

# **Pulpit to Pump: Prohibition and the Ascent of Gasoline**

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## **Abstract**

The Eighteenth Amendment to the US *Constitution* played a decisive role in the global transition to the oil age. Prohibition eliminated alcohol as a serious rival in the market for motor fuel and thus secured the triumph of gasoline. The fuel market rivalry between gasoline and alcohol in the early 20<sup>th</sup> Century has not been raised in the vast literature on the forces behind the Eighteenth Amendment or in the equally vast literature on the consequences of Prohibition. This paper offers new insight about Prohibition and presents supportive evidence.

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*The Standard Oil Company has no politics. It knows no difference between prayer and politics, between preachers and politicians, between creeds and constitutions, and has no respect for any or all of them. It has no God but gain. It fears no Devil but loss.*

Allen O. Myers (1895)

*Say nothing and saw wood.*

Standard Oil Company Maxim (Winkler, 1929)

## **1. A New Piece to the Prohibition Puzzle**

The oil age dramatically began in 1859 when Colonel Edwin Drake struck oil in Titusville, Pennsylvania. The actions that came next — discovery, extraction, refining, and retailing of large reserves of petroleum — launched a global energy transition that started with kerosene for illumination and then accelerated with gasoline for internal combustion engines. In the transition to oil, the Eighteenth Amendment to the US *Constitution* played a decisive role. Prohibition eliminated alcohol as a serious rival and thus secured the triumph of gasoline in the market for transportation fuels. The fuel market rivalry between gasoline and alcohol has not been raised in the vast literature on the forces behind the Eighteenth Amendment or in the equally vast literature on the consequences of Prohibition.

The Eighteenth Amendment gave the advantage to gasoline over alcohol fuel at a nascent stage in the development of the automotive industry, and its 14-year reign provided a sufficient head start to harden this advantage.<sup>1</sup> The immediate advantage was to increase the price of alcohol fuel high relative to gasoline, which naturally changed consumer choices between these alternative fuels. The Prohibition-induced price edge favoring gasoline, in turn, had three long-lasting effects that reinforced and locked-in its triumph as the predominant fuel for automobiles. First, it influenced the trend in the design of internal combustion engines, making them more gasoline-friendly and less alcohol-friendly. Second, it affected incentives to invest in the substantial physical and knowledge infrastructure required to be viable in the motor fuels market. These investments determined production efficiency, supply chain management, and distribution networks, which ultimately affected long-run fuel costs. Third, Prohibition altered incentives for research and development of the two fuel sources. For example, by the time Prohibition was repealed in December 1933, researchers had discovered a metallic additive, tetraethyl lead, that solved a significant engine performance problem (commonly-known as “knocking”) that had initially rendered gasoline inferior to alcohol fuel.<sup>2</sup> As for alcohol, some of its

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<sup>1</sup> The number of motor vehicles in the United States exploded from 8,000 in 1900 to 20 million in 1925, a 2,500-fold increase (United States Census Bureau, 1960, Table No. HS -- 41).

<sup>2</sup> Alcohol fuel, or ethanol, never knocked. One year after Prohibition, General Motors researchers under the direction of Charles F. Kettering and Thomas Midgley initially discovered the anti-knocking properties of tetraethyl lead as an additive to gasoline, although Kettering’s feud with the knock dates back to 1912. For detailed accounts and the formation of the Ethyl Corporation, see Leslie (1983) and Robert (1983).

initial technical issues, such as its tendency for slow starting in cold weather, were eventually solved but too late in the competitive game.

Prohibition provided the initial advantage that set in motion a series of events that resulted in the triumph of gasoline in the motor fuels market. This ensured the energy transition to oil and a global economy that has relied heavily on petroleum for roughly 150 years. We present this thesis in further detail and connect some of the missing dots in the path to Prohibition, its language, and its legislative implementation. For example, to what extent was the oil industry a political force behind the passage of the Eighteenth Amendment? What explains the timing of the national Prohibition? Why was the manufacture, sale, and transportation of intoxicating liquors prohibited but not consumption? Why did the legislation enacted to implement the Eighteen Amendment define “intoxicating liquors” to include beer and wine?

The remainder of the paper is organized into three sections. Section 2 gives a brief historical account of the prohibition movement, stressing key events that are relevant to our thesis. It surveys pressure group explanations for the adoption of Prohibition, many of which are complementary to our hypothesis about eliminating alcohol as a rival for gasoline in the motor fuels market. Section 3 presents the simple analytics behind why Prohibition was a boon for gasoline. Here we present additional facts to support the pre-Prohibition competitiveness of alcohol in the motor fuels market, and how this was quickly lost in the dry decade of the 1920s. We also provide empirical results that

compare the growth in petroleum consumption in the pre- and post-Prohibition eras. Section 4 offers brief concluding comments.

## **2. Pressure Groups and Prohibition**

National prohibition in the United States went into effect on January 16, 1920, one year after three-fourths of the states ratified the proposed Amendment.<sup>3</sup> This presumed legal good-bye to John Barleycorn was a long time in the making. Some formative events leading up to 1920 are the basis for our thesis, and we provide a brief historical narrative to lay the groundwork.

### **A. Formative Events along the Path to Prohibition**

Merz (1930) eloquently traces the prohibition movement from Colonial times, stressing the shifts along the way in goals and tactics, from temperance by moral suasion to demanding abstinence through the force of law. Even the movement's "abstinence by law" approach had more than 60 years of state level experiments before national Prohibition. Maine was first state to enact a statewide prohibition statute in 1858, followed by three waves of state prohibition laws. When national Prohibition went into effect in 1920, a large number of states had adopted prohibition laws or constitutional amendments. However, only thirteen states at the time had adopted 'bone-dry' laws. Most states allowed

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<sup>3</sup> Appendix A provides the language of the Eighteenth Amendment and data on the state ratification process.

for moderate consumption of distilled spirits, beer, and wine, or local option laws.<sup>4</sup>

Two aspects of the prohibition movement in the states are relevant. First, it reveals that organized efforts against alcohol emerged during the 19<sup>th</sup> Century and picked up strength in the 20<sup>th</sup> Century. Second, the success of the prohibition movement at the state level was not effective in stopping the flow of distilled spirits. Even some states that prohibited the manufacture of alcohol did not prohibit importation of alcohol produced out of state. For the most part, the state laws did not absolutely prohibit the purchase or use of alcohol, but rather “they aimed to abolish the saloon and to place liquor traffic under rigid supervision” (Merz, p. 23).

The limited success at the state level and the interstate shipments of alcohol added pressure for government action at the federal level. This action came in several forms. Appendix B shows the major federal laws that preceded the resolution for the Eighteenth Amendment, which further illustrates the incremental, multi-year path to nationwide Prohibition. For example, the federal Webb-Kenyon Act of 1913 prohibited the importation of liquor into a state for purposes unlawful in that state.<sup>5</sup> Actions by the federal and state governments aimed at restricting alcohol

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<sup>4</sup> Almost all accounts of the state laws and constitutional rules regarding alcohol in the early 20<sup>th</sup> Century rely on the compilations by Wayne B. Wheeler in several editions of *Federal and State Laws Relating to Intoxicating Liquor*, published by the Anti-Saloon League’s American Issue Publishing Company in Westerville, Ohio.

<sup>5</sup> Webb-Kenyon Act, ch. 90, 37 Stat. 699 (1913) (codified at 27 U.S.C. § 122).

An important part of the history of alcohol in the United States is its taxation, which is described in Smith (1914) and Hu (1950). Federal taxes on alcohol were reinstated in 1862 to generate much needed revenues to finance the war effort.<sup>6</sup> In many respects, this steep federal tax did for kerosene in the market for illuminates what Prohibition did for gasoline 60 years later. The tax increased the cost of alcohol to the point where it was no longer competitive with kerosene as a fuel in lamps.

The market, the capital, the consumer, the skilled labor, the inventions, science, and industries beyond number were poised for improved illumination. The explosive growth in the market for kerosene suggests the value created by this new fuel, which made possible longer work hours for merchants and factories. Two key factors seemed to converge that contributed to the spectacular success of the business of refining kerosene. The first and most important was the tax levy in 1862 imposed on alcohol, the most viable alternative fuel at that time. In essence, the success of the petroleum industry in the 1860s was greatly aided by the heavy federal tax on its primary competitor, alcohol fuel. The second was the diminishing supply (and therefore increasing price) of whale oil. Obviously, both factors were tied to the American Civil War. These factors and more broadly the success of the US oil industry in the later part of the 19<sup>th</sup> Century have been described elsewhere.

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<sup>6</sup> The *Internal Revenue Act of 1862 (12 U.S. Stat. at Large)* defined the tax base as “all spirits of first proof distilled after August 1, 1862.” The initial tax rate was set at \$0.20 per gallon of “first proof,” and the rate increased in the proportion that the strength was greater than first proof. The law specified phased-in increases in the tax rate, rising to \$2.08 per gallon. To put the burden of this tax in perspective, the cost of producing a gallon of liquor in 1862 was about 14 to 17 cents. In other words the tax rate was greater than 100 percent of production costs.

Other oil-derived products such as fuel oil and lubricants were shortly invented and marketed, and these only added to the industry's procession to prominence driven by kerosene sales. Output of crude petroleum expanded nine-fold between 1865 and 1885 and a hundred-fold between 1865 and 1914 (United States Census Bureau, 1960, p. 360-361). As a share of US national output, Big Oil output went from nil to 1.5 percent in 1885 and to 2.6 percent by 1914 (United States Census Bureau, 1960, p. 143).

## B. Overview of Pressure Group Explanations

A number of pressure group hypotheses have been offered to explain the adoption of the Eighteenth Amendment.

In his classic 1928 book, *Pressure Politics*, Peter Odegard (1928) was the first to present in elaborate detail the thesis that the passage of Prohibition resulted primarily from the political tactics employed by the Anti-Saloon League (ASL). Founded in 1893 at Oberlin College in Ohio, the League's innovation was the "central idea of using the organized churches as a political battering ram has been the secret of its success." (Odegard, 1928, p. 5). The single-issue focus ("the one task of establishing sobriety within the nation"), dramatic tactics, and sudden success of the original Ohio League meant that the "Ohio Idea" began to spread. In 1913, the ASL became convinced that state prohibition could succeed only in a dry nation, and formally launched its campaign for national prohibition at its national convention that year. (Odegard, p. 149) The ASL's national legislative superintendent, Wayne B. Wheeler, described its effort during the

1916 federal and state elections: “We laid down such a barrage as candidates for Congress had never seen before and such as they will, in all likelihood, not see again for years to come” (*New York Times*, March 30, 1926).<sup>7</sup>

Mr. Wheeler testified before Congress that in thirty years of active labor, the ASL spent no less than \$35 million on political and public education efforts (the equivalent of about \$600 million in terms of 2010 dollars).<sup>8</sup> Adoption of the Eighteenth Amendment and the Volstead Act that filled in the necessary elements for its implementation followed were a crowning achievement of these

Other theories start with the critical role of the ASL as an effective political organization and look for the wellspring that made possible its considerable resources.

A second pressure group hypothesis is that Prohibition offered a way to lower labor costs. We see several versions of this thesis. One derives from the view expressed well by Irving Fisher (cite to his book 19?? and AER paper 19 ??) alcohol made workers less productive, especially that in light of the changing nature of the work force required with American industrialization in the late 19<sup>th</sup> and early 20<sup>th</sup> Centuries. Thus, a broad swath of businesses would benefit from Prohibition as a result of the labor productivity gains. This thesis is developed extensively by Rumbarger (1989), who argues “that large employers believed that questions of drinking, temperance, and prohibition were of vital economic importance, that rich businessmen helped organize the first temperance

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<sup>7</sup> The 1916 mid-term elections sent to Washington many members of Congress who would soon adopt the resolution proposing the Prohibition amendment.

<sup>8</sup> Cited in Merz (1926), p. 8. Wheeler’s testimony was before the Senate Campaign Fund Investigating Committee, June 23, 1926.

organizations, and that wealthy capitalists provided crucial financing and leadership for temperance organizations throughout the 19<sup>th</sup> century and in the first two and half decades of the twentieth.” (p. xi). Rumbarger’s thesis stresses direct economic interests in abstinence or indulgence, divorced from political economy. His objective is to

“put to rest the supposition that successful antidrink politics in America is not based on class distinctions or class conscious pursuit of material interests. It should equally dispel the comfortable assertions that the thrust of reform in these years was toward an abstract, albeit moralistic, ideal of human welfare and well-being. Such ideas, as well as those of social betterment and human uplift, were functionally related to the exigencies of industrialization carried on at the direction of business enterprise.” (Rumbarger, p. 175)

This concept is consistent with our thesis, although we argue that the largest benefits of Prohibition were highly concentrated in the oil industry.

A slight variation on this theme is that the labor cost savings from Prohibition would be especially beneficial to specific industries, such as the railroads and other safety-sensitive employers. Around the turn of the 20<sup>th</sup> Century, 377 railroad companies prohibited the use of intoxicating liquors, which included employee “drinking when on duty, or frequenting saloons” (Rumbarger, 1989, p. 129). In addition, at this time 25 states, territories, and the District of Columbia had enacted special labor laws that imposed drinking restrictions on a variety of occupations.<sup>9</sup> Company-specific or industry-specific anti-liquor policies for employees, whether adopted privately or collectively, would mean that in

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<sup>9</sup> Second Special Report of the Commissioner of Labor, “Labor Laws in the Various States, Territories, and the District of Columbia,” Washington, DC: US Government Printing Office, 1904, pp. 116 ff. The influx of immigrants at that time largely consisted of Irish and Italians, and who must have viewed with horror company employment policies that prohibited alcohol.

competitive labor markets employers with “dry” rules would need to pay higher wages relative to “wet” employers. One way to reduce this need for compensating higher wages would be to force Prohibition rules on all employers. A generalized prohibition rule would thus level the playing field, and firms with anti-liquor employment policies would not have to pay a wage premium to compensate for alcohol abstinence.

An example of this occurred in Colorado. In 1902 Standard Oil purchased a 40 percent share of Colorado Fuel & Iron (CFI), at that time Colorado’s largest employer, the second largest steel company, and the 17<sup>th</sup> largest industrial firm in America (Chernow, p. 572). As in other Colorado mining town operations, CFI built had its own company stores for its employees. Safety being a major concern, CFI banned alcohol from these stores, and set out to get rid of the saloons operating within the company’s property.<sup>10</sup> Its competitors, including its largest Colorado competitor, Victor-American, continued to offer private camp saloons, placing CFI at a competitive disadvantage in the market for miners. The Rockefellers (Senior and Junior) contributed \$10,000 to the Anti-Saloon League of Colorado, which in turn worked for the statewide prohibition in 1914, which was a new approach for the ASL. Anti-saloonism was abandoned for by the ALS once it realized that the social control it sought was beyond the resources of local society without enlisted the power of the state. This power was thereby used to establish a uniform (non-drinking) industrial labor force (Rumbarger, p. 175). We

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<sup>10</sup> See Rumbarger, p. 172. CFI is perhaps most famous for what came to be known the 1913 “Ludlow massacre,” in which the tents of striking miners (led by Mary Harris “Mother” Jones) were fired upon and several miners, two women, and their children was killed. This incident fueled criticism, prompting Helen Keller to tell the press, “Mr. Rockefeller is the monster of capitalism” (Chernow, p. 579).

note that the ASL's work the enact Prohibition in Colorado was only a few months before the Hobson Resolution for the US Constitutional Amendment received a four-vote majority in the US House of Representatives, but shy of the two-thirds requirement.

Rumbarger (p. 183) concludes: "In the last analysis, however, what made Rockefeller and others spend money on prohibition was their belief in its ability to end the instability of the nation's industrial labor force as a menace to business prosperity, a challenge industrial society could not resolve within the confines of state or local political units."

While we do not want to get too far ahead of our story, the support for the ASL's cause by John D. Rockefeller, his relatives, and his business associates at the Standard Oil Company has been cited by academic authors, such as Odegard, muckrakers like Lloyd and Tarbell, and in newspaper articles. A number of motives for Rockefeller's support were offered, but none that were able to find included the desire to eliminate alcohol fuel as a rival to gasoline.<sup>11</sup>

ASL policy was to "sacredly guard the names of our contributors" (*American Issue*, Maryland Edition, October 17, 1908), although several reliable sources indicate that Rockefeller (Sr. and Jr.).

Our thesis recognizes that the ASL was on the political front lines in elections and lobbying, but we argue that oil interests were behind the ASL

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<sup>11</sup> Eastern brewers alleged that Rockefeller's contributions were intended to keep the saloon question "before the public to distract attention from the methods of the Standard Oil Company." *Trade News* of Sioux Falls, South Dakota, Feb. 15, 1916. Another interesting motive is attributed to the ASL Superintendent in Nebraska, M.S. Paulson. In 1910 Paulson reported that Rockefeller's representatives offered substantial sums if the League would back off its opposition to House Speaker Cannon, who was holding temperance legislation (*Globe and Commercial Advertiser*, Lincoln, Nebraska, January 8, 1910).

juggernaut. The oil industry stood to capture considerable rents from the elimination of its prime competitor, ethyl alcohol, in the motor fuels market, and thus a very specific stake in the passage of national Prohibition.<sup>12</sup> Of course, the oil industry initially meant John D. Rockefeller and the Standard Oil interests, and later expanded to a wider circle of oil industry backers after Standard was convicted of anti-trust violations and split up.

### **3. Why Prohibition Eliminated Alcohol Fuel**

#### **A. Motor Fuels at the Turn of the 20<sup>th</sup> Century**

Gasoline was a late arrival in the competition to fuel motor cars. In the 1880s innovations by Daimler, Benz, and others were making the internal combustion engine more popular than steam- and electric- powered engines. The predominant fuels for these engines in the US and Europe were kerosene, oils from vegetables and hemp (“biofuels” in vernacular of the 21<sup>st</sup> Century), and ethyl alcohol (later-known as ethanol). This is not surprising because these were the most widely available fuels. Until 1905, gasoline was mainly a waste product that was allowed to run nightly into the rivers around the Ohio and Pennsylvania oil refineries that were producing kerosene for illuminating lamps. (Reports of fires on the waterways near Cleveland at night were common, evidently from the gasoline runoff.)

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<sup>12</sup> A few authors have recognized that Prohibition was an impediment to marketing alcohol fuel successfully. For example, Kovarik (1998) states “...blended fuel never caught on in the 1920s, due primarily to economic disadvantages but also to Prohibition and opposition by the oil industry.” On the other hand, Kovarik goes on to argue that “...with Prohibition, distillers would have welcomed a new use for their services,” in other words, that Prohibition could have stimulated encouraged the supply of alcohol fuel. See also Bernton, *et al.*, (1982).

Between 1900 and 1925, the transportation industry changed dramatically. With the development of the internal combustion engine, automobiles began to replace horses, railways, and steam engines. In the US, the number of automobiles exploded from 8,000 in 1900 to 20 million in 1925 — a 2,500-fold increase. In the midst of this explosive growth, gasoline emerged as the fuel of choice. In 1910, gasoline production exceeded kerosene output for the first time. Yet the dominance of gasoline over other fuels motor vehicle for was not inevitable. Gasoline was not a superior fuel from the standpoint of engineering efficiency, and automotive industry innovators, such as Henry Ford and Rudolf Diesel, were outspoken proponents of alcohol fuels from renewable sources. Alcohol had a higher octane rating than gasoline that allowed engines with higher compression ratios that offered greater power<sup>13</sup>

Two of the premier automotive engineers of the period, Charles Kettering, General Manager of the General Motors Research Corporation, and Sir Henry Ricardo owner of the British firm Engine Patents Ltd, both settled on alcohol fuel as the key to unshackling the internal combustion engine from non-renewable fossil fuels.<sup>14</sup>

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<sup>13</sup> The superiority of alcohol fuel was well documented at the time. For articles early in the century, see "Alcohol as a fuel for motor carriages," *Scientific American*, June 1, 1901, p. 344, and "Alcohol Automobiles at the Paris Alcohol Exhibition," *Scientific American*, December 28, 1901. Ford was working on an alcohol fueled car and tractor, see "With the Automobilists," Washington Post, May 22, 1906, p.8. In 1920, *Scientific American* noted that scientists shared "a universal assumption that [ethyl] alcohol in some form will be a constituent of the motor fuel of the future. Alcohol met all possible technical objections, and although it was more expensive than gasoline, it was not prohibitively expensive in blends with gasoline. Every chemist knows [alcohol and gasoline] will mix, and every engineer knows [they] will drive an internal combustion engine." *Scientific American*, Dec. 11, 1920 p. 593. In his treatise on the internal combustion engine in 1923,

<sup>14</sup> Kettering designed a carburetor to accommodate alcohol fuel. He wrote in 1922 "vegetation offers a source of tremendous quantities of liquid fuel, the utilization of which awaits only a proper

## B. How Prohibition Affected the Motor Fuels Market

The Volstead Act exempted from Prohibition industrial alcohol, that is, alcohol not intended to be consumed as a beverage. The use of alcohol for fuel was therefore permitted.<sup>15</sup> An important question is why wasn't it still a viable competitor with gasoline in the fuel market? The answer is that the beverage market for alcohol, despite being illegal, was more profitable than the fuel market. Alcohol continued to be produced, but it was diverted from industrial uses into beverage consumption, which meant that supply of alcohol for motor fuel dried up. Two forces caused this diversion, which we discuss in turn.

The first is regulation. Alcohol could be produced legally for industrial uses as long as it was rendered unfit for human consumption through a proscribed process of denaturing.

The second reason large quantities of industrial alcohol were diverted into beverage consumption is an effect that is sometimes called "the iron law of drug prohibition". The diversion of alcohol from industrial uses into beverage consumption is an effect that is sometimes called "the iron law of drug prohibition," and the analytics of this diversion of alcohol from industrial to beverage require additional explanation, and the effect is sometimes labeled "the iron law of prohibition."

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cheapening and simplification of the process of converting cellulose to a liquid suitable for motor fuel" (quoted in Leslie, 1983, p. 156) In other words, alcohol needed a vastly cheaper and more energy-efficient production process before it could be practical.

<sup>15</sup> Prohibition Commissioner Roy Haynes commented at the 1926 hearings: "Of the hundreds of uses of alcohol, only one is outlawed by the Volstead Act."

We note that this points to a crucial element of the National Prohibition Enforcement Act (the Volstead Act), which is that it defined (quantified) “intoxicating liquors” as containing one-half-of-one-percent alcohol. To the astonishment of many, beer and wine were thereby prohibited. This definition by the Volstead Act meant that under Prohibition stronger, high-valued products drive out weaker, milder, and therefore cheaper products. It became more profitable and cost effective to make and distribute distilled spirits (gin, vodka, whiskey, or rum) than beer. Beer is mostly water, only 3 to 6 percent alcohol. Production and storage of beer require enormous tanks, many barrels, and huge trucks and demand a substantial investment in equipment. Hard liquor is 40 to 50 percent alcohol; it contains up to 15 times more pure alcohol than beer. Because alcohol content was the main determinant of price, a gallon of spirits was much more valuable than a gallon of beer and also could be hidden and transported more easily. Furthermore, spirits could be preserved indefinitely, whereas beer spoiled very quickly. Large-scale beer bottling and refrigeration only developed in the 1930s, after repeal. (Levine and Reinerman, 1991, p. 471)

The supply of beverage distilled spirits reportedly came for several illicit sources: small home distilleries; imports smuggled from Canada, Mexico, and Europe; and alcohol diverted from purported industrial uses. Warburton (1932) estimates the sources of spirits consumed during prohibition, and these sources are shown in Table 1.

The key point is that Prohibition caused alcohol to become more valuable as drink than as fuel, and this diversion into the higher valued use doomed the supply of alcohol in the motor fuel market.<sup>16</sup>

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<sup>16</sup> In its 1930 annual report, *Statistics Concerning Intoxicating Liquors*, the Prohibition Bureau lists 38 products manufactured with denatured industrial alcohol, none of which is motor fuel. See Table 21, p. 34.

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**Table 1. Sources of Intoxicating Spirits During Prohibition**

(in Millions of US 190 Proof Gallons)

Year	Diverted From Industrial Alcohol	Share of Total	Produced from Raw Materials (Corn Sugar, Corn Meal, Cane and Beet Sugar, Molasses)	Share of Total	Medicinal	Smuggling	Total Spirits Available for Consumption
1921	13	38%	20	58%	1	0.25	34
1922	16	9%	153	90%	1	0.25	170
1923	20	9%	199	90%	1	0.75	221
1924	23	11%	175	87%	2	1	201
1925	30	14%	176	84%	2	2	210
1926	26	11%	195	86%	2	3.5	227
1927	15	8%	165	89%	2	4	186
1928	17	8%	192	89%	2	4	215
1929	16	7%	209	90%	2	4	231
1930	9	5%	157	92%	2	3.5	172

Source: Warburton (1932), pp. 43, 49, 66, and 70.

**Table 2. Consumption of Distilled Liquor versus Beer: Before, During, and After Prohibition (1901 to 1970)**

	Dependent Variable: ln (Consumption of Distilled Liquor)		
	Before	During	After
ln (Consumption of Beer)	0.996	-0.549	1.016
	5.05 **	-2.76 **	11.26 **
Constant	1.13	16.57	1.87
	0.53	9.80 **	1.82
F Statistic	25 **	7.62 **	127 **
No. Obs.	29	14	37

Regressions with Newey-West standard errors.

t-statistics are listed below the respective coefficients in the shaded rows.

\*\* indicates significance at the 0.01 level.

**Table 3. Motor Vehicles and Petroleum Consumption: Before and After Prohibition (1901 to 1970)**

	Dependent Variable: ln (Consumption of Crude Oil, trillion BTU)		
	Specification 1	Specification 2	Specification 3
ln (No. of Motor Vehicles per Capita)	0.26	0.24	0.18
	12.17 **	13.01 **	7.84 **
Post-18 <sup>th</sup> Amend	1.99	1.08	0.47
	13.47 **	8.13 **	2.96 **
Interaction Term: ln (No. of Motor Vehicles per Capita) x (Post-18 <sup>th</sup> Amend)	0.87	0.37	0.14
	9.88 **	8.36 **	2.24 **
World War I	-0.04	-0.09	-0.04
	-0.78	-1.85	-0.82
World War II	0.12	-0.06	0.06
	1.62	-2.63 **	1.83
ln (Real GDP per Capita)		0.61	
		11.36 **	
Time Trend			0.02
			11.39 **
Constant	-3.24	-0.45	-50.85
	-29.36 **	-1.59 **	-12.13 **
F Statistic	925 **	2555 **	1317 **
No. Obs.	70	70	70

Regressions with Newey-West standard errors.

t-statistics are listed below the respective coefficients in the shaded rows.

\*\* indicates significance at the 0.01 level.