Approaches to Value

Effective March 1, 2011

A note to the reader: For further information regarding the terminology or examples utilized throughout this chapter, see “Property Assessment Valuation,” Second Edition (1996), published by the International Association of Assessing Officers. Also, see “The Appraisal of Real Estate,” Thirteenth Edition (2008), and “The Dictionary of Real Estate Appraisal,” Fifth Edition (2010), both of which are published by the Appraisal Institute.

The Nature of Value

Value is represented by the monetary worth of property, goods or services to buyers and sellers. Usually, the value of property, goods or services is determined as of a particular point in time. The value of any property depends on the utility and scarcity of that property. Utility is the “want-satisfying” power of a property, good or service, or its desirability. Although utility is a necessary condition of value, it is not the only condition. The air we breathe possesses a great deal of utility, yet it does not have a high price since it is not scarce. Scarcity is a function of supply and demand. As demand increases in contrast to limited supply, or as supply decreases in contrast to constant or increasing demand, then scarcity increases and value increases. Conversely, if supply increases or demand decreases, the inventory of property, goods or services increases and the value of these items will decrease.

Utility and scarcity alone do not determine value. A marketplace is needed in which potential purchasers, with the necessary purchasing power and desire to purchase, can evaluate utility and scarcity in negotiating the amount of money or its equivalent that should be exchanged for a property. The price arrived at is a property’s market value[1] (i.e. the value arrived at in the market place). Market value is generally described as the most probable price, as of a specific date, expressed in terms of cash or comparable financial arrangements, that a property would bring if exposed for sale for a reasonable period of time in an open market in an arm’s-length transaction between a willing seller

[1] Under Arizona Law, the terms “Market Value” and “Full Cash Value” are considered synonymous, except where statutory valuation procedures are prescribed (e.g., agricultural properties, golf courses, shopping centers and Centrally Assessed property).

and a willing buyer, both of whom are knowledgeable, acting prudently and in their own best interests, with neither party being under any duress.

There are three generally recognized approaches to determining the market value of a particular property. First, there is the Market Sales Comparison Approach, which compares a subject property to other properties like it which have recently been sold. Second, there is the Cost Approach, which determines the cost of constructing an improvement that is similar to a subject property plus the value of its building site. Generally, a prudent investor is not going to spend more to build a property than it would cost to acquire a completed property with the same utility, allowing time to acquire the replacement. Third, there is the Income Approach, which estimates the price one would pay to acquire the right to the income a property is capable of earning. A prudent investor is generally not willing to pay more for an income-producing property than the present value of the income the property is capable of producing over the economic life of the property. All three of these approaches can estimate market value.

Since there are only three approaches that can be utilized in determining market value, an appraiser must be able to view value from the perspective of each of these approaches. For properties that are commonly sold, such as residential properties, the market sales comparison approach is the best method of value determination. For properties that have readily measurable incomes generated by the property, such as apartments or office buildings, the income approach is the best method. For properties that sell infrequently, or that do not have a measurable income generated by leasing the property, such as an industrial plant or a one-of-a-kind property, the cost approach may be most applicable.

For some properties, all three approaches can and should be utilized. For others, only one or two of the three approaches may be applicable. Regardless of which approach or combination of approaches is employed, the objective is to estimate the market value of a subject property. Further, if each method is performed properly, they should all yield

reasonably similar estimates of market value. The following discussions and examples provide overviews of the processes and considerations that are involved in each of the three approaches to value.

The Sales Comparison Approach

The sales comparison approach is generally the most direct approach for determining market value. It is the most useful and applicable approach if there are several properties that are similar to a subject property that have recently sold in the same market area in which the subject property is located. This approach requires obtaining a concise description of the property being sold and an expression of its market value and related information.[2] The description of the subject property goes beyond just the physical dimensions of the real estate, and includes the property rights that go with the real estate. That is, do the property rights being transferred include or exclude mineral rights, air rights or water rights? Is the property subject to public or private easements, such as utility lines, or is the property located in a transportation corridor? Does the property's deed contain any restrictions affecting its use or transferability? Are there any provisions in the sale contract that would influence its purchase price?

Cash Equivalency

A sale price should be for the real estate (i.e., the land and improvements) and the real property rights being sold. If a business is being sold along with the real estate, or if household furnishings are included in the sale of a residence, the sale price must be adjusted to reflect only the sales price of the real property (i.e., the land, improvements and the rights regarding them that are being sold). A sale should be in terms of money, either cash or negotiable financial paper. If noncash items are included in a sale, such as a total or partial trade, then the noncash asset must also be valued in terms of money. The terms of a sale must be expressed in terms of cash or its equivalent.

[2] For property tax purposes, the property should be valued as if it is free of any encumbrances (i.e., an estate in fee simple).

This does not mean that the payment must be in all cash if the use of negotiable financial ‘paper’ is common. Usually, this means mortgages, but stocks, bonds and other negotiable instruments could be used, as well. This ‘conversion to cash’ requires an analysis of the following factors:

1. **The amount of the down payment**. A low down payment could suggest an overstatement of the total sale price, while a large down payment could indicate a firm sale price. It could be argued that with no down payment the buyer is taking little to no risk, so the seller seeks protection by increasing the sales price. If the amount of the down payment is consistent with other similar properties exposed to the same market, and if it has similar financing, then no adjustment is required.

2. **The amount of interest**. If a third party provides a loan (e.g., a bank), then the interest rate charged on the mortgage is generally considered to be a market rate, and no adjustment is required. However, if a loan is held in total or in part by the seller, the interest rate should be studied to see if it is typical for the market at the time of the sale. Since the seller participated in setting both the sale price and the interest rate, it is possible that the seller adjusted the sale price upward for a lower than normal interest rate, or adjusted the price downward for a higher than normal interest rate.

   Example. A property had a sale price of $325,000 with a twenty percent down payment and with a seller-financed interest rate of eight percent for twenty-five years. Current market financing indicates that conventional lending agencies were offering conventional mortgages in the area with a rate of ten percent. What is the cash equivalent sales price?

   1. Contract amount (after twenty percent down) $325,000 - $65,000 = $260,000.

2. Principal and interest amortization factor for a mortgage with a ten percent interest rate for twenty-five years = 0.110168.[3]
3. Principal and interest amortization factor for a mortgage with an eight percent interest rate for twenty-five years = 0.093679.(also 3)
4. Contract rate advantage: 0.093679 ÷ 0.11016 = 0.85033.
5. Cash equivalency of contract amount: $260,000 x 0.85033 = $221,086.
6. Cash equivalency of sale: $221,086 + $65,000 = $286,086.

That is, the seller was able to add $38,914 (or $325,000 - $286,086) to the sale price by offering a below-market interest rate of eight percent. By comparing the amortization factor of the seller's contract loan interest rate with the amortization factor of a market interest rate, the contract rate advantage was computed. This contract rate could also be a disadvantage if the contract rate is higher than the market rate. For example, consider a seller's contract loan with an interest rate of twelve percent and a market interest rate of ten percent:

1. Principal and interest amortization factor for twelve percent for twenty-five years = 0.127500.
2. Principal and interest amortization factor for ten percent for twenty-five years = 0.110168.
3. Contract rate disadvantage: 0.127500 ÷ 0.110168 = 1.1573.

That is, the contract rate amount would have to be increased by 15.73 percent to compensate for the higher-than-market contract interest rate.

3. **The amount of assumed mortgage.** It is possible that a purchaser may assume an existing mortgage if the interest rate and payment schedule are favorable. The sale price should be adjusted downward to reflect the fact that a purchaser would pay more to acquire a mortgage with a below-market interest rate.

[3] See Column 6, "Partial Payment," in Compound Interest Table. See also page 57 of this chapter, for a discussion of "The Six Compound Interest Functions of One Dollar."

Example. A property was acquired for $500,000 with an assumed mortgage of $350,000 for twenty years with a ten percent interest rate. The buyer paid $150,000 down. At the time, conventional lending agencies were offering conventional financing mortgage rates in the area at thirteen percent.

1. Amount of assumed mortgage = $350,000.
2. Principal and interest amortization factor at thirteen percent for twenty years = 0.142354.
3. Principal and interest amortization factor for ten percent for twenty years = 0.117460.
4. 0.117460 ÷ 0.142354 = 0.82513.
5. Assumption rate advantage: $350,000 x 0.82513 = $288,796.
6. Cash equivalency of assumption: $288,796 + $150,000 = $438,796.
7. Sale price = $500,000.
8. Cash equivalency value of the property = $438,796.
9. Value of the favorable mortgage financing = $61,204.

That is, the seller was able to demand $61,204 (or $500,000 - $438,796) more when the buyer assumed the below-market mortgage interest rate of ten percent.

4. **Other financing.** All other financial features of the loan should also be studied to convert the impact of their features to their cash equivalent. Examples of features that must be studied are balloon payments, wrap-around mortgages, variable interest rate loans (a.k.a., adjustable rate loans) and buy-down loans where loan payments are held down for the first few years. Many of these financial arrangements, if not properly adjusted for, could result in a total sale price being misstated.

5. **Time on the market.** Given “normal” market conditions, it is generally assumed that if a property was offered for sale on the market for a very short time prior to

sale it was priced too low. If that same property was on the market for a very long time, one reason may be that it was priced too high.

6. **Time adjustment.** Market value is best determined by the market sales comparison approach, using recently sold comparable properties. At times, there may not be many recent sales in a given market area (or none). When this occurs, older sales must be used to help determine a subject property's market value.

While "time on the market" addresses the period of time from the listing of a property on the market until it has been sold, the process of time adjustment addresses the period of time from the date of sale until the sale is considered as a potential comparable for the sale of another property. This adjustment is based on the principle of change. The social, economic, governmental and environmental factors that influence the real estate market are constantly in flux and, as a result, can change the market value of a given property over time. Sometimes these changes occur slowly, while at other times, they can occur rapidly. Market values tend to rise during inflationary periods and fall during recessionary times. These changes in value must be determined and the proper adjustments made to comparable properties. Two methods of measuring the changes in value occurring over time are (1) the same property resale method and (2) the paired-sales analysis method.

The **same property resale method** is valid only if a subject property has sold twice and has not undergone any significant changes between the two dates of sale that would otherwise affect its value. To utilize this method, subtract the first sale price from the second sale price, then divide the difference by the prior sale price. The resulting percentage is then divided by the number of months between the two sales. The quotient is the average percent of change per month.

Example. A property sold twenty months ago for $200,000. It resold two weeks ago for $220,000.

1. $220,000 - $200,000 = a $20,000 increase in value.
2. $20,000 ÷ $200,000 = 0.1 (or a ten percent increase).
3. 0.10 percent ÷ 20 months = .005 (or, a 0.05 percent per month average increase in price).

If a statistical analysis of a number of same property resales in a market area shows that this increase is valid, it can be used to adjust older sales to current market values. This method is valuable if there are no current comparable sales in the subject's market area, but there are sales in the market area that, while not directly comparable to the subject (e.g., larger- or smaller-size homes than the subject) are affected by the same economic influences as those affecting the subject property.

If there aren't enough same property resales in a given market area to use the same property resale method for making time adjustments, but there are a number of sales of similar properties, the **paired-sales analysis method** can be used. The assumption in this second method is that the sales are comparable in every way except for the date of sale. The formula for making this type of time adjustment is the same as the one utilized in the same property resale method.

Example. Property A sold ten months ago for $250,000. Property B sold two weeks ago for $200,000.

1. $200,000 - $250,000 = a $50,000 difference in value.
2. $50,000 ÷ $250,000 = 0.20 (or a twenty percent decrease).
3. 0.20 ÷ 10 months = 0.02 (or a two percent per month average decrease in price).

The adjustments made to this point satisfy the first portion of the definition of market value that prescribes "...the most probable price, as of a specific date, expressed in terms of cash or in terms equivalent to cash, that a property would bring if exposed for

sale for a reasonable period of time in an open market ....” The second part of the definition provides “...in an arms-length transaction between a willing seller and a willing buyer, both of whom are knowledgeable concerning other uses to which it is adapted and for which it is capable of being used.” The second part of this definition pertains to the validity of the transaction being representative of a valid market transaction. Some of the factors that must be considered before accepting the sale as a valid measure of market value include the following:

1. Was the sale between members of the same family or units of the same business? These transactions tend not to be truly “arm’s-length.”
2. Was the sale to or from a governmental agency? As above, these sales also tend not to be “arm’s-length.”
3. Was the sale a Sheriff’s sale (i.e., was the property sold at auction for taxes)?
4. Was the seller over-motivated to sell (was the seller in need of a quick sale)?
5. Was the buyer over-motivated to buy (e.g., did the buyer have to find a new place quickly)?
6. Did either party appear to take advantage of the other, or have knowledge not common to both parties?

Each of these questions is pertinent to determining the “arm’s-length” nature or validity of the sale transaction. While it is possible that a sale under these conditions could still reflect market value, the existence of such conditions should cause an appraiser to study the sale much more closely. Sales made by governmental agencies, including sheriffs’ sales and auctions for taxes, are exempt from the requirements for recording an Affidavit of Value form (DOR 82162). Sales not involving the use of the Affidavit of Value form are rarely found in the population of sales encountered by most County Assessors’ appraisers or by the Department of Revenue’s appraisal staff in the Property Tax Division.

If the degree of similarity between a subject property and recently sold properties is not sufficient to make a direct comparison, it will be necessary to make adjustments to the prices of the properties that have sold to reflect these differences and make them more comparable to the subject property. For example, the sale prices of the comparables can be adjusted up or down for square footage or room count, for special amenities, for the date of the sale, location, physical condition, etc. Care should be exercised to minimize the number and extent of these adjustments to any particular comparable property. If any major adjustment is required, or if a large number of adjustments are needed, then the usefulness of a comparable becomes questionable.

Once a sale is determined to have been valid, has been adjusted for cash equivalency, if necessary, and has been stripped of all non-real property items (usually, personal property), it can then be considered to be a representative local marketplace transaction. An appraiser must now utilize these sales to set a market value estimate on the subject property. This is accomplished by matching the property characteristics of the subject property with recently sold properties which have the most comparable property characteristics with the least amount of adjustments. Hopefully, there will be several sales that are comparable to the subject property, requiring an appraiser to select the appropriate value for the subject property from the value range formed by the sales of these comparable properties. The sale price of an individual property may not be the market value of truly comparable properties. If a subject property's sale price appears at either end of the market value range, the value placed on it for property tax purposes must reflect the composite of all of the comparables.

It is important to note that the value derived from the market sales comparison approach is generally a range of values - not just a fixed-point value. This is due primarily to the differing motivations of the buyers and the sellers and the adjustments that may be required for cash equivalency, time on the market, or physical differences. A strong seller will try to hold the price up while a strong buyer will try to drive the price down.

Given the mix of buyers and sellers in typical real estate markets, the sale prices on very similar properties could vary considerably.

The Cost Approach

The cost approach (or summation approach) to estimating market value is an estimate of the purchase price and related expenses required to acquire a parcel of land, complete a building site, and then construct an improvement on it. This approach, while applicable to all improved properties, is most useful for newly-built properties, those for which there is limited market sales data, limited (or no) usable income data, and for those which are “one-of-a-kind” properties (at least, locally).

The value of an improved property derived using the cost approach is the sum of the **replacement cost new (RCN)** of the improvements, less any depreciation, plus the market value of a fully developed building site. This summation is a good estimate of the market value of a newly-constructed property. There are two categories of cost approach value estimates: replacement cost and reproduction cost. Reproduction cost (i.e., creating an exact duplicate of a subject property) is utilized for ad valorem property tax assessment purposes only in a very few select situations (e.g., valuing some historic properties).

The cost approach in general, and replacement cost in particular, is based on the principle of substitution, which states that a prudent person would not pay more for a property than would have to be spent to acquire a similar property with the same utility, allowing for the time required to replace it. Further, the cost approach is the only approach which provides consistent results for all categories of improved properties, whether or not adequate income data or improved property sale data are available. This consistency is accomplished by using the same improvement construction cost information on all similar properties and deducting typical depreciation. This is of

particular concern to the County Assessors since the equal treatment of similar properties must be achieved, by law.

Over time, the costs of material and labor changes can cause the RCN to change. At the same time, the improvement depreciates and certain types of obsolescence may also affect a subject property. A decline in value over time due to normal wear and tear is referred to as physical deterioration. Value loss may also occur over time due to excessive deterioration, a lack of maintenance, or one or more forms of obsolescence. When these forms of value loss are reflected in a cost estimate, the resulting cost approach value is referred to as the **replacement cost new less depreciation (RCNLD)**.

The term “depreciation,” as used above, reflects the loss in value attributable to all causes. Included in this term are “physical deterioration” and “obsolescence” (of one type or another). The **physical deterioration** component of “depreciation” is the long-term decline in value occurring due to normal wear and tear on improvements. The rate of decline is a function of the expected life of the improvements, and assumes normal maintenance. The rate of depreciation can vary significantly, depending primarily on the amount and quality of maintenance an improvement receives.

Modernization can also alter the rate of depreciation. Modernization includes repairing or replacing building components like the electrical service, HVAC system or plumbing system to meet current local building code requirements. Reroofing and painting fall under the category of normal maintenance and are not, by themselves, considered modernization. Modernization extends the remaining life of an improvement, and therefore decreases its rate of depreciation. The method for reflecting modernization is discussed in more detail in Part 2, Chapter 4 of this manual, “Age Calculation.”

The concept of **effective age** is utilized to reflect situations in which modernization, superior maintenance or other factors have caused an improvement to appear like, and have the same utility as, a newer improvement. A lower effective age reflects a

reduction in the amount of depreciation that must be allowed for, which results in a higher replacement cost new less depreciation (RCNLD) figure. A higher effective age reflects the opposite, and results in a lower RCNLD. Remaining useful life should be a function of an improvement's effective age, not of its chronologic age.

For example, a well-maintained home in a desirable neighborhood built in 1948 might still have an expected remaining life of thirty to forty years. If the original improvement had an expected life of seventy years, and it now has a remaining life of forty years, its effective age would be thirty years, while its chronologic age is sixty-two years. That is, the sixty-two-year old improvement is currently equivalent to a thirty-year-old home.

The **physical life expectancy** of an improvement is a very important component of normal depreciation, as it determines the length of time over which depreciation is to be computed. The shorter the expected life, the faster a property depreciates. The physical life expectancy of an improvement is based on the category of construction utilized (e.g., wood framing versus steel framing), the materials and workmanship used (average quality versus custom construction), and assumes a property receives normal maintenance. It measures the number of years an improvement is expected to be useable considering normal physical deterioration and maintenance, rather than economic factors.

For example, a service station may have a physical life of from thirty to thirty-five years depending on the quality of construction and materials. From the perspective of keeping the property economically viable however, it will probably be replaced, or substantially modernized, after only twenty to twenty-five years, in order to "keep up with the competition" and to reflect changes in technology, building codes, etc.

Just as important as the physical life expectancy of a structure is the **chronologic age** of that structure. For a given expected life, the age of an improvement determines the amount of normal depreciation to allow for, by applying the appropriate depreciation 'curve' to the improvements. In the absence of other information, the chronologic age is

used to determine the effective age (with some consideration for modernization, if applicable) as discussed above. The depreciation component of the cost approach only accommodates normal wear and tear.

Occasionally, excessive wear and tear or structural deterioration caused by excessive use, by damage, neglect, insect infestation (especially termites), dry rot, moisture and mold, or weathering may exist. Physical deterioration that can be repaired (or structural components that can be replaced) at an economically feasible cost is referred to as **"curable physical deterioration,"** or deferred maintenance. This form of physical deterioration is generally measured by the "cost to cure" the deterioration. Since this type of physical deterioration can be rectified, or 'cured,' properties with these kinds of problems should be inspected periodically to ascertain if the physical deterioration has been cured since the last inspection.

Physical deterioration which is not considered economical to repair or replace is referred to as **incurable physical deterioration**. Incurable deterioration usually affects some larger physical component(s) of the structure (e.g., the roof framing, wall framing, or the foundation or floor slab or framing) and could include short-lived items that are not currently economically correctable. Changing the effective age is the preferred method for dealing with incurable physical deterioration, but other acceptable methods are also available. Incurable physical deterioration and any adjustment of effective age should be well documented and made a part of a property's permanent record.

In addition to normal depreciation and physical deterioration, a loss in value to an improvement can be attributed to either functional or economic obsolescence. **Functional obsolescence** also has two categories: **curable** and **incurable**. Which is used also depends on whether or not correcting a problem would be economically feasible. Functional obsolescence is generally caused by changes in construction styles, consumer tastes, newer technology, or a property owner's changing needs or demands. It is the impairment of a property's functional capacity, or efficiency, and is a loss in value that is brought about by factors that include excess capacity, inadequacy,

and changes in technology which affect the improvement or its relation with other items comprising the overall property. It is also the inability of a structure to adequately perform the function for which it is currently intended to be utilized. Effective age is not to be used to reflect a shortening of the life of a structure due to either form of functional obsolescence, as these factors can be considered an addition to normal depreciation.

Examples of functional obsolescence include the vault area in a former bank structure which is not needed in its current use as an office; excessively reinforced flooring in a structure that was originally designed to accommodate heavy machinery, but which is no longer utilized in that manner; or a former service station now being used as a retail store. This form of obsolescence is generally reflected by a percentage adjustment that is added to normal depreciation. Occasionally, functional obsolescence can be estimated by determining the cost to cure the functionally obsolete feature (e.g., removing the unwanted vault from an office formerly occupied by a bank; removing the roll-up overhead doors in a former service station). In many cases, however, rectifying the problem (i.e., the cure) is not so easily accomplished, as in the case of a former bank structure with its built-in, superadequate construction style and materials (relative to those of a typical retail store). In a situation like this, an appraiser would first compute the RCN of the bank as it was originally built. The appraiser would then compute the RCN for the same size structure as if it had been built for use as a retail store. The difference in the two RCNs would be the measure of the functional obsolescence affecting the subject property.

To illustrate, consider a structure originally built as a branch bank which has an RCN of $360,000. The building is currently being used as an office, and it will continue to be used as an office. The RCN of a structure constructed as an office building which is the same size as the branch bank building is determined to be $290,000. The functional obsolescence is nineteen percent, rounded down ($360,000 - $290,000 = $70,000 ÷ $360,000 = 0.194).

As other examples, consider a warehouse built in 1935 with three foot thick adobe walls. A similar structure would be built today using concrete block. A retail structure built in 1940 with a sixteen-foot wall height would more likely be replaced today with a structure having twelve-foot high walls. When replacement cost is used, there is no need to allow for functional obsolescence, as it is assumed the subject structure would be replaced with one using modern materials and design. Reproduction cost, on the other hand, reflects the cost to duplicate the existing improvement using original building materials, design style and construction technology. Reproduction cost should be used only when the value of the property is enhanced by preserving an older style of construction, as in the case of historic properties that capitalize on the uniqueness of a structure. Reproduction costs can include items that are of no current use, or incorporate a design that is obsolete by modern standards. These items would generally be considered to be functionally obsolete in arriving at a final value.

External (or economic) obsolescence is caused by factors that are external to a subject property. That is, the obsolescence is not caused by the subject property, but by influences that are near to, or that surround, the subject. These include: rerouting traffic patterns away from the subject; the deterioration of a subject's neighborhood and an impairment of the desirability of the area; changes in the economy that create changes in supply or demand for properties like the subject; or increased and (now considered as) excessive noise or traffic in a subject's area. The use of market sale data or the incomes of comparable properties provide the best methods for measuring this form of obsolescence.

Consider, for example, a warehouse in an older industrial neighborhood that is in direct competition with a new industrial park development that is attracting the tenants of the older warehouses. If the RCNLD plus the land value of the older warehouse is $1,000,000, but the market sales of similar warehouses in the same area indicate a value of $800,000, then the **subject property** is suffering $200,000 of economic obsolescence. Also, if the rental income that the old warehouse can command now only

supports a market value of $800,000, then the income approach also indicates that the old warehouse property is suffering a $200,000 economic loss (economic obsolescence).

This form of obsolescence usually affects both the value of the improvement and the value of the land. This is generally estimated by first determining a new market value for the land, which (if correctly estimated) will include the external obsolescence factors affecting it. The improvement's value is then calculated by subtracting the new land value from the newly estimated market value of the total property. The difference between the improvement's newly-developed value and its RCNLD would be due to external obsolescence.

Depreciation should also be developed from the marketplace. Physical deterioration, modernization, functional obsolescence and economic obsolescence all are reflected in the market place. With the exception of normal depreciation, each of these factors applies to individual properties or small groups of properties. Only normal depreciation is applicable to all improvements. For that reason, sold properties experiencing one or more forms of obsolescence in addition to normal depreciation must either be excluded when using market sales to measure normal depreciation, or they must have their sale prices adjusted to offset the factors affecting their values. Once these factors have been accounted for, the difference between the value of the improvement (as derived by subtracting the land value from the sale price) and its replacement cost new should be due to normal depreciation.

When these differences are related to the age of the structure, normal depreciation curves can be developed. Since these normal depreciation 'curves' are derived from the market, their application to replacement cost new should provide reliable estimates of market value. As stated earlier, all depreciation factors should be derived directly from the market. That is, the sale price of a property, after subtracting its estimated land value, is related to both the replacement cost new and the effective age of the structure.

That relationship, for improvements of any age, expressed as a percentage, represents the percent of the replacement cost new of the structure that remains allowing for that property's age. If the remaining value of a structure is sixty percent of the replacement cost new, (i.e., sixty percent "good") as supported by market sales, then that structure has depreciated by forty percent (100.0 - 60.0). If depreciation curves are derived from valid market sales, then the cost approach should produce an approximation of a subject property's market value.

The Income Approach

The income approach to valuing property is based on determining the present value of the future benefits of property ownership. Those future benefits are measured by the net rental income (or the "income stream") that a property is capable of earning, usually over a one-year period. Determining the present value of an income stream is known as the capitalization of net income. The income approach reflects the quantity and quality of the income stream that a property is expected to generate over its economic life. It is also a check on the value indications derived from the sales comparison and cost approaches to value. Investors in income-producing properties rely on the income approach when making decisions about buying and selling properties. In some cases, the income approach, or a statutory variation of the income approach, is mandated by law. Various statutory valuation procedures are specified for several different categories of both locally assessed and centrally assessed properties.

Income-producing property is generally worth no more to a typical investor than the present value of the income stream which it will produce. The decision-making process for investing in income properties is similar to making the decision to place money into savings, or purchasing certificates of deposit, U.S. Treasury bonds, state or local government-secured bonds, or investing in stocks. An investor is concerned with the amount of money an investment will earn, the length of time over which the earnings will occur, the assurance that the full amount of earnings will be realized (or conversely, the

risk that they will not be received), and the “opportunity cost” that may be involved in not being able to make other investments. When investing in U.S. Treasury bonds, the amount of interest earnings, the duration of those earnings and the risk of losing the investment are known factors at the time the investment is made. With money-market or savings accounts there is somewhat less certainty as to the full extent of the income that will result from the investments, as interest rates will fluctuate over time. Buying and selling stocks carries a higher risk, as several uncontrollable (by the purchaser) variables can and do affect stock-issuing business enterprises and their stock’s values.

When investing in income-producing real estate a prospective investor must consider the same factors as those involved in the investments just described. However, the real estate investor must also understand the income-generating potential of the property and the current and projected conditions in the property’s market. These investors must also be realistic about expectations as to what can be earned after all expenses on the investment have been deducted. When placing funds in savings accounts or buying U.S. Treasury bonds the investor knows what the interest rate is, and can evaluate that investment in comparison to other similar investments with different interest rates.

Rather than dealing with only the simple expressions of interest rates, a real estate investor also must consider a more complex relationship of income to investment - the capitalization rate. The capitalization rate (or “cap” rate), like the interest rate, expresses the relationship of income to investment, but also includes additional economic factors. The capitalization rate is an expression of what a real estate investor wants as a **return on** their original investment, as well as the recapture, or **return of,** that original investment. When an investor in savings bonds withdraws their investment, both the original investment and the interest earnings from that investment are received.

To illustrate this principle, consider an apartment complex that sold for $5,500,000 which had an annual net operating income of $500,000. The overall capitalization rate would be 9.1 percent ($500,000 ÷ $5,500,000 = 0.0909). That is, the investor expects to

earn 9.1 percent of the original investment, per year, over the life of the investment. This will include both the return on the investment and the return of the original investment. This illustration demonstrates the income approach to value in its simplest terms. This principle also illustrates the answer to the most basic question: What are investors paying today for the right to receive a particular income stream that can be generated by a similar income-producing property over the duration of the investment period?

The income approach to value is based on several appraisal principles. The primary principle is anticipation. Various capitalization methods seek to anticipate the future earnings of a property and convert those earnings (the income stream) into an estimate of present value or worth. Along with anticipation, some capitalization methods utilize the principle of change in the anticipated income to be received over time. When forecasting future benefits and rates of return, the principles of supply and demand are also useful in anticipating the 'direction' of these earnings. Understanding how economic conditions affect the current supply of similar properties, predicting the demand created by these conditions, and therefore, the income a property is capable of producing, is of great importance in capitalizing the income stream into an estimate of present value.

An alternative method of capitalization utilizes a gross income multiplier (GIM) applied to the gross income generated by a property. This method may be useful when the full range of income and expense data required for income capitalization cannot be obtained, but the gross income and sale price of a subject property are available. Either the total potential gross income multiplier (PGIM) or effective gross income multiplier (EGIM) may be used. However, the factor (the multiplier) must be derived from comparable properties of similar size and location, and they must have similar income-to-expense ratios, land-to-building ratios, and risk characteristics. Additionally, the use of total potential gross income is valid only if the comparable properties have the same potential for future vacancies. The formula for this method uses the acronym

VIF, wherein **V** is the property's value, **I** is the **gross** income and **F** is the **gross** income multiplier, or factor.

The basic formula is **V = I x F**. The gross income that is multiplied by the factor will yield a property value.

DIRECT CAPITALIZATION FORMULA UTILIZING **VIF**

VALUE **=** **I**NCOME **x** **F**ACTOR
INCOME **=** **V**ALUE **÷** **F**ACTOR
FACTOR **=** **V**ALUE **÷** **I**NCOME

Gross Income Multipliers express the relationship between a property's annual gross income and its value. The basic method is to divide the property's value or selling price by the gross income at the time of sale. It assumes that the property will remain leased with no unusual changes in vacancy and, as with other direct capitalization methods, that there are a number of comparables having similar physical and income profiles. Gross Rent Multipliers (GRM) use a monthly rent instead of an annual income. Both methods use the same formula. In the following example, a comparable property is a triplex with a sale price of $150,000 and an annual gross income of $21,600.

Sale Price ÷ Gross Income = Factor
$150,000 ÷ $21,600 = 6.94 (7.00, if rounded)

The market-developed multiplier, or factor, is then multiplied by the subject's gross income (or annual total rent) to yield an estimated value. This method is useful for smaller properties for which the expenses are not known.

In the following example, the subject property is a small apartment building with five units. The total annual gross rent is $48,000. The market derived factor is 4.35.

Gross Rent x Factor = Value
$48,000 x 4.35 = $208,800

Income and Expense Analysis

Regardless of the capitalization method chosen, the first step to utilizing the income approach is to develop the income and expenses into a net operating income figure. This process is known as creating a 'reconstructed' income statement. There are four parts to this process:

1. Estimating the Potential Gross Income (PGI).
2. Subtracting the Vacancy and Collection Losses.
3. Adding any Miscellaneous Income to arrive at an Effective Gross Income (EGI).
4. Estimating and subtracting all valid Operating Expenses to arrive at a Net Operating Income (NOI) before discount, recapture and real estate taxes have been removed.

The processes involved for each of these parts are discussed next.

1. **Estimate the Potential Gross Income (PGI).** The potential gross income is the maximum rental income that a property could produce if it were one hundred percent occupied for an entire year. For example, a 2,000 sq. ft. office structure rents for $22 per square foot per year: 2,000 sq. ft. x $22 = $44,000 per year PGI.

   When capturing income data, contract rent (i.e., the actual rental payments specified by a lease) should be used only if they are verified as being "at market." That is, a contract rent amount that does not reflect current rents in comparable facilities is not considered "economic rent" (sometimes also called market rent). A twenty-year lease entered into ten years ago may not reflect the rent that the property could be leased for in the current market. However, many long-term leases have escalation clauses, or provisions, that may keep the lease terms 'at market' over time. In other instances, a lessor may not want to increase the rent

on an existing or a long-term tenant's lease, but the lessor knows that a new lease at a higher rental amount could be initiated with a new tenant.

Further, it is not uncommon to find that one business unit within a corporation is leasing space to another business unit within the same corporation at a rental amount that does not reflect current market lease rates. Rents paid under lease-purchase agreements may not be at market (and often are not). Instead, lease-purchase payments often reflect the repayment of a loan. When analyzing market rents, care should be exercised to evaluate the impact of market rents on an entire complex. If applicable, an entire economic unit should be included in an income analysis.

2. **Subtract the vacancy and collection losses.** Most leased properties will experience some degree of vacancy and collection loss over their economic lives. There are some categories of properties (e.g., an industrial manufacturing company, or a warehouse structure) that may have a single tenant that has a long-term lease which will not experience any vacancy or collection loss (but they are the exception). For most properties, an allowance should be made for this category of expense as a deduction from the PGI. Estimates of vacancy and collection losses can be derived from studying comparable properties in a subject property's market area and from analyzing the subject property's recent income history. Indications of appropriate percentages of vacancy and collection losses can also be derived from published surveys of similar properties in similar market areas.

3(a). **Add miscellaneous income.** Miscellaneous income is any 'nonscheduled' income from a property (i.e., other income from a property that is earned outside of the contracted rental income). This income may be from parking fees, recreation or clubhouse fees, coin operated laundry machines, food vending machines, etc. Miscellaneous income is also sometimes referred to as 'service'

income. Care should be taken when including miscellaneous income to assure that other "business income" has not been included with it. For example, some mini-storage facilities also have truck and trailer rental businesses that operate in conjunction with the rental of storage spaces. The income from the truck and trailer rental business would be considered "business income," and is not income derived from leasing the property's individual storage units. Neither is it "miscellaneous" income.

3(b). Effective Gross Income (EGI). The effective gross income is the income remaining after subtracting the vacancy and collection losses and adding any miscellaneous income. It is the income derived from the property before expenses are removed.

4. **Estimate and subtract all valid operating expenses to arrive at Net Operating Income (NOI).** Once an effective gross income has been established, a property's operating expenses must be identified and subtracted from the income stream. Only the periodic, 'normal' expenses (i.e., those necessary to keep a property maintained, functional and rented competitively with other comparable properties in the same market area) should be allowed. There are three categories: fixed expenses, variable expenses and reserves for replacement.

Fixed expenses are those that do not vary from month to month and that are usually set by contract or statute. They may be monthly or annual payments. Property insurance, license fees and permit fees are fixed expenses.

Variable expenses are those that vary from month to month. Some are a percentage of income. Variable expenses are utilities, regular maintenance, management and leasing fees, administrative and payroll expenses (property management related), property

supplies and services, etc. These expenses will vary depending on the category of property, the level of occupancy, or with the extent of services provided.

Reserves for replacement cover the replacement costs of those components that have a shorter expected life than the overall improvement of which they are a part. Those components consist of items such as **exterior** painting, replacing the roof cover, and replacement of significant portions of the heating, cooling, plumbing or electrical systems. Expenses in the reserves for replacement category should be pro-rated over the anticipated life of the item(s) being replaced. Discretion must be used, however, because certain component costs may include the entire cost of initial installation, while an actual replacement may later be necessary for only a portion of a given component.

For example, in replacing a package heating and cooling system, the portions requiring replacement might consist only of the heater, compressor, condenser and evaporator, as the existing ductwork, wiring, etc., would still be functional. Therefore, if the replacement cost includes the initial installation cost of the entire system, it would be an upper-limit cost, useful for reference purposes, but higher than the actual cost an owner would incur in replacing only individual items comprising the actual components being replaced.

The annual dollar amount to be retained in a reserve for replacement account for a component can be estimated by dividing the total cost of the component by its expected life. For example, assume the cost to replace the roof cover of an office structure is $30,000 and the expected life of the roofing is fifteen years. The annual reserve for replacement amount would be $2,000 ($30,000 ÷ 15 = $2,000). Similarly, consider the replacement of appliances in a one hundred-fifty unit apartment complex. If the cost to replace appliances is $750 per unit, and the estimated expected life of the appliances is ten years, then the annual reserve for replacement amount would be $11,250 (150 units x $750 per unit = $112,500 total cost; $112,500 ÷ 10 = $11,250).

The normal life expectancy for short-lived items may be found by referring to the Marshall Valuation Service (Section 97), or to the I.R.S. Publication 946. For site improvements, an average life expectancy of fifteen years is considered reasonable.

Caution. In developing the expenses for reserves for replacement, an appraiser should also be aware of the following:

1. If the expected life of a component is equal to, or greater than, the remaining economic life of the structure it is a part of, no reserve for replacement is required.
2. Avoid duplication of expenses. Some of the periodic replacement expenses of short-lived components may instead be accounted for as variable operating expenses in the repair and maintenance category (e.g., interior painting). If handled in this manner, they should not be included as a reserve for replacement.
3. Large expenditures, such as a roof replacement, may have been erroneously accounted for as a capital expenditure. Capital expenditures are improvements or additions to an existing property that are intended to create additional value, which is reflected in potential (or actual) increased rent. This additional rent is capitalized, which accounts for the added value. Capital expenditures, therefore, should not be considered as expenses. A roof replacement does not add value to an existing structure. It is the repair of a short-lived item that should be accounted for as a reserve for replacement and annualized over the expected life of that item.

Care should also be taken when using a subject property's income and expense data to verify that the data is within the market range for that data. If the data is above or below the typical market's 'norms,' the resulting estimate of value will also be outside of the typical market's indicated value range.

Improper expenses. While a property owner may consider **property taxes** to be an operating expense (especially for income tax purposes), they are generally excluded from consideration in arriving at a net operating income figure when the purpose of an appraisal is to estimate value for ad valorem property taxation. The preferred method is to account for property taxes when developing the income-to-market value relationship (i.e., the capitalization rate), which will be discussed later. Likewise, depreciation should not be allowed as a deduction from income because it will be addressed as the recapture component of the capitalization rate. Expenses to cover debt service, including both the interest and principal payments for a property, will be reflected in the discount portion of the capitalization rate. Certain expenses incurred by a property owner (e.g., personal insurance, private vehicle expenses and travel expenses) are not proper deductions from the income of their property. Income taxes paid by an owner, be it an individual, a partnership or a corporation, are also in the disallowed expenses category. Disallowed business expenses are those that are neither associated with, nor necessary for, maintaining the rental income stream being produced by a property.

In some property categories, for example, Motels and Hotels, an income stream is generated by the business operating on a property, instead of from the leasing of the property to the business. In these instances, certain business expenses, such as “franchise fees,” are allowable. With Motels and Hotels, the business and real estate income is derived from the daily rental of the real estate, and the business directly benefits from the public recognition of the franchised operation. In these instances, franchise fees are an allowable expense because they enhance the income-generating ability of the real estate. Only ‘on-going’ franchise fees are an allowable expense, because ‘initial’ franchise fees (regarding the franchise purchase) are a part of the “soft costs” that are often associated with the construction of the improvements and the initial ‘start-up’ costs which occur prior to the operation of the business. Leased properties are unaffected by franchise fees, as far as the owner / lessor is concerned, as they are a

business expense of the tenant. They are not part of the operational income and expenses of the property owner.

EXAMPLES OF ALLOWED AND DISALLOWED EXPENSES

TYPICAL ALLOWED EXPENSES:

FIXED EXPENSES

Property Insurance
License Fees
Permit Fees

VARIABLE EXPENSES

Utilities
Management Fees (e.g., accounting services, rent collections, advertising, leasing commissions, legal fees, etc.)
"On-going" Franchise Fees (allowed for owner-occupied properties only). Payroll and Payroll Taxes (property management-related only)
Supplies and Materials
Maintenance and Repairs
Contracted Service Fees (e.g., services for property security, for landscaping, janitorial and pool maintenance, pest control, etc.)
Miscellaneous (minimal expenditures)

RESERVES FOR REPLACEMENT

Cost of Replacing Short-Lived Items

TYPICAL DISALLOWED EXPENSES:

Property Taxes (the effective tax rate is added to the capitalization rate)
Income Taxes
Mortgage Debt Service payments (this expense is accounted for in the discount rate component of the capitalization rate)
Depreciation (this expense is accounted for in the recapture component of the capitalization rate)
Capital Expenditures
Owner's Personal Expenses
"Initial" Franchise Fees.

Capitalization Formulas and Rates

The capitalization of income process is comprised of three basic components: the **net** operating income, the capitalization rate and the value, as represented by a verified property sale, price. The basic formula is represented by the acronym IRV, wherein **I** = net operating income, **R** = the capitalization rate, and **V** = the property value. The basic formula for estimating property value is **(I ÷ R = V)**. The net operating income divided by the capitalization rate yields a property value.

DIRECT CAPITALIZATION FORMULA UTILIZING **IRV**:

INCOME **=** **R**ATE **x** **V**ALUE

RATE **=** **I**NCOME **÷** **V**ALUE

VALUE **=** **I**NCOME **÷** **R**ATE

Rate Development

For ad valorem appraisals, the capitalization rate (or, “cap” rate) is comprised of three components – the discount rate, the recapture rate and the effective tax rate. All three components are used when appraising improved property. When appraising vacant land, only the discount rate and effective tax rate are used, as land is a nondepreciating asset, and therefore does not need a recapture component to recover the value of any improvements.

Discount Rate

The discount rate component of the capitalization rate is composed of the total required return **on** the investment in the real estate. It includes the “equity yield” component, or the compensation for making the investment, and the mortgage debt service requirements, including both the principal and interest amounts paid. It can be developed by the summation method, the market comparison method, or the band-of-investment method.

The **summation method** reflects an investor’s consideration of risk, investment return, management costs and liquidity (and other factors) in determining an acceptable

discount rate. In the summation method, the following four rates are added together ("summed") to obtain a discount rate:

1. Safe Rate: The interest rate obtainable with the least risk and the most safety.
2. Risk Rate: The return (earnings) applicable to the risk assumed by an investor.
3. Nonliquidity Rate: The rate representing an investor's inability to convert their investment into cash.
4. Management Rate: The compensation for managing the investment.

The **market comparison method** is appropriate when there are comparable sales with income information in the subject's market area. This method is reliable in that it directly reflects the discount rate of comparable investments in the subject's market area.

The **market comparison method** involves calculating a Net Operating Income after recapture and real estate taxes have been subtracted. The difference is the discount component of the income stream. The NOI is then divided by the subject's sale price. The quotient is the discounted capitalization rate. The formula for this calculation is based on IRV, **(I ÷ V = R)**. (See the following discussion of "Recapture Rate" for the methods of calculating the recapture amount.)

The **band-of-investment method** creates a market discount rate by weighting the mortgage rate (or rates, if one or more subordinate mortgages exist) and the investor's required 'yield' (i.e., earnings) on their equity in a property. This method considers the actual mortgage rates and the investor requirements for properties in the vicinity of the subject property. To develop a discount rate by the band-of-investment method, an appraiser must gather the following information:

1. The percentage of value (i.e., the loan-to-value ratio) that financial institutions will lend on first mortgages for the category of property in question, along with the rate of interest. Also, the same information is required for any subordinate mortgages.

2. The yield rate for the equity requirements of a particular investor. The equity yield rate is the interest rate required to attract investors to this category of investment property. It is generally higher than the mortgage rate(s). For high-risk properties, it may be considerably higher.

The following example demonstrates how to calculate a discount rate using the band-of-investment method. An investor has secured a first mortgage for $90,000. The interest rate on the mortgage is 5.25 percent. A second mortgage was obtained for $30,000 at 7.00 percent interest. The sale price for this property was $150,000. This results in an equity investment of $30,000 with a yield rate of 9.5 percent for this property. The first mortgage represents sixty percent of the total price, and the second mortgage is twenty percent of the total price. The remaining twenty percent balance of the sale price is the equity investment.

The interest rate(s) and the equity yield rate are then weighted according to the percentage that each is of a total sale price. The sum of all weighted rates gives an indicated discount rate for an entire financial transaction.

	Percent of price		**Rate**		**Weighted average (percent of price x rate)**
First mortgage	0.60	**x**	0.0525	**=**	0.03156
Second mortgage	0.20	**x**	0.0700	**=**	0.01400
Equity	0.20	**x**	0.0950	**=**	0.01900
Total	1.00	**x**		**=**	0.06456
					(6.5 percent, rounded)

Recapture Rate

Money invested in a property needs to be returned at the end of the investment, or holding period. The land value will be returned on the future sale of the property, as it is a nondepreciating asset. The return **of** the capital invested in the improvements is known as recapture. The annual rate of return is the recapture rate, which is the second portion of the capitalization rate. There are two methods of calculating the recapture rate. These are the remaining economic-life method and the market comparison

method. The recapture rate equals the annual amount of depreciation or loss in improvement value.

In the **remaining economic life (REL)** method, the remaining economic life of an improvement must be estimated. This is done by examining comparable properties and researching the typical life expectancy of the subject property's improvement. Once the remaining economic life has been estimated, its reciprocal (1 divided by REL) is calculated. This produces the annual percentage rate that is required to recapture the investment in the improvement.

For example, if an improvement has a remaining economic life of forty years, then the reciprocal of forty (1 ÷ 40) will yield a recapture rate of 2.5 percent per year (1 ÷ 40 = 0.025). This means that, on a straight-line basis, one-fortieth (1 ÷ 40), or 2.5 percent of the investment, will be recaptured during each year of the improvement's remaining economic life. This becomes the second component of the capitalization rate.

The **market comparison method** for deriving a recapture rate is similar to the method for estimating the discount rate: NOI, after taxes are subtracted, divided by the improvement's value, produces a recapture rate. The following example shows the data required and the procedure utilized to arrive at a recapture rate.

Sale price	$150,000
Land value	$ 30,000
Discount rate	6.5 percent
NOI after taxes	$ 12,750

Using the formula **I = R x V,** the income necessary to satisfy the discount rate can be calculated: $150,000 x 0.065 = $9,750. Subtract the income attributable to the discount rate from the NOI. The difference is the income attributable to recapture: $12,750 - $9,750 = $3,000.

Using the formula **R = I ÷ V** the recapture rate can be calculated:

$3,000 ÷ $120,000 = 0.025 (2.5 percent recapture rate).

Effective Tax Rate

The third component of the capitalization rate for an ad valorem appraisal is the effective tax rate (ETR). As stated earlier, even though property taxes are a valid expense from an owner's perspective, they are not deducted as an expense when reconstructing an income and expense statement. The effective tax rate is instead calculated for the market area and is applied to a subject property's capitalization rate. Since an ad valorem valuation is used to determine property taxes for a subject property, it is not possible to know the taxes for a property until its valuation has been determined.

To deduct the property taxes as an expense, an appraiser would first have to make several assumptions about the value of a subject property in order to estimate the taxes. This is especially true for new properties being appraised for the first time, or for properties that have been physically changed, or that have had a change of use and which therefore need to be reappraised. To solve this dilemma, the effective tax rate is included as a component of the capitalization rate. Therefore, the property tax expense is accounted for without having to make any unsupportable assumptions.

In Arizona, there are two ways of developing the effective tax rate: the direct method and the market comparison method. These are discussed below.

The **direct method** utilizes the official overall tax rate of the taxing jurisdiction in which a subject property is located and multiplies that rate by the assessment ratio of that subject property.

As an example:

Tax Rate	x	Assessment Ratio	=	Effective Tax Rate
0.12587	x	0.20	=	0.0252 or 2.52 percent

The **market comparison method** divides the most current year's taxes for a comparable property by that year's Full Cash Value for the property. Similar properties located in the same taxing jurisdiction as a subject property should yield similar ETRs. As an example:

Taxes	÷	Full Cash Value	=	Effective Tax Rate
$3,776	÷	$150,000	=	0.0252 or 2.52 percent

Overall Capitalization Rate

The overall capitalization rate expresses a direct relationship between the net operating income of a property and the value of that property. For ad valorem appraisal purposes, the overall "cap" rate is comprised of three components: the discount rate, the recapture rate and the effective tax rate. The overall capitalization rate is valid when developed from highly comparable properties. There are several factors to consider when selecting comparable properties from which to develop this rate. They are: Land-to-Building Ratios, Expense-to-Income Ratios, Effective Tax Rates and the Remaining Economic Life of the improvements of the comparable properties.

In the overall capitalization rate, the recapture component is affected by the land-to-building ratio. Since land is not a depreciating asset, and therefore does not require a recapture rate, properties with large land-to-building ratios will have a smaller recapture component, relative to value, than do properties with smaller land-to-building ratios. Expense-to-income ratios affect both the discount and recapture rates. Properties with large expense-to-income ratios will have smaller net operating incomes, which in turn will produce smaller overall discount and recapture rates. Conversely, properties with smaller expense-to-income ratios will have larger NOIs, producing larger overall discount and recapture rates.

The effective tax rate directly affects the overall capitalization rate since it is added to the discount and recapture rates. Comparable properties should be from the same

taxing jurisdiction or one that has a tax rate that is very similar to a subject property's rate. A higher effective tax rate will result in a larger overall capitalization rate, just as a smaller ETR will result in a smaller overall capitalization rate.

The remaining economic life of improvements directly affects the recapture rate and may indirectly affect the discount rate as well. Newer improvements will have a smaller recapture rate because they have longer remaining economic lives over which to recapture the investment in the improvements. Older improvements produce a larger recapture rate, as they have shorter remaining economic lives over which to recapture the investment. The discount rate may be affected as well, since newer improvements tend to be of a higher quality, overall, than older structures. A higher-quality investment generally produces a higher rate of return than a lower-quality investment.

Overall Capitalization Rate Development

There are several methods for developing an overall capitalization rate: the Comparable Sales Method, the Net Income Ratio method, the Band-of-Investment Method, and the Debt Coverage Formula Method. The following discussion will address only the Comparable Sales Method. (The Gross Income Multiplier or Gross Rent Multiplier method is addressed on pages 6.1.20 – 6.1.22). The other methods noted above are not normally utilized for ad valorem appraisal purposes. If needed, they can be researched through publications such as the IAAO's "Property Assessment Valuation" text and the Appraisal Institute's text "The Appraisal of Real Estate."

The **comparable sales method** requires an appraiser to find sales that are comparable to a subject property in terms of location and physical attributes, as well as having comparable income streams, as indicated above. When developing an overall capitalization rate using the Comparable Sales Method, an important distinction must be made concerning real estate taxes and the effective tax rate. In a competently managed income-producing property, the gross income will reflect an amount necessary to cover all allowable property expenses, real estate taxes, debt service, equity yield

requirements, and an appropriate amount for the recapture of the investment in improvements. The Comparable Sales Method will yield the discount and recapture components of the overall capitalization rate.

In order to arrive at a net operating income that reflects these two components, all valid property expenses must be removed from the income stream, including real estate taxes. When this has been accomplished, the remaining income reflects the amount needed to cover the discount requirements (i.e., debt service and equity yield) and the recapture requirement. Once these portions of the rate have been determined from comparable sales analyses, a market-based effective tax rate can be added to create the final, or overall, capitalization rate.

The following example demonstrates the process by which an overall capitalization rate can be estimated from a comparable sale. The comparable property is a 2,000 sq. ft. office structure that sold for $300,000, or $150.00 per sq. ft. It has a PGI of $20.00 per sq. ft., with the owner paying all expenses. The vacancy and collection losses average $2.50 per sq. ft., and expenses, including the property taxes, are $8.50 per sq. ft. The effective tax rate is 0.0300.

PGI (sq ft)	$40,000
Vacancy & Collection Loss	- $5,000
EGI	$35,000
Expenses (inc. prop. taxes)	- $17,000
NOI	$18,000

NOI	÷	Sale Price	=	(Discount and Recapture)	+	ETR	=	Overall Rate
$18,000	÷	$300,000	=	0.0600	+	0.0300	=	0.0900 (9.00 percent)

Direct Capitalization

Direct capitalization is a method of converting a single year's net operating income into an estimate of value. It is a useful and valid method for estimating the value of a subject

property when there are sufficient comparable properties from which to develop the required market data. There are two basic methods of developing a capitalization rate with direct capitalization. The first method uses the formula known as (IRV), which capitalizes a typical net operating income into an indication of value using an overall capitalization rate. The second method is Mortgage-Equity Capitalization, which considers the effects of the mortgage and equity requirements on the value of income-producing properties.

Using an overall capitalization rate requires the estimation of the net operating income (NOI) of a property. To calculate NOI, an appraiser should prepare a reconstructed income and expense operating statement for a “typical” year in which all **allowable** operating expenses (both fixed and variable) and reserves for replacements are subtracted from a property’s effective gross income. The purpose of using a “typical” year’s income stream is to determine an NOI that reflects the normal expenses over the entire remaining economic life of an improvement. Therefore, a portion of all expenses, including the replacement cost of short-lived items, must be allocated to the NOI in the year of the appraisal. Subtracting reserves for replacements from the effective gross income recognizes that replacements will eventually be necessary and their costs will affect the NOI of the property. Real estate taxes, debt service and depreciation costs for improvements are not subtracted, as they will be included in the overall capitalization rate, as was discussed above.

Capitalization using an overall rate is most suitable to clusters of properties with highly similar property characteristics where there are a number of sales. Examples are apartments and leased offices and retail stores. The prime consideration is that, for those properties that were sold, there must be enough similarity so that the variations in their capitalization rates are a function of the market place and are not due to differences in the properties themselves.

In the following example, the subject property is a 20,000 sq. ft. office structure. It is leased for $160,000 annually, and the owner pays all expenses. It has a vacancy and collection loss of 2.5 percent, or $4,000. Allowable expenses are $64,000. The overall capitalization rate, including the effective tax rate, is 6.30 percent, or 0.0630.

PGI	$160,000
Vacancy & Collection Loss	- $4,000
Effective Gross Income	$156,000
Allowable Expenses	- $64,000
NOI	$92,000

NOI	÷	Overall Rate	=	Value Estimate
$92,000	÷	0.0630	=	$1,460,000 (Rounded)

The **mortgage-equity capitalization** method, in its simplest form, considers the mortgage and the equity structure proposed by a potential purchaser. That is, the capitalization rate is a function of the demands of a mortgage on potential income and an expected return on equity. To illustrate, consider the following:

Example 1. The property has an eighty percent mortgage at 9.5 percent for twenty-five years. The mortgage is for $80,000 and the owner expects to earn 12.5 percent on the equity. The capitalization rate would be calculated as follows:

A 9.5 percent mortgage for a twenty-five year period requires a return of 10.483 percent per year. The monthly mortgage constant = 9.5 percent interest for twenty-five years (.00873697 x 12).

An eighty percent Mortgage requirement (0.80 x 10.483)	= 8.386 percent.
A twenty percent Equity at 12.5 percent (0.20 x 12.5)	= 2.500 percent.
	10.886 percent.

To this rate must be added the effective tax rate of three percent:

+ 3.000 percent.

The overall rate is: 13.886 percent.

This means that for a property valued at $100,000, it must earn $13,886 per year, or ($100,000 x 0.13886), to satisfy the demands of the mortgage, the expected return on equity, and to cover property taxes. This calculation can be worked in reverse given the income from the property. However, doing that requires some knowledge of the owner's equity status and the terms of the mortgage (information an Assessor generally does not have). Further, an existing mortgage does not necessarily reflect the mortgage conditions of all potential purchasers. For these reasons, this alternative method of deriving a capitalization rate is not applicable to ad valorem property tax appraisals.

Yield Capitalization

Another approach to valuing income-producing properties is to break the process down into parts, as follows:

1. Determine the amount of income potential and the distribution of the income over time (i.e., the shape of the income stream).
2. Establish the investment criteria.
3. Determine the capitalization rate.
4. Complete the investment decision.

When investors consider the potential purchase of income-producing properties, they require considerable information on the quantity, quality, durability and the shape (distribution) of that income over time. The quantity of the income is, as discussed earlier, the amount of rental income a property is capable of earning, minus those costs required to maintain that income. This is the amount that an investor can reasonably expect to receive over a defined period of time. The presence of a high-quality tenant could improve the quality of the income stream and reduce the investor's risk.

The distribution of the potential income over time, or the shape of the income stream, is of paramount concern to an investor in evaluating the ability of that income to achieve long-term investment goals, and therefore justifying the price offered for that property. There are a number of considerations involved in estimating the shape of this projected

income stream. Income from land is generally level (i.e., constant) since the land does not depreciate over time. Therefore, it retains its earning ability into perpetuity. Improvements, on the other hand, lose their ability to earn income as they age and 'wear out' (i.e., depreciate). The following items describe typical income streams normally encountered in evaluating real estate investments:

a. **Level Perpetual.** This income projection is associated with the leasing of land only. A property owner could expect to receive equal periodic payments for as long as the property is leased. This is due to the fact that the land does not depreciate and should be expected to earn income into perpetuity.
b. **Level Terminal.** This income projection assumes that there will be level payments over the economic life of the improvement, and that the income stream will terminate at the time the improvement loses its ability to produce rent.
c. **Declining Terminal.** This income projection assumes a declining income over the life of an improvement, and that the income would be discontinued at the time the improvement loses its ability to produce rent.
d. **Single Future Income Payment.** This income projection assumes a single payment at a future time. This form of income projection is usually associated with one of the terminal projections described above. For example, the single future income payment used in conjunction with a declining terminal income stream would be applicable in the case of a property consisting of land and improvements which would earn a declining income over the economic life of the improvements and would then be sold when the income from the improvements terminates.

Most properties will have income projections similar to one or more of the four examples described above (i.e., they may have a stable income stream). Some properties, however, will have erratic income streams, and none of the typical income projections will be applicable. This last situation is expanded on in the "Discounted Cash Flow Analysis" discussion, starting on page 6.1.55.

The Investment Criteria. With most investments, a prospective investor is primarily concerned with the amount of earnings that an investment will realize. If the investment is to be in federal bonds, it is very simple to determine the amount of earnings the investment will bring. The risk is quite low and there will be a close relationship of income to investment. If the investment is to be in corporate bonds, for which the income may be higher, but somewhat riskier, an investor can analyze the bond market to see what other investors are paying for different bonds.

Likewise, prospective investors in many different categories of income-producing properties can formulate an investment decision by looking directly to the market for similar properties (e.g., if a proposed investment is to be in one or more apartment properties, an investor need only study the incomes and sale prices of similar apartment complexes). As described in the “Direct Capitalization” discussion above, this direct comparison is largely restricted to homogeneous clusters of properties. For other income-producing properties, an investor must consider various other investment criteria. If an investment is to be in stocks, consideration must be given to many factors: how stable are the earnings, how long will the stocks produce the earnings; what will their value be when the stocks are sold? Similarly, many factors must be considered if an investment is to be made in income properties, especially if there is little market consistency and income patterns are varied, as is often the case with leased offices and retail properties. For some categories of properties, the markets are neither stable nor defined, and their income patterns are mixed.

When making decisions in these economic environments, an investor must consider two primary factors. First, an investor must consider the **return on** the original investment (its discount). This is the amount an investor expects to earn from the original investment in the property over the life of the investment. Second, an investor must consider the **return of** the investment (its recapture). Recapture is the provision for returning to an investor a sum of money that is at least equal to the original value of the improvements at the end of a given period of time, usually at the end of the economic

life of the improvements. Investors must decide what the best basis is for determining how much, and for how long, an investment must continue to earn interest to make the investment economically feasible. One of an investor's goals is usually to keep a property for the period of time during which items including depreciation and investment tax credits produce an income tax benefit. As these income tax benefits run out, it may be more profitable for the investor to sell the property and reinvest in another. Investors have a tendency to analyze the value of a property by considering what the market value should be at the end of the investment period. Conversely, ad valorem appraisers are charged with valuing a property as of the lien date of each Valuation Year.

Sinking Fund. For each of the income projections discussed in above, there are alternative methods of allowing for the amounts of "return and discount" and "recapture". For the level income projection(s), an investor may select either the "sinking fund" or the "annuity" method. The sinking fund method assumes:

1. The income will remain constant over time.
2. The return is received in equal periodic payments based on the original investment in the depreciable assets (i.e., the improvements).
3. The recapture is accomplished by periodic payments into a sinking fund, which is invested at a safe rate.

An investor would expect to receive equal periodic payments for the use of the investment (return and discount) plus the return of the investment (recapture). The periodic payments would be sufficient to return the amount of the investment if those payments were invested in a safe rate sinking fund. That sum should be sufficient to at least equal the value of the original investment in an improvement at the end of its economic life.

A sinking fund is (usually) a hypothetical account, which can be used as a provision for the recapture of an asset, and which accumulates interest on a compound basis for the periodic deposits made into the account. Since the amount set aside for recapture

grows due to the periodic deposits and the compound interest earned, the periodic amounts required to recapture an original investment can be reduced. While an actual sinking fund account is seldom used, the recaptured amounts could be used for alternative investments.

Annuity Method. The annuity method, like the sinking fund method, assumes a level income over the economic life of a depreciable asset (an improvement). It assumes that the **return on** an investment in an improvement declines as the value of that improvement decreases over time, while it also assumes that the recapture amount will increase by the amount by which the return (the discount) decreases. Stated another way, an income will be derived from the property in equal periodic amounts. As that portion of the income required to provide the desired **return on** an investment declines while an improvement depreciates, the amount required to recapture the **return of** the investment increases over time by the same amount that the **return on** the investment decreases.

Straight-Line. For properties to which a declining income projection is applicable, an investor may use the straight-line method. This method assumes that the **return on** an investment will decline over the economic life of the improvements, but that the amount required to recapture the original investment in the improvements will be constant, and will be received in equal periodic amounts throughout the economic life of the improvement.

The three methods described above relate to the **return on** (discount) and the **return of** (recapture) an original investment component of the investment decision process. There are several other methods to convert this information into a statement of value, but these three are the most commonly used. If the need arises to utilize any other valuation methods, there are many good textbooks that discuss these techniques in detail.

There are also three **residual techniques** that can be used in the income approach: **(1)** The building residual technique, **(2)** the land residual technique, and **(3)** the property

residual technique. “Residual” refers to the income remaining to the ‘unknown’ part of a property (i.e., the land or an improvement) after all of the requirements for the ‘known’ part has been satisfied. The selection of the proper residual technique depends on the quality of information available and the category of property involved. If a property has an older improvement, but the land value can be reasonably ascertained from sales of comparable land, the building residual technique is most applicable. If the improvement value is known with certainly, but there are no unimproved land sales available, then the land residual technique is most applicable. If however, neither the land value nor the improvement value is reliably known, the property residual technique is most applicable.

As stated above, the **building residual technique** is most applicable when the value of the improvements is not known, but the value of the land can be determined by comparable land sales evidence. This usually occurs when the improvements are old and their replacement cost and depreciation are hard to determine. Since the value of the land is known from the market sales comparison approach, only the value of the improvements must be estimated. The building residual technique first subtracts the income potential of the land from the net income of the property, thereby deriving the income attributed to the improvements. This figure is used to determine the value of the improvements which, when added to the known land value, provides the estimated value of the total property.

The **land residual technique** is most applicable when the value of improvements can be reasonably well documented, but there are no reliable sales of comparable land. The improvements should be relatively new, and they must represent the highest and best use of the land (note that a highest and best use analysis is not typically performed in ad valorem appraisals – statutory law requires the current use of a property be the basis for valuations). This technique first subtracts the income from the improvements from the net income of the total property, thereby deriving the income attributable to the land.

This income is then used to determine the value of the land which, when added to the known improvement's value, provides the estimated value of the total property.

The **property residual technique** is most applicable when the values of neither the land nor the improvements are known with any degree of reliability. However, it does require an estimate of land value at the end of the economic life of the improvements. This technique does not allocate the income between the land and the improvements. Instead, it considers the total property. The potential net income from the total property is used to derive the value of the total property directly. Once the investment criteria developed above have been established, an investor must consider the relationship of income to investment (i.e., what earnings from the investment will make it economically feasible?). When purchasing savings bonds the investment-to-income relationship is known, and is expressed as the interest rate. With income-producing properties, this relationship is expressed as the capitalization (or "cap") rate.

Capitalization Rate. When investing in real estate, the essential parts of an investment decision are the determination of an investor's expectation of the **return on** an investment (the return rate, or discount rate), the **return of** their investment (the recapture rate), and the remaining value that can be expected from the property once the income goal has been realized (i.e., reversion). With the direct capitalization technique discussed earlier these factors were not considered separately. They were extracted from the sales as one factor. Similar to savings bonds, the investment-to-income relationship was readily obtainable.

This was possible because the income characteristics of the subject property and sold comparable properties were highly similar and the direct capitalization rate was stable. When homogeneous income characteristics do not exist, an alternative method of arriving at the capitalization rate, **yield capitalization**, is required. The return rate (i.e., discount rate) reflects the amount an investor expects to earn on an investment considering the interest required on the cash investment in the property (their equity),

the cost of money borrowed to purchase the property (the mortgage), and the risk associated with the quality and durability of the projected income. The first two factors are functions of the money market, and depend on prevailing interest rates paid on comparable investments and the interest rates required to borrow money. The risk component is a subjective factor, which is based primarily on the performance of similar investments. The recapture rate reflects the amount an investor anticipates receiving periodically to recover their investment in the improvements. It is a direct function of the anticipated economic life of the improvements. For example, if an improvement is expected to produce rent for forty years, a recapture rate of 2.5 percent per year is required to achieve total (i.e., one hundred percent) recapture (1.00 ÷ 40 years = 2.5 percent per year). This example is based on the straight-line capitalization method.

In addition to a return on an investment and a return of that investment, an investor must also allow for the payment of property taxes (see the discussion of effective tax rates on page 33). By considering all of these factors, an investor can determine the capitalization rate, or the percent of the investment the investor requires, in periodic payments made to the investor, to make the investment feasible. For example, assume that an investor requires nine percent of an original investment to be returned annually as the **return on** that investment. Further, this investor wants to recover the value of the improvement over forty years at a rate of 2.5 percent of the value of the improvement per year. In addition, the investor will be expected to pay property taxes on the real estate (for which this example assumes a three percent effective tax rate).

These investment requirements equate to the following data:

Return on Investment (Discount)	9.0 percent per year
Return of Investment (Recapture)	2.5 percent per year
Effective Property Tax Rate	3.0 percent per year
Improvement Capitalization Rate	14.5 percent per year

In the earlier discussions on allowable deductions from income, depreciation was not considered to be a proper deduction. Depreciation is now allowed in the capitalization rate by the **recapture** component. As stated earlier, the recapture rate provides for the **return of** the investment over the life of the improvement. Therefore, there is no need for a depreciation allowance. If the property in the example above consisted of land only, the proper capitalization rate would be twelve percent instead of fourteen and one-half percent, because there would be no recapture for the land, as land does not depreciate, and the land's income-producing potential extends into perpetuity. To demonstrate the use of the capitalization rate when considering income-producing land, the following simplified examples are applicable:

Example 2. A parcel of land has a net income of $3,000 per year. The **return on** the investment is expected to be nine percent, and the effective tax rate is three percent. An investor would offer $25,000 [$3,000 ÷ (0.09000 + 0.03000)] to acquire the $3,000 per year rental income. This price would allow the investor to receive the desired return on the investment ($2,250) plus pay the property taxes ($750) from the anticipated rent of $3,000 per year.

Example 3. A parcel of land is offered for sale at $30,000. An investor expects to earn nine percent on the investment, and the property taxes should be three percent of the purchase price. The investor would have to anticipate an annual net income of $3,600 [$30,000 x (0.09000 + 0.03000)] before the investor would invest $30,000. This rent would be required to achieve the investor's anticipated return of $2,700 on the investment annually, plus pay the $900 in property taxes.

If a property consists of an improvement only (for example, an Improvement on Possessory Rights, or an IPR), the capitalization rate would be the same as it was for the land, plus a provision for recapturing the original investment in the improvement. That is, the income potential from the rental of the improvement must provide an

adequate **return on** the investment, the **recapture of** the original investment, and it must cover the property taxes on the improvement. Examples of this are as follows:

Example 4. An improvement earns an annual net rent of $3,000. An investor requires a return of nine percent, a recapture over forty years of 2.5 percent per year, and the taxes should be three percent per year. With these conditions, the investor would offer $20,690 for the income-producing improvement [$3,000 ÷ (0.09000 + 0.02500 + 0.03000)]. This price for the income-producing improvement would provide for both a **return on** the investment, the **return of** the investment, plus it would pay the property taxes.

Example 5. An improvement is offered for $30,000. An investor wants a return of nine percent, a recapture rate of 2.5 percent per year, and an amount for paying property taxes of three percent per year. The annual net income required to meet these conditions is $4,350 [$30,000 x (0.09000 + 0.02500 + 0.03000)].

It should be noted that land earning a $3,000 rent commands a higher price than an improvement earning the same income. This is because at the end of the economic life of the improvement it is fully depreciated, and the owner has been reimbursed for the investment. While the owner may retain ownership of the improvement, its remaining income-generating potential, if any, cannot cover all of the ongoing fixed and (generally increasing) variable costs of maintenance, insurance, property taxes, etc. With land only, there is no depreciation, little (if any) maintenance, etc., and the investor still has the land at the end of the investment period, which remains capable of earning sufficient income to cover all of its expenses and generating a profit.

More typically, if a property consists of both land and improvements, an “overall” capitalization rate is required. If we use the same capitalization components as above (a return of nine percent, a recapture of 2.5 percent, and taxes of three percent), we still need one more factor to derive the “overall” capitalization rate. We must know the approximate relationship of the value of the land and the improvements. This is

necessary since only the improvements require recapture. The following example assumes the use of straight-line capitalization.

Assume an improvement to be eighty percent of the total property's value. The "overall" capitalization rate would be as follows:

Return on (Discount)	9.0 percent.
Return of (Recapture) (0.80 of 2.5)	+ 2.0 percent.
Effective Property Taxes	+ 3.0 percent.
Overall Capitalization Rate	= 14.0 percent.

The application of the above overall capitalization rate can be demonstrated with the following examples:

Example 6. A property is capable of earning a net rent per year of $6,000. Using the investment requirements set forth above, an investor would offer $42,857 [$6,000 ÷ (0.09000 + 0.02000 + 0.03000)]. This price would permit an investor to satisfy the return and recapture requirements and cover the property taxes on the anticipated net income of $6,000 per year.

Example 7. A property is offered for sale for $50,000. Given the investment requirements set forth above, the potential net income must be $7,000 [$50,000 x (0.09000 + 0.02000 + 0.03000)] per year. That amount of net rent is required to meet the investment requirements, pay taxes and support a $50,000 purchase price.

Investment Conclusion. An investor now has the following necessary factors:

1. The estimate of the potential net income of the total property.
2. The estimated income projection over time.
3. The return and recapture method.
4. The capitalization rate required to make the investment economically feasible.

An investor is now in a position to make the investment decision of what price to offer for an income producing property under a number of differing combinations of return and recapture methods and capitalization techniques. For each of the following six examples, the basic facts about a subject property are:

Return (i.e., Discount) Rate	9.0 percent.
Recapture Rate (over 40 years)	2.5 percent.
Effective Tax Rate	3.0 percent.
Net Income per Year	$10,000
Sinking Fund Rate	6.0 percent.

Building Residual Techniques. The following three examples all assume that an appraiser has a reliable estimate of the land value which was developed from the sales of similarly situated parcels. For this reason, only the value of the improvements must be estimated. It is further assumed that the land value is $40,000.

Example 8: Straight-Line Capitalization.

Capitalization Rate:	Land	Improvements		
Return (discount)	0.09000	0.09000		
Recapture		0.02500		
Property taxes	0.03000	0.03000		
Total	0.12000	0.14500		
Net Income			$10,000	
Assumed Value of Land			$40,000	
Income to Land $40,000 x (0.09000 + 0.03000)			$ 4,800	
Income Attributed to Imps. ($10,000 - $4,800)			$ 5,200	
Improvements value ($5,200 ÷ 0.14500)				$35,862
Land value (given above)				$40,000
Total property value				$75,862

Example 9: Sinking Fund Capitalization.

Capitalization Rate:	Land	Improvements		
Return (discount)	0.09000	0.09000		
Recapture (0.06 for 40 years)[4]		0.00646		
Property taxes	0.03000	0.03000		
Total	0.12000	0.12646		
Net Income			$10,000	
Assumed Value of Land			$40,000	
Income to Land $40,000 x (0.09000 + 0.03000)			$ 4,800	
Income Attributed to Imps. ($10,000 - $4,800)			$ 5,200	
Improvements value ($5,200 ÷0.12646)				$41,120
Land value (given above)				$40,000
Total property value				$81,120

Example 10: Annuity Capitalization.

Capitalization Rate:	Land	Improvements		
Return (discount)	0.09000			
Amortized (0.09 for 40 years)[5]		0.09296		
Property taxes	0.03000	0.03000		
Total	0.12000	0.12296		
Net Income			$10,000	
Assumed Value of Land			$40,000	
Income to Land $40,000 x (0.09000 + 0.03000)			$ 4,800	
Income Attributed to Imps. ($10,000 - $4,800)			$ 5,200	
Improvements value ($5,200 ÷0.12646)				$42,290
Land value (given above)				$40,000
Total property value				$82,290

Land Residual Techniques. The next three examples assume that the current market value of the improvements is known, usually from similar recently constructed

[4] See Column 3, “Sinking Fund Factor” in Compound Interest Table.
[5] See Column 6, “Partial Payment” in Compound Interest Table.

improvements. For this reason, only the value of the land must be estimated. It is further assumed that the improvements have a value of $40,000.

Example 11: Straight-Line Capitalization.

Capitalization Rate:	Land	Improvements		
Return (discount)	0.09000	0.09000		
Recapture		0.02500		
Property taxes	0.03000	0.03000		
Total	0.12000	0.14500		
Net Income			$10,000	
Assumed Value of Improvements			$40,000	
Income to Imps. $40,000 x (0.09000 + 0.02500 + 0.03000)			$ 5,800	
Income Attributed to Land ($10,000 - $5,800)			$ 4,200	
Land Value [$4,200 ÷ (0.09000 + 0.03000)]				$35,000
Improvements Value (given above)				$40,000
Total property value				$75,000

Example 12: Sinking Fund Capitalization.

Capitalization Rate:	Land	Improvements		
Return (discount)	0.09000	0.09000		
Recapture (0.06 for 40 years)[6]		0.00646		
Property taxes	0.03000	0.03000		
Total	0.12000	0.12646		
Net Income			$10,000	
Assumed Value of Improvements			$40,000	
Income to Imps. $40,000 x (0.09000 + 0.03000 + 0. 00646)			$ 5,800	
Income Attributed to Land ($10,000 - $5,058)			$ 4,200	
Land Value [$4,200 ÷ (0.09000 + 0.03000)]				$41,183
Improvements Value (given above)				$40,000
Total property value				$81,183

[6] See Column 3, "Sinking Fund Factor" in Compound Interest Table.

Example 13: Annuity Capitalization.

Capitalization Rate:	Land	Improvements		
Return (discount)	0.09000			
Recapture (0.09 for 40 years)[7]		0.09296		
Property taxes	0.03000	0.03000		
Total	0.12000	0.12296		
Net Income			$10,000	
Assumed Value of Improvements			$40,000	
Income to Imps [$40,000 x (0. 09296 + 0.03000)]			$ 4,918	
Income Attributed to Land ($10,000 - $4,918)			$ 5,082	
Land Value $5,082 ÷ (0.09000 + 0.03000)				$42,350
Improvements Value (given above)				$40,000
Total property value				$82,350

Property Residual Techniques. Because of the several assumptions that must be made in utilizing the Property Residual Technique, it is not recommended for use in ad valorem property tax appraisal. If, for some reason, this technique must be used, please refer to either the IAAO textbook, “Property Assessment Valuation, 2nd edition,” page 269, or “Property Appraisal and Assessment Administration,” page 296.

From a review of the preceding six examples, it can be seen that the amount which a potential investor would pay for a property with a $10,000 annual income stream depends on several investment criteria, the return and recapture method selected, and the capitalization technique utilized. The straight-line return and recapture method produces the lowest value of all the variations of these techniques, since that method is normally associated with declining incomes. The sinking fund method at first appears unrealistic, since most investors do not place the funds from “recapture” into an actual account for sinking funds. However, the use of that method produces results that are close to the annuity method, and it is easier to use and explain than the annuity method. Both the sinking fund and the annuity methods require a great deal of insight as to the

[7] See Column 6, "Partial Payment" in Compound Interest Table.

shape of the future income stream and the method of receiving both a return on and the return of the original investment. All three methods are only as reliable as the various assumptions that are required.

As for the various residual techniques, the property residual technique is most applicable to an older area in which both the land and improvement values are unknown. However, certain assumptions must be made that weaken the technique. Because of this weakness, using direct capitalization with an overall capitalization rate is recommended in lieu of using the property residual technique. The building residual technique is preferable when adequate land sale data is available.

It should be noted that the building residual technique, and straight-line capitalization assumptions, are prescribed as a statutory valuation formula by A.R.S. 42-13203 through 42-13205 for use in valuing defined shopping centers.

Direct vs. Yield Capitalization

The most significant differences between the yield capitalization and the direct capitalization techniques are in the amount of detail and the assumptions required. The direct capitalization technique requires only the sale prices of comparable properties and their annual net or gross incomes. From these data either a direct capitalization rate or a gross income multiplier (GIM) is developed. The capitalization rate is based purely on the market and not on the assumed details of the investment decision as utilized in the yield capitalization techniques. Because of its simplistic nature, the direct capitalization technique is restricted to clusters of fairly homogeneous properties, as indicated by their having similar income-to-expense ratios, remaining economic lives, and land-to-building ratios.

Yield capitalization techniques, on the other hand, can be used on most income-generating properties, but they require an appraiser to make a number of very subjective assumptions. Assumptions are required on the shape of the income stream,

the return and recapture criteria, the residual technique to be utilized, and the capitalization rate. Slight variations in any one of these assumptions could significantly alter the final value estimate. A comparison of the yield capitalization technique to the direct capitalization technique is analogous to the comparison of an asking price to a sale price. What do investors want for a return as compared with what they will receive?

Discounted Cash Flow Analysis

In the discussions of the income approach above, income projections have been either constant over time (i.e. stable income) or declining at a fairly constant rate. There are, however, properties whose income-generating performance over time is quite erratic. The erratic nature of the income stream of these properties cannot be addressed by any of the income methods considered above. These situations require special treatment.

This special treatment also employs the concept of “present worth,” which asks the question: How much would you pay today for the right to receive a certain sum of money at the end of a specific period of time? For example, how much would you pay to receive $1,000 at the end of one, two or five years? If money currently earns six percent and there is no risk involved in receiving the $1,000, the present worth table for six percent indicates that for $1,000 to be received at the end of one year, it is currently worth $943 at the start of the year, $890 if deferred for two years, and $747 if deferred for five years. Stated another way; if you invested $943 today at six percent interest it would be worth $1,000 at the end of the year, while $890 invested today would be worth $1,000 at the end of two years, and $747 invested today would be worth $1,000 at the end of five years.

Discounted cash flow analysis requires an estimate of potential net income for each period of time involved. That income is discounted, year by year, to its present worth. The sum of the present worth of each year’s income is the present value of that income stream. The value indicated by a discounted cash flow analysis consists of the present value of the income stream(s) plus the present value of the reversion (i.e., the future

sale price). As a simplified example, consider a property which is expected to have an annual net operating income (NOI) of $15,000 for each of the next five years, and which can be sold for $150,000 at the end of the fifth year. Using a twelve percent discount rate, the present value would be calculated as follows:

Example 14: Discounted Cash Flow

Year	Net Annual Rental		Present Value Factors[8]			Present Value
1	$15,000	x	0.892857	=		$ 13,392.86
2	$15,900	x	0.797194	=	+	$ 12,675.38
3	$16,800	x	0.711780	=	+	$ 11,957.90
4	$17,800	x	0.635518	=	+	$ 11,312.22
5	$18,200	x	0.567427	=	+	$ 10,327.17
Present Value of Income Stream:				=		$ 59,665.53
	Future Sale Price (Reversion)					
5	$150,000	x	0.567427	=	+	$ 85,114.05
			Total	=		$144,779.58

While the discounted cash flow technique requires considerably more calculations and assumptions about a property's future economic performance, it does allow the use of the income approach for properties with variable income projections. These calculations can be made on a monthly, quarterly or mid-year basis, depending on the degree of precision desired and the availability of the required data. However, these factors also make the discounted cash flow technique impractical for use in property tax assessment.

The Income Approach as an Indicator of Market Value

To the extent that a yield capitalization rate reflects the true expectations of buyers and

[8] See Column 4, "Present Worth of 1" in Compound Interest Table.
[9] See Column 4, "Present Worth of 1" in Compound Interest Table.

sellers of income-producing properties, the income approach serves as a good indicator of market value. Care must be exercised to assure that the many assumptions required in this approach are realistic and reflect the current market for the particular categories of properties involved.

With the exception of the gross rent multiplier and direct capitalization, the capitalization techniques developed as shown above can be characterized as yield capitalization, as they derive a capitalization rate by analyzing the expectations of investors, which may or may not be reflective of what is actually occurring in the market.

The Six Compound Interest Functions of One Dollar

Many of the more advanced techniques require the use of factors that can be found in compound interest tables. These tables are normally referred to as “the six functions of 1” (i.e., of one dollar). These functions relate to the six columns in the compound interest tables for various interest rate amounts (from five to fifteen percent) that are available from the International Association of Assessing Officers, or which can be found in books of financial tables. Financial calculators, or a computer, can also be used to calculate the functions in the compound interest tables, as needed. These tables are calculated for various periods of time. In the examples used in this manual, all tables are annual.

Function 1 - The Amount of 1. This table compounds the interest on one dollar as if had been deposited in an account and allowed to accumulate interest for a period of time. If $1.00 is deposited at five percent interest, at the end of one year, the amount available is $1.00 plus the interest for one year at 0.05 percent, equaling $1.05. In the second year, the amount available is $1.05 plus 0.0525 (five percent of $1.05), equaling $1.1025, and so on down the table.

Example 15. Compound Interest Table 1.

Year	Principal	Interest	Total
1	1.00	0.05	1.05
2	1.05	0.05	1.1025
3	1.1025	0.05	1.157625
4	1.15625	0.05	1.215506
5	1.21506	0.05	1.276282

Function 2 - The Amount of 1 per Period. This table compounds interest in a similar manner to Function 1, except that the assumption is that one dollar will be deposited at the end of each period. If $1.00 is deposited at five percent interest at the end of year one, at the end of year two it will be worth $1.05. If another $1.00 is deposited at the end of year two, it is worth $2.15, and so on down the table.

Example 16: Compound Interest Table 2.

Year	Balance	Interest	Subtotal	Deposit	Total
1				$1.00	$1.00
2	$1.00	0.05	$1.050000	$1.00	$2.05
3	$2.05	0.05	$2.152500	$1.00	$3.1525
4	$3.1525	0.05	$3.310125	$1.00	$4.310125
5	$4.310125	0.05	$4.525631	$1.00	$5.525631

Function 3 - Sinking Fund Factor. This table indicates to an investor how much money must be invested to have a given amount available at the end of a period of time. As an example, to have $1,000 available at the end of five years, the amount required is the reciprocal of the amount in Function 2. The amount of 1 per period, or 1 divided by 5.525631, equals 0.180975. This factor, multiplied by $1,000 requires that $180.98 must be deposited each year. To prove this:

Example 17: Compound Interest Table 3.

End of Year	Beginning Balance	Interest	Interest Earned	Annual Deposit	Total
1				$180.98	$ 180.98
2	$180.98	0.05	$ 9.05	$180.98	$ 371.01
3	$371.01	0.05	$18.55	$180.98	$ 570.54
4	$570.54	0.05	$28.53	$180.98	$ 780.05
5	$780.05	0.05	$39.00	$180.98	$1,000.03

Function 4 - Present Worth of 1. This table determines how much money must be deposited today to receive a given amount at some point in the future. The figure is the reciprocal of function 1 (i.e., it is 1 divided by the amount of function 1). To determine the amount of money required to provide $100 five years in the future, divide 1 by 1.276282 (the factor developed in the explanation of function 1, above). This new factor is 0.783526. Multiplying that by 100 equals $78.3526.

Example 18: Compound Interest Table 4

Year	Deposit	Interest	Interest	Total
1	$78.3526	0.05	$3.9176	$ 82.2702
2		0.05	$4.1135	$ 86.3837
3		0.05	$4.3192	$ 90.7029
4		0.05	$4.5351	$ 95.2381
5		0.05	$4.7619	$100.0000

Function 5 - Present Worth of 1 per Period. This table determines the amount of a deposit required today that will provide a given number of equal annual payments at a given interest rate, which is calculated as follows:

Example 19: Compound Interest Table 5.

Year			Amount of One		Present Worth of One		Present Worth of One per Period
1	1.0	÷	1.05			=	0.952381
2	1.0	÷	1.1025	+	0.952381	=	1.859410
3	1.0	÷	1.157625	+	1.859410	=	2.723248
4	1.0	÷	1.215506	+	2.723248	=	3.545951
5	1.0	÷	1.276282	+	3.545951	=	4.329477

For example, to receive a pay-out $100 per year for five years, multiply 4.329477 by 100. This equals a $432.9477 initial deposit amount:

Beginning Account Balance	Interest Rate	Interest	Subtotal	Payout	Ending Account Balance
$432.9477	0.05	$21.6474	$454.5951	$100.00	$354.5951
$354.5951	0.05	$17.7298	$372.3249	$100.00	$272.3249
$272.3249	0.05	$13.6162	$285.9411	$100.00	$185.9411
$185.9411	0.05	$ 9.2971	$195.2382	$100.00	$ 95.2382
$ 95.2382	0.05	$ 4.7619	$100.0001	$100.00	0

Function 6 - Partial Payment. This table is used to calculate the payment required to pay off a loan in a given period of time. In the following example, $1,000 is to be paid off in five annual payments, plus five percent interest. This table is the reciprocal of Table 5, which is the present worth of 1 per period:

Example 20. Compound Interest Table 6.

Year			Present Worth of One per Period		Partial Payment
1	1.0	÷	0.952381	=	1.050000
2	1.0	÷	1.859410	=	0.537805
3	1.0	÷	2.723248	=	0.367209
4	1.0	÷	3.545951	=	0.282012
5	1.0	÷	4.329477	=	0.230975

0.230975 multiplied by $1,000 equals the annual payment of $230.98.

Loan Balance	Interest Rate	Interest	Principal	Balance
$1,000.000	0.05	$50.000	$180.975	$819.025
$819.025	0.05	$40.951	$190.024	$620.001
$620.001	0.05	$31.450	$199.525	$429.476
$429.476	0.05	$21.474	$209.501	$219.975
$219.975	0.05	$11.000	$219.975	0

Summary

There are several different income approach techniques available that will derive an estimate of market value. The most direct methods of deriving a market value are those that use recent market sales, such as the market sales comparison technique and the direct capitalization technique. If market sales are used to develop depreciation factors, or to develop local market adjustment factors, and if land values have been established at market value by use of the sales comparison approach, then the cost or summation approach truly reflects market value. Yield capitalization will reflect market values only if the various assumptions related primarily to the capitalization rate are accurate

expressions of market conditions. The reason there are three generally recognized approaches to value is that not all three of the approaches are applicable to all properties. Raw land and vacant land lend themselves to the sales comparison approach, as there is usually no income attributable to the land. The cost approach is not applicable to vacant land, as the cost is simply the price required to purchase a parcel and the costs (if any) of bringing that parcel to its present state of development. Single-family residential properties lend themselves well to both the market sales comparison and cost approaches. Wherever there are adequate comparable sales, the sales comparison approach is superior to the cost approach (and the income approach is not generally applicable).

All three of the approaches to value are generally applicable to income-producing properties. The preferred method under the income approach depends largely on the quality and quantity of income and sales data that are available. On many properties, such as owner-occupied commercial properties, industrial plants, most rural structures, and one-of-a-kind properties, there are generally inadequate market sales data for the utilization of either the sales comparison or income approaches to value. The cost approach must be considered the primary approach to use in those situations. The cost approach can be applied to all improved properties, while both the income and sales comparison approaches are limited by the availability of income or sales data.