The Economics and Politics of Contracting out with the Private Sector: Evidence from the US Transit Industry[1]

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The paper studies contracting practices in the US transit industry. It employs the methods of transaction cost economics and public choice theory to develop an empirical model of bus contracting in the US transit industry. The empirical results shed light on why transit services in the US remain largely public, despite many attempts to introduce competition by contracting out services to the private sector. The results show that the decision by transit agencies to contract out with the private sector is constrained by the transaction costs of contracting and the institutional and subsidy arrangements that govern the transit industry in the US. Services that require idiosyncratic investments to provide large densities of passengers are less likely to be contracted out than those services that are provided using standard, small vehicles. Similarly, increases in federal subsidies and dedicated subsidies are found to discourage contracting out with the private sector. On the other hand, increases in state and local subsidies, other things being equal, encourage contracting. Agencies that have high labor costs — indicating strong labor unions — are less likely to contract out. In light of these findings, the paper concludes that piecemeal contracting out of services is not likely to increase the role of the private sector in the provision of public transit services. Structures of subsidies and federal arrangements creates intertwined incentives that discourage contracting by transit agencies, thus foiling the attempts to increase efficiencies by establishing competition for transit markets.

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1. Introduction

Since the 1950's, the US transit industry has been in decline. As household income increased in the post World War II era, people bought cars and moved to the suburbs. Fewer people rode public transit, but transit had to cover greater distance. As a result, US public transit companies were unable to cover their expenses and, in 1950s and 1960s, most transit companies went bankrupt (Lave 1985). Through a lobbying effort by a coalition of large cities and transit labor, the federal government enacted the 1964 Urban Mass Transportation Act mandating and providing money to local governments to save urban mass transit (Smerk 1974, 1991). Municipalities responded by purchasing the failing private transit companies and replacing their equipment, and setting up new institutions to operate them. Despite the efforts from the government, public transit continues to lose its appeal to passengers. Transit's share of commute trips has declined from 12.6 percent in 1960 to 5.1 percent in 1990 (Nationwide Personal Transportation Survey 1990).

The disappointing record of the transit industry and the failure of the public sector to improve the situation have led policy makers and researchers to propose private sector participation. It is argued that this will make the industry more responsive to market forces, and control the rising costs and subsidies of transit investment and operation (Department of Transportation 1984; Lave 1985; Gomez-Ibanez and Meyer 1993; Klein, et. al 1997; Winston and Shirley 1998).

Private sector participation in the transit industry could be introduced by allowing competition *in* the market, or by instituting what is called competition *for* the market. The former takes place when competing bus companies compete on the same route, or when informal operators (such as jitneys) provide comparable services on the same route with the formal transit provider. The British bus deregulation and privatization in the 80's is an example where competition in the market took place in cities outside of London (White 1995). Similarly, in many cities in less developed countries there is extensive competition in the market from informal operators that provide comparable service with the formal service (Roth 1987, Gomez-Ibanez and Meyer 1993).

The second form of competition, which is the focus of this paper, is often called *competitive contracting or franchising*. It is the most common form of privatization in the US where many municipalities contract out with the private sector local public services, including transit services (Savas 1987; APTA 1995; Teal 1988).

Under competitive contracting, the transit provider delegates the operations of transit services to a private company but retains planning and policy decisions. Although it is only the winner of the contract that gets to provide the services, competitive contracting allows the government agency to get the benefits of competition as competing contenders offer the best market terms they can to win the contract.

The structure of the essay is as follows. Section two provides current contracting practices in the US transit industry. Section three develops a model of service contracting in the US transit industry. Empirical results and the data used in the analysis are reported in section four. Section five has concluding remarks.

2. Contracting Practices in the US Public Transit Industry

A substantial literature addresses the question of whether contracting out with private sector brings cost and subsidy reductions and whether it increases labor productivity. The most widely cited and extensive research was done by Teal et al. in the 1980's. The authors surveyed over 800 transit systems throughout the United States, and found that 35 percent of them contracted some or all of their services (Teal, 1988, 209-210). Several factors motivate public agencies to contract out with private providers. The primary reason for contracting out with the private sector, according to these studies, is the cost savings accrued when a private firm, with less labor cost and restrictions, operates the services (Teal, 1985, 6; Gomez-Ibanez and Meyer, 1993, p. 65). Teal (1988, 218-219) found that contracting reduces costs by 10 to 50 percent.

In addition to the study done by Teal et al., others have examined whether contracting leads to improved performance in the transit industry. Some studies found that there were efficiency gains from contracting while others found conflicting evidence (See Perry et al. 1988 for a review, or see Cox et.al 1997 for more recent experiences with bus service contracting).

Transit agencies that have instituted contracting claim improved productivity and cost effectiveness. Cervero (1988) argues that contracting not only reduces costs on the contracted services but also provides transit agencies with what he calls "second-order benefits". The benefits accrue because labor unions make wage and work-rule concessions to forestall further contracting and protect their jobs. The concessions include the elimination of 40-hour work guarantees and the ability to hire part-time drivers. Similarly, Winston and Shirley (1998, 90-93) find, in a simulation study of US urban transit, that privatization of the transit system would bring in a net welfare benefit on the order of 10 billion dollars from reduced subsidies and efficiency gains. Similarly, Cox, et al.(1997) find that the Denver Regional Transportation District was able to save 88 million dollars in the five years it contracted out 25 percent of its bus operations.

If contracting out saves on costs and subsidies and has the attractive features described above, the question is then why hasn't contracting out become the rule rather than the exception in the US transit industry? In particular, in an era of worldwide movement to scale down government involvement in the economy and to privatize many government services, the US transit industry still remains largely public[2].

Previous studies on the topic fail to systematically answer this question of why competitive contracting has not been used more widely in the US transit industry. They focus mainly on efficiency gains from contracting out with the private sector. But, these do not account properly for efficiency because they don't include transaction costs (which are real costs) incurred when moving to a different institutional arrangement. Without accounting for transaction costs of contracting, we will not know whether it is more efficient to contract out or produce the service internally. Furthermore, previous studies do not account for political and institutional barriers faced by transit providers to establish competition for the transit market.

The purpose of the paper is to remedy this gap in the literature and to shed light on the factors that restrain the use of competitive contracting as an alternative institutional arrangement for service provision in the US transit industry.

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[2]Teal (1988, 212) reports that contracting accounted only for 5.1 percent of nationwide transit expenditure, and 8.6 percent of revenue vehicle miles. Similarly, APTA (1995) reports that in 1993 contracted services accounted for only 11.08 percent of nationwide transit operating expense.

3. Theoretical Framework

The analytical framework for the paper is that of the New Institutional Economics and Public Choice theory. I build on this body of research to analyze the choice of a governance structure in the transit industry. These analytical frameworks offer a systematic and comprehensive approach to analyze institutional choice and economic organizations. The New Institutional Economics focus on transaction costs, and its more microanalytic approach to the study of economic organization is a useful instrument to identify the factors involved in choosing a particular form of institutional arrangement over other alternatives. Similarly, public choice theory suggests political and institutional variables to incorporate into the analysis and considers how these variables affect the economic performance of different institutional arrangements.

The New Institutional Economics framework extends the methods of neoclassical economics, but holds the view that institutions matter in economic activities, and that different types of economic activities call for different forms of institutional arrangements. It focuses on organizational issues and seeks to explain how transaction costs and the structure of property rights affect economic behavior, and how the various economic activities are aligned with different forms of governance structure to economize on transaction costs.

Transaction costs are distinguished from production costs in that they refer to the friction created in economic exchanges across technologically separable production units (Williamson 1985, 18-19). North (1990, 27) defines transaction costs as "the costs of measuring the valuable attributes of what is being exchanged and the costs of protecting rights and policing and enforcing agreements". Williamson (1985, 20-21) identifies two types of transaction costs: *ex ante* and *ex post* costs. The former deals with the costs of drafting, negotiating and safeguarding an agreement. The latter includes (i) the costs incurred when transactions drift out of alignment with requirements; (ii) the haggling costs incurred to correct *ex post* misalignment, (iii) the costs of governance structure (often not the courts) to which disputes are referred, and (iv) the bonding costs of effecting secure commitments.

According to Williamson, transaction costs emanate in the presence of three interrelated factors: bounded rationality, opportunism, and asset specificity. In the presence of bounded rationality, any contract would be ultimately incomplete as contracting parties lack the foresight to write a sufficiently detailed contract. The incompleteness of the contract may cause one contracting agent to "hold-up" the other in the event an adaptation is needed to changing circumstances during the execution period. Ex post transaction costs thus become pervasive if the contract is exposed to opportunistic behavior. According to Williamson (1979, 1985) and Klein, Crawford, and Alchian (1978) opportunistic behavior arises when contracting parties behave with self-interest that includes *guile.* In order to avoid *ex post* opportunism, parties must design *ex ante* safeguards in the form of either bilateral contract that spell out future contingencies and appropriate adaptations, or a unified governance structure.

However, behavioral assumptions (bounded rationality and opportunistic behavior) alone do not lead to non-market governance structures. Williamson claims that the presence of *idiosyncratic investments* in assets is a necessary condition for market mediated transactions to pose contractual problems, therefore needing a specialized governance structure to execute the transaction. In the absence of asset specificity, a bilateral relationship that would create a "lock-in" effect between contracting parties does not occur, and the identity of the parties does not

become relevant to the execution of the contract. When non-trivial relationship specific investments are undertaken, however, the parties to an exchange establish a bilateral relationship in which the continuation of the transaction is valued. The bilateral relationship calls for a safeguard mechanism to reduce the hazards of opportunism. The safeguards could be in the form of long term contracts, specifying *ex ante* all future contingencies and appropriate adaptations; or vertical integration of the contracting parties.

The foregoing shows that firms are important institutions in the market economy. They economize on transaction costs by allowing economic agents to make sequential adaptations to future contingencies and unforeseen circumstances. Transaction cost economics also highlights that there are important differences between producing internally and using the marketplace to procure inputs for production. In section 4.4, we will see how transaction costs also become pervasive and enter the cost function of transit providers when they decide to outsource their operations. As with private firms, transit providers face an uncertain and complex world. Therefore, any outsourcing arrangement they make will be susceptible to contractual problems that are similar to those faced by private firms.

3.1 Application of Transaction Cost Economics to Bus Contracting

Although transaction cost economics has been used to examine the choice of alternative governance structures in the private sector, its application to the public sector has been limited. This paper will extend transaction cost economics to examine the nature of public firms and to analyze how the existence of transaction costs affects the choice of alternative institutional arrangements in the public sector.

Local and county governments in the US have transit agencies or departments that plan and operate mass transportation. Most transit providers operate as vertically integrated firms where the planning and operations of transit service are carried out within a unified governance structure. But when transit agencies contract out with the private sector, the planning and operating units will be separated into two autonomous entities. The two units will have a contractual relationship and their transactions will be governed under bilateral governance structure, as opposed to unified governance structure. The private contractor assumes the operation of the services, while the public contracting agency retains the planning and policy functions. Therefore, contracting out with the private sector entails changing the governance structure for the production of transit service from a unified to bilateral governance structure. The question is then when is it more efficient for a transit agency to move from unified governance to bilateral governance structure? In the private sector, outsourcing takes place when asset specificity is low. In a similar fashion, I use transaction cost variables of asset specificity to develop testable hypotheses to explain conditions that make it more efficient to contract out.

Vehicle Asset Specificity and Contracting Out

As outlined above, the existence of asset specificity is the most important dimension for a transaction to pose a contractual problem. Most of the vehicles used for urban transit are built to specifications that depend on the type of service. The American Public Transit Association (1995) reports that there are seventeen different types of vehicles in use for urban mass transportation. Vehicles used for fixed-route services, for example, are different from vehicles used for demand responsive or commuter-express services. More importantly, many transit

vehicles are not suitable for use outside of the firm[3]. Therefore, the extent to which a vehicle could be re-deployed for use outside of the firm determines the degree of its asset specificity. If a vehicle could not be used for other forms of transportation, such as interstate transportation or charter buses, then the vehicle would have a relatively high degree of asset specificity. On the other hand, if the vehicle is a general-purpose vehicle in the sense that it could easily be re-deployed for use outside of the transit industry, then its degree of asset specificity will be relatively lower.

Consider articulated buses. An articulated bus is 55 or more feet long, has connected passenger compartments, and bends at the connecting point when the bus turns a corner. It is used in urban thoroughfares for fixed-route services. Its applicability in other forms of transportation either outside of the transit industry, such as interstate travel, or within the transit industry, such as demand responsive transit services, is limited. Similarly, a *transit bus*, which has front and center doors with low back seating and does not have luggage storage, is used mainly for fixed-route services. Thus, *transit buses* cannot be re-deployed easily for other uses, such as interstate travel, for interstate buses must be equipped with luggage storage, and usually maximize passenger seats by having only one front door.

On the other hand, vehicles used for demand responsive services exhibit trivial asset specificity. The vehicles used for demand responsive services are oftentimes sedans or small vans, which clearly have use outside of the transit industry. Asset specificity is, therefore, more pervasive in fixed-route services than commuter and demand responsive transit services.

Measuring transaction costs of contracting

Transaction costs are notoriously difficult to measure, as they do not appear in a firm's accounting book. Empirical researches that measure the extent of transaction costs in economic exchange use proxy measures (Masten, 1996). Most often, asset specificity is measured by simply asking whether the technology of production is specific to the transaction in question.

Therefore, to determine whether transaction costs are a factor in the decision to contract out, I need to measure the level of asset specificity of the vehicles in use to operate services. However, there is no direct way of measuring the degree of vehicle asset specificity, as the data does not exist for it. Therefore, I will use proxy measures whose features are correlated with vehicle asset specificity.

Insofar as asset specificity becomes an important element in the contractual agreement, the extent to which public transit agencies will contract out services is determined by the degree of relationship-specific investments required to support the contract. For example, contracts that require idiosyncratic investments make the party that makes the investments vulnerable to opportunistic behavior by the contracting agency, increasing the ex post transaction costs of renegotiating the contract. Once a private contractor deploys a large fleet of dedicated buses to support the transaction, the contracting agency may demand more concessions from the contractor. It may require it to provide services in areas that are not profitable without more remuneration. In addition, contracts could be cancelled during the contract period or when they are up for renewal because of policy reversal from the contracting agency.

[3]The transit provider could presumably sell the vehicles to another transit firm in another city. But this would entail added cost to find a buyer in a market that is not well developed. Hence, the argument that specialized vehicles are not easily redeployed holds.

Contracts that require relationship-specific investments in vehicles, therefore, have high transaction cost of contracting, and need specialized governance structure to safeguard the contract from opportunistic behavior. On other hand, contracts that could be supported by general-purpose vehicles are associated with low transaction costs of contracting, and therefore do not need specialized governance structure. Hence we have the following proposition.

> Hypothesis I: Other things being equal, demand response services are more likely to be contracted out.

The fleet size of a transit agency is a variable that is correlated with high degree of asset specificity, because the more specialized vehicles are deployed to support a contract, the more it is difficult to re-deploy them for other use. Thus, as the fleet size of specialized vehicles increases, the need for a safeguard mechanism increases. Alternatively, fleet size may just capture whether contracting varies by the size of the firm. That is, it may be a proxy measure of whether large agencies are more likely to experiment with contracting out or not. That is, transit agencies with a large fleet size may provide an array of services that provides them with the flexibility to contract out those services that use standardized vehicle. Nevertheless, we have the following testable hypothesis.

> Hypothesis II: Other things being equal, if the fleet size of the transit agency is large, the agency is less likely to contract out.

The volume of passenger trips is correlated with high degree of vehicle asset specificity. This is because transit providers deploy large, specialized buses to exploit economies of densities in service provision (Mohring 1972). The more the number of passengers are in a service contract, the larger the vehicles have to be to support the contract. Contractors that wish to provide services in a thick route, for example, may need to deploy articulated buses and other large vehicles that have little use outside of the transit industry. Therefore, density of passenger trips is a good predictor of how specific the vehicles will be to support a contract service. Hence, we expect transit agencies that have high volumes of passenger trips to contract out less than those with fewer passenger volumes do.

> Hypothesis III: Other things being equal, if the density of passenger trips is high, transit agencies are less likely to contract out.

Summary

In the transit industry, there are three variables that determine the extent of transaction costs involved in producing a contract service: *demand responsive service, fleet size and passenger trips*. These variables are proxy measures of how much relationship-specific investments are needed to support a service contract. The testable hypothesis is that the higher the magnitude of these variables is, the larger the transaction costs will be to contracting out with the rivate sector.

> The three hypotheses are combined to form equation 1 below:
> (1) Probability of contracting = f (fleet size, passenger trips, demand responsive services.)

3.2 Public Choice Theory and the Choice of Governance Structure

Transaction cost economics provides us with an economic explanation of the choice of a governance structure. Public Choice theory, however, suggests that political economy and institutional considerations often dictate many decisions in the public sector. As a result, transaction cost considerations may not fully account for the choice of governance structures in the US public transit industry. A better understanding is gained when political and institutional considerations are included in the analysis. Public choice theory studies non-economic decision-making using economic tools. Its focus and scope are vast, and the discipline has been used to analyze various non-economic decision making, such as voting behaviors in representative democracy (Downs, 1957), rent-seeking activities (Tullock, 1967), bureaucratic behaviors (Niskanen, 1971; McCubbins, Noll, Weingast, 1987), policy intervention in research and development (Cohen and Noll, 1991). Mueller (1989) has an exhaustive literature review and topics covered in public choice. In this study, I draw from analysis of public bureaucracies to examine how political and institutional variables affect institutional choice in urban transit.

William Niskanen (1971) building on the works of Weber (1947), Downs (1967), Tullock (1965) developed a model of bureaucracy that could test the behaviors of bureaus. Niskanen's model of bureaucracy uses standard economic tools and is based on purposive behavior by managers of bureaus. The managers of bureaus (or, bureaucrats in general) are assumed to be self-interested rational individuals who maximize their utility subject to a constraint, in the same way consumers and firms maximize utility and profits, respectively. Niskanen's proposition that bureaucrats maximize *their* own utility is a departure from previously held notions that bureaucrats maximize a social objective function.

According to Niskanen (p. 38), the utility of a bureaucrat is a function of, among other things, income and perquisites. The latter includes prestige, power, and patronage. Both income and perquisites are postulated to be positive monotonic functions of the bureau's budget and output.

Niskanen (p. 15) defines bureaus as organizations that are partly financed by grants from a collective organization, and whose profits from sales may not be appropriated by employees or managers of the organization. But bureaus do have a discretionary budget that could be appropriated by bureaucrats. A discretionary budget is the difference between the maximum budget that could be obtained from a bureau's sponsor for the production of a given output, and the lowest cost for which the output could be produced. Since managers do not have residual rights to profits from sales, they opt to maximize the discretionary budget so as to enable them to maximize their utility. Niskanen contends that managers of the bureaus appropriate the "profits" indirectly in the form of increased income (such as higher salary grades) and perquisites (such as bigger offices). In short, bureaucrats maximize their utility by expanding the discretionary budget.

Niskanen's theory has been criticized not so much for its conclusion of the budget maximizing bureaucrat, which has been supported by many empirical evidence (see Mueller 1989 for a review) but, for its theoretical underpinnings. McCubbins, Noll and Weingast (1987) argue that while there is asymmetry of information between the sponsor and bureau, there are ways of mitigating this problem. In particular, they argue that "oversights", such as monitoring, hearings, budget reviews are ways of extracting information from bureaus. Even a more a subtle way, they say, is that of administrative procedures. According to "McNollgast" (McCubbins, Noll and Weingast), the relationship between the collective organization and the bureau is best viewed as a

principal-agent problem. Thus, the principal (the collective organization such as a city council) could set up appropriate incentives to get the agent (for example, a transit agency) to behave in the collective organization's or its constituent's interest. So, while Niskanen conjectures that the collective organization's hands are tied by its monopoly relations with its agent, the McNollgast view contends that carefully structured incentives and administrative procedures will ensure that the agents will make decisions that the elected officials would themselves have made.

The McNollgast theory rests on a critical assumption in that elected officials wish to be efficient when spending taxpayers' money in order to increase their chance of getting re-elected (Becker, 1983, 1985). Becker argues that pressures from the electorate will ensure that the officials who get elected and stay in office are the ones whose expenditure preferences are aligned with those of the electorate. Hence, to the extent that the political process gives these results, elected officials will ensure that the bureau — which is their agent — does not astray too far from the electorate's preference.

Although, the McNollgast's theory of political control of agency is developed in the context of the federal government, it could easily be extended to local governments. Local governments have elected legislatures (such as city councils or county board of supervisors), and elected executives (for example, the Mayor of a city). Additionally, elected local official, like Congress and the President, have agents to carry out their policy objectives. Regional transit authorities are analogues to a federal agency such as the Environmental Protection Agency, which has been analyzed to support the McNollgast theory.

However, there is one important difference in that local bureaus, in addition to state and local sponsors, have federal sponsors. Many local government agencies receive subsidies from the federal government, but they are not subject to the same agency relationship as, say, EPA would have with the federal government, or the same local agencies would have with their local sponsors. This key difference in the structure of the agency relationship highlights that elected federal officials, even when wishing to be efficient, will suffer from lack of local knowledge to effect constituent-responsive behaviors from bureaus (Hayek 1945).

Like any principal-agent relationship, the bureau-sponsor relationship is fraught by asymmetry of information. When the asymmetry of information is extreme, bureaus would have autonomy from their sponsors and we could test whether they act like a Niskanen- bureaucrat. On the other hand, if we assume elected officials wish to enhance efficiency in response to electoral pressures, we can test whether the McNollgast theory of political control of bureaus would hold.

3.3 Application of Public Choice Theory of Bureaus to Bus Contracting

Does the Niskanen/McNollgast conjecture explain contracting practices in the US transit industry? In what follows, I develop testable hypotheses to examine whether transit agencies behave as budget-maximizing bureaus. But first, I will summarize the non-economic issues that affect the choice of governance structure in the US transit industry. The most important non-economic variables that may constrain contracting in the public transit industry are the availability and structure of subsidies, the institutional arrangements, labor laws, and the existence of ancillary goals.-

Subsidies and Transit Contracting

Many empirical studies have found subsidies to be a source of inefficiency in transit operation (see, for example, Pucher et al. 1983; Winston and Shirely 1998; and Karlaftis and McCarthy 1998). Subsidies cause inefficiencies because they (i) accrue mostly to pay salaries and benefits of transit mangers and labor; (ii) keep fares below the marginal cost of operation; and (iii) encourage pressure from residents in the suburbs and from other constituents to expand services to non-profitable areas.

Transit agencies get most of their funding from federal, state and local subsidies. The incentive structures of the different levels of government subsidies are different, and hence affect the performance and decision making process of transit providers in different ways. Pucher et al. found that federal subsidies were more distortionary than local subsides. Similarly, in a study of transit systems in the State of Indiana, Karlftis and McCarthy (1998, 370-371) found that federal subsidies were more likely to increase operating expenses than local and state subsidies.

The fact that federal subsidies are more likely to be distortionary than state and local subsidies is consistent with the hypothesis that asymmetry of information between bureaus and sponsor organization is more severe with federal sponsors than state and local sponsors of transit services. Federal officials are likely to have less local knowledge than state and local officials on the cost and production process of local agencies (Hayek, 1945). As a result, transit officials are more likely to bargain for a larger budget with the federal government than with state and local governments. The larger budget, will in turn, encourage the production of transit services within the agency, so that the bureaucrats' utility of having higher income and perquisites is maximized.

The effect of state and local subsidies on the choice of governance structure is unclear. On the one hand, Niskanen's model predicts that the availability of any subsidies would lead to a budget-maximizing behavior. But, in the McNollgasts model, since the asymmetry of information is less severe with state and local governments, elected local officials may limit transit agencies from behaving as budget-maximizing bureaus. In particular, state and local governments can develop administrative procedures and incentive structure to make transit agency behave in their constituent's interest. State and local sponsors of transit agencies have a bargaining power that allows them to provide transit agencies with a budget that is enough only to produce services at minimum cost. Therefore, we have the following hypothesis.

> Hypothesis IV: Other things being equal, transit agencies that receive federal operating subsidies are less likely to contract out with private providers. And, the availability of state and local subsidies is indeterminate *a priori.*

Institutional Arrangement and Transit Contracting

Giuliano and Teal (1987) identify two forms of institutional structures by which transit agencies are organized. The first one is referred to as *consolidated agency or special district.* These are transit agencies that have funding and operating authority. Regional transit authorities, such as the Los Angeles Metropolitan Transit Authority, are examples of consolidated agencies. They have dedicated transit revenues from sales or property taxes, and often cover more than one jurisdiction. They report to Board of Directors, who are often elected city/county officials or their appointees.

The second type of institutional arrangement for the provision of public urban transit is called an operating agency which are agencies that are limited to operating transit services and

whose budgets are controlled or allocated by external entities, such as counties, cities or transportation boards (Giuliano and Teal, 1987, 2). Operating agencies are often transit departments within a city or county government.

The two institutional arrangements for the provision of public transit have different incentive structures with different payoffs to bureaus and sponsors alike. They therefore have a bearing on the decision making process by transit providers in that the decision to contract out will be different across institutional structures. For example, because consolidated agencies have dedicated taxes, we could expect that they would be less likely to contract out than operating agencies.

On the other hand, when cities use general funds to support transit services and when they have the mandate to allocate transit subsidies for other municipal services, such as road repair, they tend to seek a more efficient way to provide transit services. As a result, we could expect cities with discretionary funds that use operating agencies would be more likely to contract out with the private sector than their counterparts with dedicated funds for transit services. In the context of Niskanen's model, transit agencies with dedicated funds will attempt to increase the budget and output beyond what is necessary. While it maybe less expensive to contract out with private providers, officials of the transit authority will produce the services "in-house" in order to increase the available budget from dedicated taxes. Thus, we have the following hypothesis:

> Hypothesis V. Other things being equal, transit agencies with dedicated subsidies are less likely to contract out.

Labor Laws and Contracting Out

Labor laws affect whether a transit agency will contract out or maintain an integrated transit agency. Transit agencies that receive federal subsidies are constrained under Section 13 (C) of the Urban Mass Transportation Act from taking actions that would harm transit workers. Therefore, if contracting would lead to the layoff of drivers or reduce their fringe benefits, transit agencies may not contract out. Moreover, Section 13 (C) provides labor unions with a collective bargaining privilege to influence policy decisions in transit agencies. Thus, most transit policy makers often lack a clear authority to make decisions, including the allocation of funds and whether to contract out or not (Transportation Research Board, 1988, 27f).

The salary and benefits that accrue to transit labor can measure how strong the labor union is in a given transit agency. A transit agency that faces high labor costs could be expected to contract out to save on operating expenses. But, the fact that transit labor is getting paid unusually high salary and benefits reflects the bargaining power of the labor union. Therefore, transit agencies that have high labor costs could be expected to have strong labor unions than those agencies with lower labor costs. Therefore, if we use labor cost as a proxy to measure the power of labor union, we have the following hypothesis.

> Hypothesis VI: Other things being equal, transit agencies that have high labor costs are less likely to contract out with the private sector.

Ancillary Goals and Contracting out

Finally, contracting in the public sector is distinguished from the private sector in that transit authorities are required to solve a host of socioeconomic and environmental issues. Lave (1985) and Fielding (1995) argue that in addition to providing transit services, transit agencies are

now required to reduce air pollution, conserve energy, mitigate poverty, and rejuvenate cities. Many citizens, interest groups and politicians consider these ancillary objectives as "public goods"[4]. They thus call for government intervention in the form of subsidies and public ownership of transit to ensure that these goals are met. Since, measuring the output of ancillary goals (such as, how much air pollution has been reduced by public transit) is difficult, contracting out with a private sector will pose measurement problems (Barzel 1982). The public agency can not package the contract with specific performance measurements of ancillary goals, in the same way it could include performance measurements on passenger services provided. Therefore, the difficulties in measuring the output of ancillary goals may encourage the production of transit services within the public sector. In particular, transit authorities whose constituency emphasizes ancillary goals (for example, an environmentally conscious constituent) will be less likely to contract out.

There is no good way of directly measuring this variable. So, it will not be estimated. However, the dedicated subsidy could capture some of the elements in that dedicated taxes for transit reflect the willingness of the constituent to use transit to achieve ancillary goals. Given that most Americans rarely use transit, it appears they are willing to be taxed for reasons other than traveling.

Summary

Political economy and institutional variables that are part of transit providers' objective function may sway the choice of governance structure from the economically optimal choice. While the governance structure for private sector economic exchange is determined by the behavioral and physical attributes of the transaction, the choice of governance structure in the public transit industry involves political and institutional issues. After accounting for transaction costs, a transit agency may find it more efficient to contract out, but the existence of non-economic variable may preclude it from contracting out.

Therefore, the analysis will test the political and institutional variables that affect the incentives and behaviors of transit providers to examine whether transit agencies will contract out with the private sector. The different forms of subsidies capture most of the non-economic variable in the transit agency's objective function. Dedicated subsidies are good proxy for whether the transit provider is a *consolidated agency or an operating agency.* They also measure the willingness of the local constituency to provide funding to achieve ancillary goals. Similarly, federal subsidies measure whether transit agencies behave as Niskanen-type bureaucrats, as federal sponsors lack local knowledge and suffer from asymmetry of information to affect the behavior of local transit providers in the constituents' interest. State and local subsidies will test whether governments at lower levels respond to their constituents more efficiently than those at the federal level. That is, the state and local subsidies will test whether lower level governments are more able to structure incentives to affect the behavior of bureaus be responsive to the constituent.

Combining the subsidy and the salary variables, we get equation 2 below.

(2) Probability (Contracting) = g(federal subsidy, state subsidy, local subsidy, dedicated subsidy, salary)

[4]Although many researchers have found that the role of transit in meeting ancillary objectives have been disappointing at best (Lave 1978; Altshuler, 1978; Lowe 1990; Fielding 1995.)

4. Data and Estimation

Data for this analysis is drawn from the 1993 Section 15 Report of the Federal Transit Administration. The Section 15 data contains annual operating and financial reports of transit agencies that receive federal subsidies, which includes virtually all transit systems in the US. The sample used for estimating the model omits rail services, trolley buses and ferries, leaving only motor bus and demand responsive services. Additionally, privately owned transit companies are excluded from the sample. This leaves 425 observations. Definitions and descriptive statistics of the variables used in the estimation are given in Table 5.1(Shown in Appendix 1, P. 124).

Methods of Estimation

Equations 1 and 2 above are combined to specify the model for estimation.

(3) Prob (CONTR) = F(FLTSIZE, PASSTRIPS, DR, FEDSUBVM, STATSUBVM, LOCSUBVM, DEDSUBVM, SALVH).

The method of estimation is that of discrete choice model. The public transit agency is assumed to have a binary choice of whether to contract out or not. Formally, the choices are as follows:

Prob (Y=1) = F (β_i'X_i)
Prob (Y=0) = 1- F (β_i'X_i)

Where the parameters β_i reflect the impact of changes in X_i on the probability of contracting out (Y=1) or producing the service in-house (Y=0). That is, Y=1 if the transit agencies contracts out some or all of its operations, and zero otherwise. The X's are the explanatory variables listed in equation (3). The function F is assumed to be of a logistic form. The subsidy variables are measured as subsidy per vehicle miles, while fleet size and passenger trips are in logarithm values. Salary variable is measured as total wages and benefits per vehicle hour[5].

In addition to the logit model, Ordinary Least Square (OLS) estimation technique was employed to assess whether expenditures on contracted services are related to the explanatory variables. The following equation was estimated using the OLS regression technique.

(4) $PURCH_i = \alpha_0 + \alpha_1 LOG\ (FLTSIZE)_i + \alpha_2\ LOG\ (PASSTRIP)_i + \alpha_3 DR + \alpha_4 FEDSUBVM_i + \alpha_5 STATSUBVM_i + \alpha_6\ LOCSUBVM_i + \alpha_7 DEDSUBVM_i + \alpha_8 SALVH_i + \mu_i$

The specification relates purchased transportation (PURCH) — the share of operating expenditure paid to private contractors — to the transaction cost and public choice variables discussed in section three. The stochastic term μ_i is assumed to be normally distributed with mean zero and constant variance.

[5]I use salary per vehicle hours instead of salary per labor hours because the data does not have all the labor hours worked. It only reports labor hours for those services that are directly operated by the transit agencies.

Results

The regression results of equation 3 and 4 are reported in tables 5.2 and 5.3 respectively. The fleet size variable is positive and significant, contrary to expectation. One reason is that the variable is not a good proxy to measure asset specificity. The variable is an aggregate of all vehicles used in different services — transit bus, commuter bus and demand response service vehicles. Therefore, while transit buses have higher asset specificity, vehicles used for commuter and demand responsive services display trivial asset specificity. Therefore, if a transit agency contracts out its demand responsive service or commuter express service, any increase in the fleet size will come out as positive, confirming the notion that demand responsive and commuter services are often contracted out to the private sector.

Another regression on a sample of motor bus services only was run to see whether a different result would be obtained. Demand responsive vehicles were taken out, although it was not possible to separate commuter service vehicles. The regression results of the limited sample of 370 systems are reported on Table 5.4 and 5.5. The sign of the fleet size variable is still positive. An alternative explanation why the sign on the fleet size came out as positive instead of negative as expected is that large transit agencies may be under pressure from the press and regulators to contract out, since they are more likely to be on the spotlight than smaller agencies. Hence, they may be responding to this pressure by contracting out a small portion of their operation. In addition, large transit agencies are more likely to afford experimenting with contracting out than small agencies to see whether contracting out provides them with any benefits.

The other measure of asset specificity, passenger trips, came out negative and significant in the logit regression, as expected. Increases in passenger volume tend to discourage contracting with the private sector. The transaction costs to establish and monitor service contracts for extensive route and schedule service system was apparently high. Therefore economies of scale are gained by performing these functions and operation of services all in-house. Contracting out entails that the planning and monitoring of routes and schedules remains with the contracting agency, while operation of services will be done by the private sector. The result, however, suggests that it is more efficient to do the planning, operation and monitoring of services under a vertically integrated firm, rather than under a bilateral governance structure, where the operation is separated from the transit agency.

Demand response service came out as positive and significant in the logit regression, consistent with prediction. The low level of asset specificity and monitoring costs of demand responsive services is associated with low levels of transaction costs of contracting. Hence, transit providers find it economical to contract out the service rather than establishing an operational unit in-house to provide the service. The result also suggests that there are few if any economies of scope from operating both route and demand responsive services in-house. A transit provider could operate fixed-route services in-house, while contracting out its demand responsive service, without losing efficiency.

All the signs of public choice variables came out as expected, but not all were significant. An increase in federal subsidy was found to decrease the probability of contracting out with the private sector. This supports the hypothesis that federal sponsors of transit are not able to effect responsive behavior from transit agencies.

Similarly, if a transit provider receives a dedicated subsidy, it was less likely to contract out its services with the private sector. Again this supports the conjecture that transit agencies

behave as budget maximizing bureaus. When transit providers have dedicated taxes, they are insulated from the political process where elected officials have no way of influencing their behaviors. They do not have to go to elected officials for budgets and reveal their costs and operating procedures. As a result, elected officials are not able to make these transit agencies to be responsive to the electorate.

The coefficient sign on state and local subsidy variables came out as positive, supporting the McNollgast notion of administrative control of agencies by elected officials. Increases in state and local subsidies were associated with an incentive structure that makes transit providers to be more cost conscious, and hence use the private sector to operate some services. The results also confirm the Hayekian notion that local knowledge is important in making policy decisions. The fact that state and local governments are closer to transit providers than the federal government, suggests that the former is more able to design incentive structure that is closely aligned with the electorate — an electorate that prefers to be taxed less to more. In addition, since transit is a local prerogative, lower level governments have more political stake than the federal government in the sense that voters are more likely to reward or punish local governments than the federal government for the performance of transit operation. Therefore, it is not surprising we find state and local subsidies to have cost-saving incentives, while federal subsidies do not.

The salary variable was negative and significant, as expected. Increases in labor costs reflect the bargaining power of labor unions. The result, therefore, shows that strong labor union is preventing more contracting with the private sector.

Table 4.1 Definitions and Descriptive Statistics

		Motor Bus and Demand Response Services		Motor Bus Services Only	
Variable	**Definition**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
CONTR	A binary variable that takes a value of one if a transit provider contracts out some or all of its operations, zero otherwise.	0.64	0.48	0.31	0.46
DEDSUBVM	Dedicated operating subsidy per vehicle mile in dollars.	0.21	0.66	0.37	1.77
DR	Demand Response services; it takes a value of one if a transit agency provides a demand response service, otherwise zero.	0.84	0.37		
FEDSUBVM	Federal operating subsidy per vehicle mile in dollars.	0.61	1.10	0.8	0.66
FLTSIZE	Fleet size; vehicles operated in maximum service.	126.50	296.93	112	279.82
LOCSUBVM	Local operating subsidy per vehicle mile in dollars	1.08	2.21	1.76	0.98
PASSTRIP	Passenger trips; Annual unlinked trips in thousands.	10749.1	43022.2	12067.3	45887.7
PURCH	The share of operating expenditure paid to private contractors (in percent).	23.4	38.1	17.5	37.03
SALVH	Total wages and benefits paid to all transit workers per vehicle hour.	23.23	16.57	27.29	16.6
STATSUBVM	State subsidy per vehicle mile in dollars.	1.05	1.44	0.43	8.53

TABLE 4.2: Logit Regression Results: All Modes

Dependent Variable: CONTR

Independent Variable	Coefficient	t-Statistic
LOG (FLTSIZE)	0.868363	3.935879*
LOG (PASSTRIP)	-0.158640	-1.083206
DR	0.722494	2.184845**
DEDSUBVM	-0.662113	-2.517574
FEDSUBVM	-0.317825	-1.059348
STATSUBVM	0.019667	0.386030
LOCSUBVM	0.350311	2.269736*
SALVH	-0.053615	-5.175341*
C	-0.989583	-1.592250

Log likelihood = -221.765. Sample (N) = 425

**, ** significant at the 1%, 5%, confidence level respectively.*

TABLE 4.3: OLS Regression Results: All Modes

Dependent Variable: PURCH

Independent Variable	Coefficient	t-Statistic
LOG (FLTSIZE)	11.33597	5.212936*
LOG (PASSTRIP)	-5.620470	-3.716886*
DR	-18.69147	-5.302439*
DEDSUBVM	-3.295238	-1.657647***
FEDSUBVM	-4.760531	-1.591983***
STATSUBVM	0.879358	2.094771**
LOCSUBVM	1.679392	2.995428*
SALVH	-1.696623	-19.55063*
C	76.22383	11.83843

R^2 = 0.58; N = 425;

, **, * significant at the 1%, 5%, 10% confidence level respectively.*

TABLE 4.4: Logit Regression Results: Motor Bus Only

Dependent Variable: CONTR

Independent Variable	Coefficient	t-Statistic
LOG (FLTSIZE)	1.361067	4.668851*
LOG (PASSTRIP)	-0.301001	-1.557287***
DEDSUBVM	-0.550208	-3.295690*
FEDSUBVM	-0.227466	-0.761206
STATSUBVM	0.356089	2.683874*
LOCSUBVM	0.168701	1.313615***
SALVH	-0.141502	-8.374133*
C	-0.289188	-0.350941

Log Likelihood =-146.0053; N = 371

, **, * significant at the 1%, 5%, 10% confidence level respectively.*

TABLE 4.5: OLS Regression Results: Motor Bus Only

Dependent Variable: PURCH

Independent Variable	Coefficient	t-Statistic
LOG (FLTSIZE)	10.73296	4.524177*
LOG (PASSTRIP)	-5.498068	-3.012218*
DEDSUBVM	-1.166830	-1.649970***
FEDSUBVM	-5.436270	-2.763525*
STATSUBVM	1.044722	3.616803*
LOCSUBVM	0.352237	2.107626**
SALVH	-1.785512	-20.34193*
C	72.24767	9.952049

R-squared = 0.61; N = 371

, **, * significant at the 1%, 5%, 10% confidence level respectively.*

5. Conclusion

The US has chosen to introduce private sector participation in the transit industry through competitive contracting of services with the private sector rather than deregulating and privatizing the industry. It is argued that the public sector needs to preserve the policy and planning function of services to ensure that the larger public policies of transit are met. However, since its advocacy in the 1980's contracting out of services with the private sector has been limited. Data and surveys show service contracting in the US transit industry has been limited to some specialized service on a small scale. US transit providers apparently are not heeding the call to encourage private sector participation in the sector.

The results of this study show that competitive contracting with the private sector is constrained by the economics and politics of the transit industry. First, any contracting, whether it is in the private sector or public sector, entails transaction costs. There maybe production cost savings by contracting out operations, but when transaction costs of contracting are included, internal operation maybe more efficient than outsourcing. In particular, when idiosyncratic investments are incurred to support a service contract, outsourcing the service operation creates high transaction costs, which offsets the production cost savings. Therefore, efficiency analysis of contracting out has to include the transaction costs of contracting. The fact that transit agencies may reduce production costs from contracting some specialized services does not mean they will gain by contracting out more services that require idiosyncratic investments to support the contract.

Second, the availability of subsidies encourages transit mangers to maximize their discretionary budget to increase their utility. Transit managers prefer more budgets to less. To the extent contracting out with the private sector saves money, it would entail the reduction of budgets. Therefore, transit managers will resist contracting out of services, unless they are required by their sponsors to employ more private sector in the provision of services.

Third, the structure of subsidy and federal arrangements create intertwined incentives that discourage contracting by transit agencies, and thus foiling the attempts to increase efficiency by establishing competition for the market. Even though local governments and their constituents may wish transit providers to be more efficient, federal sponsors of transit negate their initiatives by throwing money into transit.

Fourth, the strength of the labor union is a major constraint on using the private sector to operate services. The labor clauses dictate that transit providers can not take actions in such a way it will reduce current and future income and benefits of transit labor. As it was shown contracting out with the private sector has adverse effects on labor. Therefore, a strong labor union will see to it contracting out does not take place.

In light of these findings, the US's chosen method of private sector participation in the sector can not be expected to bring a meaningful change in the organization of the transit industry. Given the economic and political constraints of contracting out, it is not surprising that the transit services continue to be largely operated by public transit agencies.

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