Competition and Corruption:
Lessons from 150 Years of Industrial Governance

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I. Introduction

In this paper, I argue that corruption and competition are inversely related: corruption flourishes in industries where markets function poorly; and corruption is short-lived and limited in industries where markets function well. On one level, this argument seems obvious: to extent that corrupt relationships such as patronage employment and private kick-back schemes are costly and inefficient, they could not possibly survive in highly competitive environments. But this simple observation should not be seen as the end of the argument; it is only a beginning. To fully understand why corruption varies across industries, one needs go beyond a simple story about the redeeming effects of market forces to grapple with the sources and limitations of the idea that competition undermines corruption. One might, for example, ask about the role of informational asymmetries, scale economies, or the effects of large investments in non-redeployable capital, all of which might influence the relationship between market forces and corruption. One might also ask about the efficacy of alternative markets. To be more precise, most firms operate in multiple markets: an output market; a market for executive and managerial inputs; another market for labor; a market for raw materials; a market for capital; and a market for political favors. To what extent are these markets linked? For example, does competition in the output market mitigate corrupt practices on the part of managers and executives?

Much of my discussion will focus on the historical experience of public utility industries such as gas, electric, and water. Public utility industries are attractive, in part, because they offer a sort of lower bound on the spectrum of competitiveness. Recent history aside, I can

think of no other set of industries where market forces have worked so poorly and have so uniformly given rise to monopolistic outcomes. If competition and corruption are inversely related, corruption should be rife among public utilities, and be very difficult to eradicate. Public utilities are also interesting because they have a rich institutional and technological history. As will be made clear later in the paper, public utilities have been subject to a variety regulatory regimes, and must make huge investments in non-redeployable capital. Among other things, these characteristics make it possible to identify how changes in regulatory regimes can mimic competition in undermining corruption, to isolate how corruption evolves in response to institutional change, and to examine how capital immobility promotes corruption.

After documenting and explaining the intractability of corruption in public utility industries, I turn to an industry on the other end of the competitive spectrum: whiskey distilling. In contrast to public utility industries, whiskey distilling has always been a highly competitive industry, and setting aside (for the moment) the period of Prohibition, corruption has been short-lived and not especially profitable. The historical evidence presented below illustrates how competition in whiskey distilling has destroyed efforts to create rents and finance corrupt relationships. In the final historical section of the paper, I explore the viability of corruption in the oil refining industry. This industry lies somewhere between public utilities and whiskey distilling on the spectrum of competitiveness; historically, oil refining has always been more competitive than public utility industries, but less competitive than whiskey distilling. In the case of oil refining, John D. Rockefeller and his competitors made repeated

attempts to buy legislative favors that would have given them increased market power. These efforts, although they resulted in some short-term payoffs, did not have a lasting impact on the industry largely because of the rapidity of technological diffusion and change.

II. Corruption: Preliminary Observations

Public Versus Private Corruption

For the purposes of this paper, I define two types of corruption: public and private. Public corruption is defined as the *illicit* sale of political influence. The sale of political influence can take many forms, including the following: patronage arrangements (politicians buying votes by offering plum jobs at above-market wages); special-interest politics (politicians securing legislative changes that benefit a small minority at the expense of broader societal interests); political extortion (politicians extracting bribes from private companies by threatening to impose confiscatory regulations and taxes); strategic investment decisions (as explained below, private utilities can distort their capital investment decisions to secure more favorable treatment from regulators); and industry capture (private companies spend resources to make friends with regulators). Having offered these examples, in the definition above, the word *illicit* is critical. The act of selling political influence is not, in and of itself, corrupt. For example, governments frequently auction off rights and exclusive franchises—perhaps it is the right to log a particular area of land, the right to supply a particular defense department need, or the right to operate a public utility within a particular city. Whatever the case, as long as the fees private companies pay are public knowledge and are returned to voters, either directly in the form of reduced taxes or indirectly through the provision of other public services, this is a

completely legitimate sale of political influence. The act only becomes corrupt if politicians pocket for themselves some or all of the proceeds of the sale of valuable rights.

Private corruption might refer any number of fraudulent activities, but for the purposes of this paper, the focus will be on corrupt managerial practices, such as kickback schemes and managerial shirking. In this context, it useful to think about the agency problem that confronts the managers and shareholders of a private corporation. Agency problems arise because the interests of the managers and the shareholders diverge, and because it is costly for shareholders to monitor and control managers (Berle and Means 1932; and Jensen and Meckling 1976). For example, in a response to a poor earnings report, managers might claim to shareholders, "the corporation has performed poorly because of unanticipated demand shocks, or because of an unforeseen rise in the price of raw materials" though the real reason for the poor performance is the corrupt and profligate spending habits of managers—staying in five-star hotels, buying private jets that are more for personal convenience than genuine business needs, padding expense accounts, etc. As explained and illustrated with historical examples later in the paper, market forces usually put limits on the ability of managers to engage in these sorts of behavior, but there are cases where markets break down, particularly in the case of public utility industries. And when markets break down, this sort of corruption can flourish.

Corruption, whether public or private, imposes costs on third-parties who are not party to the exchange of favors that underlie corrupt relationships. In other words, corrupt relationships generate negative externalities. For example, political patronage is costly to the taxpayers who finance above-market wages for work that benefits primarily incumbent

politicians, and it is costly to the workers who would otherwise qualify for the jobs in question except that their political affiliations are incorrect. To the extent that industry capture results in higher prices, it is costly to consumers. Private kickback schemes are costly to consumers because they raise costs and consumer prices, and they are costly to outside shareholders because they undermine firm profitability.

Competition and Corruption

Whether discussing public or private corruption, I build on the hypothesis that corruption is costly. Much like Becker's (1957) taste for discrimination, corruption can put firms at a competitive disadvantage, absent some corresponding benefit. In the example of managers who use corporate assets for their own personal aggrandizement, competing firms will have a distinct cost advantage, and will eventually, in the presence of reasonably competitive output markets, drive the corrupt firm out of business. Having said this, the costs of corruption often carry with them a corresponding benefit that more than compensates for the increased cost. For example, a private utility that pays off local politicians to acquire an exclusive franchise to operate in particular city will have to pay some bribe money, but in the end, the bribery costs will result in a lucrative market, immune to competition.

Intuition and casual empiricism tell us that it is not only competition among economic organizations that helps undermine corruption; so too does competition among politicians. Imagine first a world where there was stiff competition among politicians for re-election. In such a world, if incumbents engaged in corrupt behavior, new politicians could enter and win elections by promising to return to voters some of the rents currently being expropriated by

incumbent politicians. The stronger and more intense the competition, the less likely corrupt relationships would be able to sustain themselves. A possible example of this sort of political entrepreneurship occurred during the Progressive Era, when reform-minded politicians challenged, and defeated, incumbent politicians by promising to eliminate corruption in urban politics (see, for example, Griffiths 1974b). But the problem with this example is that one must also explain why, in most cities, graft and corruption flourished for fifty years or more before reform-minded politicians were able to unseat corrupt incumbents.

On the other hand, in a world where a single party dominates the political system, there would be little genuine competition and it seems unlikely that an outside political entrepreneur could enter and threaten to disrupt the status quo. Even in a world where there is competition among multiple political parties, there is the possibility of collusion if the returns to corruption are sufficiently high. Accordingly, for some parts of the paper, it would seem reasonable to assume that political competition is limited and insufficient to undermine corruption. In particular, much of my discussion of public utility industries will focus on the experience American cities during the late nineteenth and early twentieth century. It is well-known that during this period most urban governments were dominated by a single political party and were often controlled by machine-style political regimes (e.g., Allswang 1986; Griffiths 1974a; MacDonald 1994; Scheisl 1977; Zink 1930).

One might argue that all that is really needed to prevent corruption is a well-informed electorate that has the opportunity to vote. If voters know about corruption, and the costs of corruption are sufficiently high, outsiders will be able to enter the system and win elections by

promising to reduce corruption. There is, however, good reason to question the idea that voters would make the necessary investments to inform themselves, because they have little incentive to do so. They are, in the jargon of political science, rationally ignorant—why should voters take the time to inform themselves about the issues when their single vote means so little in terms of (the probability of) affecting electoral outcomes?[1]

More generally, in the absence of effective commitment mechanisms, there are good reasons to believe that political competition alone would not eliminate corruption. Consider the case of an entrepreneurial politician who challenges a corrupt incumbent by promising to eliminate corruption and return the associated bribe money back to voters. Once the reformer-politician is elected, it is not clear what forces and institutions would force him to live up to his electoral promises. There is the threat of being voted out of office during the next election, but this will not always be sufficient. In particular, when the short-term benefits from graft and corruption are large relative to benefits of winning reelection as a corruption-free candidate, the reformer-candidate would happily forego reelection and assume the role of the corrupt politician.

Exit and the threat of exit in political markets might, however, serve a role in undermining corruption. In particular, a simple Tiebout (1956) model would suggest that even if the political process in one jurisdiction is thoroughly dominated by one party, voters could leave, on mass, and move to another political jurisdiction where corruption is less pronounced. This sorting mechanism would put pressure on local political bosses to limit their take from the

[1]On the incentives of voters to inform themselves, see Downs (1957), pp. 258-60.

sale of political favors. To see this more clearly, consider the relationship between local politicians and a private gas company within its jurisdiction. Suppose that local politicians sell the private gas company a lucrative and monopolistic franchise, and then split the resulting rents with the gas company. Suppose further that these politicians are entrenched and face no real electoral threat now or any time in the future. In the extreme case, if all voters exit this city for one where corruption is less severe, all of the rents associated with the gas company's monopolistic franchise would vanish. To the extent that corruption is costly to local voters—in this example, the costs are in the form of higher gas prices—they have an incentive to exit.[2]

Competition, Corruption, and Capital Immobility

Having considered the effects of Tiebout-like competition, it is useful to consider what happens when exit is prohibitively costly. In other words, what is the link between corruption and asset specificity (Williamson 1985)? Answering this question will help explain the intractability of corruption in public utility industries, where the costs of exit are often prohibitive. To begin, consider two restaurants located in a heavily ethnic neighborhood in New York City. One restaurant sells generic fast-food, the other sells authentic ethnic food that caters to the tastes of those in the neighborhood, but would have little appeal to markets outside that neighborhood. The latter restaurant has made a neighborhood-specific investment; the former has not. Imagine that both restaurants are subjected to the same shake-down offer: "pay me off, or something bad will happen." That offer might come from a local

[2]For a more general statement of the role exit and competition among states in disciplining politicians, see North (1981), pp. 20-32.

food or fire inspector who threatens to find violations of health or fire codes, or it might come from the mob selling protection. Whoever makes the offer, it is clear which restaurant is most likely to stay and participate: the one selling ethnic food that caters to the tastes of the neighborhood. The generic fast-food place can sell its product anywhere, and could move to the suburbs out of the reach of the corrupt public officials, or the mob, at relatively low cost. The primary attraction of moving to the suburbs for the generic restaurant is that it can sell the same food at the same price, but at a lower cost because it can avoid the shake-down payments. The ethnic restaurant, however, is tied to the neighborhood because its food has great appeal to those in the neighborhood, but little or no appeal to other ethnic groups outside the neighborhood.

Of course, a shake-down man who thinks ahead and whose time is valuable recognizes the threat of exit on the part of the generic restaurant and does not even bother approaching it with the offer. The smart shake-down man, in other words, only extorts money from those who have no choice but to pay. Besides looking for victims with limited options, extortionists also want to identify those who have a lot to lose. Desperate poor men can pay only so much; desperate rich men can pay so much more. In short, for shake-down men and extortionists of all stripes, the trick is to identify men of means for whom choices are few. In the example above, the ethnic restaurant would have had a differentiated product with great appeal to those in the community but with almost no appeal outside that particular neighborhood, making the restaurant an ideal target for extortionists.

III. Corruption, Competition, and Capital Immobility in Relation to Public Utilities

Preliminary Observations

Once public utilities put their mains in the ground or their wires in the air, they become men of means for whom choices are few. To see this, consider the size and immobility of the investments made by urban gas companies in turn-of-the-century America. In Chicago and New York in 1890, local gas companies owned more than 10 percent of all the private capital invested in both cities and nearly all of the physical capital held by gas companies was in the form of distribution mains (Troesken 1996, pp. 9-10). If one contemplates the magnitude of industrial activity in both of these cities, 10 percent of all capital is a remarkable statistic. In Chicago, the only industry that was even close to owning as much capital as the gas companies was the city's meatpackers and slaughterhouses. Chicago's infamous stockyards were, by themselves, a reasonably sized town, with their own railroads, housing stock, and massive factories (see, generally, Wade 1987).

Moreover, in contrast to most other industries, once gas and other utilities installed their distribution systems, they were stuck; gas mains and electric transmission wires could not be resold for some other purpose, or moved to some other market if local conditions turned against producers. In the words of Oliver Williamson, utility companies were held hostage by their investments. Because producers could not credibly threaten to exit, these investments left them vulnerable to the opportunistic acts of consumers and local governments. For example, local politicians might demand large bribes from local utilities in return for fair treatment in terms of regulations and taxes (Troesken 1996, pp. 55-78, and 1997). If local politicians tried to

do this to, say, local grocery stores, those businesses could have simply exited and located in a more hospitable political environment.

In light of such large nonredeployable investments, public utilities had viable choices only during the time preceding the installation of their distribution systems. At this point, they would have been perfectly mobile and immune to any shake-down schemes, no matter how elaborate (Demsetz 1968). Indeed, prior to the installation of their distribution systems, utilities would have been able play cities off one another in an order to garner the most favorable location package from competing municipal governments. Surely the managers of utility companies were sufficiently forward looking to anticipate the dangers of immobility *ex post*, and would have demanded legally-binding promises from local governments that would have provided protection against political extortion down the road. Put more generally, the *ex ante* competition just described would seem to undermine corruption just as effectively as *ex post* competition in more competitive industries. Yet historically, this is not at all what one observes: although there was plenty of *ex ante* competition among cities to attract private utility companies during the late nineteenth century, corruption was rampant in these industries. Why? The short answer is that *ex ante* competition does not work nearly as well as this brief, stylized example suggests. (A longer answer is provided in the following section.)

Up until now, the focus has been on the ability of local politicians to extort bribes from private utilities. But the ability to extort runs both ways; local governments usually have to grant utilities exclusive rights to install mains and wires along local streets and property. Once granted, these rights cannot be meaningfully revoked, and leave cities vulnerable to the

opportunistic acts of utility companies (Goldberg 1976; Jacobson 2000, pp. 114-15; Troesken 1996, pp. 10-12). Consider, for example, the case of a private water company and some city A. Suppose that the water company enjoys a monopoly over the city's water market so that the city must depend solely on this company for its water. In this context, city A is much like any buyer of a unique and highly specialized product who must rely solely on a single, monopolistic supplier. Just as the customer of the unique product is vulnerable to hold up by the product's manufacturer, city A's reliance on the water company creates incentives for the water company to act opportunistically. For example, by shutting down or curtailing service to the city—which historically could have resulted in disease epidemics or great city-wide fires—the water company might be able to secure tax breaks or other favorable treatment from the city. As above, one might ask why *ex ante* competition among utility companies for the right to operate in a particular city does not limit their ability to behave opportunistically *ex post*. More precisely, if there were many utility companies willing to enter the city, city authorities could have played the companies off one another to secure legally-enforceable contractual arrangements that prevented the utility from holding the city hostage. Was this observed historically? If not, why?

Franchise Bidding in Nineteenth-Century America

During the nineteenth century, municipal governments and private utilities in the United States seemed to understand the theory sketched out above. As theory suggests, both parties tried to use *ex ante* competition to mitigate *ex post* opportunism. In contracting arrangements that mimicked the franchise-bidding schemes proposed by Demsetz (1968), cities

and utility companies exchanged legally-binding promises about their respective future behaviors. These promises were exchanged through municipal franchise contracts. Franchises included provisions limiting the ability of city governments to impose onerous rates and taxes—these protected utilities—and provisions setting quality standards and rate ceilings—these protected the cities and their residents. Because franchises embodied legally-binding promises about future behavior, they put limits on the ability of both cities and utilities to behave opportunistically *ex post*. Limiting the ability of both sides to behave opportunistically, cities and utility companies became sufficiently confident to invest in non-redeployable capital and property rights.[3]

In theory, such franchise bidding schemes sounded great. If the private utility (city) refused to agree to the rate ceiling (the limits on regulatory authority), the city (private utility) could have turned to another private company (city) that was more amenable to such promises. Their actual historical performance was much less satisfactory, however, and several problems emerged. The most serious problems were the absence of numerous firms competing for the right to enter specific urban markets, and more seriously, the absence of even a single firm willing to enter with only the promise of competitive returns. All potential entrants seemed to realize that there were substantial risks of *ex post* opportunism, no matter what cities might have promised in writing. Consequently, as compensation for this risk, private firms generally refused to enter unless there was a real possibility of recouping most of their investments

[3]For discussions of municipal franchises as a response to non-redeployable capital, see Jacobson (1989) and (2000); Miller (1993); Priest (1993); and Troesken (1996), pp. 3-24. For a detailed historical overview of the franchises from many cities, see Wilcox (1910).

within a relatively short time span. This meant that to attract private capital, cities typically had to permit utility companies to charge rates at or near monopoly levels (Troesken 1997; and Troesken and Geddes, forthcoming). It also meant that a necessary precondition for corruption—excess profits—was created.

Once city politicians took a few steps down the path of granting exclusive and monopolistic franchises, the promise of high profits, even it came with risks, was sufficient to attract private investors. Not only this, for monopolistic franchises with few regulatory constraints, private companies were willing to pay handsomely. During the early 1900s, in Grand Rapids, Michigan, the mayor and multiple members of the city council were implicated, and eventually convicted, in a scheme to sell a lucrative franchise to a private water company. The bribes the promoters of this company paid to local politicians were substantial, around $3,000 (or about $42,000 in current dollars) per politician. The politicians and the promoters of the water company were eventually caught, tried, and convicted. Their trials garnered nationwide attention and were front page news in cities as far away as New York and Phoenix. At one point during the trials, at least one defendant tried to bribe jury members to vote against conviction.[4]

In Chicago in 1894, the promoters of a local railway company spent lavishly to secure

[4]See *Arizona Gazette* (Phoenix), December 1, 1903, p. 1, and December 2, 1903, p. 1; and the following issues of the *New York Times*: November 15, 1903, p. 2; November 22, 1903, p. 1; December 1, 1903, p. 1; December 2, 1903, p. 3; and December 27, 1903, p. 2. For some of the legal issues surrounding the trials of the men convicted in this scheme, see the following court cases: *People v. Albers*, 137 Mich. 678 (1904); *People v. Mol*, 137 Mich. 692 (1904); *People v. McGarry*, 136 Mich. 316 (1904); and *People v. Salsbury*, 134 Mich. 537 (1904).

passage of a valuable franchise that faced widespread voter opposition. Four members of the city council received $25,000 each (roughly $350,000 each in current dollars) for their votes in favor of the franchise, and other members of the council received $8,000 each for their votes. One particularly important Chicago politician received $100,000 ($1.4 million) for his role in securing passage of the franchise. W.J. Onahan, for two years the Comptroller for the City of Chicago, believed that all of the bribery and graft associated with the sale of franchises cost the city millions of dollars that otherwise could have been used to lower taxes:[5]

> If the city . . . had received proper annual compensation for all the franchises that have been ignorantly and corruptly disposed of for nothing, Chicago would today have income enough to run its affairs without levying a dollar of taxation on real estate or personal property. . . . The street railways, the gas companies, the electric lighting companies, the telephone companies, the water privileges, the dock privileges . . . every one of these favored interests, which secured their privileges by bribing Aldermen and corrupting officials, ought to [pay] millions in annual tribute to the city.

In St. Louis too, in 1898, the promoter of a local railway company paid bribes between $3,000 and $17,500 to local politicians in return for securing a franchise to operate in the city. In the end, the promoter paid about $250,000 (about $3.5 million in current dollars) in bribe money, none of which was returned to the city. The promoter, however, was eventually convicted and sentenced to five years in prison, as were several prominent St. Louis politicians. The same basic story obtained when St. Louis granted lighting franchises. Once, in the midst of all this graft and corruption, a newly elected member of the city council expressed concern that

[5]The information and quotation in this paragraph are from Stead (1894), pp. 176-177 and 199.

if voters discovered such schemes he and other politicians might be voted out office. His colleagues "laughed" and "assured him that the political power of the boodlers was too great."[6] The histories of Chicago, St. Louis, and Grand Rapids, while perhaps exceptional in terms of the richness of the historical record and the detailed information about the amount of money that changed hands, are representative of a much larger pattern of graft and corruption associated with the granting of franchises to private utility companies.[7]

If this sounds as though utilities were getting the better end of the bargain, it is important to recognize that monopolistic rates did not last for long. Once private utilities had completed building their distribution systems, city governments began lobbying state legislatures for legal changes that would allow them to abrogate their initial promises to utility companies regarding exclusive franchises and limited rate regulation. By the turn-of-the-twentieth century, city governments had acquired increased regulatory powers and were using these powers aggressively to extract rents from local utilities (Troesken 1996, pp. 74-78). In a speech before the Pacific Gas Association delivered during the early 1900s, an officer of a San Francisco gas company explained:[8]

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[6]These events are recounted in an article published by a St. Louis district attorney, Folk (1903).

[7]See, for example, Brown (1905), Rosewater (1903), Zueblin (1918) and Steffens (1964). See also, Troesken (1996, pp. 45-49) for the corruption associated with the granting of gas company franchises in Chicago.

[8]From a speech delivered before the Pacific Gas Association at its annual convention in the fall of 1908. The speech was reprinted in the *American Gas Light Journal*, September 28, 1908, p. 527.

> When the time for the regulation of rates arises, a [city] councilman or supervisor, elected on a platform that calls for a reduction in the gas and electric rates, is hardly in a proper frame of mind to listen to evidence and impartially vote thereon. No matter what the evidence is, if he does not vote for a reduction a large number of citizens, and all of the daily papers, will accuse him of being biased in favor of the corporation.

The noted historian Forrest McDonald concurs with this assessment: "At the turn of the century, public utilities were regulated by municipal governments. Such regulation was governed largely by political concerns; shrewd politicians . . . recognized . . . that voters were often inclined to respond favorably to attacks on utilities (McDonald 1957, p. 117)."

Three examples illustrate the politicized nature of municipal regulation. In 1905, Illinois granted the Chicago City Council the authority to regulate gas rates. A few years later, Carter Harrison ran as a Chicago mayoral candidate. Harrison, and several candidates for city council, promised that, if elected, they would reduce gas rates in the city from 85 cents to 70 cents. *After* Harrison and his friends won, they launched an investigation into the costs of manufacturing and distributing gas. The expert they hired, W.J. Hagenah of the Wisconsin Public Utilities Commission, recommended a 77-cent rate, 10 percent higher than Harrison had promised the voters. According to Hagenah, anything lower than 77 cents would not allow producers a reasonable rate of return. Chicago authorities promptly fired Hagenah and hired Edward Bemis. After paying Bemis five times the salary they paid Hagenah, Chicago authorities got the result they wanted. Bemis recommended, and the city eventually passed, a 70-cent rate ordinance. Ironically, earlier in his political career, Carter Harrison had opposed attempts by the city to regulate gas rates. As Chicago's mayor in 1900, Harrison claimed that

the city would use the power to regulate rates only as a way of "blackmailing" Chicago gas companies—if the gas companies did not payoff the city council, the city would order them to reduce rates (Troesken 1996, pp. 67-73).[9]

Similarly, on May 4, 1891, the Cleveland City Council passed an ordinance requiring the city's two gas companies to reduce their rates from $1.00 to $0.60. The ordinance grew out of a plan launched by Cleveland's newly elected mayor. The mayor thought the city paid too much to light streets and public buildings. He directed several members of the city council to meet and devise a plan to lower the city's gas bill. At one of these meetings, one council member suggested that private consumers also paid too much for their gas. Someone else said that the price of gas for private consumers should be reduced to 60 cents. The other council members agreed that 60 cents was a good rate. Within a few days, and without any investigation into the costs of manufacturing gas, the council passed an ordinance setting rates at 60 cents, a 40 percent reduction in gas rates.[10]

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[9]One might argue that substantive due process put limits on this sort of egregious behavior. Although this is certainly true to an extent, the protection offered by the substantive due process was neither cheap nor timely. In the case of Chicago's 70-cent rate ordinance, the gas company was in court for ten years before the dispute was resolved. More generally, when private utilities appealed to the courts claiming that rates were confiscatory, the courts were often reluctant to intervene. Unless there was overwhelming evidence that the rates set by city officials were confiscatory, the courts allowed the rates to go into effect. If after some time it became clear that the company was losing money and the rates were indeed confiscatory, then the company could file another appeal. See Troesken (1997) and (1996, pp. 12, 21, 58, and 76-77).

[10]The following issues of the *Cleveland Leader and Herald* describe the battle between the city council and the gas company: May 5, 1891, p. 8; August 11, 1891, p. 8; August 12, 1891, p. 5; August 25, 1891, p. 8; August 28, 1891, p. 8; November 14, 1891, p. 8; and June 1, 1892, p. 1.

In 1887, Tennessee authorized Memphis officials to regulate gas rates, subject to the provision that they never set rates below $1.50. A few years later, without any investigation into the costs of producing and distributing gas, the Memphis City Council ordered the New Memphis Gas Company to reduce its rates to $1.50.[11] Given the strong political incentives to deliver consumers in their area low utility rates, local politicians had little trouble extorting bribes from utility companies. For example, in San Francisco in 1906, the Pacific Gas and Electric Company bribed fifteen of sixteen members of the city's board of supervisors in return reducing gas prices to only 85 cents, rather than the 75-cent rate that the same supervisors had called for when they were elected on the Union Labor platform (Jacobson 2000, p. 99).

This sort of political gamesmanship undermined the long-term development of utility industries, and had serious consequences for urban residents.[12] By 1910, private utility companies were refusing to extend service and improve infrastructure without a new round of legally-binding promises from local governments that they would refrain from enacting overzealous and politicized regulations. For example, in Akron, Ohio, the local water company refused to build a new filtration system until the city promised that it would renew its franchise, which was set to expire. Similarly, in New Orleans and Billings, Montana local water companies refused to install new water lines without additional promises from local

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[11]See *New Memphis Gas & Light Company v. City of Memphis*, 72 Fed. 952 (1896).

[12]In this regard, even without the bribery and political extortion, one might characterize overzealous municipal rate regulation as corrupt, because, by undermining the long-term viability of the industry, such regulation imposes costs on future city residents who are not party to the current regulatory regime.

authorities regarding future regulatory behavior. More general evidence comes from statistical studies linking investment patterns in the gas and water industries to municipal regulatory regimes: these studies show that in cities where private gas and water companies faced a relatively high risk of future political expropriation, private investments in gas and water mains and other forms capital were sharply reduced.[13]

IV. Alternative Forms of Public Utility Regulation and the Intractability of Corruption

By the early 1900s, most disinterested observers believed that municipal franchises and local control were ineffective regulatory devices that allowed corruption to flourish. To combat the corruption associated with the granting of municipal franchises, Progressive-Era reformers began recommending one of two policy changes: the creation of state-wide commissions to regulate the behavior of both private utilities and municipal politicians; or alternatively, the creation of municipally-owned public utility systems. Although these reforms undermined corruption in the short-term, over the long-term they too were subject to corruption.[14] The discussion that follows explains how state regulation and municipal ownership were supposed

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[13]For Akron, see *Engineering News*, March 2, 1911, p. 277 and *Akron Waterworks Company v. City of Akron*, 92 N.C. 1108 (1910, Ohio). For Billings, see *Engineering News*, February 18, 1915, p. 365. For the econometric evidence, see Troesken (1997) and (1999b); and Troesken and Geddes (forthcoming).

[14]On the growing dissatisfaction with municipal franchises and other forms of municipal control, and the growing desire for state regulation or municipal ownership, see, for example, National Municipal League (1896); National Civic Federation (1907); *American Gas Light Journal*, September 28, 1908, p. 527; Fairlie (1914); Anderson (1913); Gesell (1914); Zueblin (1918); Carey(1900); Rosewater (1903); and Keeler (1889). On the desire among utility companies for state regulation instead of municipal regulation and control, see Blackford (1970); McDonald (1958); and Troesken (1996), pp. 55-56. For statements about how state regulation promised to undermine corruption, see in particular, Jacobson (2000, pp. 99-105).

to work in theory, and how they actually worked in practice.

Ideally, state regulatory commissions were supposed to act like impartial arbitrators, mediating disputes between cities and utility companies as they arose (Jacobson 2000, pp. 99-102). Commissions, in other words, functioned like an administered contract (Goldberg 1976). The terms of which were set by the legislature that created the commission. In the presence of objective and impartial commissions, cities and utilities would have felt confident that *ex post* opportunism would be minimized, and therefore made the necessary investments in property rights and capital (Troesken 1996, pp. 79-90).

Municipal ownership was yet another way to mitigate the contracting problems that confronted public utilities and local governments. One might think of public ownership as a form of vertical integration. To see this, consider two recent studies, Levy and Spiller (1995) and Troesken (1997). Comparing the ownership of telephone systems across several countries, Levy and Spiller find that publicly-owned telephone systems are most common in those nations that cannot commit to stable and reasonable regulatory policies. Comparing the ownership of urban gas systems across U.S. cities and towns in 1911, Troesken finds the same pattern; publicly-owned gas companies were most common in those towns that could not commit to stable and reasonable regulatory policies. There is a clear parallel between the city that buys its own gas company because it cannot commit to treating a private gas company fairly and the manufacturer that acquires a potential supplier because it cannot commit to treating that supplier fairly.

Corruption and State Regulatory Commissions

State regulatory commissions were subject to at least two types of corruption. The first type of corruption stemmed from the mechanics of rate regulation. State commissions in the United States were by law required to set utility rates high enough to allow private utilities to earn a reasonable rate of return on their capital investments, typically around 8 percent. Rate of return regulation created strong incentives for private utilities to exaggerate the size of their capital stock so that they would be able to charge higher rates. Jarrell (1979) presents evidence that, during the mid-twentieth century, privately-owned electric companies that were regulated by state commissions reported suspiciously high levels of capital investment. But private utilities need not have cooked their books to get favorable treatment; simply by investing more in capital investments than would have unregulated firms, private utilities were able to secure a more favorable rate base (Averch and Johnson 1962).

The second type of corruption is the longstanding idea that regulatory commissions are subject to industry capture (see, for example, Kolko 1963 and 1976). Crudely put, industry capture occurs when regulators get too close to the industry they regulate and begin promoting the interests of the industry at the expense of broader societal interests. More formally, one might develop the idea of industry capture by appealing to recent work by McCubbins, Noll, and Weingast (1987 and 1989). In this work, administrative agencies (like regulatory commissions) embody a contract between the legislature that created them, and the interest groups that originally lobbied for them. It is in the interest of the legislature that creates an administrative agency to make it difficult for subsequent legislatures to undo their contract

with the interest groups. It is also in the interest of the creating legislature to design a set of rules so that no matter the political, ideological, or economic background of the administrators, the agency will reflect the needs and wishes of the interest groups with whom the legislature struck its original bargain. When subsequent legislatures undo the original contract, it is called coalitional drift. When subsequent administrators undo the original contract, it is called bureaucratic drift.[15]

Industry capture is a type of bureaucratic drift. As the word itself connotes, capture upsets the original contract between the legislature and the interest groups, and it does so because the regulators get cozy with the industry. The legislature that creates a regulatory commission can try to limit the amount of coziness through any number of rules. It might, for example, prohibit commissioners from working in the regulated industry for some number of years after leaving the commission. It might also prohibit commissioners from communicating with industry leaders outside of a narrow set of official channels. But no matter how many rules the legislature makes, there always exists the possibility that the ideological or economic backgrounds of future regulators will undo the legislature's original commitments.[16] There is much historical and econometric evidence to suggest that, over time, public utilities gradually

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[15]See, for example, Macey (1992); and Shepsle (1992).

[16]While historical studies of regulatory commissions provide numerous examples of industry capture, they also suggest that industry capture is not inevitable. Moreover, to the degree that regulatory commissions have been captured in the past, it is not always producers who capture them. There are examples of consumers capturing the regulatory apparatus. The most famous of these is Martin's (1971) study of farmers and the Interstate Commerce Commission during the early twentieth century.

captured regulatory commissions.[17]

Corruption and Municipal Ownership

The problems with municipal ownership stemmed from a mismatch between the time horizons of politicians and the depreciation of capital. More precisely, the assets of public utilities were long-lived, with distribution systems lasting fifty to one-hundred years before they were fully depreciated (Troesken 1996, pp. 9-10). Yet, the time horizons of local politicians and voters—i.e., those who the control the assets under municipal ownership—were relatively short. Politicians came up for election every few years, and most voters moved once or twice in a lifetime. This means that confronted with a choice between the long-term viability of the utility system, and an immediate short-term payoff, such as reduced rates for consumers or well-paying jobs for political supporters, politicians would have invariably chose the latter.[18] Investments that payoff ten to twenty years down to road, were of little use to politicians concerned with the next election, or for voters with weak ties to the municipality served by the utility system in question. The incentive to sacrifice the long-term viability of the capital stock for short-term payoffs could have been minimized by granting control over investment and finance decisions to federal authorities (while most voters move from town to town, relatively few move from country to country) or by creating an oversight agency immune to short-term political cycles. The problem with these solutions is that they are, by their construction,

[17]This evidence will be discussed, in detail, later in the paper.

[18]Rates that are too low are corrupt because they impose costs on future city residents in the form of reduced service levels.

immune to democratic forces, even though one of the standard justifications for public ownership is that it allows for a more democratic and egalitarian distribution of resources.[19]

In light of the temptation of politicians to use municipally-owned enterprises for short-term political gain, there is a real concern that municipal ownership would support a giant patronage scheme: perhaps politicians garner support by giving away jobs at the local gas and electric companies. Nobody said it better than George Washington Plunkitt, the inimitable boss of Tammany Hall (MacDonald 1994, p. 78):

> Some of the reformers are sayin' that municipal ownership won't do because it would give a lot of patronage to the politicians. How those fellows mix things up when they argue! They're givin' the strongest argument in favor of municipal ownership when they say that. Who is better fitted to run the railroads and the gas plants and the ferries than the men who make a business of lookin' after the interests of the city? Who is more anxious to serve the city? Who needs the jobs more?

Progressive-era conservatives worried that as the number of municipally-owned utilities grew, so too would the number of municipal employees. And eventually municipal employees would come to dominate local politics. "One day," prophesized Robert Porter, the "unconsidered trifles who cluster round the local authority" would grow into a political "Frankenstein," a collective monster "so huge" that its "creators would not be able to control" it.[20]

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[19]For articles justifying municipal ownership because it promotes democratic participation and a more active citizenry, see, for example, United States (1906), pp. 18-19; and Keating *et al.* (1991).

[20]Porter (1907), p. 109. Johnson and Libecap's (1994) analysis of the rise of the civil-service workforce at the federal level suggests Porter's claims were not mere hyperbole.

There is much historical evidence to suggest that patronage was a serious problem for municipally-owned utilities. Exploiting a sample of nearly 90,000 workers in turn-of-the-century America, Troesken (1999a) provides evidence that in cities where patronage was widespread, state and local employees earned 40 percent more per hour; worked 16 to 17 percent fewer hours; and earned 22 percent more per week than comparable workers in the private sector. Similarly, a study conducted by the National Civic Federation—a lobbying group that strongly favored municipal ownership— claimed that municipal employees often had to pay sizeable annual assessments to incumbent politicians. Such assessments were intended to defray the costs of local elections. Workers that failed to pay their assessments were fired. Data reported by the National Civic Federation suggest that the size of assessments ranged between 2 and 4 percent of a worker's annual salary depending on the worker's occupation (National Civic Federation 1907, pp. 488-92).

In addition, the federation found that employees of publically-owned utilities were often required to work in local elections. Politicians also hired more workers than needed just so that they would have more supporters come election time. Describing conditions at the Wheeling Gas Company, a municipally-owned and operated firm, the federation wrote (p. 492):

Although municipal ownership might have facilitated patronage arrangements, it was not a prerequisite for patronage. Private utility companies and local politicians could just trade favors directly: "you hire our friends and political supporters, and we'll go easy on you the next time the city sets gas rates." In describing the situation during the late nineteenth and early twentieth century, Yearly (1970, pp. 117-18) observes that in return for favors from local politicians, private utility companies "were obliged to respond not only with cash but also with places for those who, though deserving, could not be accommodated on the public payroll."

> The Superintendent of the Gas Works requires his employees to assist in the primaries and the elections. It is partly on account of the political usefulness of these gas workers that the Superintendent has employed about 20 per cent more men than are needed to do the work. He makes his appointments as much as possible to conciliate the Councilmen.

Elsewhere in its report, the federation wrote of the same gas plant (p. 156):

> The management is honeycombed with politics. Appointments in the gas department are parceled out and controlled by the councilmen. All employees are supposed to belong to the party in power. Should that party change, it is probably true that the whole force in the department would change. All employees are regularly assessed for campaign purposes . . . the assessment ranging from $2 to $75.

The federation (pp. 149-152) found the same level of patronage and political influence at the municipally-owned and operated gas works in Philadelphia.

Another concern with municipal ownership relates to the transition from private to public ownership, a transition that is especially vulnerable to graft and corruption. During the late nineteenth and early twentieth century, hundreds of cities across the United States acquired their own gas, electric, and water systems. Rather than building utility networks themselves, city authorities often purchased works directly from private companies already in operation. In 1915, for example, perhaps as many as one-third of all municipally-owned water companies had been privately owned and operated at one time (Troesken and Geddes forthcoming).

Three related factors made the purchase of private utility networks a difficult exchange. First, there was only one buyer and one seller, the city and the private utility company. It is

well-known that bilateral monopoly complicates the bargaining process. Second, the capital exchanged was long-lived and specific to place and purpose. Third, the city often had the power to regulate and tax; the utility company did not. Asset specificity and unequal regulatory power left the utility company in a difficult spot. In particular, city authorities could have used their police powers strategically to reduce the utility company's asking price.

Two historical examples illustrate how politicians tried to extract rents in the process of acquiring private utility networks. In 1903, Knoxville authorities decided to buy the Knoxville Water Company, a private corporation. However, the city and the company could not agree on a sale price, so Knoxville decided to build its own waterworks. The water company sued, asking the courts to enjoin the city from constructing a competing works. In 1906, the Supreme Court refused to grant injunctive relief and allowed the city to proceed with construction. Significantly, a few years before Knoxville tried to build its own waterworks, the Knoxville city council had passed an ordinance requiring the water company to cut its rates. The company sued, claiming the rate ordinance was part of a larger scheme to acquire its capital at bargain rates.[21]

In Kansas City, the city council granted a twenty-year franchise to the National Waterworks Company in 1873. After twenty years, Kansas City decided not to renew the company's franchise, but neither did it wish to purchase the company's plant and distribution system. On the contrary, city authorities tried to simply take the company's works, without

[21]See *Knoxville Water Company v. City of Knoxville*, 200 U.S. 22 (1906) and *Mayor v. Knoxville Water Company*, 64 S.W. 1075 (1901, Tenn.).

paying any compensation, when the franchise expired on April 30, 1894. Not surprisingly, National Waterworks sued, asking that the courts compel the city to pay for its plant. The city launched a countersuit. It claimed that the company had not, as required by franchise, built a first-class waterworks. A complex and protracted legal battle followed, but on the company's central claim—that the franchise compelled the city to purchase its plant and distribution system—the courts sided with the company. The company's franchise clearly required the city to purchase the plant at the end of twenty years if it did not renew the company's franchise.[22]

State Regulation, Municipal Ownership, and Corruption: Summary Observations

The upshot this discussion of state regulation and municipal ownership is that corruption was endemic to public utility industries; it existed, in some form, across all regulatory and ownership regimes. When municipal franchises were used to regulate rates and service, promoters of private utility companies often bribed local officials in order to secure passage of their monopolistic franchises. In later years, as the franchises began to expire and city governments acquired increased regulatory authority, local politicians used their regulatory powers in a cavalier way to extort bribes or win votes. This resulted in private utilities curtailing their investments in mains, filtration systems, and other long-term capital. Subsequent regulatory regimes were subject to other problems. Under state regulation, utilities often captured regulatory commissions, or they distorted their capital investments to

[22]See, generally, *National Waterworks Company v. Kansas City*, 62 Fed. 853 (1894). The court wrote (p. 863): "We dissent in toto from the claim of the city that at the lapse of the 20 years the title to this property, with the right of possession, passed absolutely to it, without any payment or tender of payment, leaving only to the company the right to secure compensation by agreement or litigation, as best it could."

secure more favorable rate bases. Under municipal ownership, local politicians financed patronage employment and low consumer prices by sacrificing the long-term health of the capital stock. As explained above, the intractability of corruption in utility industries stemmed from the huge non-redeployable investments made by utility companies and the subsequent creation of rents. With this discussion, however, I do not wish to imply that changes in ownership and regulatory regimes have been fruitless. As the next section makes clear, regime changes typically improved, at least temporarily, the problem of corruption in public utility industries.

V. Regime Change and Corruption

History

The history of public utility regulation has an odd circular quality. Consider first the experience of the gas and electric industries. Gas and electric companies were first regulated through municipal franchises and local regulation. In most cases, various forms of local regulation eventually gave way to state regulatory commissions. Between 1907 and 1924, nearly thirty states created state-wide regulatory commissions to govern the behavior of local politicians and private gas and electric companies (Priest 1993; Troesken 1996, pp. 1-5). State regulation governed behavior in these industries until the late 1970s and 1980s, when the deregulation movement began and control of local utilities was returned largely to the purview of local authorities (Joskow 1997; Winston 1998). With the deregulation movement, the regulation of the gas and electric industries had come full circle and the industries were returned to an institutional environment akin to the one that existed for much of the nineteenth

century (Jacobson 1989).

Consider next the rise and fall of municipal ownership in the water industry. Like gas and electric companies, private water companies were initially regulated through franchises and various forms of municipal control. Around 1900, scores of local governments in the United States began acquiring the private water companies in their jurisdictions (Priest 1993; Troesken 1999a; 2001; and Troesken and Geddes, forthcoming). Yet by the turn of the twenty-first century, the same governments that had municipalized their water systems a century earlier, were now privatizing those systems and returning them to the institutional environment that had governed private water companies for much of nineteenth century (Galiani *et al.* 2003; Vitale 2001). Once again governance regimes have come full circle and long-forgotten regulatory regimes have been rehabilitated.

Oddly, whatever their direction, regime changes always appear to have improved the operation of utility industries. These improvements, however, have not been permanent. To see this, consider first the rise and fall of state regulatory commissions. Troesken (1994; and 1996, pp. 83-86) shows that, initially, the creation of state regulatory commissions did a fairly good job constraining the behavior of private gas and electric companies, and limiting their ability to charge monopolistic rates.[23] By reducing gas and electric rates closer to competitive levels, state regulators reduced the excess profits necessary to finance corruption. State

[23]Jacobson (2000) also presents some evidence that state regulators during the early twentieth century were reasonably effective in curtailing the market power of private utilities, see, for example, pp. 84-87; and 100-101, though he concedes that this evidence is mixed. See pp. 246-47, note 99. Also, a study by the Twentieth Century Fund (1948) found evidence that electric rates in states with state-regulatory commissions were lower than in states without.

commissions also effectively prevented local politicians from extorting bribes from private utility companies. But gradually state utility commissions lost their regulatory bite, and often allowed gas and electric rates to reach monopolistic levels. Studies of state regulation using late-twentieth-century data show that state regulation had, at worst, no effect on rates (Stigler and Friedland 1962; and Moore 1970), and at best, only mixed success in reducing rates from monopolistic levels (Meyer and Leland 1980). The primary reason for the devolution of state regulation appears to have been regulatory capture, which grew increasingly severe as the ties between regulators and utilities became increasingly close and unhealthy. The deregulation movement put an end to regulatory capture, and this otherwise retrogressive change, appears to have improved, at least temporarily, the functioning of public utility industries (Joskow 1997; Peltzman 1989; and Winston 1998).

The history of municipal ownership exhibits the same characteristics. When private water companies were first municipalized around 1900, the change was associated with dramatic improvements in prices and quality of service. There is much evidence to suggest, for example, that the price charged for water generally fell after municipalization, eliminating some of the rents necessary to finance corrupt relationships. In 1899, the federal government conducted a survey of the rates charged by public and private water companies. Including nearly one-third of all water companies then operating in the United States, the survey found that the rates charged public water companies were, on average, 24 percent lower than the rates charged by private companies (United States 1899). However, as shown in Table 1, the discount offered by public companies varied with size; small public companies offered large

discounts from comparably-sized private companies while large public companies offered little, if any, discount from comparably-sized private companies. A study of public ownership in Omaha, Nebraska found that water rates fell by over 25 percent after the city acquired the water company in 1912. This reduction reversed a five-year upward trend in water prices (Thompson 1925, p. 215). Recent econometric studies comparing the rates of public and private utility companies during the late twentieth century corroborate these findings: publicly-owned utilities tend to charge significantly lower rates than privately-owned utilities (e.g., Peltzman 1971; and Kwoka 2002).

Perhaps the most significant improvements associated with municipal acquisition were the subsequent extensions in service. Prior to municipalization, many private water companies were fearful of political expropriation, and therefore shied away from installing water mains in all but the most densely-populated and most profitable areas of town (Troesken 1997; and Troesken and Geddes forthcoming). As a result, persons living in the less-densely-populated urban periphery often had to go without service from the public water supply, and instead, were forced to rely on private well water. Because private wells were generally much more polluted than the water distributed by large water companies, typhoid and other waterborne diseases were rampant in these low-density areas. But the municipal acquisition of private water companies changed all this. Once they became municipally owned, utility companies no longer feared expropriation from local politicians (they were now one and the same), and service was rapidly expanded. Outlying areas, which had not offered private companies sufficient profitability, now gained service. African-Americans who were more likely than

whites to have lived in these low-density and low-profitability areas gained access to pure water for the first time, and disease rates in black neighborhoods plummeted following municipalization (Troesken 2001).

But gradually, as was the case with state regulation, municipal ownership gave rise to its own set of corruption-related problems. Because politicians faced strong incentives to sacrifice the long-term viability of plant and distribution systems for short-term political gains, the operation of municipal utilities eventually degraded to a point that they were unsustainable. The gradual erosion of the capital stock of municipally-owned enterprises began almost immediately. A turn-of-the-century study of the effects of municipal ownership, found that soon after acquiring private utility companies, municipal governments let them fall into disrepair, and rather than investing in the long-term viability of the capital stock, used the profits of the plants to finance patronage, reduced taxes, or to provide other public goods (National Civic Federation 1907, pp. 149-57).

By the 1970s, municipal water and sewer systems across the United States had been so poorly maintained that they were unable to meet EPA standards on environmental quality, and had to be privatized in order to raise the funds necessary to bring the systems into compliance with federal law (Vitale 2001). To accomplish this, the regulatory environment that had preceded municipal ownership (i.e., private provision with some local oversight) was rehabilitated to combat the years of neglect in investing in long-term capital wrought by municipal ownership. It is worth noting that the problems of patronage and short-term time horizons are not unique to the United States. A recent study of privatization of water systems

in Argentina finds very similar patterns. Municipal water companies had for years been used by politicians as a way to reward political supporters with jobs. By the 1990s, water from most municipal systems had become tainted with disease, and distribution systems experienced frequent ruptures leaving whole neighborhoods without water service for months at a time. The result was extraordinarily high infant mortality rates related to waterborne bacteria, and it was only with privatization, which put a quick end to the existing patronage schemes, that service and quality improved, and more importantly, infant mortality rates plummeted (Galiani *et al.* 2003).

Interpretation

It is tempting to attribute the circular history of public utility regulation to ideological mistakes. An economist with right-leaning sympathies could be easily persuaded that Progressive-Era reformers believed too strongly in the efficacy of state regulatory regimes and municipal ownership, and that the deregulation and privatization of public utilities during the 1970s, 80s, and 90s simply undid the mistakes of the past. Alternatively, a left-leaning historian would have little trouble believing that late-twentieth-century conservatives had too much faith in deregulation and privatization, and somewhere down the road, it will be necessary to undue their mistakes. Whatever variant one prefers, there are two problems with the "mistakes-were-made" argument. First, it presumes a flawed ideological faith, in either statism or markets, led many otherwise intelligent people astray. While ideological mistakes are certainly possible, they probably should be adopted as explanatory factors only after all other reasonable alternatives have been exhausted. Second and more important, there is much

evidence to suggest that transitions in regulatory and governance regimes—whether from market-orientated to statist, or vice versa—improved the operation of public utilities. In other words, the process of change was, by itself, beneficial to public utilities and their consumers, and the direction of the change—whether to something entirely new and untried, or back to a regulatory environment long since abandoned—was of second-order importance.

In short, the historical evidence suggests that the circular nature of utility regulation and governance has been driven by the desirability of occasional regime changes in public utility markets. Why are occasional regime changes desirable for public utility markets? The answer builds on three observations. First, corruption was endemic to public utility industries; corruption existed, in some form, across all regulatory and ownership regimes. Second, regime change did not eliminate corruption; it only altered the type of corruption observed. For example, under state regulation corruption flourished as industry capture, while under municipal ownership corruption flourished as patronage. Third, for any type of governance regime, corruption grew increasingly severe over time, and at some point, became politically untenable. When corruption became politically untenable, politicians intervened and replaced the existing and utterly corrupt governance regime with a new regime. The institutional change broke the fully-matured and corrupt relationships of the old regime, and replaced them with new corrupt relationships that also eventually matured and flourished, but that maturation took time, and at least initially, the new governance regime was associated with much less corruption than the old regime.

In this way, one might think of regime change in public utility markets as mimicking

the effects of competition. For example, when first created, state regulatory commissions acted like market forces in that they drove down utility rates closer to competitive levels. This eliminated most of the rents necessary to finance corrupt relationships. The only problem was that over time, without any direct or conscious effort, the institutions that kept rates in check were gradually eroded and prices and profits slowly rose, allowing corruption to reappear. The source of this gradual erosion in institutions was the ease with which participants could create rents and suppress market forces. Because market forces have historically worked so poorly in utility industries, once the political mechanisms governing the behavior of politicians and regulators broke down, there was no external force that could help keep prices in check. And absent market forces, politicians and regulators always had the incentive, and the ability, to allow prices to rise above competitive levels in return for some pay-off from utility companies. As the analysis in sections VI and VII makes clear, politicians and regulators had much less control over outcomes in more competitive industries, and therefore could not, even if they had wanted to, use corruption to extract rents over the long-haul.

Early on, many consumers and reformer-minded politicians recognized that if they could somehow create an effective market, and then turn control over utility rates and service to that market, they would eliminate the corruption associated with public utility regulation. Alas, all such efforts failed. In Chicago, for example, a group of reform-minded politicians and local leaders such as Clarence Darrow, actively promoted the use of antitrust enforcement and market entry to undermine the city's gas monopoly and the associated political corruption. Between 1883 and 1900, eight new companies entered the Chicago gas industry, and

responding to the lobbying efforts of various city officials, the State of Illinois launched an aggressive five-year antitrust campaign to dissolve the Chicago Gas Trust. Although the antitrust campaign resulted in a series of decisions ordering the dissolution of the Gas Trust, by 1900, a single firm—the Peoples Gas Light and Coke Company—monopolized the industry (Troesken 1995; Troesken 1996, pp. 25-54).

VI. Competition and Corruption in Whiskey Distilling

History

Whiskey distilling was the polar opposite of gas or electricity production. The former required almost no fixed investment, and the costs of entry were near zero. In 1900, a whiskey distillery of minimum efficient scale could have been built for about the cost of opening a small restaurant. There were also a wide range of products that could have been used as substitutes for whiskey, such as rum, beer, malt liquor, vodka, champagne, tequila, and wine (Troesken 1998; Clay and Troesken 2002). Gas and electric have few attractive substitutes. In addition to competition from these other forms of liquor, legitimate whiskey distilleries also faced competition from a lively illicit fringe that avoided a large federal tax on alcoholic spirits (Clay and Troesken 2002). Also in contrast to public utilities, the natural evolution of the whiskey distilling industry has not been toward monopoly, but toward competition. The one aberration in this natural evolution was the Whiskey Trust, which dominated the industry during the 1890s, and for a short time, controlled 95 percent of industry production (narrowly defined). This aberration offers a unique opportunity to explore the viability of corruption in a highly-competitive industry.

The beginnings of the Whiskey Trust date back to the Peoria Pool of the early 1870s, a combination that was limited to distillers located in central Illinois. A much larger pool, the Western Export Association, formed in 1881, but like its predecessors, this pool failed because of incessant price wars and cheating. After the pools failed, whiskey distilleries organized the Distillers and Cattle Feeders' Trust, better known as the "Whiskey Trust" in May 1887. Modeled after the Standard Oil Trust, the Whiskey Trust was a bona fide trust so that when a distillery joined the trust it surrendered control of its operations to a board of trustees. Of the eighty-six distilleries that eventually joined the combination, only ten or twelve were kept in operation; the remainder were shut down. However, during the 1880s, state courts raised questions about the legality of trust arrangements. In 1890, fearing dissolution by state courts, the Distillers and Cattle Feeders' Trust reorganized as an Illinois corporation, the Distilling and Cattle Feeding Company. Although no longer a trust in the strict sense of the term, the combination was still referred to as the Whiskey Trust.[24] It is important to note that the trust's stock was traded on the New York Stock Exchange until the trust entered receivership in January, 1895.

Few combinations in American history can rival the managers of the Whiskey Trust in terms of criminality and corrupt activity. When rival distilleries refused to sell out to the trust, the managers sabotaged the distillery's machinery, or in particularly acrimonious cases, simply dynamited the competitor into submission. Once during the early stages of an antitrust suit

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[24]See United States Industrial Commission (1900), pp 75-90; and 171; Troesken (1995 and 1998).

brought by federal authorities in Massachusetts, the trust bribed a jury member to vote against the government's suit. In terms of private corruption, the managers of the trust operated a kickback scheme. To understand this scheme, one needs to know about the role slops played in the distillation of whiskey. In the process of distilling whiskey, all distilleries created a residue product known as slops—slops was the corn residue that was left from the distillation process, and was often used as cattle feed. The managers of the trust, it was alleged by outside shareholders, sold the slops generated by trust-affiliated distilleries at below market rates to a cattle company in Chicago. The managers of the cattle company and the trust then split the excess profits from the subsequent sales.[25]

On other occasions, outside stockholders claimed that the managers of the trust routinely issued false or misleading announcements on the trust's performance in an effort to capitalize on insider stock trades (*Chicago Tribune*, February 5, 1895, p. 12). The clearest and most blatant example of this sort of behavior occurred when, toward the end of the trust's organizational life, the president the trust, Joseph B. Greenhut, petitioned a federal court to have himself appointed as receiver of the trust—that is, as a guardian of the trust's long-term future. Greenhut indicated to the presiding judge that he had no conflict of interest. In fact, Greenhut had recently sold short 30,000 shares of trust stock, and as a result, had a strong personal incentive to drive down the value of the trust (East 1958; Troesken 1998).

To generate the funds necessary to finance all of this private corruption, the managers

[25]Information in this paragraph is based on East (1958); Troesken (1998); Clay and Troesken (2002); *Chicago Tribune*, April 2, 1895, p. 1; *Chicago Tribune*, January 8, 1892, p. 5; and *New York Times*, December 22, 1892, p. 9.

of the Whiskey Trust launched an exclusive dealing scheme that was intended to give the trust market power. Through the exclusive dealing scheme, the trust offered distributers large rebates if the distributers carried only whiskey produced by trust-affiliated distilleries. By foreclosing scarce distribution outlets, the trust hoped to raise the operating costs of its rivals, and in the process, deter market entry and competition. Once the rebate scheme was launched, the trust started to raise prices, and at least temporarily, began earning above-normal profits. But rather than returning these profits to outside stockholders, the managers of the trust used them finance the insider trading and kickback schemes discussed above. The central problem with this whole arrangement, however, was that the trust's exclusive dealing program failed to deter entry and competition. When the management of the trust tried to raise prices, it induced new distilleries to enter and these new entrants undercut the trust and eventually drove it into bankruptcy (Troesken 1998; Clay and Troesken 2002).

Figure 1 charts the rise and fall of the Whiskey Trust in a way that helps highlight the efficacy of market forces. In particular, the figure plots the markup on whiskey sold by trust-affiliated distilleries using monthly data extending from May 1887 through April, 1898. The markup is defined as:

(1) $(P\text{-}C)/C$,

where P equals the price of whiskey per gallon, and C equals the marginal cost of producing a gallon of whiskey (distilling was a constant cost industry). In a perfectly competitive industry, the markup would equal zero. In figure 1, month 0 indicates May, 1887, the month the of the formation of the Whiskey Trust. The first vertical line at month 37 (June, 1890) indicates the

onset of the trust's rebate program, and the second vertical line at month 93 (August, 1894) indicates the (beginning of the) demise of the Whiskey Trust.[26]

As figure 1 shows, the trust initially set prices only slightly above perfectly competitive levels, with the markup averaging around 2 percent. During this early, period there was little entry into the distilling industry and the trust enjoyed a fairly stable and large market share. But after the initiation of the rebate program in June, 1890, the trust started to raise prices and the markup began to trend steadily upward to around 8 percent by the summer of 1894. With the increase in price and markup, the trust began to earn excess profits and this attracted entry into the industry. The managers had hoped that exclusive dealing would forestall entry, but this was not the case, largely because new entrants were able to contract the trust's exclusionary rebates at very low cost. In particular, by entering as vertically-integrated enterprises that both produced whiskey and operated distribution outlets, new entrants rendered the trust's rebates ineffective in foreclosing valuable distribution centers. As new, low-cost firms entered, they were able to undercut the trust, and by 1895, the trust was bankrupt (Troesken 1998; Clay and Troesken 2002).

Interpretation

The Whiskey Trust was one very corrupt enterprise. It was, however, also one very short-lived enterprise. Formed in 1887, the trust was in serious financial trouble by 1893, and was bankrupt by 1895. The reason for this was simple. Corruption raised the operating costs

[26]For additional details on the derivation of these cost estimates, see Clay and Troesken (2002 and 2003).

of the trust and hampered its ability to raise outside capital, while at the same time, the exclusive dealing program was not nearly as effective in fending off potential competitors as its creators had hoped. Faced with relatively high costs and vibrant competition from small, upstart distilleries, the trust failed as did the corrupt relationships its founders tried to promote. Having told the story of the Whiskey Trust in this encapsulated form, it is useful to analyze more closely why corruption failed to take root in this case. The corruption associated with the Whiskey Trust was mainly private corruption: the managers of the combination appropriated money from outside shareholders by operating kickback schemes and by engaging in fraudulent trading activity. The managers hoped to finance their illicit activities by creating market power for the combination through exclusive dealing.

In the end, three forces undermined the creation of excess profits, and simultaneously, eliminated the ability of insiders to abuse outsiders. First and foremost, there was competition in the output market. In the long run, it did not matter how closely shareholders monitored managers, because low-cost firms undercut the trust and drove price down to marginal cost. This made it impossible for the managers of trust to finance their illicit activities. Second, there was a viable market for corporate control. Industry observers saw early on what was happening and sought to wrest control of the trust away from the high-cost and ultimately unprofitable operation of Greenhut *et al.* Although the output market worked faster than the market for corporate control in disciplining the managers of the trust, there is anecdotal evidence that outside investors were working to acquire a controlling interest in the trust (*Chicago Tribune*, January 31, 1895, pp. 1 and 11; East 1958; Troesken 1998). The third force

working to undermine corruption in whiskey distilling was the capital market. When the unsavory practices of the trust became common knowledge, banks refused to lend the trust additional funds, despite its dominant market share (*Chicago Tribune*, August 28, 1894, p. 1)

One might object to my claim that corruption was shorter-lived in whiskey distilling than in public utility industries on the grounds that the types of corruption observed in the two industries were qualitatively different: private corruption existed in whiskey distilling; and public corruption existed in public utility industries. A counter-argument to this objection is that even if one considers private corruption among public utilities the same pattern emerges. During the nineteenth and early twentieth century, public utilities were the focus of government investigations and laws regulating the often shady financial practices of the holding companies that controlled public utilities. Private corruption is intractable in utility industries because preventing it requires vigilant monitoring and enforcement on the part of individual stockholders; as explained above, stockholders of whiskey distilleries could free ride on competition in the output market to keep the costs of corruption in line. Along these lines, it seems that the proliferation of holding companies among public utility industries during the early 1900s might have been a response to the costliness and difficulty of monitoring by private stockholders. Perhaps holding companies were, in effect, an effort by stockholders to hire a group of knowledgeable persons to oversee the internal governance of their firms.[27]

Another way to counter the claim that I am comparing apples (private corruption in

[27]On private corruption among public utilities, especially as it relates to the rise of holding companies in public utility industries, see McDonald's (1962) biography of Samuel Insull.

distilling) and oranges (public corruption in utility industries) is to look at the one period of time when public corruption in the distilling industry was pervasive and insoluble: the period of Prohibition. As argued above, the ultimate source of corruption among public utility industries was the extreme costliness of entry and exit, which created the excess profits necessary to finance corrupt practices. During Prohibition, the government made whiskey distilling like gas and electric in that it made market entry very costly: enter and face a substantial risk of going to prison. This created profit opportunities well in excess of those that would have prevailed in a more competitive setting where entry was costless, and allowed corrupt relationships to flourish.

VII. Competition and Corruption in Oil Refining

History

As stated earlier, oil refining lies somewhere between whiskey distilling and public utilities on the spectrum of competitiveness. In contrast to public utilities, no one firm in the United States has ever held a permanent and genuine monopoly over a particular market in oil refining. On the other hand, the costs of opening an oil refinery and developing the associated infrastructure for transporting oil are substantially greater than those associated with opening a whiskey distillery (Williamson and Daum 1959). Consequently, unlike whiskey distilling, there is evidence of individual firms dominating the oil refining industry for sustained periods of time. In particular, for much of the nineteenth century, the dominant firm was John D. Rockefeller's Standard Oil Company. As table 2 shows, between 1880 and 1900 Standard controlled between 70 and 95 percent of the industry's oil-refining capacity, though its share of

capacity was falling steadily over time. In terms of market share, around 1900, Standard sold 40 percent of the country's lubricating oil; 50 percent of petroleum-based waxes; and 85 percent of fuel oil and gasoline (Williamsom and Andreano 1962).

The rise of Standard Oil was associated with sharp reductions in the price of refined oil. As Figure 2 shows, the real price of refined oil fell by nearly 80 percent between 1860 and 1893. The sources of this decline were threefold. First, production of crude oil, the primary input in oil refining, grew dramatically during this period and this drove down the price of crude. Figure 2 highlights the strong correlation between the prices of crude and refined oil. Second, increases in consumer demand for refined oil, particularly lighting oil, enabled refiners to expand output and exploit economies of scale. Third, innovations in transportation during the 1870s and early-1880s reduced the cost of shipping oil. In particular, pipelines that ran from oil wells to railheads reduced the cost of shipping crude oil, and tank cars reduced the cost of shipping refined oil via the railroads.[28]

The innovations in shipping crude and refined oil will play a central role in interpreting the nature of corruption in oil refining. It is useful, therefore, to specify why pipelines and tank cars represented such an improvement over previous modes of shipping oil. Before the introduction of pipelines, crude oil had to be transported from the wells to the railroad in barrels carried by teams of horses. Furthermore, as the oil industry developed, pipelines were

[28]On the rapid growth of crude oil production, and the corresponding reductions in price, see Williamson and Daum (1959), pp. 118-19, and 560-67. On increases in consumer demand allowing producers to better exploit scale economics in refining, see Williamson and Daum (1959), pp. 282-84, and 621-22. On pipelines and tank cars reducing transport costs, see Williamson and Daum (1959), pp. 183-89, 383-90, 451-52, 529-30 and 570-72.

built linking oil drilling centers in rural Pennsylvania and Ohio to refining centers in urban areas like Cleveland and Pittsburgh. This allowed refiners to bypass the railroads entirely in the movement of crude oil (Williamsom and Daum 1959; Troesken 2002).

As for the introduction of tank cars, prior to their introduction, to ship refined oil to retail centers it had to be shipped in barrels. Barrels were inferior to tank cars on many margins. Barrels leaked and allowed much of the oil to evaporate; tank cars allowed roughly 50 percent less oil to evaporate. Barrels had to be repaired and replaced constantly, which meant refiners typically had to hire a team of coopers to maintain an adequate stock of barrels; tank cars required much less maintenance. Barrels were costly to load and unload from railroad cars; tank cars were not. When shipping oil in barrels, there was a significant risk of accidental explosion; tank cars reduced that risk. In addition, because tank cars reduced the likelihood of accidental explosions and fires during transport, and because tank cars required much less handling by railroad workers—the responsibility for unloading barrels typically fell on the railroad, not the refiner—railroads offered refiners who shipped their oil in refiner-owned tank cars significant rate reductions relative to those who continued to use barrels (Williamsom and Daum 1959, pp. 106-07; 178-80; and 528-31).

Standard Oil aggressively pursued low-cost production and transportation techniques, including tank cars. By 1889, Standard owned more than 50 percent of all tank cars then in use; owned and operated large pipelines to transport crude; and possessed relatively large and efficient refineries (Chandler 323-26; Williamsom and Daum 1959; and Troesken 2002). The efforts of Standard to adopt low-cost production and distribution methods played a central role

in Standard's rise to market dominance. Innovation alone, however, might not account for all of Standard's success. Rivals claimed that Standard dominated the late-nineteenth-century refining industry because it pursued anticompetitive strategies, including the use of predatory pricing and vertical restraints to forestall entry (Thorelli 1955, pp. 135-86; Granitz and Klein 1996; and Tarbell 1904). Having offered this caveat, Chandler (1977, pp. 323-26); McGee (1958), and Telser (1966 and 1978) all raise serious questions about the reliability of these charges. McGee, in particular, presents documentary evidence that claims about predatory pricing are incorrect, and economic logic to suggest that even if it had, it probably would have been ineffective.

As Standard and other efficient refiners adopted new distribution techniques, small oil refiners who were not so savvy in terms of adopting new technologies found themselves at a competitive disadvantage and were gradually forced out business. Figure 3, which plots the margin between the price of refined oil and the price of crude oil, illustrates the process that squeezed smaller, less efficient refineries out of business. Because crude oil is the primary input producing refined oil, the margin provides a rough indicator of the efficiency of the least productive oil refineries. When the margin was large, even relatively inefficient refineries were able to stay in business because they could waste large amounts of crude oil and charge enough for refined oil to cover such waste. But as the margin fell and the price of refined oil and crude oil converged, the ability to make such mistakes shrank and there was less room to pass along mistakes to consumers in the form of higher prices for refined oil. Before Standard ascended to market dominance, the margin between refined oil and crude oil was very large,

around sixty dollars per barrel. This left plenty of room for small, inefficient refineries to allow crude and refined oil to evaporate away in barrels. But as Standard Oil grew and imposed more advanced technologies on the industry, the margin fell sharply, and by the late 1890s, hovered around six dollars per barrel, one-tenth the level observed thirty years earlier. This new and improved oil industry left little room for inefficient firms unable to the adopt low-cost production and distribution techniques that economized on evaporation and other forms of waste.

But small and inefficient refineries did not pass quietly into the night. Unable to compete head-on with Standard and other large refiners, they turned to the market for political favors and secured the support of a powerful ally: Senator John Sherman of Ohio. Senator Sherman, brother of William Tecumsah Sherman, was the longest serving member of the U.S. Senate. During the early 1890s, at the behest of numerous small oil companies in Ohio, Sherman introduced legislation that sought to suppress the use of tank cars to transport oil, as well as other commodities. It is notable, however, that not all independent oil companies supported the measure. In particular, W.C. Warner, the secretary of the National Oil Company of Titusville, Pennsylvania, opposed Sherman's anti-tank-car bill. According to Warner, Standard was not the only oil refiner that used tank cars, and by suppressing the use of tank cars, Sherman's bill would have undermined the competitive position of the independent oil companies who used tank cars, as well as Standard Oil. Moreover, according to Warner, because Sherman's bill affected all commodities shipped in tank cars, it promised to increase the price of commodities other than oil (Troesken 2002).

In congressional debates over the anti-tank-car bill, Sherman's cohorts and competitors in the Senate argued that his bill would privilege a narrow constituency at the expense of broader societal interests. Senator Gray—an outspoken advocate of free trade and no friend of Standard Oil and other large industrial combinations—argued that tank cars offered "great economy in the distribution" of oil and that suppressing them would harm consumers. Similarly, Senator Cullom, while he denied wanting to defend Standard Oil, argued that if the anti-tank-car bill was passed "the result would be inevitably that the price of oil to the people of this country, the consumers, would be increased instead of reduced" At one point during the debate, Senator Reagan of Texas argued, "I do not think there is any human being on earth who will contradict or take issue with the" claim that tank cars reduced the costs of transporting oil. As these quotations suggest, opposition to Sherman's anti-tank-car bill was substantial and a motion killing the bill passed by a vote of 34 to 11 (Troesken 2002).

Of course, small oil refiners were not the only ones who wanted to secure political favors at the expense of broader societal interests. Standard was quite active on this margin as well. For example, Henry Payne, along with John Sherman, represented the State of Ohio in the U.S. Senate. Payne's son, Oliver, was the treasurer of Standard Oil and a member of Standard's board of directors. It was widely believed Standard Oil bribed the Ohio legislature to get Henry Payne elected to the senate. While inquiries by state and federal authorities failed to prove these allegations, there is no doubt Standard lobbied hard to get Payne elected (see, for example, Ohio 1886).

One of the clearest examples of Standard trying to suppress competition at the expense

of broader societal interests, came during the late 1870s, when a group of independent oil companies sought to build an oil pipeline through central Pennsylvania. This pipeline, which if built would have been the longest pipeline in the United States, would have linked crude oil producers around Titusville and Oil City, Pennsylvania to independent oil refineries in Eastern Pennsylvania and Southern New York. It would have also allowed independent refineries in these areas to compete head-on with Standard's own impressive transportation network. Rockefeller and Standard, however, bribed the Pennsylvania legislature and blocked the construction of the pipeline through legislative fiat (Chernow 1998, pp. 205-09). When a similar pipeline was planned in New York State, Standard again resorted to bribing state legislators to block the pipeline. In his recent biography of Rockefeller, Chernow (1998, p. 207) aptly summarizes the context and effect of such corrupt politicking:

> Before [these] pipeline battle[s], one could argue that Standard had been an innovative force, modernizing the industry through up-to-date plants, superior management, and smoother coordination of the oil from wellhead to consumer. Now, it became a benighted custodian of the status quo, squelching progress to safeguard its own interests.

Interpretation

In the long run, neither Standard nor its smaller rivals succeeded in their efforts to squelch the diffusion of technology through political means. As noted above, Sherman's anti-tank-car bill failed, and by 1911, Standard's market share had fallen to 64 percent as its competitors adopted the low-cost production and distribution techniques Standard had pioneered and worked so hard to monopolize. It is worth understanding why the Luddite

impulse failed in oil refining. Sherman's anti-tank-car bill failed because of political competition. The anti-tank-car measure was such a transparent effort to suppress a technological innovation with broad consumer benefits, that Sherman's cohorts in the Senate would have voted for it at their peril. Like Sherman, they too were competing for votes at home, and political competitors would have scored plenty of political points if they revealed support for such a lame policy.

The same holds true for Standard's efforts to suppress new pipelines, operated by competitors. While Standard blocked new pipelines in Pennsylvania and New York during the 1870s, such victories were short-lived. By the turn of the twentieth century, competing oil companies had successfully built new pipelines all across the United States. A plausible explanation for this development is that the political costs of blocking new pipelines were too high. A politician who consistently took bribes from Standard and passed laws inhibiting the construction of new pipelines would have been vulnerable to electoral competition. One might restate this line of thought by appealing to Denzau and Munger (1986). Denzau and Munger derive a supply price for public policy, and show that it is difficult (costly) for an organized interest group to win a legislator's support if voters in the legislator's district are opposed to the policies being espoused by the interest group. In the context of Denzau and Munger's model, the supply price of a law permanently barring the construction of independently-owned oil pipelines was prohibitive.

One might ask why the same process of political competition did not work in public utility industries. To be more precise, a local politician who consistently took bribes from local

utility companies, and in return, provided them with lucrative and monopolistic franchises also would have been vulnerable to electoral competition. Why could not new politicians enter and win local elections by promising to reduce gas prices and return some of the bribe money to voters in the form of tax breaks or increased provision of local public goods? Why, in other words, was political competition so much less effective in rooting out corruption in the context of urban public utilities? The answer has two parts. The first part has already been given: because public utilities had to make such huge non-redeployable investments, they often demanded lucrative and exclusive franchises as compensation for the risk of subsequent political expropriation. Urban politicians and voters, therefore, faced a stark choice: a monopolistic gas or electric company, or no company at all. Because even monopolies generate consumer surplus, voters and politicians chose the former. Endemic to all monopolies, however, are excess profits, and in the presence of excess profits, corruption is always a possibility.

The second part of the answer has to do with the viability of long-term competition in oil refining and public utility industries. In contrast to public utility industries, oil refining is not a natural monopoly that required huge investments in non-redeployable capital. Rather, the structure of oil refining was such that market forces worked reasonably well, and helped to keep price close to marginal cost. In this way, market competition complemented political competition in checking the development of corrupt relationships. To be more precise, market competition acted as a commitment device for the politicians who entered the political arena promising to eliminate corruption: once they removed whatever legal barriers to competition

existed (e.g., a legislature's refusal to allow new oil companies to build a pipeline), market forces kicked in and drove excess profits to zero, eliminating the rents necessary to finance corruption. In the presence of a viable competitive market, it was difficult for subsequent politicians to undue the promises of reformer politicians because all of the excess profits necessary to finance corruption would have been competed away.

To see this more clearly, consider again the legislators John D. Rockefeller bribed in order to prevent the construction of a competing oil pipeline. Suppose that in the election following this blatant act of political malfeasance politicians promising to eliminate Rockefeller-inspired corruption are elected. These reform-minded politicians eliminate the legal obstacles that had prevented the upstart oil refiners from building their pipeline, and the pipeline is built. Now Standard begins to face stiff competition from refiners with the same technical savvy as Standard, and Standard's market power falls, along with its profitability. Once the legal barriers to entry have been eliminated, competition flourishes and there is little Standard can do, short of physically destroying the new pipeline, to undue the actions of the reformer politicians. Even if subsequent legislators are more responsive to the Rockefeller purse—which is now much smaller than it had been before—it is not clear what they could do to stop the new refiners; it does no good to lock the barn door once all the animals have left.

For some observers, it might be tempting to attribute the decline of Standard Oil, and the associated corruption, to the federal government's famous antitrust suit which resulted in the court-ordered dissolution of Standard in 1911. There are two problems with this line of thought. First, before the federal antitrust suit, Standard's market share had already fallen

sharply and stood at only 64 percent on the eve of dissolution. (See table 2.) Arguing that this decline was the result of earlier state-level antitrust proceedings will not do because most observers agree that these cases were ineffective (Bringhurst 1979; Pratt 1980; and Singer 2002). As with other large corporations subject to state antitrust proceedings during the late nineteenth century, Standard was able to contract around the state decisions at low cost (Binder 1988; Troesken 1995 and 1998). Second, in an event study of the 1911 dissolution of Standard, Burns (1986) finds no evidence that the capital markets believed that the court-ordered break up of Standard would seriously undermine the firm's long-term profitability.

In most industries, competition and technological change are inextricably linked, and this linkage is particularly clear in the history of oil refining. Standard Oil rose to market dominance because it pioneered new production and distribution techniques, and ultimately fell from power because it was not able to monopolize these techniques. New entrants into oil refining were able to emulate, and improve upon, Standard's production and distribution methods and their efforts gradually eroded the combination's market power. Because technological change typically engenders new competition, suppressing competition (and promoting corruption) often goes hand-in-hand with suppressing new technologies. In the case of oil refining, this manifested itself in a failed attempt to outlaw the use of tank cars in transporting oil. A similar process was at work in other industries. For example, Libecap (1992) shows how the Meat-Packing Trust used refrigerated rail cars and advanced slaughtering techniques to drive down the price of processed meat. When this process began to threaten the livelihood of butchers and smaller meat-packing establishments, they lobbied

for laws that would have suppressed new technologies and insulated them against competition from the larger and more efficient Meat-Packing Trust.

Even in public utility industries—which, as explained above, were industries where unfettered competition worked quite poorly—the competition wrought by technological change was sufficient to drive down consumer prices, and at least temporarily, threaten the profitability of incumbent firms. Consider the introduction of water gas technology during the 1880s and 1890s. Water gas represented a large improvement over existing coal gas technologies in that it economized on coal and capital costs in the production of illuminating gas. The introduction of water gas had dramatic effects on market entry and competition. In Chicago, several new firms entered and challenged the dominance of existing coal gas companies. As a result, between 1880 and 1885 the price of illuminating gas in Chicago fell by over 50 percent. Even in smaller cities and towns, such as Minneapolis, Minnesota and Danville, Iowa, where the technology did not lead to new market entry, the adoption of water gas led to sharp reductions in consumer prices. See figure 4. Yet because water gas challenged incumbent firms producing ordinary coal gas, in cities across the United States, incumbent coal gas producers sought to suppress the new technology by claiming that it posed serious health risks—it was alleged that leaking water gas asphyxiated people faster than ordinary coal gas. And in some towns, in response to the lobbying efforts of incumbent producers, local politicians passed laws outlawing water gas because, they claimed, it posed a serious risk to public health. In fact, water gas was no more dangerous than ordinary coal gas: in either case, leaking case was potentially fatal (Wood 1877; and Troesken 1996, pp. 26-29).

VIII. Concluding Remarks

In this paper, I compare the historical persistence of corruption across three industries: public utilities; whiskey distilling; and oil refining. Based on the historical evidence presented above, if one were to place these industries on a scale that rated the persistence of corruption from low (corruption is short-lived) to high (corruption is long-lived), public utilities would be characterized by high levels of persistence and whiskey distilling by low levels of persistence; oil refining would be an intermediate case. In addition, if one were to place these industries on a scale that rated how well market forces have worked in these industries historically, public utility industries would fall on the lower end of the spectrum of competitiveness and whiskey distilling would fall on the upper end; and again oil refining would be an intermediate case.

Figure 5 illustrates the implied relationship between competition and corruption. In industries where unfettered competition has not worked very well, such as public utilities, corruption has flourished, while in industries where market forces have been highly effective, such as whiskey distilling, corruption has been very short-lived. Based on the evidence presented above, the negative correlation between industrial competitiveness and corruption is not spurious. On the contrary, because corruption, whatever its form, is costly it cannot survive in highly competitive environments. Accordingly, when the managers of the Whiskey Trust tried to appropriate rents from outside shareholders through the use of kickback schemes and deceptive insider-trading tactics, the trust found itself at a competitive disadvantage and was soon driven into bankruptcy by low-cost rivals. Entry into whiskey distilling was simply too easy, and competition too intense, for any organization fettered with the costs of corruption

to survive for a sustained period of time.

Although corruption flourished for a longer period of time in oil refining, Standard Oil could not monopolize new and efficient production and distribution techniques forever; they were too easy to emulate. Gradually, new firms entered and beat Standard at its own game, despite Rockefeller's many bribes to legislators designed to inhibit the diffusion of new technologies. By the same token, the traditional oil-refiners who (for whatever reason) could not adopt Standard's use of tank cars and oil pipelines found themselves driven into bankruptcy, and when they lobbied for laws suppressing these new technologies, they were rebuffed. In a competitive electoral environment no one, except perhaps Senator John Sherman, could have possibly sold constituents at home on the idea that suppressing tank cars and pipelines would promote consumer interests.

But in public utility industries, capital immobility and natural monopoly undermined the efficacy of market forces; and as a result, corruption was an insoluble problem that was endemic to all regulatory regimes. In the case of municipal franchise regulation, local authorities often took bribes from utility companies in return for granting exclusive and monopolistic franchises. While creating profitable franchises was necessary to attract private investment, the side-payments made to local politicians should have been returned to the voters in the form of lower taxes or increased provision of public goods. With state regulation, regulatory commissions were subject to capture by utility companies, and the emphasis on rate-of-return regulation created hard incentives for utility companies to overinvest in fixed capital in an effort to increase their rate bases. Both activities imposed costs on consumers in

the form of higher utility rates. With municipal ownership, politicians faced strong incentives to sacrifice the long-term viability of the capital stock for short-term political gains. In the short run, this resulted in patronage employment and rates that were set too low; in the long run, it resulted in an inadequately maintained capital stock, that in the case of water, posed serious public health risks, including, in some places, greatly increased infant mortality.

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Table 1. Water Prices: Public and Private Water Companies, 1899

	Private companies		Public companies	
Annual sales	obs.	Price[a]	obs.	Price[a]
< 50 million gallons	101	$0.218	287	$0.123
50 to 99 million gallons	70	0.124	76	0.076
100 to 149 million gallons	29	0.100	45	0.064
150 to 249 million gallons	45	0.046	33	0.036
250 to 499 million gallons	52	0.071	58	0.062
≥500 million gallons	78	0.061	155	0.061
Total/Weighted Average	375	0.118	654	0.089

Notes: [a] - average price per first 1,000 gallons of water.

Source: United States (1899, p. 42).

Table 2. Market Share: Standard Oil, 1870-1911

Year	% of industry refining capacity controlled by Standard	% of major products sold by Standard			
		Lubes	Waxes	Fuel Oil	Gasoline
1870	10				
1880	90-95				
1899	82	40	50	85	85
1906	70				
1911	64	55	67	31	66

Source: Williamson and Andreano (1962).

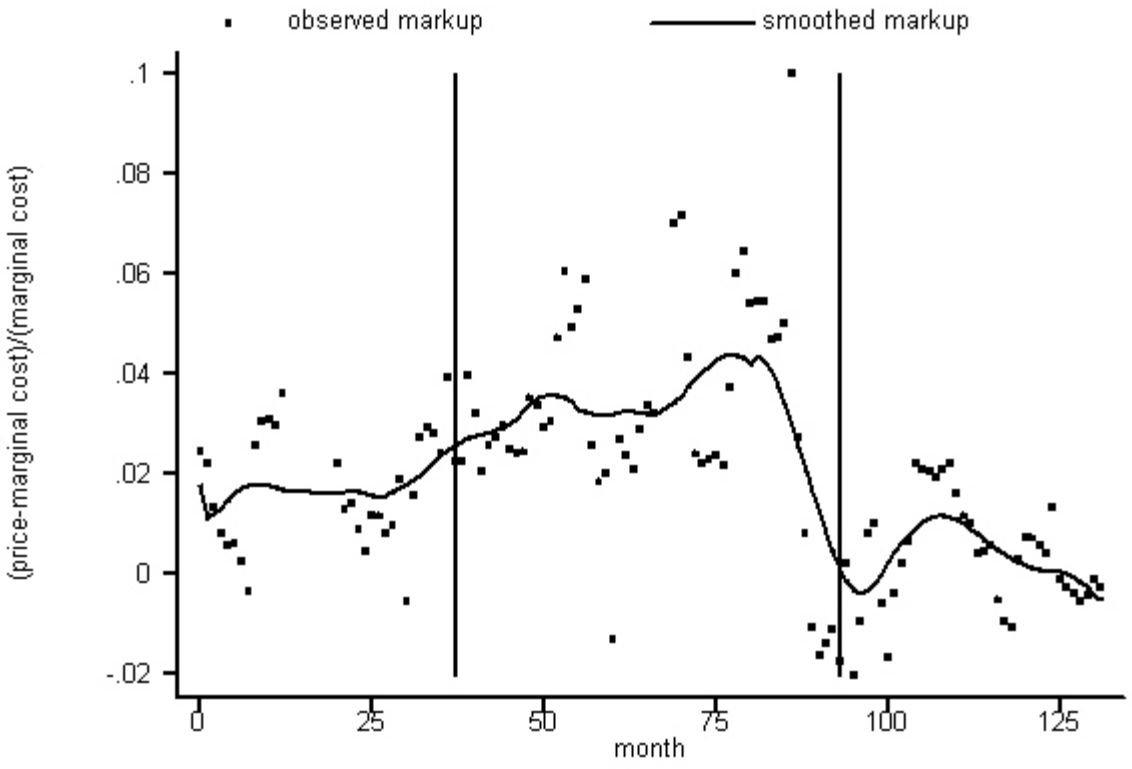

Figure 1. The Markup in Whiskey Distilling, 1887-1898

Notes: The first vertical line at month 37 (June, 1890) indicates the onset of the trust's rebate program, and the second vertical line at month 93 (August, 1894) indicates the (beginning of the) demise of the Whiskey Trust

Sources: Clay and Troesken (2002 and 2003)

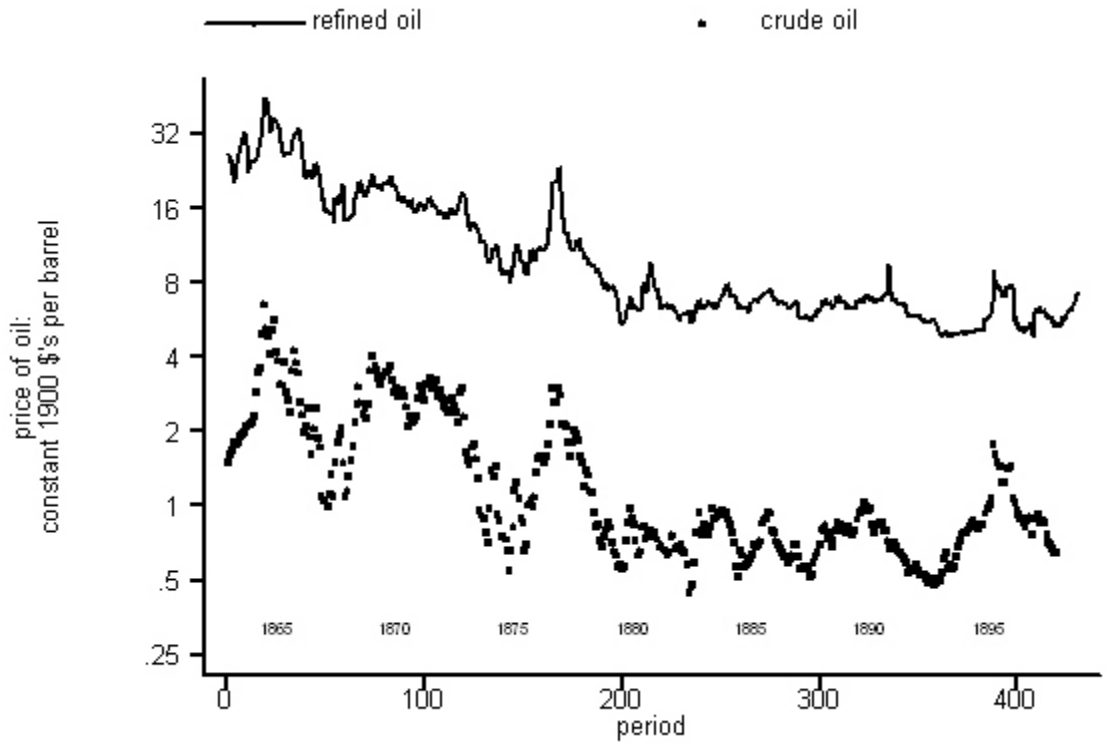

Figure 2. Oil Prices, 1863-1898: Constant 1900 Dollars

Source: *Derrick's Petroleum Handbook.*

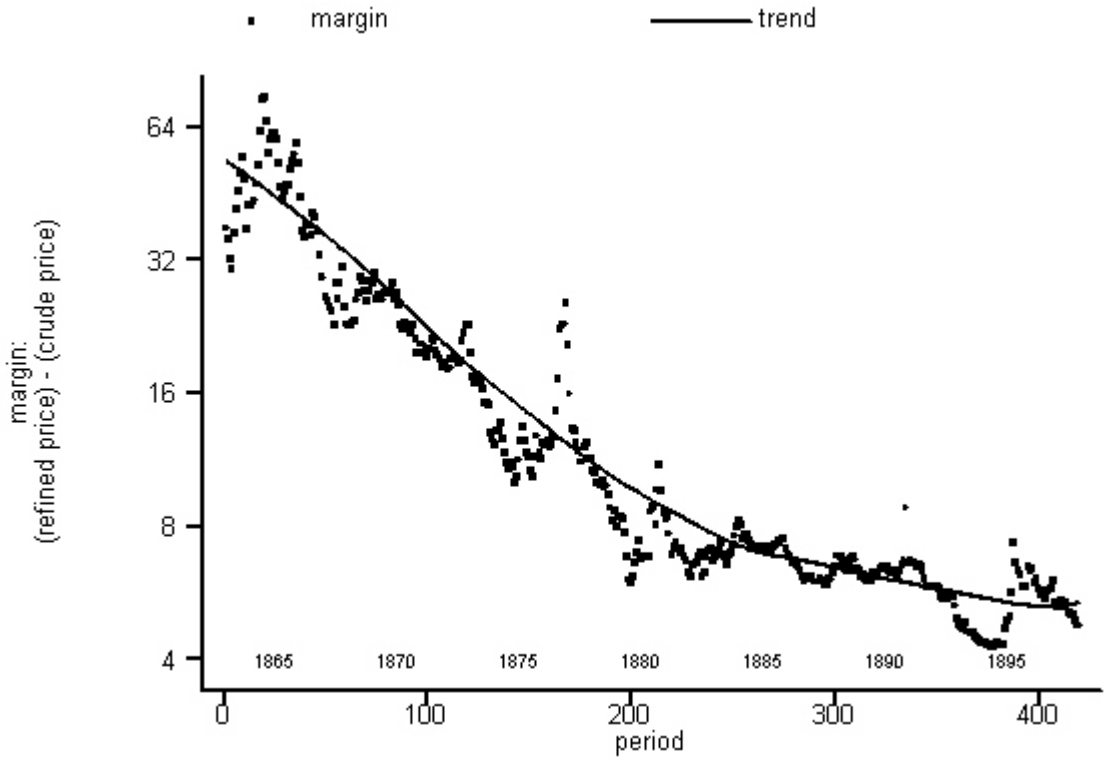

Figure 3. The Margin in Oil Refining: 1863-1898

Source: *Derrick's Petroleum Handbook*

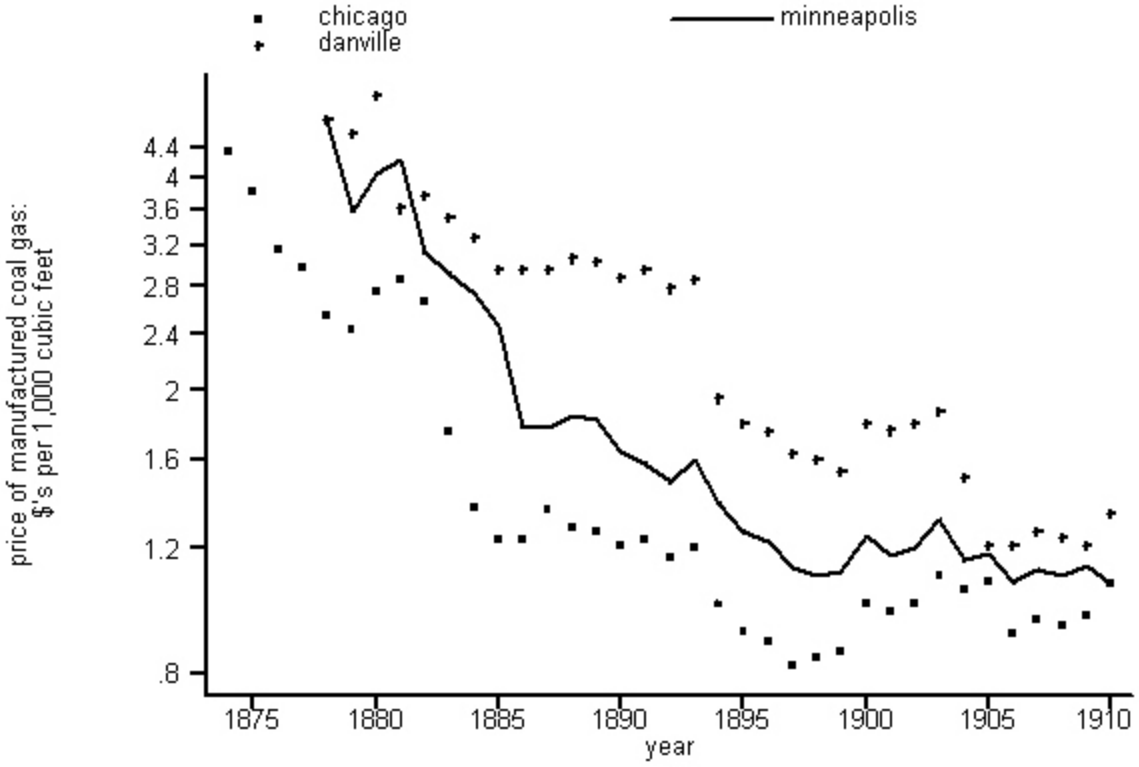

Figure 4. Gas Prices in Chicago, Danville (Iowa), and Minneapolis, 1875-1910: Constant 1900 Dollars

Sources: Troesken (1994 and 1996).

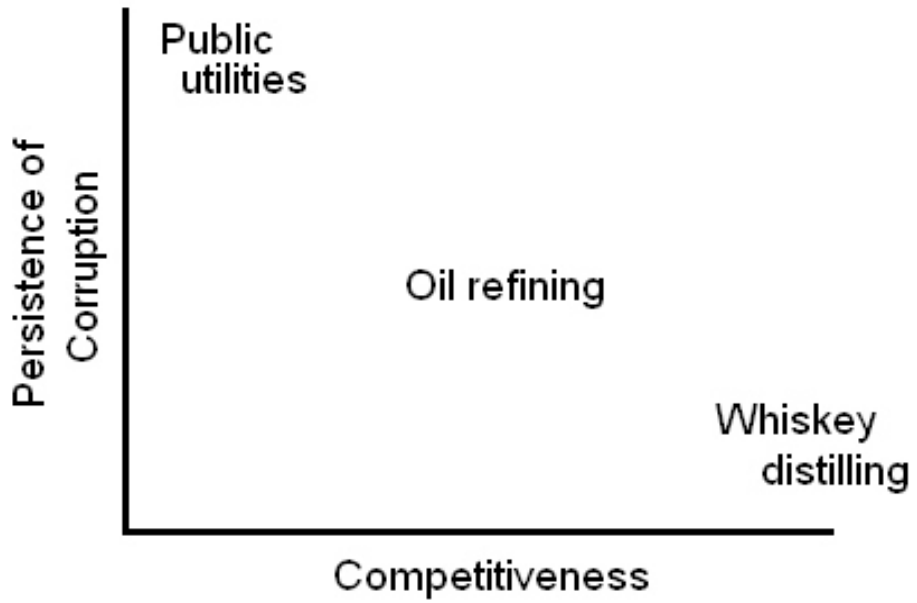

Figure 5. Competition and Corruption: A Summary

Source: see text.