Chapter 5

Funding State and Local Budgets

Chapter Five Overview

While the previous chapters have more or less centered on the expenditure side of the budget, this chapter concentrates on *revenue*. Revenue is the lifeblood of governments and a very important factor for government officials and citizens. At the end of FY 2012, more than a dozen states have projected severe budget shortfalls for FY 2013 (McNichol, et al 2012). In some cases, these deficits were projected well into the 100s of millions of dollars. Hence, it is quite important that government officials closely examine potential revenue sources and spend quality time conducting accurate revenue forecasts. Due to limited revenue sources it is also important that government engage in *revenue management*. This chapter begins with a general discussion of revenue sources for all levels of government followed with a more detailed examination of state and local revenue sources. This includes the newest form of revenue sources: lotteries and gambling.

Sources of Revenue

The number one source of revenue for state and local governments is *taxes*. Taxes are "compulsory charges made against the public by a government to obtain the money it needs to finance its activities" (Mendosa 1983, p. 63; see also Rose 2010). Taxes come in various forms and differ somewhat from one governmental unit to the next. For example, the federal government depends heavily upon *federal individual income taxes* and *social insurance* receipts while state governments depend a lot on *sales* and *individual state income taxes*. Local governments are more dependent upon *property taxes* (Bartle, Kriz, and Morozov 2011). Some taxes are considered *regressive* while others are considered *progressive*.[27] However, taxes are not the only source of revenue for state and local governments. Revenues are also collected from *user fees; intergovernmental transfers; licenses and permit; and excise taxes on motor fuels, alcohol sales and tobacco sales;* and various other charges (fines, forfeitures). Many cities work under the auspices of a charter and this document dictates what sort of taxes will be collected. For example, some cities collect income from earning.[28] However, legislative approval is often needed to add an additional tax. Table 5.1 shows the major categories of revenues for the federal, state and local govern-

ment along with budget representation estimates.[29] These estimates can differ by state and local governments for any particular year (Carroll 2009; Kioko 2011).

As shown, the federal government is heavily dependent upon individual income taxes and social insurance payments. However, social insurance is not used to fund any federal program, it is considered a trust. State and local governments are much more diverse and balanced in their sources of revenue. Most notable with these latter two levels of government is the dependence upon intergovernmental transfers.

Table 5.1 Major Sources of Revenues over different Periods

	Federal		State		Local	
	2002	2010	2002	2008	2002	2008
1. Individual Income Taxes	48%	42%				
2. State Income Taxes			17%	18%		
3. Corporate Income Taxes	11%	9%		3%		
4. Sales Taxes			21%	24%	5%	6%
5. Property Taxes					25%	28%
6. Excise Taxes	3%	3%				
7. Social Insurance	33%	40%				
8. Intergovernmental Transfers			22%	31%	34%	38%
9. Insurance Trust Revenues			20%			
10. Charges, Fees and Miscellaneous				18%	21%	23%
11. All Other	5%	6%	20%	6%	15%	5%

Source: Nice, David B. 2002. *Public Budgeting*. Stamford, CT: Wadsworth. Budget of the United States Government, Fiscal Year 2012, Historical Tables: Table 2.1; http://www.whitehouse.gov/omb/budget/Historicals. Tax Policy Center, State and Local Government Finance Data Query System, http://www.taxpolicycenter.org/taxfacts/displayafact.cfm/docid=529. Tax Policy Center, State and Local Government Finance Data Query System, http://www.taxpolicycenter.org/taxfacts/displayafact.cfm/docid=527.

Further, state governments are modestly dependent upon sales and income taxes, and *insurance trust revenues*. Insurance trust revenues are "taxes and fees that finance various insurance trusts to support unemployment compensation programs, state employee pensions, and other programs" (Nice 2002, p. 26). Lastly, local governments depend on property taxes, charges and fees. Taxes are traditionally evaluated using the following dimensions:

A. Yield - How much money can be raised using the tax?
B. Stability – How much does revenue fluctuate based on changes in the economy?
C. Equity - Do similarly situated people pay the same level of tax? Do those who have a greater ability to pay more contribute more?

D. Efficiency – Does the tax distort economic activity? How much does it cost to administer the tax and who covers those costs?

Given the fact that states and local governments have a plethora of revenue sources at their disposal, one can use the following formula to determine the level of revenue needed:

Yield = Rate * Base

A. Yield = Revenue.
B. Rate = The rate is levied against the base (i.e. higher incomes are taxed at a higher rate).
C. Base = Property value, income, subject sales, etc.

In order to change the yield, you simply need to change the definition of the base as well as the rate.

Taxes

Taxes fall into three basic categories: income, consumption, and wealth. In some cases, several categories may be involved in a transaction. Taxes here are split into four general categories: A. Property, B. Income Taxes, C. Sales Taxes, D. Alcohol, Tobacco and Petroleum (see also Gravelle 1999, and Swain and Reed 2010).

A. Property Taxes

A major source of revenue for local governments is *property taxes*. These are taxes levied against real property, personal property and the property of a privately owned utility. Real property consists of land, homes, businesses, and other permanent fixtures. Personal property is property that can be moved from one location to another. It can be inventory, vehicles, and equipment. Privately owned utilities include real and personal property (Mikesell 2011; Kittredge and Ouart 2005; Rubin 2006). The assessed value of these categories is usually determined by a state or local government or by judicial decision. Under normal circumstances, the market will play a role in this value. This process is very complicated to say the least.[30] However, Mendosa (1983) offers the following principles when assigning value to property.

- Uniform procedures should be in place when assigning value to property. Property that are similar should be assessed the same. That is, property that have "equal market value should be assigned approximately equal taxable values" (p. 63).

- Assessed values should be adjusted periodically to keep pace with market value. When market values decrease, the assessed value should likewise decrease and vice versa.
- Officials should make every effort to tax all property. This includes using "aerial photographs, field surveys, comparing utility customer records with personal property tax rolls, and other search and find techniques" (p. 64).

According to Gianakis and McCue (1999) property taxes is one of the most unpopular taxes in the U.S. even though it is considered by most to be progressive. [31] One reason for such a poor ranking is based on the principle of capital gains. That is, as the value of the property increases, so does the amount of the tax unless the rate is reduced. Since the gain in wealth is not realized until the property is sold the tax seems unfair since the property tax is paid each year. The tax can also be used to balance the budget of a local government when other options do not appear to be feasible.[32] Even though a large number of tax bills are escrowed, the bill comes once a year and thus is highly visible to the taxpayer. Infrequent reassessments may also have a negative impact on property during periods of economic downturn. Lastly, taxpayers see the value of their property as subjective and arbitrarily set by the government (Lynch 1995).

Setting the Property Tax Rate

There are quite a few items that are considered when setting the property tax rate. These include items such as the location (city v. rural) of the property and what the property is used for (business v. residential). There are three basic operations used when setting the tax rate: *assessment of property value* (*tax assessor*), establishing the *tax rate* (*millage rate*), and collecting the tax (*tax collector*). The legislative body sets the tax rate while assessment and collection can be done by the same or separate institutions.

Tax Assessments and Tax Rates

The *tax assessor* office normally identifies and classifies property. Property can be classified as: residential versus business; farm versus non-farm; or farm, residential, commercial or industrial. Farmland is taxed at a much lower rate than non-farm land and businesses tend to be taxed at a much higher rate than residential areas unless they are new to the area (Lynch 1995). Another important characteristic in this process is to determine the role of exemptions. An exemption is the "amount deducted from the assessed value of property for tax purposes" (Riley and Colby 1991). Homestead exemptions are very common. However, there could be exemptions for widowers, senior citizens, handicap

residents, etc.

The *market price/value* of the property is also very important when establishing the tax rate. Market price is the price that a seller and buyer are willing to accept without coercion. Normally, this is the price used in the assessment. After the assessor places a value on the property, the tax rate is established. While the government expects other revenue, the tax rate is still influenced by the amount of revenue needed to run the government. If expenditures are not balanced, the property tax rate can increase or the budget can be cut (Raphaelson 2004).

A local government can either decide how much money it needs from property taxes or simply set the property tax rate. In method one, let's assume that the government needs $200,000.00 from individual property taxes and the tax assessor has determined the total assessed value of individual property taxes is $4,000,000.00. So, if you divide the amount of funds needed by the total assessed valued, you will get the *fixed or nominal tax rate*. In this case, the rate would be .05 or 5% ($200,000.00/$4,000,000.00). Therefore, a home assessed at $55,000.00 would yield $2,750.00 in property taxes (.05 x $55,000.00). The tax rate typically changes for business and personal property.

In the second method, property tax rates are set up front and then applied to property. This rate is commonly assessed using a *millage rate* or a "cents on the dollar method. A millage rate is expressed in terms of mills. One mills yields (1/1000 of one dollar) $1.00 of tax liability for every $1,000.00 of assessed value. Again, the rate would vary depending on the type of property assessed. For example, let's consider a business that has a market value of $100,000.00 and an assessed value of $45,000.00. The millage rate is 5% (or 50 mills/dollar). So, you multiply the assessed value by the millage rate and determine the estimated tax ($45,000.00 x .05 = $2,250.00). Another way of looking at this assessment is to use the following calculation: Taxes = 50 mills / $1 x $45,000.00 = 2,250,000 mills = $2,250.00. [33]

The *most effective tax rate* (METR) can be calculated by dividing the tax assessment (estimated) by market value ($2,250.00/$100,000.00 = 0.0225 or 2.25%). When calculating multiple units, add all of the tax rates (METRs) together and divide by the total number of properties. All calculations are done after all exemptions are considered (Rabin, Hildreth, and Miller 1996).

Consider the City of Loudon's Autoplex in Table 5.2. As shown, the applied millage rate is 3%, but the question is: what is the most effective tax rate? The table shows that the METR is 2.32% for the cities' autoplex.

In the example below the estimated tax is the sum of the assessed value multiplied by the millage rate (in Excel: =90,000*.03). The METR for A&B Auto is calculated by dividing the estimated tax times the market value (In Excel: "=2,700/135,000"). The total METR is calculated by adding each of the individual METR together and dividing them by the total (2.00 + 2.33 + 2.57 + 2.53 + 2.19 = 11.62; 11.62/5 = 2.32%).

Table 5.2 Most Effective Tax Rate City of Loudon's Autoplex

Business Entity	Market Value	Assessed Value	Millage Rate	Est. Tax	METR
A&B Auto	$135,000	$90,000	3%	$2,700	2.00%
Amido's Car Repair	$200.000	$155,000	3%	$4,650	2.33%
Autos For You	$175,000	$150,000	3%	$4,500	2.57%
Hybrid Express	$355,000	$300,000	3%	$9,000	2.53%
McClain's BMW	$650,000	$475,000	3%	$14,250	2.19%
Total	$1,515,000	$1,170,000		$35,100	2.32%

An extremely important event in property tax administration involves the date on which the property value is to be fixed. Property changes hands constantly. As a result, failing to fix a date means the government is aiming at a moving target. So, a government specifies that the value of the property will be determined as of a particular date, such as January 1st. This is known as the lien date. The government places a lien on the property as of that date. Thus, the government is entitled to the tax. The date on which the actually levy of the tax is made by the legislative body is usually later in the year. For example, the levy date might be April 1st. Unlike virtually all other taxes, a property tax is levied to support the activity of the government for the fiscal year. In this example, the fiscal year is July 1-June 30.

Another event that takes place is the reappraisal. Governments have different ways of reappraising property. Some require that an actual appraisal take place by an appraiser. This might be done every three years or more. Others allow for estimates every two or three years followed by an actual appraisal the next cycle. Estimates are usually done by analyzing housing sales in the neighborhood during the past two years. The assessor would also look at permits to see if any improvements were made.

The reappraisal was one of the most unpopular actions that affected a property owner. An increase in the property tax bill resulted from the inflationary increase in the value of the property without any increase in the rate. For example, a home that had a value of $100,000 and a rate of $20 per thousand would receive a bill for $2,000. When the property was reappraised, it was valued at $120,000. Now the bill was $2,400. The most famous instance of taxpayer revolt was Proposition 13 in California. Its passage required the rate to be reduced so that the amount paid after appraisal was substantially the same as the amount paid before. Many states have enacted similar provisions.

Let's assume for a moment that the tax assessments are questionable. That is: Were the properties assessed based on market price? Are there biases in the assessment based on the type of property? Are some properties under or over assessed? In order to answer the first question, the *coefficient of dispersion* should be checked. This test allows the examiner to determine how close are

assessed values are to each other, relative to the market. Exhibit 5.1 gives us an example of this test (partially excerpted from Lynch 1995).

Exhibit 5.1 Coefficient of Dispersion Test

	Sales Price	Assessed Value	Assessment Ratio	Average Deviation
Property 1	$100,000.00	$55,000.00	55%	55%-63%=[-8%]
Property 2	100,000.00	64,000.00	64%	64%-63%= 1%
Property 3	100,000.00	70,000.00	70%	70%-63%= 7%
	$300,000.00	$189,000.00	189%	16%

- *Step 1:* Individual Assessment Ratios:
  $55,000 / $100,000 = .55 or 55%
  $64,000 / $100,000 = .64 or 64%
  $70,000 / $100,000 = .70 or 70%

- *Step 2* : Average Assessment Ratio of Properties:
  (Total Assessment Ratio / Total Number of Properties) = Average Assessment Ratio (189 % / 3) = *.63 or 63%*

- *Step 3:* Average Deviation:
  (Sum of the Absolute Value of Average Deviation / Number of Properties) = Average Deviation 8% + 1% + 7% = 16%, 16% / 3 = *5.3%*

- *Step 4:* Coefficient of Dispersion:
  (Average Deviation / Average Assessment Ratio of Properties) = 5.3% / 63% = *.08 or 8%*

A coefficient of dispersion less than 10% suggest a minor problem with the assessed values. A coefficient higher than 10% suggests a problem and the magnitude of the problem increases as the coefficient increases. Hence, a coefficient of 8% does not indicate a substantial problem with the assessed values in the Exhibit 5.1. The closer the coefficient is to zero the better the assessments are to each other.

Another test that can be used with the coefficient of dispersion is the *price-related differential*. This test determines if higher priced properties are under assessed. Exhibit 5.2 provides an example of this procedure (The example and subsequent steps in Exhibit 5.2 were excerpted from Smith and Lynch 2004, p. 348).

Exhibit 5.2 Price Related Differential Test

- *Step 1*: Calculate the individual aggregate assessment-sales ratios which are weighted by the values of the parcels in the sample. In the example below, you divide the assessed value by the sales price (i.e. $20,000/$100,000.00=.20 or 20%/ assessed value/sales price).

	Sales Price	Assessed Value	Assessment Ratio
Property 1	$100,000.00	$20,000.00	20%
Property 2	10,000.00	4,000.00	40%
Property 3	10,000.00	4,000.00	40%
Property 4	10,000.00	4,000.00	40%
	$130,000.00	$32,000.00	140%

- *Step 2*: The aggregate assessment-sales ratio is: ($32,000.00/$130,000.00) = 0.246 or 24.6%.

- *Step 3*: Calculate the average of the assessment ratios of the separate parcels. The average assessment ratio of properties is: 140% / 4 = 0.350 or 35%.

- *Step 4*: Divide the mean of the assessment ratios by the aggregate assessment-sales ratio to determine the price-related differential. The price-related differential is: 35 / 24.6 = 1.42 or 142%.

- *Step 5*: Interpreting the results. Deviation from 100% is the important figure in this analysis. A price-related differential that is 100% indicates that there is neither over assessment nor under assessment. However, if the differential is more than 100% then there is under assessment of the higher priced properties. If the differential is less than 100% then there is an under assessment of the lower priced properties. In this case, the deviation is 142% indicating the higher priced property is significantly under assessed. Mathematically, the differential indicates that the collective disparity between the sales price and the assessed value of the higher priced properties is greater than the collective disparity between the sale price and assessed value of the lower priced properties.

Tax Collection

The last step in the process is tax collection. In a lot of local governments, tax collection is handled by the Tax Collector or in some instances the Sheriff's office. The Sheriff's office becomes particularly important when property is

foreclosed. If property taxes are not paid, the property can be sold in order to collect the taxes. Delinquency rates normally do not exceed 5%. However, it is wise to assume that everyone is not going to pay their taxes when preparing revenue estimates.

Tax assessors assume that the property tax will be paid yielding a one to one ratio. That is, if your taxes are $956 then you will pay $956. However, property tax payments frequently come in schedules based on months. For example, let's say that your payment is due by November 30. The bill might have a payment schedule for October, November, December, and January. The property owner could save money by paying the bill early (October date) or pay the actual tax amount by paying by November 30. By delaying payment, the property owner can be penalized with a 1% penalty in December, 2% in January and then become delinquent in February with a flat 3-5% penalty. Although it is not a good accounting practice, you can budget for the penalties. Arguments for doing so should be based on strong historical trend analysis.

B. Income Taxes

For a lot of states, *income taxes* make up a large proportion of taxes collected. In 2002, 43 states collected state income taxes.[34] These taxes tend to follow the same format as federal income taxes. That is, income is defined as all income rather than just wages. An income tax is considered to be a *progressive tax*: the greater the income, the higher the tax rate. Individual income taxes make up about 13% of all revenue collected in a state (Nice 2002; Rubin 2006, Swain and Reed 2010).

Local governments can also levy and collect income taxes (*payroll taxes*). Some local governments limit the tax to earned income, such as salary and wages, rents and royalties; and lottery and other gambling winnings. In other instances, the tax is only applied to wages and salaries earned and are deducted directly from individual earnings. The tax rate is usually 1-2% of earned wages. Generally speaking, these taxes are considered to be *regressive taxes* because all individuals pay the same rate regardless of their salaries or wages. Thus, the rate for the CEO is the same as the rate for the mail clerk. Hence, the impact is more significant for the lower income individual. Payroll taxes also have an impact on commuters who do not live in the jurisdiction where they work, since they are also required to pay the tax. Commuters essentially pay a tax for services that they receive associated with their place of employment, such as police, fire, and road maintenance. This is particularly important for cities that have large employment centers, but whose employees live in suburbs.

Since income and payroll taxes are taxpayer assessed, they have a low administrative overhead. The tax is collected by the employer and sent to the state or local government. Some state governments also allow local governments to collect a *corporate income tax*. However, this tax can be detrimental to promoting the business industry unless other local governments also have the tax

(Bland 2005). Payroll taxes are not as stable as property taxes and are very susceptible to the business cycle. The majority of local governments do not collect payroll taxes. However, this aspect is very regional in nature.[35]

In 2012, as in most years, tax rates shift. Exhibit 5.3 shows the tax rates for the federal government and an example of what a state and a local government tax rate could resemble.

Exhibit 5.3 Tax Rates in 2012

- Federal income tax rates ranges in 2012 were:
  $0-$8,700.99 in salary = 10%; $8,701.00-35,350.99 = 15%;
  $35,351.00-$85,650.99 = 25%; $85,651.00-$178,650.99 = 28%;
  $178,651.00- $388,350.99 = 33%; >$388,351 = 35%.

- State income tax rate (used below): $0-2,000.00 = 3% rate; >$2,000.00 = 4.5%

- Local payroll tax (used below): A flat 1.75%

Let's consider the example in Exhibit 5.4. There are four employees listed in City X's legal affairs office. Note that two of the employees are listed by name while the other two are not. If you have several employees who make the same salary, it is easier to put them into one category listed by their title rather than listing them separately. This format does not work if you want to identify a person by name, nor does it work if and when their salaries change.

Exhibit 5.4 Income Tax Payments

Employee	FTE	Salary	Fed. Income Tax	State Income Tax	Payroll Tax
Joia Thornton	1	$97,000.00	$20,620.32	$4,334.96	$1,697.50
John Anderson	1	90,000.00	18,660.32	4,019.96	1,575.00
Exec. Asst.	2	100,000.00	17,059.70	4,439.91	1,750.00
	4	$287,000.00	$56,340.34	$12,794.83	$5,022.50

In this example, there are two executive assistants who make the exact same salary. Therefore, the amount of taxes owed would be the same after any exemptions. This method is much more efficient and effective than listing each employee.

Income taxes are normally graduated. As salary increases, so does the *tax rate*. For example, the following tax rates were used with the example in Exhibit 5.3 (all of the calculations are rounded to two digits to the right of the decimal).

While this process may seem complicated, it is really quite easy. The one

thing that you should remember is that employees who make lower salaries pay fewer taxes and as their salaries increase, so does the rate on the tax. However, do not make the mistake of taking the entire salary and applying one tax rate. For example, Joia Thornton's federal income tax, in the above example, was calculated in a three-step process. First, take the first $8.700.99 of her salary and apply a 10% tax rate to that amount. Second, apply a 15% tax rate to the next $26,649.99 ($35,350.99-$8,701.00) of her salary, then, apply a 25% rate to the next $48,300.00, and finally apply a 28% tax rate to the last $11,349.00 ($97,000.00-$46,700.00) of her salary. If you calculate the math, it would essentially look like this:

Salary Range	Calculations	Taxes Owed
$0-$8,700.99	= $8,700.99 x 10%	= 870.10
$8,701.00-$35,350.99	= $26,649.99 x 15%	= 3,997.50
$35,351.00-$85,650.99	= $50,299.99 x 25%	= 12,575.00
$85,651.00-$97,000.00	= $11,349.00 x 28%	= 3,177.72
		$20,620.32

In Excel, you can use the formula =8700.99*10%+(35350.99-8701)*15%+(85650.99-35351)*25%+(C8-85651)*28% to calculate Mrs. Thornton's taxes. As a point of reference, C8 in this formula is the employee's maximum salary ($97,000). If there are multiple persons considered on the salary line, you cannot use the cell number (C8), you must divide the salary by the number of people. Hence, you should write a formula to determine the taxes owed by one person and then multiply the total by the number of individuals.

An example of a formula in Excel with two persons, who make the same salary ($50K), on one line could look like this: =(8700.99*10%+(35350.99-8701)*15%+(50000-35351)*25%)*2; or you could use: =(8700.99*10%+(35350.99-8701)*15%+((C9/B9)-35351)*25%)*2, where C9 is the total salary and B9 is the number of persons on the line/in the position description. The second formula is more efficient and effective because you do not have to change the formula to compensate for changes in the number of persons or the salary in the future.

Note the differences between the two Excel formulas listed above (one person versus multiple persons). First, note the point that is noted above, the tax is calculated for one person and then multiplied by 2. Second, the maximum salary of the employees is $50,000 so, you do not need the latter part of the formula (C8-85651)*28%).

In order to calculate state income taxes you would follow the same format as the federal model. Last, since the payroll tax is a flat rate, it can be computed by simply multiplying the rate times the total salary for each employee. With all of these examples rounding is an issue, so make sure that you include two digits to the right of the decimal whenever it is necessary and it is always necessary when calculating taxes.

C. Sale and Use Taxes

One of the largest sources of income in a state is the *sales tax*. Sales taxes are funds collected at the retail transaction stage. They are collected when goods and services are sold. One advantage for the government is that retailers bear the burden of handling most of the paperwork. The government is concerned with timely and accurate payments from the retailer. Once the taxes are collected by the state, they redistribute the funds to the appropriate local government. Many local governments also have the discretion to levy a local option sales tax (Wang and Zhao 2011). In many states, only counties are able to levy a sales tax. In others, a municipality may levy a tax if the county chooses not to. In still others, both the county and municipality may levy the tax. Local governments should consider all other options prior to making this decision because it could have a negative impact on revenue collections.[36] To lessen the burden on retailers, local government sales taxes are added to state sales taxes and remitted to the state.

Sales taxes are *regressive taxes* because citizens pay the same sales tax rate regardless of their income level. They also are not as stable as property because of fluctuating business cycles. Citizens will stop buying "luxury items" and reduce discretionary purchases when the economy slows down. Each state sets its own sales tax rate. States and localities also have some discretion as to what sales taxes will be applied to. For example, sales taxes are not applied to the sale of un-prepared food in Kentucky. Other products that may be exempt from sales taxes are medicines and clothing. An additional item for a state to consider is collecting the tax from the retailer. The Department of Revenue in the state of Tennessee has officers who are charged with collecting delinquent sales tax payment from retailers who choose not to send in the payments.

A *use tax* differs slightly from a sales tax. A use tax is imposed by a state to compensate for the sales tax lost when an item is purchased outside of the state, but is used within the state. For example, let's say that you buy a car in a state that has no sales tax, but you live across the border in a state that does have a sales tax. When you bring your car home and register it in your state, the state taxing authority will bill you for the sales tax it would have collected had you bought the car within the state. Otherwise, you are not able to "use" the car in the state where you live (Kittredge and Ouart 2005).

D. Alcohol, Tobacco and Motor Fuel Taxes

Alcohol, tobacco, and motor fuel taxes are also collected at the time of sale. These are also called *excise taxes* because a rate is applied to a specific product on a per unit basis. In many cases, such as alcohol and tobacco, the purpose of the tax is to curtail the use of the product. Excise taxes are also applied to luxury items such a luxury boats and cars and hotel rooms. In some cases, these funds

are also returned to the locality where they were collected. Further, they may be *earmarked* for a specific purpose. For example, motor fuel taxes are commonly used for building and maintaining roads and highways. The advantage to this tax is that it is benefit-based. The citizens that pay the tax reap the benefit of improved highways and roads. Unfortunately, these funds may be needed in other areas, but there is no chance of diversion given the rigid nature of the funds (Mikesell 2011, 2003).

E. User Charges and Impact Fees

A *user charge* is a fee charged to individuals who voluntarily use a publicly provided service. For example, large municipalities may implement a toll charge to pay for the construction of a new road. If you do not use the new road, then you do not pay the charge. The purpose of a user charge is to relieve the financial burden placed on the general revenue system. In most cases, user charges are geared toward the population that is benefiting from public service. User charges are useless if they are not enforceable and the charge must cover the cost of the service without disrupting other revenue sources.

A more common example of a user fee is the funds collected for police and fire protection or a school district. Charges for this service will often appear on a utility or cable television bill. The address on the utility bill essentially alerts government officials that a new customer has moved into the jurisdiction.[37] Likewise, small towns often operate one or more utilities where they can charge fees. This includes water, gas, and electrical utilities. These government businesses have little or no competition (*monopoly*). Mendosa (1983) points out that "utility charges are calculated by applying a predetermined rate to a measured volume of service received by a utility consumer. Thus, the amount of revenues due from the utility charges is known before the payments are actually received" (p. 66).

Impact fees are charges that are passed on to developers in order to offset the cost to community resources and the infrastructure. According to Lynch (1995) these fees are more popular in high-growth areas and larger cities. Development frequently causes wear and tear on the roads in these areas, requires additional water resources, sewage and so forth. Further, the increase in the population that results from development impacts the local parks, community centers, and libraries.

Setting a User Fee Rate

While it may be clear to government officials that they should implement a user fee, it might not be clear how much that amount should be. One method to determine the amount is to use *cost-volume profit* (CVP) or *break-even analysis*. This tool assesses how price, volume, and variable and fixed costs interface. At some point, revenue and cost equal (Bierhanzl and Downing 2004; Smith and

Lynch 2004).

Let's consider an example. A local government has decided to charge individuals driving a motor vehicle a fee to use a newly constructed four-lane road that will save the user 100 miles of travel. Government officials expect that 75,000 vehicles will pass through the road on a yearly basis, the traceable fixed costs (for example, permanent salaries, insurance equipment, and utilities) are projected at $400,000, and the allocated fixed costs (for example toll overhead and general government overhead) are $80,000. The variable costs (for cleanup, supplies, and part time workers) are projected at $3 per car. A subsidy of $100,000 is budgeted from the city's general fund.

The CVP equation is: $P=VC+\frac{[(TFC+AFC)-S]}{Q}$

P = The correct user fee charge per vehicle
VC = Variable Cost per car
TFC = Traceable Fixed Costs ($400,000)
AFC = Allocated Fixed Costs ($80,000)
S = Subsidy ($100,000)
Q = Total number of vehicles (75,000)

$$P= 3 + \frac{[(400{,}000.00 + 80{,}000.00) - 100{,}000.00]}{75{,}000}$$

$$P = 3 + \frac{380{,}000.00}{75{,}000} \qquad P = 3 + 5.07 \qquad P = 8.06 \text{ or } \$8.07 \text{ per car}$$

Let's go a step further and add another caveat to this scenario. For 12 weeks in the summer, city official perceive that the amount of traffic on the highway will increase by 100,000 cars per week. In the past, the city has used its current police force to manage any increases in traffic. However, they have concluded that they cannot continue with this practice. As a result, they are interested in hiring more police officers to two of the shifts 7 days a week for the twelve-week period. So, how many policemen will be needed to provide 16 hour coverage for the 3 month period or 90 days?

The first thing that we must do is calculate the number of hours that could be gained by each additional employee over the 3-month period. If each employee works 40 hours per week for 12 weeks, the number of paid hours (P) is 480. Let's also provide the following benefits over the period: 1.) 2 sick days, 2). 1 paid holiday, and 3.) 4 paid days off. Assuming that the five paid days are taken, the following would apply: 5 x 8 hours = 40 hours (A). Hence, the effective hours per employee (E) is:

Effective Hours Per Employee = P – A
= 480 – 40
= 440 Effective Hours

The formula for calculating a single shift is:

$$\textit{Staffing Factor} = \frac{\text{Hours per year of operation}}{E}$$
$$= \frac{\text{8 hours per day x 90 days}}{440}$$
$$= \frac{720}{440}$$
$$= 1.64 \text{ (single shift)}$$
$$= 3.28 \text{ (double shift 1.64 x 2)}$$

If you want to double the shift, you simply need to double the number of hours to 16 per day. This would bring the total to 3.28 officers per day (see also Ammons 2002). Unlike other numbers (such as income or average age), it is more difficult to round people. For example, if we use the data in the above example and traditional rounding methods, we would round 1.64 to 2 employees and 3.28 to 3 employees. However, if the formula is indeed valid we would have too many employees or not enough. So, what do you do in these circumstances? Research by Ammons (2002) suggests that you round to the nearest whole number (i.e. 1 full time employee) or a part time employee. In the above example, 1.64 would be rounded to 1.5 persons and 3.28 would be rounded to 3.5 persons. If the number of person is less than .5, it may be more feasible to simply provide overtime to the new or existing employees rather than place resources into hiring an additional person. A cost-benefit analysis can help you to make this decision.

F. Intergovernmental Transfers

A large percentage of a state's revenue comes in the form of *federal grants*. The amount of a grant varies and is quite dependent on federal activities. During the 1960s and 70s federal grants to states increased as the federal government sought to expand the role of the states. By the 1980s, grants leveled out and then rose again in the late 1980s. Grants come in two major forms: categorical and block. *Categorical grants* make up the largest type of grants that a state receives. A categorical grant is used for a specific program and has very strict guidelines for the activities to be carried out within a specific time period. Medicaid and food stamps are included in this category. Categorical grants exploded during Johnson's Great Society programs in the 1960s. Formula and project grants fall within the umbrella of categorical grants. *Formula grants* use a distribution formula to determine the amount to be allocated to the state or locality.

Population, geography, income and education are variables that are used in formula grants. A *block grant* is used for broad policy areas. It can be used in a variety of programs and activities by state and local governments. States prefer this type of grant due to fewer restrictions on the funds (Riley and Colby 1991; Axelrod 1995).

Local governments receive grants directly from the federal government or passed through from the state government. Local governments also receive grants from the state. In many cases, the grants from the state are a form of revenue sharing. For example, the state will share income and sales tax collections with local government on some formula basis. School districts receive major funding from the state, along with additional funding from the federal government. Transportation agencies receive significant funding from the federal government to purchase capital equipment.

G. Licenses, Permits, and Franchise Fees

Another source of revenue for local governments comes from licenses and permits. A *license* or *permit* is defined as "special rights or privileges granted to an individual or business by a governmental unit in return for the payment of designated fees" (Mendosa 1983, p. 65). Licenses are provided to businesses and individuals to conduct an array of different activities. These include, operating a street side kiosk to operating a restaurant. Permits allow individuals and businesses to build structures and to authorize other regulated actions. The cost of the license fee differs by activity. For example, the cost of a hunting license is different from that of a license to operate a restaurant. Without a license, an individual or business is forbidden to engage in the activity legally. The owner of a license does not receive any specific government service by having the license. Under normal circumstances, everyone who applies for a license receives it if they are qualified. However, a person does receive services from a permit. For example, the issuance of a building permit will result in a number of inspections by the government. The purpose is to ensure that the building or improvement meets the building code requirements established by the government.

One positive aspect of a license and permit is that they are easy to track. Because each license and permit is numbered; government officials can monitor, measure and control the process. It also allows the government to audit the revenue source with little effort. When problems occur, they can be easily pinpointed. For example, if building permits are decreasing, officials can determine whether the drop is the result of a dip in the economy or some other factor.

A *franchise fee* is closely related to a license fee, but there are some subtle differences. Franchises are provided on a limited basis. A franchise presupposes that the business will serve the entire community, operate with a certain quality and rate, and outline the responsibility of the owner and the government. It also may involve the use of the government's rights-of-way. In certain parts of the

country cable companies operate on a franchise fee basis. Other examples could include telephone services. These fees can generate large amounts of funds.

H. Gaming

States and local governments began dabbling in games of chance in the mid 1960s, but in the last 15 years they have become very popular as an alternative source of revenue as a result of opposition to tax increase. Since New Hampshire adopted the lottery in 1964, forty-three states and the District of Columbia have legalized some form of gaming (Menifield 2012). These institutions come in the form of state lotteries, bingo, riverboat gambling, casinos, and slot machines. Despite the social and moral concerns that residents have with gaming, they tend to support these measures because they raise funds voluntarily versus compulsory taxes. In addition, proponents of lotteries often argue that lotteries are preferable to raising taxes when it comes to issues such as funding education. As a result, states have been able to generate millions of dollars in revenue. However, there is a fair amount of overhead associated with the gaming industry. In each case, state and local governments have established bureaucratic structures to regulate the industry. Some states, however, see minimum economic benefits from casino operations. This is the case in states where casinos are owned and operated by American Indians on reservations. They are exempt from taxes and other fees.[38] However, these states do reap benefits in other ways. Many Indian casinos contribute payments-in-lieu-of-taxes to the government. Others provide substantial support to schools within the reservation, thus reducing state support.

I. Other Revenues

Occasionally governments will receive funds from sources that do not fit into any of the above-mentioned categories. For example, gifts, donations, and sales of equipment and assets fit into this category. There are no tax levies and there is no method to distributing the funds. Cities and states can also collect funds from investments and leasing of property to the private sector or other governments. Governments that operate jails may charge smaller governments that do not have such facilities for the housing of prisoners.

Governments also receive monies from fines, forfeits, and penalties. These funds usually come from the actions of police and the courts. Since these activities are well documented and are standardized, it is fairly easy to keep track of them (Mendosa 1983).

Revenue Management

Gianakis and McCue (1999) define revenue management as "the assessment and maintenance of a local government's capacity to generate sufficient funds

from all available sources to support policy decisions regarding service levels" (p. 102). Revenue management attempts to establish revenue performance standards, compare actual with expected performance, record revenue performance, initiate corrective change, and constructs a support system that facilitates that model. There are three general components to proactive revenue management: *revenue development, revenue analysis* and *revenue support systems*. Revenue development is mainly concerned with developing a tax structure that considers short and long term funding. A lot of revenue management techniques are time limited and tend to reflect election cycles and short term political needs rather than long term strategic planning. Revenue analysis systematically examines each revenue source with an eye to achieving the optimal benefit from the source. This includes issues such as equity, yields, and the cost of administration. Lastly, revenue support systems examine the day-to-day management of revenue (Gianakis and McCue 1999).

Let's consider a simple example. The city of McClain was considering passing a law increasing the millage rate on business property for FY 2008 in order to balance the proposed budget. If passed, the law would increase the amount of property taxes by $598,000.00. However, when the law was examined, it was found that it would have a negative impact on the tax structure for small businesses. The city has 35 businesses, but one business (Business X) employs 65% of the private workforce. As a result of the increase, Business X would see a 3% increase in taxes owed while the remaining 34 businesses would owe the balance. So, is it feasible to pass on 97% of the cost to the remaining small businesses despite the fact that they represent only 35% of the private workforce? Businesses can pass on tax increases to customers or the land owner, but this can also have a negative domino effect on the cost of doing business. In this example, the equity issues raised by the law did not seem to affect the city council since small businesses were the fastest growing industry in the city.[39] While the decision on paper would have a positive impact on the city's budget, the council members did not consider the long-term effect of the law on the city's small business sector.

Situations like this one bring value to revenue management. It is crucial that a budget manager communicate to elected officials the value of revenue management. In order to properly implement a revenue management system, it is important that the organization's culture is understood. That includes a good understanding of the social, political and economic dynamics associated with a city or state.

Revenue management is a proactive approach concerned with "establishing revenue performance standards, documenting revenue performance, comparing actual with expected performance, initiating corrective action and creating a support structure that facilitates the approach" (Gianakis and McCue 1999 p. 103). This means that elected officials and agency heads need to:

- Develop a commonly accepted method for funding services in the short and long term.
- Identify where the city currently stands in relation to its revenue capacity.
- Explore other options for achieving vision.
- Institute a program for measuring progress.

There are a number of items that must be considered when evaluating revenue structures and determining the revenue management strategy. Consider the questions in Exhibit 5.5 when thinking about the previous example. Essentially, as a budget officer, you are asking yourself how any particular factor will affect the tax structure and vice versa. For example, if we consider the current example, the budget director would want to know: will the increase in the rate generate the needed funds, who is going to be affected by the property tax increase, how that change will affect their ability to pay and still make a profit, will that cost be passed on to other individuals, will it hurt our tax structure and so on. As an elected official, you want to know if your chances of reelection will be impacted, will you get support from other elected officials, will the tax adversely impact your constituents and so on.

Exhibit 5.5 Developing a Revenue Management Plan

Political Questions
1. What are the dominant political attitudes (party/council unity)?
2. What is the dominant political culture (mixed or unified)?
3. Is raising taxes feasible right now (election year)?

Tax Questions
4. Can user fees or special districts solve the tax deficit?
5. Should funds be earmarked from the current budget?
6. Can taxes be raised legally?

Demographic Questions
7. Is a particular group benefiting from the tax increase?
8. Will increasing taxes have an adverse economic impact on a particular sector (business, personal, education, etc)?
9. What is the level of education in the city? [40]
10. What is the age of residents?[41]
11. What type of industries exists and are we facilitating their growth?

Administrative Questions
12. Is there a cost associated with the decision?
13. If yes, what kind (payer cost, convenience cost, administrative cost)?

These and other questions address political, efficiency, effectiveness and equity issues. However, equity and equality are not synonymous. Decision makers can also: A.) Divide the number of users by the total cost and spread the burden evenly without concern for impact. B.) Apply the *ability to pay rule* where those who can afford to pay more are taxed at a higher rate and C.) Apply the *benefits received principle* where those that receive the benefit bear the cost associated with the benefit.

Conclusion

The chapter shows that there are a number of different ways in which state and local governments finance the administration of government. Some of the methods discussed are political in nature while others apply across the board to everyone. Effective revenue management models must consider a plethora of important political, cultural, economic, demographic and administrative questions. Despite the fact that no one really wants to pay more taxes, financial decisions are more palatable when the decisions that led to the tax structure are well thought out and developed based on good questions and answers.

Important Terms and Phrases

Ability to Pay Rule
Assessed Value
Aggregate Assessment-Sales Ratio
Allocated Fixed Cost
Benefits Received Principle
Block Grants
Break Even Analysis
Categorical Grants
Coefficient of Dispersion
Cost-Volume Profit (CVP)
Earmarked Funds
Econometric Model
Excise Taxes
Federal Grants
Federal Income Taxes
Fines
Forfeitures
Formula Grants
Franchise Fees
Impact Fees
Insurance Trust Revenues
Input-Output Model
Intergovernmental Transfer
License
Market Price/Value
Micro-simulation Model
Millage Rate
Monopoly
Multiple Regression Model
Payroll Taxes
Permit
Price-Related Differential
Progressive Taxes
Property Taxes
Public Utilities
Regressive Taxes
Revenue
Revenue Analysis
Revenue Development
Revenue Support Systems
Revenue Management
Sales Taxes
Simplistic Model
State Income Taxes
Taxes
Tax Assessment
Tax Assessor
Tax Collector
Tax Rate
Traceable Fixed Cost
User Fees
Use Tax
Variable Fixed Cost

Chapter 5 Homework Exercises

Directions: Questions 1-6 should be completed in Excel. You can complete question 6 and 8 in a word processing program. Round all of your data in the same fashion as it is done in the text. Unless noted otherwise, dollar amounts should be rounded to two digits to the right of the decimal (cents). See the appendix for Excel templates.

1. You are an intern at the Tax Assessor's Office for the City of Winkelman and your supervisor, Mrs. Jacqueline Anderson, has asked you to prepare the following:

a. A property tax estimate for a newly built subdivision (Walters) after she conducted her assessment of the property. Apply a 12% millage rate on the assessed value of each house and the park. The land that the house sits on is included in the market value of the property. Also, what is the total assessed value of all of the units/properties and the total estimated tax? (See Appendix 5A)

- The new subdivision has 100 units and Park. The prices provided below are based on assessed value.
- There are 15 two-bedroom houses on 5 acres of land valued at $70,000.00 each.
- There are 15 two-bedroom houses on 20 acres of land valued at $85,000.00 each.
- There are 60 three-bedroom houses with a two-car garage on 75 acres of land. The houses are valued at $210,000.00 each.
- The last 15 houses are four-bedroom units with a two-car garage on 15 acres of land. They are valued at $170,000.00.
- Lastly, the subdivision has a park with a swimming pool, tennis court, and a basketball court. The park and green space is valued at $65,000.00.

Note: Assessed value is: Individual Unit Value X the Number of Units

b. The City of Winkelman also needs $1,600,000.00 in individual property taxes and the tax assessor indicated that the total assessed value of individual property is $20,000,000.00. What should the fixed or nominal tax rate be set at to collect the $1,600,000.00 in property taxes?

Tax rate = _____.

c. The City of Winkelman has set the millage rate at 4% for all businesses. The spreadsheet in Appendix 5A has a partial listing of the city's businesses. Calcu-

late the amount of taxes that can be expected along with the most effective tax rate (METR) for each business and an average tax rate using the partial list of businesses provided. (See Appendix 5B)

- The millage rate for each of the seven properties is 4%.
- Franklin's Clothing has a market value of $650,000 and an assessed value of $495,000.
- Payton's Tax Service has a market value of $550,000 and an assessed value of $425,000.
- Stacie's Lawn Care has a market value of $285,000 and an assessed value of $175,000.
- Eva's Finishing School has a market value of $400,000 and an assessed value of $325,000.
- Tiffany's Day Care has a market value of $250,000 and an assessed value of $175,000.
- Yiesha's Hair Care has a market value of $370,000 and an assessed value of $300,000.
- Myron's Boys Club has a market value of $650,000 and an assessed value of $575,000.

2. Calculate the coefficient of dispersion using the following information. Should the assessor reapportion the assessed property values (use average assessment)? Explain.

a. There are five pieces of property that sold for $165,000.00 each and were assessed at $115,000.00, $120,000.00, $125,000.00, $110,000.00 and $95,000.00.

b. There are ten pieces of property that sold for $125,000.00 each and were assessed at $89,500.00, $90,900.00, $68,000.00, $65,000.00, $92,000.00, $90,000.00, $85,000.00, $75,000.00, $89,250.00, and $65,000.00.

3. Using the price related differential test, calculate the aggregate assessment-sales ratio using the data provided below. Are the higher priced properties or the lower priced properties under assessed? (See Appendix 5C)

	Sales Price	Assessed Value	Assessment Ratio
Property 1	$165,000.00	$170,000.00	
Property 2	145,000.00	100,000.00	
Property 3	25,000.00	20,000.00	
Property 4	30,000.00	25,000.00	
Property 5	25,000.00	18,000.00	
Property 6	200,000.00	170,000.00	
Property 7	150,000.00	100,000.00	
Property 8	135,000.00	115,000.00	

Property 9	30,000.00	22,000.00
Property 10	25,000.00	15,000.00
Property 11	25,000.00	19,000.00
Property 12	35,000.00	28,000.00
	$990,000.00	$802,000.00

4. Calculate the revenue collected from federal income taxes, state income taxes, and the local pay roll tax for FY 2014 and prepare a revenue estimate for the City of Winkelman's Public School System for FY 2015 based on the following information. Assume that no other deductions came from the employee's salary other than what is listed in the spreadsheet. Hint: New employees are not eligible for raises, which are based on performance from the previous fiscal year. (See Appendix 5D)

FY 2014 Facts:

- The school system currently has 34 full time employees. There is one superintendent, two principals, three janitors, ten kitchen staff, and eighteen teachers (including coaches).
- The superintendent has a salary of $95,000.00.
- Each principal has a salary of $70,000.00.
- Four of the teachers (Teacher A) had salaries of $55,000.00; six teachers (Teacher B) had salaries of $45,000.00; and six teachers (Teacher C) had salaries of $40,000.00.
- The remaining two teachers (A Level) are also coaches. The football coach receives an additional $5,000.00 in salary and the basketball coach receives an additional $7,000.00 in salary each year.
- Mrs. Jones manages the kitchen. Her FY 2014 salary was $45,000.00.
- The remaining kitchen staff made $28,000.00 each in FY 2014.
- The three janitors made $25,000.00 each in FY 2014.
- Use these federal income tax rates:
  $0-$8,700.99 = 10%; $8,701-35,350.99 = 15%; $35,351-$85,650.99 = 25%; $85,651-$178,650.99 = 28%; $178,651 - $388,350.99 = 33%; >$388,351 = 35%.
  The tax rates were the same in FY 2014 & FY 2015.
- The state income tax rate is 4% for the first $3,000.00 of employee salary and 5.5% on everything above that amount. The rate is the same in both years.
- The local payroll tax is 1.75% in FY 2014 and 1.85% in FY 2015.

FY 2015 Facts:

- In FY 2015, the school system hired 2 more teachers at the Teacher D level. They will begin work in FY 2015 at a salary of $35,000.00.
- In FY 2015, each school employee received a 5% raise except the principals and superintendent. They received a 2% raise. Note, new employees do not receive a raise.

5. Using the information that is listed below, prepare a revenue estimate and revenue projection for the City of Winkelman in FY 2014 and FY 2015 respectively. All of the changes to the FY 2015 budget are based on FY 2014 estimates. Hint: Complete each of the FY 2014 estimates, based on FY 2013 actuals, prior to beginning the FY 2015 projections. Round all data to the nearest dollar amount since these are estimates. (See Appendix 5E)

- User fees in FY 2014 are expected to increase 5%. In FY 2015 the fee will increase 5% due to an increase in the number of street meters.
- Franchise fees and permits are expected to increase 2% in FY 2014 and 1% in FY 2015 because of new development near the mall.
- Property tax collections have been quite stable. A modest 2% increase is expected in FY 2014 and a 3% increase in FY 2015. News alert: The new Kollipara subdivision will be completed in FY 2014. So, property tax receipts should increase an addition 1% in FY 2015 for a total of 4% in FY 2015.
- Sales tax collections are also expected to increase 4% FY 2014 based on the expanded business sector. It is expected to increase 11% in FY 2015.
- Utility fees/charges are expected to decrease 5% in FY 2014 and 5% in FY 2015.
- Storm water management is expected to increase by 5% each year.
- Impact fees remain unchanged.
- Intergovernmental transfers are expected to increase 4% in FY 2014 and 2% in FY 2015.

6. The City of Winkelman has constructed a swimming pool in FY 2014 and you have been asked to calculate the user charge based on an estimate of 10,000 swimmers. Since the pool is inside a building it will remain open all year. Household income in Winkelman is $100,000.00 per year.

a. After you calculate the user fee, explain the impact of the fee on the popula-

tion. Use the cost-volume profit formula, the information in the directions, and the items listed below to construct your user charge.

- Employee salaries, insurance, fringe benefits, equipment maintenance, and utilities are projected at $65,000.00.
- The city received a one-time gift of $55,000.00 to subsidize the first year of operation.
- Allocated fixed costs are projected at $25,000.00.
- Variable costs are projected at $3.00 per swimmer.
- Using the same figures estimate the user charge for the second year as well. However, assume that the number of swimmers increases by 2,000 and the local government will take $60,000.00 from the general fund to subsidize the pool. What can the government do to maintain the current user fee?

b. Using question 6a as a point of departure, the city has to determine how many additional life guards it needs to operate the pool during the summer when children are out of school. Due to the sheer volume of children and city codes, the city cannot ask the existing employees to work additional shifts. Hence, they are interested in hiring lifeguards for *three* of the shifts. Each lifeguard will work a four-hour shift seven days a week for the twelve-week period. They cannot work more than one shift per day. The new lifeguards will get three paid days off over the 12 week period. So, how many life guards are needed to provide 12 hours of additional coverage for the 84-day period? This problem can be completed in a word processing program.

7. The City of Winkelman has appointed you to work on the FY 2015 budget. Your job is to modify the FY 2014 budget according to these guidelines. Print a hard copy of the completed assignment for your instructor and save the new file under a new file name. Assume that FY 2014 revenue collections are identical to those collected in FY 2015 unless the information indicates something different. Hint: Funds should be placed in funds that have jurisdiction. The fund balance for FY 2015 is the exact amount as it was FY 2014. (See Appendix 5F)

Revenue

- Revenue created as a result of changes in these areas goes into the General Fund.
  a. Property taxes increased 3.5%.
  b. Business licenses increased 4.7%.
  c. Vehicle stickers decreased 1.3%.
  d. Insurance taxes increased 2% in the general fund only.
- The total amount of user charges increased 10% in FY 2015. The

new revenue from the user charges went into the Water & Sewer Fund and the Natural Gas Fund. Each Fund received half of the new revenues from the user charges.

- The remaining funds maintained their FY 2014 revenue funding levels.

Expenditures

- General Fund Modifications
  a. Half of the new revenues (dollar amount change in Total Revenue from FY 2014 to FY 2015) in the General Fund went to Public Safety.
  b. General Government received 3% of the new revenues in the General Fund.
  c. Public Works received 17% of the new revenues in the General Fund.
  d. Sanitation and Capital Expenditures each received 15% of the new funds in the General Fund.

- Water and Sewer and Gas System Operations (Natural Gas) received increases in expenditures as a result of increased revenues in their departments/funds.
- The remaining departments and funds went unchanged. That is, expenditures were the same as they were in FY 2014.

Note: Revenues and expenditures should be the same amount for each fund in the worksheet.

8. The city of Winkelman is contemplating the construction of a football arena near the down town main artery and the city administrator has requested that you (finance officer) develop a tax plan to fund the construction of the structure. The proposed structure will cost the city $35,000,000.00 to construct and could bring in over a $1,000,000.00 a year in revenue. Your job is two-fold. First, prepare a funding structure with the percentage and dollar contribution of each entity. Second, develop a set of economic questions that are likely to arise in the city council meeting concerning your plan. You should also provide answers to these questions. When formulating your questions, remember that there are political issues that are likely to arise. Also, you cannot use more than two outside funding source (i.e. naming rights, private donors, advertising, etc).

A. Funding Structure	Amount	Percentage

B. Economic Questions

9. Optional In-Class Exercise: Defending Funding Structure Plan (45 minute exercise)

Step 1: Split the class into groups of four or five and have each person defend the funding structure that they created in question 8. Hence, it will be necessary for each person to bring four copies of their response to question 8 to distribute among the group members.

Step 2: Each participant in the group should be given no more than four minutes to explain their funding structure. Then, group member should question the impact of the funding structure on the city, citizens, tourists, stakeholders, etc (four minutes max). By majority vote, each individual tax plan should be approved as viable or denied based on the structure as well as the presenter's ability to respond to the questions.

Step 3: While several plans may be good, the group should select one as the "best" alternative and that person should briefly describe their plan to the entire class at the end of the group meetings.

References

Ammons, David N. 2002. *Tools for Decision Makers: A Practical Guide for Local Government*. Washington, D.C.: CQ Press.

Axelrod, Donald. 1995. *Budgeting for Modern Government*. 2nd Edition. New York: St. Martins.

Bartle, John R., Kriz, Kenneth A., and Morozov, Boris. 2011. "Local Government Revenue structure: Trends and Challenges." *Journal of Public Budgeting, Accounting & Financial Management*. 23(2): 268-287.

Bierhanzl, Edward J. and Paul B. Downing. 2004. "User Charges and Special Districts." In *Management Policies in Local Government Finance*. Eds. J. Richard Aronson and Eli Schwartz, Washington, D.C.: ICMA.

Bland, Robert. 2005. *A Revenue Guide for Local Government*. 2nd Ed. Washington, D.C.: ICMA.

Bland, Robert and Irene Rubin. 1997. *Budgeting: A Guide for Local Governments*. Washington, D.C.: ICMA.

Bland, Robert L. and Wes Clarke. 1999. "Budgeting for Capital Improvements." In Roy Meyer's (ed) *Handbook of Government Budgeting*. California: Jossey Bass.

Bretschneider, Stuart and Wilpen L. Gorr. 1999. "Practical Methods for Projecting Revenues." In Roy Meyer's (ed) *Handbook of Government Budgeting*. San Francisco, CA: Jossey Bass.

Carroll, Deborah. A. 2009, Diversifying Municipal Government Revenue Structures: Fiscal Illusion or Instability?. *Public Budgeting & Finance*, 29(1): 27–48

Clynch, Edward J., Douglas G. Feig, and James B. Kaatz. 2001. "Local Government Casino Gaming Tax Receipts in Mississippi: An Impact Appraisal." Paper presented at the Southeastern Conference for Public Administration Conference, Baton Rouge, Louisiana.

Doss, Bradley C. 1993. "Capital Budgeting Practices." In Thomas D. Lynch and Lawrence L. Martin's (eds) *Handbook of Comparative Public Budgeting and Financial Management.* New York: Marcel Dekker.

Downing, Paul. B. 1983. "User Charges and Service Fees." In Jack Rabin, W. Bartley Hildreth and Gerald J. Miller's (eds) *Budget Management: A Reader in Local Government Financial Management*. University of Georgia: Carl Vinson Institute of Government.

Fleeter, Howard and L. Lee Walker. 1997. "Revenue Forecasting." In *Case Studies in Public Budgeting and Financial Management*. Eds. Aman Khan and W. Bartley Hildreth. Dubuque, IA: Kendall Hunt Publishing.

Gianakis, Gerasimos A. and Clifford P. McCue. 1999. *Local Government Budgeting: A Managerial Approach*. Praeger: Westport, Connecticut.

Gruber, Jonathan. 2005. *Public Finance and Public Policy*. NY, NY: Worth Publishers.

Kioko, Sharon. N. 2011, Structure of State-Level Tax and Expenditure Limits. *Public Budgeting & Finance*, 31(2): 43–78.

Kittredge, William P. and Sarah M. Ouart. 2005. *Budget Manual for Georgia Local Government*. Athens, GA: Vinson Institute.

Lee, Robert D. Ronald W. Johnson, and Philip G. Joyce. 2008. *Public Budgeting Systems*. 6th ed. Sudbury, MA: Jones and Bartlett Publishers.

Liner, Charles D. 1983. "Projecting Local Government Revenue." In Jack Rabin, W. Bartley Hildreth and Gerald J. Miller's (eds) *Budget Management: A Reader in Local Government Financial Management*. University of Georgia: Carl Vinson Institute of Government.

Lynch, Thomas D. 1995. *Public Budgeting in America*. New Jersey: Prentice Hall.

McNichol, Elizabeth., Oliff, Phil, and Johnson, Nicholas. 2012. *States Continue to Feel Recession's Impact*. Center on Budget and Policy Priorities. Retrieved on February 2, 2012 http://www.cbpp.org/files/9-8-08sfp.pdf.

Mendosa, Arthur A. 1983. "Revenue Sources." In Jack Rabin, W. Bartley Hildreth and Gerald J. Miller's (eds) *Budget Management: A Reader in Local Government Financial Management*. University of Georgia: Carl Vinson Institute of Government.

Mikesell, John L. 2011. *Fiscal Administration*. 8th Ed. Belmont, CA: Wadsworth Publishers.

Mikesell, John. 2004. "General Sales, Income, and Other Nonproperty Taxes." In *Management Policies in Local Government Finance*. Eds. J. Richard Aronson and Eli Schwartz, Washington, D.C.: ICMA.

Nice, David. 2002. *Public Budgeting*. Wadsworth: Stamford, Connecticut.

Rabin, Jack, W. Bartley Hildreth and Gerald J. Miller. 1996. *Budgeting: Formulation and Execution*. University of Georgia: Carl Vinson Institute of Government.

Raphaelson, Arnold H. 2004. "The Property Tax." In *Management Policies in Local Government Finance*. Eds. J. Richard Aronson and Eli Schwartz, Washington, D.C.: ICMA.

Riley, Susan L. and Peter W. Colby. 1991. *Practical Government Budgeting: A Workbook for Public Managers*. New York: State University of New York Press.

Rubin, Irene S. 2006. *The Politics of Public Budgeting: Getting and Spending, Borrowing and Balancing.* 5th ed. Washington, D.C.: CQ Press.

Rose, Shanna. 2010. Institutions and fiscal sustainability. *National Tax Journal 63*(4): 807-838.

Smith, Robert W. and Thomas D. Lynch. 2004. *Public Budgeting in America*. 5th ed. Upper Saddle River, NJ: Pearson/Prentice Hall.

Srithrongrung, Arwiphawee. 2008. The Impacts of State Capital Management Programs on State Economic Performance. *Public Budgeting & Finance*, 28(3): 83–107.

Swain, John W. and B.J. Reed. 2010. *Budgeting for Public Managers*. Armonk, NY: M.E. Sharpe.

Vogt, A. John. 1983. "Budgeting Capital Outlays and Improvements." In Jack Rabin, W. Bartley Hildreth, and Gerald J. Miller's (eds) *Budget Management: A Reader in Local Government Financial Management*. The University of Georgia: Carl Vinson Institute of Government.

Wang, Wen & Zhao, Zhirong. 2011. Fiscal Effects of Local Option Sales Taxes on School Facilities Funding: The Case of North Carolina. *Journal of Public Budgeting, Accounting & Financial Management*. 23(4): 507-533.

Yan, Wenli. 2012. The Impact of Revenue Diversification and Economic Base on State Revenue Stability. *Journal of Budgeting, Accounting & Financial Management*. 24(1): 58-81.

Appendix 5A

Property Tax Estimate
Walters Subdivision
City of Winkelman
FY 2014

Items	Number of Units	Individual Unit Value	Assessed Value	Millage Rate	Total Est. Tax
Two BR on 5 Acres	15	$70,000.00		12%	
Two BR on 20 Acres	15	85,000.00		12%	
Three BR on 75 Acres	60	210,000.00		12%	
Four BR on 20 Acres	15	170,000.00		12%	
				12%	
Green Space and Park	1	65,000.00	_____	12%	__
Total	**101**				

Appendix 5B

Millage Rate
City of Winkelman
FY 2014

Business	Market Value	Assessed Value	Millage Rate	Tax Est.	METR
Franklin's Clothing	$650,000.00	$495,000.00	4.0%		
Payton's Tax Service	550,000.00	425,000.00	4.0%		
Stacie's Lawn Care	285,000.00	175,000.00	4.0%		
Eva's Finishing School	400,000.00	325,000.00	4.0%		
Tiffany's Day Care	250,000.00	175,000.00	4.0%		
Yiesha's Hair Care	370,000.00	300,000.00	4.0%		
Myron's Boys Club	650,000.00	575,000.00	4.0%	_____	_____
TOTAL	$3,155,000.00	$2,470,000.00			

Appendix 5C

Coefficients of Dispersion

	Sales Price	Assessed Value	*STEP 1 & 2* Assessment Ratio	*STEP 3* Average Dev.
Property 1	$165,000.00	$115,000.00		
Property 2	165,000.00	120,000.00		
Property 3	165,000.00	125,000.00		
Property 4	165,000.00	110,000.00		
Property 5	165,000.00	95,000.00	_____	_____

STEP 4 Coefficient of Dispersion =

Explanation:

	Sales Price	Assessed Value	*STEP 1 & 2* Assessment Ratio	*STEP 3* Average Dev.
Property 1	$125,000.00	$89,500.00		
Property 2	125,000.00	90,900.00		
Property 3	125,000.00	68,000.00		
Property 4	125,000.00	65,000.00		
Property 5	125,000.00	92,000.00		
Property 6	125,000.00	90,000.00		
Property 7	125,000.00	85,000.00		
Property 8	125,000.00	75,000.00		
Property 9	125,000.00	89,250.00		
Property 10	125,000.00	65,000.00	_____	_____

STEP 4 Coefficient of Dispersion =

Explanation:

Appendix 5D

City of Winkelman
Public School System
FY 2014
Projected Revenue

Position Description	# in Grade	FY 2014 Salary	Fed .Inc. Tax	State Inc. Tax	Payroll Tax	Total Taxes
Superintendent	1					
Principal	2					
Teacher A	4					
Teacher B	6					
Teacher C	6					
Janitor	3					
Kitchen Manager	1					
Kitchen Staff	9					
Football Coach	1					
Basketball Coach	1					
TOTAL	34					

City of Winkelman
Public School System
FY 2015
Revenue Estimate

Position Description	# in Grade	FY 2015 Salary	Fed. Inc. Tax	State Inc. Tax	Payroll Tax	Total Taxes
Superintendent	1					
Principal	2					
Teacher A	4					
Teacher B	6					
Teacher C	6					
Teacher D	2					
Janitor	3					
Kitchen Manager	1					
Kitchen Staff	9					
Football Coach	1					
Basketball Coach	1					
TOTAL	36					

Appendix 5E

City of Winkelman
Revenue Estimate
FY 2014-FY 2015

Items	FY 2013 (act.)	FY 2014 (est.)	FY 2015 (proj.)
Property Taxes	$610,000.00		
User Fees	30,000.00		
Franchise Fees	5,600.00		
Permits	3,600.00		
Utility Fees	115,000.00		
Intergovernmental Transfers	235,000.00		
Sales Taxes	80,000.00		
Impact Fees	4,500.00		
Storm Water Mgt.	9,500.00		
TOTAL	$1,014,000.00		

Appendix 5F

f Winkelman
t Summary
4

NUE SOURCE	General Fund	Cemetery Fund	City Tax Aid	911 Fund	Central Garage	Water &Sewer	Sanitation	Natural Gas	Capital Exp.	**GRAND**
ty Taxes	$1,483,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,4
nce Taxes	885,000.00	0	0	0	0	41,500.00	0	0	0	$9
e Stickers	420,000.00	0	0	0	0	0	0	0	0	$4
ss Licenses	350,000.00	0	0	0	0	0	0	0	0	$3
Charges	0	27,500.00	0	0	116,250.00	3,421,500.00	1,884,000.00	5,375,000.00	0	$10,8
l Assessments	0	0	215,000.00	94,000.00	0	195,000.00	50,000.00	285,000.00	0	$8
& Misc.	662,779.00	1,000.00	4,000.00	7,500.00	0	0	0	0	0	$6
Transfers	0	47,800.00	0	0	0	0	0	0	1,037,200.00	$1,0
L Revenues	$3,800,779.00	$76,300.00	$219,000.00	$101,500.00	$116,250.00	$3,658,000.00	$1,934,000.00	$5,660,000.00	$1,037,200.00	$16,6
alance	$650,000.00	$7,500.00	$40,000.00	$170,000.00	$0.00	$0.00	$50,600.00	$0.00	$0.00	$9
L Available Funds	$4,450,779.00	$83,800.00	$259,000.00	$271,500.00	$116,250.00	$3,658,000.00	$1,984,600.00	$5,660,000.00	$1,037,200.00	$17,5

NDITURES	General Fund	Cemetery Fund	City Tax Aid	911 Fund	Central Garage	Water &Sewer	Sanitation	Natural Gas	Capital Exp.	**GRAND**
al Government	$1,309,454.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,3
Safety	2,781,100.00	0	0	271,500.00	0	0	0	0	0	$3,0
Works	360,225.00	0	165,000.00	0	0	0	0	0	0	$5
al Garage	0	0	0	0	116,250.00	0	0	0	0	$1
tion	0	0	0	0	0	0	1,984,600.00	0	0	$1,9
&Sewer Oper.	0	0	0	0	0	3,658,000.00	0	0	0	$3,6
tery Operations	0	83,800.00	0	0	0	0	0	0	0	$
ystem Oper.	0	0	0	0	0	0	0	5,660,000.00	0	$5,6
al Expenditures	0.00	0.00	94,000.00	0.00	0.00	0.00	0.00	0.00	1,037,200.00	$1,1
AL Expenditures	$4,450,779.00	$83,800.00	$259,000.00	$271,500.00	$116,250.00	$3,658,000.00	$1,984,600.00	$5,660,000.00	$1,037,200.00	$17,5

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Chapter 6

Budgeting Techniques and Analytical Models

Chapter Six Overview

By definition, budgeting requires some level of technical analysis. This fact has become more realistic today as an increasing number of state and local governments deal with a variety of problems ranging from budget deficits to urban sprawl. In a lot of cases, governments provide services that cannot be performed or are too large to be provided by the private sector or through normal market forces. As a result, it is imperative that budget analysts apply various analytical techniques and models to their analysis in order to determine the most efficient and effective approach to solving issues and providing services.

This chapter discusses several practical techniques and analytical models that are useful in assisting state and local budget analyst in dealing with expenditure issues from an array of different perspectives. The chapter begins with a simple method of understanding policy problems and analysis. Next, there is a discussion of various forecasting techniques. Last, some specific techniques are discussed. These include: discounting, cost benefit analysis, cost-effectiveness analysis, internal rates of returns, payback method, productivity analysis, and multiple regression analysis.

Understanding the Methods and Techniques of Analysis

Once a decision has been made to solve a public problem or expand services, policy experts must ensure that the problem is fully understood along with the alternatives to solving the problem. Weimer and Vining (1989) provide a succinct model to understanding the problem and examining the options to solving the problem. Bureaucrats and budget analysts can follow these steps in providing policy makers with viable policy options. In short, a decision has to be made to chose alternative A or alternative B or C (see also Swain and Reed 2010).

Problem Analysis

1. Understanding the Problem
    a. Receiving the Problem: Assessing the Symptoms
    b. Framing the Problem: Analyzing Market and Governmental Failures

c. Modeling the Problem: Identifying Policy Variables
2. Choosing and Explaining Relevant Goals and Constraints
3. Choosing a Solution Method

Solution Analysis
4. Choosing Evaluation Criteria
5. Specifying Policy Alternatives
6. Evaluating: Predicting Impacts of Alternatives and Valuing them based on a Criteria
7. Recommending Actions

Forecasting Revenues

Good revenue estimations or forecasts are considered by most to be more of an art than a science. In addition to good judgment, economic savvy and a variety of methodologies go into the process. Any particular methodology will lead to a different estimate. To say the least, an analyst should understand the revenue system and have a good understanding of all the factors that have impacted past revenue collections. Revenue estimates are normally conducted out of the budget office or the comptroller's office (Axelrod 1995; Wang 2006). Most state and local governments will begin revenue projections about six months before the beginning of budget implementation. The advantage to starting early is that it allows analyst time to revise their estimates as they get closer to the actual day of implementation and determine whether revenue collections will exceed or fall short of expectations (Fleeter and Walker 1997). To say the very least, a state or local government should forecast revenues and expenditures over a couple of years regardless of the level of economic and political stability in the jurisdiction. Hence, forecasting is an integral part of any model assessing expenditure or revenue patterns over time. *Forecasting* is an attempt to predict future revenue collection based on present administrative, structural conditions, demographic and economic factors. For example, the federal government has predicted that the social security fund will practically disappear in the next twenty years based primarily on the number of persons currently contributing to the fund and those taking money out of the fund.

Depending on the size ($) of the budget in a jurisdiction, forecasters should begin the process anywhere from 6 to 18 months prior to the beginning of the fiscal year. A good time frame is useful because it saves a lot of time and effort on the part of agency directors who are charged with preparing their budget. It is not efficient or effective to budget for funds that may or may not exist. Hence, budget forecasts should be modified as new information is added to the equation. The Office of Management and Budget (OMB) and the Congressional Budget Office (CBO) along with Presidential advisors estimate the federal

budget, while state and local budget officials handle the responsibility at lower levels (Lee, Johnson and Joyce 2008; Mikesell 2011; Nice 2001).

Key Factors to Consider When Forecasting Revenues

- *Revenues should be projected separately*. Because each revenue source is distinct and has its own set of nuances it is rational to estimate them separately. By so doing, it limits the number of errors and may bring greater balance to the overall estimates due to over and under estimates for individual tax expectations.

- *Focus efforts on the large revenue sources.* As indicated in Table 5.1, the property tax is one of the largest sources of income for a local government. Hence, it is important that great care be taken in this preparing this estimate. Small revenue sources do not have a great impact on the budget.

- *Historical data is the key to success*. Revenue projections do not tend to change dramatically over time. As a result, data and financial records should be closely examined. Once this data is examined, projections can be made after adjustments are made for other factors in the environment such as demographic shifts and economic development. Further, it is important that the analyst pay attention to items that may not reoccur. For example, the government may receive a grant for five years that is not renewable.

- *Underestimate rather than overestimate budgets*. Although budgets are based on solid economic factors, the ramification of budget deficits can be very political in nature. State and local elected officials do not want to explain budget deficits to voters because the repercussions could be felt in the next election cycle. Therefore, estimates should be somewhat conservative.

- *Good Judgment*. While a state or local government's tax base may seem stable, it is important that estimators keep an eye on other nearby jurisdictions that may have an impact on their revenue estimates. Further, estimators may receive estimates from other sources that are not in line with their estimates. Ultimately, it is up to the judgment of the estimator to decide what to consider in the estimate.

Forecasting Models

Riley and Colby (1991) discuss five models that local governments can use when estimating revenue. Deciding which model to use can be determined by a number of factors. Particularly, the size of the city's budget and resources available to conduct the estimate are important. The first model is called a *simplistic model*. This model is based on historical data. An analyst would simply use trend analysis and extrapolate the data for the current fiscal year. In addition, expected changes in the use of services that might be relevant to revenue collections are also considered. For example, a factory that closes with several hundred residents may have a disparate impact on revenue collections. The second model is a *multiple regression model*. A multiple regression model uses factors such as unemployment, population shifts, and changes in the economy to predict revenue. An *econometric model* synchronizes revenue estimates with a review of interdependent variables, such as the consumer price index, interest rates, cost benefit analysis, net present value (NPV), internal rate of return (IRR), and construction activity. The fourth model is called a *mircrosimulation model*. This model uses various forms of data such as a sample of IRS returns to predict future trends. The last model is an *input-output model*. This model uses purchase and sales data to ascertain where the revenue is produced.

Most local governments use the simplistic model because it is very clear-cut and uses data and financial resources that are readily available. Liner (1983) argues that multivariate regression is not an appropriate tool for local government revenue projections. However, he does make a case for time series analysis since it makes use of internal data that is readily available and can be computed using simple equipment such as a calculator. A three to five year period is typically used in the model (Bretschneider and Gorr 1999). Special attention should be paid to calculating property tax estimates. Liner (1983) suggests that revenue should be split into component parts and then the analyst has to decide whether to analyze actual revenues or the base of the revenue sources. Property tax revenue has assessed value (base), the tax rate, and the collection rate (actual). Further, it may be necessary to separate, real versus personal property. It may be useful if the analyst can prepare graphs or charts showing the revenue trend over time. The amount of time designated to this process will clearly be dictated by the size and level of importance for the revenue source.

State governments are more likely to use one of the more sophisticated models because their budgets are larger and more complicated. Axelrod (1995) argues, "the critical phase in revenue estimation is calculating the effect of the economic assumptions on the tax base for each tax" (p. 78). For example, income taxes come from three major sources of income: wages and salaries, corporations, and other non-wage income such as rents, dividends and interests. Analysts can then use the set tax rates to estimate revenue. Lastly, they can adjust the estimate for various exemptions, deductions, refunds or expected delin-

quencies.

"For sales, excise, and other consumption taxes, it is necessary to estimate, tax by tax, the effect of economic activity on wholesale and retail sales. After deducting exemptions, analysts come up with a new tax base to which they apply the tax rates. Property taxes are determined by the assessed value of property and the appropriate tax rates, and adjusted to reflect exemptions, deductions, and statutory tax limits" (Axelrod 1995, p. 78).

Selecting the Best Forecasting Model

Mikesell (2003) discusses six points that are useful as a guide to forecasting. First, the user should completely understand the revenue source. This includes administration and collection measures. Further, forecasters should ensure that the variables included in the model are as close to perfect as possible. Unreliable data for the dependent variable in particular compromises the validity of the estimate (Liner 1996). Second, the data should be plotted in a graph to show the movement of the revenue. Forecasters can use this information to determine the affects of other variables on the revenue. If possible, corrective measures can be taken to improve the administration or collection mechanisms.

The third point is honesty in reporting. Elected officials often have their own agendas and may seek to manipulate the process with low or high forecasts in an attempt to increase or decrease expenditures. Mikesell's (2003) fourth suggestion considers "what" the forecaster is trying to do with the revenue source. For example, if an annual forecast is needed, then a regression model would suffice. If a long-term forecast is needed, then a trend extrapolation model would work. Fifth, each revenue source should be estimated separately. There are too many factors that are indigenous to a particular revenue source that would inflate or deflate the total revenue source. It is easier to compensate for errors in separate revenue models. Lastly, revenue sources should be monitored throughout the year and compared with the projections. With that stated, the forecaster should be aware that a change in revenue projections for one month may or may not make a drastic difference for the rest of the year. Regardless to what is found, the forecaster should use the information to improve the model (see also Riley and Colby 1991 and Liner 1996).

Generally speaking, state and local governments initiate budget projections about six months prior to the beginning of the next fiscal year or budget cycle. The size of the budget and the number of factors affecting the budget are likely indicators of how much lead time is needed (Bretschneider and Gorr 1999).

Types of Forecasts

- *Status Quo Model*: This model assumes that the future will look a lot like the present. For example, if a state spent $75,000,000.00 on capi-

tal expenditures last year, then it will cost approximately that amount this year. This model works well in stable governments. The major advantage of the model is that it is simple and easy to administer. The major disadvantage is that any shift in economic conditions will compromise the validity of the model (Nice 2001).

- *Extrapolation Model*: This model uses current trends (time-series data) in revenue and expenditures to explain future revenue and expenditure trends. Extrapolations can use constant increments, constant percent changes, simple growth models using the average annual compounding formula, or linear or nonlinear time trends in which revenue for the budget year is estimated as an arithmetic function of time ($R = a + bt$). For example, if property tax receipts have increased an average of 2% over the last five years, the model would assume that they would increase 2% during the forecasted year as well. While more accurate than the status quo model, it does have the same disadvantages. For example, the model does not examine cause and effect relationships between the revenue sources and a particular economic factor (Bretschneider and Gorr 1999; Mikesell 2011; Nice 2001).

- *Judgmental or Brainstorming Model*: In some instances, budget managers have substantive experience and knowledge of the nuances of a jurisdiction. They essentially use all of their contacts that also have longevity and the exact information that they need to project the budget. Initially, all sorts of data and information are generated. Then, these data and information are analyzed and scored for usefulness. Third, the best information and data are synthesized. Lastly, the best information and ideas are considered in the model. The obvious disadvantage to this model is dependence on the experts. While human judgment is important, it is enhanced tremendously with known facts that are quantifiable (Gianakis and McCue 1999).

- *Delphi Model*: In this model, experts discuss forecasts under the auspices of a moderator who handles only the logistical part of the discussion. Each participant is asked the same question by the moderator with the intent or hope that a consensus can be reached. The advantage of the model is that participants are not pressured to accept the position of other participants. This model also serves to allow minority views to be espoused (Gianakis and McCue 1999; Nice 2001).

- *Time-Series Model*: A time-series model can be simple or very com-

plex. The model essentially attempts to break down and explain all of the component parts to the budget into four components: a long-term trend, seasonal variation, cyclical variation and irregular variation. The model addresses questions such as: When are the most property taxes, user fees, and sales taxes collected? When are public utilities the most heavily utilized? (Liner 1996; Gianakis and McCue 1999; Mikesell 2011, 2003; Nice 2001).

- *Multiple Regression Model*: A regression model is a more complex time series model that estimates revenue using several independent variables such as the unemployment rate and income levels. The advantage of this model is that it is relatively simple to estimate each revenue source separately (Bretschneider and Gorr 1999; Gianakis and McCue 1999; Mikesell 2011).

- *Econometric Models*: These models estimate revenue "within a simultaneous system of interdependent equations that express theoretical and empirical relationships between economic and fiscal variables" (Mikesell 2011, p. 486). The advantage to this model is that it allows the user to examine revenue sources that are not dependent on other revenue sources.

Cost-Benefit Analysis and Cost-Effectiveness Analysis

These two techniques "attempt to relate the costs of projects or programs to performance, and both quantify costs in monetary terms. They differ, however, in the way they measure the outcomes of programs" (Lee, Johnson and Joyce 2008, p. 494).

Cost-benefit analysis (CBA) compares the cost of a program with the benefits of the program. The alternative that yields the greatest net benefit at the least amount of cost is normally chosen. In addition to a dollar amount being placed on the variables in the analysis, benefits are also assessed from a quantitative perspective. Both of these techniques are quite dependent on data, so the analyst should ensure that he/she has the most reliable data available (Makowsky and Wagner 2009).

The main objective of these and other techniques is to improve internal and allocative efficiency in public spending. Spending today does not equate to spending tomorrow. As a result, it is necessary for budget analysts to be aware of items such as: present value, discount rates, recurring costs, and compounded interests when putting together cost-benefit models. [42]

There are some problems associated with cost-benefit models. One problem is with *free riders*. That is, some citizens enjoy the benefits of public service without paying for them. A second problem is the uneven distribution of

benefits. Nice (2002) uses the example of a car licensing fee in Washington that offered the greatest reduction in the cost of the fee to those who owned the most expensive cars. From a political perspective, this proposal was not viewed as beneficial. A third example is political manipulation. In order to make a project look more attractive, the costs of the program can be lowered arbitrarily while the benefits can be increased (Axelrod 1995). Further, it is sometimes difficult to identify all of the costs and benefits associated with a program. There may be some spillover effects as well as other externalities that are hard to predict (Ammons 2002). There are also some benefits that are not necessarily considered when providing public services. For example, research shows that crime tends to decrease in neighborhoods when a police officer parks a squad car in the driveway at his/her private residence. Apparently, criminals avoid neighborhoods where policemen reside (Gianakis and McCue 1999).

Calculating cost-benefit analysis can be very complex since all of the factors involved in the process must be quantifiable and measurable over time. "Benefits are measured by the market price of the project outputs or the price consumers are willing to pay, while costs are measured by the monetary outlays necessary to undertake the investment" (Lynch 1995, p. 160).

Let's look at an example of a municipality that wants to decrease the amount of non-violent crime in a particular part of the city. They look at three possible alternatives to improving the problem: 1.) Increase the amount of time patrolmen spend in the neighborhood. 2.) Place a police substation in the neighborhood and move six currently employed officers. 3.) Add a bicycle/foot patrolman in the department whose jurisdiction would include that neighborhood.

Alternative 1: Increase Patrol Time
(Budget: $0)

Cost: The first option is to increase the amount of patrol time in the neighborhood, while reducing the amount of time in other neighborhoods, using existing officers. Overall, patrol time will increase by 15%. There should be minimum, if any, increases in cost since we will use existing law enforcement personnel.

Benefit: Based on previous patterns, crime should decrease by 5% for every two hours added to the day patrol and decrease by 4% for every four hours added to the evening and night patrol. However, data suggest that shifting officers from one neighborhood to another is likely to shift crime from one neighborhood to another over time.

Alternative 2: Add a Substation

Cost: The city has several options within this alternative. It is assumed that utility cost will be comparable in each of the alternatives.

Option A. Rent space from a private vendor. The most desirable area costs $750.00 per month plus utilities.

Option B. Purchase and refurbish one of the older buildings in the neighborhood. While the average building in the neighborhood is relatively cheap as a result of the crime level ($72,000.00), the cost to refurbish the site can range from $10,000.00-$15,000.00 based on the condition of the building.

Option C. Build a new substation. The building, land and furnishing will cost the city $175,000.00 and take at least seven months to complete.

Option D. Purchase a building that is ready for occupation. Buildings that are ready for occupation tend to sell 10-15% higher than the average building. For example, a 700 square foot building that is completely ready for occupation will cost about $105,000.00.

Benefit: Based on previous crime patterns, we expect the crime rate to decrease by 50% within the first month of operation. Whether we lease, buy or build a substation will not affect this rate. However, the speed in which the officer's occupy the space obviously will impact how quickly their presence will impact the crime rate.

Alternative 2 Budget

Option A

	FY1
Rent	$9,000
Total	$9,000

Option B

	FY1
Building Purchase	$72,000
Refurbishing Cost	15,000
Total	$87,000

Option C

	FY1
Building	$100,000
Land	50,000
Furniture	25,000
Total	$175,000

Option D

	FY1
Building	$105,000
Benefits	50,000
Equipment	32,000
Total	$187,000

Alternative 3: Add a Bicycle/Foot Patrolmen to the Area

Cost: The city would hire one new police officer at a cost of $50,000.00 per year, plus an additional $8,000 for training. Last, he/she will need a fully equipped bicycle ($1,000.00).

Benefit: One additional foot patrol would increase police visibility in the neighborhood by 100%. Crime decreased by 10% when the first foot patrol was hired last year. We expect that rate to increase an additional 15% since both officers will work simultaneously. Further, a citizen satisfaction survey indicated that citizens felt 75% safer as a result of the increased interaction with police officers that were on foot.

Alternative 3 Budget

	FY 1
New Policeman	$55,000
Benefits	15,000
Training	8,000
Bicycle	1,000
Total	$79,000

Now that we have three options, which one is the most efficient and effective? Let's look at each of the three alternatives. Alternative 1 is by far the most cost efficient, but is the worse in terms of benefits given the impact of moving an officer from one location to another location. Each of the options within Alternative 2 is an expensive choice. In fact, this alternative is the most expensive, but it has the potential for good benefits. Alternative 3 falls squarely in the middle of Alternatives 1 and 2 in terms of costs and benefits. In this example, Alternative 3 is probably the best option given an assessment of costs and benefits. However, these decisions can and often become political decisions with little discussion of the economic ramifications.

Cost-effectiveness analysis (CEA) assumes that there are benefits and concentrates on spending the least amount of funds to achieve the objective. Another way to look at cost-effectiveness is to examine all viable policy options and determine which option is the most cost efficient. Gianakis and McCue (1999) point out that this model provides for technological efficiency, but not allocative efficiency "because no effort is made to determine whether the cost supports the pursuit of the goal" (p. 89). Cost-effectiveness models are useful in both operating and capital budgets.

For example, Exhibit 6.1 compares three options to reducing the number of cars in the downtown area of Columbia. Each of the options clearly has benefits, but the costs of exercising any particular option varies. Policymakers consider

many more factors than what is included here. This would include questions such as: How many citizens will be affected by the option? Which option will allow for expansion in the future? Will the option generate revenue? How long will it take to complete the option? The quantitative techniques used in cost-effectiveness models are similar to those used in cost-benefits models (Axelrod 1995).

Exhibit 6.1 Cost-effectiveness Analysis Example (Transportation)

Objective: Reduce the number of cars in the Columbia downtown area.

Policy Option	Cost	Est. Users
A. Add two new bus lines emanating from a new garage near midtown.	$9.5 million	3,500/day
B. Add three trolley lines with parking lots near the three main arteries.	$8.2 million	3,000/day
C. Build an above ground train that circles downtown from each of the five suburbs.	$22.4 million	6,000/day

Financial Decision Making Tools

Discounting To Present Value/Discount Rates

The term discounting has been traditionally used in the private sector. However, *discounting* to the present value is a very useful tool for public administrators because it considers the value of the dollar today relative to some other period in time. Analysts will find discounting useful when comparing two items that occur during different periods with similar financing methods. For example: leasing versus purchasing items or contracting out versus providing the service from within the government. Lee and Johnson (1998) indicate that discounting serves two main purposes. First, funds are diverted from the private sector to the public sector. If these funds reap at least a dollar for dollar ratio, then it is feasible from an economic perspective to provide the service from within the government. Second, citizens prefer to reap the benefits of spending now rather than in the future. Hence, citizens are aware that the spending power of a dollar is greater today than it is in the future and are not inclined to endorse programs or invest money unless the interest is likely to reap greater future benefits (Wang 2006).

If we had a choice, we would like our money to increase in value over time, rather than decrease. Discounting works similar to compounded interest collected on a savings account in reverse. For example, if we were contemplating putting $10,000.00 in a saving account at a 6% interest rate, we would want to make sure that the spending power of the principal and interest ($10,600.00) will

equal or exceed its current value in one year. If principal and interest does not equal or exceed the current value, then it would not be economically feasible to put money into the account. The 6% interest rate measures our willingness to trade $10,000.00 today (PV) for $10,600.00 in twelve months (FV). Interest rates calculate *future values*, while discount rates calculate *present value*.

Future Value (FV) = Present Value (PV) X (One + Interest Rate (IR))

FV = $10,000.00 X (1 + .06)

FV = $10,600.00

Present value is calculated using the same data as future value. However, the term discount rate is used rather than interest rate because the value of what we will receive in the future is smaller today because there is a delay in receiving the benefit. Hence, we subtract an amount to compensate us for that delay. We are, in effect, placing a value on time (Miller 1996; Ammons 2002; Aronson and Schwartz 2004). There is no hard and fast rule to determining what discount rate should be applied, but the process can be difficult. However, you should consider these rules relative to the public sector when considering a discount rate (Lee, Johnson and Joyce 2008):

- The longer it takes for returns to occur, the more their value is discounted.
- Costs that occur earlier in the project are subject to less discounting.
- Total discounted benefits must exceed total discounted costs.

Discount to the Present Value = Future Value / (1 + IR)

Let's consider an example that describes how discounting to the present values occurs:

Example 6.1

The City of Brassell has a project that will take four years to implement from the day that construction begins. The city expects to save $5,000.00 a year once the project is implemented. Since funds will be spent prior to the completion of the project, time becomes a cost. Hence, it is feasible to use discounting. Using the PV formula and a 5% discount rate, the expected value of a $5,000.00 forecasted benefit for the project at the end of four years is $4,113.50. So, city officials can decide if the project is worth the investment based on this figure. That is, is it worth the effort to complete the project to save $4,113.50 a year?

Year 1 PV = $5,000.00 / (1 + .05) = $4,761.90
Year 2 PV = $4,761.90 / (1 + .05) = $4,535.14
Year 3 PV = $4,535.14 / (1 + .05) = $4,319.18
Year 4 PV = $4,319.18 / (1 + .05) = $4,113.50

A simple or short way to calculate the value of the savings in the fourth year is to use the Excel formula given below. By cubing the discount factor, you can calculate the present value the same way as you did with the long method above. However, you can expect the sum to vary slightly based on rounding error. You can decrease this error by not rounding the sum to two digits to the right of the decimal as you did in the long method. In this example, 1.05 raised to the fourth power is 1.21550625, which would give us a PV of $4,113.51. This is only one cent off of the long method. In Excel, you can use the formula =(1+.05)^4 to calculate the answer. Note that the number four in the preceding formula represents the number of years and .05 represents the discount rate.

$$\text{PV (of \$x over 4 years @ 5\%)} = \frac{\text{Future Value}}{(1 + .05)^4} = \frac{\$5{,}000}{1.21550625} = \$4{,}113.51$$

The second example below considers a leasing agreement versus a selling agreement for the city. In short, the city has to decide if it is financially better off selling the building versus leasing it for a finite period of time.

Example 6.2

The City of Brassell has been offered $150,000.00 for a building that is leased to Barnett Real Estate. The real estate company pays $1,200.00 per month on a 5-year lease with the option to buy the building at the end of the lease for $80,000.00. So, the city has to decide if it is better to sell the building now, or continue to lease it. Using a 5% discount rate, for a property that has annual benefits for n years, we can use the following formula to calculate the present value. Note: n = number of years.

$$PV = \text{Annual Value } X \frac{[(1 + \text{Discount Rate})^n - 1]}{\text{Discount Rate } (1 + DR)^n}$$

A. Leasing/Purchase Option

- Annual Benefit = $14,400.00 ($1,200.00 X 12 months)

- One Time Benefit = $80,000.00
- PV Annual Benefit = $14,400.00 X $\frac{(1.276-1)}{.05\ (1.276)}$

(Add the math to calculate 1.276)

$$= \$14{,}400.00 \quad X \quad \frac{(.276)}{.064}$$

$$= \$14{,}400.00 \quad X \quad 4.31$$

$$= \$62{,}064.00$$

- PV One Time Benefit $= \$80{,}000.00 / (1.05)^5$
  $= \$62{,}695.92$

Total Benefit $= \$62{,}064.00 + \$62{,}695.92$
$= \$124{,}759.92$

B. Sale Option

- $150,000.00

C. Comparing Options

It would seem feasible to sell the property given the small but positive disparity between the two sale options ($150,000.00 - $124,759.92 = $25,240.08). If the difference was smaller, other items such as the current status of the lease holder, future plans of the city, and expenditure and revenue priorities should be closely scrutinized. More than anything, PV allows decision makers the opportunity to examine the current lease and assess what it is really worth (([5 X $14,400.00] + $80,000.00) = $152,000.00).

Let's consider one more example where the city wants to invest funds into a new computer system. The question posed to the city is: Are the computers worth the investment?

Example 6.3

The City of Brassell has determined that it is losing money in the billing department due to its inferior computer network. So, prior to spending $150,000.00 on new computers, city officials decided to use discounting to determine if it is worth the money to buy a new computer system. Specifically, is the expected $47,500.00 saved each year worth it in another six years when the cost of buying the computers is considered?

Depending on the item in question, it might be useful for a city to also secure bids and contract the project out to the lowest bidder if it is cost efficient. When leasing or contracting out a service/project is an option, the analyst should pay close attention to the net present value (NPV). The NPV should be large

(positive number) enough to justify the city providing the service. If the net present value is small, the city might want to seriously consider the lowest bidder.

Table 6.1 shows the results of the analysis using a 9% discount rate over a 6 year period. When the amount invested is subtracted from the total present value of annual saving the net present value is $63,081.14 (where the sum of the NPV – Amount Invested: $213,081.14 - $150,000 = $63,081.14). This amount is over and beyond the cost of purchasing the computers. Hence, it would be a good investment for the city.

$$\text{NPV (Present Value)} = \frac{\text{Annual Savings}}{(1+r)}$$

Table 6.1 Discounting Cash Flow Technique

Year	Savings	NPV*	9% D.R.
1	$47,500.00	$43,577.98	.917
2	47,500.00	39,979.80	.842
3	47,500.00	36,678.72	.772
4	47,500.00	33,650.20	.708
5	47,500.00	30,871.74	.650
6	47,500.00	28,322.70	.596

Total Present Value of Annual Savings = $213,081.14
(Sum of NPV for each year)

Amount Invested = $150,000.00
Net Present Value (NPV) = $63,081.14

* Figures are rounded.

Note: See also Kramer, Fred A. 1976. "The Discounting to Present Value Technique as a Decision Tool." *Special Bulletin*.

However, what if the NPV was smaller given the potential size of a city's budget? What if the savings were smaller and the discount rate was larger or smaller? What if the computers had a life span of seven years rather than six years? What if we had a private company offering the service at a lower amount? The NPV is ultimately affected by the data that is put into the equation. Hence, an analyst should be fully cognizant and understand this principle. Lastly, if the NPV is a negative number, it is a bad investment.

In order to get the figures in Table 6.1, use the present value formula. After the first iteration, the sum becomes the new value. Over a six-year period, the city would save $213,081.14.

$$\text{NPV (Net Present Value)} = \frac{\text{Annual Savings}}{(1+r)} = \frac{\$47{,}500.00}{(1+.09)} = \$43{,}577.98^*$$

\$43,577.98/\$47,500.00 = .917 \$43,577.98/1.09 = \$39,979.80
\$39,979.80/\$47,500.00 = .842 \$39,979.80/1.09 = \$36,678.72

*Figures are rounded.

Note: The formula that was used in Example 6.2 can also be applied to the problem discussed in Example 6.3. It is particularly useful in this setting because we are expecting annual benefits over several years.

Rate of Return

The *rate of return* (RI) is a private sector technique that solves for the rate of return on investments. In some instances, government officials have to decide if it is economically feasible to provide a service or contract the service out to the private sector. RI is calculated by dividing the net yearly/annual savings by the average investment in the project. There is an underlying assumption in this technique that government entities depreciate assets on an annual basis.

We can use the example in Table 6.1 to explain and apply this technique. As shown previously, the city had yearly/annual savings of \$47,500.00 by investing \$150,000.00 into a new computer system. So, the first thing that we do is calculate annual depreciation using the following formula:

I (Initial Investment) / EL (Expected Asset Life) = AD (Annual Depreciation)

\$150,000.00 / 6 years = \$25,000.00

Next, we calculate the average investment (AI). We know that the computers will be worth \$150k during the first year (FI) and \$25k during the sixth year (LI) or the last year of the project. So, if we add the value of the computers in the first year to their value in last year and divide it by two, the average investment is \$87,500.00. By the way, the last year value and the annual depreciation are the same.

First Year Value (FI) + Last Year Value (LI) /2 = Average Investment (AI)

\$150,000.00 + \$25,000.00 / 2 = \$87,500.00

After doing the math we see that the rate of return on the average investment is 53.7% using the formula:

Annual Savings (AS) /Average Investment (AI) = Rate of Return (RI)
$47,500.00 / $87,500.00 = .543 or 54.3%

City officials now have to decide if a rate of return of 54.3% is large enough to justify the project. While there is not an exact cut off for an acceptable rate of return, one can follow a basic rule, a larger rate of return is more acceptable than a smaller rate of return. In this case, 54.3% is not as good as 75%, but better than 40%.

Payback Method

The payback method is a tool that allows decision makers to examine the time needed to recover an investment through net annual savings. In simple terms, how much time is needed to recover the cost of the investment? In the private sector, the question is: how much time is needed to make a profit?

Let's use the City of Burnside in Example 6.3 where the city expected to save $47,500.00 annually by purchasing $150,000.00 in new computers for the Billing Department. The annual operating cost to the city is $25,000.00. The first thing that we must do is calculate the net annual cash flow saving.

Net Annual Cash Flow Savings (NSAV) =
Annual Saving (AS) – Operating Cost (OC)

$22,500.00 = $47,500.00 - $25,000.00

Since we know the total dollar amount needed to complete the investment, we simply need to determine the expected life of the computers. Generally speaking, high end technology hardware and software is expected to have a life span of five years in the public sector. So, we can determine the payback period by dividing the annual investment (Ai) by the net annual cash flow saving (NSAV).

Ai / NSAV = PP

$150,000.00 / $22,500.00 = 6.6 years

In this example, it is clear that 6.6 years is barely larger than the 6-year expected life of the computers. Therefore, it would suggest that the computers are not a great investment. However, all is not necessarily lost. The city can also use this information to formulate other scenarios and ways to save money or reduce operating expenditures. For example, what would happen if the city received a lower bid on the computers or the life expectancy of the computers is extended one more year? The basic goal is to ensure that the expected life of the investment is greater than the payback period.

This model can be modified a bit to calculate the remaining life (RL) of an asset and actual savings (aS). Using the above example, we can calculate RL using this formula:

$$EL - PP = RL$$

$$6 - 6.6 = -0.6 \text{ years}$$

In this example, the computers fall .6 years short of the period needed to pay for them (Note: In Excel you should round this number to one digit to the right of the decimal. This will require you to round the RL in a separate cell). Again, this would support the previous finding that this would not be a great investment. It also supports the proposition that the city should ensure that they are getting the best possible estimates/bids on the computers. Actual savings can be determined using the formula:

$$RL \; X \; AS = aS$$

In the above example (-0.6 X $47,500.00 = -$28,500.00), we would have a net sum of zero since we are not saving any money. RL and AS must be positive numbers in order to reap savings (Round the remaining life years to one digit to the right of the decimal prior to calculating annual savings). Realistically, you want the item of expenditure to last longer than the period needed to pay for it (See Chapman 1996 for a nice snapshot of these three methods).

Productivity Analysis

The term *productivity* can be measured in a number of different ways, but the most common method compares the ratio of the quantity to the quantity of input used in the production of that output. The key question is: Can the work be completed more efficiently and effectively with the addition of more resources? Contrary to popular belief, governments do in fact make an attempt to do more with less. Using better work procedures, better equipment, and improving employee attitude toward the job can work toward achieving this end. Assessing productivity can be achieved through an examination of outputs and outcomes. However, it is better to examine the benefits to individuals and society (outcomes) rather than the product of the project (outputs). Performance audits make it easy to obtain outputs, but outcomes require value judgments to determine if society is better off. There are a number of factors that can affect the relationship between outcomes and outputs, so it is difficult to have a meaningful analysis of outcomes. Review the section in chapter 1 on program and performance budgets to see how expenditures are tied to outcomes and outputs. Further, an increase in production may suggest a decrease in cost, but a reduction in cost does not necessarily mean an increase in production. Programs may appear to be

more efficient by cutting the budget without much regard for productivity.

One of the most commonly cited reasons for increased productivity are increased workload. Some employees are simply bored and unchallenged while others do not have enough to do. Others find their work too complex and thus do not perform. When the work is simplified, they tend to perform better. As a result, unit costs can be lowered. Improved training procedures, new equipment, better use of job evaluations, improved employee relations, and opportunities for mobility have also been shown to improve productivity.

Essentially, programs and projects must be evaluated on their own merits. Evaluators must understand the mechanics of the work performed and human behavior in order to provide good recommendations (Follett 1918; Lynch 1995).

Multiple Regression Analysis

Regression analysis is used quite a bit as a forecasting method by most states and large local governments. Users of this technique should be familiar with statistical packages such as SPSS, Stata, or SAS to conduct this sort of analysis. Regression analysis is particularly useful in budgeting when examining revenue and expenditure models. It allows the user to determine the affect of each independent variable on the dependent variable while controlling the other independent variables.

A simple regression model uses a straight line where $Y = a + bX$ to describe the relationship. In this model, Y is the dependent variable, a is the distance between the point where the regression line intercepts the Y axis and the origin, the slope b is the regression coefficient and measures the change in Y given one unit change in X (Lynch 1995; Mikesell 2011).

Again, the technique works on the basic assumption that a change in a dependent variable (Y) is correlated with a change in an independent variable (X). This change can be negative or positive. Regression analysis uses interval or ratio data. However, nominal or ordinal data can be converted to numbers and then the numbers are used as proxies (also called dummy variables).

For example, let's think about the word region. The words south and north do not mean anything to a computer program. So, if we convert the terms to 0 and 1, where 0 = south and 1 = north, we can then use the numerical data in our analysis. However, the user has to remember not to make false claims with the data. For example, a mean score of 145 for south and 239 for north means absolutely nothing. Let's take a look at an example to clarify the concepts listed above.

In this example, Mrs. Joya Smith is the Secretary of Health and she is trying to make an argument that the federal government needs to continue supporting the Medicaid and SCHIP programs in their efforts to decrease the number of uninsured children in the United States. The following directional hypothesis summarizes her argument:

H_1: Enrolling children in SCHIP and Medicaid will decrease the percent of uninsured children.

The basic premise of her model is that variables (independent) such as the percentage of children who: graduate from high school, live below the poverty level, live in a certain region of the country, etc have an effect on the percentage of uninsured children. Each of the variables used in the model are in rates or percentages with the exception of region. Region in this model is a dichotomous dummy variable. The model is:

$$Y=b_0+b_1x_1+b_2x_2+b_3x_3+b_4x_4+ b_5x_5+ b_6x_6+ b_7x_7+e$$

where:

Y = Percentage of Uninsured Children

Demographic Variables (annual)
x_1 = Poverty Rate
x_2 = High School Graduation Rate,
x_3 = Unemployment Rate,
x_4 = Percent of Population that is Caucasian,
x_5 = Geographical Region (South and Southwest=0, Other States=1),

Public Health Variables (annual)
x_6 = Children Medicaid Enrollee Rate, and
x_7 = Children SCHIP Enrollee Rate.

What does the model reveal? Table 6.4 shows that each of the independent variables has some affect on the dependent variable. The most important item for Mrs. Smith is to show that the Medicaid and SCHIP program variables are significant. The coefficients for each of these variables are significant at the .01 level of analysis and in the correct direction (-.0236 and –0.591 respectively). That is, as the percentage of Medicaid and SCHIP enrollees increase the percentage of uninsured children decreases. The negative sign next to the coefficient indicates a decrease. A positive coefficient would indicate an increase in the coefficient. For example, the model shows that the percentage of uninsured children increases as the poverty rate increases.

Other things that are useful in this table are the F score and Adjusted R^2. The R^2 coefficient ranges from 0-100. The coefficient basically defines the level of predictability for the model. In this example, the adjusted R^2 is .969. So, that would mean that all of the independent variables explain 96.9% of the variance in uninsured rates.

Table 6.4 OLS Children's Health Care Regression Model (Pooled Data)

Demographic Variables		*Economic Variables*	
-High School Graduates	-0.192 (.023) ***	-Unemployment Rate	-0.423 (.138) **
-Children in Poverty	0.175 (.028) ***		
		Medicaid and SCHIP Variables	
-White Population	-0.076 (.006) ***	-Medicaid Enrollees	-0.236 (.038) ***
-Region	16520 (9507.7) *	-SCHIP Enrollees	-0.591 (-.591) ***
-Total Population	0.203 (.012) ***	-Intercept	-14019 (7539.7)
F=771.23***	R^2=.970	Adjusted R^2 =.969	N=301

Note: The table reports unstandardized coefficients with the standard errors in the parenthesis. It also includes a dummy variable for all but one year in the fixed effects model.

***Significant at the .01 level. **Significant at the .05 level.
*Significant at the .10 level.

Reading and Understanding Reports

Reports that are filled with statistics and models are useful when they are understood by the user. Hence, it is important that the bottom line be clearly stated with references to the difficult sections. For example, when conducting a cost-benefit analysis, it would be prudent to describe the many features of the model during the conceptualization stage. In addition, provide the consumer with alternatives paradigms that describe how a change in one factor may bring about a change in the outcome. For example, how would a half percent increase in the discount rate affect the value of an option?

Conclusion

As mentioned at the beginning of the chapter, there are a number of techniques that are useful to budget analysts and politicians in understanding how to forecast the amount of revenues needed for the budget. In addition, there are tools that allow analysts the ability to determine if policy decisions, upon implementation, are good or bad. While there are no hard and fast rules in estimating revenues, the chapter does show that there are some basic principles that should be adhered to regardless to the size of the government. Basically, good projections come from analysts who stick to the basic principles while paying close attention to population shifts, economic fluctuations, industry movement, etc. Sophisticated models are only as good as the analysts using them. These as

well as other tools are quite useful and can save governments thousands of dollars over multiple fiscal years.

Important Terms and Phrases

Annual Benefit
Annual Depreciation
Annual Savings
Annual Value
Average Investment
Brainstorming Model
Congressional Budget Office (CBO)
Cost-Benefit Analysis (CBA)
Cost-Effectiveness Analysis (CEA)
Delphi Model
Discounting/Discount Rates
Econometric Model
Expected Asset Life
Extrapolation Model
First Year Value
Fixed Cost
Forecasting
Free Rider
Future Value
Interest Rate
Initial Investment
Input-Output Models
Judgmental Model
Last Year Value
Marginal Cost
Micro Simulation Model
Multiple Regression Model
Net Present Value (NPV)
Net Annual Cash Flow Saving (NSAV)
Office of Management and Budget (OMB)
One Time Benefit
Operating Cost
Payback Method
Present Value
Productivity
Rate of Return (RR)
Recurring Cost
Remaining Life (RC)
Status Quo Model
Time-Series Model

Chapter 6 Homework Exercises

Directions: Complete question 1 & 2 in a word processing program and questions 3-7 in Excel. Do not round any numbers until the final step. You can complete the remaining questions in Excel and paste the answers into a word processing program.

1. The mayor for the City of Harriston has requested a cost-benefit analysis. In short, she wants to know if the city can save money by using outside security vendors for public events held at the city's convention center. The city manager has appointed you, budget analyst, to conduct the analysis. Your analysis should provide three alternatives. The first one should provide the data for the cities' police department and the latter two should be estimates from two private companies (Security One and First Line Security). Since private companies are considered in this example, the budget should be primarily limited to personnel and operating costs. Below is a list of information that you should use when conducting your analysis. When you complete your analysis, make a recommendation to Mayor McClain. You are free to write your analysis in any form that you choose as long as you consider the information that is provided below.

- The city spent $740,000.00 in salary and benefits last year (police department) in providing security at the convention center for 35 events.
- The events averaged 25,000 people.
- A total of thirty five officers were used, on average, for each event last year.
- The convention center has a main security office that requires three persons to be on duty at all times.
- There are 8 points of entry that require an armed security guard.
- The events averaged five hours in length.
- Security One has contracted with the city in the past (four years) with fairly good evaluation scores on customer service. They have 40 security officers who are trained in CPR and paramedic skills, with an average tenure of 6 years. Thirty five of the officers are registered to carry weapons. They have four staff members with at least one person on duty at all times. The main office is not in the downtown area.
- First Line Security is a new company that was started by the previous police chief. They have 50 security officers with an average tenure of 10 years of experience and five staff members. They also have an office downtown near the areas where events tend to occur (open 24 hours per day). They have managed two large events thus far with few problems. They received high evaluation scores on both events. In addition, their fees tend to be slightly less than the competition for the same services.

Items to consider in the "Benefits" section of your analysis could include: educational levels of security officers, certifications (diversity training, CPR, etc), length of experience, permits (handgun, etc), age; age of company, clientele list, work history of company, number and type of security vehicles; and expected length of the security contract. Also, note that the contractors are completely responsible and liable for their employees and any incidents that may occur (i.e. employee insurance; contractor must be bonded, etc). In addition to the above items, you should consider speaking with a security or police office to see what additional items should be included in your proposal. It is not necessary to include every possible detail in your cost, but try to be holistic in your categories so as to keep your budget succinct.

2. As a result of the population growth at the north end of Harriston over the last five years (5,000 people and 2,000 new homes), Mayor Helms has asked you to create a cost effectiveness analysis plan (CEA) to manage the provision of postal services to residents in that area. In short, the residents want a new post office in their neighborhood. However, the mayor is not completely sold on the idea, but she has to make a recommendation to the Post Master General. Hence, she wants you to examine the proposals so that she can provide the council with multiple options to consider, including building a new post office at the north end of town. When you are finished considering the three options, make a recommendation to the mayor along with a narrative explaining the recommendation. That is, which option should produce good results with the least amount of spending? Your options should include at least three variables (cost, users, space, vehicles needed, equipment, etc.). In addition, include at least four important questions (budget, traffic patterns, location, etc.) that could impact the council's decision.

3. The City of Harriston has decided to build a downtown parking garage to house city employee's vehicles. Since the city has to demolish several buildings on the site, the project will take five years to complete. The city expects to save $30,000.00 a year once the project is completed. Using a 6% discount rate, determine the present value (PV) of the $30,000.00 savings at the end of the five year period.

4. The Harriston City Council is contemplating selling a building that is currently leased to Dr. Tarria Whitley, a local veterinarian, for $95,000.00. Whitley leases the building for $900.00 per month and is currently on a six year annually renewed lease with the option to buy the property at the close of the lease for $45,000.00. Using the present value formula and a 6% discount rate, calculate the total benefit of the leasing option and compare it with the option to sell the property.

5a. Chief Derek Miller of the Harriston police department has submitted a proposal to the city's budget director of Harriston requesting the purchase of ten new police cars. He estimates the department will save $20,000.00 a year by having the new cars. The cars will cost the city $200,000.00. Unfortunately, the life span of a police car is only four years at best. Using an 8% discount rate, calculate the net present value of the proposal. Explain the results.

b. Using the above example, calculate the NPV using the following data: Discount Rate = 5%, Cost of Cars = $185,000.00, Annual Savings = $90,000.00, Life span of car = 5 years. Explain the results.

6. Using the data in Question 5a and b, calculate annual depreciation, average investment, and the rate of return for the police department's proposal. Explain the results in each problem.

7. The Parks and Recreation department has suggested renovating the municipal golf course at a cost of $1,000,000.00 with an annual operating cost of $225,000.00 and an annual savings of $395,000.00. The expected life of the golf course is 7 years before the city will have to make a major investment in improving the course. Calculate the payback period, remaining asset life, and the actual savings. Explain the results.

8. Optional In-class Exercise: Defending Cost Effectiveness Analysis Plans (30-35 minute exercise)

Step 1: Arrange the class in groups of four or five.

Step 2: Have the groups discuss their CEA plans for question 2. That is, each group should come up with a consensus group cost effectiveness plan based on their individual plans. The plan should include 8-10 questions to go along with a minimum of three options (20 minutes).

Step 3: Have one person from each group present the plan to the entire class (15 minutes).

References

Ammons, David N. 2002. *Tools for Decision Makers: A Practical Guide for Local Government*. Washington, D.C.: CQ Press.

Axelrod, Donald. 1995. *Budgeting for Modern Government*. 2nd ed. N.Y.: St. Martins Press.

Bretschneider, Stuart and Wilpen L. Gorr. 1999. "Practical Methods for Projecting Revenues." In Roy Meyer's (ed) *Handbook of Government Budgeting*. San Francisco, CA: Jossey Bass.

Chapman, Ronald. 1996. "Capital Financing: A New Look at an Old Idea." In *Budgeting Formulation and Execution*. Eds. Jack Rabin, W. Bartley Hildreth, and Gerald J. Miller. Athens, GA: Carl Vinson Institute of Government, University of Georgia.

Follett, Mary P. 1918. *The New State: Group Organization, the Solution of Popular Government*. New York: Longmans, Green.

Gianakis, Gerasimos A. and Clifford P. McCue. 1999. *Local Government Budgeting: A Managerial Approach*. Westport, CT: Praeger.

Gruber, Jonathan. 2005. *Public Finance and Public Policy*. NY, NY: Worth Publishers.

Lee, Robert D. Ronald W. Johnson and Philip G. Joyce. 2008. *Public Budgeting Systems*. 8th ed. Sudbury, MA: Jones and Bartlett Publishers.

Liner, Charles D. 1996. "Projecting Local Government Revenue." In *Budget Management: A Reader in Local Government Financial Management*. Eds. Jack Rabin, W. Bartley Hildreth, and Gerald J. Miller. Athens, GA: Carl Vinson Institute of Government, University of Georgia.

Lynch, Thomas D. 1995. *Public Budgeting in America*. 4th ed. Englewood Cliffs, NJ: Prentice Hall.

Makowsky, Michael D. and Wagner, Richard E. 2009. From scholarly idea to budgetary institution: The immergence of cost-benefit analysis. *Constitutional Political Economy, 20*(1), 57-70.

Mendosa, Arthur A. 1983. "Budgeting." In *Budget Management: A Reader in Local Government Financial Management*. Eds. Jack Rabin, W. Bartley Hildreth, and Gerald J. Miller. Athens, GA: Carl Vinson Institute of Government, University of Georgia.

Mikesell, John L. 2011. *Fiscal Administration*. 8th Ed. Belmont, CA: Wadsworth Publishers.

Miller, Gerald J. 1996. "Cost-Benefit Analysis." In *Budgeting Formulation and Execution*. Eds. Jack Rabin, W. Bartley Hildreth, and Gerald J. Miller. Athens, GA: Carl Vinson Institute of Government, University of Georgia.

Nice, David. 2002. *Public Budgeting*. Stamford, CT.: Wadsworth.

Swain, John W. and B.J. Reed. 2010. *Budgeting for Public Managers*. Armonk, NY: M.E. Sharpe.

Wang, XiaoHu. 2006. *Financial Management in the Public Sector: Tools, Applications, and Cases*. M.E. Sharpe: Armonk, NY.

Weimer, David L. and Aidan R. Vining. 1989. *Policy Analysis: Concepts and Practice*. Prentice Hall: Englewood Cliffs, NJ.