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The Effects of Governmental Accounting Methods on Asset Acquisition Decisions: A Theoretical Model and Three Case Studies

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ABSTRACT

This is an exploratory study of effects of municipal accounting practices on capital asset acquisition decisions. Theoretical decision models are developed for using expenditure and depreciation accounting. The models suggest expenditure accounting may lead to inefficient acquisitions in the long-run. Leases in three cities are subjected to present value analysis and compared to purchase alternatives. In these three cases, lease analysis supports the theoretical models. They suggest that departments using expenditure accounting will acquire assets with uneconomic leases and that these leases will be more uneconomic than leases of departments using depreciation accounting.

The cost of government is a topic of considerable concern today. While different parties may disagree on the appropriate level of government spending, most will agree on the need for efficiency in spending. For this reason, the effect of an accounting and reporting model on governmental financial efficiency should be of concern to accounting standard-setters and to the constituents of government.

This is an exploratory study of the effects of alternative municipal accounting practices on capital asset acquisition decisions. It begins with the development of a theoretical model of asset acquisition decision-making in the municipal environment, based upon an analysis of the incentives and constraints presented by current reporting practices. This model suggests that reporting expenditures, as required for general government activities by municipal generally accepted accounting principles (MGAAP), will encourage acquisition decisions that will reduce annual expenditures. These may include the use of operating leases, in spite of the fact that they may be more expensive, or inefficient, in the long run, than purchases. A contrasting theoretical model, in which expenses are reported, suggests that more expensive, inefficient acquisitions will be discouraged by the use of this alternative reporting method. While municipalities as a whole do not report expenses, some of their activities (enterprise and internal service funds) are required to use the commercial model for reporting purposes. Thus, it is possible to compare the decisions resulting from the use of the two reporting methods within a city.

After development of the theoretical models, a field study of the leasing practices of departments in three cities was conducted to determine whether actual practice appears to be consistent with the theoretical models

in these cases. The lease contracts (both operating and financing leases) for all departments of three cities were analyzed using present value techniques and were compared to their purchase alternatives for long run efficiency. Based upon the theoretical model and results of the examination of case study data, hypotheses regarding the effects of government accounting practices on departmental capital asset acquisitions are proposed. The following hypotheses were suggested and are proposed for further investigation:

H1: Municipal departments that use expenditure accounting will tend to acquire assets for long-term use with leases that are uneconomic.

H2: Municipal departments that use depreciation expense accounting will tend to acquire assets for long-term use with leases that are more economic than the leases negotiated by departments that use expenditure accounting.

Theoretical Development

Municipal Accounting and Budgeting

Governmental funds, which are used to account for most municipal government functions, use modified accrual accounting and incorporate the budget into accounting. When an asset is purchased for long-term service, the total cost of the acquisition is recorded as a one-time expenditure of the period, instead of depreciated. The expenditure accounts will usually show both the total expended to date and the remaining budget appropriation. In addition to its inclusion in the accounts, the annual operating budget must also be included in the external reports of governmental funds that are in compliance with MGAAP [MFOA, p. 18].

Capital budgeting is emphasized much less than the annual operating budget. The decision to use a capital budget for planning or to include these documents in external reports is left to the individual municipalities [MFOA, pp. 15-18]. Harry Hatry, director of the State and Local Government Research Program at the Urban Institute, has noted:

> Capital-budgeting analysis in state and local governments is rudimentary compared with the private sector. There is seldom significant provision for such techniques as "make or buy" analysis or "optimal equipment replacement" analysis [Hatry, p. 273].

Enterprise funds account for activities that are operated and financed in the same manner as private enterprises, e.g., utilities and airports. Internal service funds provide goods or services internally, but charge user departments on a cost-reimbursement basis. These "proprietary funds" are required by MGAAP to use full accrual accounting and report net income as business enterprises, using a capital maintenance focus [MFOA, pp. 10-13]. Fixed assets are capitalized and charged against net income through depreciation expense. In order to accentuate the difference between the two approaches in accounting for asset acquisitions, the modified accrual approach will be referred to as "expenditure accounting" while the full accrual approach will be referred to as "depreciation accounting." General government activities, then, will always use expenditure accounting, but most cities will also have subunits of proprietary funds that use depreciation accounting.

Considerable controversy exists with regard to the use of expenditure accounting for reporting the activities of governmental funds. Proponents of MGAAP feel that reporting budgetary compliance is of primary importance:

> [T]he objective of accounting for fund entities is not to provide managerial information relative to costs and

> accomplishments of programs. Rather, the objective is to provide accounting control for the collection and expenditure of selected funds and to insure that no violations of legally authorized limits on expenditures occur [American Accounting Association, p. 97].

Opponents of current MGAAP suggest other objectives:

> The public has a right to know...the cost of present programs and services provided by the governmental unit. Proper depreciation accounting is necessary for this purpose [Davidson, et al., p. 46].

From a policymaking point of view, one means of resolving this conflict would be to demonstrate a cost (or benefit) associated with the objective chosen. The decision models discussed below suggest that the method of reporting asset acquisition and use might be expected to affect the efficiency of department administrators' financing decisions. The field study then examines actual costs associated with those decisions in three municipalities.

Models of Decision-Making Behavior

Organizational behavior literature provides a theoretical framework for the development of a model of municipal administrators' asset acquisition decisions. Simon's [1976] theory of administrative decision-making characterizes the administrator as solving a problem by choosing a course of action from a limited set of alternatives that may be controlled, to some degree, by the information provided by the organization. In this framework, data generated by the accounting and budgeting system would be expected to act as cues suggesting possible courses of action to the municipal administrator.

Insert Figure 1 about here

Figure 1 illustrates the asset acquisition process suggested by the information produced by an accounting system designed to comply with MGAAP for general government activities. The accounting system ordinarily provides two relevant cues (indicated in circles) to a municipal administrator who wishes to acquire a package of assets:

1) the budgeted expenditure limits for that department, and

2) the total actual expenditures made by the department.

These cues focus attention on a comparison of actual to budgeted expenditures. MGAAP provides no formal incentive to consider long-run costs. If other factors are to be considered in acquiring asset services, they must be suggested by information outside the formal MGAAP accounting system.

The apparent resulting behavior by the administrator is that, as long as he/she can force total expenditures ($P+$L) under the budget limit ($B), he/she will acquire the entire package of desired assets (A). Leasing (short-term or long-term) is one way to accomplish this. There is no apparent need to justify one acquisition method over another on any basis other than budget compliance. This model will be referred to as the "expenditure model."

Insert Figure 2 about here

Figure 2 introduces a decision cue not readily available to the general government administrator that could modify the expected decision-making behavior. This model might represent a business or proprietary administrator's asset acquisition decision framework. For comparative purposes, let us assume that this administrator views his/her budget as inflexible. In this model, the income statement reports the annual cost of using

purchased assets (CP), or depreciation, as well as leased assets (CL) instead of the total expenditures ($P+$L) presented in the earlier model.

The difference between the decision models in Figure 1 and Figure 2 is that the cost information reported in the financial statements may trigger the decision process enclosed by dashed lines in Figure 2. An asset purchase will result in annual depreciation reported over the life of the asset just as lease expense will be reported each year. Two types of considerations are suggested by this type of information:

1) Which alternative is least costly (e.g., has the lowest present value or smallest dollar outlay) over the life of the asset?

2) Can the annual cost of an alternative be justified?

The first consideration is a capital budgeting decision. The financial statements will not actually report the present values compared in the models, but the long-term nature of the accrual financial statements would suggest that these values be computed in order that long-term comparisons can be made. The second consideration is a direct evaluation of the annual cost resulting from each choice. This model will be referred to as the "depreciation model."

While asset acquisition decisions in this model are screened for cost justification and efficiency, budget restrictions are also considered. A decision to lease or purchase must satisfy both conditions relating to cost and conditions relating to budget control. If the same package of assets were considered using the models developed in each figure, the depreciation model would probably reject some acquisitions accepted by the expenditure model.

The expenditure model suggests that a governmental department head may internalize the one-year time horizon of the operating budget, accepting

a limited annual expenditure goal rather than a minimum long-term cost goal. If the manager becomes a short-run optimizer, or a short-run satisficer, the result could be waste of taxpayers' money in the long-run. The depreciation model suggests that a municipal administrator of a proprietary fund reporting expenses (depreciation) is more likely to consider long-run costs and adopt a goal of minimizing long-term costs.

Field Study Research Design

A field study of asset acquisition decisions in three municipalities was employed to refine two hypotheses suggested by the theoretical models. Because the models developed suggest expenditure accounting might encourage various types of leasing to reduce annual expenditures, the focus of the field study is on the short-term and long-term leases of the participating municipalities and on the "costs" associated with those leases. In the three cities studied, two major questions are addressed:

1) Do municipal departments using expenditure accounting acquire assets for long-term use with uneconomic leases?
2) Do municipal departments using depreciation accounting (governmental departments) engage in leases that are more economic than those of municipal departments using expenditure accounting (proprietary departments)?

In order to answer these two questions, the personal property leases for all governmental and proprietary departments were subjected to present value analysis and compared to purchase alternatives. Excess leasing costs are evaluated in terms of their materiality to the departments and by comparison between types of departments. The method of analysis is discussed in detail below.

Characteristics of Municipalities Studied

Several criteria were established for selection of the cities to be studied. First, because the research questions are concerned with comparing the effects of using expenditure accounting for governmental funds and depreciation accounting for proprietary funds, it was necessary to study cities that had both types of funds following these GAAP requirements. Cities with fewer than two proprietary funds were not considered. The contents of independent auditors reports were used to determine compliance, and discussions with finance directors determined they were not employing accounting procedures beyond GAAP requirements. City A has 29 departments, seven of them proprietary; of City B's 12 departments, three are proprietary; and City C has 17 departments, three of which are proprietary.

Each municipality in the study is located in a different state; one in the southwest, one in the midwest and one in the southeast. They were offered anonimity and are referred to as City A, City B, and City C. The populations of these cities are between 90,000 and 350,000. Their sizes were assumed to be large enough to assure acquisition of a significant number of assets every year and small enough to facilitate thorough analysis of all leasing activity by the researcher. None of these municipalities is at or near its debt limit, which might cause legal restrictions in available acquisition alternatives.

Location and Examination of Leases

In all three cities, there was no central file of short and long term leases and no individual who could provide information on all leases. Several audit techniques were used to identify and locate all personal property lease contracts. All department administrators were asked to

identify their leases. Purchasing directors were interviewed and their lease files were examined for lease contracts. Finally, the financial records were audited for charges to rental expenditures which were then traced to lessors and contracts.

Department administrators and personnel were asked to explain the asset use associated with each short-term lease (some were month-to-month leases) to identify those where long-term use was anticipated. All leases of assets for long-term use were examined and analyzed as discussed in the following section. Assets for whom expected use was temporary were excluded from the analysis.

Analysis of Lease Contracts

Lease/purchase evaluation models are primarily concerned with separating the investment and financing components of the alternatives. In the case of a municipal government, the analysis is rather uncomplicated because of the absence of income tax effects on cash flows. Davidson et al. [1978] developed a model for making lease/purchase comparisons, and a similar model, adapted to the governmental context, was used to compare the present value of each lease to its purchase alternatives:

$$e = \sum_{t=1}^{j} \left[\frac{L_t}{(1 + i)^{t-1}}\right] - P$$

In this model, e represents the net present value of the additional cost of a lease; L is the annual lease payment; P is the purchase price of the asset at the beginning of the lease period; i is the municipality's borrowing rate; and j is the life of the lease, set equal to the life of the asset for operating leases. If e is positive, a lease is uneconomic. The

materiality of the diseconomies may be evaluated by reference to other city statistics, such as taxes and expenditures discussed in later sections.

In order to operationalize the model, the variables must be either observable or capable of estimation. L, the annual lease payment, can be directly observed by examination of the lease contract. P, the purchase price, and i, the municipality's borrowing rate, represent hypothetical cases; and the life of the asset, j, cannot be observed until the end of its economic life. P, i, and j must, therefore, be estimated; the estimation methods are discussed below.

Purchase Price

Estimates of the purchase price, P, of each asset were obtained through correspondence with the lessors, except where lease contracts specified a purchase price. In each case, a letter was sent to the lessor by the finance director of the lessee city requesting that the purchase data be provided to the researcher. Lessors were also asked to specify if any portion of the lease payment was for maintenance, so this amount could be removed from L.

A purchase price provided by lessors is unlikely to reflect discounts that might have been obtained through the negotiation process and, as such, can be accepted as a conservative component in the lease analysis. If this component introduces any bias into the analysis, it would be to understate e.

Discount Rate

The municipal bond rate is an appealing cost of capital measure because bonds are the only type of noncancellable long-term debt available to municipalities under most state laws. It has the additional research advantage that, at some points in time, the rate is observable.

One perceived drawback of using the municipal bond rate for analysis of equipment acquisitions is that the assets often have useful lives of five-to-ten years while bond terms are generally twenty-to-thirty years. This problem can be avoided when serial bonds are issued and bids for the bonds are broken down into different effective rates for bonds of varying maturities. In the three municipalities studied, all bonds issued were serials, and the serials began maturing within two years of issuance. Specific interest rates had been bid for each maturity and a composite rate determined for the overall issue. Thus, at the time of issue it was possible to observe actual interest rates for periods approximating the life, j, of practically any type of personal property.

The rate, i, required for the model is the appropriate rate at time of acquisition, t. Since acquisitions seldom occur on the date of a bond issue, a model was developed to adjust the most recent bond rate to an approximation of the rate applicable at the acquisition date:

$$i_{j,p} = i_{j,k} \cdot \frac{I_{m,p}}{I_{m,k}}$$

$i_{j,p}$ = the unknown interest rate for debt of term j on the date of purchase p;

$i_{j,k}$ = the interest rate obtained by the municipality for bonds of the term j issued on date k, where k is the last bond issuance date prior to p;

$I_{m,p}$ = the average yield on equally rated bonds traded on date p for term m;

$I_{m,k}$ = the average yield on equally rated bonds of term m issued on date k.

A data file of rates representing $i_{j,k}$ was constructed from approved bond bid sheets for each municipality from 1975 through 1981. This file notes, for each bond issue, the actual rate bid and accepted for each maturity period. Moody's Bond Record [p. 127] includes indices equivalent to $I_{m,p}$ and $I_{m,k}$ for municipal bonds.

Asset Life

The asset life, j, had to be estimated for all leased assets. For long-term leases in which title passed at the end of the lease period or the payments obviously met or exceeded the purchase price, the term of the lease was assumed to be the life of the asset. For other leases, two sources were consulted in order to obtain a reasonable, objective estimate of asset life.

Section 167 of the Internal Revenue Code, as amended in 1971, sets forth the Class Life Asset Depreciation Range (ADR) system as a guideline for depreciating business assets. Section 167 establishes estimated useful lives for specific classes of assets, by type of asset used in all business activities (e.g., office furniture, fixtures and equipment; automobiles and taxis). The ADR asset guidelines provided an objective estimate of j for most of the leased assets in this study.[1]

There is no ADR asset class for hospital assets, and City A's hospital leased a significant amount of diagnostic and treatment equipment that is unique to this type of activity. The American Hospital Association (AHA) publishes a guide for member hospitals titled Estimated Useful Lives of Depreciable Hospital Assets [1978] that includes a table of estimated useful lives of individual items of major movable equipment [pp. 4-7], and this was used to estimate j for hospital leased assets.

Comparisons of Governmental and Proprietary Departments

In order to address the question of whether proprietary departments using depreciation accounting negotiate more efficient leases than governmental departments using expenditures accounting, the leasing activities in the two types of funds must be compared. First, leases in all proprietary departments were evaluated using the present value model explained above. Interpretation of the differences between types of funds requires consideration of several factors.

Mathematical comparisons can be made of total dollars of excess cost, average value per lease of excess cost, and total excess cost as a percentage of purchase price. Total dollar comparisons allow the outcome to be driven, to some extent, by the greater number of departments and the greater number of leases. Average value per lease and total excess cost as percentage of purchase price, on the other hand, will permit a single extremely uneconomic lease to overwhelm large numbers of uneconomic leases. All may need to be considered in interpreting the lease analyses. The implications of nonleasing departments must also be considered.

Finally, subjective factors may be very important in understanding the underlying causes of the results. There may be factors unique to a department or to a particular administrator that will explain activity that is not consistent with the models. These could include funding restrictions by third parties and specialized training and background of the department head. Interviews with all department heads were used to identify important factors in the asset acquisition process and in background and training of the individuals involved. Both types of information, objective and subjective, were considered in interpreting the results and in developing hypotheses for further testing.

Results

Lease Analysis for City A

Uneconomic Leases of Governmental Departments

Four of the 22 governmental departments in City A leased 244 assets for long-term use from outside suppliers. The present value of these personal property leases is $6,721,349, $3,060,264 more than the original purchase price of these assets. The details of these statistics are summarized in Table 1.

Insert Table 1 here

The materiality of the excess cost can be evaluated by comparing it to other city-wide statistics. Total 1979-80 expenditures for the general funds were $92,258,302. The excess cost of leasing in the governmental departments is 3.3% of total expenditures. Comparing this cost with total tax revenues ($47,627,716) and property tax revenues ($25,533,796) for the same period, the excess cost of leasing is 6.4% and 12.0% of these amounts, respectively.

Individual Departments

Table 1 also shows capital expenditures as a percent of total expenditures for each governmental department. For departments where both lease and purchase are negligible, the issue is irrelevant. Because City A purchases vehicles and equipment through an internal service fund, a number of departments, such as police and fire, fall into this category. Since departments with a significant amount of capital outlay and no leasing would appear to contradict the first model, those with capital outlay in excess of 1% of expenditures (Table 1, last column) are discussed below.

Capital expenditures in the finance, internal audit and research and budget departments were 2.7%, 13.2% and 1.3%, respectively, of total expenditures. But each of these departments is involved in accounting and/or budgeting for all city departments, governmental and proprietary, and, thus, could be exposed to both the long-term or the short-term model. Furthermore, the controller and the city auditor had previous public accounting experience and training in commercial accounting, and the research and budget department is developing a "life cycle costing" concept to use for lease/purchase analysis in the future. These factors suggest explanations for their lease avoidance.

Capital outlay expenditures were 3.2% of total expenditures for the urban transportation department in 1979-80. The absence of leasing in this department is probably related to grant restrictions. The transit division relies heavily on federal and state funds, and the director explained that the terms of these grants were such that capital items were financed 80% by Federal funds and 13% by state funds. The City could, in essence, buy assets for 7% of their cost. Leases, on the other hand, are "operating costs" and grants covered no more than 50% of these costs. The result is that, even in the short run, purchase was less expensive than lease.

Based upon this analysis of nonleasing governmental departments and the leases existing in the remainder of departments, the expenditure model appears to provide a reasonable explanation of the asset acquisition decisions of governmental department administrators who have neither special training in long-term cost evaluation nor grant restrictions with regard to capital asset acquisition.

Proprietary vs. Governmental Departments

Three of the seven proprietary departments using depreciation accounting in City A were leasing 100 assets for long-term use. The present value of these leases was $3,678,798 and the excess cost was $1,703,069. Table 2 presents asset acquisition information and expense data for all the proprietary funds. In total dollars, the excess cost of leasing is much greater for the governmental departments than for the proprietary departments in City A. But the average excess cost per lease was $17,030 and the excess cost of leasing as a percent of purchase price was 86.2% for proprietary departments, compared to $12,542 and 83.6% for governmental departments. This measure does not seem to support the contention that proprietary departments engage in more efficient leases. However, after the individual departments are evaluated below, the two major leasing proprietary departments appear to be "special cases" while the nonleasing proprietary departments take on more significance as possible illustrations of the expected decisions resulting from the depreciation model.

Insert Table 2 here

Individual Departments

The three leases of the electric utility are the most uneconomical of the proprietary leases; the $14,647 excess cost is 190.83 percent of purchase price. The materiality of the leases, however, is doubtful. Table 2 shows this department had both expenses and additions to fixed assets in excess of $130,000,000. Furthermore, these leases were located by audit of rent expense accounts; the department head indicated in his interview that

this department does not lease equipment. This indicates that these leases may not have been the result of the department head's decision.

The leases of the hospital are "more uneconomic" than the leases of any governmental department and are significant both in terms of dollar size ($2,849,618) and compared to the expenses of that fund. The present value of the leases is 7.7% of all 1979-80 expenses for the hospital and almost as large as its additions to property, plant and equipment.

The hospital administrator indicated that technology is a major consideration in leasing assets, and hospital equipment is probably more susceptible to obsolescence than any other municipal assets. There were, however, several hospital equipment leases for periods as long as the estimated useful life, while ownership remained with the lessor, with implicit interest rates exceeding 20%. There were also 19 typewriters leased month-to-month.

An unusual feature of hospital operations may contribute to the propensity to lease in this department. A large portion of the revenue earned by a hospital is collected through third party reimbursers such as the Federal Government, through the Medicare and Medicaid programs, and insurance companies, and they establish guidelines for determining the reimbursable costs that can be billed to patients. Costs of leasing can be passed on as operating costs in the year of lease, but capital assets must be depreciated using lives that are longer than the current AHA guidelines. Thus, to the degree that these third parties are providing hospital revenues, leasing costs are recoverable in the year of expenditure, while capital expenditures are recovered over a period that may be longer than the useful life. In this case, leasing could prove more economical than purchasing.

The public information department, previously a governmental department, had recently taken responsibility for all copy machines used by the City; it was then set up as an internal service fund. As shown in Table 2, all acquisition was accomplished by leasing. While the leases in this department were "more economical" than those in the other proprietary departments, over 60% of the leases had implicit interest rates in excess of 15%. All these machines were acquired on a monthly lease basis, with prices fixed by a two-year supply agreement negotiated with suppliers. This administrator mentioned the risk of obsolescence as the major factor he considered in making acquisition decisions, but gave no indication of having tried to determine optimal usage periods that might have, at least, resulted in longer-term leases. This director had previously been responsible for public relations in the governmental department, and he indicated that this is still his primary responsibility, noting that his performance evaluation would not have "anything to do with money." Thus, his training and experience were primarily governmental in nature.

The asset acquisition activities in the remaining proprietary funds provide some support for the depreciation model. As illustrated in Table 2, the airport, vehicle and equipment services, and water and wastewater departments have made material additions to property, plant and equipment and, yet, did not lease. Fixed asset additions were smaller for the auditorium and coliseum, but this fund also had no leases. Lease avoidance in proprietary departments using long-term assets suggests weighing of long-term costs in acquisition decisions consistent with the depreciation model.

Lease Analysis for City B

Uneconomic Leases of Governmental Departments

Only one of the nine governmental departments in City B leased assets. The present value of these leases, shown in Table 3, is $226,663, resulting in an excess cost of leasing of $57,228. The total expenditures of the general fund for 1979-80 were $11,597,676, and the excess cost of leasing is 0.49% of these expenditures. It is 0.51% of total tax revenues ($11,153,665) and 1.82% of property tax revenues ($3,142,219). The implicit interest rates for the items being leased ranged from 18.25% to 22.58%, considerably higher than the City's hypothetical borrowing rates.

Insert Table 3 here

Table 3 compares capital outlay to total departmental expenditures, and it indicates the nonleasing departments also had small percentages of capital outlay. Comparing the excess cost of leasing to these capital expenditures, the excess cost takes on more significance, it is 174% of 1979-80 governmental departmental capital outlay. This result appears to provide some support for the expenditure model.

Proprietary vs. Governmental Departments

The summary of asset acquisition activities for City B's proprietary departments is presented in Table 4. None of these departments had leased fixed assets when the purchase option was available. Special grant restrictions tend to provide additional incentive to purchase in the mass transit department. These restrictions were discussed in connection with City A. In terms of the research question, the water department is probably the most significant of these departments because it had large additions to

property, plant, and equipment, without the grant incentives. This absence of leases is consistent with the depreciation model.

Insert Table 4 here

Attitudes toward Leasing in City B

Interviews with City B department administrators indicated a general reluctance to use leases. This was the smallest of the three cities studied, and directors of departments appeared to rely heavily on the Budget Committee members for planning their asset acquisitions. This committee includes the director of a proprietary fund, Central Services, who stated that leasing is "living beyond your means;" the director of finance, whose prior experience was five years in finance and accounting in industry; and the City Manager, who is exposed to both expenditure and depreciation accounting. While the City Manager indicated that directors had considerable autonomy in running their departments, several mentioned that they felt he would not approve of leasing and that they would want his approval before engaging in a lease. If these individuals were strongly influencing leasing decisions, their influence is consistent with their training and with the accounting information they receive. This type of decision effect suggests how the expenditure model might be overcome by introduction of other factors.

Lease Analysis for City C

Uneconomic Leases of Governmental Departments

Eleven of the fourteen governmental departments (79%) in City C have engaged in 28 leases with a present value of $892,075, and an excess cost

of $87,849. These are summarized by department in Table 5, along with total expenditure and capital expenditure data. City C's Information Systems department also leased a computer that was not included in the analysis because of the inability to obtain purchase information. The excess cost is 0.23% of general fund expenditures for 1979-80 ($38,815,676). Comparing excess cost to total tax revenues ($32,031,240) and property tax revenues ($23,506,428), the excess cost is 0.27% of the first and 0.37% of the second.

Insert Table 5 here

Only three departments appear to be leasing no assets: management and budget, public transportation, and recreation. Each of the departments had capital outlay of less than 0.5% of total expenditures for 1979-80. Thus, the governmental departments of interest all appear to be involved in leasing.

Of particular interest in City C were two economic lease-purchase contracts of the fire department. This department acquired two pumpers with an implicit rate of 7.04% while the estimated borrowing rate of the City was 8.32% at that time. This finding is not inconsistent with the hypothesized expenditure model; it illustrates that some types of leasing can satisfy the goal of reducing annual expenditures and long-run costs at the same time. The lack of long-run cost data may, however, fail to suggest investigation of this option to an administrator. Except for this lease, the relevant governmental departments were engaging in uneconomic leases, providing some support for the expenditure model.

Proprietary vs. Governmental Departments

Table 6 shows the excess leasing costs in the proprietary departments of City C was $7,047. The total dollar value of the excess cost of leasing in governmental departments of City C, $87,849, is much greater than that in the proprietary departments; but, as a percentage of the purchase cost (10.92% for governmental funds and 70.51% for proprietary funds), the proprietary department lease displays the greater excess cost. The average excess cost of $3137 for governmental funds is also less than $7047.

Insert Table 6 here

The excess cost of leasing in the proprietary funds is actually the result of only one copier leased by the airport authority. This excess cost is .21% of total expenses ($3,305,846) of the airport authority and .67% of the additions to property, plant and equipment. The materiality of this lease, compared to other items, may be questionable, but it also suggests the possibility of other factors considered in the lease/purchase decision process. These are discussed in the following section.

The remaining proprietary departments in City C (civic center and fleet management) had no leases. In interviews with these directors, and with the airport director as well, all indicated a concern with long-run costs in making asset acquisition decisions. Thus, proprietary asset acquisition activity seemed to be fairly consistent with the hypothesized depreciation model.

Additional Evidence: Administrators Perceptions of Acquisition Decisions

Interviews of the department administrators in the three cities provided some additional support for the different models of asset acquisition

decisions. Administrators were asked to name the factors they considered in making their lease-purchase decisions. An extensive discussion of the responses is beyond the scope of this paper,[2] but a contrast of two factors is of particular relevance to this discussion.

Two commonly mentioned decision factors were annual budget constraints (expenditure emphasis) and some measure of total cost, including lifetime dollar outlay, net present value, and implicit interest rate (expense emphasis). Governmental and proprietary administrators mentioned these factors in reverse order of frequency. Annual budget constraints were mentioned by 76% of governmental administrators, but by only 46% of proprietary administrators. On the other hand, total costs were stressed by 85% of proprietary administrators, compared to 55% of governmental administrators. Thus, the administrators' own evaluations were consistent with the expenditure model's short-term governmental department decisions and the depreciation model's long-term proprietary department decisions.

Extensions of the Models

While the major emphasis of this study was the present value analysis of the leases of each city, other factors of interest emerged in the analyses and the interviews. In particular, the leased assets were predominantly limited to certain kinds of assets. While these findings will not be discussed at length in this paper, they are mentioned briefly to suggest possible extensions of the models and further related investigation.

All three cities were involved in leases of computers and computer equipment. Cities A and C were also leasing most of their copy machines and several typewriters and word processors. These three types of assets

represent a majority of the leases analyzed, and they have two characteristics in common that should probably be taken into account in developing an expanded model of asset acquisition decisions. First, these assets are perceived to be subject to more rapid technological change than many assets. Second, computer and copy equipment vendors do an extensive amount of their business through leasing. They probably, therefore, suggest leasing to prospective customers more often than do many other vendors, and many leasing options are readily available.

Twelve (45%) of City C's leases were for vehicles and heavy equipment (cars, vans, fire engines, and bulldozers) acquired by governmental departments, indicating that these types of assets are also available through short-term lease or lease-purchase arrangements.

Finally, as discussed earlier, hospital equipment was leased in City A, and this may have been due to special cost reimbursement restrictions by third parties and by technological change considerations.

The findings above suggest that a refinement of the asset acquisition models developed earlier might include a ranking of leasing alternatives based upon factors such as risk of technological change, marketing of leasing options, and cost reimbursement restrictions.

Conclusion

The preceding analysis of leases has provided evidence of uneconomic asset acquisition in three cities. Based upon this analysis and interviews with department administrators, most governmental administrators appeared to be making decisions consistent with a governmental administrative decision model that focuses primarily on controlling expenditures. Most exceptions to the model appeared to be due to the introduction of additional

decision cues such as the involvement of other personnel with training in long-term cost measurement, grant and third-party restrictions, or administrators' experience employing expense accounting.

The comparison between governmental and proprietary departments' leasing activities seems to provide support for an alternative model of proprietary asset-acquisition decisions. Proprietary administrators indicated, by their limited leasing (except in special circumstances) and by their statements regarding these decisions, a tendency to emphasize long-run costs over short-run expenditures. This was consistent with the "depreciation model" of asset acquisition decisions developed at the beginning.

Based upon the theoretical development and the detailed evaluation of these three cases, preliminary support for and additional investigation of the following hypotheses seems warranted.

H1: Municipal departments that use expenditure accounting will tend to acquire assets for long-term use with leases that are uneconomic.

H2: Municipal departments that use depreciation expense accounting will tend to acquire assets for long-term use with leases that are more economic than the leases negotiated by departments that use expenditure accounting.

If the preliminary theoretical development and findings hold true, they imply a possible solution to the problem of uneconomic asset acquisition. Expansion of municipal accounting and budgeting systems to include the generation of long-term cost information would provide an additional cue to municipal administrators for use in their asset acquisition decisions.

Awareness of the long-term cost differential might encourage an administrator to investigate alternative means of financing or to defer acquisition to another budget period; it should, at least, focus attention on various long-term alternatives.

The alternative information system suggested in this study is the accrual accounting system usually employed by proprietary departments and by private enterprise. This should not be viewed as an exclusive solution, for there are other types of accounting information that could direct attention at long-term costs as well as alternative measurements of those costs. Since governmental administrators must be concerned with annual budgetary constraints, for legal reasons at the very least, a reasonable solution might supplement budgetary accountability with information that will focus on and encourage the minimization of long-run costs.

Footnotes

[1]The manner in which these guidelines were established insures their conservative nature. Senate Report 92-437, in discussing this revision to the Internal Revenue Code, explains that guideline lives should reflect the actual asset replacement practices of taxpayers in the 30th percentile. In other words, for taxpayers surveyed, 29 percent of the assets had shorter lives and 70 percent had longer lives than the guideline established. [pp. 584-585]. Choice of the 30th percentile further assures that any bias is toward the conservative side.

[2]These factors are examined at length in "Factors Affecting the Asset Acquisition Decisions of Municipalities," a forthcoming article by the author in The Government Accountants Journal.

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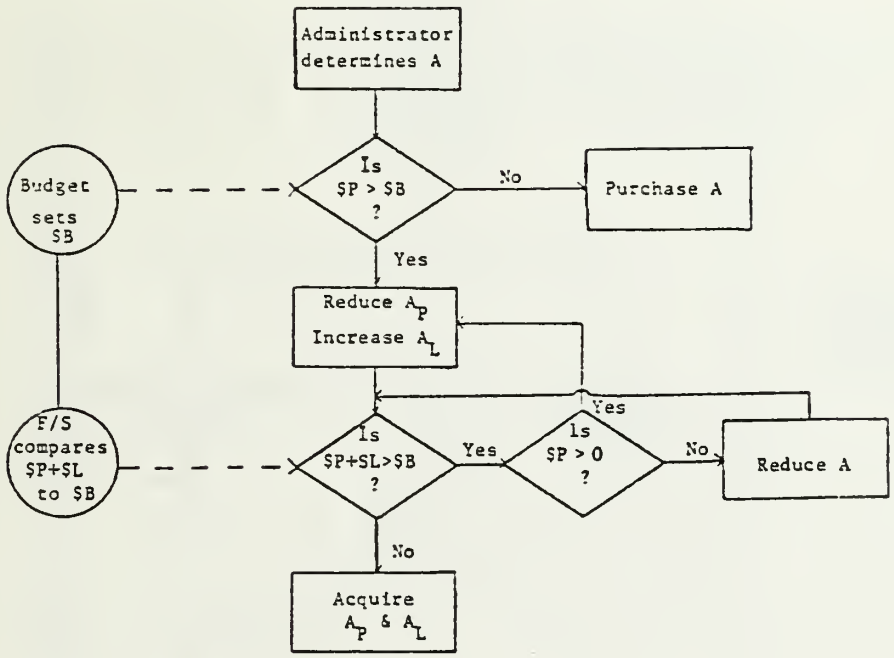
FIGURE 1

ASSET ACQUISITION MODEL: SHORT TERM BUDGET CONTEXT



A : The administrator's desired package of assets.

A_P: Assets acquired by purchase.

A_L: Assets acquired by lease.

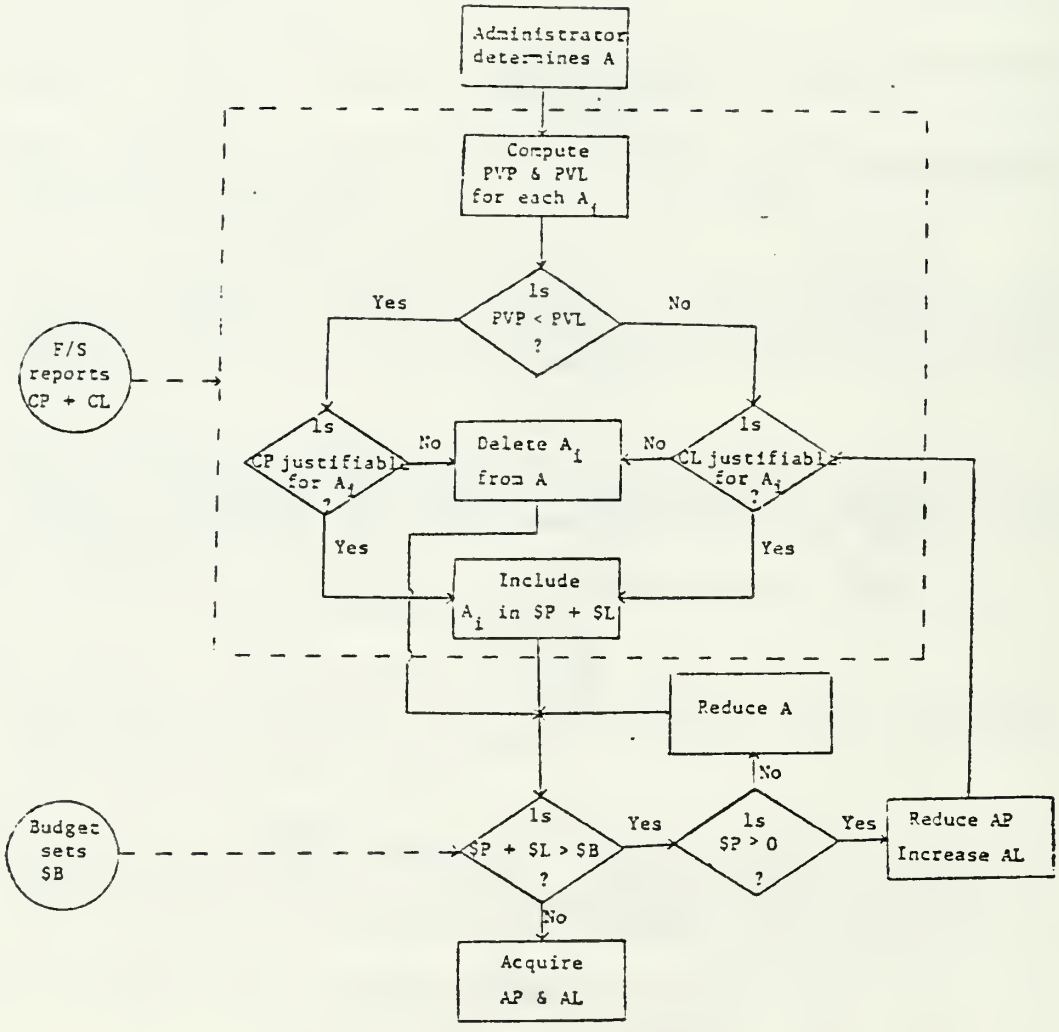
$B: Annual expenditure limit set by budget.

$P: Annual expenditure for purchase of assets.

$L: Annual expenditure for leased assets.

FIGURE 2

ASSET ACQUISITION MODEL: LONG TERM COST CONTEXT



A: The administrator's desired package of assets $\sum_{i=1}^{n} A_i$.

PVL: Present value of lease over life of asset.

PVP: Present value of purchase contract.

AP: Assets acquired by purchase

AL: Assets acquired by lease.

CL: Annual cost of using a leased asset.

CP: Annual cost of using a purchased asset.

$P: Annual expenditure for purchased assets.

$B: Annual expenditure limit set by budget.

$L: Annual expenditure for leased assets.

TABLE 1

CITY A

Governmental Departmental Analysis

Department	Number of Leases	Present Value of Leases (PVL)	Purchase Price (PVP)	Excess (PVL-PVP)	Percentage Excess/PVP	Expenditures (1980)	Capital Outlay (1980)	Percentage C.O./Exp.
Building Inspection	0	$ 0	$ 0	$ 0	0%	$ 1,847,822	$ 984	0.1%
Data Systems	236	6,611,195	3,593,781	3,017,414	83.96	3,503,192	63,511	1.8
Emergency Medical Service	3	47,399	30,494	16,845	55.24	2,689,601	48,165	1.8
Energy/Renewable Resources	1	7,429	7,344	85	1.16	N/A	N/A	N/A
Environmental Resource Mgmt.	0					277,232	704	0.3
Finance	0					1,241,490	33,285	2.7
Fire	0					11,775,048	101,684	0.9
Health	0					3,442,814	9,230	0.3
Human Relations	0					106,114	0	0
Human Services	0					2,349,309	1,607	0.1
Internal Audit	0					283,306	37,302	13.2
Legal	4	55,386	29,466	25,920	87.97	1,066,812	1,064	0.1
Library	0					3,436,154	6,022	0.2
Parks, Recreation	0					8,737,282	45,467	0.2
Personnel	0					906,379	424	0.1
Planning	0					1,229,770	1,335	0.1
Police	0					18,416,230	93,485	0.5
Public Works	0					10,999,885	68,060	0.6
Purchases, Stores	0					790,411	1,849	0.2
Research, Budget	0					461,256	5,984	1.3
Tax	0					2,597,348	3,292	0.1
Urban Transportation	0					1,870,293	60,426	3.2
Total	244	$6,721,349	$3,661,085	$3,060,264	83.59%			

TABLE 2

Asset Acquisitions by Proprietary Departments

City A

Department	Number of Leases	Present Value of Leases (PVL)	Purchase Price (PVP)	Excess Cost (PVL-PVP)	Percentage Excess/PVP	Total Expenses	Additions to PP&E	Percentage PPE/TE
Airport	0					$ 2,227,048	$ 2,608,048	114.5%
Auditorium & Coliseum	0					1,300,221	80,428	6.2
Electric Utility	3	$ 22,320	$ 7,673	$ 14,647	190.83%	136,133,642	131,021,607	96.2
Hospital	36	2,849,618	1,442,473	1,407,145	97.55	37,023,255	1,503,651	4.1
Public Information	61	806,860	525,583	281,277	53.52	658,844	0	0
Vehicle & Equipment Service	0					11,502,303	4,060,557	35.3
Water & Wastewater	0					22,569,152	18,184,098	81.6
Total	100	$3,678,798	$1,975,729	$1,703,069	86.20%			

TABLE 3

City B

Governmental Departmental Analysis

Department	Number of Leases	Present Value of Leases (PVL)	Purchase Price (PVP)	Excess (PVL-PVP)	Percentage Excess/PVP	Expenditures (1980)	Capital Outlay (1980)	Percentage C.O./Exp.
Community Development	0					$ 544,453	$ 1,200	0.2%
Community Relations	0					51,273	0	0
Data Services	5	$226,633	$169,435	$57,228	33.78%	114,597	0	0
Finance	0					281,042	474	0.2
Fire	0					3,589,164	24,523	0.7
Legal	0					103,520	0	0
Personnel	0					123,378	231	0.2
Police	0					3,709,458	4,925	0.1
Public Works	0					2,520,746	1,383	0.1

TABLE 4

Asset Acquisitions by Proprietary Departments

City B

Department	Number of Leases	Present Value of Leases (PVL)	Purchase Price (PVP)	Excess Cost (PVL-PVP)	Percentage Excess/PVP	Total Expenses	Additions to PP&E	Percentage PPE/TE
Central Services	0	0	N/A	N/A	N/A	$ 835,909	$ 11,969	1%
Mass Transit	0*	0	N/A	N/A	N/A	1,406,399	2,312,735	164
Water	0	0	N/A	N/A	N/A	3,859,459	1,300,607	34

*A lease of "guaranteed mileage tires" is excluded from this schedule because the department head indicated these tires are not available for purchase. The lessor also indicated, after inquiry, that these tires are not ordinarily sold.