



HIER

Harvard Institute of Economic Research

Discussion Paper Number 1930

Public Ownership in the American City

By

Edward L. Glaeser

October 2001

Harvard University
Cambridge, Massachusetts

This paper can be downloaded without charge from the:

<http://post.economics.harvard.edu/hier/2001papers/2001list.html>

PUBLIC OWNERSHIP
IN
THE AMERICAN CITY

by

Edward L. Glaeser¹
Harvard University and NBER

October 1, 2001, Preliminary Draft

ABSTRACT

American local governments own and manage a wide portfolio of enterprises, including gas and electricity companies, water systems, subways, bus systems and schools. Existing theories of public ownership, including the presence of natural monopolies, can explain much of the observed municipal ownership. However, the history of America's cities suggests that support for public ownership came from corruption then associated with private ownership of utilities and public transportation. Private firms that either buy or sell to the government will have a strong incentive to bribe government officials to get lower input prices or higher output prices. Because municipal ownership dulls the incentives of the manager and decreases the firm's available cash, public firms may lead to less corruption. Public ownership is also predicted to create inefficiency and excessively large government payrolls.

¹ This paper was written for a festschrift volume dedicated to Richard Netzer. The NSF provided financial assistance. Emily Oster was an excellent research assistant. This paper is part of an ongoing research project that is joint with Andrei Shleifer, and this paper embodies thoughts that are his as well as mine.

I. Introduction

Why do many American city governments directly provide public transportation, water and even power and light? Why do so many governments pave and clean their own streets instead of using subcontractors? Government ownership is almost invariably linked with waste and inefficiency. Yet, government provision in these areas remains common.²

One traditional argument is that natural monopolies create a case for government ownership, or at least significant regulation (see e.g. Atkinson and Stiglitz, 1980). But it is not obvious that most public services are really natural monopolies. Subways may have some aspects of natural monopoly, but New York once had three competing subway lines. Certainly buses are not natural monopolies. New York once had dozens of competing bus and streetcar lines. There are times when water has been supplied privately and competitively (Koeppel, 2000). Some utilities may look like natural monopolies, but often there were competing electric and gas providers.³

More recently, Hart, Shleifer and Vishny (1997) argue that the advantage of government ownership is that it limits perverse incentives. The weaker incentives of government operators mean that there is less incentive to cut costs and therefore cut quality. This theory helps us understand some of the examples of public ownership. For example, public provision of water may be explained by the huge problems associated with unclean water. However, this theory works much less well in explaining public transportation and electricity. It also doesn't work well as a theory of direct government provision of street cleaning—clean streets are very observable and easy to contract on (especially in a repeated setting).

² Lopes-de-Silanes, Shleifer and Vishny (1997) provide a careful description of public services in the U.S. today.

³ At the dawn of the public era, Wilcox (1912) wrote “the manufacture and distribution of electricity is inherently the least monopolistic of public service utilities.”

A less benign view of public ownership is that it is an example of empire-building politicians obtaining power at the expense of public welfare. Public ownership provides large opportunities for political patronage that would appeal to any politician even if there were welfare losses from public ownership (see e.g. Shleifer and Vishny, 1994). I am certainly friendly to this view, and even if many supporters of public ownership were motivated by benign reasons, many supporters were, and are, motivated in other ways. However, the cynical view doesn't help us to understand the widespread support for public ownership across American cities in the 19th century. Many progressive reformers who supported public ownership were unconnected to governments and clearly had nothing to gain from public ownership.

The history of America's cities provides a fourth theory of public ownership that is complementary to the other three: public ownership may reduce bribery and corruption. In the 19th century, private firms that either sold to the government or bought from the government would frequently bribe government officials to get favorable prices. The city of New York massively overpaid for the construction of the Tweed Courthouse. Transit companies bribed politicians to get extended (i.e. perpetual or 999 year) rights to public streets for free. Private companies had huge incentives to bribe politicians and they acted consistently on those incentives.

Indeed, progressive era reformers called for public ownership as a solution to this problem of corruption. As Leonard Darwin wrote in 1907, "One of the points which here appears to tell most in favour of municipal ownership is the belief that it would tend, if extensively adopted, to purify civic life." A few pages later, he continues describing the progressive argument for public ownership "the worst frauds attributed to civic administrators have been committed in connection with the franchises granted to private corporations; abolish these franchises by means of the introduction of direct municipal labour and this type of fraud must disappear completely" (Darwin, 1907).

This paper presents three models of public ownership that formalize this argument. The first two models examine situations where firms sell to the government (such as street

cleaning contractors) or buy from the government (such as railroads). In these models, corruption led governments to overpay for their purchases and undercharge for their sales. Public ownership eliminates this problem because the public manager is only weakly incentivized and will not risk prison for profits that he doesn't himself enjoy. This paper follows Glaeser and Shleifer (2001) in emphasizing that large private firms subvert the government: the corruption of the Gilded Age came from the increases in the scale of firms (and government), and that there are scale economies in corruption. The reforms of the progressive era, including public ownership, can be seen as responses to that increase in scale.

Of course, public ownership doesn't eradicate corruption. When governments own firms, the corruption just moves upstream. Public firms will still overpay for inputs if those inputs are privately provided, because private providers will bribe the officials in charge. Even if the firms just use labor, which is the case that I consider, there will be corrupt bargains between workers and firms. Public firms will overpay workers who will reciprocate either with direct kickbacks or through in kind service (such as campaigning for Tammany Hall or votes). Such direct, or indirect kickbacks, have been quite common, particularly before Civil Service Reform. This explains why reformers saw public ownership and Civil Service Reform as strong complements and why Tammany Hall politicians were quite happy with public ownership as long as they could eliminate civil service reform.

Since both public and private ownership create losses from different sorts of corruption, the model gives us conditions under which public ownership is desirable. A key determinant is whether the firm sells or buys significantly from the government. If the firm is particularly labor intensive, then large kickbacks from workers may deter public ownership. If it is hard to create corrupt bargains with large amounts of workers, then public ownership becomes more attractive.

A third model explains why government ownership—rather than subsidization—may be an appropriate response to externalities. In a world of massive corruption, subsidies will

be roundly abused. For example, in the 19th century, land grants and tax abatements were used to address the externalities supposedly coming from railroads. In practice, the subsidies to railroads seem to have been related more to the size of the bribes of railroad officials than to the merits of the case. If government subsidies are going to be perverted through corruption, then public ownership may provide a solution. Of course, government ownership will again bring its own forms of corruption.

After presenting a model of corruption and public ownership, I examine the history of public ownership in New York City (and to a lesser extent other American cities) for the major local government services: water supply, sanitation, street maintenance, power and light utilities, and public transportation. In these histories, I evaluate the importance of the four theories of public ownership: natural monopoly, maintaining quality through soft incentives, public empire building and eliminating corruption. Water supply, some utilities and the subway system all have some aspects of natural monopolies. Certainly, many of the contemporary observers arguing for public ownership thought that there were substantial scale economies that suggested natural monopoly.

The best example of the Hart, Shleifer and Vishny (1997) model is public provision of water supply where poor quality seems to have been the biggest problem with private provision. Other services also have quality problems, but it is not obvious whether poor quality occurs because of standard contracting problems or because of corruption. For example, there are huge quality problems when private contractors handle street cleaning in the 19th century. Low quality is the result of corruption combined with rules restricting politicians to take the lowest bid. When politicians are forced to take the low bid, then accepting low quality is a means by which bribed politicians can overpay for services.

In almost all of these five areas, the desire to eliminate corruption seems to have played some role in public provision. Eliminating corruption seems to have been least important in the provision of water, and probably most important in public transportation. While I am not sure that it was the dominant factor leading to public ownership in any of the sectors, the history seems to suggest that it was a sizable factor in all of the sectors.

II. Corruption in the City

In this section, I describe the principal forms of 19th century municipal corruption. The municipal ownership movement hit its stride during the early 20th century as a response to the events of the late 19th century. For example, in 1902, 22.5% of the electric light and power stations in the country were owned by municipalities; by 1927, 50.7% of these utilities were municipally owned. Municipal stations grew in absolute number even as commercial ones decreased. The 1912 census of electric railways cites only two cities that own their own street railways. By 1922, sixteen cities had their own street railways. Between 1880 and 1903, 22 cities bought waterworks from private companies.

I focus on three types of corruption: underpricing on inputs bought from the government, overpricing of outputs sold to the government, and the perversion of attempts to subsidize positive externality producing behavior. The first two types of corruption are quite obvious and simple to describe.

Overpricing of Outputs

There is no more straightforward means of raiding a public treasury than overpaying for inputs with government money. Typically, either a politician himself or confederate contracts with the government to provide some type of service. The politician's influence ensures that the contract would go to the corrupt contractor, and not the lowest bidder (if indeed bids were even taken). The contractor then shares the proceeds with the politician.

A typical example is described by the muckraking journalist Lincoln Steffens in *The Shame of the Cities*: in Pittsburgh "one firm [Flinn's] received practically all the asphalt-paving contracts at prices ranging from \$1 to \$1.80 per square yard higher than the average price paid in neighboring cities" (Steffens, p. 145, 1904). Steffens goes on to show that 99 percent of the business over a 9-year period went to this single firm. He

describes a situation where a less-connected rival who offered to provide higher quality granite for 2/3 of the price of the Flinn firm was rebuffed. It should be no surprise that Flinn was himself a politician and one of the bosses of the city.

This type of story is repeated throughout Steffens' volume. In Philadelphia, Boss Martin's firm "Filbert and Porter got all the public contracts they could handle, and the rest went to other contractors friendly to them and the ring" (Steffens, p. 145, 1904). In St. Louis, "A member of the Assembly ... succeeded in having his bid for city supplies accepted although the figures were in excess of his competitors" (Steffens, p. 24, 1904). In New York, "There are public works for Tammany contracts ... Low bids and short deliveries, generally speaking (and that is the only I can speak here), is the method" (Steffens, p. 209, 1904). The term "short deliveries" means that in New York, underpaying for inputs took the form of giving the contract to the Tammany-backed low bidder, who would then raise the price per unit delivered by lowering the number of units delivered.

This sophisticated form of corruption represents an evolution from the days of the Tweed ring, where New York led the nation in this form of corruption. Under Tweed, "Plunder of the city treasury, especially in the form of jobbing contracts, was no new thing in New York, but it had never before reached such colossal dimensions" (Bryce, 1914). The ultimate highlight of this form of corruption was the Tweed courthouse. As Ellis (1966) writes:

Under the new Tweed charter the new board of audit consisted of Tweed, Hall and Connolly. At one of the board's first meetings, on May 5, 1870, the trio authorized the payment of an additional \$6,300,000 for the new courthouse they were building. Nearly 90 percent of this sum was padding, and they pocketed the extra \$5,500,000.

But this is only the most famous example of Tweed's corruption through overpaying for privately provided services. For example, Tweed centralized street cleaning and gave the contract to a single company. "The successful bidder was paid \$279,000 for a year's work—and immediately 'kicked back' \$40,000 from his fee" (Glaab and Brown, p. 204,

1967). This type of corruption seems to have been particularly simple to implement and enormously profitable.

This type of corruption is relevant for several of the major public services. For example, public provision of Gas and Light was often motivated by high prices charged by private providers for these services. In 1895, Detroit started to run a public electric plant to provide power for streetlights. As Judd and Swanson (1994) write that the reforming Mayor of Detroit, Hazen Pingree's "main argument against the private control of electricity was that it cost too much ... Corruption became the issue that tipped the scales in his favor." Street cleaning and maintenance is another area where the legacy of corruption led to direct public provision. For example, in 1895, George E. Waring, Jr. led the reorganization of street cleaning in New York and moved cleaning from private contractors to a public department.

Underpricing of Inputs

A second, primary form of corruption that is intimately related with the move to public ownership is the underpricing of publicly owned inputs that are then sold to private firms. Again, the chief method of this type of corruption is that a powerful politician, or his private allies, would buy some government asset for a fraction of its price. The spoils from this transaction would then be shared with the government agent responsible for running the sale. In Steffens' words, "The riffraff, catching the smell of corruption, rushed in the Municipal Assembly, drove out the remaining respectable men, and sold the city—its streets, its wharves, its markets, and all that it had—to the now greedy business men and bribers."

Again, Steffens' chronicle of corruption stretches across all of America. In St. Louis, "Municipal legislators sold rights, privileges and public franchises for their own individual profit and at regular schedule rates." Steffens relates the 1898 Central Traction deal in that city where Robert Snyder handed out \$250,000 in bribes to get a traction (public transit) franchise from the government (nothing was formally paid for the

franchise) that he immediately resold for \$1,250,000. In Pittsburgh, Boss Magee used his power “turning the streets to his uses, delivering to himself franchises, and building and running railroads.” These franchises represented the right to run trolleys on city streets, often for 999 years, with no payment to the city. In New York, “just as other cities shave their corrupt dealings with railways and their terminals, so New York’s great terminal business is with steamships and docks. These docks should pay the city handsomely. Mr. Murphy [The Boss of Tammany Hall] says they shouldn’t.”

Free use of public land and facilities, such as docks, were the primary forms of underpayment by private firms for inputs, but there were other less frequent examples. George Washington Plunkitt describes how he used his political influence to buy 250,000 fine granite paving stones from the government for \$2.50. He promptly resold them. City governments depositing their funds with banks at no interest, in exchange for kickbacks, can also be seen as an example of this phenomenon.

As the previous examples have already suggested, the corrupt underpricing of inputs was probably most important in the transport industry. As roads are generally public, if private transport companies were to use roads for their operations, they would have to buy this right from the public government. Public governments would grant the right to use particular roads in the form of franchises. These franchises might just allow the private transport firm to use of the existing road space, as in the case of bus lines.

Alternatively, rail transport (whether horse drawn, steam powered or electric) required alterations to the existing road structure. These alterations are both socially costly to create and maintain (e.g. delays due to lost road use), but they also in a sense permanently reduce the space in the road that was available for public traffic. Economic efficiency would generally dictate that the transport firms should pay for the social costs of these roads, but they generally didn’t (except through bribes). Franchises were generally free or priced at far below market values.

One way to think about the corruption involved is that the government owns land that it is renting at far below market prices to corrupt firms. An even more extreme example in the rail industry was the construction of the trans-continental railroad. Josephson (1934) writes, "... the railroads, especially in the West, were 'land companies' which acquired their principal raw material through pure grants in return for their promise to build, and whose directors, combined with friendly statesmen, such as Douglas, did a rushing land business in farm lands and town sites at rising prices." There is perhaps an argument that there are externalities associated with rail that justify these grants. However, this argument still must face that these land grants were paid for by massive bribes to local and national politicians (see Josephson, 1934, for details). Often, politicians were themselves massive shareholders of the railroads as they were in the case of the *Credit Mobilier* scandal.

But transportation is not the only industry that used public land as a major input. All of the public utilities including water supply, sewers, and the power and light industries all make use of land. In all of these industries, corrupt government officials handed over use of public property and state privileges in exchange for private bribes. Aaron Burr's Manhattan Water Company managed to get "substantial rights of eminent domain over lands, river and streams," through the political strength of its owner. It didn't hurt that the Council of Revision which gave the final approval to the bill included the largest shareholder of the company (see Koeppe, 2000). Electricity franchises for putting up wire poles, or for burying wires beneath the ground, were also generally given out for free.

Did this underpricing of public inputs motivate public ownership? Indeed, the great advocate of municipal ownership, Hazen Pingree, the Mayor of Detroit, "first concerned himself with the gas problem in 1891, when he became annoyed at the excavation of the pavements and streets by the companies" (Holli, p. 87, 1969). The movement for public ownership of transportation in Chicago seems to have been galvanized by a proposal to give Charles Yerkes a 99 year extension of his franchise at quite favorable rates, which was being considered by a city council that was supposedly bribed by Yerkes. Cudahy

(1990) writes that “an angry mob of citizens armed with clubs and carrying flaming torches ...surrounded City Hall during the deliberations and demanded, successfully that Yerkes be repudiated. Yerkes had marshaled all the usual arguments about socialism and government inefficiency and what he felt was the inherent superiority of the private sector for accomplishing just about any task, but the idea of public ownership and operation continued to gather momentum in Chicago.”

Perversion of Subsidization

The third type of corruption is far less obvious than the other two types: the perversion of subsidization. Throughout history, city governments recognized that there were a variety of services where private provision would fail to meet social goals. In particular, there are certain services that are either public goods or that have very large-scale externalities. Most basically, the justice system, sanitation and fire prevention have long been thought of as services worthy of profound government involvement. In the 19th century, clean water was another good that was clearly very important for public health. The great plagues of central cities were thought, from the beginning of the 1900s, to have some connection with the water supply. Economists are still unsure as to whether there are large positive externalities associated with transportation. For example, in 1828, Daniel Webster urged public subsidization of canals because of the general benefit to the United States. Of course, schooling was also thought to have a widespread general benefit.

The traditional economics approach to these types of economics might predict that the government would use money to directly subsidize the private firms providing water and transport. However, this very rarely occurred. Perhaps direct subsidization of private firms was understood to have been too much of a temptation to boodlers. Instead, the subsidization came primarily through land grants and tax abatements. I have already given examples of what I see as the corruption that was involved in property gifts to railroads, buses and even private water suppliers. The evidence for corrupt underpricing of public inputs is, in a sense, also evidence for corruption of the practice of subsidizing certain businesses.

Tax subsidies were also determined by corrupt bargains between firms and politicians.

As Glaab and Brown (1967) write:

In many places, part of the [cities'] debt was due to lavish encouragement to railroads, which stemmed from local rivalries during the booster years; city and country obligations of this kind were conservatively estimated at \$185,000,000 in 1870. Inefficiency and corruption explained some part of the cities' skyrocketing obligations—how much cannot be estimated realistically.

For example, as of 1891, Detroit railroads were exempted from taxation by the state legislature. While I do not have direct evidence that this privilege came about as the result of bribery, it seems likely. After all, the Detroit railway company offered Pingree himself \$75,000 to cease his fight against them (Judd and Swanstrom, 1994). The Detroit Transportation Company, another tax avoider, was owned by the powerful Senator MacMillan.

I cannot prove that subsidies to railroads were themselves inefficient. However, an efficient subsidy scheme would presumably not lead to massive profits for politically well connected firms. Furthermore, an efficient subsidy scheme would be more likely to direct payments on the basis of efficiency-considerations than on the basis of bribes and political connections.

III. A Series of Simple Models

In this section, I present three simple models which formalize the corruption problems discussed above. The models are meant to illustrate the impact that municipal ownership would have on consumer welfare and the tradeoffs involved in publicly owned firms. The first model deals with underpricing inputs. I address this type of corruption first since it is the most important phenomenon in the industries that were eventually made public. The second model addresses overpricing outputs, and the third model addresses the perversion of subsidization.

Underpricing Inputs

In this case, there is a fixed quantity constraint on producing the good, denoted \bar{Q} , and the price of the good, which is sold on the free market, is P . For each unit of the good that is made, the producer requires ϕ_L units of labor and ϕ_P units of a public good. The free market cost of labor is w . The social cost of the public good is c_P . To keep social analysis simple, we will assume that if the firm pays for the social cost of its inputs, it will receive zero profits, i.e. $P = \phi_L w + \phi_P c_P$.

We assume that the government has ruled that the firm should be charged the true social cost, c_P , for each unit of the public good. In this case, other prices would be non-distortionary. However, this social cost seems like a reasonable benchmark. A reasonable alternative is that the government will act like a monopolist. I denote the price paid to the government as \tilde{c}_P .

In this, and the following models, I make the assumption that voters are able to write down clear rules limiting the ways in which the government can transfer funds to private entities and individuals. Until I discuss subsidies explicitly (in the third model), I will assume that the people are able to craft a bright line rule that ensures that the government can only pay money in exchange for services rendered. The price for these services may well be overinflated, but this assumption strongly limits the forms which corruption might take.

The sale of the public good is handled by an individual, each of whom must approve a sale. Throughout this model, I assume a detection technology which is an increasing function of the difference between the price that the government is paid for something and the true social cost of the good, i.e. $\delta(c_P - \tilde{c}_P)$. This function is continuously increasing as long as $\tilde{c}_P < c_P$, and continuously differentiable. I also assume that it is convex, so that as the underpayment becomes more and more flagrant, the marginal

effect of lowering the price further will be greater. When $c_p = \tilde{c}_p$, the probability of detection equals zero, and the derivative also goes to zero. If the government official is caught taking a bribe, he goes to jail and pays a penalty of K , which includes lost salary, jail time, etc. The official also receives a baseline utility level that is independent of bribes and being caught. The net gains to the official from bribery equals $b - \delta(c_p - \tilde{c}_p)K$.

The company's net gain from bribery will equal $(c_p - \tilde{c}_p)\phi_p \bar{Q}$ minus the cost of bribery,

b. As such, the total gain to the two actors from bribery equals

$(c_p - \tilde{c}_p)\phi_p \bar{Q} - \delta(c_p - \tilde{c}_p)K$. We assume that this surplus is split between the firm and the government official, according to some bargaining. Any deal must maximize just surplus, which implies the first order condition: $\delta'(c_p - \tilde{c}_p) = \frac{\phi_p \bar{Q}}{K}$. The convexity of

$\delta(c_p - \tilde{c}_p)$ ensures that the problem satisfies second order conditions. Differences in bargaining power will not change the level of the bribe. Differentiating this condition produces proposition 1:

Proposition 1: The firm will pay less for the public good if (1) the firm is larger, (2) the firm buys a greater share of its inputs from the government, (3) the penalty associated with being caught taking a bribe is lower. If the detection technology $\delta(c_p - \tilde{c}_p) = d_0 * d(c_p - \tilde{c}_p)$, then the firm will pay more for the good as d_0 rises.

Proposition 1 helps us to understand the conditions under which we should expect to see bribery and underpricing of government inputs. Larger firms will be more likely to bribe the government. This actually creates an incentive for mergers, and some of the merger wave of the 19th century can be understood as a means of getting advantages of scale in subverting the government. This paper follows Glaeser and Shleifer (2001) in emphasizing the existence of scale economies in the subversion of justice and government. In the earlier paper, we argued that the increased scale of business explains why corruption appears to have increased in the late 19th century.

Firms that purchase a large amount of their inputs from the government will also be likely to engage in more bribery. Public utilities and transportation are a classic example of firms with large government inputs. In public utilities, pipes and wires must be laid underground. Installing and repairing these pipes requires the use of government property—the roads. Public transportation also uses the roads or land below the streets. Frequently, public utilities and transportation seem to have underpaid, or not paid at all, for the privilege of using these government inputs.

The penalty result is unsurprising and suggests that we should expect more bribery in governments that pay less or that have fewer penalties for being caught taking bribes. Indeed, one of the ideas of civil service reform was that through this reform corruption would be eliminated as workers became better paid and more professional. The detection result is also unsurprising, but it also means that as police and journalism technology improved over the 20th century, the level of bribery decreased.

Of course, in this simple model, there are no distortions from this bribery—it just leads to a redistribution of wealth from the city to the firm. However, we will consider the problem from the point of view of the taxpayers who want to maximize overall government revenue. As such, the underpayment for inputs represents pure social loss. In a more complex model, mispricing of the inputs will lead to overuse of them as well, which will create a true social loss. Indeed, it is debatable whether we should include the bribe payments as part of the social gains. If the government offset higher bribes with lower wages, for example, it might be appropriate to include this bribery amount. However, we will restrict our analysis of costs and benefits just to the losses from underpayment. In that case, the social loss from private ownership (relative to the first best) is $(c_p - \tilde{c}_p)\phi_p \bar{Q}$.

An alternative assumption is that there is no detection, but that instead the government is just not allowed to pay private firms anything (except when buying goods). In that case,

there is just a non-negativity constraint on the price for the input and the equilibrium price will be zero. The loss to the public is then $c_p \phi_p \bar{Q}$.

I now consider the alternative possibility that the firm is run by a public entrepreneur. In the spirit of Hart, Shleifer and Vishny (1997), public ownership changes the objective function of the firm. In this case, the manager's salary is assumed to be fixed and independent of firm profits. As such, if the public official faces any penalty from bribing someone else, the public official will not himself engage in bribery to get the public input for a lower price. Since his compensation is not tied to firm profits, there is no reason why he would risk jail to increase profits by bribing an input supplier.

However, in this model the government official will overpay his employees and receive kickbacks from these workers for their higher wages. In principle, it is also possible that the government official will underprice the output and receive kickbacks for these lower prices. I assume away the second possibility by assuming that the consumer base for the good is just too widespread for this to occur. In the cases of water supply or public transportation, this assumption is likely to be met. It would be very difficult to have extra-legal arrangements with millions of subway passengers where they got a price below the market price.

However, it is possible for the government official to collaborate with the workers, overpaying them and then getting a kickback. Indeed, the turn-of-the-century Tammany Hall Satchem warmly applauded municipal ownership because of the opportunities for patronage:

It's a grand idea—the city ownin' the railroads, the gas works and all that. Just see how many thousands of new places there would be for the workers in Tammany! (Riordan, p. 54, 1995).

This quotation perfectly captures the structure of the model. Under municipal ownership, the government raises wages to above competitive levels, and jobs go to cronies. As Leonard Darwin wrote in 1907, “And as regards wages, here also it must be remembered

that [under municipal ownership] the civic authorities would always remain under the temptation of buying the votes of the municipal workmen by raising their wages or shortening their hours of work.”

Since the wage is now endogenous, we denote this as \tilde{w} . The gap between $\tilde{w} - w$ will be shared between the public official and the workers. Historically, it is certainly true that in many cases direct kickbacks for lucrative public jobs certainly did occur. However, in many cases, the kickback would represent payment in kind. For example, it was particularly typical for highly paid government workers to reward their patrons with effort during election campaigns. As George Washington Plunkitt said, “Parties can’t hold together if their workers don’t get the offices when they win” (Riordan, p. 13, 1995). Even more obviously, Plunkitt says that “A Supreme Court Judge in New York City gets \$17,500 a year, and he’s expected, when nominated, to help along the good cause [Tammany Hall] with a year’s salary” (Riordan, p. 74, 1995).

There continues to be a probability of detection equal to the difference between the paid price and the market price, or in this case, the market wage and the true wage. Thus, the public official faces a probability of detection equal to $\delta(\tilde{w} - w)$, which is an increasing and convex function, just as before. The joint surplus between the workers and the government official will again be split by some bargaining rule, and they will act in such a way to maximize their joint surplus.

A key question is whether the payment to each worker should be treated as a separate bribe, for the purposes of the detection technology, or whether the entire wage bill should be considered one bribe. Is it true that each time you bribe a worker you run a risk, or is the bribe to the union of workers as a whole? The truth is surely between these two extremes. To capture this we assume that if there are N workers taking bribes, the probability of detection equals $N^\alpha \delta(\tilde{w} - w)$, where α is a parameter between zero and one.⁴ When α is close to one, then bribing workers is quite hard and represents

⁴ Thus, for bribes to consumers we are effectively assuming that N is infinite.

individual bargains with them. When α is close to zero, then bribing workers becomes much easier.

In this case, the joint surplus will equal $\phi_L \bar{Q}(\tilde{w} - w) - (\phi_L \bar{Q})^\alpha \delta(\tilde{w} - w)K$, i.e. the excess wages paid to the workers minus the cost to the government employee of getting caught. The first order condition is: $\delta'(\tilde{w} - w) = (\phi_L \bar{Q})^{1-\alpha} / K$. We assume $\phi_L \bar{Q} > 1$. In this case, it is obvious that the amount of bribery will be rising with the size of the firm, declining with K and increasing the extent to which the firm uses labor. Furthermore, the amount of bribery will be declining with the value of α . This parameter partially captures the extent to which the workers are organized, and thus more organization will lead to more bribery. This leads us to proposition 2:

Proposition 2: Corruption leads private firms to earn excess profits and public firms to earn losses.

This model predicts that public firms will overpay their workers and earn losses.⁵ As Plunkitt said, “If the city owned the railroads, etc., salaries would be sure to go up. Higher salaries is the crin’ need of the day.” The model also explains why unions would lobby heavily for government ownership. As long as the workers get some benefit from the firm, they will prefer the case of public firms, where they are being paid above market wages, to the case of private firms where they are being paid market wages. If politicians could actually increase the employment of the firm, this analysis predicts that they would do so.⁶

Despite these profits and losses, it is still not clear whether the public or private firms are better at maximizing taxpayer’s welfare. The taxpayer’s losses from the public firm equals $(\tilde{w} - w)\phi_L \bar{Q}$ or $\phi_L \bar{Q} \delta'^{-1}((\phi_L \bar{Q})^{1-\alpha} / K)$, and this must be compared with the losses from the public firm which are equal to $(c_p - \tilde{c}_p)\phi_p \bar{Q}$.or $\phi_p \bar{Q} \delta'^{-1}(\phi_p \bar{Q} / K)$. The

⁵ The lack of profitability of public firms is one of the main stylized facts in the public/private debate, see e.g. Pashigian (1976).

following proposition discusses the conditions under which public ownership dominates private ownership from the taxpayer's perspective.

Proposition 3: There exists a value of ϕ_p , denoted ϕ_p^* , where the losses to taxpayers from public and private ownership are equal. For values of ϕ_p above ϕ_p^* , public ownership dominates private ownership, and for values of ϕ_p below ϕ_p^* , private ownership dominates public ownership. The value of ϕ_p^* is rising with ϕ_L and falling with α .

This proposition gives us one main result. First, firms that purchase a great deal of their inputs from the government are more likely candidates for public ownership. This is certainly part of the story for both public transportation and the utilities. Furthermore, firms that use a lot of labor are somewhat less attractive to make public. The intuition of this result is clear, since public ownership leads to overpayment of workers, then firms that are labor intensive will be a particularly poor choice for public ownership. In this sense, I mirror Boyko, Shleifer and Vishny (1996) who argue that a primary cost of public ownership is overemployment.

The next result tells us that public ownership becomes more attractive when it is harder to bribe large numbers of actors. Indeed, when α is sufficiently high (and the number of workers is high) there is almost no overpayment at all. An advantage of publicly owned firms is that their natural form of corruption—overpayment of workers—is hard if there are large numbers of workers.

Of course, if there were other inputs of the firm that were supplied privately, this would create another problem. The input suppliers would bribe the manager of the government firm. We will address overpaying by the government for inputs in the next section, but we note here that in some cases, public ownership of a firm simply pushes the corruption upstream.

⁶ In this way, the model provides a justification for the pro-labor preferences of politicians assumed in Shleifer and Vishny (1994).

I have assumed symmetry between public inputs and labor inputs. If corrupting many workers turned out to be fairly difficult, then this would make public ownership more appealing. If the workers' welfare entered into the social welfare calculation, then this would also make public ownership more appealing.⁷ If there were other effort-related choices that the firm needed to make, then this would make public ownership less appealing, since the weaker incentives would be harmful.

These caveats to the model are certainly important, but they don't eliminate the basic message: public ownership embodies a tradeoff where private companies will corrupt the city government and underpay for public inputs, while public companies will overpay their workers.

In some cases, regulation, particularly limiting profits, may solve the corruption problem more effectively than government ownership. What will be the impact of regulation where the firm's profits are regulated by the government? In principle, regulated profits will act to reduce the benefits from bribing the government and can achieve positive effects. The firm itself will have little to gain from bribing its workers either. As such, regulation may offer a more attractive course of action than pure public ownership. Indeed, it is not surprising that progressives often supported regulation instead of wholesale government ownership.

However, regulation still has its own problems. Like public ownership, it will sap the incentives to innovate or put out high levels of effort. This cost has been well discussed in the literature, and certainly does not create a case for public ownership relative to regulation.

A second problem with regulation is that the regulated firm may coerce (capture?) its regulator (as in Stigler, 1971). Through direct or indirect bribery, the firm may get the

⁷ Indeed, it is often argued that machines were socially productive because they redistributed to the poor, often through public patronage.

regulator to increase its profit levels or overlook indirect profit-taking. As such, regulation may end up being quite ineffective.

A final problem with regulation may occur if the firm managers figure out ways to indirectly get profits out of the firm. For example, the private utility may purchase from a co-owned private supplier. If that supplier is not itself regulated, the firm can overpay for its inputs and thereby get its profits indirectly. If the firm still has an incentive to make profits, it will still have an incentive to bribe officials. An extreme example of this will occur if the managers just personally steal from the firm. The managers can overpay for their inputs, such as labor, and pocket the proceeds. Thus, regulation is a reasonable alternative to public ownership, but it brings its own problems.

Overpricing Outputs

A natural extension of the model eliminates the government input, and focuses on the role of government as consumer. This is particularly relevant for government services such as sanitation or highway construction and maintenance. In these cases, government demand is relatively fixed and the key issue is how much the government pays for its services. We will again use the notation of \bar{Q} to denote the government's demand for the good.

In this case, the problem will be that the government's purchasing agent may be bribed by his supplier. Here, to simplify, we assume that the only input is labor, and again ϕ_L units of labor are needed to produce the good. If the good is priced at marginal price the cost should be $w\phi_L$, and an honest official will pay $w\phi_L$ for the good. We will let \tilde{P} denote the agreed upon price for the good. In this case, the probability of detection will be $\delta(\tilde{P} - w\phi_L)$, which is again increasing and convex. The cost of being caught is again K.

Again, we assume that the supplier and the government official share in the rents and maximize their joint surplus. The total surplus for the supplier and the government official to split is $(\tilde{P} - w\phi_L)\bar{Q} - \delta(\tilde{P} - w\phi_L)K$, which has first order condition $\delta'(\tilde{P} - w\phi_L) = \bar{Q}/K$. Overpayment will tend to be bigger if the firm is larger, or if the penalty is higher. The structure of this extension has not changed from the previous model. In the case of private ownership, the lost revenues to the taxpayer will equal $(\tilde{P} - w\phi_L)\bar{Q}$.

In the case of public ownership, the situation is the same as above. The cost of public ownership is overpayment of the workers, and the level of overpayment will again satisfy $\delta'(\tilde{w} - w) = (\phi_L \bar{Q})^{1-\alpha} / K$. The total losses to the taxpayer will equal $(\tilde{w} - w)\phi_L \bar{Q}$.

Which policy leads to greater losses? Again higher values of ϕ_L and α make public ownership less appealing. Large labor consumption acts to exacerbate the cost of public ownership—padded payrolls. Higher values of α make the bribing of workers easier to accomplish.

The Perversion of Subsidies

In this final variant on the model, I discuss situations where the government is neither buyer, nor seller, but wants to subsidize the provision of the good. A natural example might be sanitation or clean water. Both of these goods have large externalities working through disease. Classical economic analysis has tended to imply that all of the benefits of public provision in the presence of externalities can be created through subsidies. If there is bribery, then this claim may no longer be true. The private firms may bribe the government to oversubsidize the commodity, and the result may be corruption. In practice, private firms have also tended to bribe the government to overlook the poor quality of their product.

I continue to assume that total fixed demand for the product is \bar{Q} , but we assume that there is now a quality margin. The firm can either produce high quality goods, which again are made using ϕ_L units of labor, which is again purchased at a cost w , or low quality goods which are made using $\lambda\phi_L$, where $\lambda < 1$. The high quality good costs $\phi_L w$ to produce and the low quality good costs $\lambda\phi_L w$ to make. The low quality good produces private benefits B_1 , and the high quality good provides private benefits of B_2 . In addition, the high quality good also produces social benefits of B_S . These added social benefits from quality represent the health advantages, perhaps, to the entire community of having clean water.

I assume that there is one producer who is a monopolist. The monopolist faces a demand curve that allows him to sell \bar{Q} units of either good at a price of B_1 or lower, but nothing at any price above that. Just as before, though, we will assume that $B_1 = \lambda\phi_L w$ so if the producer makes the low quality good and sells it, it earns no profits.

I assume that $B_S + B_2 > \phi_L w > B_2 > B_1 = \lambda\phi_L w$. This tells us that in the absence of government subsidies, consumers would not pay for the high quality good, at its production cost, but that socially they should. The externality leads to underconsumption of quality relative to the free market. The social welfare to consumers (who are assumed to be the taxpayers) from complete non-intervention is therefore zero (which is also the monopolists profit level).

In the case of public ownership, the firm will be instructed to produce the high quality good and sell it for B_2 . In this case, the consumers will all buy the high quality good and social benefits equal to $\bar{Q}(B_S + B_2)$. However, in this case the firm will as before overpay their workers and receive kickbacks. The level of overpayment will once again satisfy $\delta'(\tilde{w} - w) = (\phi_L \bar{Q})^{1-\alpha} / K$. Total social welfare will equal $\bar{Q}(B_S + B_2 - \phi_L \tilde{w})$. The comparison between the public and private ownership is described by the following proposition:

Proposition 4: There exists a value of B_S , denoted B_S^* , where consumers are indifferent between completely private provision and public provision. For values of B_S above B_S^* , consumers will strictly prefer public ownership and for values of B_S below B_S^* , consumers will strictly prefer private ownership. The value of B_S^* is rising with ϕ_{L} , rising with \bar{Q} , falling with K , and rising with α .

The intuition of this is straightforward. Public ownership is more desirable, relative to the complete free market, when there are large externalities from consumption. Public ownership becomes less attractive when the public official is harder to punish, or when the scale of the enterprise is larger, or uses more labor.

Now I move on to consider the case of subsidized private provision. In principle, standard economics would tell us that the first best could be achieved if the government pays each firm $\phi_L w - B_2$ for each unit of high quality good that is sold. In that case, the firm will earn as much by producing the high quality good and selling it at B_2 , the highest price that the market will bear, as by producing the low quality good. Critically, I assume that the quality of the good is perfectly observable to all actors involved.

In a situation like this there are many opportunities for corruption, all of which would have been exploited by men like William Marcy Tweed. The producer can shirk on quality and bribe the government to overlook the low quality product and still give the subsidy. The producer can bribe the government official to certify that he has sold a falsely high amount of the product. Finally, the government can bribe the government official to increase the level of the subsidy.

The third type of bribery is most in line with the previous model. In this case, we can again assume that the probability of detection for the official is increasing in the distance between the optimal subsidy and the paid subsidy, i.e. $\delta(S - (\phi_L w - B_2))$, where S denotes the post-bribe subsidy. In this case, the combined surplus of the industry and the

government official will equal $\bar{Q}(S + B_2 - \phi_L w) - \delta(S - (\phi_L w - B_2))K$, which has first order condition $\bar{Q} = \delta'(S - (\phi_L w - B_2))K$. Taxpayer welfare under this situation equals $\bar{Q}(B_S + B_2 - S - \phi_L w)$. For high enough levels of B_S this will also dominate private provision without a subsidy.

More interesting for our purposes is the comparison of this situation and welfare under public ownership. Public ownership will dominate subsidy and private provision if $S > \phi_L(\tilde{w} - w)$. This will be less likely to hold if ϕ_L is high or if α is high. This will be less likely to hold if B_2 is high.

IV. Public Ownership and Control in New York City

In this section, I give thumbnail sketches of the history of municipal ownership of a variety of services in New York, with reference to some other cities. My goal is to highlight the factors that seem to be most important in the decision to have the government own and manage these services. In particular, I will look at the importance of three theories of government ownership. First, the corruption theories outlined above. Second, the classic economic theory of natural monopoly (e.g. Marshall, 1890). The natural monopoly theory argues that government ownership is necessary to keep prices away from monopoly levels. Third, there is the quality-shirking model of Hart, Shleifer and Vishny (1997). This model argues that private provision will lead to undersupply of quality, when quality is non-contractible. Private agents will reduce quality to cut costs. Because the government manager faces softer incentives, he may not engage in cost-cutting, quality-reducing innovations. Finally, I will discuss cases that seem to be motivated by purely selfish politicians trying to extend their reach.

I focus on the water supply, sanitation, roads, water, power and light and public transportation. After five longer sections on these services, I discuss three other areas of local government expenditure: the justice system, fire safety and schools.

*Water Supply and Sewers*⁸

Government involvement in New York's water supply dates back to 1666, two years after the Dutch surrender, when the English governor sunk the first public well. Apparently, water, fire and sanitation were the primary responsibilities of the earliest government of New York, the Common Council (Koeppel, 2000). They established a public well system. This stands in contrast to the Dutch who had private wells (most of the water seems to have been turned into beer). It is not obvious if the English preference for public wells came about because of a greater belief in the positive externalities associated with water, or (more likely in my opinion) because wells are large resources that can easily be shared. Presumably, the price of water would have been so at this time that the time involved for a retailer to actually manage the operations of a well wouldn't have been worth it.

In any case, early public wells certainly didn't engender much corruption. After all, the expenditures were so low that there wasn't really opportunity for bribery. They did, however, deteriorate. Again, I am unsure if the depreciation of the public wells came about naturally as a result of rising population levels, or if the public status of the wells meant that no private individuals had a stake in maintaining the wells. In any case, by the 18th century New York's public wells no longer produced good water.

To substitute for the breakdown in the public system, a more sophisticated private system developed. Private wells, set at a distance from the main population center, became the norm. The size of the city, and the rising price of water, now justified a distribution system that involved bringing water down from private wells. Public wells were still important, but they served primarily as an input into fire safety. As Koeppel (2000) writes, "As the laws protecting the public wells and pumps make clear, the greatest interest was in having plenty of water to douse fires." Thus, there was a two-tiered water

⁸ Koeppel (2000) provides an extremely useful history of New York's water, on which this discussion is based.

supply system. Cheap public water from wells in high-density areas served to stop fires, and residents (at least wealthy ones) drank from more distant private wells.

Eventually, the quality of the private wells appears to have deteriorated as well. This may have had an aspect of the Hart, Shleifer, and Vishny (1997) shirking on quality, but it can also be easily attributed, again, to rising density levels. Since waste was deposited on the ground, high-density levels naturally lead to poisoned water. New York also had outbreaks of Yellow Fever which were linked by some to poor water quality.

Government re-entered the water supply market in a significant way with Christopher Colles' project to pipe water from further uptown. This project would have used a large well and a steam engine. It seems that the externalities involved in water supply in combination with the large scale of the project made it seem appropriate for government involvement. Eventually this project was abandoned when the British occupied New York during the American Revolution.

After the revolution, the city tried a private water project. In 1798, New York had a significant Yellow Fever outbreak and public interest in cleaner water increased. However, instead of pure public funding, in this case, they opted for a subsidized private scheme. Aaron Burr and Alexander Hamilton collaborated on the project. It would be a private company with some public funding. The company claimed that it would bring water in from the Bronx. It received two substantial rights in exchange for bringing water. First, it was entitled to rights of eminent domain (mentioned earlier) and second, it was allowed to use its surplus capital in any way that the directors of the company saw fit. This was a substantial right—at this time, limited liability companies were generally extremely restricted in their operation. The substantial political clout of the company's founders overcame initial opposition to these aspects of the company.

In fact, the company did almost nothing with water. It used its surplus capital clause to engage in various more lucrative aspects and skipped the much harder task of bringing in water. In fact, the Manhattan Water Company is the direct ancestor of the Chase Manhattan Bank. While public interest in water came about because of health and

safety, the problems with private provision had already become obvious 200 years ago. Political clout led to substantial gifts to the company with no recompense.

Meanwhile, Philadelphia had begun to move ahead with its pathbreaking water works. There are two aspects of Philadelphia which differ radically from New York. First, it is swamplier and even more innately disease prone. In 1793, approximately eight percent of the city died from Yellow Fever. Second, it is bordered by fresh, not salt, water rivers. As such, large water works were both more necessary and easier. Philadelphia had tried a prior experiment in private, large-scale water works in the Delaware and Schuylkill Canal Company. Like the Manhattan Water Company, this private company also failed to deliver water to the city, despite substantial government subsidization. Under Benjamin Latrobe's leadership, Philadelphia began a large-scale public water works system that was eventually quite successful in delivering water. However, despite high charges for some subscribers, it regularly ran at a loss.

New York moved more slowly. It wasn't until the cholera epidemic of 1832 that the city seriously focused on large-scale public water supply. The Croton Aqueduct was built over a seven-year period, starting in 1835, and its \$11.5 million cost represented a massive investment of government funds. Like Latrobe's works, it eventually delivered clean water efficiently, but it took thirty years more until annual revenues from the water works exceeded expenses (including debt on the fixed costs of construction). After this period, New York has systematically never experimented with private provision of water.

The first public sewer in New York was built in 1703, but large-scale sewers ultimately followed the Croton Aqueduct. They were built by the Aqueduct authority, and essentially always public. Sewers and water supply appear to be complementary enough so that if water is to be provided by a public company, it is sensible for that company to also handle the sewer system.

The provision of water in other cities eventually followed. Boston built its Cochituate system over a nine-year period, starting in 1846. All of these water supply systems were

massively expensive. For example, by 1900, municipal spending on water in the U.S. was significantly greater than all U.S. federal government spending excluding the Armed Forces and the Postal Services.

The corruption story seems to play only a minor role in municipal water works. The main problem seems to be that consumers were unwilling to pay the actual costs of expensive clean water piped in from outside of the big cities. As such, private companies either went bankrupt (like the Delaware Canal Company) or avoided water production entirely (like the Manhattan Company). Public spending was necessary if clean water was to be provided to stop disease. But that doesn't explain why public subsidies of private companies weren't successful.

A first possibility is that people were afraid of the natural monopoly that would be created by large-scale water works. There is certainly some truth to that, and the privately subsidized schemes generally had to agree to some limits on their prices. However, given that it seems that there was nowhere near enough demand to pay for construction, this fear does seem a little misplaced, at least during the early time period.

A second possibility is that people were afraid that the private company would shirk on quality. This may have been an issue at some point, but fears about quality levels don't surround the private companies. At this point, knowledge of water quality was limited, and both government and private providers would have judged the water to be high quality if it came from a clean source far from the city. This would have been quite contractible and observable. A third possibility is the corruption theory. There clearly was something like corruption in the Manhattan Company.

Ultimately, the answer in New York's case is probably that no private company could have been trusted with the levels of subsidy needed to build large-scale water works. After the experience of Aaron Burr, what sensible politician would have voted to trust a private entrepreneur with the \$11.5 million needed to build the Croton? The problem with privately provided, publicly funded, water works was not shirking on the quality of

water. More likely, it was just stealing the money, probably in some semi-legitimate manner. As such, the softer incentives of government ownership seem to have been the only possibility.

Sanitation

Early government involvement in sanitation took the form of regulating private behavior, not public provision. The Dutch have strong street cleaning regulations which compelled private citizens to clean the streets near their homes and forbid dumping certain types of waste into the street. The English later adopted these regulations. While private citizens frequently ignored public regulations, it is clear that the government always saw clean streets as public responsibility. In 1670, the city created a system where cartmen's monopoly (a quasi-guild of transport professionals) were obliged to carry away refuse to keep their monopoly. Essentially, this was private provision with public (indirect) subsidy. This arrangement seems to have persisted until the early 19th century.

In the 19th century, direct public subcontracting appears to have replaced this subsidy system. There were two primary problems with subcontracting. First, as discussed above, subcontractors would frequently bribe public officials to overpay for their services. Boss Tweed's \$40,000 kickback is a classic example. More importantly, corruption led to underprovision of quality. When the machine was required to take competitive bids, it could still dispense favors by overlooking low quality provision. Firms were able to bribe officials to overlook the fact that they underdelivered on their street cleaning obligations. As the sanitation reformer George Soper wrote in 1909, "The contractor is often suspected of wielding, or being subservient to, political influence." The resulting poor quality of sanitation led to a public outcry for reform and indeed for public street cleaning. The Department of Street Cleaning was established in 1881, but there seems to have been little real innovation until Tammany was ousted, albeit briefly, in the 1890s.

In 1895, the Waring era began. In response to public outcry, the reform administration of William Strong brought in the sanitation expert Colonel George Waring to run the city's street cleaning department. Waring was a visionary reformer who dressed his street cleaners in white and created a quasi-military operation. He seems to have created a remarkable efficient, honest system at least for his period in office. While he did not outlast the reform administration, public street cleaning was firmly established. Tammany Hall was unlikely to lose this attractive source of political patronage.

The case for public involvement in street cleaning is based on the massive externalities associated with filth. In principle, street cleaning could be handled by subcontracting cleaning to private providers. Indeed, within the U.S., as Lopes-de-Silanes et al. (1997) show, private contracting is quite common. However, private contracting creates the problem of bribery, overpayment and underprovision. Public provision was seen as a means of fighting these problems, and at least briefly, it was successful.

Streets and Roads

While private roads have certainly existed, streets and roads have generally been public responsibilities. This presumably occurs because the administrative costs of tolls have usually been too high to have a functioning private road system in most cases. In New York City, the government has always taken responsibility for roads. New York's famous grid system was laid out by the government. I have already discussed street cleaning and I will discuss street lighting in the next section. Here I briefly discuss road construction, i.e. paving.

As in the case of street cleaning, colonial governments originally tried to handle paving through regulation. In 1684, New York's common council ruled that streets be paved by adjacent property owners. This regulatory era was generally marked by enforcement problems as private owners often disregarded the relatively weak powers of municipal government. The parallel with street cleaning is close. Eventually, the state directly began paving streets itself. This public involvement would continue through our day.

The primary public/private distinction in road building has therefore been the issue of subcontracting. Progressive era reformers frequently complained about street paving contracts; the 1911 Mayor's Committee on Pavements reported "there can be no doubt that much of the trouble with our pavements has been due to long term maintenance contracts." The subcontractors were seen as shirking on quality and public provision was put forward as a remedy. It is possible that the desire for public provision came from true contracting difficulties. However, it is relatively easy to write a contract with quality provisions in this area. It is more difficult to enforce the contract, if city officials are subject to bribery. As the street paving interests were certainly well connected politically, I certainly suspect that the bulk of the quality problems came more from corruption than from standard contracting problems.

Mass Transit

According to legend (Cudahy, 1990), mass transit began in New York city in the 1740s as ox carts carried passengers up and down Broadway. True fixed-route transit lines, however, did not begin until 100 years later. In 1827, Abraham Brower pioneered mass transit in the Americas with a stagecoach that ran from the Battery to Bleeker Street along Broadway (a 1.75 mile). By 1831, Brower had three vehicles and the largest of them was referred to as an omnibus (the term was borrowed from Paris). These buses just used city streets, like any other vehicle.

In 1832, the New York and Harlem Railroad pioneered, these buses main competitors—the street railroad. These railroads were horse drawn carriages that used rails set in city streets. In the cobblestone era of street paving, this represented a massive advance over buses. Cars with metal wheels moving along rails were much more comfortable and much easier to move than buses. While eventually these rails would use electricity and steam, for the first fifty years street railways were horse-drawn. Still, the New York mayor in 1832 thought that the recently-patented street railways represented such an

improvement over other technologies that “this event [the first street railways] will go in history of our country as the greatest achievement of man” (Cudahy, 1990).

While both omnibuses and street railways used city streets, street railways actually physically altered the streets by covering them with rail. The rail itself, even when not in use, posed a barrier to other forms of transportation. The rails blocked both wheels and sleighs and were clearly something of an impediment to other forms of travel. Cudahy (1990) describes ferocious conflicts between private citizens who were used to using sleighs in the winter and street railway companies. Since the railroad companies had to clear the snow around their rails, the sleigh-users were blocked from these roads. While the rail beds themselves were an inconvenience to others, railways also were legally given rights-of-way on their rail beds. Thus, the use of rail imposed costs of citizens who were walking or using horses.

In principle, of course, the market is supposed to efficiently allocate resources between two consumers with competing claims. The city governments could have made some attempt to appropriately charge the railway companies for the costs that they imposed on the public as a whole. As described earlier, the traction magnates were given the use of city streets for usually nominal fees. They received long franchises (including perpetual or thousand-year franchises) to use city streets at little official cost. Of course, unofficially they would end up paying significantly in bribes to government officials. In almost every major city in the country, there appears to have been at least some bribery associated with street railways franchises.

Eventually horses were replaced by other technologies. First, cable cars were used. In this technology, cars were pulled along tracks by cables, which were in turn pulled by steam engines. Second, electricity revolutionized the industry between 1890 and 1902. These innovations required other publicly supplied inputs. Electricity was either run using overhead current and third rails. The poles that provided the current clearly also imposed some public costs (visual externalities, perhaps). Both technologies led

occasionally to socially costly accidents for which the traction companies were only rarely fined.

The transit industry in the street railway era was fairly decentralized. At the turn of the century, there were 415 firms in the street railway association (Cudahy, 1990). Eventually, individual cities moved toward concentration, mainly as entrepreneurs tried to seize monopoly profits. Overall though, there seems to have been little natural monopoly at this stage in the transit industry. Indeed, even when the city began the 25-year process of moving from private to public transportation between 1934 and 1960, the New York City streetcar and bus industry had a large number of independent firms. It is also clear that the Hart, Shleifer and Vishny (1997) theory of public ownership had little relevance in this market. Quality in street transport is observable and firms competed regularly on ride quality.

Of course, in the 19th century, public transit began using more than just the streets. In the 1860s, New York began using elevated railways. Later subways would begin playing a bigger role in America's larger cities. In these situations, the possibility of true natural monopoly seems to have been more important. However, corrupt sale of railway franchises also seems to have been extremely important. After all, New York began its elevated railways in the days of William Marcy Tweed.

New York's first elevated railway was built by Charles Harvey in 1867-1870. Harvey's company used cable technology and failed, but the tracks were taken over by the New York Elevated Railroad Company which used steam. In the 1870s, a competing elevated railway company—the Gilbert Elevated Railway—began operating on Second and Sixth Avenues. Eventually, these railways consolidated, and Jay Gould ended up running a large elevated railway consortium in New York City. Competition would continue in this industry, but there is no question that the elevated networks had greater returns to scale than the streetcar lines.

In general, the elevated rails paid nothing in New York for running lines over city streets, despite the fact that these elevated imposed large social costs on the properties that abutted their lines. Indeed, eventually LaGuardia would tear down elevated rails to increase property values in the area. There was some attempt to limit rail fares as a means of extracting some rents to compensate for the use of previously public airspace. However, most of the attempts to reduce fares were defeated by the politically powerful rails.

This situation of free airspace can be contrasted with Chicago. In Chicago, statute required that a majority of abutting property owners would have to agree to the building of elevated railways. This policy explains why Chicago's elevated railways were generally built on alleys rather than on main thoroughfares. Pricing space seems in this case to have led to less socially costly elevated rails.

The final major type of mass transit is the subway. The first New York subway was built in 1870 by Alfred Beach. However, attempts to expand the small pneumatic tube were blocked by Boss Tweed who saw this as a threat to his interests in surface transit. At this time, a free 100-year franchise for a tunnel railway was given to Cornelius Vanderbilt. Again, public rights were given away to an entrepreneur for free. However, New York's first subway wasn't built in 1900. This construction was financed jointly by public and private funds. Essentially, the public sector paid for the large costs of building the tunnel which was then leased to the private company for far less than its cost. Again, bribery appears to have been rampant.

Again, there were a limited number of subway companies in New York (relative to streetcar companies). At the time when Mayor John "Red Mike" Hylan tried to move to municipal rail, there were two dominant companies (the IRT and the BMT). The returns to scale were again much larger. Hylan implemented his own public rail system by building the Independent Subway System (IND). Eventually, restrictions on fares, union wages and competition from the public sector would push the private subways into

financial difficulties. Eventually, in 1940, the city bought both of the subway companies and ended private subways in New York.⁹

There were clearly several things that led to public ownership of transit in New York, and the U.S. as a whole. There was certainly some truth to the argument that rail is a natural monopoly and public ownership can eliminate monopoly pricing and profits. Hylan was also clearly an empire builder, and state ownership may have much to do with his desire to expand the size of government. However, there is no doubt that the sentiment for public ownership in transit had much to do with corruption in the industry. Transport companies received a tremendous amount of public inputs at below cost. They received the use of the streets in the case of streetcars and elevated rail. In the case of subways, the government actually paid for the construction of the tunnels. In all of these cases, there was at least the appearance that corruption led to underpaying for these inputs, and this fueled the popular desire for public ownership.

Power and Light

Large-scale utility companies in New York began in 1823 when the New York Gas Light Company got a 30-year franchise to lay gas pipes underground. A number of gas companies soon followed. These companies interacted with the city in two important ways. First, they used city resources, as their pipes went under city streets. As usual, “the gas companies have usually obtained their franchises for the asking, and practically no revenue has been derived from this source” (Bemis, 1904). Second, they sold gas to the city for use in street lamps (and public buildings). It seems that in this case, the city both underpriced its inputs and overpaid for the companies’ output.

In the 1880s, electricity began to replace gaslight. The city granted perpetual franchises to the electricity companies, generally for free. Again, there were initially a large number of companies competing in the provision of this commodity. Eventually, consolidation in

⁹ Other public transit facilities also owed their existence to public buyouts of private companies. For example, Boston bought its ferries in the 1840s when they were in financial trouble. In this case, the

the industry occurred, and now Con Edison provides almost all of the electricity in the city. The combination of scale economies and standard gains from monopoly clearly motivated this trend.

Other cities began to operate public utilities themselves. This public provision generally began as a means of providing power for street lamps, and other public purposes. Reformers, such as Pingree, thought that private provision led to overcharging, mainly because of political corruption. Indeed, Detroit's public electric plant lowered costs significantly to both public and private customers. In New York, regulation rather than public ownership was the norm. This regulation was regularly aimed at reducing prices and refunding "excess" profits by the utilities to the public in the form of lower prices. As usual, political influence limited the extent to which lower prices ever materialized. As Plunkitt writes, "Since the eighty-cent gas bill was defeated in Albany, everybody's talkin' about senators bein' bribed" (Riordan, 1995).

Why didn't New York ever move to public ownership of the utilities? As Wilcox (1910) wrote, "The only interesting thing about the electric light and power franchises of New York City is the magnitude of the privileges involved and the absence of any appreciable restrictions upon the companies for the protection of the public interest." One might think that the size of New York City might have made competition more possible, and thus public ownership less necessary. But while competition certainly was possible (it existed during an earlier era), it didn't exist. My best explanation of this fact is that Con Edison was just too powerful to touch. In the early years, it was controlled by Rockefeller interests and it would have been very difficult to fight. Of course, the perceived (and quite true) costs of public ownership also must have dissuaded reformers from public provision of these utilities.

buyout can be seen as a transfer to the private companies as a result of their political influence.

Other Services: Justice, Fire Safety, Charity and Schools

The justice system has always had an overwhelming public component, although private protection is also common. Since the dawn of recorded history, rulers have tried to maintain their control of the justice system. There is a clear public good aspect to protecting property right. Private police forces will have a tendency to exploit their physical power. Indeed, the market system often depends on the existence of disinterested courts. As such, police and courts have always been run by the government in New York and elsewhere. Of course, corruption has also been rampant in these areas, but there really isn't a feasible private alternative.

In the U.S., fire safety began with volunteer regiments. These groups would be subsidized by the state. For example, volunteers were often exempted from jury duty and their equipment was paid for by the state. Corruption was a problem in volunteer fire departments as money meant for equipment got spent elsewhere. William Marcy Tweed got his start as a volunteer fireman. As New York grew, and as the gains from having a specialized fire department increased, volunteers were replaced with professional departments. The government's interest in fire safety is natural. There are massive externalities associated with fire. Indeed, history is full of great cities being demolished by rampant flames (e.g. the great Chicago fire of 1873, the New York fire of 1835).

As such, the government must at least subsidize fire prevention. In principle, subcontracting to private providers is a possibility, but here the analysis of Hart, Shleifer and Vishny (1997) seems apt. Given the difficulties that would be relating to contracting on quality, private providers would be likely to shirk. Low quality is observable only when a true disaster strikes and limited liability may mean that private providers are comfortable taking the risk that their low quality gets exposed in rare events. Public provision was necessary to keep quality up.

Larger cities have often spent a considerable amount on charity. For example, Boston in 1825 spent 25 percent of its budget on poor relief. More recently, redistribution to the

poor has often taken the form of public housing and public hospitals. Often public redistribution was motivated by a desire to eliminate social problems associated with extreme poverty. Of course, public charity is also often an appeal to poorer voters. Redistribution is not really a service, and as such I don't really view public redistribution through the same lens as the other services. This is not really a service, but rather conventional redistribution, and public provision doesn't really have much to do with any one of the three models.

Finally, there is the question of public provision of education. City governments have provided public schools since the nation's beginning. The case for government subsidy of education has always been based on the claim that it creates positive externalities of one sort or another. The case for government ownership and control has always been less clear. Schools don't seem to be a natural monopoly. The Hart, Shleifer and Vishny (1997) model doesn't seem to apply, as it is hard to argue that public ownership and control improves school quality. Of course, if quality is defined as adherence to the government's ideal curriculum, then perhaps this might have some importance. It is conceivable that the difficulties with governmental subsidization, highlighted above, may have played some role in public provision, i.e. perhaps it was hard for early Americans to effectively subsidize education without directly providing it, because of the openings for corruption. Ultimately, I don't really understand why schooling has long been such a big part of local government budgets. I hope future work in this area will clear up my confusion.

V. Conclusion

This paper has argued that corruption was a major force leading to support for municipal ownership in the United States. When private firms buy or sell from the government, there are large opportunities for corruption, and the government will often overpay for privately-provided goods or under-charge for publicly provided inputs. Public ownership provided one means of fighting this problem. Of course, public ownership creates its

own problems. On top of the incentive problems that are usually discussed, corruption will lead publicly owned firms to overpay for their own inputs, especially labor.

Can this analysis help us to think about the appropriate level of public ownership today throughout the world? Within the U.S. and most of the developed worlds, the weapons against corruption are much stronger today than they were in 1900. Few public governments could engage in the kind of practices that were the norm during the Gilded Age. As such, the corruption-eliminating advantages of public ownership have diminished steadily within the U.S. and anywhere else where corruption is limited.

However, in the developing world, it may be that the 19th century United States still provides valuable lessons. In countries such as the transition economies or much of Latin America, corruption is still more the norm than the exception. The justice systems are weak, and there is often no independent press to rake the muck. In these places, municipal ownership may still have some value as a means of reducing corruption. However, even in these areas, it must always be recognized that there are serious costs, including corruption, as well as benefits associated with public ownership.

Appendix: Proofs of Propositions

Proof of Proposition 1: Differentiation and using the convexity of $\delta(c_p - \tilde{c}_p)$ yields:

$$\frac{\partial \tilde{c}_p}{\partial \phi_p} = -\frac{\bar{Q}}{K\delta''(c_p - \tilde{c}_p)} < 0, \quad \frac{\partial \tilde{c}_p}{\partial \bar{Q}} = -\frac{\phi_p}{K\delta''(c_p - \tilde{c}_p)} < 0 \quad \text{and} \quad \frac{\partial \tilde{c}_p}{\partial K} = \frac{\phi_K \bar{Q}}{K^2 \delta''(c_K - \tilde{c}_K)} > 0.$$

If we let $\delta(c_p - \tilde{c}_p) = d_0 * d(c_p - \tilde{c}_p)$ and differentiate with respect to d_0 we get:

$$\frac{\partial \tilde{c}_p}{\partial d_0} = \frac{d'(c_p - \tilde{c}_p)}{d_0 d''(c_p - \tilde{c}_p)} > 0.$$

Proof of Proposition 2: Since $\delta'(0) = 0$, and $\delta''(x) > 0$, for $x < 0$, there will be positive levels of corruption in both public and private firms. In the case of private firms, corruption leads to underpaying for inputs, which leads to positive profits. In the case of public firms, corruptions leads to overpaying for output which leads to negative profits.

Proof of Proposition 3: First, the derivative of $(c_p - \tilde{c}_p)\phi_p \bar{Q}$ with respect to ϕ_p equals $(c_p - \tilde{c}_p)\bar{Q} - \phi_p \bar{Q} \frac{\partial \tilde{c}_p}{\partial \phi_p} > 0$, since $\frac{\partial \tilde{c}_p}{\partial \phi_p} < 0$. When ϕ_p equals zero, the social costs from

private ownership are zero. When $\phi_p = \phi_L + (\phi_L \bar{Q})^{1-\alpha}$, social losses from public ownership are less than the losses from private ownership because $\phi_p \bar{Q} \delta'^{-1}(\phi_p \bar{Q} / K) = (\phi_L + (\phi_L \bar{Q})^{1-\alpha}) \bar{Q} \delta'^{-1}((\phi_L + (\phi_L \bar{Q})^{1-\alpha}) \bar{Q} / K) > \phi_L \bar{Q} \delta'^{-1}((\phi_L \bar{Q})^{1-\alpha} / K)$.

The last inequality follows because $\frac{d\delta'^{-1}(x)}{dx} = \frac{1}{\delta''(\delta'^{-1}(x))} > 0$. As social losses from

public ownership are above those of private ownership when ϕ_p equals zero and below those of private ownership when ϕ_p is sufficiently high, and social losses from private ownership are monotonically increasing in ϕ_p , then continuity ensures that there exists a value of ϕ_p such that the losses from private and public ownership are equal. At the point where the social losses are equal: $\phi_p * \delta'^{-1}(\phi_p * \bar{Q} / K) = \phi_L \delta'^{-1}((\phi_L \bar{Q})^{1-\alpha} / K)$. The right hand side of this equation is increasing in ϕ_L and the left-hand side is increasing in $\phi_p *$, so if ϕ_L rises, then $\phi_p *$ must rise as well. Higher levels of α will cause $(\phi_L \bar{Q})^{1-\alpha} / K$ to fall, so $\phi_p *$ will fall as well.

Proof of Proposition 4: It is clear that $\bar{Q}(B_S + B_2 - \phi_{\gamma_L} \tilde{w})$ is strictly increasing in $B_S *$ and that for high enough values of B_2 , this level of welfare is strictly positive. When

$B_S = \phi_L w - B_2 + \varepsilon$, then the social welfare under public provision equals $\bar{Q}(\varepsilon - \phi_{\gamma_L}(\tilde{w} - w))$, and for ε arbitrarily small, this quantity must be strictly negative, and thus lower than social welfare under private provision. As such, by continuity, there must exist a value of B_S where the two welfare levels are equal. As the value of B_S^* satisfies $B_S^* = \phi_{\gamma_L} \tilde{w} - B_2$, simple differentiation tells us that B_S^* is rising with ϕ_{γ_L} , rising with \bar{Q} , falling with K , falling with B_2 and rising with α .

References

- Atkinson, A. and J. Stiglitz (1980) *Lectures on Public Economics*. London: McGraw Hill.
- Bemis, E. (1904) *Municipal Monopolies*. New York: Thomas Cromwell.
- Boyko, M., A. Shleifer and R. Vishny (1996) "A Theory of Privatization," *Economic Journal* 106: 309-319.
- Cudahy, B. (1990) *Cash, Tokens and Transfers: A History of Urban Mass Transit in America*. New York: Fordham University Press.
- Darwin, L. (1907) *Municipal Ownership*. New York: E.F. Dutton.
- Ellis, E. (1966) *The Epic of New York City: A Narrative History*. New York: Kodansha.
- Glaab, C. and A. Brown (1967) *A History of Urban America*. London: Macmillan.
- Glaeser, E. and A. Shleifer (2001) "The Rise of the Regulatory State," Harvard University mimeograph.
- Hart, O., A. Shleifer. and R. Vishny (1997) "The Proper Scope of Governance," *Quarterly Journal of Economics* 112 (4): 1127-1162.
- Holli, M. (1969) *Reform in Detroit*. Westport: Greenwood.
- Huse, C. (1916) *The Financial History of Boston*. Cambridge: Harvard University Press.
- Judd, D. and T. Swanstrom (1994) *City Politics*. New York: Harper Collins.
- Josephson, M. (1934) *The Robber Barons*. New York: Harcourt.
- Koeppel, G. (2000) *Water for Gotham: A History*. Princeton: Princeton University Press.
- Lopes-de-Silanes, F., A. Shleifer. and R. Vishny (YEAR?) "Privatization in the United States," *Rand Journal of Economics* 28 (3): 447-471.
- Pashigian, P. (1976) "Public Ownership of Urban Transit Facilities," *Journal of Political Economy* 84 (6): 1239-1259.
- Riordan, W. (1995) *Plunkitt of Tammany Hall*. New York: Signet.
- Shleifer, A. and R. Vishny (YEAR?) "Politicians and Firms," *Quarterly Journal of Economics* 109: 995-1025.
- Stigler, G. (1971) "The Economic Theory of Regulation," *Bell Journal of Economics* 2: 3-21.

Soper, G. (1909) *Modern Methods of Street Cleaning*. New York: The Engineering News Publishing Company.

Steffens, L. (1904) *The Shame of the Cities*. New York: McClure, Phillips.

Wilcox, D. (1910) *Municipal Franchises*. Rochester: Gervaise.