Chapter 11

Investment Analysis and Taxation of Income Properties

The investor must consider many variables when acquiring income properties, among them market factors, occupancy rates, tax influences, the level of risk, the amount of debt financing, and the proper procedures to use when measuring return on investment. Lenders are concerned with many of the same questions because these factors affect the value and marketability of the properties being used as collateral for loans. In addition, lenders are concerned with whether properties they finance will generate enough cash flow to cover the loan payments. This chapter provides the framework for analyzing additional issues addressed in many of the remaining chapters in this text.

Motivations for Investing

We have seen that there are many different categories of income property. We now consider why investors and lenders choose investments in one or more of these properties. We first consider the equity investor. The term **equity** refers to funds invested by an "owner," or the person acquiring the property. The particular form of ownership could be any of the freehold estates discussed in Chapter 2. That is, equity funds could be invested in a fee simple estate, a leased fee estate, a leasehold estate, and so forth. We contrast equity funds with debt, which is provided by a lender with the real estate used as collateral for the loan as discussed in Chapter 2.

The following four benefits, discussed in more detail below, motivate investors to make equity investments in income properties:

1. Rate of return.
2. Price appreciation.
3. Diversification.
4. Tax benefits.

First, investors anticipate that market demand for space in the property will be sufficient to produce net income after collecting rents and paying operating expenses. This income constitutes part of an investor's return (before considering taxes and financing costs).

Second, the investor anticipates selling properties after holding them for some period of time. (A discussion regarding how long a property will be held is discussed in Chapter 14.) Investors often expect prices to rise over the holding period, particularly in an inflationary environment. Thus, any price increase also contributes to an investor's return.

A third reason for investing in real estate is to achieve diversification. By this we mean that most investors want to hold a variety of different types of investments such as stocks, bonds, money market funds, and real estate.

A final reason for investing in real estate, which may be more important to some investors than others, is the preferential tax benefits that may result. Because of favorable tax treatment of real estate, historically investors have paid little or no taxes on returns from real estate investments for many years. Although many of these favorable tax benefits have been eliminated over the years, an understanding of real estate tax law is still important. Investors must be able to understand changes in such laws and interpret their impact on rents and real estate values. As tax laws change, investor decisions regarding purchase prices, how much financing should be used, and when to sell the property are also affected.

Real Estate Market Characteristics and Investment Strategies

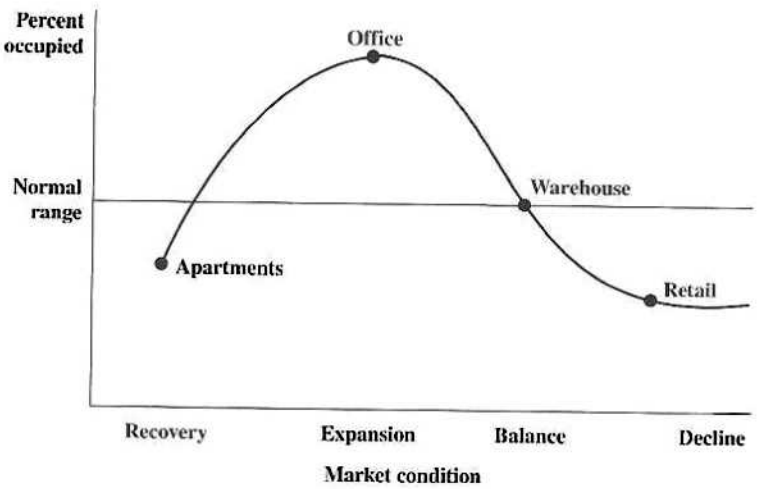
Based on our discussion of economic base analysis and local supply and demand analysis in previous chapters, it should be evident that expected market conditions are important when making estimates of future cash flows. For example, if supply and demand for a given property type are considered to be out of balance and these conditions are expected to persist, the effects on vacancies and rents should be taken into account in forecasts of cash flows. If done properly, estimates of value and investment returns will reflect these expectations. What follows is a description of (1) the cyclical nature of the real estate market and (2) the various *investment styles* that are widely used in all segments of the investment community (stocks, bonds, real estate, etc.). As the reader will come to realize, descriptions used to identify these "styles of investing" usually correspond to some underlying expectations regarding market conditions. We *do not advocate* any one or any combination of such investment styles. Nonetheless, these terms and descriptions are widely used by investment professionals to help classify and describe conditions in investment markets, and the reader should be aware of what they are.

The Real Estate Cycle

It may be useful at this point to discuss the **real estate cycle,** that is, the cyclical nature of the real estate industry, as background material for the more specific investment styles and strategies we will discuss. Some underlying facts regarding the real estate industry are: (1) it is a very large market, in terms of both the number of properties and square footage, (2) it is highly competitive, and (3) ownership is highly fragmented, that is, no one owner or developer controls a significant share of the real estate market in major cities in the United States.

It is also a fact that when local real estate owners and investors sense that vacancy rates are declining and rents are rising, it generally implies that the amount of leasable space is also declining. As a result, more development may be feasible. Consequently, developers begin to conduct highest and best use studies for specific sites and also analyze markets to determine if additional space, if developed, can be leased profitably. Because many competing developers may sense this opportunity simultaneously, they may all begin to obtain financing and develop at once in order to satisfy the demand. Even though there may be a definite need for additional space, the potential for overdevelopment will exist as each developer rushes to deliver additional space to the market before competitors. There is no way to determine exactly how much space should be developed because the depth and extent of demand are difficult to predict. As a result, the real estate industry is sometimes

EXHIBIT 11–1
The "Real Estate Cycle"



said to be prone to periodic *cycles* of overdevelopment. Because of the highly competitive nature of the industry and the difficulty in forecasting demand, there are certain times when excess supply is unintentionally produced, thereby increasing vacancy rates, reducing rents, and causing volatility in property values.

The cyclical nature of this market pattern is shown in Exhibit 11–1, which shows a *hypothetical cycle* for all property types relative to a normal level of occupancy for each property type. All points above the normal occupancy range for each property type indicate a condition of high occupancy and rising rents. This is a condition when further development is likely. All areas below the normal range indicate a condition of low occupancy and the potential for declining rents, a condition not suitable for development.[1] To illustrate, based on the pattern shown in Exhibit 11–1, apartment properties are in a recovery phase of the cycle after experiencing a condition of either excess supply or lack of demand. As implied in the exhibit, this property class is expected to continue to recover as the occupancy rate improves and demand increases relative to supply.

On the other hand, office properties are shown to be in a condition of high occupancy due to either excess demand or a shortage of rentable space. This market imbalance is expected to result in rising occupancy and higher rents. Therefore, this market segment may be expected to undergo future development. Warehouse properties appear to be in a well-balanced condition. No material change in occupancy or rents is expected, and as a result, no unexpected amount of development is likely. Retail properties, however, are in a declining occupancy phase of the cycle due to either an excessive amount of space for lease or lack of demand. The graph also indicates that retail occupancy is expected to decline further.

In summary, Exhibit 11–1 is intended to provide a framework of the supply/demand balance for each property type at one point in time. Based on the current stage in this cycle, investors considering investing in apartments should anticipate a period of vacancies and soft rents in cash flow projections even though this market is in recovery. Office property investors should expect to enjoy a period of low vacancies and higher-than-normal rents. However, these investors should also expect more office development and, therefore, competition that will eventually result in rents, occupancies, and cash flows trending back to normal levels. Warehouse investors should not expect material changes in vacancies or rents. Retail

[1] It should not be inferred from this exhibit that the normal level of occupancy shown in the graph is exactly the same for each property. This is a conceptual exhibit and is intended to depict general market conditions.

property investors, on the other hand, should expect deteriorating conditions to continue and should forecast a continuing decline and an eventual turning point in cash flow forecasts. The time period associated with the cycle in Exhibit 11–1 is very difficult to forecast. It may be expected to exist only for a short period and must be continuously reevaluated (1) as new construction is being completed or (2) as the market experiences an unanticipated surge in demand for space. While the illustration in Exhibit 11–1 is very simplistic, it does serve as a starting point for investors in understanding the nature of the supply/demand balance by property type and should help the reader understand the general strategies that follow.

Investment Strategies

Thus far, we have approached the subject of pricing and investing in properties by stressing that investors should carefully make forecasts of future cash flows given the expected market supply and demand and capital market conditions. This section contains a summary of some strategies or styles that are followed by real estate investors and portfolio managers. These styles are chosen with the intent of realizing superior risk-adjusted investment performance. Think about these styles in conjunction with the discussion of the real estate cycle and formulate a critique of each approach. Exhibit 11–2 provides you with a general perspective on real estate market cycles and some specific investment strategies. It should be obvious that many of these strategies overlap and may include combinations of one or more strategies. For example, an investor may combine a sector strategy with a timing strategy in that sector. Nevertheless, becoming familiar with these strategies may be helpful in understanding much of the industry terminology that is used when describing the current state of a real estate market and the motivations of those seeking real estate investments.

EXHIBIT 11–2
Investment Styles Used by Real Estate Investors

I. General Investment Strategies

A. Core Strategy

This style is based on a goal of acquiring existing, seasoned, relatively low-risk properties that are at least 80 percent leased to tenants with low credit risk. These properties may also be acquired as a foundation for building a larger portfolio. The goal is to realize a relatively stable cash flow with returns that are competitive with comparable properties. No major change in the operation of the property or major capital improvements would be expected.

B. Core "Plus" Strategy

This strategy combines core investment with a strategy to make minor changes in the management of the property with a releasing program or by making very limited and specific minor capital improvements. These latter changes tend to be very specific and are targeted toward increasing rents and outperforming competing properties in the same submarket. For example, this strategy could apply to acquiring a "B" class property in an "A" class location, then trying to increase rents and value.

C. Value Added Strategy

This strategy is frequently used to focus on some aspect of properties that are not being optimized. It could involve renovation of an existing property to achieve higher rents (e.g. adding a restaurant, lobby, elevators, work-out/recreation space). Re-tenanting a building to achieve more prestigious, compatible businesses and providing more services. It could involve refinancing or using more leverage as value is created after renovation and/or re-tenanting is completed.

D. Opportunistic Investing

This strategy involves acquiring properties from investors in financial difficulty or properties needing renovation, upgrading, or repositioning. The success of this investment plan may be dependent on the ability to purchase properties at a discount and understanding of the

EXHIBIT 11–2
Continued

opportunity and how to upgrade, modify, or perhaps reposition the property (e.g., from office use to retail use). The success of such an investment may also be dependent on an exit strategy such as market acceptance of the repositioned assets and the ability of buyers to obtain financing to purchase such assets.

This strategy could involve the acquisition of raw land, design of a building, and then a leasing program to reach stable occupancy. By embarking on this riskier strategy, investors believe that more value creation may occur through development, design, leasing, and so forth. Superior investment returns would be earned as compared with investing in existing properties.

II. Specialized Strategies

A. Property Sector Investing

The **sector investing** style is based on the belief that over the long term, based on economic and demographic research, one *property type* will outperform other property sectors. For example, if research shows that prospects for the office sector are excellent and that this sector will outperform the retail, apartment, and warehouse property sectors over the long term, then an investor would specialize in office properties as a preferred sector investment. After the sector is chosen, then, based on market research, specific properties in specific cities and locations would be acquired. (This style is analogous to mutual funds that are created to invest only in stocks in specific industry sectors, such as the computer industry, energy, and health care companies.)

B. Contrarian Investing

The **contrarian investing** strategy is based on the premise that some major economic, technological, or other event will make the investment outlook for a given property type poor and "out of favor" among investors. Contrarians believe that investors tend to overreact to negative news and tend to oversell out-of-favor properties. For example, investors may believe that shopping on the Internet may have a very negative effect on retail properties; other investors may believe that outsourcing to overseas manufacturers may reduce the demand for industrial warehouse properties in the United States. If the majority of investors believe that these investments will perform poorly and sell them, a contrarian may wait until these properties become available at very low prices, and then *purchase* them with the expectation that after other investors realize that this property sector has been oversold, a price recovery will occur.

C. Market Timing

The **market timing** strategy is based on the belief that with an understanding of the stage of each property type in the real estate cycle and future economic conditions, some investors have the ability to predict when to buy or sell properties. For example, in Exhibit 11–1, if investors believe that occupancy and rents will definitely improve and that the apartment market has definitely passed the bottom of its cycle and is in a recovery phase, then apartments would become a target investment for a "market timer." Similarly, if further decline is expected in the retail property sector in a given market *because of excess supply,* a market timer may attempt to "time or wait" to enter this market when it appears the excess supply of space is about to be eliminated, and then acquire properties in the hope of realizing a profit as market prices cycle upward. (Note that this strategy may be different from that of contrarians, who tend to respond to external events such as e-commerce, while timers tend to emphasize current supply/demand or cyclical conditions in their evaluation of property markets.) Many market timers also believe that they should sell when a specific property type reaches a cyclical peak and buy a different property type in a *different* phase of the cycle. This variant of timing is sometimes referred to as a property sector *rotation strategy.*

D. Investing for Future Growth

The **growth investing** strategy is based on "discovering," through research, those property types and markets that are likely to experience significant or above-average *appreciation in value.* Investors in these properties believe that economic conditions favor demand for specific property types in specific growth markets. This investment style is heavily dependent

EXHIBIT 11–2
Continued

on the value of market research and the ability to understand changes in the economic environment/technology, and its effects on all real estate sectors. For example, growth in e-commerce and technology may be expected to *favor* warehouse properties in specific strategic geographic locations. A growth investor would search those strategic locations to invest in warehouse properties. These properties would be purchased with the expectation that as more investors discover these markets and properties, they will make investments and drive prices up, thereby producing superior appreciation in property values. Investors using the strategy should expect to bear more risk than average as these markets are apt to be more volatile as they expand and contract in concert with the industries that are driving the demand for space. Other examples may include seniors housing, data centers, medical office properties, etc.

E. Value Investing
The value investing strategy is based more on a tried-and-true performance approach where research is directed toward finding those properties that have been "overlooked" by investors. Using careful research efforts, value investors try to identify properties with the ability to produce greater-than-expected income and appreciation. For example, investors may prefer to invest in office properties that are located in central business districts and leased on a long-term basis to many large corporate tenants. In this case, rental income is more assured as tenants are large tenants with good credit histories. Because many leases may be about ready to expire, the ability of landlords to increase rents may be good. In trying to execute this strategy, investors may stress market inefficiencies attempt to focus on such properties that have been overlooked by other investors and, therefore, appear to be undervalued.

F. Investing in "Trophy" or "Blue Chip" Properties
This strategy is based on a blue chip approach to investing; that is, only very visible, well-located properties (trophy properties) should be the targets for acquisition. While similar to the value investing strategy discussed above, investors in trophy assets believe that properties with some unique historical, architectural, or locational attribute (e.g., Empire State Building, Rockefeller Center, Transamerica Tower, Mall of America, Watergate Apartments) will prove to be excellent investments for the long term.

G. Strategy as to Size of Property
This strategy is based on a preference for a subsector within a property type because investor /owners believe that they can better understand the operation of tenant-users and, therefore, better understand the demand for space in that subsector. As a result, such property owners tend to specialize in one property sector believing that it may be more cost-effective to lease and manage that property type. For example, an investor/owner may choose to invest *only* in neighborhood or community size retail shopping centers and not invest in larger regional malls. Or, an investor may prefer to invest in small, low-rise suburban office buildings rather than high-rise buildings located in central cities. They believe that a better understanding of these property subsectors and the tenants in these market sectors will be more profitable than would be the case if they invested in larger, more complicated, properties.

H. Strategy as to Tenants (single vs multi-tenanted)
This strategy is based on a preference for properties leased to multiple tenants or leased to a single or very few tenants. In the former case, owners may prefer to take the risk of higher tenant turnover because the ability to adjust rents to market levels more frequently is also greater. On the other hand, many investors may prefer properties that are leased to single tenants. These properties may be less risky because of low tenant turnover and the creditworthiness of tenants. These properties may be preferred even though they may not offer the opportunity for frequent adjustment in rents. Sale-leaseback investments also may be included in this more specialized strategy.

EXHIBIT 11–2
Concluded

I. Arbitrage Investing

The arbitrage investing strategy is based on the ability of investors to recognize differences in prices that buyers are willing to pay for the same real estate investments in different markets. For example, this strategy has been used by investors who buy properties directly in *private* market transactions and then earn a profit by creating a publicly traded entity, such as an REIT, and issuing stock to the public. In this case, positive arbitrage profits are realized when the total market value of the REIT stock sold to the public exceeds the acquisition cost of the individual properties plus the cost of issuing stock. This strategy may also be reversed by purchasing all shares of a REIT and taking it private, and then selling properties to private investors at higher prices than reflected in share prices of the REIT.

J. Turnaround/Special Situation/Liquidation/Spin Offs

Turnaround investing strategies are generally based on the belief that successful investments can be made by investors who see opportunities by changing or modifying the use of existing properties. For example, investors may

1. Acquire underperforming or undermanaged or distressed properties. After a period of more intensive leasing, renovation, and property management, these properties can be sold such that the total amount received when all properties are sold exceeds the initial total cost.
2. Acquire "real estate rich" firms that own an extensive amount of real estate in their business. These firms may not realize that the market value of their real estate is not fully reflected in the value of their business operation. In this case, investors realize that the value of the business and the value of the real estate are separable. Consequently, a gain may be earned by acquiring the firm and then selling its real estate. The necessary space to run the business could then be leased back to the business operator. If successful, the value of the real estate and the value of the business after separation the property ownership and operations would be greater than the previously combined entity.

Market Analysis

Investors and appraisers perform a **market analysis** to evaluate the supply and demand for the type of property that they are evaluating as an investment. The demand for space comes from potential tenants who desire to use the space for their business. The supply of space comes from investors who have purchased or developed buildings and are willing to make that space available for rent. This is often referred to as the *space market*, as discussed previously in Chapter 9.

In Chapter 9, we discussed the different drivers of the demand for space for different property types. To illustrate market analysis, we will consider the market for office space in a hypothetical city. The key driver for office space comes from employment by companies that use a high proportion of office space, such as those in the finance, insurance, and real estate industries, as well as other service industries (e.g., lawyers, accountants, engineers, etc.). Data from the U.S. Bureau of Labor Statistics (*www.data.bls.gov*) are typically used to determine historical trends in office employment.

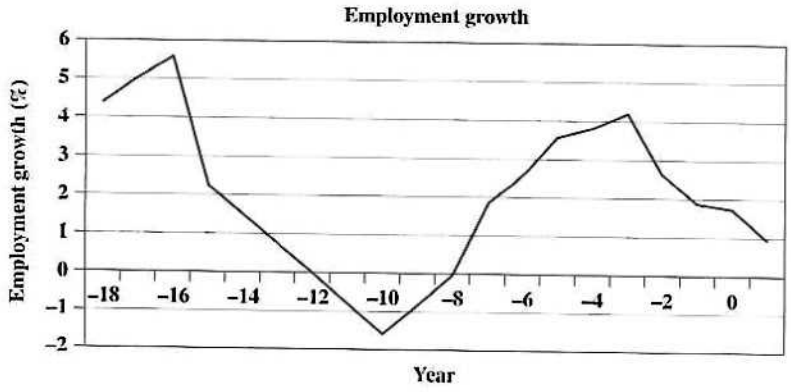
Exhibit 11–3 shows the historical employment in the office sector for a hypothetical city for the past 20 years, including the current year (0), which we assume is just ending. We see that the employment growth rate (in the last column) has varied over time, as typically happens due to the business cycle. Employment growth was strong in the early years and then slowed, becoming negative for several years due to a recession. It has been improving since then, although employment growth for the current year (0) appears to be trending downward.

EXHIBIT 11–3
Historical Office Employment

End Year	Beginning of Year Office Employment	Change in Office Employment	End of Year Office Employment	Change in Employment
–19	22,800	1,000	23,800	4.39%
–18	23,800	1,200	25,000	5.04
–17	25,000	1,400	26,400	5.60
–16	26,400	600	27,000	2.27
–15	27,000	408	27,408	1.51
–14	27,408	208	27,616	0.76
–13	27,616	0	27,616	0.00
–12	27,616	–216	27,401	–0.78
–11	27,401	–435	26,966	–1.59
–10	26,966	–222	26,744	–0.82
–9	26,744	0	26,744	0.00
–8	26,744	500	27,244	1.87
–7	27,244	700	27,944	2.57
–6	27,944	1,000	28,944	3.58
–5	28,944	1,100	30,044	3.80
–4	30,044	1,250	31,294	4.16
–3	31,294	816	32,110	2.61
–2	32,110	600	32,710	1.87
–1	32,710	560	33,270	1.71
0	33,270	306	33,576	0.92

Exhibit 11–4 graphs the historic employment growth rate. As employment growth increases, the demand for space increases and vice versa. Businesses typically use a certain amount of **space** (square feet) **per employee.** For example, historically the amount of office space per employee tends to average about 250 square feet.[2] Thus, for each additional office employee, there will be a need for 250 additional square feet of office space. The number of square feet per employee may vary depending on whether the property is a high-rise downtown building, a suburban office building, and so on.

EXHIBIT 11–4
Historic Employment Growth Rate



[2] Given advances in electronic/communication technology, this average has probably declined as less physical space is required per employee "on site." Tenants may now rely more on data centers, "cloud computing," and other technologies, which reduce the amount of square footage per employee required in some buildings. An increase in demand for alternative structures which "house" these technologies is now occurring in more remote locations. These properties typically make space available at a lower rent and, therefore, lower costs to users.

EXHIBIT 11–5
Occupied Office Space

End Year	Beginning of Year Occupied Space (sf)	Absorption (sf)	End of Year Occupied Space (sf)
−19	5,700,000	250,000	5,950,000
−18	5,950,000	300,000	6,250,000
−17	6,250,000	350,000	6,600,000
−16	6,600,000	150,000	6,750,000
−15	6,750,000	−35,000	6,715,000
−14	6,715,000	−87,041	6,627,959
−13	6,627,959	−138,082	6,489,877
−12	6,489,877	−132,849	6,357,027
−11	6,357,027	−154,802	6,202,225
−10	6,202,225	−184,831	6,017,394
−9	6,017,394	0	6,017,394
−8	6,017,394	248,720	6,266,114
−7	6,266,114	300,720	6,566,834
−6	6,566,834	235,000	6,801,834
−5	6,801,834	408,720	7,210,554
−4	7,210,554	300,000	7,510,554
−3	7,510,554	356,470	7,867,024
−2	7,867,024	310,552	8,177,575
−1	8,177,575	140,000	8,317,575
0	8,317,575	−91,352	8,226,224

Exhibit 11–5 shows the historical amount of office space occupied in our hypothetical city. For larger cities in the United States, data such as these are usually available from organizations such as the Building Owners and Managers Association (BOMA) or large real estate brokerage companies.

The term *absorption* refers to the amount of space that was leased by tenants for the year, that is, "absorbed" by the market. Note that in some years the absorption was negative, indicating that less space was being occupied at the end of the year than at the beginning of the year. This often happens during the contraction phase of the business cycle, when companies are reducing the number of employees.

If we divide the total amount of space that was occupied at the end of each year by the number of office employees working at the end of the year, we can determine what the historical usage of space per employee was for each year. Exhibit 11–6 shows the results.

From Exhibit 11–6 we see that the amount of space per employee does vary over the business cycle. As the economy weakens, businesses tend to reduce the amount of space per employee in order to save rent and reduce operating costs. When the economy gets stronger, businesses tend to increase the number of employees and provide more space per employee. This may be the result of adding more computers and equipment so as to be competitive with other employers. This is important when attempting to forecast the amount of office space needed in the future, as we will consider later in this section.

The term *net absorption* is sometimes used to describe the amount of absorption less the amount of new space supplied to the market. Supply of space is covered in the next section.

Supply of Space

We now consider the supply of office space that is available for occupancy in the market. Exhibit 11–7 shows the historical inventory of space available in the market. This includes space that has been added through new construction and space that has been subtracted due to the demolition of obsolete buildings that were no longer the highest and best use of the site.

EXHIBIT 11–6
Space per Employee

End Year	End of Year Occupied Space (sq. ft.)	End of Year Office Employment	End of Year Space per Employee (sq. ft.)
−19	5,950,000	23,800	250
−18	6,250,000	25,000	250
−17	6,600,000	26,400	250
−16	6,750,000	27,000	250
−15	6,715,000	27,408	245
−14	6,627,959	27,616	240
−13	6,489,877	27,616	235
−12	6,357,027	27,401	232
−11	6,202,225	26,966	230
−10	6,017,394	26,744	225
−9	6,017,394	26,744	225
−8	6,266,114	27,244	230
−7	6,566,834	27,944	235
−6	6,801,834	28,944	235
−5	7,210,554	30,044	240
−4	7,510,554	31,294	240
−3	7,867,024	32,110	245
−2	8,177,575	32,710	250
−1	8,317,575	33,270	250
0	8,226,224	33,576	245

To this point, we have determined the annual amount of space occupied, or demand for space (Exhibit 11–6) as well as the existing inventory of space, or supply (Exhibit 11–7). Using these two data series we can calculate the amount of vacant space in the market and the vacancy rate. This is shown in Exhibit 11–8.

EXHIBIT 11–7
Supply of Office Space

End Year	Beginning of Year Office Supply	New Construction	Demolition	End of Year Office Supply
−19	6,500,000	400,000	0	6,900,000
−18	6,900,000	300,000	0	7,200,000
−17	7,200,000	100,000	0	7,300,000
−16	7,300,000	50,000	0	7,350,000
−15	7,350,000	0	0	7,350,000
−14	7,350,000	0	0	7,350,000
−13	7,350,000	25,000	20,000	7,355,000
−12	7,355,000	75,000	0	7,430,000
−11	7,430,000	50,000	0	7,480,000
−10	7,480,000	50,000	0	7,530,000
−9	7,530,000	100,000	0	7,630,000
−8	7,630,000	200,000	0	7,830,000
−7	7,830,000	300,000	0	8,130,000
−6	8,130,000	400,000	50,000	8,480,000
−5	8,480,000	300,000	0	8,780,000
−4	8,780,000	250,000	0	9,030,000
−3	9,030,000	100,000	0	9,130,000
−2	9,130,000	100,000	0	9,230,000
−1	9,230,000	50,000	0	9,280,000
0	9,280,000	0	0	9,280,000

EXHIBIT 11–8
Historic Occupancy and Vacancy Rates

End Year	End of Year Occupied Space	End of Year Office Supply	End of Year Occupancy Rate	End of Year Vacancy Rate
–19	5,950,000	6,900,000	86.23%	13.77%
–18	6,250,000	7,200,000	86.81	13.19
–17	6,600,000	7,300,000	90.41	9.59
–16	6,750,000	7,350,000	91.84	8.16
–15	6,715,000	7,350,000	91.36	8.64
–14	6,627,959	7,350,000	90.18	9.82
–13	6,489,877	7,355,000	88.24	11.76
–12	6,357,027	7,430,000	85.56	14.44
–11	6,202,225	7,480,000	82.92	17.08
–10	6,017,394	7,530,000	79.91	20.09
–9	6,017,394	7,630,000	78.86	21.14
–8	6,266,114	7,830,000	80.03	19.97
–7	6,566,834	8,130,000	80.77	19.23
–6	6,801,834	8,480,000	80.21	19.79
–5	7,210,554	8,780,000	82.12	17.88
–4	7,510,554	9,030,000	83.17	16.83
–3	7,867,024	9,130,000	86.17	13.83
–2	8,177,575	9,230,000	88.60	11.40
–1	8,317,575	9,280,000	89.63	10.37
0	8,226,224	9,280,000	88.64	11.36

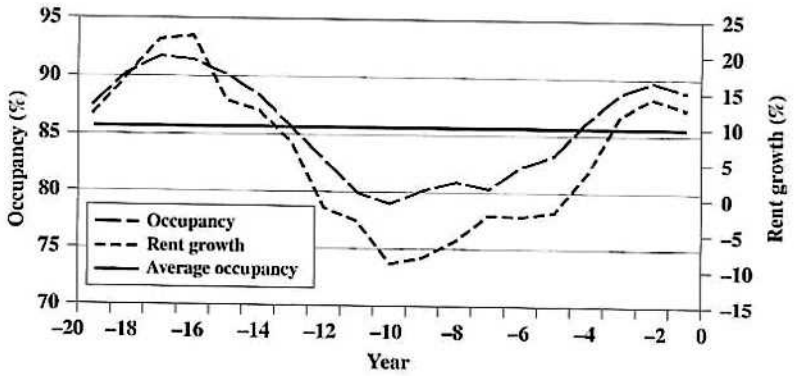
Market Rents

Now that we have seen how supply, demand, and the occupancy (or vacancy) rates have changed over time, we can relate these changes to rental rates over the same time period. Exhibit 11–9 shows the market rent trends and occupancy rates. We can see that rental rates and the growth in rents appear to be highly correlated with occupancy rates. Exhibit 11–10

EXHIBIT 11–9
Market Rent Trends and Occupancy Rates

End Year	End of Year Occupancy Rate	Rent	Rental Growth
–19	86.23%	$ 4.76	—
–18	86.81	5.38	13.12%
–17	90.41	6.31	17.16
–16	91.84	7.70	22.10
–15	91.36	9.44	22.55
–14	90.18	10.74	13.82
–13	88.24	12.07	12.31
–12	85.56	13.02	7.87
–11	82.92	12.84	–1.37
–10	79.91	12.43	–3.15
–9	78.86	11.29	–9.20
–8	80.03	10.33	–8.50
–7	80.77	9.72	–5.92
–6	80.21	9.48	–2.46
–5	82.12	9.22	–2.70
–4	83.17	9.03	–2.09
–3	86.17	9.33	3.28
–2	88.60	10.40	11.51
–1	89.63	11.86	14.00
0	88.64	13.33	12.45

EXHIBIT 11–10
Historic Market Rent Growth and Occupancy Rates



illustrates this graphically by showing both the occupancy rate and rental growth over time. The average occupancy for the past 20 years is also shown. We can see how rental growth is higher as occupancy is above average and lower, sometimes even negative, when occupancy is below average. This is an example of the real estate cycle discussed at the beginning of the chapter. As noted, different property types and different markets may be at different points in their cycle at any given point in time. Therefore, this type of analysis is usually done for a particular property type and for a given market or submarket (e.g., a suburban office in Chicago).

Forecasting Supply, Demand, Market Rents, and Occupancy

Thus far, we have considered only historical relationships. Of course, what we are really interested in is what the *future* supply and demand will be for this market and how it might impact market rents and vacancy rates.

We have previously discussed how rent growth is highly correlated to occupancy rates. Occupancy depends on the demand for space from office employment coupled with the supply of space in existing buildings from new construction, less demolitions. Although market forecasting can be quite challenging, we must estimate demand based on expected employment growth for the foreseeable future and supply as the expected amount of new space likely to be added to the market. We also must consider whether any changes to the amount of space per employee are likely.

To help with this analysis, many economic consulting firms provide projections of employment growth and other economic data at the metropolitan level. (One example is *www.economy.com.*) Knowing where the property type is in its market cycle (e.g., current occupancy relative to the average) may also be helpful.

To illustrate, in Exhibit 11–11 we present a forecast of office employment and space per employee. Exhibit 11–12 shows expected new supply as well as projected occupancy rates

EXHIBIT 11–11
Forecast of Employment and Space per Employee

Year	Beginning of Year Office Employment	Change in Employment	End of Year Office Employment	Change in Employment	End of Year Space per Employee (sq. ft.)
1	33,576	100	33,676	0.30%	245
2	33,676	500	34,176	1.48	240
3	34,176	1,000	35,176	2.93	235
4	35,176	500	35,676	1.42	240
5	35,676	400	36,076	1.12	245
6	36,076	300	36,376	0.83	245
7	36,376	200	36,576	0.55	245
8	36,576	200	36,776	0.55	250
9	36,776	100	36,876	0.27	250
10	36,876	100	36,976	0.27	250

EXHIBIT 11–12
Forecast of Supply, Absorption, and Occupancy Rates

Year	Beginning of Year Office Supply	New Construction	End of Year Office Supply	Beginning of Year Occupied Space	Absorption	End of Year Occupied Space	End of Year Occupancy Rate (%)
1	9,280,000	0	9,280,000	8,226,224	24,500	8,250,724	88.91%
2	9,280,000	0	9,280,000	8,250,724	−48,382	8,202,342	88.39
3	9,280,000	50,000	9,330,000	8,202,342	64,118	8,266,460	88.60
4	9,330,000	400,000	9,730,000	8,266,460	295,882	8,562,342	88.00
5	9,730,000	500,000	10,230,000	8,562,342	276,382	8,838,724	86.40
6	10,230,000	400,000	10,630,000	8,838,724	73,500	8,912,224	83.84
7	10,630,000	200,000	10,830,000	8,912,224	49,000	8,961,224	82.74
8	10,830,000	200,000	11,030,000	8,961,224	232,882	9,194,106	83.36
9	11,030,000	200,000	11,230,000	9,194,106	25,000	9,219,106	82.09
10	11,230,000	200,000	11,430,000	9,219,106	25,000	9,244,106	80.88

based on the employment projections and space per employee. Estimates of new supply tend to come from talking to local developers, knowing what building permits have been issued, and knowing the amount of construction that typically takes place during different stages of the real estate cycle. These forecasts are for illustrative purposes only. As can be seen in Exhibit 11–11, employment increases each year, but the growth is very low after the first three years, suggesting that there will not be much employment growth in this area over the next 10 years. As a result, there will be little growth in the demand for office space.

We can use the historical relationship between rental growth and occupancy, combined with our projection of occupancy, to estimate rental growth. In Exhibit 11–13, we have plotted rental growth versus occupancy rates using Excel. We also have added a trend line to the chart, along with the equation for the trend line (an option in Excel). The same trend line would result from a regression of rental growth versus occupancy rates. Based on this analysis, we see that rental growth could be estimated as 2.2718 × occupancy − 1.8831. Therefore, if occupancy increases by 100 basis points, then rental growth is likely to increase by about 227 basis points. This example is intended only as an illustration of one possible way of estimating rental growth. Forecasting can be an art as well as a science. The fact that the future cannot be known with certainty is one element of the risk that must be considered when selecting an appropriate discount rate to value the property.

That said, using the approach described above, we project the rental growth rates and the rents shown in Exhibit 11–14. Although we may not assume that rents will be exactly as shown in Exhibit 11–14, this provides some guidance as to a reasonable rental rate projection. For example, the average rent growth for the next 10 years is estimated to be about

EXHIBIT 11–13
Rental Growth versus Occupancy Rates

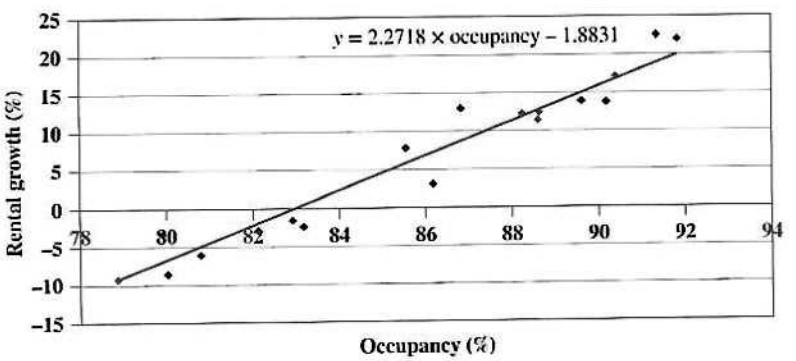


EXHIBIT 11–14
Rent Forecast

Year	End of Year Occupancy Rate	Predicted Rent Growth	Rent
1	88.91%	13.67%	$15.16
2	88.39	12.49	17.05
3	88.60	12.97	19.26
4	88.00	11.61	21.50
5	86.40	7.97	23.21
6	83.84	2.16	23.71
7	82.74	−0.33	23.63
8	83.36	1.06	23.88
9	82.09	−1.81	23.45
10	80.88	−4.58	22.38

5½ per year. Although we could simply forecast rents to grow at this rate over the next 10 years, this ignores the fact that we are projecting higher rental growth during the first five years than in the latter five years. Similarly, we have some idea as to what the occupancy (or vacancy) rate will be in the market and can use that as a basis for what might be the vacancy rate for a new project that we might develop or for what might happen when leases expire and need to be renewed in the future on an existing project.

In the next section, we will draw upon the analysis in this section to discuss forecasting cash flows for a particular office building.

Making Investments: Projecting Cash Flows

We will now look more closely at how investors and lenders project expected cash flows when they consider investing in income-producing properties. This will be followed by a discussion of various performance measures used to determine the attractiveness of a particular property.

Office Building Example

To illustrate how to make a projection of income, we consider the possible purchase of an office building by an investor for $8.5 million. Construction of the Monument Office Building was completed two years ago. The lead tenant is a bank that signed a five-year lease, which started when the building was completed two years ago. A law firm signed a five-year lease one year ago and a mortgage broker just signed a five-year lease on the remaining space. A summary of the existing leases is shown below.

Summary Lease Information—Monument Office Building

Tenant	Square Feet	Rent (per square foot)	Base Rent	Remaining Lease Term (years)
Bank	70,000	$14.00	$ 980,000	3
Law firm	10,000	14.50	145,000	4
Mortgage broker	16,000	15.00	240,000	5
Total	96,000		$1,365,000	

Note: Additional assumptions about the tenant's responsibility for increases in operating expenses (expense stops) will be discussed later.

Additional assumptions are as follows:

Leaseable square feet area: 96,000.

Management costs 5.00 percent of base rent plus expense reimbursements
Current market rent (per square foot): $15.

Market rents are assumed to have been projected based on a market analysis as discussed in the previous section. The projected market rents are as follows:

Year	1	2	3	4	5	6
Market Rent Projection	$15.00	$15.50	$16.00	$16.75	$17.50	$18.00

This is the rent that is projected to apply during the year indicated, for example, for leases beginning in year 4, the market rent will be $16.75 per square foot. Market rents could vary for different spaces in the building. For example, space that has a better view will often command a higher rent. In our example we have assumed that all space will have the same market rent. The rent offered to an existing tenant on a lease renewal may also differ from that offered to a new tenant because an existing tenant may not ask the owner to pay for improvements to the space (tenant improvements). Also, there may be less or no commissions that have to be paid to a broker on a lease renewal compared to a new lease. Finally, if the owner has to find a new tenant that can take time and result in some vacancy. So the rent offered to an existing tenant might be lower than that offered a new tenant. In our example, we will assume that the market rent would be the same whether the tenant renews or a new tenant must be found. But we will assume that there is some vacancy once leases start coming up for renewal to account for the possibility an existing tenant will not renew.

Base Rent

From this summary we see that the total **base rent** is $1,365,000. Note that the base rent for the bank ($14) that was signed two years ago is less than the current market rent of $15 per square foot. Similarly, the base rent for the law firm ($14.50) signed one year ago is less than the current market rent of $15 per square foot. The market rent has increased over the past two years.

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Year	1	2	3	4	5	6
Bank	$ 980,000	$ 980,000	$ 980,000	$1,172,500	$1,172,500	$1,172,500
Law firm	145,000	145,000	145,000	145,000	175,000	175,000
Broker	240,000	240,000	240,000	240,000	240,000	288,000
Total base	$1,365,000	$1,365,000	$1,365,000	$1,557,500	$1,587,500	$1,635,500

Market Rent

Market rent for our example is $15 per square foot during the first year. This is also the base rent for leases signed that year. Market rents were projected to increase each year based on a separate market analysis as discussed earlier. Leases will be assumed to be renewed at the market rent projected for the year of renewal.

It appears that a tenant will face much higher rents when the lease is renewed because the new lease is based on a market rate that is projected to increase over the term of the lease. However, we will see in the next section that the amount of expenses for which the tenant must reimburse the owner when the lease is renewed may also be reduced.

In the case of the bank, the initial base rent is $980,000, which is projected to remain constant until the lease expires in the third year. The base rent in year 4 is projected to be $1,172,500[3] based on the $16.75 projected market rent in year 4.

[3] $16.75 times 70,000 square feet = $1,172,500.

Expense Stops

Office leases commonly include a provision that protects the owner from increases in operating expenses beyond what they were during the year the lease was signed because of extraordinary expenses that may be related to the operation of one or more tenants or unexpected inflation in expenses. In our example, each lease for the office building has an **expense stop.** As briefly discussed in Chapter 9, these stops place an upper limit on the amount of operating expenses that will have to be paid by the owner. Any operating expenses in excess of the stop must be paid by the tenant. The amount of the stop is usually based on (1) the tenant's pro rata share (percent of total rentable area), (2) categories of expenses that the lessor and lessee agree will be included in the stop, and (3) the actual amount of operating expenses at the time the lease is signed.

For a newly developed property, the tenant and the property owner usually negotiate the amount of the stop. For older properties, the owner generally provides the prospective tenant with operating expense statements, and the stop will be based on the tenant's pro rata share of the actual expenses on such statements.

In the office building example, the lessor and lessee agree that the stop will include all operating expenses. However, the owner of the property will incur property management expenses that will not be chargeable to the tenants. All amounts in excess of the expense stop must be paid by the tenant in addition to the base rent specified in the lease. For example, if the expense stop in the lease is $4.00 per square foot and current expenses are $4.45 per square foot, then in addition to rent, the tenant must pay the owner 45 cents per square foot as an expense reimbursement. The reason for an expense stop is obviously to assure the owner that net income in subsequent years will be at least equal to the initial net income. Using expense stops is particularly important in leases containing fixed base rents (those without CPI adjustments). If expense stops are not used, operating expenses may rise during the term of the lease and net income will decline. The particular expenses passed through to the tenants are negotiable and vary with market conditions. In our example, we have assumed that all expenses except management will be passed through. Tenants are usually reluctant to allow these expenses to be passed through because they are the responsibility of the building owner, and any attempt to pass these through to tenants may be viewed, as excessive.

None of the leases in our example have CPI adjustments as mentioned in Chapter 9. CPI adjustments are more common during periods of relatively high inflation and are often combined with expense passthrough as we do have in this example. Although expense passthroughs protect the owner from increases in expenses due to inflation, this will just serve to keep the NOI constant. That is, the owner's portion of expenses will remain constant but if rents are also constant, NOI will be flat in an inflationary environment until leases can be renewed at a higher market rent. CPI adjustments allow the NOI to increase by adjusting the rent upward based on any increase in the CPI during the previous year. When used in conjunction with an expense stop, the adjustment to rents is often a portion, for example, 50 percent of any increase in rents because any erosion in NOI due to the impact of inflation on expenses is already accounted for with the expense passthrough.

Expense stops in the existing lease are assumed to be as follows:

Lease	Stop
Bank	$4.00
Law firm	4.25
Brokerage	4.45

Panel A of Exhibit 11–15 shows the current expenses for the office building and the estimated annual increase in the expenses.

We can see from panel A of Exhibit 11–15 that the projection of total operating expenses subject to expense stops is $427,200 or $4.45 per rentable square foot. Panel B shows projections for the increase in each expense category. Future rates of increase depend on estimates of how each cost is expected to change. In our example, utilities (heat and air conditioning) are expected to increase at a higher rate than the other items. We assume that property taxes will be level for two years, but then will increase when property values are reassessed. We expect property taxes to be level again for at least four years after the reassessment.

Panel C of Exhibit 11–15 uses the information on expense projections and expense stops to project expense reimbursements. Note that in year 1 the first two tenants will be making expense reimbursements to the owner because actual expenses are $4.45 per square foot, which exceeds the $4.00 and $4.25 expense stops in their leases. Also note that no expense reimbursement is projected for the year that leases are renewed because the stops included in lease renewals will be based on actual expenses at that time.

Net Operating Income

Based on the rental information and expense information in Exhibit 11–15, we can project the **net operating income (*NOI*)** for the office building. Exhibit 11–16 projects the net operating income for the next six years. Recall that we assumed management expenses to be 5 percent of base rent plus expense reimbursements. Note that the income from expense passthroughs is included in the base that is used to calculate the management fee. As noted earlier, any vacancy might be deducted before calculating the management fee. That is, the management fee would be based on **effective gross income (*EGI*)**. But in this example the management

EXHIBIT 11–15
Summary of Operating Expenses—Monument Office Building

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Panel A: Operating Expenses

	Dollars	Dollars per Square Foot	
Property tax	$148,800	$1.55	Increase 2.00% per year
Insurance	14,400	0.15	Increase 4.00% per year
Utilities	120,000	1.25	Increase 5.00% per year
Janitorial	76,800	0.80	Increase 3.00% per year
Maintenance	67,200	0.70	Increase 3.00% per year
Subtotal (before mgt)	427,200	4.45	(before management expenses)

Panel B: Projection of Reimbursable Expenses per Year

Year	1	2	3	4	5	6
Property tax	148,800	151,776	154,812	157,908	161,066	164,287
Insurance	14,400	14,976	15,575	16,198	16,846	17,520
Utilities	120,000	126,000	132,300	138,915	145,861	153,154
Janitorial	76,800	79,104	81,477	83,921	86,439	89,032
Maintenance	67,200	69,216	71,292	73,431	75,634	77,903
Total before management	427,200	441,072	455,456	470,373	485,846	501,896
Per square foot	4.45	4.59	4.74	4.90	5.06	5.23

Panel C: Projected Expense Reimbursement

Year	1	2	3	4	5	6
Bank	$31,500	$41,615	$52,103	$ 0	$11,282	$22,985
Law firm	2,000	3,445	4,943	6,497	0	1,672
Brokerage	0	2,312	4,709	7,196	9,774	0
Total	$33,500	47,372	61,756	13,693	21,056	24,657

EXHIBIT 11–16 Projected Net Operating Income

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Year	1	2	3	4	5	6
Base income	$1,365,000	$1,365,000	$1,365,000	$1,557,500	$1,587,500	$1,635,500
Plus reimbursements	33,500	47,372	61,756	13,693	21,056	24,657
Total potential income	$1,398,500	$1,412,372	$1,426,756	$1,571,193	$1,608,556	$1,660,157
Less vacancy	0	0	0	78,560	80,428	83,008
Effective gross income	1,398,500	1,412,372	1,426,756	1,492,633	1,528,128	1,577,149
Less operating expenses:						
Reimbursable expenses	427,200	441,072	455,456	470,373	485,846	501,896
Nonreimbursable expenses	69,925	70,619	71,338	78,560	80,428	83,008
NOI	$ 901,375	$ 900,681	$ 899,962	$ 943,700	$ 961,855	$ 992,245

fee is not being reduced by vacancy. Vacancy could be a result of poor management, and thus it may make sense to just compensate the manager on what is actually collected. On the other hand, vacancy can also be a result of market conditions under which the manager has no control and that is when the manager may have to work the hardest to try to attract tenants.

Management expenses are not reimbursable in these leases. The management expense may be incurred by the owner or paid to a property management company. In either case it is not passed on to the tenant, so the owner has an incentive to control management expenses. Our example projects vacancy at 5 percent of the base rent, beginning in the fourth year when the first lease is renewed.

Expected Outlays for Replacements and Capital Improvements

As discussed in Chapter 9, the analyst should also consider outlays of a recurring nature for the replacement of items that wear out in the normal operating cycle of a property. These items may be included in operating expenses. In the case of capital outlays for major, nonrecurring items such as roof replacement, parking garage construction, and so on, these should be shown as an additional deduction from *NOI* in the year that the outlay will occur.

In our example, Monument Office Building is not expected to require any major capital outlays during the six-year projection made in Exhibit 11–16. It is also assumed that there will be no additional expenditures for tenant improvements (TIs) or leasing commissions when the leases have to be renewed. If the existing tenants do not renew, there may have to be money spent to reconfigure the space for the new tenant and there may also be leasing commissions to a broker to find a new tenant. But in this case, we have assumed that these costs will not be incurred.

Exhibit 11–17 shows the output for the NOI from RealNex which is a cloud-based DCF program available to students using this textbook. Note that the answers are the same as we have been discussing. See the preface to the book for information on how to obtain RealNex. The appendix to this chapter will provide additional information on how to use RealNex to replicate the office building investment analysis in this chapter.

Estimated Sale Price

To calculate measures of investment performance over an investment holding period, we must also estimate what our property might sell for. We first need to choose a holding period over which to analyze the investment. For now we will choose five years. When estimating a sale price, investors commonly use two general procedures. The first procedure is to estimate a rate at which property values in general are expected to increase in the area. This is sometimes related to expected inflation rates, although office buildings in some areas may do better or worse than the overall inflation rate for the economy depending on employment.

EXHIBIT 11–17 RealNex Operating Data Report for Monument Office Building

Source: RealNex, 2014.

RealNex
The Technology Behind the Deal

Home | Property ▾ | Analysis ▾ | Managers ▾

Monument Office

General | Financials | Income | Expenses | Projections | Charts | Dashboard | Proposals

Select Projection: Annual Property Operating Data

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Rental Income	$1,365,000	$1,365,000	$1,365,500	$1,557,500	$1,587,500	$1,635,500
Expense Reimbursements	$33,500	$47,372	$61,756	$13,693	$21,056	$24,657
GROSS SCHEDULED INCOME	$1,398,500	$1,426,756	$1,426,756	$1,571,193	$1,608,556	$1,660,157
General Vacancy	$0	$0	$0	($78,560)	($80,428)	($83,008)
GROSS OPERATING INCOME	$1,398,500	$1,412,372	$1,426,756	$1,492,633	$1,528,128	$1,577,149
Expenses						
Property Management Fee	($69,925)	($70,619)	($71,338)	($78,560)	($80,428)	($83,008)
Property Tax	($148,800)	($151,776)	($154,812)	($157,908)	($161, 066)	($164,287)
Insurance	($14,400)	($14,976)	($15,575)	($16,198)	($16,846)	($17,520)
Utilities	($120,000)	($126,000)	($132,300)	($138,915)	($145,861)	($153,154)
Janitorial	($76,800)	($79,104)	($81,477)	($83,921)	($86,439)	($89,032)
Maintenance	($67,200)	($69,216)	($71,292)	($73,431)	($75,634)	($77,903)
TOTAL OPERATING EXPENSES	($497,125)	($511,691)	($526,794)	($548,933)	($566,274)	($584,904)
NET OPERATING INCOME	$901,375	$900,681	($899,962)	$943,700	($961,855)	$992,245

Two problems are associated with using this approach to estimate the resale price. First, it is based on the assumed purchase price, which we may decide is not what the property is really worth once we complete our analysis. Second, it assumes that the resale price depends on how the historical value (purchase price) changed over time rather than looking forward to what will happen in the future. The approach to estimating a resale price discussed next addresses these issues.

A second way of estimating a resale price is to use the terminal capitalization rate concept discussed in an earlier chapter. Recall that the going-in capitalization rate (cap rate for short) is defined as the ratio of the first-year *NOI* to the purchase price. For our office building example, the cap rate based on the purchase price is 10.6 percent.[4] This ratio expresses the relationship between the purchase price of the property and the *NOI* that the purchaser expects to receive during the first year of ownership. The investor may find that, in general, office buildings that have recently been purchased by other investors have similar rates.

When estimating a sale price in the future, investors often add a slight premium to current (going-in) capitalization rates to reflect any depreciation, obsolescence, and the uncertainty

[4] Recall from the previous chapters that this is sometimes referred to as the going-in cap rate because it applies to the rate at the time of purchase.

of income in the future when the property will be sold. However, as discussed in Chapter 9, we have to consider other factors such as whether interest rates are expected to be higher or lower at the time of sale or if expected growth in income and property value will be higher or lower in the years after sale. All these factors impact what the cap rate will be for comparable properties at the time of sale and must be considered when projecting a terminal cap rate to estimate the resale price.

Because we are only looking at a five-year holding period in this example, the property will not be significantly older and we will assume that economic conditions (interest rates, property value growth rates, etc.) will be similar in five years.[5] Therefore, we will assume a terminal cap rate that is the same as the going in cap rate of 10.6%. Using *NOI* of $992,245 in year 6 and a capitalization rate of 10.6 percent results in an estimated resale price of $9,360,805.[6]

Clearly, the analyst must use some judgment at this point regarding what is a reasonable estimate for the resale price. We are simply pointing out some of the considerations that might go into the investor's thought process. No single precise methodology can be rigidly followed. It is also common to round off the numerical estimate to convey the subjective nature of the estimate.

Introduction to Investment Analysis

In general, when we refer to **investment analysis** in real estate, we are referring to analyzing a particular property to evaluate its investment potential. This analysis should also help answer other important questions: Should the property be purchased? How long should it be held? How should it be financed? What are the tax implications of owning the investment? How risky is the investment?

We will provide the analytic tools to answer these questions in the next several chapters. However, we can now begin to answer the first question: Should the property be purchased at a price of $8.5 million? To illustrate how we might approach this question, we continue with the pro forma statements from the Monument Office Building example.

Internal Rate of Return (IRR)

In our previous discussion of the Monument Office Building, we calculated the net operating income (*NOI*) for the property as well as the projected resale price. These numbers, along with the proposed purchase price, can be used to calculate the **internal rate of return** (*IRR*) for the property.

Exhibit 11–18 shows the cash flows used to calculate the *IRR*. Recall that this is the rate that makes the present value of the projected cash flows equal to the initial investment. In this case, the *IRR* is 13.46 percent. This is the return on the entire property. It does not consider the effect of borrowing money. Thus, it would be referred to as an "unleveraged *IRR*." Financing is discussed in the next section of this chapter.

Present Value

The IRR for Monument Office Building (calculated above) is 12.38 percent. Suppose that the investor requires a 14 percent rate of return? How much would he be willing to pay?

[5] This assumes that no significant changes will occur in the market for office space during the six-year period that would change the relationship between *NOI* and value. The capitalization rate could change if a change in the supply and demand for office space affects the market rental rates or if the rate of return required by investors in office space changes.

[6] Recall that when a capitalization rate is used to estimate the resale price, it is often referred to as a *terminal capitalization rate*.

EXHIBIT 11–18 **Calculation of *IRR***

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Year	0	1	2	3	4	5
Purchase price	($8,500,000)					
Net operating income (*NOI*)		$901,375	$900,681	$899,962	$943,700	$ 961,855
Sales price						9,360,805
Cash flow	($8,500,000)	$901,375	$900,681	$899,962	$943,700	$10,322,659
IRR	12.38%					

To answer this question, we discount the cash flows (*NOI* and sale price) at a 14 percent discount rate. The purchase price is not included in these cash flows because we are calculating how much the investor is willing to pay. Using a financial calculator or spreadsheet, the reader should be able to verify that the present value of the cash flows above, when discounted at 14 percent, is $8,011,000 (rounded to nearest thousand dollars). At a purchase price of $8,500,000 the property would have a net present value (*NPV*) of $8,011,000 – $8,500,000 –$489,000.

Introduction to Debt Financing

In many cases, an investor will pay for a property by combining his own money (equity) with a loan (debt). In Chapter 12, we will discuss reasons why investors often find that a combination of equity and debt is desirable for real estate ownership. For now we will focus on how the use of debt affects the cash flows a real estate investor expects to receive.

To illustrate, we again return to our previous example of the Monument Office Building. Let us assume that an investor can obtain a loan for 70 percent of the property value at a 10 percent interest rate to be amortized over 20 years with monthly payments. The amount of the loan will be (.70 × $8,500,000) or $5,950,000. Monthly payments would be $57,418.79 or $689,025 per year. Traditional investment analysis computes loan payments based on monthly payments (assuming that is the way the payments will be made), but all cash flows are summarized on an annual basis for financial projections.

Exhibit 11–19 shows a summary loan schedule for the property for the first five years. From this point on projections will be made for five years under the assumption that the property will be sold after five years. The reason for projecting *NOI* for an *additional* year will become apparent when we discuss estimating the sale price of the property at the end of the five-year holding period.

Exhibit 11–20 shows the results of including the financing costs in the calculation of cash flows to the equity investor. Subtracting debt service from *NOI* results in before-tax cash flow from operations ($BTCF_o$). $BTCF_o$ is also referred to as the **equity dividend** because it represents the cash flow that will actually be received by the investor each year, analogous to a dividend on common stocks.

EXHIBIT 11–19 **Summary Loan Information**

	1	2	3	4	5
Payment	$ 689,025	$ 689,025	$ 689,025	$ 689,025	$ 689,025
Mortgage balance	5,851,543	5,742,776	5,622,620	5,489,883	5,343,245
Interest	590,569	580,259	568,869	556,288	542,388
Principal	98,457	108,767	120,156	132,738	146,637

EXHIBIT 11–20
Estimates of Before-Tax Cash Flow

	Year				
	1	2	3	4	5
Net operating income (*NOI*)	$901,375	$900,681	$899,962	$943,700	$961,855
Less debt service (DS)	689,025	689,025	689,025	689,025	689,025
Before-tax cash flow	$221,350	$211,656	$210,937	$254,675	$272,829

Measures of Investment Performance Using Ratios

Equity Dividend Rate

The **equity dividend rate** is calculated by dividing the *BTCF* (also referred to as the equity dividend) in the first year by the initial *equity investment.* The investor's initial *equity* in the project *is equal to the purchase price less* the amount borrowed. Thus, the equity is $8,500,000 – $5,950,000 = $2,550,000. The equity dividend rate is therefore $212,350/$2,550,000 = 8.33 percent. This is a rough measure of current return on equity. Note, however, that it is not an investment yield because it does not take into account future cash flows from operation or sale of the property. For the equity investor, the difference between the equity dividend rate and an investment yield, or *IRR,* is an important one. We will discuss this later in the chapter.

Debt Coverage Ratios

To obtain financing on the property, the lender must be satisfied that it is a good investment. One consideration obviously is the rate of return the lender will receive over the term of the loan, which depends on factors such as the interest rate charged, points, and so forth, as discussed earlier in this text. But the lender's rate of return is only one consideration. The lender will also evaluate the riskiness of the loan. One widely used indication of the riskiness of the loan is the degree to which the *NOI* from the property is expected to exceed the mortgage payments. The lender would like a sufficient cushion so that if the *NOI* is less than anticipated (e.g., from unexpected vacancy), the borrower will still be able to make the mortgage payments without using personal funds.

A common measure of this risk is the **debt coverage ratio (*DCR*).** The *DCR* is the ratio of *NOI* to the mortgage payment. When *NOI* is projected to change over time, the investor typically uses first-year *NOI.* For the office building example, the projected *NOI* in year 1 is $901,375. The mortgage payment (debt service) is $689,025. These figures result in a debt coverage ratio of 1.31. Lenders typically want the first-year debt coverage ratio to be at least 1.2 so NOI could drop by about 20 percent before there is not enough to cover the mortgage payment.

We see that this project has a debt coverage of about 1.3 for the first year. Thus, it meets the minimum debt coverage ratio typically required by lenders.

Before-Tax Cash Flow from Sale

When the property is sold, the mortgage balance must be repaid from the sale proceeds. Repayment results in before-tax cash flow from sale ($BTCF_s$). After the fifth year, the mortgage balance is $5,343,245. Subtracting this from the sale price of $9,360,805 results in before-tax cash flow ($BTCF_s$) of $4,017,559. We can summarize the process as follows:

Estimates of Cash Flows from Sale in Year 5	
Sale price	$ 9,360,805
Mortgage balance	– 5,343,245
Before-tax cash flow (*BTCFs*)	$ 4,017,559

EXHIBIT 11–21
Before-Tax Cash Flow Summary—Monument Office Building

Year	0	1	2	3	4	5
Before-tax cash flow	($2,550,000)	$212,350	$212,656	$210,937	$254,675	$4,290,389

Internal Rate of Return to Equity Investor

Recall that the initial equity investment is $2,550,000, found by subtracting the $5,950,000 loan amount from the $8,500,000 purchase price. We have also already calculated the before-tax cash flow to the equity investor. Exhibit 11–21 presents the cash flows.

You should confirm that this process results in an *IRR* of 17.11 percent, which we will refer to as the *BTIRR* since it is a before-tax *IRR*. This is the before-tax yield that the investor may expect to earn on equity over the investment period. This considers the effect of the loan on the investor's return.

Is the return adequate? The answer to this question depends on what the investor can earn on comparable investments, such as similar office buildings or even other real estate investments with similar risk characteristics. We have discussed comparing capitalization rates and price per square foot with comparable properties. Similarly, we could also ask what rate of return we would expect to earn had we bought another property at the price paid by another investor. This may give us some idea of what returns other investors are expecting. Of course, we would have to make our own projections of *NOI* and resale price unless the other investor told us exactly what he was thinking. We would also make similar projections and *IRR* calculations for other properties that are for sale, using their asking price. That is, we should earn a return that is at least as good as the return we could earn on other properties that are for sale that have similar risk characteristics.

Another test of the reasonableness of the BTIRR is to compare it with the effective interest cost of any mortgage financing that could be obtained to purchase the property. Normally, we would expect the return on the property to be greater than the effective cost of financing on the property, because the investor accepts more risk than the lender. The lender assumes less risk because a lender would have first claim on income and proceeds from sale of the property should there be a default. For example, we should expect that the IRR for the office building (BTIRR of 17.11%) would be more than the 10 percent mortgage interest rate. Otherwise, the investor would be better off lending on real estate rather than investing in it. We will discuss approaches to measuring and evaluating risk to investors and show how debt affects that risk and return for equity investors in Chapter 13.

Summary of Investment Analysis Calculations

Exhibit 11–22 shows a summary of the calculations for the Monument Office Building example. The performance measures in Exhibit 11–22 should all be compared with other investment alternatives. The comparison will give a good indication of whether acquisition of the office building is a good investment. However, these measures may still not be sufficient to allow us to decide whether we should purchase the investment because we have not yet considered how *federal income taxes* might affect the results. We also need to know more about the *riskiness* of the investment so that we can be reasonably sure that we are comparing the performance measures outlined in Exhibit 11–22 with alternatives of comparable risk, as we discuss in the next section. We will also want to know whether we should borrow more

EXHIBIT 11–22
Summary of Monument Office Building Investment Analysis Measures

Capitalization rate	10.60%
IRR on property (unleveraged)	12.38%
IRR on equity (*BTIRR*)	17.11

Abuses in Pro Forma Cash Flow Projections

Concept Box 11.1

When making pro forma cash flow projections for real estate income properties, the analysts must be realistic about the assumptions being made. The following abuses common in pro forma cash flow projections are based on an article in *Real Estate Review* by Vernon Martin:

1. Mismatched growth rates between rental income and expenses.
2. Failure to consider rental concessions and effective rents.
3. Absence of lease-by-lease analysis in properties encumbered by long-term leases.
4. Projection for expense recovery income that increases at the same growth rate as other expenses for a property encumbered by gross leases with expense stops.
5. Projections for vacancy and collection losses that are not synchronized with market conditions.
6. Omission of outlays for nonoperating expenses such as tenant improvements and leasing commissions.
7. Unsupported use of terminal capitalization rates that are lower than going-in capitalization rates. Terminal capitalization rates should be related to the property's age and remaining economic life.
8. Underestimation of selling expenses.
9. Use of an inappropriate internal rate of return (discount rate).
10. Failure to recognize capital outlays for renovations needed to maintain a property.

or less money, and whether there are other, better ways of financing the property. Chapter 12 covers financing alternatives. Being able to obtain a loan on the property also depends on the appraised value an independent appraiser presents. This value may be more or less than the investor is willing to pay. If the appraised value is too low, it will be difficult to finance the property with the amount of debt that we have assumed in our projections.

It should be obvious that we have only begun to do the in-depth analysis the potential acquisition of our office building requires. Whether investors consider all of these issues in practice depends on their level of sophistication. Our objective will be to cover all the issues that *should* be considered to be certain of making an intelligent investment decision.

Taxation of Income-Producing Real Estate

Earlier in this chapter, we introduced investment analysis of income-producing property. We calculated measures of investment performance such as the *IRR* and *NPV*. However, these calculations did not consider the effect of federal income taxes on the investment and financing decision; consequently, we referred to the analysis thus far as a before-tax analysis. We now extend investment analysis to include the effect of federal income taxes, which is referred to as an after-tax analysis.

Our discussion of taxes is intended only as a general overview of how taxes affect after-tax rates of return for real estate income property. Tax laws change frequently, and many complexities in the tax law are beyond the scope of this chapter. It is important, however, to have a sense of how tax laws influence investment decisions and how possible tax law changes may affect the desirability of real estate relative to other investments.

This chapter does *not* deal with real estate held as a *personal residence* by individuals. Special rules apply to the taxation of personal residences. For example, personal residences cannot be depreciated for tax purposes. We also assume that the property is not held for resale to others. Individuals holding property for resale to others in the ordinary course of business are referred to as **dealers**, *not investors*. Examples of individuals or firms with *dealer* status would be developers who develop lots for resale, builders of houses for resale, or others who do not intend to hold real estate as an investment, but rather for immediate resale. Real property held for resale by a dealer is *not depreciable* for tax purposes. (Depreciation rules are discussed later in the chapter.)

In this chapter, we only consider property "held for use in a trade or business." *Most income-producing real estate investments are included in this category.* An owner acquires real estate with the intent to operate, modify, or do whatever is necessary to produce income in a trade or business. Individuals in other occupations who own and operate rental properties are also in this category, although they must be actively engaged in the management of the property. Investors in a partnership, corporation, or trust may also hold property for use in a trade or business.[7] Real estate used in trade or businesses includes land and improvements, such as income-producing rental properties and commercial properties that are subject to depreciation. This category of real estate is the primary focus of the chapter.

Owners of real estate used in the production of income in a trade or business report income from rents and may deduct expenses incurred in operating the property, such as maintenance, repair, and utilities. They may also deduct property taxes, interest on mortgage loans made to acquire property, and interest on loans made in the operation of the business. In addition, they are allowed deductions for depreciation, and when properties are sold, certain capital gain and loss provisions (discussed in a later section) also apply.

Taxable Income from Operation of Real Estate

We have discussed at length how to calculate net operating income (*NOI*) for income-producing property. Recall that the calculation of *NOI* involves deducting expenses associated with *operating* a property, such as property taxes, insurance, maintenance, management, and utilities. Then, subtracting the mortgage payment from the *NOI* results in before-tax cash flow from operating the property ($BTCF_o$). We will now see that **taxable income** from operating real estate income property differs from $BTCF_o$ for two main reasons.[8] First, only the *interest* portion of a loan payment, not the total payment, is deductible from *NOI* for tax purposes. Second, the tax code allows owners to deduct a **depreciation allowance** from *NOI*. Thus, taxable income from operating a real estate income property can be stated as follows:

$$\text{Taxable Income} = NOI - \text{Interest} - \text{Depreciation Allowance}$$

The amount of interest deductible in a given taxable year equals the total interest paid to the lender during that year. We have discussed the separation of loan payments into principal and interest in considerable detail in earlier chapters.[9] We have not covered calculating depreciation allowances for tax purposes yet, and we will discuss this subject in the following section.

Depreciation Allowances

Physical assets like buildings suffer from physical depreciation over time that, *ceteris paribus*, reduces their economic value. Because buildings must ultimately be replaced, and because tax law allows investment in improvements to be recovered before income produced from the improvement is taxed, the investor may take a deduction for capital recovery (depreciation) from net operating income prior to the determination of taxable income. Otherwise, net operating income and taxable income would be overstated by an amount equal to the annual decrease in value due to economic depreciation. Thus, in theory, investors should only

[7] Real estate used for the production of income in a trade or business is categorized as Section 1231 assets. Capital equipment (such as machinery) purchased by businesses that use such assets in the production of income are also designated as Section 1231 assets.

[8] Additional differences will be shown in later chapters.

[9] You may want to review the appendix to Chapter 6 at this time.

be taxed on the income net of this economic allowance for depreciation. This is the theoretical basis for tax depreciation.

However, because of inflation, changes in supply and demand, and other economic factors that also affect the value of real estate, it is difficult to know what portion of any net change in value is caused by physical depreciation. Further, our tax system has historically provided for depreciation allowances that are greater than any actual decline in the economic value of the property. As we will see, to the extent that tax depreciation *allowances* exceed *actual* economic depreciation, investors realize tax benefits. Exhibit 11–23 summarizes the methods for computing depreciation allowances that various tax laws in effect in recent years have allowed.

It should be obvious from the exhibit that tax policy on depreciation allowances has varied considerably. As indicated, this is because, historically, Congress has provided for allowances in excess of economic depreciation to stimulate investment in real estate in the belief that this policy would increase construction and, hence, the supply of rentable space in the economy. Unfortunately, it may also have contributed too much of the overbuilding that occurred during the early 1980s. As shown in the exhibit, the Tax Reform Act (TRA), which was passed in 1986, lengthened depreciable life from its length during the period from 1981 to 1986. Increasing the depreciable life of real estate is one of the several features in the 1986 law that reduced the favorable tax treatment that real estate had enjoyed previously. Later in this chapter, we will see that depreciation is one source of tax benefits to investors in real estate.

Depreciable Basis

The amount that can be depreciated for real estate improvements depends on the **depreciable basis** of the asset. The basis for a real estate investment is generally equal to the *cost* of the improvements (unless inherited or acquired by gift). *Cost* is generally defined to include the acquisition price of the improvements plus any installation costs associated with placing them into service. The cost of any capital improvements to the property made during the ownership period is also included in the basis when such outlays are made. Only improvements can be depreciated, not the cost of land. In this chapter, we focus on the tax treatment for existing properties. (Differences for properties that will be *developed and constructed* are discussed in a later chapter.)

EXHIBIT 11–23
Depreciation Rules for Real Estate*

Years	Depreciable Life	Methods Allowed
1969–1980	Useful life, approximately 30–40 years	Accelerated or straight line[1]
1981–1983	15 years	ACRS based on 175% of straight-line depreciation[2]
1984–1985	18 years	ACRS based on 175% of straight-line depreciation[2]
1986	19 years	ACRS based on 175% of straight-line depreciation[2]
1987–1992	27.5 years for residential	Straight line
	31.5 years for nonresidential	Straight line
1993–2017	27.5 years for residential	Straight line
	39 years for nonresidential	Straight line

*Some real estate investments also include personal properties such as furniture and fixtures. Personal property can be depreciated over a much shorter time period than the real property (e.g., eight years under the current tax law).

[1]Investors generally selected accelerated depreciation methods that ranged from 125 percent to 200 percent of straight-line depreciation, depending on whether the property was residential or nonresidential, new or existing.

[2]Because of severe "recapture" rules that affected investors who used accelerated depreciation on nonresidential real estate, most investors used straight-line depreciation in nonresidential real estate during this period.

EXHIBIT 11–24
2014 Marginal Ordinary Income Tax Rates for a Married Taxpayer Filing Jointly

Taxable Income	Marginal Tax Rate
$0–$18,150	10%
18,151–73,800	15
73,801–148,850	25
148,851–226,850	28
226,851–405,100	33
405,101–457,600	35
Over 457,600	39.6

Loan Points

Points paid in connection with obtaining a loan to purchase, refinance, or operate a real estate income property investment must be deducted ratably over the term of the loan. For example, suppose an investor secures a loan for $800,000 to purchase an office building. The loan is to be amortized over a 25-year term but has a term of 10 years with a balloon payment due at the end of the 10th year. Suppose two points, or $16,000, are paid on the loan. For tax purposes, the $16,000 would have to be amortized over 10 years, or $1,600 per year. If the investor sells the property before the points are fully amortized (year 10 in this example), the balance can be expensed in the year of sale. Thus, in the above example, if the property is sold and the loan is repaid after five years, $8,000 could be expensed against ordinary income.

Tax Liability and After-Tax Cash Flow

Once we have calculated taxable income, we can calculate the tax liability that results from operating the property. The tax liability is calculated by multiplying the taxable income by the investor's marginal tax rate. The **marginal tax rate** is the rate which the *additional* income from the investment under consideration will be taxed. In general, we can think of it as the investor's tax bracket. The tax rate that corresponds to a particular tax bracket is the rate that applies to an *additional* or *marginal* dollar of income that falls in a particular bracket. For investment decisions, we want to know how the additional income from adding the particular investment under consideration will affect the investor's taxes. Thus, we are interested in knowing what marginal tax rate (or rates) applies to the investment. For example, suppose that the individual to whom the rates in Exhibit 11–24 apply already has taxable income of $100,000. Furthermore, suppose that a real estate investment would produce taxable income of $10,000. According to the exhibit, the additional $10,000 of income would be taxed at a 25 percent rate, resulting in $2,500 in taxes.

Taxable Income from Disposal of Depreciable Real Property

In establishing whether a taxable **capital gain** or loss has occurred when a property is sold, we must determine the gross sales price. The gross sales price is equal to any cash or other property received in payment for the property sold, plus any liabilities against the property assumed by the buyer. Any selling expenses (e.g., legal fees, recording fees, and brokerage fees) may then be deducted to establish *net sales proceeds*. To determine gain or loss, subtract the *adjusted basis* of the property from net sales proceeds. The adjusted basis of a property is its *original basis* (cost of land and improvements, acquisition and installation fees) plus the cost of any capital improvements, alterations, or additions made during the period of ownership, less accumulated depreciation taken to date. Any excess of the net sales proceeds over the adjusted basis results in a taxable gain, and any deficit results in a taxable loss.

In the case of depreciable real estate held for use in trade or business, *net* gains on the sale are treated as long-term capital gains. The tax rate on long-term capital gains is often less than the rate on ordinary income. For example, the 1993 Tax Reform Act set the maximum capital gain tax rate at 28 percent even if the investor is in a higher tax bracket for ordinary income. In 1997, the capital gain tax rate was lowered to 20 percent for that portion of the gain due to any increase in the value of the property and 25 percent for that portion of the gain due to depreciation taken (recapture) during the seller's holding period. It is currently 15 percent for the portion of gain due to any increase in the property value and 25 percent for the gain due to depreciation recapture.

After-Tax Investment Analysis

We now consider the effect of federal income taxes on the office building investment analysis example introduced earlier in this chapter. As a starting point for our discussion, Exhibit 11–25 summarizes the calculation of before-tax cash flow for Monument Office Building.

After-Tax Cash Flow from Operations

We have estimated *before-tax* cash flows from the investment and now must determine the increase or decrease in the investor's taxable income as a result of undertaking it. Because taxes will either increase or decrease as a result of the investment, the increase or decrease must be added to or subtracted from before-tax cash flows to determine cash flow on an *after-tax* basis. To do this, we must consider how much taxable income is produced each year from operations and then consider taxes in the year that the property is sold. Exhibit 11–26 shows the calculation of taxable income and after-tax cash flow from operating the property. In Exhibit 11–26, we see that we can find taxable income by subtracting interest and depreciation from the *NOI*. Note that only the interest, not the total loan payment, is tax deductible. In our example, interest was based on having a $5,950,000 loan amortized over a 20-year term with monthly payments based on a 10 percent interest rate. Exhibit 11–27 reproduces the summary loan schedule from earlier in this chapter (Exhibit 11–19).

Depreciation

Taxable income is also affected by an allowance for *depreciation*. As discussed earlier in the chapter, residential properties may be depreciated over 27.5 years, and nonresidential

EXHIBIT 11–25 Estimates of Before-Tax Cash Flow from Operations and Sale

	Year				
	1	2	3	4	5
Cash flow from operations:					
Net operating income (*NOI*)	$901,375	$900,681	$899,962	$943,700	$ 961,855
Less: debt service (DS)	689,025	689,025	689,025	689,025	689,025
Before-tax cash flow	$212,350	$211,656	$210,937	$254,675	$ 272,829
Estimates of cash flows from sale in year 5:					
Sale price					$9,360,805
Less: mortgage balance					5,343,245
Before-tax cash flow ($BTCF_5$)					$4,017,559

EXHIBIT 11–26 Taxable Income and After-Tax Cash Flow from Operations

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	End of Year				
	1	2	3	4	5
Taxable income:					
Net operating income (*NOI*)	$901,375	$900,681	$899,962	$943,700	$961,855
Less: interest	590,569	580,259	568,869	556,288	542,388
Depreciation	177,537	185,256	185,256	185,256	185,256
Taxable income (loss)	133,269	135,166	145,836	202,156	234,210
Tax (savings) at 36%	$ 46,644	$ 47,308	$ 51,043	$ 70,755	$ 81,974
After-tax cash flow:					
Before-tax cash flow	$212,350	$211,656	$210,937	$254,675	$272,829
Less: tax	46,644	47,308	51,043	70,755	81,974
After-tax cash flow	$165,705	$164,348	$159,894	$183,920	$190,856

EXHIBIT 11–27 Summary Loan Information

	End of Year				
	1	2	3	4	5
Payment	$ 689,025	$ 689,025	$ 689,025	$ 689,025	$ 689,025
Mortgage balance	5,851,543	5,742,776	5,622,620	5,489,883	5,343,245
Interest	590,569	580,259	568,869	556,288	542,388
Principal	98,457	108,767	120,156	132,738	146,637

real property must be depreciated over 39 years. Both must be depreciated on a straight-line basis.[10] Also recall that only the improvements, not land, can be depreciated. Thus, we need to know what portion of the $8.5 million purchase price of the office building represents building improvements as opposed to land. For our case example, we assume that land cost requirements are 15 percent of the purchase price or $1,275,000, leaving improvements of $7,225,000. Dividing improvement cost by 39 results in an annual depreciation deduction of $185,256. The first year is for 11½ months due to the IRS assuming a mid-month convention.[11] So, the depreciation is multiplied by 11.5/12 to get the first month depreciation of $177,537.

Recall that depreciation allowances represent recovery of capital and do not represent an actual cash outflow for the investor (that occurs when the property is acquired). The deduction only affects taxable income and not operating cash flows. In our example, taxable income is $133,269 in year 1. Assuming the investor is in a 35 percent tax bracket, the increase in tax liability as a result of owning the property will be $46,644 (.35 × $133,269). Subtracting this from before-tax cash flow results in after-tax cash flow of $165,705 in year 1.

[10] In the case of mixed use properties (those with both residential and nonresidential uses), if *one* of the uses produces 80 percent of revenues, the total improvement may be depreciated over the tax life corresponding to that use.

[11] The IRS publishes tables that taxpayers must use to calculate depreciation deductions. The tables assume that the investor purchases the property in the middle of the month, and they prorate the first-year depreciation according to the actual month of the year the property is purchased. We are simply dividing by 39 years.

Note that taxable income is *positive* during each year in this example. If the taxable income were negative (i.e., a tax loss), additional assumptions would have to be made regarding the investor's ability to use the losses to offset other taxable income. We discuss negative taxable income later in this chapter.

After-Tax Cash Flow from Sale

Exhibit 11–28 illustrates how sale of the property affects the investor's taxable income. When determining the investor's capital gain from sale of the property, we should keep in mind that the investor will have depreciated the property for five years. Hence, the investor's *cost basis* in the property will be reduced. In our example, depreciation was $177,537 the first year and then $185,256 per year for the next four years, resulting in total depreciation (accumulated depreciation) of $918,563. Subtracting the accumulated depreciation from the original cost basis of the property (cost of the land and improvements) results in an adjusted basis of $7,581,437. (Adjusted basis is also sometimes referred to as the *book value* of the property.) The difference between the adjusted basis ($7,581,437) and the sale price ($9,360,805) is the capital gain, $1,779,368. As discussed earlier, the portion of this gain due to price appreciation (sale price less original cost basis) has a maximum capital gain tax rate of 15 percent. The portion of the gain due to depreciation taken over the holding period (accumulated depreciation) has a maximum tax rate of 25 percent. Thus, the capital gain tax in this example can be calculated as follows:

Price appreciation ($9,360,805 – $8,500,000)		$ 860,000
Accumulated depreciation		918,563
Total gain		$1,779,368
Tax on price appreciation	$860,805 × .15 =	$ 129,121
Tax on accumulated depreciation	918,563 × .25 =	229,641
Total capital gain tax		$ 358,761

Subtracting tax from the before-tax cash flow results in **after-tax cash flow** from sale of $3,658,798.

After-Tax *IRR*

Using the information from Exhibits 11–26 and 11–28, we may now calculate the **after-tax *IRR***. Exhibit 11–29 summarizes the cash flows along with the before-tax cash flows for comparison. As we might expect, the after-tax *IRR* of 13.38 percent is lower than the

EXHIBIT 11–28
After-Tax Cash Flow from Sale in Year 5

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Sale price			$9,360,805
Less mortgage balance			5,343,245
Before-tax cash flow ($BTCF_5$)			4,017,559
Taxes in year of sale			
Sale price		$9,360,805	
Original cost basis	$8,500,000		
Accumulated depreciation	918,563		
Adjusted basis		$7,581,437	
Capital gain		$1,779,368	
Tax on gain*			358,761
After-tax cash flow from sale ($ATCF_5$)			$3,658,798

EXHIBIT 11–29 Cash Flow Summary www.mhhe.com/bf16e

		End of Year				
		1	2	3	4	5
Before-tax cash flow	($2,550,000)	$212,350	$211,656	$210,937	$254,675	$4,290,389
After-tax cash flow	($2,550,000)	$165,705	$164,348	$159,894	$183,920	$3,849,654
Before-tax *IRR (BTIRR)*	17.11%					
After-tax *IRR (ATIRR)*	13.38%					

before-tax *IRR*, which is 17.11 percent as shown in Exhibit 11–29. However, although the investor's tax rate was 35 percent, the after-tax *IRR* is not 35 percent lower than the before-tax *IRR*. Rather, it is about 22 percent lower (1 − 13.38/17.11 = 21.80%).

Effective Tax Rate

In the previous section, we indicated that the after-tax *IRR* is 22 percent lower than the before-tax *IRR*, even though the investor had a 35 percent marginal tax rate. In this case, we would say that the **effective tax rate** on income from this investment would be about 22 percent. Why is the effective tax rate on this investment lower than the marginal tax rate? The reason is that investors can reduce taxable income each year by the amount of depreciation deductions even though the property is not really decreasing in value. In fact, in this example it is increasing in value. Although depreciation allowances also reduce the adjusted basis of the property each year and will eventually result in an increase in taxes paid on the capital gain in the year of sale, the "time value of money" makes lower taxes paid on income each year a benefit to the investor. Furthermore, recall that the portion of capital gain due to price appreciation was only taxed at 15 percent, and the portion due to depreciation recapture was taxed at 25 percent. Thus, the investor is able to defer taxes until the property is sold, and convert (through depreciation deductions) some of the ordinary income to capital gains, which are taxed at a lower rate for investors than ordinary income.

Exhibit 11–30 shows the output from RealNex as if the property was sold after holding periods of one year, two years, and so on through five years. We see that the IRR for year 5 is exactly as shown above. The appendix to this chapter will show more output from RealNex.

A Note about Passive Losses

Starting with the Tax Reform Act of 1986, income and loss from all sources, including real estate, has to be divided into three categories as follows:

1. **Passive income** (or loss): Income or loss from a trade or business where the investor does not materially participate in the management or operation of the property. Material participation is defined as "involvement in the operations of the activity on a regular, continuous, and substantial basis." Investment in rental real estate is considered to be a passive activity. Hence, even if an investor materially participates in the operation of the property, income and losses earned from such activity are categorized as passive income or loss. Income (or loss) received by a limited partner in a partnership is considered passive by definition.
2. **Active income** (or loss): Salaries, wages, fees for services, and income from a trade or business in which the investor materially participates. However, even if a taxpayer

EXHIBIT 11–30 RealNex Resale Analysis

RealNex
The Technology Behind the Deal

Home | Property ▾ | Analysis ▾

Monument Office

General | Financials | Income | Expenses | Projections | Charts | Dashboard

Select Projection: Investment Return Analysis ▾

Description	Year 1	Year 2	Year 3	Year 4	Year 5
Cash Flow - To Date	$165,699	$330,044	$489,935	$673,853	$864,706
Net Resale Proceeds	$2,601,823	$2,659,189	$3,082,782	$3,314,787	$3,658,810
Invested Capital	($2,550,000)	($2,550,000)	($2,550,000)	($2,550,000)	($2,550,000)
Net Return on Investment	$217,522	$439,233	$1,022,717	$1,438,640	$1,973,516
Internal Rate of Return	8.53%	8.53%	12.57%	12.78%	13.38%

materially participates, income or loss from rental activity is not considered active income. Thus, income from rental housing, office buildings, shopping centers, and other real estate activities in which a taxpayer is a landlord is not classified as active income (or loss). This income or loss is classified as *passive income*. However, the operation of a hotel, other transient lodging, or a nursing home is *not* a rental activity, and therefore its owners will have active income if they materially participate.

3. **Portfolio income** (or loss): Interest and dividend income from stocks, bonds, and some categories of real estate that are classified as *capital assets*. As stated earlier in the chapter, most real estate investments are classified as being held for a trade or business and not as capital assets. Examples of portfolio income from real estate activity include dividends received on shares in a real estate investment trust (REIT) or income received on long-term land leases or net leases on real estate where the owner does not materially participate in its operation.

These income classifications are very important because, in general, passive losses cannot be used to offset income from another category (special exceptions are discussed in the next section). This stipulation is referred to as the *passive activity loss limitation* (PAL). Prior to the 1986 Tax Reform Act, many investors purchased real estate that was held as a trade or business by a limited partnership in which the individual investor (limited partner) did not materially participate. These investments often produced (and may still be producing) tax losses that the investor used to offset other taxable income. The passive activity loss limitation prevents investors from offsetting taxable income with passive losses. Passive losses produced from real estate investments and other passive activities now must be used to offset passive income earned during the tax year. Any remaining or unused passive losses must be "suspended" and carried forward to offset any passive income earned in future years.

When an investment producing passive income is *sold* and a capital gain occurs, any unused or suspended losses from that activity (1) must first be used to offset any capital gain from the sale of that activity, (2) must then be used to offset any other passive income produced from other passive activities during that year, and (3) can then be used to offset *any income*, including active and portfolio income earned during that year. To the extent that unused losses remain, they may be carried forward into succeeding years as capital losses, not subject to passive loss rules. For Section 1231 property, any remaining losses would be deductible as ordinary losses.

In cases where the sale of a passive activity, such as real estate, produces a capital loss *and* unused suspended losses from previous years also remain, the unused passive losses may be used to offset any other sources of income (active, passive, or portfolio). Of the capital loss portion, $3,000 of the loss may be used to offset any other source of income that year. Any excess must be carried forward to the next taxable year as a capital loss. It would no longer be subject to passive loss rules, and the excess as well as any unused passive losses may be deducted from ordinary income as a Section 1231 loss.[12]

Special Exceptions to PAL Rules

One special exception to the PAL rules that was included in the 1986 Tax Reform Act (TRA) applies to individual rental property owners (other than limited partners). These investors are allowed to offset active income with up to $25,000 of passive activity losses (to the extent such losses exceed income from passive activities) from rental real estate activities in which the individual *actively* participates. Active participation is less restrictive than the material participation standard referred to earlier and requires less personal involvement. In general, the individual must own a 10 percent or greater interest in the activity and be involved in management decisions, such as selection of tenants and determination of rents, or must arrange for others to provide services (e.g., a property manager to manage the property on a day-to-day basis).

The TRA phases out this special rule for individuals with adjusted gross incomes between $100,000 and $150,000. It reduces the $25,000 loss allowance by 50 percent of the amount of the individual's adjusted gross income when such income for the taxable year exceeds $100,000. Thus, individuals with an adjusted gross income of $120,000 would only be allowed to use up to $15,000 of any passive losses to reduce active income. An individual with adjusted gross income in excess of $150,000 would receive no loss allowance.

The Tax Act of 1993 introduced a second exception to the PAL rules that provides relief for real estate brokers, sales associates, and other real estate professionals who can demonstrate "material involvement in the real estate business."[13] These individuals are eligible to deduct unlimited real estate losses (1) if more than half of all personal services they perform during the year are for real property trades or businesses in which they materially participate and (2) if they perform more than 750 h of service per year in those real estate activities.

Web App

Use the Google search engine to find a recent article related to investment in commercial real estate and provide an executive summary of the article. Explain how it relates to the material in this chapter.

[12] For further explanation, see P. Fass, R. Haft, L. Loffman, and S. Presant, *Tax Reform Act of 1986* (New York: Clark Boardman, 1986).

[13] Material involvement generally means that the taxpayer is involved in real estate operations on a regular, continuous, and substantial basis. Limited partners (discussed in Chapter 18) do not materially participate because active involvement could cause them to lose their limited liability status.

Conclusion

This chapter has introduced concepts and techniques important in the analysis of real estate income property. We discussed ways of projecting cash flows for an investor and ways of evaluating those cash flows with various measures of investment performance. The performance measures discussed in this chapter (*IRR, NPV, DCR,* etc.) will be used throughout the remainder of the text.

Although the techniques in this chapter provide a good initial analysis of a project, as demonstrated by the office building example, many questions remain to explore in more depth. For example, how will taxes affect the performance of the property? Are there alternative ways of financing the property that would be better? The remaining chapters in this part of the text will cover these and other questions.

Another area this chapter covered was the key tax considerations that affect real estate investment decisions. These considerations include determining the appropriate marginal tax rate, rules for depreciating real property, calculation of taxable income from operation of the property, and calculation of capital gain. These tax considerations will enter into different types of analyses that we will address in many of the remaining chapters of the text. In several cases we will be applying the tax rules introduced in this chapter to see how they affect investment. We will consider issues such as, what is the optimal time to dispose of a property? and, is it profitable to renovate a building? Additional tax considerations, such as the taxation of limited partnerships and development projects, will also be introduced in future chapters. Remember, however, that tax laws are subject to revisions that can have a substantial impact on the calculation of taxable income and taxes for real estate income property. Thus, this chapter is not intended to be a substitute for a comprehensive analysis of how current and future tax laws may affect a specific investor. It does, however, point out the general issues that investors should take into consideration regardless of the specifics of the tax law in effect at a particular point in time.

Key Terms

active income *378*
after-tax cash flow *377*
after-tax *IRR 377*
arbitrage investing *354*
base rent *362*
capital gain *374*
contrarian investing *352*
dealers *371*
debt coverage ratio (*DCR*) *369*
depreciable basis *373*
depreciation allowance *372*
effective gross income (*EGI*) *364*
effective tax rate *378*
equity *348*
equity dividend *368*
equity dividend rate *369*
expense stop *363*
growth investing *352*
internal rate of return (*IRR*) *367*
investment analysis *367*
marginal tax rate *374*
market analysis *354*
market timing *352*
net operating income (*NOI*) *364*
passive income *378*
portfolio income *379*
real estate cycle *349*
sector investing *352*
space per employee *355*
taxable income *372*
trophy properties *353*
turnaround investing *354*
value investing *353*

Useful Websites

www.ncreif.com—The National Council of Real Estate Investment Fiduciaries (NCREIF) is an association of institutional real estate professionals who share a common interest in their industry. This site provides real estate information on standards, index, membership, and resources.

www.reiac.org—This is the Real Estate Investment Advisory Council website, whose purpose is to provide for the exchange of ideas, concerns, and experiences between people who conduct commercial real estate transactions within the structure of a nonprofit organization.

www.gecapitalrealestate.com—GE Capital Real Estate. This site offers information on a wide variety of real estate financial products that the company offers.

www.irs.gov—The IRS website can be useful to find information on the taxation of real estate income property. The main page has a search engine to search the IRS website.

www.ciremagazine.com—Website for the Certified Commercial Investment Manager's *Commercial Investment Real Estate* magazine. Great source of articles related to investing in commercial real estate.

www.fiabci.com—This site is a good source for a comparison of the legislation, professional standards, taxation, and licensing in different countries. It also gives a comparative snapshot of various requirements for commercial leases in several countries.

www.china-window.com/china_market/china_real_estate/index.shtml—This website gives information about the real estate market in China. It also gives useful information about the laws and regulations concerning real estate, different sites related to real estate in China, and contact information for different government agencies.

www.city-data.com—This website gives very descriptive and interesting profiles of all U.S. cities. It has tens of thousands of city photos not found anywhere else, hundreds of thousands of maps, satellite photos, stats about residents (race, income, ancestries, education, employment, etc.), geographical data, state profiles, crime data, housing, businesses, birthplaces of famous people, political contributions, city government employment, weather, hospitals, schools, libraries, houses, airports, radio and TV stations, zip codes, area codes, user-submitted facts, similar cities list, and comparisons to averages. In sum, it is a very good site for doing real estate analysis.

Questions

1. What are some of the motivations for investing in real estate income property?
2. Name the four general real estate investment styles and describe each. Identify three specialized styles within these general categories and give examples for each.
3. How may supply and demand affect a property's projected *NOI?*
4. What factors would result in a property increasing in value over a holding period?
5. How do you think expense stops and CPI adjustments in leases affect the riskiness of the lease from the lessor's point of view?
6. Why should investors be concerned about market rents if they are purchasing a property subject to leases?
7. What is meant by *equity?*
8. What is the equity dividend rate?
9. What is the significance of a debt coverage ratio?
10. What are depreciation allowances? What is meant by a *tax shelter?*
11. How is the gain from the sale of real estate taxed?
12. What is meant by an *effective tax rate?* What does it measure?
13. Do you think taxes affect the value of real estate versus other investments?
14. What is the significance of the passive activity loss limitation (PAL) rules for real estate investors?

Problems

1. An office building has three floors of rentable space with a single tenant on each floor. The first floor has 20,000 square feet of rentable space and is currently renting for $15 per square foot. Three years remain on the lease. The lease has an expense stop at $4 per square foot. The second floor has 15,000 square feet of rentable space and is leasing for $15.50 per square foot and has four years remaining on the lease. This lease has an expense stop at $4.50 per square foot. The third floor has 15,000 square feet of leasable space and a lease just signed for the next five years at a rental rate of $17 per square foot, which is the current market rate. The expense stop is at $5 per square foot, which is what expenses per square foot are estimated to be during the next year (excluding management). Management expenses are expected to be 5 percent of effective gross income and are not included in the expense stop. Each lease also has a CPI adjustment that provides for the base rent to increase at half the increase in the CPI. The CPI is

projected to increase 3 percent per year. Estimated operating expenses for the next year include the following:

Property taxes	$100,000
Insurance	10,000
Utilities	75,000
Janitorial	25,000
Maintenance	40,000
Total	$250,000

All expenses are projected to increase 3 percent per year. The market rental rate at which leases are expected to be renewed is also projected to increase 3 percent per year. When a lease is renewed, it will have an expense stop equal to operating expenses per square foot during the first year of the lease. To account for any time that may be necessary to find new tenants after current leases expire and new leases are made, vacancy is estimated to be 10 percent of *EGI* for the last two years (years 4 and 5).

a. Project the effective gross income (*EGI*) for the next five years.

b. Project the expense reimbursements for the next five years.

c. Project the net operating income (*NOI*) for the next five years.

d. How much does the *NOI* increase (average compound rate) over the five years?

e. Assuming the property is purchased for $5 million, what is the overall capitalization rate (going-in rate)?

2. You are an employee of University Consultants, Ltd., and have been given the following assignment. You are to present an investment analysis of a new small residential income-producing property for sale to a potential investor. The asking price for the property is $1,250,000; rents are estimated at $200,000 during the first year and are expected to grow at 3 percent per year thereafter. Vacancies and collection losses are expected to be 10 percent of rents. Operating expenses will be 35 percent of effective gross income. A fully amortizing 70 percent loan can be obtained at 11 percent interest for 30 years (total annual payments will be monthly payments * 12). The property is expected to appreciate in value at 3 percent per year and is expected to be owned for five years and then sold.

a. What is the first-year debt coverage ratio?

b. What is the terminal capitalization rate?

c. What is the investor's expected before-tax internal rate of return on equity invested (*BTIRR*)?

d. What is the *NPV* using a 14 percent discount rate? What does this mean?

e. What is the profitability index using a 14 percent discount rate? What does this mean?

3. (Extension of problem 2) You are still an employee of University Consultants, Ltd. The investor tells you she would also like to know how tax considerations affect your investment analysis. You determine that the building represents 90 percent of value and would be depreciated over 39 years (use 1/39 per year). The potential investor indicates that she is in the 36 percent tax bracket and has enough passive income from other activities so that any passive losses from this activity would not be subject to any passive activity loss limitations. Capital gains from price appreciation will be taxed at 20 percent and depreciation recapture will be taxed at 25 percent.

a. What is the investor's expected after-tax internal rate of return on equity invested (*ATIRR*)? How does this compare with the before-tax *IRR* (*BTIRR*) calculated earlier?

b. What is the effective tax rate and before-tax equivalent yield?

c. How would you evaluate the tax benefits of this investment?

d. Recalculate the *ATIRR* in part (*a*) under the assumption that the investor *cannot* deduct any of the passive losses (they all become suspended) until the property is sold after five years.

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4. **Excel.** Refer to the Monument Office example. Assume the capital gain tax rate is lowered to 5 percent for all capital gain (price increase and depreciation recapture). How does this affect the investor's after-tax *IRR*?

5. Small City currently has 1 million square feet of office space, of which 900,000 square feet is occupied by 3,000 employees who are mainly involved in professional services such as finance, insurance, and real estate. Small City's economy has been fairly strong in recent years, but employment growth is expected to be somewhat lower during the next few years, with projections of an increase of just 100 additional employees per year for the next three years. The amount of space per employee is expected to remain the same. However, a new 50,000 square-foot office building was started before the recession and its space is expected to become available at the end of the current year (one year from now). No more space is expected to become available after that for quite some time.
   a. What is the current occupancy rate for office space in Small City?
   b. How much office space will be absorbed each year for the next three years?
   c. What will the occupancy rate be at the end of each of the next three years?
   d. Based on the above analysis, do you think it is more likely that office rental rates will rise or fall over the next three years?

Appendix A

Approaches to Metro Area Market Forecasting:

Basic Concepts and Data Sources

In Chapters 9 and 10, we discussed the importance of leases and cash flows. In this chapter, we illustrated how to estimate the amount of space tenants need, using office space as an example. In this appendix, we elaborate on the types of industries, businesses, and tenants that are important to the economic base, or the desired amount of space by tenants, in a local market. We provide a basic discussion of economic drivers that affect the economic base, which in turn affects rents. This is done for each of the major types of space: office, warehouse, retail, and multifamily.

Office Markets

As discussed in this chapter, the demand for office space is a *derived demand.* When making leasing decisions, users (tenants) consider how much space is needed for their operations, which in turn is affected by the sales of their products and services to customers. Therefore, as sales to customers and clients increase or decrease, tenants may demand more or less space for operations. Thus, *the demand for office and warehouse space is derived from sales of products and services produced by tenants.*

When forecasting the demand for space, access to revenues and sales data for all firms doing business in a given market would be ideal. Unfortunately, these data are not available either regionally or locally. Therefore, when considering investments and forecasting cash flows, a *proxy variable* that is believed to be highly correlated with the demand for office space is constructed and used as an indicator of demand.

As discussed earlier in this chapter, the proxy variable most commonly used for the case of office properties is office employment. Data on office employment are not collected as a specific data series. They must be compiled from total payroll employment and other data collected from the U.S. Department of Labor (*www.dol.gov*). Payroll employment data, which are collected and classified based on the NAICS, or North American Industrial Classification System (*www.census.gov/eos/www/naics*), are used to develop an estimate of office employment. As shown in Exhibit 11A–1, these data files are classified by major industry classifications that are then broken down further into subcategories.[1] Data are available for all metropolitan areas in the United States.

[1] Data are available for the United States and major metro areas. Further breakdowns (level 3) are also available. In addition, data are available by income/salary ranges for occupation categories. These data are published after a considerable time lag, however.

EXHIBIT 11A–1
NAICS Employment Classifications

Employment Classifications (Level 1)	Employment Classifications (Level 2)
(1) Resources, Mining, and Construction	* Natural Resources and Mining * Construction
(2) Manufacturing	* Nondurable Goods * Durable Goods
(3) Trade, Transportation, and Utilities	* Wholesale Trade * Retail Trade * Transportation and Utilities
(4) Information	* Publishing Industries (Except International) * Motion Picture and Sound Recording * Broadcasting (Except Internet) * Telecommunications * ISPS, Search Portals, and Data Processing * Other Information Services
(5) Financial Activities	* Finance and Insurance * Real Estate, Rental, and Leasing
(6) Professional and Business Services	* Professional and Tech Services * Administration and Waste Services
(7) Education and Health Services	* Education * Health Care and Social Assistance
(8) Leisure and Hospitality	* Art, Entertainment, and Recreation * Accommodations and Food Services
(9) Other Services (except public administration)	* Repair and Maintenance * Personal and Laundry Services * Membership Association and Organizations
(10) Government	* Federal Government

When forecasting the need for office space, it is important to realize that *some industry sectors tend to have a greater percentage of workers concentrated in office buildings as compared to other industry sectors.* For example, surveys have shown that well over 80 percent of employees in the finance, insurance, real estate, legal, and accounting NAICS industry sectors occupy office space. Other important industry sectors include those employing architects, lobbyists, consultants, engineers, and advertising executives. On the other hand, fewer employees in the manufacturing industry sectors occupy office space. Therefore, demand for office space will tend to be greater in cities with a higher concentration of financial services employment (e.g., New York City) than in cities with more manufacturing employment (e.g., Detroit).

There are many *techniques* that may be used to forecast demand for office space for a given market. One very basic approach begins by forecasting total employment (*TE*) in the U.S. economy (see U.S. Department of Labor, payroll employment, *www.dol.gov*). We start with the historical data set for TE_{US}. We then establish its relationship to total output, or real gross domestic product (*RGDP*) for the United States (see the U.S. Bureau of Economic Analysis, *www.bea.gov*, and the U.S. Department of Commerce, *www.commerce.gov*). The goal is to establish the amount of total U.S. employment required to produce *RGDP*, the total output of goods and services produced in the U.S. economy. The resulting equation is

$$\textbf{Step 1:} \quad TE_{US} = f(RGDP_{US})$$

This notation simply means that total employment in the United States (TE_{US}) depends on or is a *function of* real gross domestic product in the United States ($RGDP_{US}$). We will assume for simplicity that this is a linear function that can be expressed by a simple equation for a straight line that has an intercept (α) and a slope (β)[2] To determine what the equation

is, we use simple linear regression. That is, we regress TE_{US} on $RGDP_{US}$ and obtain the equation

$$\hat{TE}_{US} = \alpha + \beta(RGDP_{US})$$

We then use estimates[3] of $RGDP_{US}$ to forecast $\hat{TE}_{US}$. The ^ symbol in the above equation simply means that we are estimating *TE* for the United States based on a statistical relationship.

In step 2, we compile historical data for OE_{HC} (office employment in Hypothetical City) based on payroll employment in those NAICS codes that we believe have the greatest correspondence to office employment (*OE*).

We then regress OE_{HC} on TE_{US}. The resulting equation may be used to forecast office employment in Hypothetical City based on forecasts of TE_{US} for the desired forecast period:

$$\textbf{Step 2:} \quad OE_{HC} = \alpha + \beta(TE_{US})$$

In step 3, we consider the *historic ratio* of OE_{HC} to the existing total stock of office space in Hypothetical City.[4] This can be calculated for past years from the annual total existing stock of office space and the total amount of office employment in Hypothetical City, or $Office\ Space_{HC} \div OE_{HC}$.

The result is the *historic ratio of office space per office employee*, or $HOSPOE_{HC}$. This ratio in Hypothetical City may now be used to determine the amount of additional space required, should $\hat{OE}_{HC}$ increase in future periods based on its relationship with increases in total U.S. employment, as shown in step 2. This assumes that the past, historic ratio of *HOSPOE*, explained in step 3 in Hypothetical City, is indicative of the future relationship.

In our example for Hypothetical City, the amount of office space demanded per office employee during the next period would be

$$\hat{OE}_{HC} \times HOSPOE_{HC} = \text{Amount of future office space demanded in HC}$$

The analyst would then conduct a survey to determine the *actual amount of office space under construction in Hypothetical City* and scheduled for completion during the forecast period.[5] By comparing the amount of space under construction with the forecasted amount of demand, a judgment can be made as to whether the new supply will be greater or less than forecasted demand. From this, judgments can be made regarding the likely course for vacancy rates and rents in Hypothetical City's office market.

Related Considerations

In addition to this very basic approach to forecasting total demand for office space in Hypothetical City, some additional questions relative to the use of data that the analyst must consider are: (1) How far back in time should data be collected? (2) Should data be compiled quarterly or annually? (3) Should seasonal factors be considered? (4) Is demand for *HC* for future periods likely to be related to total U.S. employment in the same way? (5) How far in the future should the forecast extend? (6) Are there leads or lags between this demand and the time required for additional supply to be constructed? (7) Are there any efficiencies brought about by electronic innovation (computers, cell phones, texting, teleconferencing, etc.) that may change the future relationship between office space and office employment relative to the past?

Considerations relative to *submarkets* or *smaller areas* within Hypothetical City are more difficult to estimate. Unlike employment variables, data measuring the differences of transportation—mass transit use, parking, proximity to airports, and transit hubs, all of which may affect demand for office space—may not be collected systematically. Data inputs for these influences are usually dealt with by conducting surveys from time to time. These influences are important and should be considered as "conditioning" or important "context" influences when doing research.

Warehouse/Distribution Markets

Related to the use of NAICS codes to identify employment in industry sectors closely related to office employment, another application of this approach is used frequently to estimate the demand for warehouse/distribution space. A *proxy variable* that is believed to be highly correlated with the sales and output of firms likely to lease significant volumes of warehouse space in a given market is usually constructed from payroll employment data and NAICS classifications. Industry sectors commonly used to focus more directly on warehouse-related employment include import-export, wholesale-retail, transportation, and manufacturing, as well as research and development activities. Employment in these sectors tends to expand and contract with businesses that include distribution/assembly/order fulfillment and shipping operations. As was the case with office employment (*OE*), a data series closely related

[2] Greek letters are typically used when equations are estimated from statistical analysis.

[3] Estimates for future growth in *RGDP* are usually available from research centers at major universities or from proprietary economic forecasting firms. Firms of note include Economy.com and Haver Analytics.

[4] Annual data for the stock of office space are usually obtainable from major office brokers in most metro areas.

[5] Forecasts may be made for various time periods. Forecast periods commonly used may be one, two, or three years. Forecast periods are commonly selected by the estimated time required to complete construction of buildings under way.

to those activities can be constructed from NAICS codes. Warehouse-related employment (WE) can be determined using total payroll employment data that are available for all major metro areas in the United States. Expected demand for warehouse space may be estimated following the steps used in the office market discussion relative to $RGDP_{US}$ and TE_{US} by substituting WE_{HC} in place of OE_{HC}. Based on the forecasted change in WE_{HC}, the demand for warehouse space may then be based on the historic ratio of warehouse space (obtained by broker surveys) per warehouse employee (WE). Given the expected change in $\hat{WE}$, the demand for space may then be compared to warehouse space actually under construction to judge whether or not vacancy rates and rents for warehouse space in Hypothetical City are likely to increase or decrease.

Related Considerations

Many of the same issues discussed regarding forecasting office space are relevant for the warehouse market. Additional major considerations include trends in outsourcing (overseas) manufacturing, import-export activity, energy-fuel costs, the relative costs of rail, air, truck, and alternative/combined modes of transporting goods/inventory, as well as research and development activities. Data-reflecting activities and trends in these influences are important and should be incorporated, when possible, in forecasts.

Multivariate Analysis—Unique Regional Features in Office/Warehouse Markets

In the above formulations for Hypothetical City, we have basically asserted that the need for office and warehouse space in Hypothetical City is driven by growth in total employment in the United States. In short, we are establishing a systematic relationship between past employment growth in HC and its relationship to U.S. employment growth. We are also assuming that the pattern between HC and the United States will continue during the forecast period.

In some circumstances, the analyst may be able to improve the forecast for a local or regional market by *adding one or more additional variables* to the analysis. These variables must (1) be important enough to differentiate a local market (Hypothetical City) from U.S. total employment and (2) actually improve the accuracy of the forecast.[6] An example can be used for Houston, Texas, where the energy industry is a major driver of local employment. Hence, in addition to the TE_{US}, we use another variable, WT (the price of West Texas Intermediate crude oil) to represent an additional driver of local office employment. When forecasting office employment in Houston (OE_H) which is a major center for energy production, distribution, refining, and so forth, we may consider:

$$OE_H = f(TE_{US}\, WTI)$$

In other words, office employment in Houston (OE_H) is related to total U.S. employment (TE_{US}) and the price of West Texas Intermediate crude oil (WTI) (or some other proxy variable for energy prices). (See: U.S. Energy Information Administration, *www.eia.doe.gov*.) Regressing these relationships, we have

$$\hat{OE}_H = \alpha + \beta_1(TE_{US}) + \beta_2(WTI)$$

If this observation about energy prices is accurate, our forecast for office employment in Houston is likely to be more accurate than would be the case if the forecast did not include WTI. Similar applications could be made in metro areas such as New York City, where instead of WTI, the exchange rate between the U.S. dollar and other currencies (a proxy variable that reflects the extent of international capital flows) has been suggested to be an important explanatory variable.

Modifying forecasts by including additional variables is not without problems, however. This is because values for those variables (WTI, exchange rates, etc.) also must be forecasted in addition to TE_{US} when attempting to forecast future OE. Nonetheless, these additional variables reinforce the idea that employment in many local markets is affected not only by drivers of U.S. economic growth but also by unique features in the *economic base* of metro areas. If these factors are sufficiently different from drivers of total employment in the United States, including additional variables in the metro area forecasts may be warranted.

Retail Markets

Although the demand for retail space also is a *derived demand*, the *drivers* are very different than those discussed in relation to the office and warehouse sectors. Generally, income, consumer spending, and/or population growth tend to be important drivers of demand for retail shopping space.

Population Growth

One ratio that is carefully considered by many analysts when considering the demand for retail space in local markets is *retail space per capita*. This ratio can be interpreted as the amount of retail space per person in the local market being analyzed. At the most basic level of analysis, this indicator suggests that all individuals consume by shopping directly (or indirectly for minor children, dependents, etc.). Therefore, population growth is an extremely important driver for space needed by retail business establishments. One approach that may be used to begin a forecast of the desired amount of total retail space for Hypothetical City:

Step 1. Conduct a survey to establish total retail space (TRS) in Hypothetical City.[7]

[6] Regarding accuracy in forecasting, see an elementary statistics textbook for tests of significance, "goodness of fit," and other topics.

[7] Data for total retail space are usually available from local brokers, property managers, and so on. Population data are available from the U.S. Census Bureau, *www.census.gov*.

Step 2. Calculate the annual ratio of $TRS_{HC} \div Population_{HC} =$ Historical retail space per capita ($HTRSPC_{HC}$).

Step 3. Establish the statistical relationship between POP_{HC} and POP_{US} or

$$POP_{HC} = f(POP_{US})$$

Then, given expected growth in POP_{US}, we get expected POP_{HC} as

$$\hat{POP}_{HC} = \alpha + \beta(POP_{US})$$

Then, using the historic ratio $HTRSPC_{HC}$ calculated in step 2, we multiply the increase in population for Hypothetical City and thereby obtain an estimate for the desired amount of total retail space, or

$$HTRSPC_{HC} \times \hat{POP}_{HC} = \hat{TRS}_{HC}$$

We can then compare $\hat{TRS}_{HC}$ to the actual amount of existing retail space, plus space under construction in Hypothetical City, to determine the likelihood of vacancy and rent (cash flows) increasing or decreasing for the forecast period.

Multivariate Analysis: Unique Regional Features in Retail Markets

Depending on the nature of the market being analyzed, the simplified approach using population could be modified by considering changes in income, age groups, immigration, and other characteristics important to retail shopping in a local market.

Income Variables

Very important income concepts that are closely followed by retail property analysts include

1. *Personal income.* Personal income measures the income of households from wages and salaries, fringe benefits, profits from self-employment, rent, patents, copyrights, royalties, interest, dividends, and other sources. Personal income data are available for all major metro areas in the United States (see Bureau of Economic Analysis, *www.bea.gov*, and the U.S. Department of Commerce, *www.commerce.gov*).
2. *Changes in the distribution of personal income.* An increase in the concentration of income earned by a smaller percentage of the population in an area may imply greater demand for luxury goods and specialty retail.
3. *Concentration of income by age group.* Personal income also may be measured by age group. For example, higher income, older households versus lower income, younger households may be an important distinction for retail shopping in some local markets.

Consumer Spending Variables

In addition to demographics and income, *consumer spending* is also followed closely by retail analysts. Consumer spending can be classified in three general ways based on data collected by the U.S. Department of Commerce (*www.census.gov/retail*):

1. *Personal consumption expenditures (PCE).* This is the broadest measure of spending and consists of consumer expenditures on all goods and services. This includes spending on durable and nondurable goods (utilities, autos, appliances, gasoline, food, medical, education, etc).
2. *Retail sales.* This category is more specific and includes all consumer spending on goods and services purchased from *retail establishments.* This concept is narrower in focus than *PCE* in that utilities, transportation, and other services not purchased in retail establishments are excluded. Data collected for this concept are available for all major metro areas. Demographics are important to the retail sales category of consumer spending. For example, a greater concentration of older residents (retirees) versus younger age groups affects retail shopping patterns. For example, consider Palm Beach, Florida (older) versus Dallas, Texas (younger).
3. *General merchandise, apparel and accessories, furniture, and other sales (GAFO).* This concept includes those retail sales *most likely* to be purchased from establishments in shopping centers (particularly apparel) or in stand-alone stores. Because this retail activity is most closely related to activities at malls, and similar retail establishments, it is very closely followed by investors in retail properties.

Submarket Analysis—Retail Trade Areas

After considering retail demand at the metro level, in cases where the analysis is focused on a specific location (submarket), retail analysts rely heavily on what is referred to as *trade area analysis.* This analysis is usually applied in one of two ways. In the first application, developers and/or investors may have an interest in a particular site or property and want to evaluate its potential retail demand. In this case, they collect and evaluate data corresponding to the population, income, age, gender, and education of households *living in proximity to the site or property in question.*[8] This information helps the analyst evaluate the appropriate retail mix of shops (grocery, bank, electronics, etc.) that will tend to maximize value.

The second application is used by retailers. This application usually involves *data mining. Data mining* involves analyzing attributes in locations where retailers have established successful operations. Economic/demographic characteristics in these successful locations and the corresponding trade areas are then used to identify potential sites and properties for future operations.

[8] Usually, such an analysis would be done in a one-, three-, or five-mile radius.

Multifamily Housing Markets

The demand for multifamily housing is generally related to several very important influences. A very important driver to begin a forecast is the number of households occupied by the 20- to 34-year-old age range. Research has shown that individuals ranging from 20 to 34 years of age represent the largest percentage of renters among all age groups. As the average age of a household exceeds 34 years, the percentage of renters tends to decline. This is because a greater percentage of older householders prefer to own rather than rent. To begin our forecast of multifamily housing units ($MFHU_{HC}$), we first obtain historical data for the number of multifamily units and the number of households in the 20- to 34-year-old age (AGE) group in Hypothetical City. We establish the functional relationship as

$$MFHU_{HC} = f(AGE_{HC})$$

We then estimate the basic statistical relationship as

$$\hat{MFHU}_{HC} = \alpha + \beta_1(AGE_{HC})$$

Future values for AGE are readily obtainable for all metro areas from the U.S. Census Bureau (*www.census.gov*).

Multivariate Analysis: Other Drivers of Multifamily Demand

Other important drivers of the demand for multifamily housing include:

1. *Income.* As average household income rises in a local market, holding all else constant, the demand for renter housing tends to fall relative to owned housing. This is because higher income households tend to prefer to own housing rather than rent.
2. *Price of single-family housing (or affordability).* As the price of single-family housing increases, holding all else constant, affordability of homeownership declines and the demand for multifamily housing tends to increase.
3. *Interest rates.* As interest rates rise, fewer households qualify for mortgage loans and therefore households tend to rent rather than own.

Essentially, the above discussion indicates that the demand for multifamily housing units ($MFHU$) in Hypothetical City is related to the number of households in the 20 to 34-year-age group (U.S. Census Bureau, *www.census.gov*), average personal income (PI) (U.S. Department of Commerce, *www.commerce.gov*), affordability of single-family housing (National Association of Realtors, *www.realtor.org*), and interest rates (Federal Reserve System Board of Governors, *www.federalreserve.gov*). Historical data needed for forecasting may be obtained from each source (link) indicated.

After making this $MFHU_{HC}$ forecast, the analyst may then determine whether the *actual total number of multifamily units, plus those under construction* in Hypothetical City are greater or less than the number forecasted. A judgment can then be made as to the impact on vacancies and rent (cash flows).

Other Considerations and Influences

In addition to the very basic and general approach to forecasting multifamily housing demand, there are several other trends that analysts may consider in regard to this property sector. These include

Market Segments

* Age-restricted housing (seniors)
* Assisted living communities
* Retirement housing
* Recreational centered (golf, health)
* Downtown (conversions, lofts, etc.)
* Suburban (garden style)

Demographic Refinements

* Rural-to-urban migration
* Immigration
* Marriages
* Divorce rates

Supply Considerations: All Income-Producing Property Types

Thus far, we have illustrated some very general approaches to forecasting *demand* for the four major property types. When considering drivers affecting the *supply* of existing space and the construction of new space by developers in the office, warehouse, retail, and multifamily sectors, *forecasting becomes even more complex and, generally, less reliable.* Generally, the supply side for each property type is driven by many of the same factors. These include construction costs ($ConCost$) (i.e., the price of land, labor, and materials), interest rates (i) on construction loans, and existing vacancies (VAC). Given these factors, general function for supply (S) could be:

$$S = f(ConCost,\ i,\ VAC)$$

Generally, when vacancies decline, developers expect rents to increase. They then weigh construction and interest costs relative to expected rents to determine whether the construction of additional space may be profitable. However, additions to the supply of space are not continuous. This means that the scale of projects (e.g., 1,000 apartment units or 1,000,000 sq. ft. of space) tends to be "lumpy" and varies considerably as to the time required to acquire, finance, build, and lease. Large amounts of space being constructed in a multiphased and multiperiod process complicate forecasting. For this reason, investors and developers usually (1) supplement statistical estimation with actual market surveys of occupied space

rents and units under construction for each property type and (2) continually monitor building permits, zoning, hearings, and so forth. Examples of other issues likely to vary by market area and affect supply include

* Building codes
* Zoning restrictions
* Impact fees
* Inspections
* Historic significance
* Environmental impact
* Adequacy of infrastructure
* Terrain

Appendix B

RealNex Office Example

RealNex is a cloud-based DCF program that is designed specifically to solve investment analysis and valuation problems such as the office building analysis discussed in this chapter. Although this type of analysis can be done in Excel, it can become cumbersome to modify Excel templates for all the different ways that leases are structured including different start and end dates, different expense passthrough terms, and so on. A username and password to use RealNex, while using this textbook in a course, can be obtained by registering at the following website: info.realnex.com/edu.

In this appendix, we will show the inputs for RealNex to replicate the office building investment analysis example in the chapter and then illustrate a few additional analyses that can be done such as solving for the value of the property given a discount rate as was discussed in the previous chapter on valuation of income properties.

All of the inputs shown in the appendix can also be imported by selecting Monument Office as the file in the RealNex Real Estate Exchange that is one of the services in the toolbar at the top of the RealNex Market Edge screen. The procedure to import a file from the Academic Community was illustrated in the appendix at the end of Chapter 10.

Exhibit 11B–1 shows the basic inputs for the Monument Office building example in Chapter 22. Most should be self-explanatory. There are only three tenants in this example but we have reserved inputs for three additional tenants. Users can also easily change the input for the number of tenants to add as many as needed.

We have specified a starting date for the analysis of July 2014. This will be important because as we will see, a starting date is also input for each lease. The property type input (office) is important because that determines many of the other inputs available for the analysis. For example, the inputs for apartments are based on unit types rather than leases. The discount rate will be used to estimate a property based on the present value of the NOI and projected resale (before considering financing and federal income taxes). Note that the terminal cap rate to estimate the resale price is indicated to apply to the subsequent year, that is, one year after the end of the holding period which is the way we discussed it is typically done.

Exhibit 11B–2 shows additional inputs for any capital reserves, financing, and tax information. There are no capital reserve accounts being set up in this example. There is a loan as indicated in the loan details with the monthly payment calculated. The investor's tax rate is also specified for ordinary income and for capital gains. There is a drop-down menu to determine whether the passive loss rules apply to this property as discussed in the chapter. A state income tax can also be specified although there is none in this example.

Exhibit 11B–3 shows the basic inputs for the three tenants including the number of square feet in the lease, the base rent, and the starting date for the lease. The lease start date was not specified since the leases are already in effect. What is important for these three leases in the termination date and as we will see the inputs for expense stops and what happens when the existing leases terminate.

The speed analysis at the top is an alternative way of entering data in situations where a more detailed lease-by-lease analysis is not deemed necessary. These inputs should be self-explanatory.

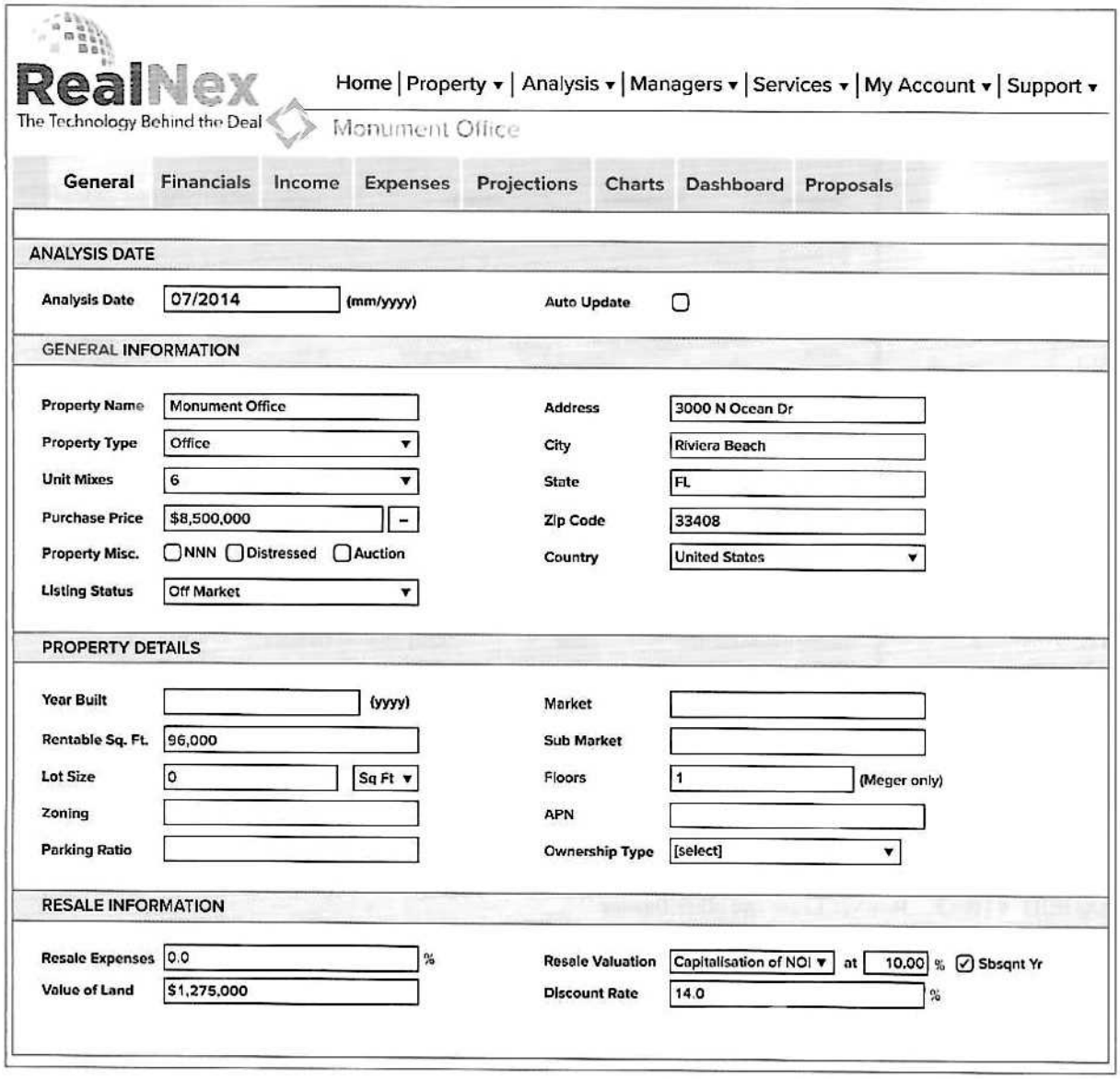
The rent abatement input is for situations where there is a free rent period during the initial term of the lease. We will look at the term increases inputs next that are available after clicking on this entry.

Exhibit 11B–4 shows additional lease information for the bank. When the existing lease expires at the end of the remaining three-year term, it will be replaced by a new lease with a five-year term. There will be an increase of $2.75 from the contract rent on the existing lease to take it to the market rent we have projected for year 4 when the new lease starts. Recall that the base rent is $14 per square foot and the market rent for year 4 is projected to be $16.75. The increase of $2.75 will also apply on subsequent lease renewals but they are beyond our analysis holding period.

We could use this input screen to specify any increases in rent for the existing lease during its current lease term. For example, the lease could have a rent step which increases the rent after the third year of the lease which, since this lease started two years ago, would be the current year (year 1 of our analysis). But in this example, there are no rent steps or CPI adjustments that would increase the rent during the lease term.

EXHIBIT 11B–1 RealNex Basic Inputs

Source: RealNex, 2014.



The bank lease does have an expense passthrough provision to pass through any increase in expenses above a rent stop which for this lease is $4 per square foot. Multiplying this by the 70,000 square feet for the bank's lease, results in an expense stop of $280,000. If the reimbursable expenses (all but management in this example) exceed $4.00 per square foot, then the excess will be passed through to this tenant based on 70,000 square feet.

The inputs for the other two leases (not shown) would be the same as for the bank except that the increase to market rent at the end of these two leases works out to be $3.00 for each lease. The insurance company goes from a base rent of $14.50 to $18.50 for year 5 and the broker goes from $15.00 to $18.00 in year 6. We only have a five-year holding period but recall that year 6 is used to estimate the resale price with a terminal cap rate.

EXHIBIT 11B–2 RealNex Loan and Tax Inputs

Source: RealNex, 2014.

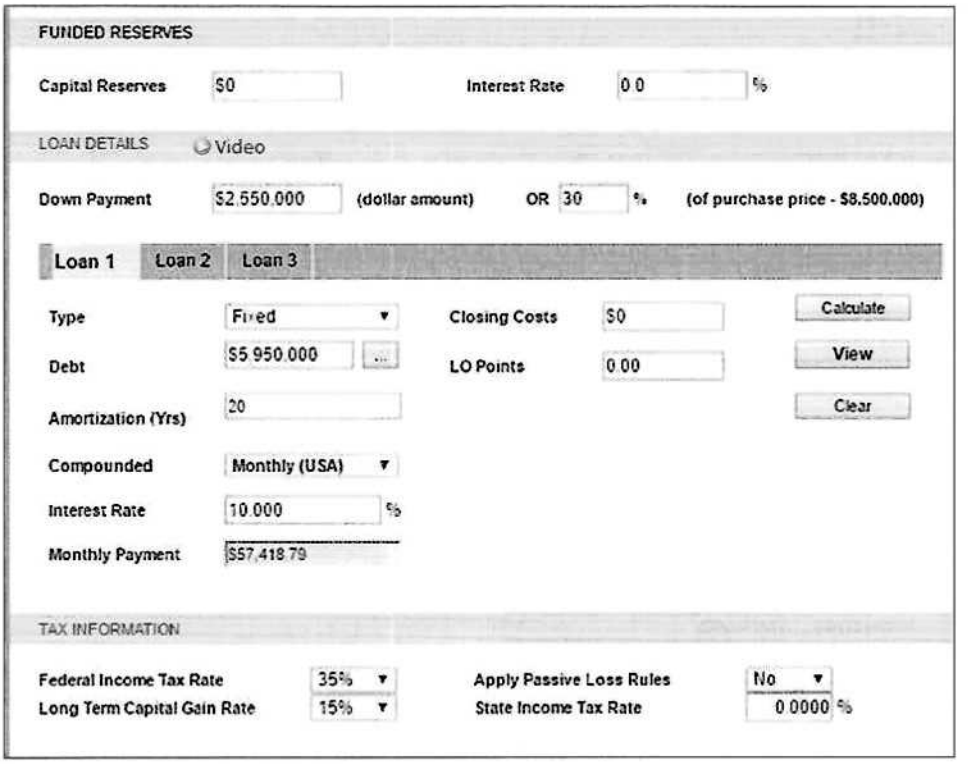


EXHIBIT 11B–3 RealNex Lease and other Income

Source: RealNex, 2014.

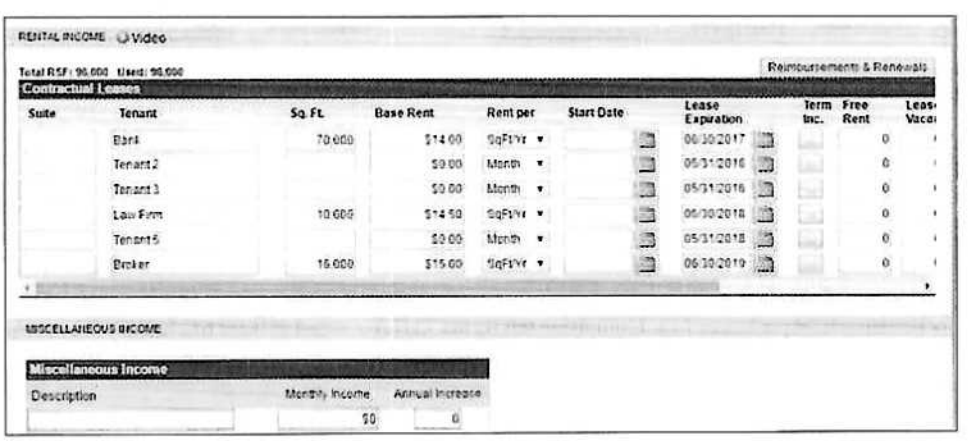


EXHIBIT 11B–4 RealNex Lease Renewal and Lease Reimbursements

Source: RealNex, 2014.

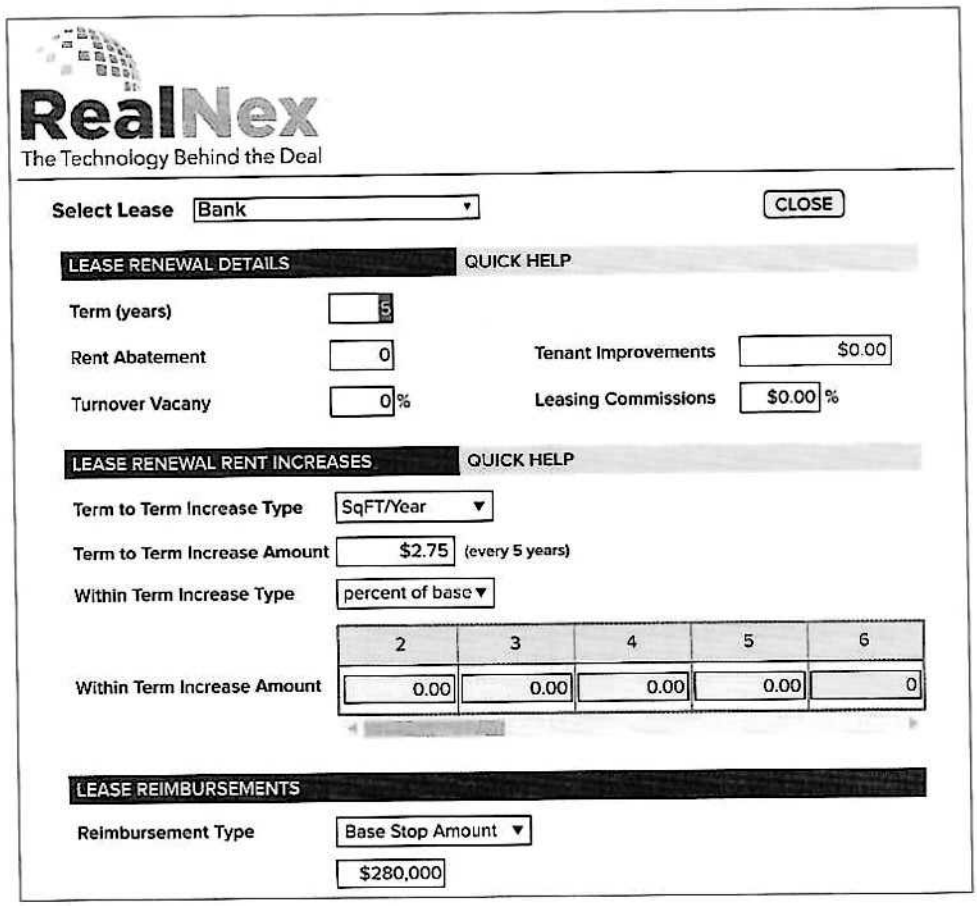


Exhibit 11B–5 shows the assumptions for the operating expenses including any reserve allowance for replacement of longer lived items like a roof replacement. There are different options for how the expenses work. For this example, the management fee is a percent of base rent plus any reimbursable expenses. Another option in the drop down menu (not shown) is to have the management fee based on a percent of effective gross income (EGI).

There is no replacement allowance in this example. Note the speed analysis option for entering expenses. But in this case, we need to specify more details about each expense such as its growth rate. We can also specify whether each expense is reimbursable or not. In this case, all expenses (except management) are reimbursable.

The final input allows you to specify a year in which you expect capital expenses to occur such as repaving a driveway. This could be an alternative to or in addition to any reserve allowance already specified. In this example, we have not anticipated capital expenditures during the projected holding period.

Exhibit 11B–6 allows you to enter a global vacancy rate. It is a minimum vacancy rate that applies for the years specified that allows for unexpected vacancy. For example, in our analysis, we assumed the tenants would renew. But if they do not, there will be some vacancy until a new tenant if found. The individual lease inputs allowed us to specify an expected vacancy due to the time to renew that lease. But we have chosen the alternative way of accounting for this possible vacancy by indicating that there will be a 5 percent vacancy rate starting in year 4 when the first lease is projected to be based on a renewal or new tenant. The same rate will apply for subsequent years.

Exhibit 11B–7 shows the projected NOI for years 1 to 6. Again, we have a five-year holding period but year 6 NOI is needed to estimate the resale price. Actually, RealNex

EXHIBIT 11B–5 RealNex Expense Assumptions

Source: RealNex, 2014.

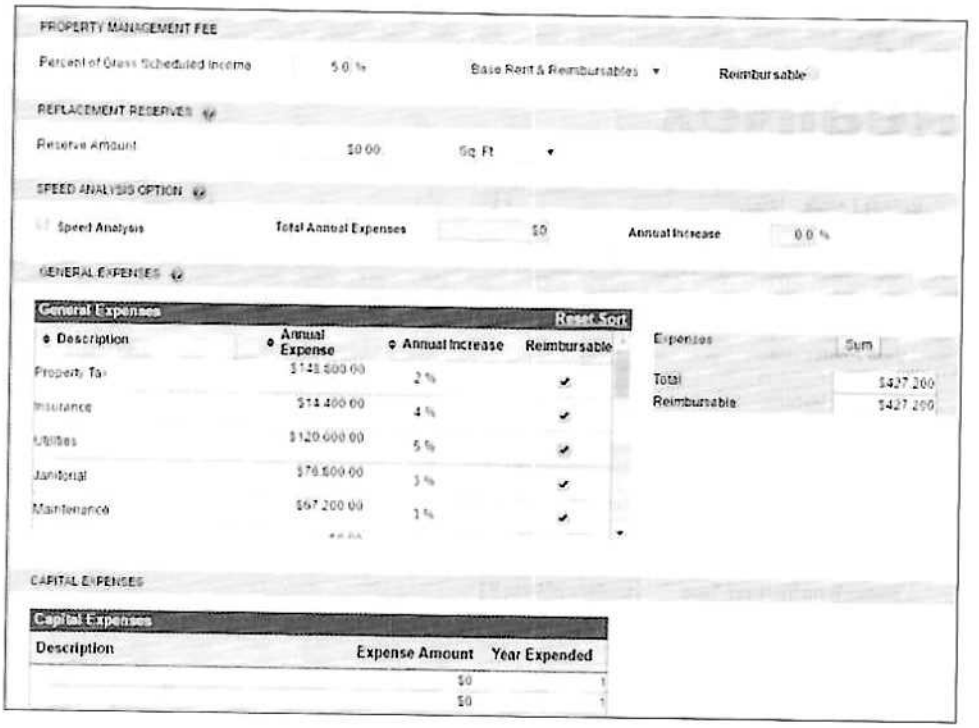
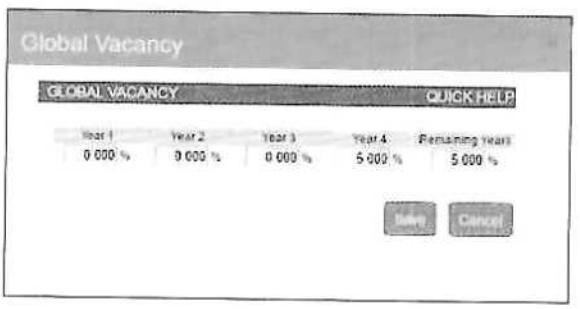


EXHIBIT 11B–6 RealNex Vacancy Assumptions

Source: RealNex, 2014.



automatically does the projections for 20 years, but we are only interested in the projections up to year 6.

Exhibit 11B–7 shows the projections for resale. The projections are shown for each possible holding period up to year 5 in the exhibit but we are only interested in the one for year 5. Note the IRR of 13.38 percent, which is the same as we showed in the chapter for the after-tax leveraged IRR for a five-year holding period.

Exhibit 11B–8 also has a row with the PV of NOI and Reversion. As suggested, this is the present value of just the NOI and reversion which are both before considering financing and before considering federal income taxes. This is based on the discount rate that was entered which, in this case, was 14 percent. The number for year 5 of $8.011,186 indicates that this is what should be paid for the property if the investor wants a 14 percent IRR. This is less than the purchase price because the actual IRR of 13.38 percent is less than 14 percent.

Exhibit 11B-9 shows the details of the calculation of after-tax cash flow from sale each possible year. Again, in this case, we focus on the results for a five-year holding period. These

EXHIBIT 11B–7 RealNex NOI Projections

Source: RealNex, 2014.

RealNex
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Monument Office

General | Financials | Income | Expenses | Projections | Charts | Dashboard | Proposals

Select Projection: Annual Property Operating Data

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Rental Income	$1,365,000	$1,365,000	$1,365,500	$1,557,500	$1,587,500	$1,635,500
Expense Reimbursements	$33,500	$47,372	$61,756	$13,693	$21,056	$24,657
GROSS SCHEDULED INCOME	$1,398,500	$1,426,756	$1,426,756	$1,571,193	$1,608,556	$1,660,157
General Vacancy	$0	$0	$0	($78,560)	($80,428)	($83,008)
GROSS OPERATING INCOME	$1,398,500	$1,412,372	$1,426,756	$1,492,633	$1,528,128	$1,577,149
Expenses						
Property Management Fee	($69,925)	($70,619)	($71,338)	($78,560)	($80,428)	($83,008)
Property Tax	($148,800)	($151,776)	($154,812)	($157,908)	($161,066)	($164,287)
Insurance	($14,400)	($14,976)	($15,575)	($16,198)	($16,846)	($17,520)
Utilities	($120,000)	($126,000)	($132,300)	($138,915)	($145,861)	($153,154)
Janitorial	($76,800)	($79,104)	($81,477)	($83,921)	($86,439)	($89,032)
Maintenance	($67,200)	($69,216)	($71,292)	($73,431)	($75,634)	($77,903)
TOTAL OPERATING EXPENSES	($497,125)	($511,691)	($526,794)	($548,933)	($566,274)	($584,904)
NET OPERATING INCOME	$901,375	$900,681	($899,962)	$943,700	($961,855)	$992,245

EXHIBIT 11B–8 RealNex Investment Summary

Source: RealNex, 2014.

Select Projection: Investment Return Analysis

Description	Year 1	Year 2	Year 3	Year 4	Year 5
Cash Flow - To Date	$165,699	$330,044	$489,935	$673,853	$864,706
Net Resale Proceeds	$2,601,823	$2,659,189	$3,082,782	$3,314,787	$3,658,810
Invested Capital	($2,550,000)	($2,550,000)	($2,550,000)	($2,550,000)	($2,550,000)
Net Return on Investment	$217,522	$439,233	$1,022,717	$1,438,640	$1,973,516
Internal Rate of Return	8.53%	8.53%	12.57%	12.78%	13.38%
Modified IRR	8.53%	8.69%	12.65%	12.88%	13.44%
NPV (cash flow + reversion)	($43,157)	($86,806)	$155,559	$214,443	$320,591
PV (NOI + reversion)	$8,244,184	$8,016,665	$8,100,331	$8,022,517	$8,011,186

EXHIBIT 11B–9 RealNex Resale Price Estimates

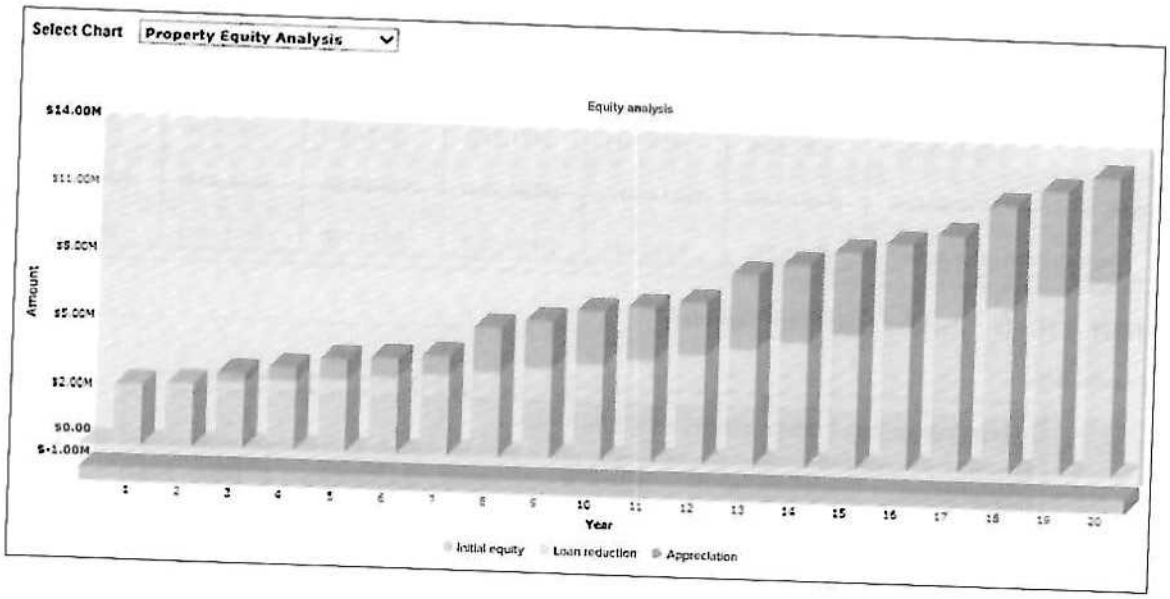
Source: RealNex, 2014.

Select Projection: Resale Analysis

Description	Year 1	Year 2	Year 3	Year 4	Year 5
Projected Property Value	$8,496,994	$8,490,209	$8,902,831	$9,074,102	$9,360,805
Resale Expenses	$0	$0	$0	$0	$0
Proceeds b/f Debt Payoff	$8,496,994	$8,490,209	$8,902,831	$9,074,102	$9,360,805
Basis at Acquisition	$8,500,000	$8,500,000	$8,500,000	$8,500,000	$8,500,000
Depreciation	($177,518)	($362,767)	($548,016)	($733,265)	($918,514)
Adjusted Tax Basis	$8,322,482	$8,137,233	$7,951,984	$7,766,735	$7,581,486
Resale Tax Gain (Loss)	$174,513	$352,977	$950,847	$1,307,367	$1,779,319
Resale Tax Benefit (Cost)	($43,628)	($88,244)	($197,429)	($269,432)	($358,749)
Loan Principal Balance	($5,851,543)	($5,742,776)	($5,622,620)	($5,489,883)	($5,343,245)
Net Resale Proceeds	$2,601,823	$2,659,189	$3,082,782	$3,314,787	$3,658,810

EXHIBIT 11B–10 RealNex Equity Graph

Source: RealNex, 2014.



are the cash flows used to get the cash flow from resale (net resale proceeds) in Exhibit 11B-8.

Finally, RealNex includes a number of charts that provide additional visual insight for analysts. Three of these are shown in Exhibits 1B–10 through 1B–12, and should be self-explanatory.

We encourage readers to register for use of RealNex while enrolled as a student. You will find it to be easy to use and a complement to use of spreadsheets. Learning to use a program like RealNex will also make it easy to understand any other DCF programs that are on the market because the concepts are generally the same in all the programs. What we like about RealNex is its ease of use for an initial exposure to lease-by-lease DCF programs and the ability to use it as long as you have an Internet connection—even from many mobile devices such as iPads.

EXHIBIT 11B–11 RealNex Income and Cash Flow Graph

Source: RealNex, 2014.

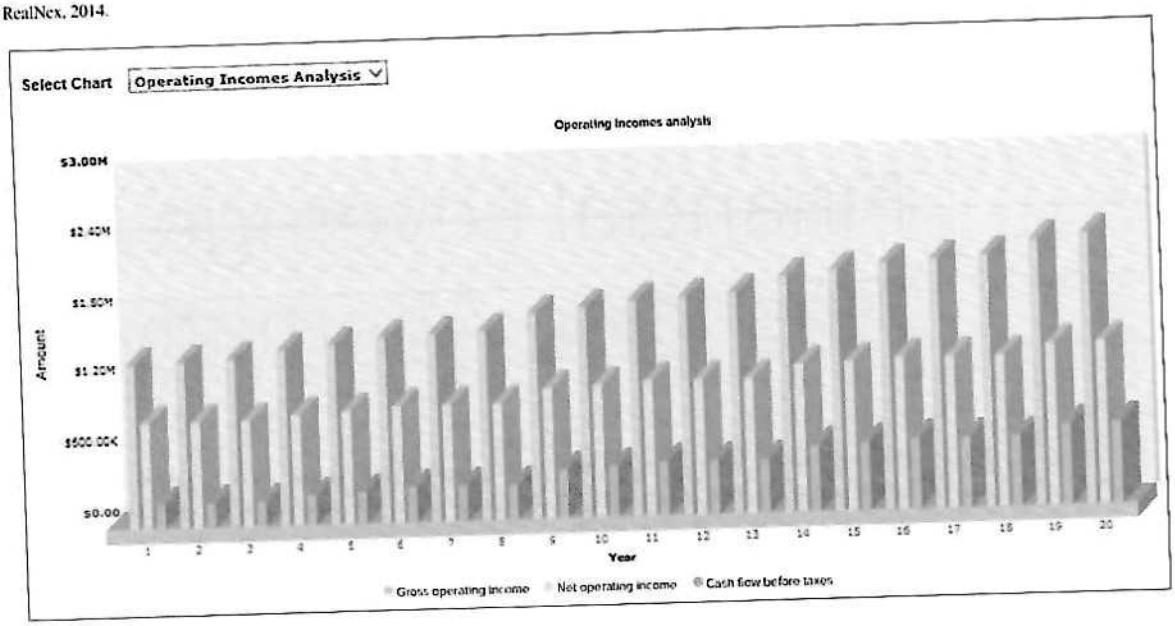


EXHIBIT 11B–12 RealNex Income and Expense Flow Graph

Source: RealNex, 2014.