

Contracting for Government Services: Theory and Evidence from U.S. Cities*

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Abstract

Local governments can provide services with their own employees or by contracting with private or public sector providers. We develop a model of this “make-or-buy” choice that highlights the trade-off between productive efficiency and the costs of contract administration. We construct a dataset of service provision choices by U.S. cities and identify a range of service and city characteristics as significant determinants of contracting decisions. Our analysis suggests an important role for economic efficiency concerns, as well as politics, in contracting for government services. *JEL* codes: D23, D73, H11, L33.

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1. Introduction

The last twenty-five years has seen intense debate about whether the private sector can provide a variety of public services more effectively than the government. The debate has touched on services ranging from education, healthcare and transportation to trash collection and street repair. In addition to the normative question of what role government should assume in providing services, it has also raised the positive question of what determines government privatization decisions in practice.

There are at least two accounts of government privatization decisions. One view, which focuses on transaction costs, looks by analogy to the private sector “make or buy” decision (e.g. Williamson, 1985; Hart, Shleifer and Vishny, 1997). In this account, privatization is dictated by efficiency considerations. An alternative view, advanced by Boycko, Shleifer and Vishny (1996) among others, emphasizes the private benefits to politicians of keeping service provision inside the government. This view holds that privatization tends to occur only in response to external pressure such as citizen discontent or tight budgets. An analogous account of the private sector would emphasize the private benefits of control that accrue to managers, and the role of shareholders in disciplining managers.

In this paper, we study the determinants of privatization at the level of U.S. city government. City government is a useful level at which to study privatization for several reasons. First, we observe many cities making decisions about service provision in parallel; in this sense cities are a useful laboratory for making statistical comparisons. Second, cities provide a wide range of services: from mundane services such as street repair and trash collection to complex services such as law enforcement and education. Third, cities differ in a variety of interesting ways — by size, location, economic conditions and form of government. Finally, local government service provision is important from both an economic and public policy standpoint. Local government spending (counties and cities) equals about one percent of GDP in the United States, so there are potentially large gains to be realized from efficiency improvements.

We start by developing a simple model of procurement in which a government must arrange delivery of a service from an agent. The government can write a contract that specifies the time the agent must spend on the job and a set of performance requirements. We assume that specifying and enforcing a time requirement has minimal cost, but that there are non-trivial costs to establishing and maintaining a set of performance requirements. Provided the government cares only about what is actually delivered, we show that an

optimal contract must take one of two forms. The government either pays the agent for meeting a minimal time requirement or for meeting a performance requirement, but not both. We view these forms of contracting as capturing, in a rough way, the two most common ways that governments provide services: inhouse provision using salaried city employees and performance requirements contracts with private sector firms.

In our model, governments face a choice between inhouse provision, where employees are compensated for their time, and performance contracting, where the provider is paid upon compliance with performance measures. In house provision suffers from productive inefficiency due to the weak incentives of employees, but enjoys low contracting costs. In contrast, the productive efficiency of performance contracts come at the cost of specifying and implementing performance requirements. This leads to predictions about how privatization decisions will vary across services. Services for which it is harder to write, monitor or adjust performance standards are more likely to be provided inhouse. The same will be true of services for which city administrators are more sensitive to the ultimate quality provided.

We also argue that the trade-off identified in the model will play out differently across cities. For instance, cities may need to be a certain size to produce a given service inhouse with any sort of efficiency. Moreover, if the relevant city administrator is more politically motivated, he or she may place more emphasize on the benefits provided by supplying a service in a certain way (e.g. from higher quality service or from satisfying the demands of a union) and less on the costs of service provision. We show that this will lead to less privatization.

We use the theoretical model to motivate an empirical analysis of privatization by U.S. cities. For obvious reasons, we cannot approximate a large-scale randomized research design that would allow us to quantify precisely how changes in contracting costs or city characteristics affect contracting practices. Rather what we can do is document broad patterns in contracting practices and relate them to our model and other ideas proposed in the theoretical literature. We take this as the goal of the empirical work.

Our analysis makes use of survey data collected by the International City/County Management Association (ICMA). The data documents how a set of just over a thousand U.S. cities provide a range of services, from public works and transportation (road construction, street cleaning, residential and commercial waste collection), to safety (fire, police, emergency services), health and human services, parks and recreation, cultural programs and administrative support functions. Over eighty percent of services are provided either in-

house or through contracts with private sector firms. A smaller but still significant set of services is provided through contracts with other public agencies. We view public contracts as somewhere between the inhouse and private contract extremes — for instance, a substitute for inhouse provision for a city that is too small to provide a certain service effectively, or alternatively, a way to contract for a service while still retaining somewhat more control over production than may be the case with a private provider.

We complement the data on service provision with data from U.S. Census and other sources that describe city demographics, form of governance, political leanings, and so forth. Of course, a central prediction of our theory is that difficulties in specifying and administering performance requirements are likely to reduce privatization. To quantify these difficulties, we surveyed a set of city administrators, asking them to assess thirty city services along a number of salient dimensions. We use this data to construct a measure of performance contracting difficulty.¹

Our main empirical findings can be summarized as follows. First, services for which it is harder to write and administer performance contracts are less likely to be privatized. The effect is substantial. A one standard deviation change in contracting difficulty is associated with a change in the probability of being privatized of eight percentage points — that is, a forty percent reduction in the likelihood of privatization. The relationship is greater for larger and more urban cities. One explanation is that these cities have the resources to use inhouse provision and perhaps also a more readily available pool of external providers. Newer cities also appear to be more sensitive to contracting difficulty, consistent with a view that governance in these cities is less political, perhaps due to a smaller public union presence, and more focused on economic trade-offs.

We also find that services that are less frequently provided, and which managers rank lower in terms of resident sensitivity to quality, are more likely to be privatized. An interpretation in line with our model is that for these services city administrators focus more on the costs of provision rather than the benefits.

In addition to the variation across services, our data reveal substantial variation in privatization patterns across cities. For instance, cities in the western states are considerably more likely to contract for service provision, both to the private and the public sector. A similar pattern is observed for newer cities. We also find a striking pattern in city size. The smallest

¹Our implicit assumption is that dimensions of contracting difficulty are largely related to service characteristics, rather than being highly idiosyncratic to a given city-service pair. As we discuss below, this view is supported by a tight correlation between the survey responses of different city managers.

cities are the most likely to contract with other public agencies, perhaps to take advantage of economies of scale. At the same time, large cities make the greatest use of privatization, and are the least likely to provide services inhouse. As noted above, we also find evidence of political effects. Cities run by an appointed manager, rather than an elected mayor, are more likely to contract for service provision, although the effect is relatively modest.

We find some evidence of spillovers within cities in the use of private sector contracts. Common wisdom among city administrators is that familiarity and experience with writing and administering contracts lowers the costs of using contracts for any given service. Consistent with this, we find that after accounting for city size and location, cities are more likely to contract for any given service if they have more experience with private sector contracting on other services. To separately identify this spillover effect from differing city-level propensities to privatize, we use an instrumental variables strategy that exploits plausibly exogenous variation in the mix of services each city provides. We explain the empirical approach in detail in Section 5.

The bulk of our analysis focuses on identifying city and service characteristics that are associated with privatization. In the final section, we provide some suggestive evidence on the relationship between privatization and city expenditures. We document that controlling for the mix of services that cities provide, cities that do more private sector contracting spend notably less per capita. Though we cannot hope to infer causality given the available data, the result is at least consistent with our modeling approach and suggests possibilities for future research.

Overall, our results indicate that a simple transaction cost based view of privatization provides a useful framework for explaining local government contracting patterns, at least at the level of U.S. city government. It is worth noting that our results do not allow us to distinguish very clearly between the distinct sources of transaction costs that have been suggested in the theoretical literature. In particular, when we try to separate out problems with performance measurement, the potential for holdup, and the desire for control and flexibility, we find our survey measures of these problems to be so highly correlated across services as to be essentially impossible to disentangle. This suggests to us that trying to separate these issues empirically is likely to be a difficult task.

We view this paper as contributing to both the economics literature on contracting and integration decisions and the public administration literature on city practices.² In particu-

²Our paper also relates to the broader and extensive literature on privatization, much of which has focused

lar, our modeling approach draws heavily on Williamson (1975, 1985) and Holmstrom and Milgrom (1991), in particular Holmstrom and Milgrom’s idea that employment is characterized by the employer prohibiting the agent from certain tasks — that is, dictating what are permissible activities during a contracted time.³ More broadly, we follow Sclar (2000) and Warner and Hebdon (2001), among others, in taking a transaction cost-based view of local government privatization decisions. In this line of work, the papers most closely related to this one are by Brown and Potoski (2003a,b), who also collect an original survey with an emphasis on contracting difficulties. We discuss the relationship between our results and theirs later in the paper.

In terms of studying political variation across local government, Lopez-de-Silanes, Shleifer and Vishny (1997) use U.S. Census data to relate contracting patterns to government characteristics at the level of U.S. counties. They emphasize that state laws restricting political hiring or imposing budget constraints on local governments might affect contracting choices. To relate our empirical findings to theirs, we perform a similar exercise using cross-state variation in state laws at the level of city contracting. We defer a detailed comparison until Section 6.

2. Local Government Service Provision: An Overview

A typical city in the U.S. provides about 40 distinct services, ranging from public works (street repair and garbage collection), to public safety (police and fire), to animal control and maintenance of public recreation areas. Many city services are relatively labor intensive. Capital equipment required to provide services (e.g. police cars, fire trucks) tends not to be highly specialized to a particular city, although there are exceptions, such as municipal libraries, hospitals or sewage treatment facilities.

City services are provided by a combination of city employees and private and government contractors. Exactly what services a city government is responsible for providing often depends on a variety of historical and institutional factors.⁴ Once provision is decided, however, city administrators have some flexibility in determining how best to provide a

on privatization at the level of national governments. The collection edited by Bailey and Pack (1995) is one entry point to this research.

³There is some recent empirical work that studies the relationship between multi-task problems and make-or-buy decisions in the private sector. See, e.g., Baker and Hubbard (2003).

⁴These can be quite idiosyncratic. For instance, the city government of Stanford’s neighbor, Menlo Park, California, is not responsible for the city’s fire department, which instead is run by an independently elected commission.

given service. The city managers to whom we have talked all emphasize that both economic and political factors go into their decisions.

There is variation across cities in the form of governance. The two most common forms for city government are Council-Manager and Mayor-Council (other forms of governance such as town meetings and direct ballot referendums are relatively rare). A Council-Manager government consists of an elected city council that is responsible for city policies, and a professional city manager, appointed by the council, who is responsible for administration. The city council is generally prohibited from interfering with the city manager's administration, but can remove the city manager at any time. In contrast, a Mayor-Council government consists of an elected mayor who serves as the city's chief administrative officer and an elected council that forms the city's legislative body. Cities with a mayor may also appoint a professional city manager, but the mayor has authority over city operations. Whether a city government is headed by an appointed manager or an elected mayor, there is typically a hierarchy of department managers responsible for service delivery. Contracting decisions generally are made by the mayor or manager together with the department head who bears responsibility for implementing the decision.

The ICMA surveys provide a snapshot of how city services are provided. The 1043 cities in our sample provide a total of 41,227 city-service observations. Of these, 60% were delivered using only city employees, 20% were provided using at least some private sector contracts, 12% were provided through contracts with another public agency, such as the county or a neighboring city,⁵ and 4% were provided by less common channels, such as franchises, vouchers, or volunteers.⁶

As our analysis in this paper is purely cross-sectional, it is worth commenting on general trends in city contracting. Despite many popular press stories about public school contracts and other high-profile privatization decisions, data from ICMA surveys performed at five year intervals between 1982 and 2002 show little evidence of any aggregate trend in contracting behavior. Ballard and Warner (2000) and Hefetz and Warner (2004) argue that decisions to contract out services are balanced by decisions to bring contracted services back in-house. Based on this evidence, we will adopt the view that the broad pattern of city contracting is

⁵In some states, cities may also form partnerships to provide services. For instance, in California, two or more public agencies may join together under a joint powers authority (JPA) to provide a service. Fire protection in San Mateo is provided by such an arrangement. We consider this a form of public sector contracting.

⁶These numbers sum to less than one hundred percent because for about four percent of city-service pairs the method of provision is not recorded in our data.

roughly stationary, though individual cities are adjusting on the margin.

3. Contracting for Services: Theory

We model the choice between external contracting and internal service provision as one of contractual form, where we associate external contracting with the use of detailed contracts specifying performance requirements, and internal provision with the use of salaried employees. This view seems particularly appropriate for local government service provision; it may also be useful for thinking about private sector make-or-buy decisions, an issue explored in more detail in Levin and Tadelis (2007).

The model establishes a sharp trade-off between productive inefficiencies that arise from using salaried employees and the costs of specifying and administering more productive performance contracts. This leads to a clear set of empirical predictions on which to base our empirical analysis. In this sense, we view the model as a useful advance over less formal transaction-cost arguments.

A. Technology, Endowments and Preferences

A city administrator, or principal, wishes to procure one unit of a good or service from an agent. The city administrator cares about service quality and the costs of provision. We interpret “quality” broadly and say that output is of higher quality if it produces more gross surplus. For example, the quality of street repair is higher if potholes are fixed in a timely manner. Similarly, police services will exhibit higher quality if there is a faster and more adequate response to the various public safety problems that arise.

To capture the idea that the value of higher quality can differ across cities and services, we let s denote the administrator’s sensitivity to service quality. Sensitivity may be a result of pressure from city residents or other political constituencies. If the quality provided is q , the sensitivity is s and the costs of provision are k , the principal’s net benefit is $V(q, s) - k$. We assume that $V_q(q, s) > 0$ and $V_{qs}(q, s) > 0$. The latter condition means that a city administrator with a high value of s is willing to spend more to secure an increase in quality; that is, she cares more about service benefits relative to costs. To guarantee a unique optimal contract, we also assume that there are decreasing returns to quality, so $V_{qq}(q, s) < 0$.

For simplicity, assume that labor is the only variable input relevant for the quality of service that is provided. Specifically, assume that service quality is given by the production function $q(e, t) = (\rho + e)t$, where $t \geq 0$ is time spent on the job, $\rho > 0$ is baseline productivity

and $e \geq 0$ is the agent's effort intensity (e.g. attention to detail, problem-solving activities, or physical exertion).

The agent is endowed with T units of time that can be allocated between working for the principal and working in an outside competitive labor market. The outside job requires no effort intensity and pays a reservation wage $r > 0$ per unit of time. The agent has preferences over income and labor costs. If he is paid $w \geq 0$ and spends t hours on the job at an effort intensity e , his utility is $w + (T - t)r - c(e)t$.

B. Contracting on Time and Performance

Following common practices in procurement, we assume that the principal can write a contract that specifies two requirements: performance and time spent on the job. For instance, if the principal wanted the agent to provide landscaping services, the contract could specify performance requirements such as the frequency for trimming certain trees and bushes, the amount of weeds allowed per square yard, and what composition of fertilizers were to be used. Alternatively, the contract could specify that the agent spend forty hours a week providing landscaping services as directed by the principal. While time and performance requirements are contractible, however, we assume that labor intensity is not. This implies that the agent will always have some discretion over how hard to work.

A contract therefore is a triple $(\hat{w}, \hat{q}, \hat{t})$, where \hat{t} specifies a minimum amount of time the agent must spend on the job, \hat{q} specifies is a minimum quality standard, and \hat{w} specifies the amount the principal will pay the agent if the time and performance standards are met.

We make an important, and in our view realistic, assumption that there are costs both to write and enforce contracts. To keep things simple, we assume that the costs of specifying and monitoring compliance with \hat{t} are almost negligible, but it is costly to specify and verify compliance with a quality standard \hat{q} . For example, to meet certain quality thresholds several things may need to be described in advance, such as lists of instructions and ex post measurement procedures (Bajari and Tadelis, 2001). Furthermore, to verify the delivery of \hat{q} the principal will often have to rely on a certain monitoring and measurement technology that has its own set-up and operating costs (Barzel, 1982).

We assume that to specify a minimal standard of \hat{q} , the principal must expend costs equal to $d(\hat{q}, m)$. The parameter m is intended to capture difficulties in contracting, such as the difficulty of describing performance requirements ex ante or adjusting them over time, or the difficulty of measuring and monitoring quality. Accordingly, we assume that $d_m > 0$.

We also assume that $d(0, m) = 0$ and $d_{\hat{q}} > 0$, so that specifying and monitoring a higher quality standard is more costly, but there is no cost if no standard is specified.

C. Optimal Contracts: Employment versus Specific Performance

Suppose the principal and agent agree to a contract $(\hat{w}, \hat{q}, \hat{t})$. If the agent intends to honor the contractual requirements, he faces two constraints. The *employment constraint* states that he must spend at least the specified amount of time on the job, $t \geq \hat{t}$; the *performance constraint* states that he must deliver at least the specified quality, $q \geq \hat{q}$. The following result turns out to be very useful.

Proposition 1 An optimal contract either specifies a quality standard or a time requirement but never both.

The formal proofs of this and other results are relegated to an appendix. The intuition is as follows. Because contracting is costly, it could only be optimal to specify both requirements if it resulted in both the employment and performance constraints binding for the agent. But if both constraints were to bind, then the agent could deliver the same quality at lower utility cost by substituting effort for time. As the principal cares only about quality and cost, he would do better to drop the time requirement and lower the wage. Simply put, if the principal specifies the final product \hat{q} , then telling the agent how to do the job can only increase costs because without this direction the agent has the right incentives for cost minimization.

This result not only simplifies the problem, but adds meaning to the contractual relationship. Namely, an optimal contract $(\hat{w}, 0, \hat{t})$ that specifies time and not performance looks very much like an *employment relationship* in which the agent agrees to spend a fixed amount of time on the job, does not expend excessive effort, and cares little about what needs to be done. In contrast, an optimal contract $(\hat{w}, \hat{q}, 0)$ that specifies only performance looks very much like a *contracting relationship* in which the agent has all the discretion over how to allocate his time and effort, and he is bound by the performance specifications of the contract.⁷

D. Characterizing Optimal Contracts

⁷The view of employment that we adopt here is reminiscent of Holmstrom and Milgrom (1991), who emphasize that employment is characterized by *exclusion*. In our model, a salaried employee is excluded from working in the outside market during the contracted time \hat{t} , meaning that on the job he will do what is desired, only at a low baseline productivity.

Proposition 1 concludes that only one dimension of contracting will be used. Since quality provision can be accomplished by either kind of contract, it is useful to specify the costs of each contracting mode. The logic of Proposition 1 almost immediately implies the following result:

Proposition 2 For any quality level provided, the payment to the agent in an employment contract is higher than in a performance contract.

The intuition is simple. Because the agent's choice of production inputs is constrained under an employment contract, the labor cost of producing quality q is lower under a contract that simply specifies a performance requirement. Note that Proposition 2 states that *ignoring contracting costs*, performance contracts will result in more efficient production. That is, fixing a level of quality, the productivity of labor is higher when the principal chooses to use performance contracting.

Accounting for contracting costs, however, implies that a performance contract imposes additional costs above and beyond direct production that are not incurred if an employment contract is used. The optimal contract will weigh the added contractual costs of using performance contracts against the added benefits of the increased labor efficiency and lower labor costs. Hence, we are interested in how the optimal contract varies with the principal's sensitivity to quality s and the difficulty of specifying and enforcing performance standards m . Our next result provides a characterization.

Proposition 3 (a) If contracting difficulty m increases, the principal will be more likely to use an employment contract, while the optimal quality may increase or decrease. (b) If in addition $d_{\hat{q}\hat{q}} > 0$, so that increases in performance standards come at increasing cost, then if the importance of quality s increases, the principal will be more likely to use an employment contract.

The first claim is straightforward: increased costs of specifying performance standards will reduce the use of specific performance contracts. The second claim requires an additional assumption that it is increasingly hard to specify and enforce performance for higher quality levels, i.e. that $d(q, m)$ is convex in q . (Bajari and Tadelis, 2001, provide a model and arguments for why this might be expected.) Under this assumption, performance contracts are less costly for low-quality service provision, so a greater preference for quality moves the manager toward higher quality and employment contracting. Under the contrasting assumption that d is concave in q , employment contracting would be used for low-quality service

provision and performance contracts for high-quality provision. The common view among practitioners is seems more aligned with the former hypothesis, and indeed our empirical results below support the view that privatization is associated with lower spending and that resident sensitivity to service quality is associated with less privatization.

E. Relating the Model to Data

In this section, we describe the empirical implications of our model. We also discuss how some simple extensions to the model can generate additional hypotheses that we will consider in our empirical analysis.

Before turning to these predictions, we address one preliminary issue of interpretation. Our model focuses on the choice of contractual form, while we have data on the use of contracting versus inhouse provision. Matching our theory to the data therefore requires us to interpret employment, or inhouse provision, as a contract that specifies time on the job and private sector contracts as specifying detailed performance requirements. This seems to be an accurate description of local government practice. In principle, however, one could have “employees” who are paid on performance, or “contractors” who are paid on time. Lawyers, for instance, often fall into the latter category. We view this as a potentially confounding problem if one were to apply our model to make or buy decisions in other settings, such as the private sector, but as relatively unproblematic for our current application.

Basic Predictions: Our model yields two elementary predictions about how contracting practices will differ across services. First, cities are less likely to privatize services for which it is harder to specify, enforce or adjust performance standards. Second, cities are less likely to privatize services for which sensitivity to quality is high. As city residents are the final consumers of services, and city administrators are ultimately accountable to residents, this suggests that privatization should be less likely for those services where city residents are more likely to react to quality problems.

City Size: It is easy to see that cities may differ in how responsive they are to the trade-offs in the model depending on their abilities to supply the service themselves or on the availability of private sector. Some services may have a relatively large efficient scale, making inhouse production inefficient for a small city. Small or rural cities also may face a thinner market of external providers. This suggests a third prediction, that small and rural cities, being potentially more constrained, may be *less responsive* to contracting difficulties of the

type highlighted by our model. In addition, to reach efficient scale within the public sector, it may be more efficient for a small city to contract for employees from another public agency rather than provide a service inhouse.

Contracting Experience: Our baseline model treats each city’s contracting decision for each service in isolation. City managers whom we interviewed, however, emphasized that writing and administering contracts takes practice, and that capabilities gained contracting for one service might facilitate future privatization. In the language of the model, the contracting cost parameter m may decrease with privatization experience. This suggests a fourth prediction: cities that privatize some services may be more likely to privatize others. Assessing whether this kind of spillover is present is an empirical challenge; we explain our empirical strategy in detail below.

Political Economy: A set of political economy predictions can be derived from the simple trade-offs highlighted in the model. When city administrators place more weight on the benefits of service provision relative to the cost, i.e. have a higher value of s , they will be more likely to provide the service inhouse. A natural conjecture is that elected mayors may have motivations that are more explicitly political than appointed managers. In light of our model, this suggests a fifth “level-effects” prediction: that cities run by mayors may be *less likely* to privatize services as compared to cities run by managers. Moreover, to the extent that political concerns might cause administrators to focus on issues other than the economic trade-offs emphasized in our model, a sixth “margins effect” prediction is that cities run by mayors will also be *less responsive* to differences in contracting difficulties as compared to cities run by managers.

The form of government is an obvious political distinction across cities, but several others may be of interest as well, and give rise to similar hypotheses. For instance, cities that were formed relatively recently may have less of a political infrastructure and perhaps less public union influence. This suggests they may do more privatization. They also may make decisions that more closely reflect current economic efficiency trade-offs, making newer cities *more responsive* to variation in contracting difficulties across services. Although it is somewhat outside of the scope of our analysis, it is also possible that differences in political ideology (e.g. cities that are primarily democratic or republican) might affect contracting choices.

Political Economy and City Finances: A final conjecture that emerges from combining

the political view of privatization with our transaction-cost view is that a city’s financial condition may matter for its contracting decisions. In particular, the political view would suggest that if cities are very constrained — for instance because they have a great deal of outstanding debt — then they may be more likely to privatize to save costs. Moreover, if financial constraints cause administrators to focus more on economic considerations, our model would then suggest that debt-constrained cities would be *more responsive* to contracting difficulties.

4. Service Provision by U.S. Cities: Data

To study the procurement practices of U.S. cities, we compiled information from several sources. Our primary data are the International City/County Management Association’s (ICMA’s) 1997 and 2002 Service Delivery surveys. This data has been used in several other studies of local government (e.g. Hefetz and Warner (2004) and references therein).

The ICMA sends its survey to roughly 4000 U.S. cities, with a response rate of about 20-25%.⁸ The survey presents city administrators with a list of 64 services. It asks them to identify the services they provide and the method of delivery. These include provision by city employees, contracting out to a private sector firm, contracting out to another public agency, a combination of the above, and other less frequent forms of procurement. After combining the survey responses from 1997 and 2002, and eliminating responses that are substantially incomplete, we have a data on a total of 1043 cities. For cities that responded in both years, we use the more complete or more recent response.

For each of these cities, we collected information from the U.S. Census on population, area, county median household income, the ratio of the city’s long-term debt to its current revenue, whether or not the city has employee bargaining units, and whether the city is part of a Metropolitan Statistical Area.⁹ We classify cities outside an MSA as rural, and those within an MSA as either suburban or urban, with the latter meaning that the city is the main city in the MSA. We searched city web pages to identify the date at which each city was incorporated.

⁸The ICMA sends the survey to the Chief Administrative Officer in all municipalities with populations over 10,000 and a random sample of one in eight municipalities with populations between 2500 and 9999. Therefore smaller cities are under-represented in the sample. The response rate in 2002 was 23.7%. As can be seen in Table 1, cities in the Northeast are under-represented among the respondents.

⁹The population data comes from the 2000 Census; the other variables from the 1997 Census of Governments. The one exception is the presence of employee bargaining units, which we use as a very crude measure of the importance of public employee unions in a city. This question last appeared in the 1987 Census of Governments, so that is what we rely upon.

From the ICMA, we obtained each city’s form of government — Mayor-Council, Council-Manager, or the less common forms of Commission and Town Meeting. In addition, we gathered data on state laws that might constrain city decisions — such as limits on borrowing or restrictions on hiring processes.¹⁰ Finally, as a rough measure of political ideology, we collected county-level voting data from the 2000 presidential election. Table 1 presents a summary of city characteristics.

While information on city characteristics is readily available, it is substantially more difficult to assemble useful measures of service characteristics. For instance, we are particularly interested in how difficult it is to specify and administer performance requirements for a given service. To assess this, we designed an additional survey of 23 city managers. For this survey we chose a representative sub-sample of 30 of the ICMA services. The survey is available as an Appendix.

We asked respondents to rank each service along three contracting dimensions: (1) the difficulty of measuring and monitoring the provision of quality; (2) how routine or unpredictable the requirements of the service are; and (3) the difficulty in replacing contractors due to specificity or lack of competition. For each question we standardized the answers of each respondent to have zero mean and unit variance. We then averaged the standardized responses to construct an average response to each question for each service.

There are at least two concerns with our reliance on survey data to construct measures of contracting difficulty. First, it requires an implicit assumption that the aspects of contracting we are asking about are commonly understood by practitioners and do not differ much across cities. That is, these contracting difficulties primarily reflect the nature of different services and are not highly idiosyncratic to individual city-service pairs. Fortunately, the survey responses to each question are highly correlated across respondents, suggesting this assumption is warranted.¹¹ A potentially more significant problem is one of reverse causality. The concern here is that the city managers we surveyed do not actually know how easy or hard it is to measure quality for different services or how routine they are in nature, but they do know how often services are privatized and conclude that those which are privatized more often are easier to measure or are more routine. We do not have a direct way of testing this hypothesis, but if it were the case, a positive correlation between our measures and inhouse

¹⁰This data on state laws comes from the U.S. Advisory Commission on Intergovernmental Relations (USACIR, 1990, 1993).

¹¹To convey a rough sense of the alignment of the responses, say that two standardized responses are congruent unless one is above 0.5 and the other is below -0.5. Making pairwise comparisons between responses concerning a given service on a given question, less than 15% were not congruent.

provision might reflect in part biases or confusion on the part of our surveyed managers.

Our survey highlights three impediments to successful contracting. Although our model does not separate them out, the existing theoretical literature suggests that each might have an independent influence on contracting decisions. In the next section, we use simple cross-tabulations to document the relationship between private contracting and our three individual measures. As the cross-tabulations will show, however, these characteristics turn out to be so highly correlated across services as to be nearly collinear in multivariate regression analysis. Therefore for the regression analysis we use a principal components approach to identify a single “contract difficulty” variable. The first principal component explains 84% of the variation in our three survey variables. We call this component, which is very nearly an equally weighted average of the three variables, *contracting difficulty*. This corresponds to m in our model.

In addition to asking city managers about contracting difficulty, we included a survey question asking the city managers to assess the relative sensitivity of residents to the quality of the thirty different services. Again, we standardized the answers of each response and averaged the standardized responses to obtain a measure of quality sensitivity that we refer to as *sensitivity*. This corresponds to s in our model.

Finally, we used information on which cities provide which services to construct two additional service characteristics. A number of city managers suggested to us that services could usefully be distinguished by the degree to which they were (in the words of Palo Alto city manager Frank Benest) “core to mission” — and hence identified in an important way with city administration. To provide a measure of whether a given service is a “core” city service, we calculated for each service the fraction of cities in our sample that provide it. We then normalized this measure, denoted *core*, to have mean zero and standard deviation one across services.

Our *core* measure captures what fraction of cities provide a service. We constructed an additional measure to describe *which* cities provide a given service. To do this, we computed for each service the average population density of cities providing the service. Again, we normalize this measure, denoted *dense population* to have mean zero and standard deviation one across services. The reason we include this measure is because there do seem to be services that are provided almost solely by the largest and most dense cities. These services include programs for the elderly, day-care and drug and alcohol treatment programs.

Table 2 reports provision patterns of each of the thirty services included in our contracting

difficulty survey. Both the frequency of provision and the method of provision range dramatically across services. Some services, such as police and code enforcement are provided by city employees in nearly 90% of the cities in our sample. Other services, such as solid waste collection are privately contracted over 40% of the time, and vehicle towing is privately contracted over 80% of the time. The last part of the Table reports service characteristics. These seem to square with common sense. For instance, the most difficult service to contract for is police services, while the easiest are utility meter reading and vehicle towing.

While our empirical analysis below focuses on the method of service provision, it is worth briefly discussing the question of whether a city provides a service at all. As discussed in Section 2, it seems reasonable to view *whether* a city is responsible for providing a given service as predetermined in investigating *how* the service is provided. This assumption seems consistent with information gleaned from interviews with city managers, who generally have to concern themselves with how to provide a specified set of services.

Nevertheless, given variation in the number of cities providing each service, it may be helpful to convey a sense of which services are provided more frequently and which cities provide more services. To this end, Table 3 reports results of a logit regression relating whether or not city i provides service j to city and service characteristics. As the Table shows, there are a number of regularities. Larger and older cities provide more services, as do cities in the Northeast. Cities in the western U.S. tend to provide fewer services. Services for which contracting difficulties are greater are also provided somewhat less frequently — in particular, a one standard deviation increase in contract difficulty is associated with provision by 6% fewer of the cities.

5. Contracting Patterns: Economic Factors

We now turn to addressing empirically the cross-section of city contracting practices. We divide our analysis into two parts. We look first at economic factors, then turn to political economy considerations. An observation in our data is a city-service pair. We focus on city-service pairs for which the city actually provides the given service, and for which the service is provided either inhouse or by contract with either a private firm or another public agency.

A. Preliminary Evidence

In our survey of city managers, we asked managers to assess each service on the basis of three characteristics: the difficulty of measuring and monitoring quality, the need for flexibility, and the potential for holdup problems due to lock-in. We start with some preliminary evidence on the relationship between private sector contracting and these separate characteristics. Table 4 provides a cross-tabulation that shows how the amount of private sector contracting varies with whether its score on each of the three contracting difficulty dimensions is high (above zero) or low (below zero).¹² Each service, and hence each city-service pair, belongs to one of eight cells in the matrix of Table 4.

The main entry in each cell in Table 4 shows the fraction of times we observe a service with the identified characteristics being provided via a private sector contract. Contracting is roughly twice as likely for services that score low on at least two of the three difficulty dimensions than for services that score low on zero or one dimensions. Table 4 also shows the difficulty with separating out the three dimensions of contracting difficulty. Of the thirty services, twenty-three of them score low on none or all of the dimensions. Only one or two services occupy the remaining six cells. This strong correlation also appears when we use continuous versions of the three dimensions. Consequently, we use our single principal component measure of contracting difficulty in the statistical analysis that follows.

It is useful to provide some initial evidence on the relationship between our aggregate measure of contracting difficulty and the method of service provision at the level of individual services. To do this in a way that controls for the fact that each service is provided by a different set of cities and cities may be more or less inclined to privatize for reasons that are city-specific, we separately regressed a dummy variable for each city-service contracting outcome (inhouse provision, public contract, private contract) on city fixed effects and obtained the average residual by service. We plot these residuals against our measure of contracting difficulty in Figure 1.

Figure 1A depicts the negative relationship between contracting difficulty and privatization. It shows, for example, that vehicle towing, waste collection and building maintenance are all relatively easy to contract and often privatized, while the reverse is true of police, fire, emergency medical services and code enforcement. There are two notable outliers: legal services and parking lot operation. The figure shows that it is relatively difficult to write a performance contract for legal services, yet they are frequently contracted out. A simple explanation is that while legal services are frequently contracted out, the standard contract

¹²Recall that survey responses are normalized to have mean zero and standard deviation equal to one.

for legal services is based on time rather than performance. Parking lot operation is rarely contracted out, despite having low contracting difficulty. A natural explanation here is that outside of relatively large metropolitan areas, parking lot operation doesn't involve any task that could be contracted. Once a parking lot is built, there is no need for an operator because parking is free.

Figures 1B and 1C show the corresponding scatterplots for inhouse provision and public contracting. Both are positively related to contracting difficulty across services, suggesting that these may be the relevant options for difficult to contract services. We explore this in more detail below.

B. Economic Factors in Privatization: Basic Results

We use a multivariate regression analysis to quantify the relationship between city and service characteristics and the alternative forms of service provision: private contracting, public contracting and inhouse provision. We describe the choice between these alternatives using a standard multinomial logit model. In this model, the probability that city i provides service j using method k is given by:

$$\Pr\{y_{ij} = k\} = \frac{\exp(X_{ij}\beta_k)}{\sum_l \exp(X_{ij}\beta_l)},$$

where $y_{ij} \in \{\text{Inhouse, Public, Private}\}$ is the method of provision and X_{ij} is a vector of city and service characteristics. We sometimes use city or service fixed effects in place of measured city or service characteristics; our results are not sensitive to this substitution. Throughout the paper, rather than reporting hard-to-interpret coefficients from the logit model, we report the marginal effects on the choice probabilities.

Table 5 reports results from our basic specification that match the two elementary predictions of our theoretical model. Greater contracting difficulty is associated with less private sector contracting and more inhouse provision and public sector contracting. The relationship is substantial. A one standard deviation increase in contracting difficulty (the difference between sanitary inspection which is rather difficult to contract and snow plowing which is rather easy) is associated with about forty percent less private contracting. (Recall that on average about 20% of services are contracted privately and the estimated probability change is between -8.3% and -10.1% depending on the specification.)

This finding is consistent with the results of Brown and Potoski (2003a), who relate contracting decisions to their own survey measures of asset specificity and service measurability

using all sixty-four services in the ICMA data. A principal finding of their paper is that private contracting is significantly less likely for services that are hard to measure.¹³ They find a somewhat less clear relationship between contracting and their survey measure of asset specificity. One issue with their specificity measure is that a service (such as ambulance service) is defined to be specific if it uses assets that are service-specific, even if those assets may not create a lock-in effect or relationship-specificity.

We also find a significant correlation between privatization and our measure of resident sensitivity to quality. Note that greater sensitivity is associated with less private sector contracting and more inhouse provision, though not more public contracting. This is consistent with the view that cities want control over the services that are more sensitive vis-a-vis resident responses. A one standard deviation increase in sensitivity (the difference water treatment to which residents are rather sensitive and solid waste disposal to which they are less sensitive) is associated with about twenty percent less private contracting (the estimated probability change is between -3.6% and -4.9%).

Another indication that cities may want to retain control over services that are perceived as central is that services that are provided by a broader set of cities (i.e. “core services”) are much more likely to be provided inhouse. A one standard deviation increase in our “core” measure is associated with a twenty to thirty percent increase in the probability of inhouse provision. Finally, services that are provided primarily by densely populated cities are substantially more likely to be provided through private sector contracts. Part of this result appears to be driven by a set of services that are provided mainly by large cities and have something of a “private good” nature (e.g. drug and alcohol treatment, day-care) and are privatized frequently. One possible explanation is that for these services there is a private market in addition to public sector provision, making private sector contracting relatively straightforward.

C. Economic Factors in Privatization: Scale Economies

We argued that differences across cities in their ability to deliver services, and in the market conditions surrounding them, will affect their sensitivity to the basic predictions of

¹³It is hard to compare the magnitudes of our respective results for several reasons. First, their survey questions are different and they do not adopt a comparable normalization of the survey numbers. Second, their multinomial analysis distinguishes slightly different categories of service provision. In particular, they say that a city privately contracts for a service only if all of the provision is by a private firm, whereas we say there is private contracting if there is some contracting with a private firm. Nevertheless, our qualitative findings are highly consistent.

our model. As indicated in the lower half of Table 5, there is substantially more contracting in larger and more urban cities. Cities that have more than fifty thousand residents contract privately about thirty percent more than cities with less than ten thousand residents. Similarly, cities in an MSA (Urban and Suburban cities) contract privately about fifteen to twenty percent more than rural cities.

Above we suggested that larger cities might not only do more contracting, but exhibit a closer relationship between mode of provision and contracting difficulty, both because they might have better access to private suppliers and because they might be able to utilize economies of scale in inhouse provision. To get at this, we consider an alternative specification where we interact contracting difficulty with city characteristics. Table 6 shows that the negative relationship between contracting difficulty and privatization is indeed stronger for larger cities. For the smallest set of cities, a one standard deviation increase in contracting difficulty is associated with a 7.6% decrease in the probability of contracting privately, holding other city characteristics at their sample averages. The change is almost twice as large for cities with populations between twenty-five and fifty thousand (13.1%) and populations greater than fifty thousand (13.7%).

The results in Table 6 are also consistent with the idea that large cities substitute between private contracts and inhouse provision, while very small cities that may lack the scale for inhouse provision may substitute between private to public contracting. For the smallest set of cities, a one standard deviation increase in contracting difficulty is associated with a 8.6% increase in the frequency of public contracting, almost all of which is accounted for by less private contracting. For the largest cities, the 13.7% reduction in private contracting divides into an 8% increase in the frequency of inhouse provision and 5.7% increase in the frequency of public sector contracting.

D. Economic Factors in Privatization: Scope Economies

Among city managers, contract administration is viewed as a specialized competency. As discussed above, this suggests a potential for economies of scope in private sector contracting. Cities that have experience privatizing some services may be more likely to use the private sector for other services. Identifying this empirically is subtle because we want to tease it apart from the possibility that some cities are just more likely to contract privately for reasons that we cannot control for directly.

Our empirical strategy is to use what we consider to be plausibly exogenous variation in the set of services that cities provide. Consider two cities, A and B, that provide an equal

number of services and are observably equivalent but for the set of services they provide. Both cities provide service 1. In addition city A provides a mix of services that are relatively easy to contract, while city B provides a mix of services that are relatively hard to contract. Our hypothesis is that city A will be more likely to contract service 1, precisely because it gains experience with contracting due to its mix of provided services. This suggests an instrumental variables strategy where we regress an indicator variable for privatization of a given city-service pair on the number of other services a city privatizes, using the average difficulty of services that a city provides as an instrument for this count.

To implement this strategy, we consider a linear probability model where the dependent variable y_{ij} is a dummy variable equal to one if city i privatizes service j rather than keeping it inhouse or using a public sector contract. The exact specification is:

$$y_{ij} = \alpha \sum_{k \in J_i \setminus j} y_{ik} + X_i \beta + d_j + \varepsilon_{ij},$$

where J_i is the set of services provided by city i , the sum on the right hand side is the number of services other than service j that city i privately contracts, X_i is a set of city characteristics possibly including the number of services that city i provides, and d_j is a service j fixed effect. We report both OLS estimates and IV estimates where we use the average difficulty of services in J_i as an instrument for number of other services that are privatized.

Table 7 reports our estimates, which are strongly consistent with the economies of scope hypothesis.¹⁴ A given service is three to five percentage points more likely to be privately contracted if a city privatizes one additional other service. The effect is not negligible; it represents a fifteen to thirty-five percent increase in the probability the service is privatized. The result resonates with the account of city managers that writing and administering contracts with private providers becomes easier with experience.

6. Contracting Patterns: Political Economy Factors

¹⁴We do not report the first stage results in the IV specifications as they are essentially aggregated and linear versions of the logit regressions reported in Table 5. As in Table 5, there is a strong relationship between the average contracting difficulty of services $j \neq i$ (the excluded instrument) and the observed privatization of services $j \neq i$ (the endogenous variable in the main regression). For the specifications reported in columns (3) and (4), the t-statistics for significance of the excluded instruments in the first stage regression are 6.91 and 11.69, respectively.

As discussed earlier, our model of privatization decisions suggests a role for political forces in focusing attention on benefits of service quality and away from costs of provision. We have several variables capturing aspects of political economy, including form of government, city age, region of the country, city debt levels and resident voting patterns. There is also variation in state laws that constrain city decision-makers, which Lopez-de-Silanes et al. (1997) argue may be important for local government privatization decisions.

A. Political Economy Factors in Privatization

Recall our fifth prediction above that cities run by mayors will be *less likely* to privatize services as compared to cities run by managers. As Table 5 shows, this prediction is borne out in the data. Cities with an appointed manager are more likely to contract with both the public sector (by 1.5 percentage points, or 12.5%) and the private sector (by 2.5 percentage points, or 20%). Supporting our other political economy “level effects” predictions, younger cities (incorporated after 1950) privatize about 25% more than older cities, and cities with employee bargaining units privatize about 10% less than cities with no bargaining units.

There is considerable regional variation in levels of contracting. Cities in the West and Northeast appear to behave quite differently from cities in the middle of the country. Cities in the West are more likely to use contracts with both public and private sector providers. At least two explanations have been suggested to us. One western city manager hypothesized that people in the West look less to government to provide jobs and services, and hence are more open to private sector contracting. An alternative explanation is that these cities have weaker public unions, even conditional on our imperfect control for union presence and hence there is less resistance to contracting.

We argued above that greater political concerns would affect how *responsive* city administrators are to the economic trade-offs identified in the model resulting in a sixth margins hypothesis. This hypothesis is explored in Table 6 where we re-run our main specification interacting contracting difficulty with city characteristics. The results are mixed. The negative relationship between contracting difficulty and privatization is much larger for newer cities and for cities in the western states. The relationship between contracting difficulty and privatization is essentially the same in cities with managers and mayors, however, and also in cities that do and do not have employee bargaining units.

Our final political economy hypothesis was that cities with higher debt burdens might be more likely to privatize in order to cut costs. Our expenditure results in Section 7 below suggest that private sector contracting indeed is associated with lower spending levels. The

estimates in Table 5 show that cities with higher ratios of long-term debt to revenue privatize significantly more than those with lower levels of debt. The latter finding is consistent with a story that high debt levels constrain political opportunism by city administrators and force them to focus on costs (i.e. in the language of the model, act as if they had a lower value of s).

The above results suggest an important role for political economy considerations in privatization decisions. One hypothesis we do not find support for, however, is that heavily Republican cities do more privatization. In fact, it appears that cities located in counties that voted Republican in the 2000 presidential election are somewhat less likely to contract with both the public and private sector. We are hesitant to make too much of the result, however, because we found no significant relationship using data from earlier presidential elections.

B. State Laws and Privatization

Lopez-de-Silanes, Shleifer and Vishny (1997) argue that state laws may have important effects on local government privatization decisions. In their paper, they use U.S. Census data to investigate the contracting decisions of U.S. counties, and find a number of interesting correlations. For studying local government privatization, however, the Census data has several weaknesses. First, it covers only a small sample of services (either twelve or seventeen depending on the year). Second, it does not distinguish between contracts with the private sector and contracts with the public sector. Our results suggest that the distinction is important. For these reasons, it is interesting to re-visit their hypotheses with our richer city-level data.

Table 8 reports results from an additional multinomial logit specification where in addition to service fixed effects and our usual city characteristics, we include as controls dummy variables for the presence of a range of state laws. The first column includes only the laws studied by Lopez-de-Silanes et al. The second column shows that these results are robust to the inclusion of additional state laws governing financial audits, clean government and collective bargaining practices.

The results yield a mixed comparison. Similar to their analysis, we find that states that prohibit political activity by city employees and states that impose city debt limits have more contracting of local services. Both findings are consistent with political economy arguments. In contrast to their analysis, however, we find that states that require a merit system for hiring, that prohibit strikes by their employees, and that do not permit take-overs of city

finances all have less contracting of local services.

Lopez-de-Silanes et al. argue that a merit system should make cronyism more difficult and hence increase privatization, contrary to our results. Another possibility is that it simply increases the quality of city employees making inhouse provision more attractive. Political economy considerations do not yield a clear prediction about whether prohibiting strikes will increase or decrease privatization, so perhaps it is not surprising that we obtain contrasting results. The fact that the possibility of state take-overs is associated with more privatization is consistent with the idea that cities that are financially constrained look more to the private sector as a way to keep costs down.

7. Contracting and City Expenditures

The empirical analysis above focused on the determinants of city contracting decisions. Ideally we would like to assess the consequences of these decisions as well. Although there are plenty of case studies on individual privatization decisions (see e.g. Sclar, 2000 for a number of such studies), there is no systematic data that allows a comparison of service quality and costs of provision across cities that choose different methods of provision, nor is there broad time-series evidence on cities that have changed their modes of provision. One thing we can do, however, is to look at overall levels of city expenditures and how overall spending relates to the degree of private sector contracting across a broad set of cities.

We use data from the 1997 Census of Governments to regress per-capita spending on the fraction of services that are privatized, controlling for city characteristics. The estimates are reported in Table 9. The first column contains no controls for the set of services that are provided; the second column controls for the number of services that are provided; the third column controls for the mix of services by including a dummy variable for each individual service that is provided. Because our measure of spending is an overall city measure, rather than disaggregated by service, each observation in these regressions corresponds to a single city.

The results show a substantial correlation between privatization and per-capita city spending. Cities that privately contract ten percent more of their services spend about three percent less per capita. Given that on average cities provide forty services and contract for eight of them, this means that changing one service from inhouse to private contracting is associated with a 0.6% decrease in per capita spending. A causal interpretation is obvi-

ously difficult, so we view this evidence as suggestive rather than definitive. It suggests an interesting avenue for future empirical research.

8. Conclusion

This paper has studied privatization of local government services. We develop a simple model that emphasizes what we believe to be a key trade-off between the productive efficiency induced by performance contracts and the low costs of contracting associated with less productive in-house employment. The model explains why contracting difficulties such as problems in monitoring performance, the need for flexibility, or a lack of a competitive market would lead to less use of the private sector. It also explains why greater sensitivity to service quality might push against privatization.

We use this model to interpret our empirical findings about the patterns of privatization across U.S. cities. Using data gathered from a variety of sources, we find that services that are characterized by high “transactions costs” of contracting and services that are widely provided by U.S. cities or are ranked high by city managers in terms of resident sensitivity to quality are privatized less frequently. We also provide evidence that contracting to other public agencies appears to be largely a substitute for inhouse provision, rather than an analogue of privatization.

Perhaps most importantly, we find a substantial degree of heterogeneity across cities in terms of their contracting practices. In particular, large cities do more private contracting and their choices exhibit a closer match to the trade-offs identified in our model. We obtain similar results for recently incorporated cities, and also observe more private contracting by cities governed by an appointed city manager rather than an elected mayor. We also provide some evidence of spillovers in contracting practices within a given city, so that privatizing one service may make it more likely to do further privatization. Finally we offer suggestive evidence that privatization is associated with lower spending.

Our analysis leaves many questions open. For instance, our empirical analysis is purely cross-sectional; it would be interesting to study the dynamics of privatization decisions — for instance, to study whether economic shocks might drive privatization decisions. This potentially could be done using our data. A more ambitious project would be to try to assess the direct costs and benefits of privatization decisions. This would probably require measures of service quality, which is one reason evidence on this front has been limited to case studies.

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Appendix A: Omitted Theory Details

Given a contract $(\hat{w}, \hat{q}, \hat{t})$, the agent chooses e and t to solve

$$\begin{aligned} \max_{e,t} \quad & \hat{w} - c(e)t + r(T - t) \\ \text{s.t.} \quad & t \geq \hat{t} & (EC) \\ & (\rho + e)t \geq \hat{q} & (PC) \end{aligned}$$

Given our assumptions, the agent's problem has a unique solution. It is independent of the wage \hat{w} , so we can denote the optimal intensity and time as $e^*(\hat{q}, \hat{t})$ and $t^*(\hat{q}, \hat{t})$.

The optimal contract from the point of view of the principal solves

$$\begin{aligned} \max_{(\hat{w}, \hat{q}, \hat{t})} \quad & V(et, s) - \hat{w} - d(\hat{q}, m) \\ \text{s.t.} \quad & (e, t) = (e^*(\hat{q}, \hat{t}), t^*(\hat{q}, \hat{t})) & (IC) \\ & \hat{w} - c(e)t + r(T - t) \geq rT & (IR) \end{aligned}$$

where the *incentive compatibility* constraint (IC) states that the agent will allocate his effort and time optimally and the *individual rationality* constraint (IR) states that the agent prefers to accept and honor the contract rather than not. This second constraint will bind for any optimal contract.

Proposition 1 An optimal contract $(\hat{w}, \hat{q}, \hat{t})$ either has the form $(\hat{w}, 0, \hat{t})$ or $(\hat{w}, \hat{q}, 0)$.

Proof. By way of contradiction, suppose the optimal contract $(\hat{w}, \hat{q}, \hat{t})$ has $\hat{q} > 0$ and $\hat{t} > 0$. If (PC) binds at the solution to the agent's problem, then the contract $(\hat{w}, \hat{q}, 0)$ will result in the same quality \hat{q} at marginally lower contracting cost. Alternatively, if (PC) does not bind at the solution to the agent's problem, then the contract $(\hat{w}, 0, \hat{t})$ will result in the same quality at lower contracting cost. *Q.E.D.*

To obtain quality q with an employment contract $(\hat{w}, 0, \hat{t})$, the principal must specify $\hat{t} = q/\rho$ and pay the agent

$$W(q|EC) = \frac{r}{\rho}q.$$

To obtain quality q with a performance contract $(\hat{w}, \hat{q}, 0)$, the principal must specify $\hat{q} = q$, and the agent solves

$$\begin{aligned} \max_{e,t} \quad & \hat{w} - c(e)t + r(T - t) \\ \text{s.t.} \quad & (\rho + e)t \geq q. \end{aligned}$$

The optimal effort level solves $c'(e) \cdot (\rho + e) = c(e) + r$, which is independent of q , so we denote it by e^* . The optimal time allocation is $t^*(q, 0) = q/(\rho + e^*)$. To make the contract acceptable, the principal must pay the agent

$$W(q|PC) = \frac{r + c(e^*)}{\rho + e^*}q.$$

Proposition 2 For all $q > 0$, $W(q|PC) < W(q|EC)$ and $\frac{dW(q|PC)}{dq} < \frac{dW(q|EC)}{dq}$.

Proof. The first inequality follows from revealed preference. The input mix e^* , $t^*(q, 0)$ is the agent's least cost way of producing quality q , so it must be that $W(q|PC) < W(q|EC)$. The second inequality follows directly from the first. *Q.E.D.*

The cost of implementing q is therefore

$$C(q, m) = \min\{W(q|EC), W(q|PC) + d(q, m)\}.$$

The cost function $C(q, m)$ is the lower envelope of $W(q|EC)$ and $W(q|PC) + d(q, m)$. A useful observation is that because labor costs are linear, the latter cost function will cross the former at most once, from below, provided that $d_{qq} > 0$, i.e. that the costs are contracting are convex. This implies that if an employment contract is the most effective way to implement quality q , it will be most effective for all higher quality levels. The optimal contract quality is the solution to the problem

$$\max_q V(q, s) - C(q, m).$$

Proposition 3 If contracting difficulty m increases, the principal will be more likely to use an employment contract, while the optimal quality may increase or decrease. If the importance of quality s increases, the principal will be more likely to use an employment contract, and optimal quality will increase.

Proof. Consider an increase from m to m' . The costs of implementing any quality q with an employment contract are unchanged, but the costs of implement any q with a performance contract are higher for m' than for m . Therefore an increase from m to m' makes a performance contract less likely to be optimal. The optimal quality could move up or down however. To see this, suppose the optimal contract under m is a performance contract. If the same is true under m' and $d_{qm} > 0$ then it is optimal to reduce quality. On the other hand, if the optimal contract under m' is now an employment contract, it will involve an increase in quality.

Now consider an increase from s to s' . As $V_{qs} > 0$ and the principal's problem has a unique solution, the optimal quality must increase. The increase in quality could change the form of optimal contract from a performance contract to an employment contract, but not vice-versa. *Q.E.D.*

Appendix B: City Manager Survey

We conducted a survey of 23 city managers, asking them to assess 30 services along several dimensions. A complete copy of the survey is available from the authors upon request. Here we re-produce the four questions that we rely upon in the paper.

Question A: Measuring and Monitoring Service Quality

To evaluate performance, it is important to measure and monitor the quality of the service provided. For each service listed below, imagine you were considering contracting out the service. Assess how easy or difficult it would be to measure and monitor the quality of service provision.

Question B: Need for Flexibility

For some services there is significant uncertainty about precisely what (or when) things need to be done. Other services are more predictable, making it easier to specify in advance what needs to be done. For services that are predictable there is a greater need for flexibility and adaptive guidance. For each service below please rank the need for flexibility and adaptive guidance.

Question C: Provider Scarcity or Lock-in

For some services it may be hard to find qualified providers or to switch providers once an initial provider is found. This could be due either to specialized expertise, specialized or expensive physical capital, or the lack of a closely related private sector market. For each service below please assess the ease of finding or switching outside providers.

Question D: Resident Sensitivity and Response

Problems with service provision may trigger a response from city residents. Residents are more aware of, and more sensitive to problems with some services as compared to others. For each service below, please assess the level of resident sensitivity to problems that might be encountered in the provision of that service.

Following each question was a list of the thirty services, organized by category: Public Works and Transportation; Public Utilities; Public Safety; Health and Human Services; Parks, Recreation and Culture; and Support Functions. Respondents were asked to rank each service on a scale of 1 to 5. For Question B, for example, a one meant “no need for flexibility”, a three meant “moderate need for flexibility, and a five meant “strong need for flexibility”. Responses by each manager to each question were standardized to have mean zero and standard deviation one as described in the text.

Table 1: Summary Statistics for Cities (N=1043)

	Mean	Std. Dev.	Min	Max
City Characteristics				
Population (2000)	59,904	185,683	1,115	3,694,820
Area (sq. miles)	24.71	47.34	1	607
Year Incorporated	1898	47	1699	2000
County Median Income (1997)	38,755	8,578	14,178	68,017
County % Republican (2000 pres. elect.)	51.0	12.3	16.1	82.3
City expenditure per-capita (1997)	1355	1033	23	16003
Long-term debt/Revenue (1997)	0.91	0.78	0	6
Public employees union (1987)	0.43			
Geographic Region	East	Midwest	South	West
	0.05	0.31	0.35	0.30
MSA Status	Urban	Suburban	Rural	
Urban	0.21	0.49	0.30	
Form of Government	Mayor	Manager	Other	
Mayor	0.25	0.73	0.02	
Services Provided (all 64 services)				
Number of Services Provided	39.5	9.7	6	64
Inhouse	23.6	8.1	0	47
Publicly contracted	4.6	5.2	0	35
Privately contracted	7.9	6.2	0	41
Otherwise provided or not reported	3.4	3.3	0	28
Service Provision (30 service subsample)				
Number of Services Provided	20.6	4.6	4	30
Inhouse	12.0	4.6	0	25
Publicly contracted	2.1	2.5	0	17
Privately contracted	4.4	3.4	0	21
Otherwise provided or not reported	2.1	2.1	0	14

Sources: U.S Census, ICMA, U.S. Election Atlas, City Web Pages.

Table 2: Summary Statistics for Services

Service	# Cities Providing	Method of Provision			Service Characteristics			
		Inhouse	Public	Private	Difficulty	Sensitivity	Core	Dense Pop.
Animal control	857	0.61	0.21	0.13	0.64	0.25	0.74	-0.44
Building security	721	0.75	0.02	0.20	-0.98	-0.74	0.27	0.30
Buildings and grounds maintenance	1003	0.62	0.01	0.30	-1.08	-0.38	1.25	0.04
Collection of delinquent taxes	584	0.40	0.39	0.17	-0.72	-0.61	-0.21	0.15
Commercial solid waste collection	558	0.32	0.01	0.43	-1.21	-0.22	-0.30	-0.20
Crime prevention/patrol	1021	0.86	0.07	0.00	2.08	0.93	1.32	-0.04
Drug and alcohol treatment programs	201	0.05	0.38	0.39	1.64	0.25	-1.55	1.67
Emergency Medical service	769	0.54	0.14	0.19	0.72	1.02	0.44	0.33
Fire prevention suppression	932	0.82	0.07	0.00	1.41	0.77	1.01	-0.16
Insect/rodent control	443	0.42	0.36	0.16	0.32	-0.18	-0.70	-0.36
Inspection/code enforcement	1013	0.84	0.03	0.08	1.47	0.24	1.29	0.01
Legal services	842	0.34	0.02	0.58	0.54	-0.85	0.69	0.16
Operation/maintenance of recreation facilities	974	0.72	0.06	0.10	0.22	0.30	1.15	0.04
Operation of daycare facilities	194	0.24	0.09	0.55	0.78	0.56	-1.57	2.27
Operation of libraries	632	0.56	0.29	0.03	0.34	0.42	-0.04	-0.03
Operation of museums	342	0.25	0.16	0.29	0.46	-0.10	-1.06	-0.47
Operation of parking lots and garages	411	0.68	0.03	0.19	-1.29	-0.74	-0.81	1.37
Parks landscaping and maintenance	996	0.69	0.05	0.18	-0.91	0.08	1.23	-0.03
Programs for the elderly	582	0.28	0.20	0.19	1.16	0.36	-0.22	1.28
Residential solid waste collection	750	0.47	0.01	0.33	-1.25	0.77	0.37	-0.19
Sanitary inspection	496	0.51	0.40	0.04	0.60	-0.22	-0.52	-0.05
Sewage collection and treatment	868	0.68	0.20	0.08	0.35	0.03	0.78	-1.14
Snow plowing/sanding	698	0.80	0.05	0.09	-0.40	-0.13	0.19	-1.34
Solid waste disposal	565	0.32	0.18	0.35	-0.40	-0.67	-0.28	-0.07
Street repair	1011	0.45	0.02	0.36	-0.31	0.31	1.28	-0.10
Street/parking lot cleaning	935	0.72	0.02	0.18	-1.19	-0.18	1.02	-0.13
Tree trimming/planting on public rights on way	939	0.42	0.02	0.39	-0.85	0.17	1.03	-0.06
Utility meter reading	727	0.78	0.04	0.13	-1.27	-0.67	0.29	-1.10
Vehicle towing and storage	596	0.09	0.02	0.81	-1.16	-0.28	-0.17	0.74
Water treatment	783	0.78	0.14	0.06	0.29	0.38	0.49	-1.16

Sources: ICMA, Levin-Tadelis City Manager Survey.

Table 3: Provision of City Services

Logit Model of Provision of City-Services (N=31,290)

	(1)		(2)		(3)	
	Marg. Eff.	s.e.	Marg. Eff.	s.e.	Marg. Eff.	s.e.
Service Characteristics						
Contracting difficulty	-0.061	(0.003)	-0.065	(0.003)		
Resident sensitivity	0.160	(0.006)	0.171	(0.007)		
City Characteristics						
Population 10-25k	0.043	(0.009)			0.048	(0.009)
Population 25-50k	0.058	(0.009)			0.064	(0.009)
Population >50k	0.072	(0.011)			0.080	(0.010)
Manager	0.014	(0.006)			0.016	(0.006)
Other form of government	-0.012	(0.020)			-0.013	(0.020)
Unions	0.016	(0.006)			0.018	(0.006)
City Debt/Revenue	0.005	(0.003)			0.006	(0.003)
East	0.031	(0.013)			0.034	(0.012)
South	0.007	(0.008)			0.008	(0.008)
West	-0.031	(0.007)			-0.036	(0.007)
Urban	0.005	(0.010)			0.005	(0.010)
Suburban	-0.012	(0.008)			-0.013	(0.008)
Incorporated after 1950	-0.065	(0.007)			-0.076	(0.008)
County med. Income (10k)	-0.011	(0.004)			-0.012	(0.004)
Percent republican	0.000	(0.025)			0.000	(0.025)
Additional Controls			City Fixed Effects		Service Fixed Effects	

Table 4: Frequency of Private Contracting

		Holdup Potential		Holdup Potential	
		Low	High	Low	High
Need for Flexibility	Low	0.29 11	0.35 1	N/A 0	0.12 2
	High	0.25 2	0.06 1	0.16 1	0.15 12
Difficulty of Measurement		Low		High	

Table 5: Effect of City/Service Characteristics on Contracting*Multinomial Logit Models for Frequency of Private and Public Contracting (N=19,244)*

	(1)		(2)		(3)	
	Public	Private	Public	Private	Public	Private
Service Characteristics						
Contracting difficulty	0.047 (0.003)	-0.083 (0.004)	0.069 (0.005)	-0.101 (0.007)		
Resident Sensitivity	0.000 (0.005)	-0.036 (0.007)	0.004 (0.008)	-0.049 (0.010)		
Core service	-0.097 (0.003)	-0.029 (0.005)	-0.147 (0.008)	-0.045 (0.007)		
Dense population service	-0.037 (0.003)	0.140 (0.006)	-0.062 (0.006)	0.177 (0.009)		
City Characteristics						
Population 10-25k	-0.008 (0.007)	0.011 (0.012)			-0.006 (0.006)	0.015 (0.011)
Population 25-50k	-0.012 (0.007)	0.022 (0.013)			-0.011 (0.006)	0.025 (0.012)
Population >50k	-0.018 (0.008)	0.063 (0.015)			-0.015 (0.007)	0.065 (0.014)
Manager	0.015 (0.005)	0.024 (0.007)			0.015 (0.004)	0.025 (0.006)
Other form of government	0.000 (0.017)	0.013 (0.025)			0.003 (0.015)	0.016 (0.023)
Public Employee Unions	-0.006 (0.004)	-0.011 (0.007)			-0.006 (0.004)	-0.012 (0.006)
City Debt/Revenue	-0.005 (0.003)	0.010 (0.004)			-0.005 (0.002)	0.011 (0.004)
East	-0.042 (0.007)	0.026 (0.016)			-0.040 (0.006)	0.037 (0.015)
South	0.018 (0.006)	-0.017 (0.009)			0.014 (0.005)	-0.023 (0.008)
West	0.032 (0.006)	0.019 (0.009)			0.031 (0.006)	0.013 (0.008)
Urban	-0.004 (0.007)	0.035 (0.012)			-0.002 (0.006)	0.034 (0.011)
Suburban	0.031 (0.006)	0.041 (0.010)			0.029 (0.005)	0.034 (0.009)
Incorporated after 1950	0.038 (0.006)	0.056 (0.009)			0.036 (0.006)	0.048 (0.009)
County med. Income (10k)	0.003 (0.003)	0.016 (0.005)			0.004 (0.002)	0.016 (0.004)
Percent republican	-0.105 (0.018)	-0.028 (0.030)			-0.091 (0.016)	-0.044 (0.026)
Additional Controls			City Fixed Effects		Service Fixed Effects	

Note: Reported coefficients are marginal effects on probability of outcome.

Table 6: Determinants of Contracting, Interaction Effects***Multinomial Logit Model for Private and Public Contracting***

	Public		Private	
Service Characteristics				
Contracting difficulty	0.065	(0.027)	0.008	(0.038)
Resident sensitivity	0.004	(0.008)	-0.049	(0.010)
Core service	-0.147	(0.008)	-0.046	(0.007)
Dense population service	-0.062	(0.005)	0.178	(0.010)
Contracting Difficulty x City Characteristics				
Difficulty * Population 10-25k	-0.020	(0.012)	-0.003	(0.017)
Difficulty * Population 25-50k	-0.014	(0.013)	-0.056	(0.019)
Difficulty * Population >50k	-0.029	(0.015)	-0.061	(0.021)
Difficulty * Manager	0.010	(0.008)	0.002	(0.012)
Difficulty * Other FOG	0.007	(0.029)	0.000	(0.034)
Difficulty * Public Employee Unions	-0.003	(0.008)	0.002	(0.011)
Difficulty * City Debt/Revenue	0.000	(0.004)	0.002	(0.006)
Difficulty * East	0.022	(0.020)	0.023	(0.023)
Difficulty * South	0.009	(0.010)	-0.028	(0.014)
Difficulty * West	0.022	(0.009)	-0.039	(0.013)
Difficulty * Urban	-0.026	(0.013)	0.043	(0.018)
Difficulty * Suburban	-0.006	(0.010)	-0.010	(0.014)
Difficulty * Inc. after 1950	0.003	(0.009)	-0.023	(0.013)
Difficulty * County med. Income (10k)	0.003	(0.005)	-0.015	(0.007)
Difficulty * Percent republican	-0.003	(0.032)	-0.003	(0.047)
Additional Controls	City Fixed Effects			

Note: Reported coefficients are marginal effects on probability of outcome.

Table 7: Scope Economies in Private Contracting

Linear Probability Model for Private Contracting of City-Services (N=19,244)

	(1)		(2)		(3)		(4)	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Scope Economies								
Number of other contracted services	0.029	(0.001)	0.033	(0.001)	0.047	(0.016)	0.034	(0.010)
Number of provided services			-0.008	(0.001)			-0.008	(0.004)
City Characteristics								
Population 10-25k	-0.005	(0.009)	0.003	(0.009)	-0.015	(0.013)	0.002	(0.009)
Population 25-50k	-0.002	(0.010)	0.007	(0.010)	-0.016	(0.016)	0.007	(0.011)
Population >50k	0.009	(0.012)	0.016	(0.012)	-0.022	(0.031)	0.016	(0.016)
Manager	0.010	(0.006)	0.012	(0.006)	0.002	(0.009)	0.011	(0.007)
Other form of government	0.014	(0.019)	0.010	(0.019)	0.014	(0.020)	0.010	(0.019)
Unions	-0.011	(0.006)	-0.008	(0.006)	-0.011	(0.006)	-0.008	(0.006)
City Debt/Revenue	0.005	(0.003)	0.005	(0.003)	0.001	(0.005)	0.005	(0.004)
East	0.016	(0.013)	0.018	(0.013)	0.000	(0.019)	0.017	(0.014)
South	-0.015	(0.008)	-0.013	(0.008)	-0.009	(0.009)	-0.013	(0.008)
West	0.013	(0.007)	0.007	(0.007)	0.015	(0.008)	0.007	(0.007)
Urban	0.013	(0.010)	0.013	(0.010)	0.003	(0.013)	0.012	(0.011)
Suburban	0.013	(0.008)	0.009	(0.008)	0.005	(0.011)	0.009	(0.009)
Incorporated after 1950	0.033	(0.007)	0.021	(0.007)	0.029	(0.008)	0.021	(0.010)
County med. Income (10k)	0.011	(0.004)	0.007	(0.004)	0.008	(0.005)	0.007	(0.005)
Percent republican	-0.009	(0.025)	-0.007	(0.025)	0.005	(0.028)	-0.006	(0.026)
Additional Controls	Service fixed effects		Service fixed effects		Service fixed effects		Service fixed effects	
Instrument for number of other contracted services					Avg. contract diff. of other services		Avg. contract diff. of other services	

Table 8: Effect of State Laws on Contracting**Multinomial Logit for Frequency of Private and Public Contracting (N=19,244)**

	(1)		(2)	
	Public	Private	Public	Private
Clean Government Laws				
State requires merit system	-0.036 (0.005)	-0.021 (0.009)	-0.035 (0.006)	-0.021 (0.010)
State sets purchasing standards	0.015 (0.005)	-0.012 (0.009)	0.025 (0.005)	-0.008 (0.011)
State prohibits political activity by city employees	0.019 (0.004)	0.042 (0.007)	0.020 (0.005)	0.030 (0.007)
City officials subject to ethics code			0.003 (0.006)	-0.004 (0.009)
City records open to public			-0.024 (0.010)	0.008 (0.014)
Labor Laws				
State prohibits strikes by public employees	-0.008 (0.012)	-0.090 (0.024)	-0.015 (0.014)	-0.081 (0.025)
City authorized to engage in collective bargaining			0.007 (0.005)	0.036 (0.009)
Budget Constraint Laws				
State law permits short-term borrowing	0.022 (0.005)	-0.014 (0.010)	0.029 (0.007)	-0.001 (0.013)
State imposes city debt limits	-0.010 (0.012)	0.065 (0.015)	0.001 (0.012)	0.068 (0.016)
State mandates balanced budget	0.018 (0.006)	-0.026 (0.008)	0.027 (0.007)	-0.025 (0.009)
State law authorizes "take over" of finances	-0.043 (0.006)	0.087 (0.022)	-0.047 (0.007)	0.059 (0.023)
State assesses property tax	0.060 (0.015)	-0.090 (0.010)	0.094 (0.023)	-0.057 (0.015)
Financial Audit Laws				
Law mandates independent audit of local accounts			-0.022 (0.005)	-0.024 (0.008)
Law mandates state audit of local accounts			-0.017 (0.006)	0.005 (0.009)
Additional Controls				
	City Characteristics, Service FE		City Characteristics, Service FE	

Note : Reported coefficients are marginal effect on the probability of public/private contracting.

Table 9: City Expenditure and Private Contracting

Linear Regression Model of ln(City Expenditure per Capita) (N=1043)

	(1)		(2)		(3)	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Degree of Private Contracting						
Fraction of city services privately contracted	-0.305	(0.122)	-0.387	(0.122)	-0.246	(0.122)
City Characteristics						
Population 10-25k	0.119	(0.059)	0.094	(0.058)	0.059	(0.057)
Population 25-50k	0.058	(0.066)	0.020	(0.066)	-0.060	(0.066)
Population >50k	0.100	(0.074)	0.051	(0.074)	-0.041	(0.076)
Manager	0.012	(0.041)	0.004	(0.041)	-0.007	(0.039)
Other form of government	0.093	(0.125)	0.108	(0.123)	0.085	(0.117)
Unions	0.047	(0.038)	0.034	(0.038)	0.004	(0.036)
City Debt/Revenue	0.061	(0.022)	0.057	(0.022)	0.094	(0.021)
East	0.316	(0.085)	0.313	(0.084)	0.364	(0.084)
South	0.136	(0.050)	0.134	(0.049)	0.179	(0.052)
West	-0.021	(0.047)	-0.003	(0.047)	0.050	(0.052)
Urban	0.017	(0.064)	0.018	(0.063)	-0.015	(0.060)
Suburban	-0.390	(0.051)	-0.372	(0.051)	-0.261	(0.051)
Incorporated after 1950	-0.291	(0.046)	-0.252	(0.046)	-0.106	(0.046)
County med. Income (10k)	0.131	(0.025)	0.141	(0.025)	0.119	(0.024)
Percent republican	-0.681	(0.162)	-0.687	(0.160)	-0.846	(0.161)
Number of city services provided			0.009	(0.002)		
Additional Controls					Individual service provision dummies	

Figure 1A: Contract Difficulty and Private Contracting

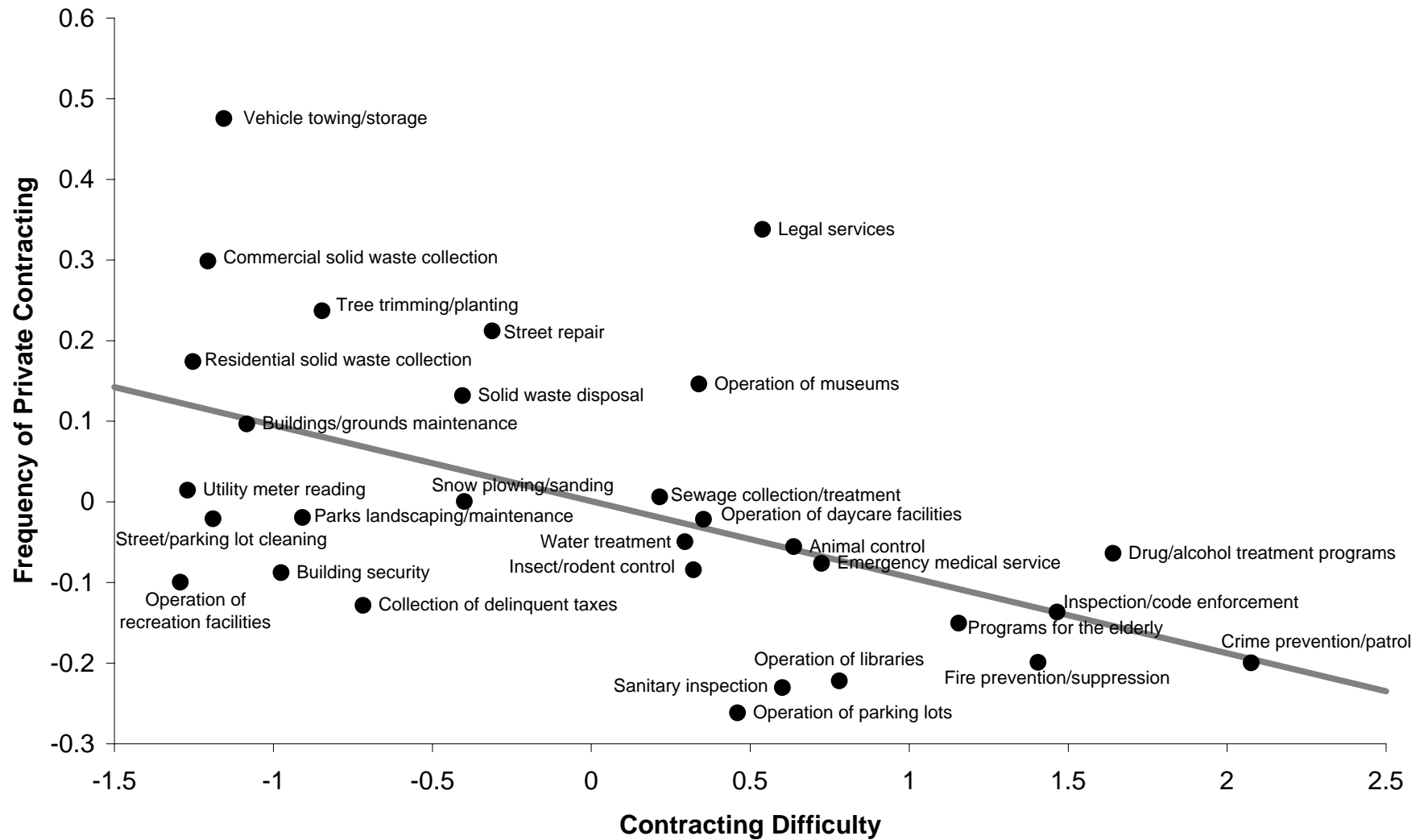


Figure 1B: Contract Difficulty and Inhouse Provision

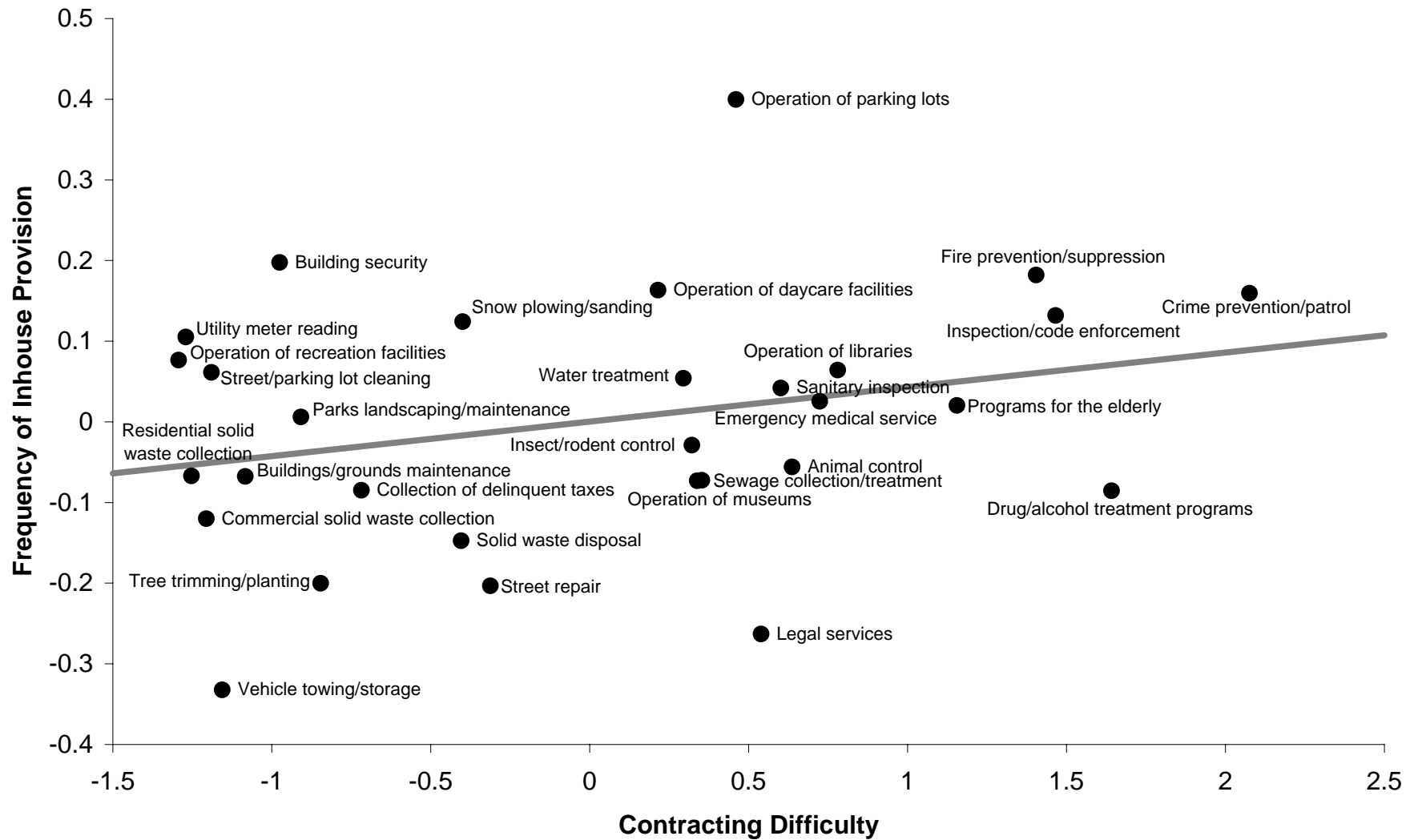


Figure 1C: Contract Difficulty and Public Contracting

