the ten-to-twenty bracket with the twenty-to-forty bracket returns nothing: in a state-by-bracket panel with state-by-bracket and state-by-year fixed effects, the post-1898 interaction on the *eligible* (twenty-to-forty) bracket is +0.044 (standard error 0.095, clustered by state; $n = 1{,}484$ across thirty-six states), and +0.028 (0.111) on the FY1887–1903 window. It stays indistinguishable from zero under Poisson, log, and level forms and on the registered margin, though not with the same sign in all of them.

On this margin the missing-data convention moves the estimate more than the specification does. Dropping every blank bracket cell returns −0.043 (0.142) on 849 state-bracket-years, but it deletes precisely the state-years in which the excluded bracket emptied out—the movement the contrast is supposed to detect—so a blank cell inside a reported table is read here as a printed zero, the rule of Section 3.1. That rule carries the sample to 1,484 state-

bracket-years, holds the standard error at 0.095, and the point estimate crosses zero. The harmonized estimate is the more precise of the two and takes the opposite sign; both are reported.

The sign convention runs opposite to intuition. The treated indicator is the eligible bracket, so exclusion harming the sub-twenty-bushel distilleries predicts a *positive* coefficient: the admitted bracket should pull away from the barred one. The +0.044 is therefore weakly foreclosure-*signed*, and the drop-blank −0.043 weakly anti-foreclosure signed. Both are within half a standard error of zero, so neither reading should be pressed on the point estimate; the ninety-five percent interval, $[-0.149, +0.237]$, runs from a fourteen percent relative decline to a twenty-seven percent relative gain for the admitted bracket.

Of the three nulls this one carries the least weight, for a reason of design. Table A11 runs the same contrast at all seven cuts the brackets allow: six of the seven are indistinguishable from zero at ten percent, the one that is not sits at forty bushels, and six of the seven point estimates are positive—so the counterfactual for the statutory estimate is neither zero nor of unknown sign. The design is inconclusive; it does not conceal a foreclosure effect. On power it is far from the weakest margin, though less precise than the capacity contrast: the minimum detectable effect is about 0.27 log points, and two-sided equivalence places the effect inside ± 0.25 at $p = 0.019$ but not inside ± 0.20—about twenty-two percent—where $p = 0.055$. Unlike the capacity bound it has not been trend-tested, and its leads are uninformative; its precision comes from the roughly six hundred additional state-bracket-years (1,484 against 849) the blank-cell rule retains. What limits this margin is design: its groups are adjacent brackets in a size distribution rather than categories the statute named, and the neighboring cuts show a positive local gradient the contrast cannot fully net out.

The eligibility contrast against its local gradient. The cut's two immediate neighbors, at ten and forty bushels, average +0.156; the forty-bushel cut is the one contrast in Table A11 distinguishable from zero at ten percent on the full window (+0.241, standard error 0.085).

If that is the local size gradient the statutory cut sits in, the statutory contrast of +0.044 falls about 0.11 log points below it. The netting is not an estimate: it assumes a linear gradient through the threshold, and the contrasts are not independent, since the twenty-to-forty bracket is treated at one cut and control at the next. What it supports is the reading in the body: the design is inconclusive.

Eligibility threshold: functional forms and margins. The statutory adjacent-bracket contrast of +0.044 (standard error 0.095) reported in Section 5.4 remains statistically indistinguishable from zero under alternative functional forms, though it does not keep its sign in all of them: Poisson on the raw counts gives +0.055 (0.245), logs on positive counts −0.040 (0.226, $n = 705$ across twenty-six states), and levels −0.860 (0.780). The log-on-positives and levels variants are the ones that change sign, and the log-on-positives one does so because conditioning on a positive count discards the emptied-out bracket-years the harmonized convention exists to retain—so it is reported here as a diagnostic of the convention; it is not a competing estimate. The same contrast on *registered* rather than operated distilleries, which isolates entry and exit from utilization, gives +0.102 (0.086, $n = 1{,}586$ across thirty-six states). An event study on the donut over FY1890–1910 shows no divergence at enactment, and the two halves are comparably noisy: the FY1890–96 leads average 0.079 in absolute value (maximum 0.148) against 0.099 for the FY1898–1910 lags, both small against a mean standard error of 0.157. FY1897 is excluded from both as a transition year; at +0.173 it is among the largest coefficients in the window, which is a reason to read the leads as uninformative rather than as reassuring. All figures in this paragraph are computed under the harmonized missing-data convention described in Section 3.1.

The pooled bracket contrast. Pooling all brackets below twenty bushels against all at or above it gives +0.310 (0.091) on the full window, which would be a serious result if it were about the Act; widening the donut only one bracket each way, to five-to-twenty against twenty-to-sixty, already cuts it to +0.200 (0.073), and the adjacent-bracket donut itself is

+0.044 (0.095). The pooled effect loads on the post-1903 years, where dry laws, local option and consolidation overlap the certified segment (see the small-distillery results above), so it is not read as the Act's.

The wholesale-dealer margin

Section 3.2 scopes the no-foreclosure conclusion to the rectified trade because the volume series cannot measure injury to the wholesale dealers—the class whose bottling business the 1896 remonstrances defended. But the count margin is measurable: the special-tax family reports wholesale liquor dealers, retail liquor dealers, and rectifier payers by state annually. Table A8 reports the test, with the design frozen before estimation (the pre-specification note is in the replication materials). Wholesale-dealer numbers do not fall after the Act on any specification: on the full window they rise about 24 percent in levels (column 2) and about 16 percent relative to retail dealers in the same states (+0.149, standard error 0.041; column 1), with individually insignificant pre-period leads, a brief dip in FY1898 (−0.123, standard error 0.067) that reverses by FY1900, and growth thereafter. Two caveats bound the reading. Relative to *rectifier* payers the wholesale class grows more slowly (−0.247, column 3)—because rectifier counts themselves surge after 1898, which is further evidence against foreclosure of the rectifying trade, not evidence of wholesale injury. And part of the late-window relative growth reflects retail contraction under the post-1903 state prohibition wave rather than wholesale expansion; the clean-reference column (5), which stops the post-period at FY1905, is accordingly smaller (+0.071, standard error 0.044) though still non-negative. Counts are not volumes—a payer class can grow while its members' bottling business shrinks—so the finding is scoped to the count-of-firms margin the statute's own records measure: on that margin, the class the remonstrances defended shows no detectable post-Act decline, absolute or relative to its own market.

Table A8: Wholesale-dealer special-tax payers around the Act

	Wholesale liquor dealers (special-tax payers), FY1889–1908				
	(1)	(2)	(3)	(4)	(5)
Post-1898	0.149***	0.213***	-0.247***	0.168***	0.071
	(0.041)	(0.043)	(0.052)	(0.045)	(0.044)
95% CI	[0.067, 0.232]	[0.128, 0.299]	[-0.351, -0.143]	[0.079, 0.258]	[-0.017, 0.158]
State FE	Yes	Yes	Yes	Yes	Yes
Observations	949	949	807	852	571
States	53	53	52	53	52

Notes: The outcome in columns 1, 4, and 5 is ln(wholesale dealers) − ln(retail dealers) within state-fiscal-year; column 2 is ln(wholesale dealers); column 3 replaces retail dealers with rectifier payers as the comparison class. All columns: ordinary least squares with state fixed effects, post-period from FY1898—the first full fiscal year under the stamp, the stock-of-firms convention of Section 4—on the FY1889–1908 window (the special-tax family is not digitized for FY1884–88; FY1889 and FY1893 cover thirty-four states). Each contrast conditions on positive counts of both classes in the state-year. Column 4 drops the FY1897–98 transition years; column 5 uses a FY1890–93 reference against a FY1898–1905 post-period. Standard errors clustered by state in parentheses; test statistics on the $t(G-1)$ convention. $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$. The design, including the specification battery and the decision rule, was frozen before estimation; the pre-specification note is in the replication materials. *Source:* special-tax payer counts by state, Annual Reports of the Commissioner of Internal Revenue (see Section 3).

E The Case on the Other Side, in Full

Section 2.4 points to the opposing case. This appendix gives the arguments, the quotations, and the two corrections that follow from them.

Private assurance. The premise of Section 2.1, that refilling and counterfeiting exposed the private brand, has a serious opponent. Scheck and Smith (2026) argue that early American whiskey producers built working private assurance—sealed bottles, exclusive dealer agencies, and brand reputation—and that federal regulation added little to it. The two readings overlap more than they conflict. The 1890 *Wine and Spirit Bulletin* register is itself such a mechanism (Online Appendix A); the 1893 hearing record shows compounded goods made and sold as aged whiskey alongside it; and a seal assures only what is inside one bottle, while the bonded stamp added a government warrant of age that no private seal could carry. The paper's claim does not turn on which reading is right. If private assurance

worked, the stamp duplicated a working market mechanism, and its value to the incumbents lay in excluding rivals from a federal mark; if it failed, the stamp answered a real problem. Either way the evidence is the same: the eligibility terms, set against the broader instrument proposed in 1893. How much of the market the private mechanisms reached neither paper measures.

Several literatures bear on this reading without changing it. Landes and Posner (1987) treat a trademark as a property right in reputation; the certified channel is that right made excludable by the state, which is why a mark rivals could copy (Section 2.1) was worth replacing. Libecap (1989) shows how the distribution of gains among parties shapes which property-rights arrangement is adopted, the margin on which the eligibility terms were fought. The reading has a testable edge: the Trademark Act of 1905 widened federal registration, and if the stamp's value lay in excluding copyists, registered brands should have leaned on it less afterward; the records consulted do not allow that test at brand level, and the tripling of bonded volume between FY1905 and FY1908 (Section 5.2) coincides with the 1906 Act and the demand campaign, so it cannot stand in for one. The theory of certification supplies the strongest objection to reading the floor as captured: coarse thresholds are a standard design even for a public-interest certifier, because a pass mark draws middling sellers into voluntary certification and can tell buyers more than an exact grade would (Harbaugh and Rasmusen, 2018), and in the models of certification intermediaries the coarseness serves the certifier (Lizzeri, 1999; Dranove and Jin, 2010). The stamp, however, printed its dates on every bottle it covered, so its coarseness lay only in eligibility, and the evidence identifies the threshold's location, not its existence, as the captured term: the four-year line sat at no price break (Online Appendix C), has no recorded rationale (Section 2.2), and fell just past the 1894 margin, where the incumbents' stock and almost no one else's could qualify. Levine and Forrence (1990) predict that capture is likeliest where an issue's salience is low, as it was for a bill passed under suspension of the rules with no roll call (Section 2.3). And Carpenter (2001) shows how the Bureau of Chemistry built its own reputation and autonomy in these

years, a stake of its own in the purity campaign the straight distillers enrolled (Section 2.5).

A capture reading is only as credible as its treatment of the opposing case, and the archives contain that case in its strongest form. In January 1907 Hiram Walker & Sons wrote Wiley fifteen pages contesting the proposed federal standard for whiskey (U.S. Bureau of Chemistry, 1898–1907). Three of their arguments are, on this record, correct. First, on the facts of their own product: Canadian Club was not the caricatured compound of neutral spirit, coloring, and flavor. The firm describes distilling two spirits of its own production, combining them *before* maturation, and aging the result as a single body, with "no mixing of a matured with an unmatured spirit." A standard drawn to exclude compounded imitations excluded this as well. Second, on the name: "We regard the name WHISKY," they wrote, "in precisely the same light as the name WINE, which expresses nothing as to type, age, quality, color, place of origin, or anything else except that it is the juice of grapes." The claim that a generic term was being appropriated to one production method is not obviously wrong, and it is substantially the position President Taft adopted in December 1909. Third, on the chemistry, the blenders were closer to right than the Bureau. The draft standard, they observed, "prescribe[d] a minimum of fusel oil for every description of whisky"—a floor on the very congeners the purity campaign elsewhere identified as the danger in cheap spirits—so that "the objection of the Bureau would be that CANADIAN CLUB is too pure." The straight distillers' own chemistry was no better: a pamphlet circulated on their side held that whiskey stored four years "has undergone a chemical change which has transformed these dangerous poisons it contained into its most healthful and fragrant properties" (U.S. Bureau of Chemistry, 1898–1907). It has not; the congeners largely remain. Their proposed remedy was the more straightforwardly informational one—"strict enforcement of truthful labeling as to everything descriptive of type, quality, origin"—rather than excluding a class of product from a name. On the economics of information the rival case is at least as strong as the one that prevailed.

None of this dissolves the capture reading, for two reasons. The dispute the parties

were actually having was about *provenance* rather than wholesomeness—and provenance is precisely the attribute a federal certification can make excludable, which is why the fight was worth having. And the fraud the straight houses complained of was real, large, and commercially organized: the same Walker letter denounces "the most notorious fakers of Cincinnati … who have debauched the liquor trade of the country," and the Bureau's files preserve trade circulars offering compounds to make below-proof spirit pass as proof goods, one promising that "on every barrel of cheap goods 5 gallons of spirits can be saved."[20] The honest summary is that a genuine fraud problem existed and a rent was sought, of a size the price record cannot fix; that the remedy adopted was the one the concentrated interest preferred; and that a broader certification—a dated stamp open to any bottler—had been recommended in a House committee report of March 1893, after the Deputy Commissioner proposed it in February (Section 2.2). Of that proposal's two halves, the compounder's label the straight houses wanted was dropped, and the universal eligibility was narrowed to whiskey four years in bond. The claim rests on that narrowing, not on whether the underlying problem was imaginary.

A correction is owed to Wiley personally, and it matters for how the mechanism should be stated. His testimony before the Committee on Manufactures of the Fifty-sixth Congress was narrower than the use later made of it. He said he could not call the compounding materials "unwholesome or deleterious to health when used in moderate quantities," and that they were "chemically the same as those which are produced by the natural methods of aging in whiskey"—but he was speaking of the *materials*, not the finished products, and he immediately denied the products were equivalent: "There is something almost undescribable which makes a difference between the compounded and the natural products."[21] His position

[20] Online Appendix A records the provenance of these items; the circulars survive only through a straight-distiller advocacy pamphlet, so the only witness to them is an interested party (U.S. Bureau of Chemistry, 1898–1907; Louisville Free Public Library, 1893–1913).

[21] Quoted from a reprint in an E. W. Taylor paper of 2 August 1903 (Taylor-Hay Family Papers, 1886–1916), not verified against the printed hearings; the inquiry was conducted by the Senate committee. Online Appendix A records this and the contemporaneous witnesses who rejected the capture charge against Wiley outright, one of whom was arguing against him at the time.

was a labeling position, which is what makes the commercial use of his authority interesting; it does not make it corrupt. The mechanism is therefore best stated as rent-seeking *around* a sincere regulator rather than capture *of* him. Nothing in the argument requires Wiley to have been bought, and the evidence is against it. What the evidence supports is that a doctrine he held on his own grounds—that a product must be labeled for what it is—was valuable to a particular set of firms, and that those firms agreed to help finance the institutions that propagated it. A 1912 letter to him in the Taylor papers shows the figure $15,000 and the words "us in the production of Old Taylor whiskey"; the verb governing the figure is covered, and nothing here rests on what it was (Online Appendix A).

The outcome should likewise be stated on two margins. Taft's decision of December 1909 rejected the exclusive definition: limiting "whisky" to the straight product was, he held, "a perversion of the Pure Food Act," and on health he found that neutral-spirits whisky contained "less fusel oil and less of the poison," so "the question, therefore, is not here one of health." But the same decision preserved the disclosure obligation and the protected status of the narrower term: "[t]he straight whisky men are relieved from all future attempt to pass off neutral spirits whisky as straight whisky."[22] Both camps read the ruling as a victory, and both were partly right. The straight distillers lost the boundary of the general name and kept an exclusive certified label with a mandatory disclosure rule running against their rivals. That is a narrower prize than the one they sought; bottled-in-bond volume continued to climb after the decision. It also means the food-standards apparatus the distillers had enrolled was overruled at the top—which needs saying plainly, because a capture account that cannot accommodate its own principal defeat is not a serious one.

Britain offers a comparison. Its Royal Commission on Whiskey and Other Potable Spirits reported in 1909 (Royal Commission, 1909), the year of Taft's decision, and likewise declined to confine the name to pot-still spirit. Six years later the Immature Spirits (Restriction) Act

[22] *What Is Whisky? President Taft's Decision*, printed by *The National Bulletin* (Cincinnati, 1910); copy in the Taylor papers (Taylor-Hay Family Papers, 1886–1916).

of 1915 barred the delivery for home consumption of spirits warehoused for less than three years (United Kingdom, 1915), with a year's grace, at extra duty, for spirit of two. Gavin D. Smith's history, drawing on Moss and Hume and on Ross Wilson, credits the floor to James Stevenson, joint managing director of John Walker & Sons, a blending house holding large matured stocks, who persuaded Lloyd George to adopt it in place of the wartime prohibition and doubled spirit duty the Chancellor had first proposed (Smith, 2023). The two systems reached a bonded age rule from opposite directions—in Britain as a universal floor, in the United States as an optional label confined to the incumbents' product—but in both the age line was sought by holders of matured stock, and in Britain as the softer of the instruments on the table.

F Full Event-Study Path and Bracket Placebos

Table A9 reports the full event-study path underlying the parallel-trends discussion of Section 5.4 and the post-period pattern reported in Section 5.3. Table A10 does the same for the capacity-bracket design, whose event study is plotted as Figure A6; individual significance is not readable off an interval plot, and the pre-period discussion in Online Appendix D quotes individual leads, so the path is tabulated here. Table A11 reports the adjacent-bracket contrast at every capacity cut the Commissioner's brackets allow, which is what bounds how much of the statutory null is the statute and how much is a local gradient between adjacent brackets.

Table A9: Event-study coefficients: straight–rectified log gap, FY1887–1908

Fiscal year	Coef.	Std. err.	95% CI
1887	+0.530	0.398	[-0.290, +1.350]
1888	+0.412	0.403	[-0.418, +1.242]
1889	+0.372	0.300	[-0.246, +0.990]
1890	+0.475	0.358	[-0.263, +1.213]
1891	+0.442	0.364	[-0.308, +1.191]
1892	+0.299	0.273	[-0.263, +0.860]
1893	+0.286	0.315	[-0.364, +0.935]
1894	+0.176	0.172	[-0.179, +0.531]
1895	+0.412	0.199	[+0.003, +0.821]
1897	-0.183	0.257	[-0.714, +0.347]
1898	-0.515	0.432	[-1.405, +0.375]
1899	+0.109	0.366	[-0.644, +0.862]
1900	+0.126	0.245	[-0.379, +0.631]
1901	+0.162	0.214	[-0.280, +0.603]
1902	+0.263	0.293	[-0.339, +0.866]
1903	+0.175	0.321	[-0.486, +0.836]
1904	+0.179	0.264	[-0.364, +0.722]
1905	+0.070	0.346	[-0.642, +0.782]
1906	+0.041	0.378	[-0.737, +0.819]
1907	-0.023	0.384	[-0.815, +0.768]
1908	-0.328	0.446	[-1.246, +0.589]

Notes: Each row is the coefficient on a fiscal-year dummy, relative to the FY1896 reference, from an event-study regression of the within-state log gap $d_{st} = \ln(\text{straight}_{st}) - \ln(\text{rectified}_{st})$ on fiscal-year dummies with state fixed effects; once the gap is differenced within state-year, the fiscal-year dummies *are* the treated-relative-to-comparison path. The estimation sample is the canonical state × fiscal-year panel, FY1887–1908, one definition throughout, on state-years in which both trades reached 1,000 proof gallons (352 state-years, twenty-six states; Section 3). FY1896 is the omitted reference year and so does not appear as a row. Standard errors are clustered by state (nested-K). A joint test that all nine pre-1897 leads equal zero does not reject on either window: $F(9, 25) = 1.02$, $p = 0.45$, on the full window, and $p = 0.40$ dropping FY1887–88. Intervals use $t(25)$: the estimator drops the three states observed only once, leaving twenty-six clusters, all of which identify year dummies; the twenty-one effective clusters of Table 2 are the states observed in both periods, which the static post indicator needs. *Source:* whiskey output panel, Annual Reports of the Commissioner of Internal Revenue (see Section 3).

Table A10: Event-study coefficients: log operated small-distillery counts relative to large, FY1887–1917

Fiscal year	Coef.	Std. err.	p-value
1887	-0.299	0.203	0.149
1888	-0.168	0.171	0.335
1889	-0.070	0.193	0.717
1890	+0.050	0.154	0.748
1891	-0.132	0.157	0.406
1892	-0.244	0.132	0.074
1893	-0.215	0.111	0.060
1894	-0.162	0.096	0.099
1895	+0.068	0.071	0.348
1897	+0.263	0.099	0.012
1898	-0.010	0.118	0.936
1899	+0.046	0.123	0.708
1900	-0.069	0.125	0.586
1901	-0.050	0.132	0.709
1902	-0.271	0.162	0.103
1903	-0.265	0.150	0.085
1904	-0.407	0.201	0.051
1905	-0.564	0.246	0.029
1906	-0.668	0.268	0.018
1907	-0.775	0.312	0.018
1908	-1.058	0.386	0.010
1909	-1.239	0.413	0.005
1910	-1.251	0.314	0.000
1911	-1.156	0.323	0.001
1912	-1.036	0.326	0.003
1913	-1.315	0.350	0.001
1914	-1.508	0.371	0.000
1915	-1.523	0.388	0.000
1916	-1.240	0.408	0.004
1917	-1.210	0.384	0.003

Notes: Coefficients on fiscal-year × small-bracket interactions, relative to the FY1896 reference, from the capacity-bracket event study whose difference-in-differences counterpart is Table A7 and whose plot is Figure A6. Operated distilleries below twenty bushels of daily mash capacity are the small group and those at forty and above the large group, in a state × size-group panel of log counts with state-by-group and year fixed effects; state-years with no operated-bracket entries enter as missing. Estimation sample 1,460 state-group-years, thirty-six clusters; standard errors clustered by state. FY1896 is the omitted reference year and so does not appear as a row. The individual pre-period leads quoted in Online Appendix D are checkable here against their standard errors and p-values, which a ninety-five-percent interval plot cannot settle. Tabulated from the capacity-bracket event study in the replication materials. *Source:* distillery capacity-bracket counts, Annual Reports of the Commissioner of Internal Revenue (see Section 3).

Table A11: Adjacent-bracket contrasts at every capacity cut

	Full window		FY1887–1903	
Cut (bushels/day)	Coef.	Std. err.	Coef.	Std. err.
5	+0.006	0.131	−0.071	0.076
10	+0.071	0.084	−0.149	0.101
20 (statutory)	+0.044	0.095	+0.028	0.111
40	+0.241	0.085	+0.113	0.076
60	+0.068	0.068	+0.031	0.047
100	−0.066	0.101	−0.100	0.074
500	+0.049	0.117	+0.114	0.077

Notes: Each row is a separate difference-in-differences on the two capacity brackets adjacent to the stated cut, with the higher bracket treated. The outcome is $\ln(1+\text{operated distilleries})$ in a state × bracket × fiscal-year panel; all specifications include state-by-bracket and state-by-year fixed effects, and the post indicator switches on at FY1898. Only the twenty-bushel cut corresponds to a legal threshold; the others are placebos. Standard errors clustered by state. The right-hand panel ends at FY1903, before the Southern state-prohibition wave. Six of the seven full-window contrasts are indistinguishable from zero at ten percent; the one that is not sits at forty bushels, and six of the seven point estimates are positive. *Source:* operated-distillery capacity brackets, Annual Reports of the Commissioner of Internal Revenue (see Section 3).

References for the Online Appendix

Associated Press wire reports (1899). *Reports on the incorporation and consolidation of the Kentucky Distilleries and Warehouse Company. Virginian-Pilot* (Norfolk), 4 Feb. 1899, p. 1; *Kootenai Herald* (Idaho), 25 Mar. 1899, p. 2; *Salt Lake Herald*, 20 Apr. 1899, p. 1 (reprinting the Louisville *Courier-Journal*). Retrieved via Chronicling America, Library of Congress; screen captures in the project's research files.

Beienburg, S. (2019). *Prohibition, the Constitution, and States' Rights*. Chicago, IL: University of Chicago Press.

Cameron, A. C., J. B. Gelbach, and D. L. Miller (2008). "Bootstrap-Based Improvements for Inference with Clustered Errors". In: *Review of Economics and Statistics* 90.3, pp. 414–427. DOI: 10.1162/rest.90.3.414.

Carpenter, D. P. (2001). *The Forging of Bureaucratic Autonomy: Reputations, Networks, and Policy Innovation in Executive Agencies, 1862–1928*. Princeton, NJ: Princeton University Press.

Cattaneo, M. D., N. Idrobo, and R. Titiunik (2020). *A Practical Introduction to Regression Discontinuity Designs: Foundations*. Cambridge Elements: Quantitative and Computational Methods for Social Science. Cambridge University Press. DOI: 10.1017/9781108684606.

Clay, K. and W. Troesken (2002). "Strategic Behavior in Whiskey Distilling, 1887–1895". In: *Journal of Economic History* 62.4, pp. 999–1023. DOI: 10.1017/S0022050702001626.

Coppin, C. A. and J. High (1999). *The Politics of Purity: Harvey Washington Wiley and the Origins of Federal Food Policy*. Ann Arbor: University of Michigan Press.

Dills, A. K. and J. A. Miron (2004). "Alcohol Prohibition and Cirrhosis". In: *American Law and Economics Review* 6.2, pp. 285–318. DOI: 10.1093/aler/ahh003.

Dranove, D. and G. Z. Jin (2010). "Quality Disclosure and Certification: Theory and Practice". In: *Journal of Economic Literature* 48.4, pp. 935–963. DOI: 10.1257/jel.48.4.935.

Harbaugh, R. and E. Rasmusen (2018). "Coarse Grades: Informing the Public by Withholding Information". In: *American Economic Journal: Microeconomics* 10.1, pp. 210–235. DOI: 10.1257/mic.20130078.

High, J. and C. A. Coppin (1988). "Wiley and the Whiskey Industry: Strategic Behavior in the Passage of the Pure Food Act". In: *Business History Review* 62.2, pp. 286–309. DOI: 10.2307/3116002.

Imbens, G. W. and T. Lemieux (2008). "Regression Discontinuity Designs: A Guide to Practice". In: *Journal of Econometrics* 142.2, pp. 615–635. DOI: 10.1016/j.jeconom.2007.05.001.

Landes, W. M. and R. A. Posner (1987). "Trademark Law: An Economic Perspective". In: *Journal of Law and Economics* 30.2, pp. 265–309. DOI: 10.1086/467138.

Law, M. T. and G. D. Libecap (2006). "The Determinants of Progressive Era Reform: The Pure Food and Drugs Act of 1906". In: *Corruption and Reform: Lessons from America's Economic History*. Ed. by E. L. Glaeser and C. Goldin. University of Chicago Press, pp. 319–342.

Lee, D. S. and T. Lemieux (2010). "Regression Discontinuity Designs in Economics". In: *Journal of Economic Literature* 48.2, pp. 281–355. DOI: 10.1257/jel.48.2.281.

Levine, M. E. and J. L. Forrence (1990). "Regulatory Capture, Public Interest, and the Public Agenda: Toward a Synthesis". In: *Journal of Law, Economics, and Organization* 6, pp. 167–198. DOI: 10.1093/jleo/6.special_issue.167.

Libecap, G. D. (1989). *Contracting for Property Rights*. Cambridge: Cambridge University Press.

Lizzeri, A. (1999). "Information Revelation and Certification Intermediaries". In: *RAND Journal of Economics* 30.2, pp. 214–231. DOI: 10.2307/2556078.

Louisville Free Public Library (1893–1913). *Kentucky whiskey-trade newspaper clippings and trade-journal files*. Microfilm prints and clipping files, Louisville Free Public Library, Louisville, KY.

National Wholesale Liquor Dealers' Association of America (1904). *List of Members and Subscribers to the Protective Bureau*. Printed roster, dated 1 March 1904, bound in the *Wine and Spirit Bulletin* "Standard Brand Register" volume, Louisville Free Public Library. 633 firms transcribed (pp. 35–37, 39; p. 38 not photographed).

Olson, M. (1965). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, MA: Harvard University Press.

Rambachan, A. and J. Roth (2023). "A More Credible Approach to Parallel Trends". In: *Review of Economic Studies* 90.5, pp. 2555–2591. DOI: 10.1093/restud/rdad018.

Roth, J. (2022). "Pretest with Caution: Event-Study Estimates after Testing for Parallel Trends". In: *American Economic Review: Insights* 4.3, pp. 305–322. DOI: 10.1257/aeri.20210236.

Royal Commission on Whiskey and Other Potable Spirits (1909). *Final Report*. Cd. 4796, H.M. Stationery Office, London.

Scheck, M. and D. J. Smith (2026). *Assurance of Quality in Early American Whiskey Markets*. SSRN Working Paper. DOI: 10.2139/ssrn.6739990.

Shapiro, C. (1983). "Premiums for High Quality Products as Returns to Reputations". In: *Quarterly Journal of Economics* 98.4, pp. 659–679. DOI: 10.2307/1881782.

Smith, D. J. and M. Scheck (2023). "Examining the Public Interest Rationale for Regulating Whiskey with the Pure Food and Drugs Act". In: *Public Choice* 196.1–2, pp. 85–122. DOI: 10.1007/s11127-023-01061-0.

Smith, G. D. (2023). *Coming of Age*. *Unfiltered* (Scotch Malt Whisky Society), July 2023. URL: https://unfiltered.smws.com/unfiltered-07-2023/whisky-history-minimum-age.

Szymanski, A.-M. E. (2003). *Pathways to Prohibition: Radicals, Moderates, and Social Movement Outcomes*. Durham, NC: Duke University Press.

Taylor-Hay Family Papers (1886–1916). *Col. E. H. Taylor Jr. correspondence, circulars, and trade clippings*. Manuscript collection, Mss. A T238d, Filson Historical Society, Louisville, KY.

Troesken, W. (1998). "Exclusive Dealing and the Whiskey Trust, 1890–1895". In: *Journal of Economic History* 58.3, pp. 755–778. DOI: 10.1017/S002205070002115X.

U.S. Bureau of Chemistry (1898–1907). *Records of the Bureau of Chemistry: correspondence of Harvey W. Wiley on whiskey and the pure-food standard*. Record Group 97, National Archives at College Park, MD.

United Kingdom (1915). *Immature Spirits (Restriction) Act, 1915*. 5 & 6 Geo. 5, c. 46.

Veach, M. R. (2013). *Kentucky Bourbon Whiskey: An American Heritage*. Lexington, KY: University Press of Kentucky.

Webb, M. D. (2023). "Reworking Wild Bootstrap-Based Inference for Clustered Errors". In: *Canadian Journal of Economics* 56.3, pp. 839–858. DOI: 10.1111/caje.12661.

Whitener, D. J. (1945). *Prohibition in North Carolina, 1715–1945*. Vol. 27. James Sprunt Studies in History and Political Science. Chapel Hill, NC: University of North Carolina Press.

Wiley, H. W. (1930). *An Autobiography*. Indianapolis: Bobbs-Merrill.

Wine and Spirit Bulletin (1890a). *Quotations on Kentucky Bourbons and Ryes and Eastern Ryes (price current)*. *Wine and Spirit Bulletin*, Louisville, KY. Price current, p. 21 ff.; undated, printed 1890 (Online Appendix C); Louisville Free Public Library.

Wine and Spirit Bulletin (1890b). *Standard Brand Register*. *Wine and Spirit Bulletin*, Louisville, KY. Date inferred, c. 1890; register pages in a bound volume at the Louisville Free Public Library.

Wine and Spirit Bulletin (1903). *Bottled in bond: the Commissioner's returns for the fiscal year ending 30 June 1902*. *Wine and Spirit Bulletin*, Louisville, KY, 1 June 1903, p. 21. Reprint of the *Kentucky Journal* (Frankfort), 15 May 1903, carrying the Commissioner's by-state bottled-in-bond withdrawal figures for FY1902.