1979

Forecasting Municipal Revenues and Expenditures

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Recommended Citation

Bahl, Roy W., Larry Schroeder, and William Montrone. "Forecasting Municipal Revenues and Expenditures." Management Information Service Report, Washington, D.C.: International City Management Association, Vol. 11, No. 10, pp. 1-13, October 1979.

International City Management Association

Management Information Service REPORT

VOLUME 11
NUMBER 10
OCTOBER 1979

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REPORT AT A GLANCE

Until recently, fiscal planning in local governments was synonymous with annual budget preparation. Few jurisdictions systematically projected their budgetary position beyond one year. Increasingly, fiscal decision makers have come to recognize that annual budgetary commitments have long-term effects on a government's financial condition. With today's severe fiscal pressures, the need for reliable forecasts is self-evident.

This report is designed to help local governments improve fiscal planning for the intermediate term— the next one to five years. It contains a simple forecasting model that can be used locally without expensive equipment or a prohibitively large staff.

The primary purpose of an intermediate-term forecasting model is to estimate a shortfall between revenues and expenditures. This estimation, called a "gap analysis," helps policy makers plan for fiscal adjustments under various economic scenarios. The secondary purpose of the model is to estimate the effects of policy decisions or external changes in the economy on budgetary balance. Called "impact analysis," this estimation can signal to managers the future implications of immediate decisions.

The model contained in the latter sections of this report involves some of the approaches to forecasting revenues and expenditures that are described earlier. While these intermediate-term forecasting approaches may sometimes prove to be inaccurate, the forecasting process itself is likely to increase the effectiveness of a jurisdiction's fiscal operations. Whatever forecasting approach is taken, the effort can be fostered through placing the activity under the control of those responsible for preparing the budget, and through the aggressive support of a chief administrator or manager.

This report is based on a handbook prepared for the Coalition of Northeast Municipalities, Boston, Massachusetts. The handbook is part of a project sponsored by the National Science Foundation (NSF # APR77-15730). The Coalition was formed in 1977 to assist fiscally distressed Northeast cities and towns and to be a voice for the region's municipalities by helping them articulate their needs to federal and state officials. It is administered by the New England Municipal Center and funded in part by HUD.

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International
City
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Management
Information
Service

October 1979
Vol. 11 No. 10

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FORECASTING MUNICIPAL REVENUES AND EXPENDITURES

This report is designed to assist municipal governments with fiscal planning—specifically, forecasting municipal revenues and expenditures. As municipalities continue to face severe fiscal pressures, it becomes imperative for policy leaders — mayors, council members, selectmen, and managers — to understand the future financial condition of their jurisdictions. An appreciation of potential fiscal problems for the next five years will enable municipal leaders to make sound fiscal policies today.

At the very heart of effective fiscal planning is the need for revenue and expenditure forecasting. Because projection models require oversimplified assumptions and some crystal ball gazing, some critics have quickly rejected modeling efforts in favor of the short-term fiscal plan contained in the annual budget. Yet, during the budget year fiscal decisions requiring long-term commitments are made in such areas as new debt, collective bargaining agreements, pension changes, and tax abatements. An understanding of how such decisions affect the long-term fiscal viability of the local government is essential. The issue is not just "what will revenues be next year," but "how will the total budget be affected by any one of a number of adverse circumstances?"

As apparent as the need for long-term budgetary planning may be, the practice of local government revenue and expenditure forecasting is in its infancy. Recent surveys of local government officials by the Urban Consortium,[1] the International City Management Association,[2] and the National League of Cities[3] all suggest the need for more reliable forecasts of revenues and expenditures in the three- to five-year time frame.

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Indeed, surprisingly few local governments take a systematic approach to projecting their budgetary position beyond one year. This report contains a simple forecasting model that can be used locally without expensive equipment or prohibitively large staff assignments.

The goals of this report are modest: to lay out the issues that are central to effective forecasting, and to describe the technical and conceptual problems that must be faced. As one might expect, the problems are much more formidable than they appear at first blush.

THE USES AND USERS OF FISCAL FORECASTING

The principal use of short-term forecasting is for annual budget preparation. Budget estimation and cash management require projections over very short periods of time, hence are less applicable to econometric modeling. There are two major uses of intermediate or longer term forecasts: *gap analysis,* to anticipate revenue-expenditure imbalances, and *impact analysis,* to estimate the budgetary effects of a policy or external change (such as a recession or a collective bargaining agreement).

The intended users of fiscal projections are mainly in-house staff such as policy analysts. They use the model to study the fiscal effects of a range of discretionary policy actions that might be introduced. The more the financial plan is directed to internal users, the more prominent will be impact analysis.

Users may also be external. Citizens may use long-term financial plans to educate themselves about the need for, or the consequences of, future fiscal actions. For example, San Diego's new financial plan carefully projects the revenue implications of Proposition 13.[4] Investment advisors and investors may read projections with an eye toward evaluating the security of city bonds and notes.[5] Finally, federal and state monitors may evaluate the fiscal health of a local government using long-term fiscal plans. Such use is made of New York City's long-term financial plan by the federal and state governments.[6]

Gap Analysis. Intermediate term or multi-year forecasting is adaptable to the use of a systematic modeling approach. The primary purpose of such a forecast is to estimate a revenue gap, or a projected shortfall between revenues and expenditures. To this end it is important to compare different assumptions about what the future may hold and to estimate their impact on the local government budget. The real growth in the national economy, the role of inflation, and regional shifts in the distribution of national income and in population are all important considerations in fiscal forecasting.

The erratic behavior of the economy in recent years

has presented a good example of the need for such comparisons. The percent growth in real GNP was -1.4 between 1973 and 1974, -1.3 in 1974-75, +6.0 in 1975-76, +4.6 in 1976-77, and +4.0 in 1977-78.[7] The next five years promise even more erratic behavior. The Advisory Commission on Intergovernmental Relations (ACIR) has pointed out the important revenue implications of these cycles for state and local government revenues.[8] Others have argued that the failure of some large local governments to anticipate these declines accentuated the seriousness of their fiscal problems during the recession.[9]

Changes in the rate of inflation have affected both the revenues and expenditures of local governments.[10] Fluctuations in consumer prices can have dramatic effects on state and local government budgets. This is particularly true for those local governments where reliance on the property tax, which relative to other types of taxes does not respond to changes in the economy, is high and where budgets are top-heavy with labor costs. In the past five years the inflation rate has gone from 11 percent to five percent, then back to double digits again.

In estimating a revenue gap, there is also a need to anticipate regional shifts in economic activity. Some state or local governments grow at a significantly different rate than the nation. Regional decline can be quite rapid, as in the case of New York State, where income growth slowed from three-fourths the national rate to just two-thirds within a five-year period. A failure to plan for the revenue declines associated with this economic slowdown has led to the serious fiscal imbalance that now faces New York State.

A gap analysis allows policy makers to consider the magnitude of revenue and expenditure adjustments that will be required under various economic scenarios. Dallas is one of several cities whose final report includes alternative assumptions about at least some macroeconomic variables.

A second type of gap analysis focuses not on the current budget, but on the capital budget implications of current account operations. Capital expenditures are financed by current surpluses and borrowed funds. With current surpluses, the projected excess of revenues over expenditures for a five-year period gives some estimate of the amounts available for capital projects. As for borrowing to finance capital projects (and operating and maintenance expenditures, for that matter), increased debt service and operation-maintenance expenditures must be built into the current expenditure projections. In a sense, the current account forecast can be used to give some estimate of the ability of a local government to carry the expense associated with a new capital project.

Impact Analysis. Apart from questions about an anticipated revenue shortfall, there are also questions about the impact of various policy decisions or external changes on budgetary balance. Impact analysis can play an important role in managerial decision making. For example, the implications of collective bargaining provisions over the life of a labor contract can be modeled and integrated into an intermediate-term fiscal plan. This capability can play an important role in the bargaining process.

An especially important kind of impact analysis is the estimation of the intermediate-term operation and maintenance costs of capital projects. If capital investment priorities are assigned on a cost/benefit basis, an estimate of the full cost stream (accumulated annual costs over the life of the capital improvement) is important information. This is often overlooked.

APPROACHES TO FORECASTING

The proper approach to forecasting depends on the intended use of the forecast, the intended user, and the period considered. The uses and users were introduced above, and will be discussed further below under the various forecasting techniques. As for the time period criteria, generally short-term forecasting, as in the annual budget, usually does not require a sophisticated approach. Long-term forecasting, as in developing a transportation plan, probably does require a sophisticated model because of the uncertainty involved.

While very short-term and extremely long-term forecasts are of potential interest in the public sector, one- to five-year forecasts have the greatest utility to the manager and policy maker. The public sector has often been characterized by a dearth of planning. And "management by crisis" is unlikely to lead to efficient operations. So, while these intermediate-term forecasts may ultimately be found to be inaccurate, the forecasting *process* itself may prove to increase the effectiveness of public sector operations. For example, if it is anticipated that budgetary problems will arise in two years, it is only reasonable to begin immediately planning on how this potential crisis is to be averted, rather than waiting until emergency cutbacks or tax increases are deemed necessary. Presented below are several forecasting techniques, and the strengths and weaknesses of each.

Best Guess or Expert Forecasts. There is no single methodology that is used in best guess or "expert" forecasts. The key ingredient to successful expert forecasting is, of course, the expert. Expertise is gained through long experience: successful expert forecasters are those who know their system, their local economy, and how to obtain additional information. For example, the local finance director may be responsible for annual forecasts of all revenue streams (revenues from all sources and their fluctuations throughout the year). If he or she has observed these streams over a long period of time, an accurate "best guess" of next year's amount is likely. Expert forecasting, however, involves some of the same theory that underlies more rigorous approaches (e.g., an assumption that a particular revenue source changes in an established ratio to changes in income).

The major problem with this approach is that it depends on the subjective views of the forecaster. Even if the expert's forecast was of proven accuracy, a hidden problem would remain: if the forecaster were to leave, he or she would take the "model" away. The technique is also apt to prove weak in forecasting revenues or expenditures beyond one year because of the greater number of factors to take into account about the performance of the economy.

Trend Techniques. For certain revenues and expenditures, time becomes a critical variable. Fairly accurate predictions may be obtained simply by assuming that revenues or expenditures are a simple function of time. For example, the most common assumption is that the growth rate will be the same in the future as in the immediate past. For some revenue and expenditure streams the assumption that time is the sole important determinant may not be unreasonable.[11]

However, pure time trend analysis has the fatal weakness that it will never predict a "turning point." It will continue to project increases (or decreases) throughout the projection period regardless of what might occur in the economy. Furthermore, the approach is almost totally useless for any type of policy analysis. It does not help predict what is likely to happen if major economic or demographic change occurs within the city.

Deterministic Forecasts. Deterministic approaches generally allow for variables other than time in deriving projections. For example, such a forecast might observe that over the past several years an average of $14.65 has been collected per resident in fines and forfeitures. One might then forecast that with an anticipated population increase of 1,000 during the next year there will be an additional $14,650 collected from fines and forfeitures.

Another example of a deterministic forecast might be the projection of real inputs on the expenditure side of the budget. The state may mandate that no more than 30 students be assigned to a single teacher. If it is estimated that the 1,000 new residents will include 150 school age students (and all are assumed to enroll in the public schools), then a deterministic estimate of the number of new teachers who must be hired is five (150/30). This technique might be carried further if it found that there are 30 support personnel (administrators and staff) for every 100 teachers in the school system. The additional five teachers projected would then require an additional 1.5 (.3 x 5) support personnel.

While this approach could be extended (e.g., to nonlabor inputs and even additional capital), the major question concerns its reasonableness. For intermediate-term revenue forecasts, especially for revenues associated with the level of economic activity, the approach leaves much to be desired. While it might be reasonable for certain expenditure activities, it is flawed in assuming fixed relationships between inputs and activities. The projection above (30 support personnel per 100 teachers) was based upon past averages or standards even though the projections are of marginal input needs (five additional teachers). It might be better to base projections on marginal relationships, or on the real life increments at which services will need to be increased. For example, if there are 1,000 new residents attracted to a new subdivision located near a group of residents for whom fire service is currently only minimally sufficient, one might project an additional fire station is needed rather than the .15 stations that might be projected based on existing standards.

These deterministic projections have been used and are most closely associated with what has come to be called "fiscal impact analysis."[12] This approach may be most useful when considering longer term projections, especially the effects of such decisions as annexation or zoning. Land devoted to commercial and light manufacturing may produce an entirely different stream of revenues and require a considerably different set of expenditures than the same land use for residential housing. Likewise, low-density, detached housing may have significantly different expenditure requirements than do high-density apartments and condominiums. The technique, at least as it has been applied in the past, appears to be most suitable to growing areas, since retrenchment may present a certain set of circumstances that make the forecasting exercise quite different.

A variant on the deterministic approach to revenue forecasting sometimes used in intermediate-term forecasting is what is known as an *elasticity-based forecast.* Many economic series (formal series of economic indicators) depend principally on the level of income in an area. A measure of the relationship between income and the tax yield is known as an income elasticity. Formally, this elasticity measures the percentage change in tax yield as related to a percentage change in income. If one can accurately forecast the percentage income is likely to grow during the projection period, the product of this projected growth rate multiplied by the elasticity will result in the percentage growth in the tax revenue source. While the approach is quite simple, one problem is that elasticity estimates are not a constant factor in the system being studied nor in the specification of the overall relationship between taxes and income. Such deterministic approaches will require statistical analysis to determine the elasticities.

Statistical Forecasting. Probably the technique used most often in intermediate-term forecasting is some form of statistical analysis. The most common approach in statistical forecasting is to forecast series independently (rather than simultaneously). The procedure involves four steps.

First, a revenue (expenditure) series is hypothesized to depend upon one or more independent or causal variables. Economic theory may suggest the independent

variables although calculations based on real figures are often used to choose the explanatory variables. Second, data are collected for as many past years as possible. The internal records of the city must be consulted to determine the availability of historical data on particular revenue (expenditure) series. An effort must be made to ensure that the data, in fact, measure what is purported to be measured in a consistent manner over the entire period. It is also at this point that theory gives way to expediency due to the lack of a consistent set of data on the particular variables hypothesized to be important. For example, many cities find that there are not good time series data (data extending over a period of time) on city incomes and that county, state, or national personal income data must be used.

Third, a statistical relationship between the revenue (expenditure) stream and the independent variable(s) is determined. Linear regression techniques are most often used for this estimation. For example, one might specify that sales tax revenues are a linear function of personal income and the sales tax rate to obtain a regression equation of the form:

$$\text{Sales Tax} = 16.221 + .013\ \text{Personal Income} + 7.248\ \text{Tax Rate}$$

This equation suggests that for each additional dollar of personal income an additional 1.3¢ in sales tax revenues is generated even if rates remain constant.[13] Fourth, after the final equation is chosen, the forecaster must obtain observed values for each of the independent variables during the projection period.

There are several advantages to this approach that the previously mentioned forecasting methods do not have. The greatest advantage is that it bases the estimates on behavioral relationships. It is not necessary that the independent variables change at the same rate over time. One can make more accurate predictions by taking fluctuations into account than through the simple use of time trend techniques.

The principal advantage of the statistical method over the deterministic is the theoretical basis for establishing the relationships: statistical inference can be used in testing the hypothesized relationship among variables. For example, while there may be a linkage between personal income and the amount of fine revenues collected, it is also possible that this relationship has varied so greatly in the past that there are no grounds on which to base predictions using simply the long-term average relationship. With statistical models, hypotheses concerning such relationships can be tested directly.

A purely deterministic approach is also likely to include only a single "causal" variable (e.g., population), while the statistical regression approach allows for several independent variables to be used simultaneously. The coefficients from the regression analysis are estimates of the direct effect of the corresponding variables upon the dependent variable while holding the remaining variables constant. This allows greater opportunities for using the method in policy analysis, because it is possible to estimate the effect of revenues (expenditures) of a particular change in one independent variable while holding the others constant. Additionally, one can alter several of the independent variables simultaneously to estimate the overall net effect of such changes on the dependent variable.

The statistical approach is generally more costly than the models discussed above. Reasonable specification of the forecasting equations is important, and this usually requires the skills of one trained in economics and statistics. Data collection can be costly, and computer facilities are necessary. Errors in prediction are still likely to occur since each of the four steps contains potential problems: the equation may be poorly specified, the data used may not be totally appropriate for the use intended, statistical estimation may create particular statistical difficulties, and the forecasts of the independent variables may be in error. Finally, many variables that are hypothesized as being independent in the statistical analysis are actually interdependent, which can create statistical problems that lead to improper or poor projections.

This problem of interdependence can be accounted for via the more complex estimating techniques known as simultaneous equation estimation methods. These models attempt to take into account the fact that economic variables are interdependent. However, building simultaneous models requires greater skills and time and more sophisticated statistical techniques. While some work in the area has been performed at the state level,[14] the only model of this kind for a city is in Mobile, Alabama.[15]

REVENUE FORECASTING

There is wide variation in the approaches local governments take in projecting revenues. Yet, the problems faced and the steps taken in developing a specific forecast are similar. An adequate time series must be developed and cleaned of discretionary rate and base changes, a set of independent variables must be specified and measured, and the forecasting equation must be estimated.

Cleaning the Data Series. Revenue projections should show how much the current tax structure will yield over some future period if no discretionary changes take place (i.e., the automatic growth the tax structure will generate). Since historical data will be used to make such a projection, it is important that these data be cleaned of all past discretionary changes in rate and base. The question is, how much would the present tax structure have yielded if it had been in effect in past years. Several methods are commonly used to clean the data series, but all are subject to various kinds of error.[16]

Adjusting the historical revenue series for major changes in rates or bases is likely to be the most difficult task and raise the most severe data problems, but there are related data adjustment problems that are encountered in the forecasting effort. One problem is that changes in the rate or base will not occur at a point that is coincident with the beginning of a fiscal year. Some adjustment of the revenue data must be made to reflect this partial year impact of the change. Changes in the timing of tax payments and refunds present another problem.

Selecting the Variables. The specification of an estimating equation to project revenues requires determining and measuring the explanatory variables. The choice of explanatory variables should only be based on theory, but more often is based on data availability. Two data concerns are paramount: can the variable be accurately measured over the historical period, and are there forecast values of the variable? Cities have used different variables to forecast taxes, but most specifications include population, personal income, and some measure of prices such as the Consumer Price Index (CPI).

Population data are available from a variety of sources at the federal, state, and local government levels. The Census Bureau makes population estimates for small areas, but no projections. Most state commerce departments make population estimates, and some even make projections by county. However, few, if any, states make population estimates and projections by city.

Personal income estimates and projections are less accessible. The only national estimates for cities are from the P-25 Series, but the historical time series on these is short.[17] It is not a comprehensive definition of income, the latest available data covers 1975, and there are no comparable projections. The alternatives are the county estimates of personal income made available by the Bureau of Economic Analysis (BEA) in the Department of Commerce, or federal models.

Three problems exist in using the Commerce Department's county income data in revenue forecasts. First, the data have a time lag of at least one year. Second, the data may not be totally appropriate for a city that does not adjoin the political boundaries of the county. (On the other hand, it could be argued that: (a) the city's income parallels the county's income quite closely, though this is somewhat questionable where the city is losing population to its suburban areas; or (b) at least in the case of the retail sales tax, the relevant income is that of the entire market area which may coincide closely with the county's.) Third, projections of county income that might be used for a five-year fiscal forecast are not available.

The federal models, detailing personal income for the nation as a whole, are a more accessible source of income data. The data are available at suitable times, and projections are also easily obtained from the national econometric models, from the Congressional Budget Office, or from the Office of Management and Budget. The problem with using national data for localities is that not all local economies experience recessions and expansions or even long-term cyclical growth in exactly the same pattern as the nation as a whole. Communities with an economic base primarily of basic manufacturing may lead the nation in decline as orders of industrial inputs decline. Service-based economic areas may be more "recession-proof" or may lag behind the nation in periods of decline.

No matter what approach is used in the projections, there should be some study of the linkages between the local economy and that of the nation. Unless there is a local or regional econometric model projecting incomes in the area, there will always be a need to somehow link national forecasts to income in the locality.

In practice, cities have handled this linkage problem in various ways. One method, used in New Orleans and in New York City, is to specify a local-national linkage equation with local income (as measured in the BEA data) as a linear function of national income.[18] Predicted values of national income are first "plugged in" to this equation to forecast local income, which, in turn, is used in the individual revenue equations. The New Orleans model forecasts U.S. income on a judgmental basis after studying the forecasts from the University of California-Los Angeles, the Wharton School of Business, Georgia State, and the Economic Report of the President. New York City's model uses projected U.S. taxable personal income from the Wharton model.

While income data are conceptually most appropriate for economic-based revenues, local employment may be more accessible. This creates opportunities to use truly *local* data, although it does not solve the problem of linking the national trends to localities. On the other hand, many regional models are employment based, so this may be a desirable alternative to the direct use of income. Moreover, if one were to use employment as a "driving force" behind the estimates, it would also be desirable to include the price level, since inflation is likely to affect most economic-based revenue sources. Two methods are then possible. One is to deflate all past revenue data using a price index such as the CPI, then to estimate the relationship and project real revenues, and, finally, to inflate the projections using forecasts of inflation. The alternative method is to directly project actual revenues, which include the effect of inflation, and to use projections of money income directly in the forecasts.

Estimating the Forecasting Equation. Local governments must generally face the problem of forecasting four sets of revenues—sales, income, and property taxes, and other taxes and intergovernmental revenues. Sales and income taxes are probably the easiest to forecast, since their revenue growth can usually be accurately predicted by income and consumption growth.

The biggest problem is forecasting revenues from the property tax. Even though it is the most important

revenue source, it is the tax source most often projected on an ad hoc basis. Assessment administration is most important in the determination of the property tax levy. More than with any other tax, the problem is in identifying a discretionary change: is an increase in assessed value an automatic annual occurrence, or is it a discretionary action that will not be repeated regularly? Where assessed values keep pace with actual property values, it is reasonable to hypothesize that the market will respond positively to economic conditions as measured by income, the price level, or possibly local building activity. In such cases it may be preferable to use expert opinion (possibly the chief assessor) about what is likely to happen to assessed valuation, and project only the values of property likely to be added to the roll as a function of projected building permits or income.

Intergovernmental revenues have grown in importance during the past decade. Accurate predictions of total revenues are unlikely unless these can somehow be projected. Unfortunately, for many intergovernmental revenues the determining variable is the political decision of a higher level of government. This may be extremely difficult, if not impossible, to predict. Nevertheless, several alternative, nonstatistical methods are possible.

Possibly the easiest, albeit least accurate, method is simply to make an assumption about the different forms of intergovernmental aid. The most conservative assumption would be to assume that any aid program that is scheduled to expire during the projection period will not be renewed. Thus, for example, if General Revenue Sharing is scheduled to be retired in 1980, projections for 1981 and beyond would exclude such aid entirely. A less conservative assumption, and one which may be fairly accurate for intergovernmental aids with "hold-harmless" provisions, is that the aid will continue at its current *money* level (i.e., excluding any effect of inflation) throughout the projection period.

A variation on the purely assumption-based method is to supplement it with expert opinion on particular types of intergovernmental aid programs. This could take the form of consultation with local legislators in higher governmental units to obtain their predictions about program aid continuation.

The more complete method, especially for formula-based grants, is to simulate the distribution of revenues based on likely funding levels and projected changes in the variables that enter the allocation formula. The problem with this approach is that these variables are usually in terms relative to the jurisdiction and other governmental units within the state or nation. Therefore, complete allocation requires an estimation of how these variables will change for the remaining jurisdictions, as well as for one's own.

EXPENDITURE FORECASTING

While expenditure forecasts can be obtained through full-scale statistical techniques, or trend analysis, the technique discussed here is more accurately termed a deterministic or accounting identity approach. Statistical estimation and trend fitting can play a role in the overall approach; however, it is unlikely that a city will find the benefits of projections from a full-scale economic model to be worth the costs of building and estimating such a model.

The general approach here relies on varying degrees of splitting up, or disaggregation, according to type of spending (e.g., personnel, debt service). These disaggregated expenditures are then projected according to a consistent set of assumptions about changes in service levels, productivity, and price levels. The major difference in the approaches is the unit of analysis (or base) that is used in carrying out the projections. Here, the general practice ranges from the projection of "real" inputs (e.g., number of employee hours, gallons of gasoline) to the projection of total expenditures.

Labor Expenditures. The total cost of labor inputs can be divided into direct labor expenditures and fringe benefits. A straightforward accounting identity—the product of the average wage rate and the number of employees — determines the total direct labor expenditures.

Thus, projections of direct labor expenditures are possible through projection of future wage rates and employment levels. From a given base year level, one can then project either *both* wages and employees, or, in a somewhat more aggregate fashion, their totals. San Antonio uses the former approach, basing forecasts on both units of employment and wage rates. Dallas and Washington, D.C., on the other hand, project only total direct labor costs, so the basic unit of analysis is expenditures.

The initial step in such projections is standard: one must define a baseline expenditure increase, which is analagous to an automatic increase in tax revenues. Although this is generally referred to as a "constant services level budget," there is little agreement about what it means.

Consider first the projection of physical units of employment in defining a constant service budget. The amount of labor employed within any functional area in future years will depend on several factors, including the level of service desired, the productivity of labor, and labor's relative prices. Service level projections are likely to be based first on a consistent set of assumptions deemed reasonable by the policy maker or forecaster. Often the assumption is that the level of service will remain constant over the projection period. This implies that government employment should change in proportion to population or should not change at all.

There are several conceptual problems associated with such assumptions. To assume that labor inputs grow proportionately to population implies that only the number of users determines the level of outputs in the expenditure category. If real incomes are growing at rates faster (or slower) than the general rate of population, the

implied income elasticity of expenditure is less (or greater) than one. While not a great deal is known about the income elasticity of demand for public services, most estimates do tend to fall quite close to one.[19]

Likewise, to assume that labor grows proportionately to the level of service implies a very specific type of production for public services. First, it implies that even if relative prices for labor and nonlabor inputs change, there will be no substitution on the part of public sector managers. Second, it implies reduced productivity in the public sector. The forecaster should keep these implications in mind if the labor/population ratio is used in the forecasting effort.

Several additional adjustments are often made in deriving the baseline expenditure projections. Somewhat in conflict with the idea of truly constant service levels, these are related to policy decisions already made within the jurisdiction or by higher levels of government. There may be locally legislated increases in service levels that should be factored into the labor projections. Similarly, service level changes mandated by higher levels of government should also be taken into account in determining real labor inputs. Finally, for particular services, capital projections may have effects on the level of labor inputs of a particular functional area.

Where a constant services employment level is determined on an ad hoc basis rather than by formula, the problem is obtaining estimates of the number of employees necessary to maintain a constant level of services in a particular agency. One approach is to make the estimates centrally, within the city manager's office or the budget office. (This is essentially the approach used in New York City.) In defining constant services, while there is greater consistency across agencies under this approach, the chances for overlooking specific factors such as mandated expenditures are increased.

An alternative is to use the services of the departmental units or budget centers in the process. (Washington, D.C., San Antonio, and Dallas use this approach, to different degrees.) The prospect for more accurate projections is increased if departmental personnel take the task seriously and do not attempt to view these longer range plans as an opportunity to compile a "wish list" of projects. To avoid this, the centralized forecasting unit can closely review the projections made at the local level of disaggregation and require justification of proposed employment changes.

If the analysis is carried out in units of expenditure rather than physical units, baseline projections are made by inflating expenditures by some indicator of price increases. A current services budget implies a constant real expenditure increase. Determining the baseline level of expenditures raises the same problems as determining the baseline level of employment.

The next step in the projection exercise is to estimate future expenditures over and above the baseline projections. It is here that discretionary decisions come into play.

In some cities, each department identifies expenditure changes accompanying new programs, changes in levels of service, operation of new capital facilities, and expansion of service areas. In each case, the department identifies, and justifies, only the *incremental* costs applicable to a specified year in the projection period.

In making future year projections of personal service expenditures, the issue of wage rate changes must be considered. If the projections are run out in expenditure terms, a constant real expenditure level implies that either (a) no increase in wages beyond the inflation rate, or (b) real wage increases in the agency, must be balanced against reductions in employment or some nonlabor cost category. If projections are made in real terms such as employment, the wage increase assumption must be made explicit.

Consider the alternative assumptions that might be made about wage rate increases for city employees. One assumption is that real wages will remain constant (i.e., money wages will increase in proportion to prices). Another assumption is that the increase in money wages will lag behind price increases or local private sector wage increases by one year.

To justify such assumptions, historical data may be used to observe trends in wages. Finally, where differential wage changes are anticipated, depending upon the bargaining strength of the unions (e.g., uniformed personnel are assumed to have greater bargaining strength), differential rates of wage increments can be assumed. The potential problem with such an assumption in public forecasts is that it may hinder the bargaining process.

The second, and increasingly important aspect of labor expenditure forecasting is fringe benefits. The major fringe benefits—retirement contributions, Social Security, and insurance expenditures—are likely to be related directly to either the wage bill (total direct labor expenditures) or the level of employment. Once contribution rates have been assumed or projected, possibly using the trend in contribution rates, and the levels of employment and wages have been forecast, projected fringe benefit costs are easily formulated.

Nonpersonnel Costs. Current nonpersonnel expenditures include a multitude of inputs, from stationery supplies to gasoline. While accurate projections of these costs play an important role in the overall accuracy of expenditure projections, the principal limitation to a full disaggregation of these expenses is the accounting system. If such nonlabor inputs can be disaggregated into relatively homogeneous categories, the same general accounting identity approach as noted above can be used.

The level of disaggregation needed will depend in great part on the assumed differential inflation rates for the several types of nonlabor inputs. Unfortunately, there is no good series of price indices for many categories of nonlabor inputs used in governmental production, nor is

there a single price deflator applicable to the sector in general. Instead, proxy variables are generally used. These are mainly the wholesale price index, the consumer price index, or one of the components thereof.

Transfer Payments. For many cities transfer payments are not applicable. Where a city is responsible for such payments, use of a statistical model to forecast caseload as a function of the state of the economy (not unlike the methods used for economically-sensitive taxes) is appropriate. These caseloads, when multiplied by an assumed or mandated level of payment, determine expenditures.

Debt Service. Debt service is one of the easier expenditures to forecast. A forecaster may assume that there will be no change in the overall composition or level of debt. Here, expenditures will be known with certainty from repayment schedules. Or, a forecaster may wish to include the assumption that there will be additions to debt according to a long-term capital plan. In this case, it is necessary to make assumptions about the structure and rates of the debt when issued.

ORGANIZATIONAL AND ADMINISTRATIVE FRAMEWORKS FOR FORECASTING

The role of higher level administrators and the organizational placement of the forecasting activity largely determine the efficacy of the forecasting effort. The role of the chief administrator or manager in the overall success of the forecasting project cannot be overstressed. This is especially true for those expenditure forecasting techniques that use a great deal of departmental input. A time-pressed department head is unlikely to devote much effort to the process if it is thought that the projections are unlikely to be used. Further, the attitude of the administrator affects the efforts of those responsible for the forecasts. A perceived lack of interest in the results will greatly erode enthusiasm and will undercut the results.

The placement of the forecasting effort within the organizational structure and its relationship to the annual budgeting process is a less obvious factor; yet this is also central to successful forecasting. There are several advantages to placing the forecast under the purview of those responsible for preparing the budget. First, there is a logistical advantage in having those most familiar with the budget structure carry out the forecasts. This is most evident on the expenditure side, where the same individuals responsible for overseeing the administration of the current budget and preparing the subsequent document are likely to have the most intimate knowledge of the expenditure plans (and future "dreams") of individual department heads. Budget office personnel can best evaluate the reasonableness of the longer term projections provided by individual departments. And they probably have the most accurate and up-to-date information on developments within any expenditure category.

Second, the two processes — the annual budget and the multiyear plan — can supplement each other. When reviewing budget requests, the examiner can easily consult last year's multiyear projection to determine whether the request seems to be in line with what had been expected. Likewise, preparation of the longer term plan, especially if initiated at the departmental, or a lower, level, may provide the department chief with a broader perspective of the fiscal implications of the annual requests.

Even if the multiyear forecasting responsibility is placed within the budget department, timing the forecasts can cause problems. The annual budget process is a time-consuming effort. If the multiyear forecast is to be accomplished concurrently, the staff might be overwhelmed by the responsibility of producing two documents in such a short period. The temptation might be to decrease the effort on the multiyear forecast, since only the annual forecast calendar is mandated by statute. An alternative is to produce the long-term forecast during the "offseason," when the budget department's schedule may be less hectic.

Staffing Requirements. It is difficult to generalize what is the minimum staff size needed to produce long-term forecasts. Most importantly, adequate staffing must be provided to ensure that the forecast is produced on time. To expect a staff person to produce a good forecast in his or her "spare time" is unrealistic.

It is crucial that those responsible for forecasts have a knowledge of financial management and fund accounting. Ideally, forecasting teams should include at least one person with a background in economics (preferably with a Master's degree) so that the revenue equations reflect the influence of the local economy on revenues. It is also preferable that this person be trained in statistics, especially if econometric techniques are to be used in estimation. For expenditures, knowledge of the budget process is highly desirable. Finally, a sufficient number of support staff is necessary if high quality forecasts are to be produced on time, especially if the methods used are not computer-oriented.

Supporting Hardware. Computers are not absolutely necessary, but they make the forecasting process much easier. Whereas computers are necessary in a data-oriented econometric approach to revenue forecasting, most expenditure projection efforts *could* be carried out without the aid of a computer. However, mechanization greatly eases the computational efforts necessary in projecting even a constant service level, especially if the inputs are disaggregated by object. If several alternative scenarios are to be used in the projections or if the forecasts are to be produced upon demand as new policy issues arise, computerization is almost a necessity. The alternative is an overburdened staff.

Similarly, neither a fully computerized financial management system nor a personnel management system appears to be indispensable for the forecasting effort; yet both could greatly assist in the process. A financial management system may make it considerably easier to track the accuracy of the forecasts, and may also aid in the preparation of data for statistical estimation techniques. Where expenditure projections are based primarily on real labor inputs, a personnel management system may reduce staff time for producing forecasts.

While it is possible simply to present, without comment, the projected revenues and expenditures, this is usually not an effective method of presentation. When presenting results, especially if a revenue shortfall is being projected, the underlying rationale for the entire forecasting exercise must be presented in understandable terms. The reader must be able to grasp that the revenue projections have been made under a particular set of assumptions about the future state of the local economy and about the revenue structure. Perhaps more importantly, it must be stressed that the expenditure projections have also been made under a particular set of assumptions. These concern future price and wage changes and service levels. If a revenue shortfall is projected, the reader should be made aware that this does not necessarily mean the city will resort to deficit financing during the next five years. Instead, the projected shortfall means that some action must be taken, or at least be planned, to avoid deficit financing. Failure to provide an explanation may make the forecasts less credible in the eyes of policy makers and the public.

A MODEL APPROACH

As was seen in the section "Approaches to Forecasting," there are many ways forecasting is done. The approach taken here is designed to make forecasting simple. Analysis for this model involves four steps:

- Identifying
- Disaggregating
- Organizing
- Adding, subtracting, or multiplying

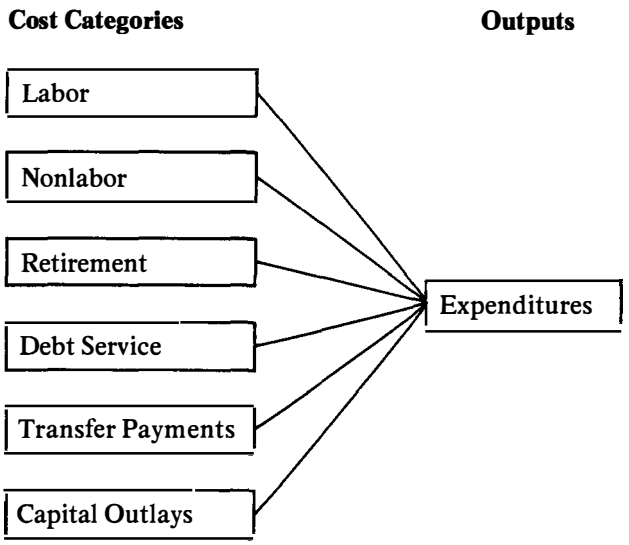
There is nothing mystical about a municipality's budget, and any model that attempts to extrapolate figures for future costs should recognize this.

The most important (and subtle) differences between projection models that have been developed for local governments stem largely from intended use. A forecast can be used as an instrument in arriving at policy decisions. It can help a municipal official set taxing policies, order needs by priority where cost overruns are imminent, cost out settlement packages for bargaining units, and in many other ways. It is increasingly being considered by many in the field as an integral part of any financial planning process.

The rest of this report deals with the steps that are necessary to project a sound financial statement, based on various assumptions of future service levels in jurisdictions. The nature of the model and the factors upon which it is based are discussed next, followed by a step-by-step account of the various stages in the forecasting process, first for expenditures and then for revenues.

Nature of the Model. Essentially, the model takes a public employment approach to project expenditures. Aggregate spending forecasts follow from assumptions about the level of inputs that a municipal government will employ and the prices paid for these inputs. In other words, costs are associated with numbers of employees and the durable and nondurable goods these employees use. The model will only be as accurate as the jurisdiction's count of employees. Most costs are related to the common unit of employment. In constructing the model this way, the results obtained from the analysis are easy to understand and, if conditions change, modify. Settlement packages for bargaining units, new service levels, or new programmatic functions can be readily added to the projection. All that is needed are new assumptions about the extent of change in people employed.

TABLE I. STAGES IN FORECASTING EXPENDITURES ACCORDING TO THE MODEL



EXPENDITURE FORECASTS

Expenditure projections are made using a simple computational procedure. First, total spending in the base year (the most recent year) is disaggregated by function or department. Next, base year spending for each department is disaggregated into four cost components: labor, nonlabor, fringe benefits, and other expenditures. With this data available, future costs can be projected based on assumptions about the level of services to be provided.

There are other costs incurred by municipal governments, including contributions to employee retirement systems, transfer payments for the needy, debt reduction payments, and capital outlays (see *Table I*). The extent to which a jurisdiction is involved in these areas varies widely. But there are certain steps that can be taken to project future expenditure levels for these areas, as seen below.

Labor—Disaggregated by Department and by Job Classification. An accurate count of employees is critical in estimating costs. So first, employees should be disaggregated into the various departments of municipal government, then further disaggregated into relatively homogeneous job classifications. Exactly how this is done will depend upon the local situation. One way is to organize the count by job classification: administrative, uniformed or delivery, laborer, and clerical.

(1)

Police Department Job Classification	Number of Positions Filled
Administrative (A)	8
Uniformed (U)	27
Clerical (C)	6
Worker (W)	0

The next step is to establish an average wage for each job classification in each department. Total compensation in each job category should be divided by the number of employees in that category.

(2) Administrative Unit (A)

$$\text{Average Wage (AW)} = \frac{\text{Total Compensation}}{\text{Number of Positions Filled}}$$

When this is complete, labor costs (L) can be projected by multiplying the number of employees to be engaged by the average wage for the job classification:

(3) $L = (A)(AW) + (U)(AW) + (C)(AW) + (W)(AW)$

Total spending for personnel services can then be estimated based on: (1) the projected number of employees needed to carry out desired service levels, and (2) an inflator factor (P). The inflator should be 1.00 in the base year and grow at a rate consistent with national economic projections. This factor will, of course, change as the economy changes, and future forecasts should be based on the latest available estimate. A ten percent growth factor would be considered realistic given current inflation rates.

(4) $L = [(A)(AW) + (U)(AW) + (W)(AW)] \quad (P)$

This four-step process yields an equation that can be used to forecast total labor costs in a department.

Nonlabor—Disaggregated by Cost Per Employee. It is assumed that growth in units of nonlabor inputs will parallel the growth in public labor employment in each department, despite the variable prices of these inputs. As a first step, nonlabor spending is disaggregated into a price component and quantity component.

(1) $NL = (P)(Q)$ where

NL = Nonlabor costs
P = Price per unit
Q = Quantity

With this data in hand, nonlabor costs can be projected as a cost per employee. This facilitates straightforward projections based on assumed changes in the level of employment.

(2) $CPE = NL$ where

CPE = Cost per employee
NL = Nonlabor costs
E = Number of positions filled or to be filled

It is then possible to forecast current total expenditures (TE) in equation form.

(3) $TE = (L) + (E)(CPE) + (0)$
Labor costs Nonlabor costs All other

It is assumed that inflation affects labor and nonlabor inputs identically in each department, and that inflation has the same relative effect on all departments. The model, then, assumes the same rate of inflation for all objects of expenditure. To complete the equation for total expenditures, it is necessary to compute the inflator factor (P) against the cost categories.

(4) $TE = [(L) + (E)(CPE) + (0)](P)$

Retirement. Retirement expenditure forecasts should be treated separately from other personnel services because

of the special problems posed by such outlays. The determinants of retirement outlays vary widely from city to city. In those cities known to consistently finance retirement obligations according to a sound actuarial approach, and where there are no expectations of either substantial benefit improvements or salary increases above those assumed in the actuary's cost calculation, the analyst will probably not be far off by using as the determinant of future contributions the ratio of retirement contributions to wages (the contribution rate) for the most recent year.

$$R = (\text{Contribution Rate}) \times (E)$$

where R = Retirement expenditures, and

E = Number of positions filled or to be filled

But where a city is operating its retirement system on a pay-as-you-go basis, or, more likely, where a city has a nominally funded arrangement but unfunded accrued liabilities are growing rather consistently, forecasting retirement outlays, even for the years immediately ahead, is nearly impossible without the services of a pension specialist.

Debt Service. With each municipal bond issue or short- and long-term borrowing contract, repayment schedules are established at the date of issue or the date of receipt of funds. Forecasting expenditures for the retirement of debt should pose no particular problem, since amounts can be extracted directly from repayment schedules.

However, if a bond issue or borrowing contract has been authorized for some future period, a municipality may want to project, as best it can, repayment obligations based on assumed periods of longevity and interest rates. If it has traditionally authorized borrowing without consistently undertaking action, the municipality may want to refrain from projecting these costs until they are formally obliged.

Transfer Payments. In some areas, funding and administration of social welfare programs has become a state's responsibility. For the many municipalities that still perform this function, forecasting these expenses is important. Transfer payments are forecast on an ad hoc basis, depending on assumed numbers of recipients and average payment levels. To best predict future costs, a municipality may want to begin its analysis by arriving at an average payment per recipient per program. In doing this, it will want to consider relevant state or local laws on minimum/maximum allowances and its own current practices. Discretionary changes in the level of benefits offered should not be computed unless known.

Eligibility criteria should be examined to determine growth or contraction for those who are currently eligible and for those who will be eligible in future years. Depending on the criteria used, demographic factors such as personal income, female heads of households, and housing stock without potable water might be helpful as indicators of future levels of recipients. This will, of course, vary from city to city.

Capital Expenditures. Capital expenditures are difficult to forecast because of their discretionary nature. However, one can use the prospective capital expenditures as reported in a municipal government's capital budget. Debt service resulting from these projects should be added to the forecast when they are expected to occur. Operating costs should be projected when these projects come on line. A municipality can use the method described earlier for projecting total current spending to estimate costs for new public capital projects.

REVENUE FORECASTS

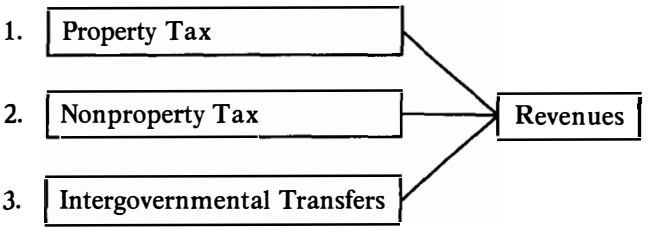
The method described here for forecasting revenues departs less drastically from the traditional method than did the expenditure projection technique (see *Table II*). Since this model is intended primarily for application to general purpose municipal governments, much of the revenue side of the forecast centers around the property tax. Methods for predicting levels of other funds derived from local sources are described afterwards.

To begin the analysis, first disaggregate base year receipts into component parts, then make alternative assumptions about changes in the base of a tax or charge, or discretionary changes in rates or formulas. The assumptions yield alternative forecasts of total receipts. By disaggregating revenues according to source, the forecast can be easily amended to allow for various assumptions about the base of the source. This method also has the value of being able to measure the relative impact of different sets of discretionary rate and formula changes on the total receipts of the municipality.

Property Taxes. The first step in the analysis is to project future trends based on an extrapolation of past growth in assessed value. The municipality should compute the affect of inflation on the property base only if the community traditionally reassesses to reflect inflationary increases in property values. If reassessment is

TABLE II. STAGES IN FORECASTING REVENUES ACCORDING TO THE MODEL

Source of Funds



done every eight to ten years, or less frequently, assume inflation has little affect on the base. From this gross value amount of real property, rate structures can be amended to determine the yield from the tax. The model is sufficiently flexible to allow for comparative analysis.

$$\frac{\text{Total Growth in Property Values For Latest (x number) Year Period}}{\text{Number of Years Surveyed}} = \text{Average Yearly Growth (AYG)}$$

(Base Year + AYG) (Rate) = Revenue Yield

If the community reassesses to reflect inflationary increases, then:

(Base Year + AYG)(P)(Rate)=Revenue Yield
where P=Inflator Factor

Nonproperty Taxes. Nonproperty taxes such as the sales and income tax can best be predicted by factors that reflect personal spending levels or the potential for spending. These are personal income, the gross national product (GNP), price levels, and employment figures. The problem with employment figures is that few municipal governments would be able to obtain data that reflect employment fluctuations for their own community. These figures are usually maintained for areas that include more than one municipal jurisdiction. On the other hand, figures for income levels, GNP, and prices can be obtained from various sources, including the U.S. Congressional Budget Office in Washington, D.C. and many state budget offices.

Municipalities must project the elasticity of income based on predicted growth derived from historic data or directly from forecasts that include this data. Two forecasts might well be developed, one which reflects a constant growth pattern and one which is less rigorous in its assumptions. In doing so, alternative projections can be based on the best and most recently available information on changing conditions. If an economic downturn or recession occurs, a forecast will exist that reflects this condition.

Intergovernmental Funds. Short of an elaborate analysis of state government fiscal outlook, state aid is difficult to project. Forecasting in this area is usually done ad hoc. One way to approach this is to assume a growth rate in state aid that roughly parallels the inflation rate (i.e., allows for no real increases in state financing of local services).

Another approach requires analysts to make assumptions about changes in the local position compared to other localities and the historical movements of state funding for the particular program or aid area. The factors to be considered in comparing local positions will depend upon the determinants of the state aid formula.

The forecast would allow the same format as used for expenditures. Revenue sources are first disaggregated and then identified by the factors that determine the relative local share. These factors include population, assessed value, and general revenue sharing formula. The amount to be received by a municipality can then be projected as a share of the total.

The process would work like this. First, identify the revenue source, such as state grants to Municipality A for highways, and then identify how it is apportioned (e.g., population size). Next, determine the relative local share of total state disbursements by dividing state grants to Municipality A (G_a) by state grants to all municipalities (G_s).

(1) Share of Total

$$G_a = \frac{G_a}{G_s}$$

G_a = Grant to Municipality A
G_s = Grants to all municipalities

With this ratio established, approximate the amount of state funding in the grant area to the total state budget. Grants to all municipalities (G_s) is divided by total state spending (B_s).

(2) Budget to Grants

$$G_a = \frac{G_a}{G_s} \times \frac{G_s}{B_s}$$

B_s = Total State Budget

Finally, estimate the growth in state spending by dividing the state budget total (B_s) by the growth in personal income in the state (Y_s).

(3) Size of Budget

$$G_a = \frac{G_a}{G_s} \times \frac{G_s}{B_s} \times \frac{B_s}{Y_s}$$

Y_s = Growth in personal income for the state

As the equation shows, the forecasting of state aid in a programmatic area is based on three factors:

1. Local share of total
2. Ratio of total budget to grants
3. Effective size of budget

Finally, when determining the local share of the total, some thought should be given to the factors upon which the aid is apportioned. For example, if state aid for highways is distributed on a per capita basis, and if population shifts have occurred and have been recorded, the local share will vary depending on how this shift has taken place. The same concept applies to formulas that are apportioned on the basis of local property value. If available, the ratio of the local value to the total for all municipalities should be used in the forecasting process.

If a formula change should occur, the forecast should be recalculated to reflect the new method.

SUMMARY

A model can best be judged by the usefulness of its results. The flexibility of the model, as that presented here, is also a worthy criterion of usefulness. By choosing a reasonable set of assumptions about a city's compensation and employment options, an accurate projection of expenditures may be made. This report offers a method for predicting a realistic upper limit of revenues available to cover this projected expenditure level, and it recommends the development of a less optimistic assumption that will reflect the sensitivity of the budgetary balance to a change in economic conditions.

The model is only structural in nature. The local official or analyst must decide "how many" and "how much." Although the model is sufficiently flexible to cover almost any forecast period, a five-year projection is recommended, with at least annual modification based on new information. With the forecast in hand, it is up to the local official to influence how the city or town might make adjustments to improve the fiscal situation. It is then up to the official to determine what, if any, fiscal implications such adjustments would have.

Copies of the handbook on which this report is based can be obtained at cost from the Coalition of Northeast Municipalities, 131 Tremont Street, Boston, Massachusetts 02111. The title of the handbook is, **Forecasting Municipal Revenues and Expenditures: A Primer and Handbook.**

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[1] The Urban Consortium, Public Technology, Inc., *Multi-Year Revenue and Expenditure Forecasting: Interim Review of the State-of-the-Practice in Large Urban Jurisdictions* (Washington, D.C.: June, 1979); and the *Urban Government* (Washington, D.C.: 1977).

[2] Sanford M. Groves, *Evaluating Financial Condition* (Washington, D.C.: International City Management Association, 1979).

[3] American Association for the Advancement of Science, *Report from the Workshop on Management, Finance, and Personnel* (Washington, D.C.: 1978).

[4] City of San Diego, Financial Management Department, *Six Year Ramifications of Proposition 13, Proposition J, and the Proposed Gann Initiative,* Report 79-259 (San Diego: Financial Management Department, 1979).

[5] Roy Bahl and Bernard Jump, Jr., "Projecting the Fiscal Viability of Cities," in *Fiscal Choices,* ed. George Peterson (Urban Institute, forthcoming).

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[7] U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business 1973-1978.*

[8] Advisory Commission on Intergovernmental Relations, *State-Local Finances in Recession and Inflation: An Economic Analysis* (1979).

[9] Roy Bahl, Bernard Jump, Jr., and Larry Schroeder, "The Outlook for City Fiscal Performance in Declining Regions," in *The Fiscal Outlook for Cities,* ed. Roy W. Bahl (Syracuse: Syracuse University Press, 1978).

[10] David Greytak and Bernard Jump, Jr., "Inflation and Local Government Expenditures and Revenues: Method and Case Studies," *Public Finance Quarterly,* V (July, 1977), p. 275. Also, see David Greytak and Bernard Jump, "The Effects of Inflation on State and Local Government Finances, 1967-1974," Occasional Paper No. 25, The Metropolitan Studies Program, The Maxwell School, Syracuse University (Syracuse: 1975).

[11] For example, under conditions of some tax limitations, projecting these taxes to increase by the limited amount is not only likely to be accurate, but the only reasonable projection that can be made. This is the approach taken in San Diego after Proposition 13.

[12] See Robert W. Burchell and David Listokin, *The Fiscal Impact Handbook* (New Brunswick: Center for Urban Policy Research, 1978).

[13] This equation is taken from the New Orleans, Louisiana, *Municipal Budget Projections: Econometric Revenue Forecasting* (New Orleans: 1977).

[14] For a review of the activity see John Gambill, "State Use of Econometric Models for Revenue Estimating: A Report on a Survey," *National Association of Tax Administrators Conference on Revenue Estimating* (Washington: Federation of Tax Administrators, 1978).

[15] Samoon Chang and Patrick W. Kelly, "Ten Year Economic and Revenue Forecasting with Alternative Fiscal Plans for Mobile" (City of Mobile: Finance Department, 1977).

[16] The most commonly used is the so-called "constant-structure" method. See, for example, Michael J. Wasylenko, "An Estimate of the Elasticity of the New York State Personal Income Tax," Occasional Paper No. 13, The Metropolitan Studies Program, The Maxwell School, Syracuse University (Syracuse: 1974). This and other methods are compared in Roy Bahl, "Alternative Methods for Tax Revenue Forecasting in Developing Countries," International Monetary Fund Department Paper, Fiscal Affairs Department (mimeographed, 1972).

[17] U.S. Bureau of the Census, *Population Estimates and Projections,* Series P-25 (Washington, D.C.: U.S. Government Printing Office).

[18] See New Orleans, *Municipal Projections,* and New York, *Financial Plan.* Since New Orleans and New York City are also counties, such a specification is possible.

[19] For a review of the results of many of these studies see Roy Bahl, Jesse Burkhead, Bernard Jump, Jr., *Public Employment and State and Local Government Finance.*