CHAPTER 26

Valuing Real Estate

The valuation models developed for financial assets are applicable for real assets as well. Real estate investments comprise the most significant component of real asset investments. For many years, analysts in real estate have used their own variants on valuation models to value real estate. Real estate is too different an asset class, they argue, to be valued with models developed to value publicly traded stocks.

This chapter presents a different point of view: that while real estate and stocks may be different asset classes, the principles of valuation should not differ across the classes. ~~In particular, the value of real estate property should be the present value of the expected cash flows on the property.~~ That said, there are serious estimation issues to confront that are unique to real estate and that will be dealt with in this chapter.

REAL VERSUS FINANCIAL ASSETS

Real estate and financial assets share several common characteristics: Their value ~~is~~ determined by the cash flows they generate, the uncertainty associated with these cash flows, and the expected growth in the cash flows. Other things remaining equal, the higher the level and growth in the cash flows, and the lower the risk associated with the cash flows, the greater is the value of the asset.

There are also significant differences between the two classes of assets. There are many who argue that the risk and return models used to evaluate financial assets cannot be used to analyze real estate because of the differences in liquidity across the two markets and in the types of investors in each market. The alternatives to traditional risk and return models will be examined in this chapter. There are also differences in the nature of the cash flows generated by financial and real estate investments. In particular, real estate investments often have finite lives, and have to be valued accordingly. Many financial assets, such as stocks, have infinite lives. These differences in asset lives manifest themselves in the value assigned to these assets at the end of the estimation period. The terminal value of a stock, 5 or 10 years hence, is generally much higher than the current value because of the expected growth in the cash flows, and because these cash flows are expected to continue forever. The terminal value of a building may be lower than the current value because the usage of the building might depreciate its value. However, the land component will have an infinite life and, in some cases, may be the overwhelming component of the terminal value.

THE EFFECT OF INFLATION: REAL VERSUS FINANCIAL ASSETS

For the most part, real and financial assets seem to move together in response to macroeconomic variables. A downturn in the economy seems to affect both adversely, as does a surge in real interest rates. There is one variable, though, that seems to have dramatically different consequences for real and financial assets, and that is inflation. Historically, higher than anticipated inflation has had negative consequences for financial assets, with both bonds and stocks being adversely impacted by unexpected inflation. Fama and Schwert, for instance, in a study on asset returns report that a 1 percent increase in the inflation rate causes bond prices to drop by 1.54 percent and stock prices by 4.23 percent. In contrast, unanticipated inflation seems to have a positive impact on real assets. In fact, the only asset class that Fama and Schwert tracked that was positively affected by unanticipated inflation was residential real estate.

Why is real estate a potential hedge against inflation? There are a variety of reasons, ranging from more favorable tax treatment when it comes to depreciation to the possibility that investors lose faith in financial assets when inflation runs out of control and prefer to hold real assets. More importantly, the divergence between real estate and financial assets in response to inflation indicates that the risk of real estate will be very different if viewed as part of a portfolio that includes financial assets than if viewed as a standalone investment.

DISCOUNTED CASH FLOW VALUATION

The value of any cash-flow-producing asset is the present value of the expected cash flows on it. Just as discounted cash flow valuation models, such as the dividend discount model, can be used to value financial assets, they can also be used to value cash-flow-producing real estate investments.

To use discounted cash flow valuation to value real estate investments it is necessary to:

- Measure the riskiness of real estate investments, and estimate a discount rate based on the riskiness.
- Estimate expected cash flows on the real estate investment for the life of the asset.

The following section examines these issues.

Estimating Discount Rates

Chapters 6 and 7 presented the basic models that are used to estimate the costs of equity, debt, and capital for an investment. Do those models apply to real estate as well? If so, do they need to be modified? If not, what do we use instead?

This section examines the applicability of risk and return models to real estate investments. In the process, we consider whether the assumption that the marginal investor is well diversified is a justifiable one for real estate investments, and, if so, how best to measure the parameters of the model—risk-free rate, beta, and risk

premium—to estimate the cost of equity. We also consider other sources of risk in real estate investments that are not adequately considered by traditional risk and return models and how to incorporate these into valuation.

Cost of Equity ~~The two~~ basic models used to estimate the cost of equity for financial assets ~~are the capital asset and the arbitrage pricing models. In both models~~, the risk of any asset, real or financial, is defined to be that portion of that asset's variance that cannot be diversified away. This nondiversifiable risk is measured by the market beta in the capital asset pricing model (CAPM) and by multiple factor betas in the arbitrage pricing model ~~(APM)~~. The primary assumptions that ~~both~~ models make to arrive at these conclusions are that the marginal investor in the asset is well diversified and that the risk is measured in terms of the variability of returns.

If one assumes that these models apply for real assets as well, the risk of a real asset should be measured by its beta relative to the market portfolio in the CAPM and by its factor betas in ~~the APM~~. If we do so, however, we are assuming, as we did with publicly traded stocks, that the marginal investor in real assets is well diversified.

Are the Marginal Investors in Real Estate Well Diversified? Many analysts argue that real estate requires investments that are so large that investors in it may not be able to diversify sufficiently. In addition, they note that real estate investments require localized knowledge, and that those who develop this knowledge choose to invest primarily or only in real estate. Consequently, they note that the use of the capital asset pricing model or ~~the arbitrage pricing model~~, which assume that only nondiversifiable risk is rewarded, is inappropriate as a way of estimating cost of equity.

There is a kernel of truth to this argument, but it can be countered fairly easily by noting that:

- Many investors who concentrate their holdings in real estate do so by choice. They see it as a way of leveraging their specialized knowledge of real estate. Thus, we would view them the same way we view investors who choose to hold only technology stocks in their portfolios.
- Even large real estate investments can be broken up into smaller pieces, allowing investors the option of holding real estate investments in conjunction with financial assets.
- Just as the marginal investor in stocks is often an institutional investor with the resources to diversify and keep transactions costs low, the marginal investor in many real estate markets today has sufficient resources to diversify.

If real estate developers and private investors insist on higher expected returns because they are not diversified, real estate investments will increasingly be held by real estate investment trusts, limited partnerships, and corporations, which attract more diversified investors with lower required returns. This trend is well in place in the United States and may spread over time to other countries as well.

Measuring Risk for Real Assets in Asset Pricing Models Even if it is accepted that the risk of a real asset is its market beta in the CAPM, and its factor betas in ~~the APM~~, there are several issues related to the measurement and use of these risk

parameters that need to be examined. To provide some insight into the measurement problems associated with real assets, consider the standard approach to estimating betas in the capital asset pricing model for a publicly traded stock. First, the prices of the stock are collected from historical data, and returns are computed on a periodic basis (daily, weekly, or monthly). Second, these stock returns are regressed against returns on a stock index over the same period to obtain the beta. For real estate, these steps are not as straightforward.

Individual Assets: Prices and Risk Parameters The betas of individual stocks can be estimated fairly simply because stock prices are available for extended time periods. The same cannot be said for individual real estate investments. A piece of property does not get bought and sold very frequently, though similar properties might. Consequently, price indexes are available for classes of assets (for example, downtown Manhattan office buildings), and risk parameters can be estimated for these classes.

Even when price ~~indexes~~ are available for classes of real estate investments, questions remain about the comparability of assets within a class (Is one downtown building the same as any other? How does one control for differences in age and quality of construction? What about location?) and about the categorization itself (office buildings versus residential buildings; single-family versus multifamily residences)?

There have been attempts to estimate market ~~indexes~~ and risk parameters for classes of real estate investments. The obvious and imperfect solution to the nontrading problem in real estate is to construct ~~indexes~~ of real estate investment trusts (REITs), which are traded and have market prices. The reason this might not be satisfactory is because the properties owned by real estate investment trusts may not be representative of the real estate property market, and the securitization of real estate may result in differences between real estate and REIT returns. An alternative index more closely tied to real estate property values is the National Council of Real Estate Investment Fiduciaries (NCREIF) which estimates annual returns for commercial property as well as for farmland. Since transactions on individual properities are infrequent, NCREIF uses appraised values for properties to measure returns. Finally, Case and Shiller constructed an index using actual transaction prices, rather than appraised values, to estimate the value of residential real estate. Table 26.1 summarizes the returns on real estate indexes, the S&P 500, and an index of bonds.

There are several interesting results that emerge from this table. First, not all real estate series behave the same way. ~~First, returns~~ on REITs seem to have more in common with returns on the stock market than returns on other real estate indexes. Second, there is high positive serial correlation in many of the real estate return series, especially those based on appraised data. This can be attributed to the smoothing of appraisals that are used in these series.

The Market Portfolio In estimating the betas of stocks, we generally use a stock index as a proxy for the market portfolio. In theory, however, the market portfolio should include all assets in the economy in proportion to their market values. This is of particular significance when the market portfolio is used to estimate the risk parameters of real estate investments. The use of a stock index as the market

TABLE 26.1 Returns by Asset Class

Asset Class	Source of Data	Period Examined	Computational Rates	Arithmetic Average	Standard Deviation	Geometric Average
Stocks	Bloomberg	1928–2010	Dividend + Price appreciation	11.31%	20.21%	9.32%
Treasury bonds	Federal Reserve	1928–2010	Total return on 10-year	5.28%	7.74%	5.01%
Treasury bills	Federal Reserve	1928–2010	3-month T.Bill	3.70%	3.04%	3.66%
Corporate bonds	Federal Reserve	1928–2010	Total return on Baa bond	6.15%	9.66%	5.85%
Equity REITs	FTSE	1971–2010	Dividend + Price appreciation	11.87%	21.64%	9.51%
Mortgage REITs	FTSE	1971–2010	Dividend + Price appreciation	9.36%	30.56%	4.97%
All REITS	FTSE	1971–~~2000~~	Dividend + Price appreciation	13.75%	18.94%	12.01%
Commercial real estate	NCREIF	1978–2010	Total return, appraised	9.22%	8.21%	8.90%
Residential real estate	Case & Shiller	1987–2010	Transaction prices	3.28%	7.51%	3.01%
Farmland	NCREIF	1978–2010	Total return, appraised	11.24%	7.44%	10.66%

portfolio will result in the marginalization[1] of real estate investments and the underestimation of risk for these assets.

The differences between a stock and an all-asset portfolio can be large because the market value of real estate investments not included in the stock index is significant.

There is also evidence that~~, historically,~~ real estate investments and stocks ~~do not~~ move together in reaction to larger economic events. In Table 26.2, we reproduce a correlation table ~~from Ibbotson and Brinson~~ that measured the correlation between different asset classes and found that real estate was lightly or negatively correlated with financial assets. This was at the core of the advice given to investors in the 1980s and 1990s that adding real estate to a portfolio would produce a better risk/return tradeoff. As noted earlier in this chapter, the differences between real asset and financial asset returns widen when inflation rates change. In fact, three of the five real estate ~~indexes~~ are negatively correlated with stocks, and the other two have low correlations. The advice to diversify by adding real estate to your portfolio may need to be revised in light of the changes to the real estate market in the last three decades. As real estate has been increasingly securitized, there is evidence that real estate as an asset class has started behaving more and more like other financial asset classes (stocks and bonds). Perhaps the best way to bring this home is to use a measure for equities that we presented in Chapter 7—the implied equity risk premium.

[1]When the beta of an asset is estimated relative to a stock index, the underlying assumption is that the marginal investor has the bulk of his or her portfolio ~~(97 percent to 98 percent)~~ in stocks, and measures risk relative to this portfolio.

TABLE 26.2 Correlations across Asset Classes

	I&S	CREF	Home	C&S	Farm	S&P	T-bonds	T-bills	Inflation
I&S	1.00								
CREF	0.79	1.00							
Home	0.52	0.12	1.00						
C&S	0.26	0.16	0.62	1.00					
Farm	0.06	–0.06	0.51	0.49	1.00				
S&P	0.16	0.25	–0.13	–0.20	–0.10	1.00			
T-bonds	–0.04	0.01	–0.22	–0.54	–0.44	0.11	1.00		
T-bills	0.53	0.42	0.13	–0.56	–0.32	–0.07	0.48	1.00	
Inflation	0.70	0.35	0.77	0.56	0.49	–0.02	–0.17	0.25	1.00

I&S = Ibbotson & Siegal; CREF: CREF index; Home: Index of home prices; C&S: Case & Shiller; Farm: Index of farmland prices.
Source: Ibbotson and Brinson (1996).

AU: You talk about the changing real estate market in terms of 2 decades and later 3 decades. I've changed the first mention to 3 decades as well. Okay?

In Figure 26.1, we bring together the equity risk premium, the default spread on a Baa rated bond (the risk premium for bonds, and a real estate risk premium, computed by subtracting the risk-free rate from the capitalization rate (a required return measure used by real estate investors). Note that while stock and bond premiums have always moved together for the most part, the behavior of real estate has changed dramatically over the last three decades. In the 1980s, real estate risk premiums followed a course completely unrelated to the paths followed by stocks and bonds, which is consistent with the low or negative correlations reported in Table 26.2. Starting in the mid-nineties and accelerating through the last decade, real estate risk premiums have converged both in magnitude and direction with equity and bond risk

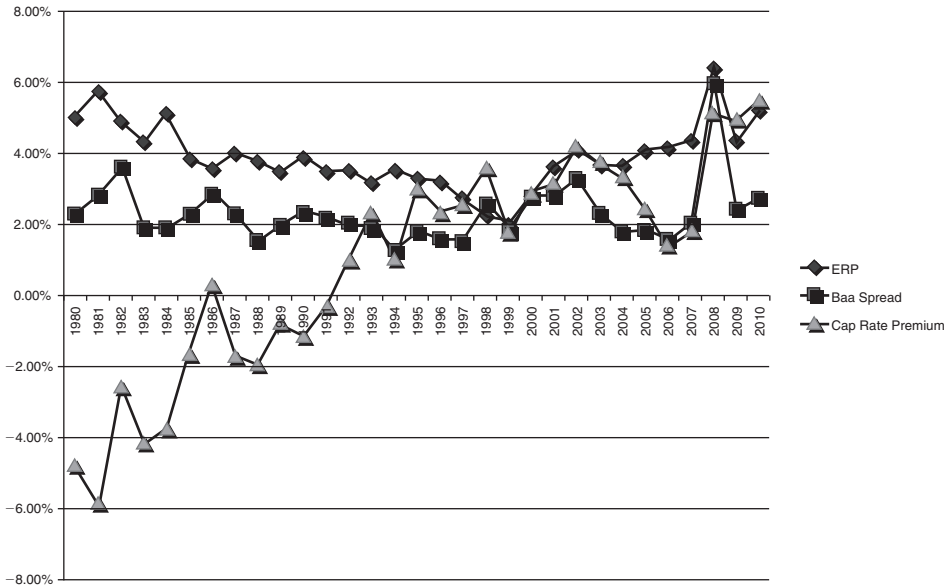

FIGURE 26.1 Equity risk Premium, Cap Rates and Bond Spreads

premiums. In practical terms, this suggests that not only is the correlation between real estate and financial assets much higher but that the former ~~advice~~ of diversifying your portfolio by adding real estate to it may no longer be good advice.

While few economists would argue with the value of incorporating real estate investments into the market portfolio, most are stymied by the measurement problems. These problems, while insurmountable until recently, are becoming more solvable as real estate investments get securitized and traded.

Some Practical Solutions If one accepts the proposition that the risk of a real estate investment should be measured using traditional risk and return models, there are some practical approaches that can be used to estimate risk parameters:

- The risk of a class of real estate investments can be obtained by regressing returns on the class (using the ~~Ibbotson~~ series, for instance, on commercial and residential property) against returns on a consolidated market portfolio. The primary problems with this approach are (1) these returns series are based on smoothed appraisals and may understate the true volatility in the market, and (2) the returns are available only for longer return intervals (annual or quarterly).
- The risk parameters of traded real estate securities (REITs and MLPs) can be used as a proxy for the risk in real estate investment. The limitations of this approach are that securitized real estate investments may behave differently from direct investments and that it is much more difficult to estimate risk parameters for different classes of real estate investment (unless one can find REITs that restrict themselves to one class of investments, such as commercial property).
- The demand for real estate is in some cases a derived demand. For instance, the value of a shopping mall is derived from the value of retail space, which should be a function of how well retailing is doing as a business. It can be argued, in such a case, that the risk parameters of a mall should be related to the risk parameters of publicly traded retail stores. Corrections should obviously be made for differences in operating and financial leverage.

Other Risk Factors Does investing in real estate investments expose investors to more (and different) types of risk than investing in financial assets? If so, how is this risk measured, and is it rewarded? The following are some of the issues related to real estate investments that might affect the measurement of risk and expected returns.

Diversifiable versus Nondiversifiable Risk As stated earlier, using risk and return models that assume that the marginal investor is well diversified ~~is~~ reasonable even though many investors in real estate choose not to be diversified. Part of the justification for this statement is the presence of firms with diversified investors, such as real estate investment trusts and master limited partnerships, in the real estate market. But what if no such investors exist and the marginal investor in real estate is not well diversified? How would we modify our estimates of cost of equity?

Chapter 24 examined how to adjust the cost of equity for a private business for the fact that its owner was not diversified. In particular, we recommended the use of a total beta that reflected not just the market risk but also the extent of nondiversification on the part of the ~~owner~~:

Total beta = Market beta/Correlation between ~~owner~~'s portfolio and the market

This measure could be adapted to estimate a total beta for ~~private businesses~~. For instance, assume that the marginal investor in commercial real estate has a portfolio that has a correlation of 0.50 with the market and that commercial real estate as a property class has a beta of 0.40. The beta you would use to estimate the cost of equity for ~~the~~ investment would be 0.80.

$$\text{Total beta} = 0.40/0.5 = 0.80$$

Using this higher beta would result in a higher cost of equity and a lower value for the real estate investment.

Lack of Liquidity Another critique of traditional risk measures is that they assume that all assets are liquid (or, at least, that there are no differences in liquidity across assets). Real estate investments are often less liquid than financial assets; transactions occur less frequently, transactions costs are higher, and there are ~~far~~ fewer buyers and sellers. The less liquid an asset, it is argued, the more risky it is.

~~The~~ link between ~~lack of liquidity~~ and risk is difficult to quantify for several reasons. One is that it depends on the time horizon of the investor. An investor who intends to hold long-term will care less about liquidity than one who is uncertain about his or her time horizon or wants to trade short-term. Another is that it is affected by the external economic conditions. For instance, real estate is much more liquid during economic booms, when prices are rising, than during recessions, when prices are depressed.

The alternative to trying to view the absence of liquidity as an additional risk factor and building into discount rates is to value the illiquid asset ~~conventionally (~~as if it were liquid~~)~~ and then applying a illiquidity discount to it. This is often the practice in valuing closely held and illiquid businesses and allows for the illiquidity discount to be a function of the investor and external economic conditions at the time of the valuation. The process of estimating the discount was examined in more detail in Chapter 24.

Exposure to Legal Changes The values of all investments are affected by changes in the tax law—changes in depreciation methods and changes in tax rates on ordinary income and capital gains. Real estate investments are particularly exposed to changes in the tax law, because they derive a significant portion of their value from ~~depreciation~~ and tend to be highly levered.

Unlike manufacturing or service businesses which can move operations from one locale to another to take advantage of locational differences in tax rates and other legal restrictions, real estate is not mobile and is therefore much more exposed to changes in local laws (such as zoning requirements, property taxes, and rent control).

The question becomes whether this additional sensitivity to changes in tax and local laws is an additional source of risk, and, if so, how this risk should be priced. Again, the answer will depend on whether the marginal investor is diversified not only across asset classes but also across real estate investments in different locations. For instance, a real estate investor who holds real estate in New York, Miami, Los Angeles, and Houston is less exposed to legal risk than one who holds real estate in only one of these locales. The trade-off, however, is that the localized knowledge that allows a real estate investor to do well in one market may not carry well into other markets.

Information Costs and Risk Real estate investments often require specific information about local conditions that is difficult (and costly) to obtain. The information is also likely to contain more ~~noise~~. There are some who argue that this higher cost of acquiring information and the greater ~~noise~~ in this information should be built into the risk and discount rates used to value real estate. This argument is not restricted to real estate. It has been used as an explanation for the small stock premium—that is small stocks make higher returns than larger stocks, after adjusting for risk (using the CAPM). Small stocks, it is argued, generally have less information available on them than larger stocks, and the information tends to be more noisy.

An Alternative Approach to Estimating Discount Rates: The Survey Approach The problems with the assumptions of traditional risk and return models and the difficulties associated with the measurement of risk for nontraded real assets in these models have led to alternative approaches to estimating discount rates for these real estate investments. In the context of real estate, for instance, the costs of equity and capital are often obtained by surveying potential investors in real

DIVERSIFICATION IN REAL ESTATE: TRENDS AND IMPLICATIONS

As we look at the additional risk factors—estimation errors, legal and tax changes, volatility in specific real estate markets—that are often built into discount rates and valuations, the rationale for diversification becomes stronger. A real estate firm that is diversified across holdings in multiple locations will be able to diversify away some of this risk. If the firm attracts investors who are diversified into other asset classes, ~~it diversifies~~ away even more risk, thus reducing its exposure to risk and its cost of equity.

Inexorably, then, you would expect to see diversified real estate investors—real estate corporations, REITs, and MLPs—drive local real estate investors who are not diversified (either across locations or asset classes) out of the market by bidding higher prices for the same properties. If this is true, you might ask, why has it not happened already? There are two reasons. The first is that knowledge of local real estate market conditions is still a critical component driving real estate values, and real estate investors with this knowledge may be able to compensate for their failure to diversify. The second is that a significant component of real estate success still comes from personal connections—to other developers, to zoning boards, and to politicians. Real estate investors with the right connections may be able to get much better deals on their investments than corporations bidding for the same business.

As real estate corporations and REITs multiply, you should expect to see much higher correlation in real estate prices across different regions and a drop-off in the importance of local conditions. Furthermore, you should also expect to see these firms become much more savvy at dealing with the regulatory authorities in different regions.

estate on what rates of return they would demand for investing in different types of property investments. In many cases, these surveys ~~will be~~ done in terms of capitalization rates, which—as we noted earlier—are just required rates of return in another guise.

This approach is justified on the following grounds:

- These surveys are not based on some abstract models of risk and return (which may ignore risk characteristics that are unique to the real estate market) but on what actual investors in real want to make as a return.
- These surveys allow for the estimation of discount rates for specific categories of properties (hotels, apartments, etc.) by region, without requiring a dependence on past prices like risk and return models.
- There are relatively few large investors who invest directly in real estate (rather than in securitized real estate). It is therefore feasible to do such a survey.

There are, however, grounds for contesting this approach, as well:

- Surveys, by their very nature, yield different "desired rates of return" for different investors for the same property class. Assuming that a range of desired returns can be obtained for a class of investments, it is not clear where one goes next. Presumably, those investors who demand returns at the high end of the scale will find themselves priced out of the market, and those whose desired returns are at the low end of the scale will find plenty of undervalued properties. The question of who the marginal investor in an investment should be is not answered in these surveys.
- The survey approach bypasses the issue of risk but it does not really eliminate it. Clearly, investors demand the returns that they do on different property classes because they perceive them to have different levels of risk.
- The survey approach works reasonably well when there are relatively few and fairly homogeneous investors in the market. While this might have been true a decade ago, it is becoming less so as new institutional investors enter the market and the number of investors increases and becomes more heterogeneous.
- The survey approach also becomes suspect when the investors who are surveyed act as pass-throughs—they invest in real estate, securitize their investments and sell them to others, and move on. If they do so, it is the desired returns of the ultimate investor (the buyer of the securitized real estate) that should determine value, not the desired return of the intermediate investor.

There are several advantages to using a model that measures risk and estimates a discount rate based on the risk measure, rather than using a survey.

- A risk and return model, properly constructed, sets reasonable bounds for the expected returns. For instance, the expected return on a risky asset in both the CAPM and the APM will exceed the expected return on a riskless asset. There is no such constraint on survey responses.
- A risk and return model, by relating expected return to risk and risk to prespecified factors, allows an analyst to be proactive in estimating discount rates rather than reactive. For instance, in the context of the CAPM, the expected

return on an investment is determined by its beta, which in turn is determined by the cyclicality of the business (in which the investment is made) and the financial leverage taken on. Thus, an analyst who knows how the financial leverage in an investment is expected to change over time can adjust the beta of that investment accordingly and use it in valuation. There is no such mechanism available when the survey approach is used.

- Where the ultimate investor is not known at the time of the analysis, as is the case in real estate investments that are securitized, a risk and return model provides the framework for estimating the discount rate for a hypothetical marginal investor.

As real estate markets become more accessible to institutional investors and more investments are made with the objective of eventual securitization, the need for a good risk and return model becomes more acute. These same trends will also make real estate investments more like financial investments (by making them more liquid). Sooner rather than later, the same models used to estimate risk and discount rates for financial assets will also be used to estimate risk and discount rates for real estate investments.

From Cost of Equity to Cost of Capital Once you have estimated a cost of equity, there are two other inputs needed to estimate the cost of capital. The first is the cost of debt, and estimating it is much more straightforward than estimating the cost of equity. You have two choices:

1. If you are raising capital for a new real estate investment, you could use the stated interest rate on bank loans used to fund the investment. In making this estimate, though, you have to be aware of the terms of the bank loan and whether there will be other costs ~~created to the real estate firm~~. For instance, a requirement that a compensating balance be maintained over the life of the loan will increase the effective cost of debt.
2. You could look at the capacity that the real estate investment has to cover bank payments (this is the equivalent of an interest coverage ratio), estimate a synthetic rating, and use this rating to estimate a pretax cost of debt. In fact, you could modify the numerator to include depreciation, since the investment is a finite life investment and should not require significant reinvestment.

To estimate an after-tax cost of debt, you would use the marginal tax rate of the individual or entity investing in the property.

The debt ratio in most real estate investments is usually estimated by looking at the proportion of the funds raised from debt and equity. Thus, if a property costs $4 million to build and the investor borrows $3 million to fund it, the debt ratio used is 75 percent. While we will stick with this convention, it is worth bearing in mind that the ratios should be based on the value of the property rather than the funding needs. Thus if the value of the property is expected to be $5 million after it is built, the debt ratio used should be 60 percent ($3 million/$5 million). This, of course, ~~requires~~ circular reasoning since the cost of capital is necessary to estimate the value of the property in the first place.

The distinction between cost of equity and the cost of capital, drawn in Chapter 7, is significant. If the cash flows being discounted are predebt cash flows (i.e., cash flows to the firm), the appropriate discount rate is the cost of capital. If you

use this approach, you will value the property and if you are the equity investor, you would then subtract out the value of the outstanding debt to arrive at the value of the equity in the real estate investment. If the cash flows being discounted on a real estate deal are cash flows to equity, the appropriate discount rate is the cost of equity. You would then value the equity in the real estate investment directly.

Estimating Cash Flows

Not all real estate investments generate cash flows. For those that do, cash flows can be estimated in much the same way that they can be estimated for financial investments. The ultimate objective is to estimate cash flows after taxes. Just as with financial assets, these cash flows can be estimated to equity investors. This is the cash flow left over after meeting all operating expenses, debt obligations (interest expenses and principal payments), and capital expenditures. The cash flows can also be estimated for all investors (debt as well as equity) in the real estate investment. This is the equivalent of cash flows to the firm, which is the cash flow prior to meeting debt obligations.

Cash Inflows The cash flows from a real estate investment generally take the form of rents and lease payments. In estimating rents for future years, you have to consider past trends in rents, demand and supply conditions for space provided by the property, and general economic conditions.

In office/multiple residential buildings all space may not be rented at a particular time. Thus, the vacancy rate (i.e., the percentage of the space that will not be rented out at any point in time) has to be projected in conjunction with market rents. Even in tight markets, there will be periods of time where space cannot be rented out, leading to a vacancy rate. Thus, no building, no matter how sought after, can be expected to have a 100 percent occupancy rate. With new buildings, the projections have to factor in how long it will take initially to get occupants to rent/lease space. Clearly, the longer it takes, the smaller is the discounted cash flow value of the building.

In the case of leased property, the terms of the lease can affect the projected lease revenues. If income properties are subject to existing leases, the terms of the lease such as the length of the lease, the contracted lease payments with future increases, additional reimbursable expenses, and provisions on lease renewal will determine cash flow estimates. The leases may also be net leases, where the tenant is responsible for paying taxes, insurance, and maintenance.

Cash Outflows Expenses on real estate investments include items such as property taxes, insurance, repairs and maintenance, and advertising—which are unrelated to occupancy and are fixed—as well as items such as utility expenses, which are a function of occupancy and are variable. In addition, the following factors will affect projected expenses:

- *Reimbursability.* Some expenses incurred in connection with a property by the owner may be reimbursed by the tenant, as part of a contractual agreement.
- *Expense stops.* Many office leases include provisions to protect the owner from increases in operating expenses beyond an agreed-on level. Any increases beyond that level have to be paid by the tenant.

In many real estate investments, real estate taxes represent the biggest single item of expenditures, and they can be volatile, not only because the tax laws change but because they are based often on assessed values.

Expected Growth To estimate future cash flows, we need estimates of the expected growth rate in both rents/leases and expenses. A key factor in estimating the growth rate is the expected inflation rate. In a stable real estate market, the expected growth in cash flows should be close to the expected inflation rate. In tight markets with low vacancy rates, it is possible for the expected growth rate in rents to be higher than the expected inflation rate at least until the market shortages disappear. The reverse is likely to be true in markets with high vacancy rates.

The surveys used to estimate discount rates, reported in Table 26.3, also collect information on investors expectations of expected growth. It is interesting that while there are significant differences between investors on discount rates, the expected growth rates in cash inflows and outflows fall within a tight band. In 1989, for instance, the Cushman and Wakefield survey of investors in a wide range of markets found that they all estimated expected growth in cash flows to be between 4 percent and 6 percent.

How will rent control affect these estimates? By putting a cap on how high the increases can be without limiting the downside, it will generally lower the expected growth rate in cash flows over time. Uncertainty about rent control laws, in terms of both how much the cap will be and whether the laws will be revised, will add to the estimation error in the valuation.

Terminal Value In all discounted cash flow valuation models, a key input is the estimate of terminal value, that is, the value of the asset being valued at the end of the investment time horizon. There are three basic approaches that can be used to estimate the terminal value:

1. The current value of the property can be assumed to increase at the expected inflation rate to arrive at a terminal value. Thus the terminal value of a property, worth \$10 million now, in 10 years will be \$13.44 million if the expected inflation rate is 3 percent (terminal value = $\$10 \times 1.03^{10}$). The danger of this approach is that it starts off with the assumption that the current value of the asset is reasonable, and tries to then assess the true value of the asset.

2. An alternative to this approach is to assume that the cash flows in the terminal year (the last year of the investment horizon) will continue to grow at a constant rate forever after that. If this assumption is made, the terminal value of the asset is:

$$\text{Terminal value of equity/Asset}_n = \text{Expected CF}_{n+1}/(r - g)$$

where r is the discount rate (cost of equity if it is the terminal value of equity, and cost of capital if it is the terminal value of the asset) and CF_t is the cash flow (cash flow to equity if terminal value is for equity and to firm if terminal value is total terminal value).

Thus if the property described earlier had produced a net cash flow, prior to debt payments, of $1.2 million in year 10, this cash flow was expected to grow 3 percent a year forever after that and the cost of capital was 13 percent, the terminal value of the property can be written as:

$$\text{Terminal value of asset} = FCFF_{11}/(WACC - g)$$
$$= 1.2(1.03)/(.13 - .03) = \$12.36 \text{ million}$$

The assumption of perpetual cash flows may make some analysts uncomfortable, but one way to compensate is to require that more cash be set aside each year to ensure that the property life can be extended. If you use this approach, for instance, you could assume that the cash flow from depreciation be reinvested back into the building in the form of maintenance capital expenditures.

3. A close variation on the infinite growth model is the capitalization rate (cap rate) used by many real estate appraisers to value properties. In its most general form, the cap rate is the rate by which operating income is divided to get the value of the property.

$$\text{Property value} = \text{Operating income after taxes/Capitalization rate}$$

The capitalization rate is, in fact, the inverse of the value-to-EBIT multiple used to value publicly traded companies in Chapter 18.

There are three ways in which capitalization rates are estimated. One is to use the average capitalization rate of similar properties that have sold recently. This is the equivalent of using the industry-average earnings multiple to estimate terminal value in a publicly traded company. The second is to use the surveys mentioned earlier to obtain an ~~estimate of the cap rates~~ used by other real estate investors. The third is to estimate the cap rate from a discounted cash flow model. To see the linkage with the infinite growth model, assume that the net operating income (prior to debt payments) is also the free cash flow to the firm (note that this essentially is the equivalent of assuming that capital maintenance expenditures equal depreciation). Then the capitalization rate can be written as a function of the discount rate and the expected growth rate:

$$\text{Capitalization rate} = (r - g)/(1 + g)$$

where r is the discount rate (the cost of equity if net income is being capitalized and the cost of capital if operating income is being capitalized) and g is the expected growth rate forever. In this example, the capitalization rate would have been:

$$\text{Capitalization rate} = (.13 - .03)/1.03 = 9.70\%$$

If the capitalization rate is being applied to next year's operating income, rather than this year's value, you can ignore the denominator and use a cap rate of 10 percent.

A SPECULATIVE INVESTMENT IN UNDEVELOPED LAND

Developers sometimes buy undeveloped land not with the intention of developing it, but to hold onto in the hope that the value of the land will appreciate significantly over the holding period. An investment in undeveloped land does not generate positive cash flows during the holding period. The only positive cash flow, in fact, is the estimated value of the land at the end of the holding period. If you have to pay property taxes and other expenses during the holding period, you will have negative cash flows during the holding period.

There are two ways you can approach the analysis of this investment. The first is the traditional discounted cash flow approach. You could discount the expected property taxes and other expenses during the holding period and the estimated value of the land at the end of the period back to the present at the cost of capital and see if it exceeds the cost of the land today. In fact, the expected appreciation in the price of the land will have to be greater than the cost of capital and the expected annual property tax rate for this investment to have a positive net present value. To illustrate, if your cost of capital is 10 percent and the annual property tax rate is 2 percent of land value, you would need a price appreciation rate of 12 percent a year for the present value of the inflow to exceed the present value of the outflows.[2]

The other is to view the land as an option, and developing the land as exercising the option. You would then consider the cost of the land as the price of the option. The interesting implication is that you might choose to buy the land even if the expected price appreciation rate is lower than your cost of capital, if there is substantial volatility in land prices. This application will be considered in more detail in Chapter 28.

DCF Valuation Models

Once a discount rate has been chosen and cash flows estimated, the value of an income-producing real asset can be estimated either in whole (by discounting cash flows to the firm at the weighted average cost of capital) or to its equity investors (by discounting cash flows to equity at the cost of equity). The following illustrations provide examples of DCF valuation in real estate.

[2]We are assuming that the property taxes are based on the estimated value of the land each year and not the original cost. If it is the latter, the price appreciation rate can be lower.

ILLUSTRATION 26.1: Valuing an Office Building in 2000

In this illustration, we will be valuing an office building located at 711 Third Avenue in New York City. The operating details of the building are as follows:

- The building has a capacity of 528,357 square feet of rentable space. While 95% of this space is rented out for the next year, the occupancy rate is expected to climb 0.5% a year for the following four years to reach 97% of capacity in year 5. This is expected to be the occupancy rate in steady state.
- The average rent per square foot[3] was $28.07 in the most recent year and is expected to grow 3% a year in perpetuity. Historically, there has been a credit loss, associated with tenants failing to make payments, of 2.5% of rental revenues.
- The building has a garage that generated $800,000 in income for the most recent year. This income is also expected to grow 3% a year in perpetuity.
- Real estate taxes were $5.24 a square foot in the most recent year, and are expected to grow 4% a year for the next five years and 3% a year thereafter.
- The land under the building is rented under a long-term lease, and the ground rent in the most recent year was $1.5 million. This rent is expected to remain unchanged for the next five years and grow 3% a year thereafter.
- Other expenses, including insurance, maintenance, and utilities, amounted to $6.50 a square foot in the most recent year and are expected grow 3% a year in perpetuity. Approximately 10% of these expenses will be reimbursed by tenants each year (and thus will become a part of the revenues).
- The management fee for the most recent year was $300,000 and is expected to grow 3% a year in perpetuity.
- The depreciation in the building is expected to be $2 million a year for the next five years. The capital maintenance and upgrade expenditures (including leasehold improvements for new tenants) last year amounted to $1.5 million, and are expected to grow 3% a year for the next five years. Beyond year 5, depreciation is expected to increase 3% a year in perpetuity, and capital maintenance expenditures will offset depreciation.

The potential buyer of the building is a corporation that faces a marginal tax rate of 38% and expects to finance the building with a mix of 60% debt and 40% equity. Then debt will take the form of a long-term balloon payment loan with an interest rate of 6.5 percent.

Step 1: Estimating a Cost of Capital

We begin by trying to estimate a cost of equity. While we had access to a survey that provided typical hurdle rates used by real estate investors for office buildings in New York, we chose to estimate the cost of equity from the capital asset pricing model because the potential buyer is a corporation (whose investors are diversified).[4] To make this estimate, we began with the unlevered beta of 0.62 of equity ~~real estate investment trusts~~ with office properties. We estimated a levered beta using the debt-equity mix proposed for the building:

$$\text{Levered beta} = \text{Unlevered beta}[1 + (1 - \text{Tax rate})(\text{Debt/Equity})]$$
$$= 0.62[1 + (1 - .38)(.6/.4)] = 1.20$$

[3]The rents vary depending on location in the building, with lower rents in the basement and lower floors and higher rents on the top floors.

[4]Note that it is the investors in the corporation that need to be diversified and not the corporation itself.

To estimate the cost of equity, we used a risk-free rate of 5.4% and a risk premium of 4%:

$$\text{Cost of equity} = \text{Risk-free rate} + \text{Beta} \times \text{Risk premium}$$
$$= 5.4\% + 1.20(4\%) = 10.20\%$$

Using the interest rate on the bank borrowing as the pretax cost of debt, we estimated a cost of capital:

$$\text{Cost of capital} = 10.20\%(.40) + 6.5\%(1 - .38)(.60) = 6.49\%$$

We assumed that this would be the cost of capital in perpetuity.[5]

STEP 2: ESTIMATING CASH FLOWS ON THE BUILDING

We used the operating information specified earlier to estimate the cash flows prior to debt payments on the building for the next five years in the following table.

	Base Year/ Assumption	*1*	*2*	*3*	*4*	*5*	*Terminal Year*
Building space (square feet)		528,357	528,357	528,357	528,357	528,357	
Occupancy		95%	95.50%	96.00%	96.50%	97%	
Rent/square foot	$28.07	$28.91	$29.78	$30.67	$31.59	$32.54	
Rental income		$14,512,115	$15,026,149	$15,557,965	$16,108,166	$16,677,377	$17,177,698
Garage income	$800,000	$ 824,000	$ 848,720	$ 874,182	$ 900,407	$ 927,419	$ 955,242
Reimbursement revenue	10.00%	$ 353,735	$ 364,347	$ 375,277	$ 386,536	$ 398,132	$ 410,076
Credit loss	2.50%	$ 362,803	$ 375,654	$ 388,949	$ 402,704	$ 416,934	$ 429,442
Total revenues		$15,327,047	$15,863,563	$16,418,475	$16,992,404	$17,585,993	$18,113,573
Expenses							
Real estate taxes	$5.24	$ 2,879,334	$ 2,994,508	$ 3,114,288	$ 3,238,860	$ 3,368,414	$ 3,469,466
Ground rent	$1,500,000	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,545,000
Other expenses	$6.50	$ 3,537,350	$ 3,643,471	$ 3,752,775	$ 3,865,358	$ 3,981,319	$ 4,100,758
Management fee	$300,000	$ 309,000	$ 318,270	$ 327,818	$ 337,653	$ 347,782	$ 358,216
Total expenses		$ 8,225,684	$ 8,456,248	$ 8,694,881	$ 8,941,870	$ 9,197,515	$ 9,473,440
Operating income before depreciation		$ 7,101,363	$ 7,407,314	$ 7,723,594	$ 8,050,534	$ 8,388,478	$ 8,640,133
Depreciation	$2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,060,000
Operating income		$ 5,101,363	$ 5,407,314	$ 5,723,594	$ 6,050,534	$ 6,388,478	$ 6,580,133
Taxes	38%	$ 1,938,518	$ 2,054,779	$ 2,174,966	$ 2,299,203	$ 2,427,622	$ 2,500,450
Operating income after taxes		$ 3,162,845	$ 3,352,535	$ 3,548,628	$ 3,751,331	$ 3,960,857	$ 4,079,682
+ Depreciation		$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,060,000
– Capital maintenance and leasehold improvement	$1,500,000	$ 1,545,000	$ 1,591,350	$ 1,639,091	$ 1,688,263	$ 1,738,911	$ 2,060,000
Cash flow to firm		$ 3,617,845	$ 3,761,185	$ 3,909,538	$ 4,063,068	$ 4,221,946	$ 4,079,682

[5]This implies that the existing loan will be refinanced with a new loan when it comes due.

Since all of the items grow at 3% beyond year 5, we estimated a cash flow for year 6 as the terminal year. The terminal value of the building was calculated based on this cash flow, a perpetual growth rate of 3%, and a cost of capital of 6.49%:

$$\text{Terminal value} = FCFF_6/(\text{Cost of capital} - \text{Expected growth rate})$$
$$= \$4{,}079{,}682/(.0649 - .03) = \$116{,}810{,}659$$

The present value of the expected cash flows for the next five years and the terminal value, summarized in the following table yields the value of the building:

	1	*2*	*3*	*4*	*5*
Cash flow to firm	$3,617,845	$3,761,185	$3,909,538	$4,063,068	$ 4,221,946
Terminal value					$116,810,659
Present value @ 6.49%	$3,397,275	$3,316,547	$3,237,186	$3,159,199	$ 90,928,871

The sum of the present value of the cash flows is $101.48 million. This is the estimated value of the building.

ILLUSTRATION 26.2: Valuing the Equity Stake in a Building

The preceding analysis can be done for just the equity stake in 711 Third Avenue. To do so, we will first estimate the dollar debt that will be borrowed to buy this building. Assuming that the building has a value of $101.48 million (from the previous illustration) and using a debt ratio of 60%, we estimate debt to be $60.89 million.

$$\text{Debt} = \text{Value of building} \times \text{Debt ratio} = 101.48 \times .6 = \$60.89 \text{ million}$$

Since this is a balloon payment loan, the interest payments on the debt will remain the same each year, based on the 6.5% interest rate:

$$\text{Annual interest expenses} = \text{Dollar debt} \times \text{Interest rate} = \$60.89 \times .065 = \$3.96 \text{ million}$$

The appropriate discount rate to use while valuing the equity stake in the building is the cost of equity, estimated to be 10.20% in this analysis.

Estimating Cash Flows to Equity

The estimated cash flows to equity are estimated each year by netting out interest expenses from income and adjusting the taxes accordingly. The following table summarizes cash flows to equity each year for the next five years.

	1	*2*	*3*	*4*	*5*
Building space (square feet)	528,357	528,357	528,357	528,357	528,357
Occupancy	95.00%	95.50%	96.00%	96.50%	97.00%
Rent/square foot	$28.91	$29.78	$30.67	$31.59	$32.54
Rental income	$14,512,115	$15,026,149	$15,557,965	$16,108,166	$16,677,377
Garage income	$ 824,000	$ 848,720	$ 874,182	$ 900,407	$ 927,419
Reimbursement revenue	$ 353,735	$ 364,347	$ 375,277	$ 386,536	$ 398,132
Credit loss	$ 362,803	$ 375,654	$ 388,949	$ 402,704	$ 416,934
Total revenues	$15,327,047	$15,863,563	$16,418,475	$16,992,404	$17,585,993
Expenses					
Real estate taxes	$ 2,879,334	$ 2,994,508	$ 3,114,288	$ 3,238,860	$ 3,368,414
Ground rent	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,500,000
Other expenses	$ 3,537,350	$ 3,643,471	$ 3,752,775	$ 3,865,358	$ 3,981,319
Management fee	$ 309,000	$ 318,270	$ 327,818	$ 337,653	$ 347,782
Interest expenses	$ 3,957,737	$ 3,957,737	$ 3,957,737	$ 3,957,737	$ 3,957,737
Total expenses	$12,183,422	$12,413,986	$12,652,618	$12,899,608	$13,155,252
Net income before depreciation and taxes	$ 3,143,625	$ 3,449,577	$ 3,765,856	$ 4,092,797	$ 4,430,741
Depreciation	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000
Operating income	$ 1,143,625	$ 1,449,577	$ 1,765,856	$ 2,092,797	$ 2,430,741
Taxes	$ 434,578	$ 550,839	$ 671,025	$ 795,263	$ 923,682
Net income	$ 709,048	$ 898,738	$ 1,094,831	$ 1,297,534	$ 1,507,059
+ Depreciation	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000	$ 2,000,000
– Capital maintenance and leasehold improvement	$ 1,545,000	$ 1,591,350	$ 1,639,091	$ 1,688,263	$ 1,738,911
Cash flow to equity	$ 1,164,048	$ 1,307,388	$ 1,455,741	$ 1,609,271	$ 1,768,148

In year 5, we also estimate the terminal value of equity by subtracting the debt due from the terminal value of the building estimated in the previous illustration:

$$\text{Terminal value of equity} = \text{Terminal value of building} - \text{Debt}$$
$$= \$116.81 \text{ million} - \$60.89 \text{ million} = \$55.92 \text{ million}$$

Estimating the Value of Equity

The present value of the cash flows to equity for the next five years and the terminal value are computed in the following table:

	1	*2*	*3*	*4*	*5*
Cash flow to equity	$1,164,048	$1,307,388	$1,455,741	$1,609,271	$ 1,768,148
Terminal value					$55,922,390
Present value @ 10.20%	$1,056,435	$1,076,833	$1,088,178	$1,091,735	$35,519,318

The value of the equity stake in the building is $39.83 million. Adding this value to the value of the debt raised of $60.89 million gives us an estimate for the value of the building:

$$\text{Estimated value of building} = \$60.89 \text{ million} + \$39.83 \text{ million} = \$100.72 \text{ million}$$

Why is there a difference between this estimate of the property value and the one we arrived at in the previous illustration? The reason is simple. The debt ratio of 60% that we assumed and kept constant when estimating cost of capital will require us to borrow an additional amount each year for the next five years, since the building's value will appreciate by about 3 percent a year. The tax benefits from this additional debt were implicitly built into the valuation of the building in the previous illustration but were ignored while valuing equity in this one. If we consider those tax benefits, we will arrive at the same value.

REAL ESTATE VALUATION IN PRACTICE: A COMPARISON

The building on 711 Seventh Avenue was valued for sale by an appraiser using discounted cash flow valuation. While many of the base assumptions in our valuation were borrowed from that appraisal, the estimate of value in the appraisal was $70 million, about a third below our estimate. The main differences between our valuation and the appraiser's valuation are as follows:

- The appraisal was done entirely in terms of pretax cash flows. Depreciation was therefore not considered and the tax benefits from it were ignored.
- The discount rate used was 11.5 percent, based on a proprietary survey of real estate investors done by the appraiser. While nothing was mentioned in the appraisal, this discount rate presumably was in pretax terms (to ensure consistency with how the cash flows were estimated) and stated as a return on the overall investment (and not just the equity investment). This is higher than the cost of capital we used.
- The terminal value was estimated based on a capitalization rate of 9.0 percent, which was also based on the survey. (The operating income in year 5 was divided by 9.0 percent to arrive at terminal value.)

We believe that using pretax cash flows and pretax discount rates will miss the segment of value that comes from depreciation and interest expenses being tax deductible, and understate the value of the building. Assuming that the discount rate is defined correctly as a pretax cost of capital, the use of surveys to estimate both this number and the terminal multiple makes us uncomfortable, especially given the fact that the buyer of this building is a corporation with diversified investors.

Limitations of Discounted Cash Flow Valuation

There are many reasons given for why discounted cash flow valuation is not appropriate for real estate. First, it is argued the discount rates are difficult, if not impossible, to estimate for most real estate investments. ~~The discussion of this topic has pointed out~~, that this is not necessarily true. Second, it is ~~argued~~, that estimating cash flows for the time horizon is tedious and difficult to do, as is the estimation of the terminal value. However, it would seem that it is much easier to estimate cash flows for real estate than for some financial investments (for instance, a high-growth stock). Third, it is argued that discounted cash flow valuation ~~does~~ not reflect market conditions—that the market is strong or weak at the time of the valuation. This argument could be rejected at two levels. On one level, the cash flows should reflect the market conditions, since they will be higher (higher rents and lower vacancy rates) and grow faster in strong market conditions. On the other level, ~~any additional value being assigned by the market beyond the cash flow levels can be considered to be overvaluation and should not be built into the appraised value in the first place~~.

COMPARABLE/RELATIVE VALUATION

Just as price-earnings and price-book value ratios are used to value financial assets, real estate investments can be valued using standardized value measures and comparable assets. There are several reasons for doing so:

- It provides a mechanism for valuing non-cash-flow producing assets. For instance, the value of a single family residential building bought as a primary residence can be estimated by looking at similar properties in the same area.
- It takes into account market trends that might not be reflected in the cash flows yet for a number of reasons. ~~Leases~~ might have frozen lease payments in place, while market values have risen, and rent control laws might ~~prevent~~ rents from rising with market values.
- It is also argued that valuing based on comparables is much simpler to do than discounted cash flow valuation since it does not require, at least explicitly, the estimation of discount rates and cash flows.

What Is a Comparable Asset?

The key limitation of all comparable-based approaches is in the definition of comparable. In the case of stocks, differences in growth, risk, and payout ratios between stocks have to be adjusted for before price-earnings ratios are compared. Many analysts choose to restrict their comparisons of stocks to those within the same industry group, to keep it relatively homogeneous. In the case of real estate, differences in income production, size, scale, location, age, and quality of construction have to be accounted for before comparisons are made. Some of these adjustments are simple (such as differences in size) and others are subjective (such as differences in location).

Use of Standardized Value Estimates

When valuing assets based on comparable assets, the value has to be standardized for the comparison. In stocks, this standardization is often done by dividing the price per share by the earnings per share (PE) or the book value per share (PBV). In the case of real estate, this adjustment is made by:

- *Size.* The simplest standardized measure is the price per square foot, which standardizes value using the size of the building. In office rentals, where square footage is a key factor determining rental revenues, this may by a useful adjustment. It does not, however, factor in differences on any of the other dimensions.
- *Income.* The value of an asset can be standardized using its income. For instance, the gross income multiplier (price of property/gross annual income) is an income-standardized value measure. The advantage of this approach is that the income incorporates differences in scale, construction quality, and location.[6] The gross income should be prior to debt payments, since differences in leverage can cause large differences in the income available to equity investors.

[6]Buildings of better quality in better locations should command higher rents/leases and higher expected income than other buildings.

Why Comparables May Work Better for Real Estate Than Stocks

One of the difficulties in using comparables to value stocks is that risk and growth characteristics can vary widely across stocks even in the same industry class. In the case of real estate properties in the same locale, the argument can be made that the growth and risk characteristics are very similar across these properties ~~and that the only differences are therefore differences in the capacity to generate income~~.

ILLUSTRATION 26.3: Valuing a Property Based on Comparables in 2000

Consider the property at 711 Third Avenue that was valued using discounted cash flow valuation. The appraisal also noted eight other properties in that part of Manhattan with roughly the same characteristics as the building being appraised that had sold recently. The following table summarizes the details of these properties and the prices that they were sold for:

Property	*Size (Square Feet)*	*Occupancy Rate*	*Price for Sale*	*Price per Square Foot*	*Net Operating Income per Square Foot*	*Price/ NOI*
900 Third Avenue	560,000	99%	$182,000,000	$325.00	26.98	12.05
767 Third Avenue	456,007	95%	$ 95,000,000	$208.33	NA	
350 Madison Avenue	310,000	97%	$ 70,060,000	$226.00	17.6	12.84
888 Seventh Avenue	838,680	96%	$154,500,000	$184.22	NA	
622 Third Avenue	874,434	97%	$172,000,000	$196.70	NA	
150 East 58th Street	507,178	95%	$118,000,000	$232.66	16.52	14.08
1065 Avenue of the Americas	580,000	95%	$ 59,000,000	$101.72	NA	
810 Seventh Avenue	646,000	95%	$141,000,000	$218.27	15.17	14.39
Average		96.13%		$211.61		13.34

The property at 711 Third Avenue has 528,357 square feet of rental space, had an occupancy rate of 95%, and generated net operating income of $6.107 million in the most recent year. Based on the average price per square foot, the value of the property is:

$$\begin{aligned}\text{Value of 711 Third Avenue} &= \text{Square footage} \times \text{Price per square foot}\\ &= 528{,}357 \text{ sq. ft.} \times \$211.61 \text{ per square foot} = \$111.807 \text{ million}\end{aligned}$$

If we adjust for the fact that the occupancy rate is slightly lower at 711 Third Avenue, we would estimate the following value:

$$\begin{aligned}\text{Value of 711 Third Avenue} &= \text{Square footage} \times (\text{Occupancy rate}_{\text{711 Third}}/\text{Average occupancy rate})\\ &\quad \times \text{Price per square foot}\\ &= 528{,}357 \text{ sq. ft.} \times (95\%/96.13\%) \times \$211.61 \text{ per square foot}\\ &= \$110.498 \text{ million}\end{aligned}$$

Finally, if we apply to this property the multiple of operating income based on the four properties for which it is available:

$$\begin{aligned}\text{Value of 711 Third Avenue} &= \text{Net operating income} \times \text{Average price/NOI}\\ &= 6.107 \times 13.34 = \$81.470 \text{ million}\end{aligned}$$

Which of these values gets used will depend on whether you view the lower operating income per square foot at 711 Third Avenue ~~as~~ the consequence of poor management or the building's characteristics—location and condition. If it is the former, you might be willing to pay the higher values ($111 million). If it is the latter, you would pay only $81.4 million.

Regression Approach

One ~~of the approaches used~~ to extend the reach of relative valuation for stocks is the regression approach, where price-earnings or price–book value multiples are regressed against independent variables that cause differences in these multiples—risk, growth, and payout. Since the variables causing differences in real estate values in a locale are fairly obvious—vacancy rates, size, and capacity to generate income, among others—it should be relatively simple to ~~extend~~ this approach to analyze properties.

ILLUSTRATION 26.4: Regression Approach

You could regress the price per square foot for the eight properties in Illustration 26.3 against occupancy rates and obtain the following:

$$\text{Price per square foot} = \underset{[2.07]}{-2{,}535.50} + \underset{[2.25]}{2{,}857.86}\ \text{Occupancy rate} \qquad R^2 = 46\%$$

Using this regression, we would obtain an estimated price per square foot for 711 Seventh Avenue, with its 95% occupancy rate:

$$\text{Price per square foot} = -2{,}535.70 + 2{,}857.86(.95) = \$179.46$$

$$\text{Value of 711 Third Avenue} = 528{,}357 \times \$179.46 = \$94.820 \text{ million}$$

This regression is clearly limited in its power because there only eight observations and the occupancy rates are very similar. If we can obtain information on more properties and include variables on which there are bigger differences—a variable measuring the age of the building, for instance—we would be able to get much stronger predictions.

VALUING REAL ESTATE BUSINESSES

Much of this chapter has focused on valuing real estate properties. This section considers extending this analysis to value a real estate business. To value such a business, you have to consider its sources of income and then look at its organization structure.

Sources of Income

Real estate businesses vary widely in terms of how they generate income, and how you approach valuation will vary as well. In particular, we could categorize real estate firms into four businesses.

1. *Service income.* Some firms generate income from providing just management services or support services to the owners of real estate—for instance, selling, security, or maintenance. Valuing these firms is relatively straightforward and requires assumptions about how fees will be assessed (many management service contracts, for instance, are stated as a percent of the gross income on a

property) and how much the fee income will increase over time. More efficient firms or firms with better reputations (brand names) may be able to charge higher fees and be worth more.

2. *Real estate construction.* These businesses make their income from real estate construction—building residential or commercial properties. They usually agree to deliver the units at a contractually fixed price and generate profits from being able to construct them at a lower cost. Firms that are more cost-efficient will generally earn higher profits and be worth more. Here again, though, reputation can make a difference, and firms that are associated with quality construction may be able to charge premium prices.
3. *Real estate development.* These businesses usually buy vacant or underutilized land, put up new construction, and sell the units to real estate investors. They generally do not hold on to the properties for purposes of generating ongoing income. The values of these businesses will be determined by their capacity to gauge market demand and complete construction both quickly and at low cost.
4. *Real estate investment.* These are businesses that buy real estate property as income-generating investments. The simplest way of valuing these businesses is to value each of the properties that they own and to aggregate them. However, a premium may be attached to this value if a business has shown the capacity to repeatedly buy undervalued properties.

Thus the factors we should think about when valuing real estate businesses are the same factors we think about in any valuation—the capacity to generate not just cash flows but also excess returns, and the uncertainty associated with these cash flows.

Organizational Structure

There are four basic organizational forms available to real estate business—the real estate investment trust (REIT), master limited partnership (MLP), business trust, and real estate corporation. They differ in two major areas:

Structure of Taxation Single taxation is a characteristic of REITs and MLPs, since both are taxed at the investor level, but not at the firm level. This tax benefit is given to REITs to compensate for certain investment and dividend policy restrictions to which REITs must adhere. MLPs receive single-taxation status only if they invest in certain activities, such as real estate or oil and gas. Otherwise, for tax purposes, MLPs are treated as corporations. This tax advantage does not exist for business trusts and corporations that are taxed at both the entity level on income and at the investor level on dividends.

What are the implications for valuation? When valuing real estate investment trusts and master limited partnerships, the tax rate used to estimate cash flows and discount rates is zero. That does not mean that there are no tax benefits from depreciation or interest expenses, since these benefits still flow through to the ultimate investors. When valuing real estate corporations, the ~~marginal~~ corporate tax rate should be used for estimating cash flows and discount rates.

Restrictions on Investment and Dividend Policy The tax code requires REITs to distribute 95 percent of their taxable income to shareholders, which effectively limits REITs' use of internal financing. Consequently, REITs must return to the capital

markets on a regular basis, which in turn ~~tends to impart discipline and monitoring~~. The code further requires that a minimum of 75 percent of a REIT's gross income must come from real estate. A REIT must also be a passive investment conduit; that is, less than 30 percent of a REIT's income must come from the operation of real estate held less than four years and income from the sale of securities held less than one year. REITs cannot engage in active real estate operations. They cannot operate a business, develop or trade properties for sale, or sell more than five properties per year. A REIT is prohibited from entering into tax-free exchanges to acquire properties. Although no dividend payout restrictions exist for MLPs, a high payout ratio is likely, since partners are taxed regardless of whether they actually receive the income or the MLP retains it~~. This fact has to be weighed against the investment opportunities of an MLP. The empirical~~ evidence suggests that MLPs pay out a high proportion of their earnings as dividends. Although MLPs are restricted to engaging in real estate activities ~~(or oil and gas)~~, there are no restrictions on the nature or management of these activities. Consequently, MLPs can actively and directly engage in the real estate trade or business. There are no MLP restrictions on the number of properties that can be sold in any given year. Business trusts and corporations have no restrictions on dividend payout and can engage in any real estate or non–real estate activity except those prohibited in the declaration of trust or corporate charter, respectively.

The implications for valuation are significant. When valuing REITs and MLPs, you have to assume much of the earnings will be paid out in dividends. If you do not assume external financing, your estimates of expected growth will be low, no matter how well managed the entities are. If you do allow for external financing, you can have high expected growth but the number of shares in the firm will have to increase proportionately, thus limiting the potential price appreciation on a per-share basis. The restrictions on investment policy will constrain how much returns on capital can be changed over time.

CONCLUSION

There is much that is said in this chapter that repeats what was said in earlier chapters on stock valuation. This is because a real estate investment can (and should) be valued with the same approaches used to value financial assets. While the structure and caveats of discounted cash flow models remain unchanged for real estate investments, there are some practical problems that have to be faced and overcome. In particular, real estate investments do not trade regularly and risk parameters (and discount rates) are difficult to estimate. A real estate investment can also be valued using comparable investments, but the difficulties in identifying comparable assets and controlling for differences across them remain significant problems.

QUESTIONS AND SHORT PROBLEMS

In the problems following, use an equity risk premium of 5.5 percent if none is specified.

1. An analyst who looks at real estate decides to apply the capital asset pricing model to estimate the risk (beta) for real estate. He regresses returns on a real estate index (based on appraised values) against returns on a stock index, and estimates a beta of 0.20 for real estate. Would you agree with this estimate? If you do not, what might be the sources of your disagreement?

2. An alternative way of estimating risk for real estate is to use prices on traded REITs to compute returns, and to regress these returns against a stock index to arrive at a beta estimate. Would this beta be a more reliable estimate of risk? Why or why not?
3. The risk for real estate can be viewed as a derived demand. If this is the case, the risk of real estate can be estimated from the underlying business it supports. Under this view, what would be the appropriate proxy to use for risk in the following types of real estate investments:
   a. Commercial real estate in New York City.
   b. Commercial real estate in Houston, Texas.
   c. Commercial real estate in San Jose, California (Silicon Valley).
   d. Hotel complex in Orlando, Florida.
4. Would your valuation of real estate by affected by who the potential investors in the property are? (For instance, would your analysis be any different if the primary investors were individuals involved primarily in real estate or if they were institutional investors?)
5. How would you factor in the absence of liquidity into your valuation?
6. You have been asked to value an office building in Orlando, Florida, with the following characteristics:
   - The building was built in 1988, and has 300,000 square feet of rentable area.
   - There would be an initial construction and renovation cost of $3.0 million.
   - It will take two years to fill the building. The expected vacancy rates in the first two years are:

Year	*Vacancy Rate*
1	30%
2	20%
After year 2	10%

   - The market rents in the building were expected to average $15.00 per square foot in the current year based on average rents in the surrounding buildings.
   - The market rents were assumed to grow 5% a year for five years and at 3% a year after that forever.
   - The variable operating expenses were assumed to be $3.00 per square foot, and are expected to grow at the same rate as rents. The fixed operating expense in 1994 amounted to $300,000 and was expected to grow at 3% forever.
   - The real estate taxes are expected to amount to $300,000 in the first year, and grow 3% a year after that. It is assumed that all tenants will pay their pro rate share of increases in real estate taxes that exceed 3% a year.
   - The tax rate on income was assumed to be 42%.
   - The cost of borrowing was assumed to be 8.25%, pretax. It was also assumed that the building would be financed with 30% equity and 70% debt.
   - A survey suggests that equity investors in real estate require a return of 12.5% of their investments.

   a. Estimate the value of the building, based on expected cash flows.
   b. Estimate the value of just the equity stake in this building.

7. You are trying to value the same building based on comparable properties sold in recent years. There have been six property sales of buildings of comparable size in the surrounding area.

Property	*Sale Price*	*Size (Sq. Ft.)*	*Gross Rent*
A	$20,000,000	400,000	$5,000,000
B	$18,000,000	425,000	$4,750,000
C	$22,000,000	450,000	$5,100,000
D	$25,000,000	400,000	$5,500,000
E	$15,000,000	350,000	$4,000,000
F	$12,000,000	300,000	$3,000,000

   a. Estimate the value of the building based on price per square foot.
   b. Estimate the value of the building based on price/gross rent.
   c. What are some of the assumptions you make when you value a building based on comparable buildings?