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REAL ESTATE MATHEMATICS

Applied analytics and quantitative methods for private real estate investing

Edited by
David Lynn and Tim Wang

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Dr. David Lynn is an institutional real estate investor, strategist and portfolio manager with 25 years of experience in national and international markets. At Clarion Partners (formerly ING Real Estate Investment Management), he is managing director and partner. He guides the firm's strategic and tactical investment decisions across funds, portfolios and separate accounts for $22 billion in assets under management. He is a member of the Investment Committee and the Operating Committee. He has an extensive and deep network of global real estate business and government relationships.

David has directed the investment and management of billions of dollars of institutional real estate in national and international markets in holding senior executive management positions at AIG Global Real Estate, AvalonBay Communities, the Keppel Corporation (one of the largest property groups in South East Asia headquartered in Singapore), and the Target Corporation (Property Development Group).

David has been published, interviewed and written about in numerous national and international finance and business periodicals. His theoretical work on financial distress developed a new analytical framework for analysing macroeconomic distress factors. His recent book on emerging market real estate investments has been critically acclaimed. He has written several books, including *Active Private Equity Real Estate Strategy* (John Wiley & Sons, 2009) and

Emerging Market Real Estate Investment (John Wiley & Sons, 2010). He writes a widely read 'Capital Trends' column in the *National Real Estate Investor.* He accurately predicted the dramatic decline of real estate fundamentals and values before the downturn as well as the timing and magnitude of the current recovery.

David earned his PhD in Financial Economics at the London School of Economics, where he also earned a MS in Finance. He earned an MBA from the Sloan School of Management at the Massachusetts Institute of Technology. He earned a MRP in City and Regional Planning with an emphasis in Real Estate from Cornell University. He earned a BA from the University of California at Berkeley. David is actively involved in the industry's major professional organisations, including the Pension Real Estate Association, Urban Land Institute, Homer Hoyt Institute, Counselors of Real Estate and International Council of Shopping Centres.

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Dr. Tim Wang is a senior vice president and senior investment strategist at Clarion Partners (formerly ING Real Estate Investment Management). He joined the firm in 2006, and assists in managing $22 billion in private equity real estate investment. He is responsible for macroeconomic analysis, portfolio strategies, quantitative forecasting and client advisory. Tim has published numerous research articles in real estate journals, including *Real Estate Issues, Urban Land, Institute for Fiduciary Education* and *The Institutional Real Estate Letter,* and co-authored four real estate strategy books, including *Active Private Equity Real Estate Strategy* (John Wiley & Sons, 2009) and *Emerging Market Real Estate*

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Tim is a member of the National Council of Real Estate Investment Fiduciaries, Pension Real Estate Association and Urban Land Institute. He is a frequent guest speaker at real estate investment conferences in the US, and has been quoted in publications including *New York Times, Commercial Property Executive, Indianapolis Business Journal* and *CoStar Newsletter.* He holds an MBA from the Stern School of Business at New York University and a PhD from the University of Georgia.

Introduction and acknowledgements

By David Lynn, Clarion Partners

In the aftermath of the 2008 real estate crash, real estate investment professionals were forced to re-evaluate long-standing approaches to investment practices. Once the worst of the crisis had passed, investors and managers were left with the task of carefully reappraising risks and revisiting performance expectations of real estate in order to rebuild investment portfolios.

Real Estate Mathematics seeks to examine the more mathematical and analytical aspects of current trends in real estate investment. Some questions we pose are: What are the mathematical equations behind successful real estate investment? How can these functions be applied to such a diverse asset class as real estate, and what are the most applicable tools for adequately measuring returns in this current climate?

It is the intent of this book, then, to offer explanations to those inquiries, as well as others. *Real Estate Mathematics* addresses the issues that come with a quantitatively-driven market. Among these issues, we thought it would be most beneficial to focus on two of these: the effects of an increase in value-based investing, and the associative variations between real estate equities and real estate debt.

This content is most useful to those investors whose primary focus is on real estate investment, acquisitions and portfolio management.

The contributing authors in the following pages are some of the foremost experts on real estate investment, fund and portfolio management, whose opinions are sought after for their accuracy, consistency and insightful analysis. It has been a great pleasure to collaborate with them in producing this book, and we hope their expertise displayed here proves valuable to your investment goals.

We have classified chapters under one of three main sections:

I. Fundamentals

II. Investing

III. Fund and portfolio management

The chapters discuss many principles of real estate mathematics, including appraisal practices and issues, environmental issues, forecasting real estate due diligence, risk analysis, portfolio management strategies international real estate, distressed debt, debt structuring, real estate cycles and allocations, among others. The chapters are summarised below.

Section I: Fundamentals

Chapter 1: Real estate allocations in multi-asset investment portfolios

We begin this book with an overview of the role of real estate in diversified asset investment portfolios. The benefits of real estate investment are enticing more and more investors, and this chapter focuses on examining those benefits in greater detail. As Greg MacKinnon explains, careful consideration should be given to relying on assumed benefits of real estate investment – the concepts of inflationary lags, appraisal smoothing and leverage risks are expanded on, as well as other potential issues in real estate investment returns.

Chapter 2: Forecasting real estate returns

Timothy Bellman takes a look at the importance of forecasting in real estate returns, highlighting the differences between retrospective and predictive investment practices. Included is an explanation of the techniques that best determine asset performance, based on both qualitative and quantitative aspects of the market. Bellman argues that forecasting acts on forward potential that exists in the market, rather than a merely reactive practice based on previous data. The needs of the forecaster often dictate which approach is most appropriate – as such, one whose emphasis is on income return may be better served with a more reflective, quantitative analysis, whereas a forecast for capital return will require a greater understanding of the anticipated change in the net operating income. As the amount and quality of data available to analysts continues to expand exponentially, forecasting is likely to adapt to a more predictive practice for investors moving forward.

Chapter 3: Real estate investment capital structure

The following chapter introduces the concept of capital structuring and its reliance on debt financing. According to Hugh Kelly, debt financing can be an appropriate means of maximising value to a variety of investor types, so long as default risks are adequately hedged. Taking an in-depth look at the mathematics behind solid capital structuring, the author makes the case for hybrid capital structuring, utilising both debt and equity financing.

Chapter 4: Contrasting approaches to quantifying risk in real estate investments

Jon Southard examines how to quantify risk in real estate investments, comparing three approaches. Scenario analysis, forward-looking distribution and Monte Carlo simulation (which is discussed at greater length in Chapter 5) can offer different perspectives where an investor can gain a better understanding of the level of hazard associated with a given real estate asset. This chapter seeks to give the reader a better understanding of each approach, and its respective advantages and disadvantages, as they can be applied to individual properties.

Chapter 5: Modelling uncertainty: Monte Carlo analysis and the pricing of real estate

This chapter examines the use of Monte Carlo methods in determining risk. It begins with a review of the basics of Monte Carlo modelling in comparison with other techniques. Authors Randall Zisler and Matthew Zisler make the case for Monte Carlo modelling, even suggesting that more widely used techniques, such as deterministic modelling, are typically inadequate and can no longer accurately portray today’s investment scenario. The authors offer a complex analysis of Monte Carlo applications that presents answers for the skilled investor.

Chapter 6: Analysing and pricing risk in international real estate markets

Maurizio Grilli and Richard Barkham focus on the increased activity in international real estate investment since the early 2000s. This interest in overseas markets has sustained, despite inconsistencies in international policies and monetary dependability. However, despite over-exaggerated results in some international markets, the desire for a more globalised portfolio continues to expand. The authors propose a new framework for evaluating risk in investing internationally, taking into account respective hurdle rates and individual countries' potential risks, of which national diversification, corporate presence and independent financial institutions play a large role.

Chapter 7: Special considerations in sustainable property financial analysis

This chapter contains a thorough account of sustainable property investment. Moving beyond the limited results achieved through simple pay-back or simple return on investment, Scott Muldavin presents a six-step process by which analysts can refine the qualitative nature of their research and produce results that consider the effects of sustainability.

Chapter 8: Real estate loans and real estate debt

The relationship between mortgage lending and commercial real estate financing has become increasingly prevalent since 2000. However, with this interdependence comes a new collection of issues. In this chapter, Sam Chandan examines several of these issues in greater depth, offering an analysis of the use of debt in commercial properties and providing standardised equations that can be adjusted to the qualities of specific loans.

Chapter 9: Distressed debt investing

David Lynn and Tim Wang discuss the characteristics of distressed debt, as well as its role in current investment practices. Offering investment strategies that capitalise on the increasing amounts of distressed debt on banks' balance sheets, this chapter illustrates both loan-to-own and hold-to-maturity purchasing, as well as approaches for distressed debt investments.

Section II: Investing

Chapter 10: CMBS securitisation and investing

Understanding commercial mortgage-backed securities as both a lender and asset class is an important tool for participants on either side of the debt-equity line. While differences between pre-crisis and recent CMBS issuance is still under scrutiny, a familiarity with CMBS as both a source of financing as well as a financial asset could be the competitive edge for investors in the near future. This chapter focuses on the intricacies of securitisation, with an emphasis on conduit transactions and the associated risks. Josh Younger traces the oscillation of the CMBS market, from its rise in the 1990s, to its dramatic fall at the onset of the US credit bubble in 2004–2007 through its careful return in present-day investing.

Chapter 11: Key considerations in joint-venture projects

This chapter considers the fundamental differences between the various types of joint-venture projects – specifically, single asset, multi-asset and programmatic joint ventures. With a focus on the cash flow issues associated with joint ventures, authors Roy Schneiderman and Dean Altshuler begin with a simple incentive fee structure and build on it with examples of more complex joint-venture configurations.

Chapter 12: Cash-flow considerations for value-added deals

Pip White and Nigel Allsopp introduce the considerations needed for value-added deals. By restructuring a property through repositioning, investors can increase the value of the investment by enhancing its marketability. This section looks at the delicate balance that must be struck between income needs and capital expenditure needs, and how the correct combination of income return and capital growth (accounting for unexpected costs that may arise over the course of an investment) can solidify a gain.

Chapter 13: Cross-border investment: Considerations and risks

This chapter reflects on the increasing aim of financiers to invest in international real estate markets. Paige Mueller discusses the advantages of cross-border opportunities at length – such as the growth and size of international markets, the portfolio diversification, the appeal of higher yields than domestic markets – as well as the associated risks with investing offshore.

Chapter 14: Benchmarking real estate performance

Kevin Scherer analyses the utility of benchmarking in real estate investment strategy. According to Scherer, "proper benchmarking should be performed at multiple levels". This allows for a clearer understanding of where a property lies in comparison with its equivalent and a better estimation of its future performance. Both time-weighted and internal rate returns are explained at length, along with accompanying equations useful in their applications.

Section III: Fund and portfolio management

Chapter 15: Principles of real estate appraisal

Three most common theories for property appraisal – sales comparison, income capitalisation and cost approach – and their respective applications are described in this chapter. Authors Aart Hordijk and Peter van Arnhem also discuss the importance of international valuation standards, and their significance for international investors. Offering transmutable calculations, the chapter breaks down the fundamentals of real estate appraisal while offering insights for even the experienced investor.

Chapter 16: Valuation of income-producing real estate

This chapter challenges the use of all-risks yield valuation practices by offering a candidate for replacement: discounted cash flow (DCF). Phillip Gainey discusses the central aspects of DCF valuation, as well as how variations in the most common assumptions surrounding property investment worth can alter the valuation assigned to a given property. A summary of valuation assumptions is included at the conclusion of the chapter to provide readers with a succinct review of what aspects of their current valuation models of which they should be most sensitive.

Chapter 17: Management fee, carried interest and other economic terms of real estate funds

Derek Williams discusses the language behind real estate's sometimes abstruse terminology around deal structuring. This chapter attempts to more clearly define the key concepts that are employed in many complex private equity real estate transactions today – concepts such as carried interest, catch-ups and clawback are defined and examined in relation to their function for today's real estate investor.

Chapter 18: Mathematical concepts in building a real estate multi-manager portfolio

This chapter focuses on multiple management, specifically real estate multi-managers (REMM) or fund of funds. Emphasising a combined approach of top-down and bottom-up analysis, Edward Casal and Tiffany Thomas explore the mathematics behind REMM portfolios, highlighting the importance of an analysis that includes the portfolio strategy, manager and structure.

Chapter 19: Portfolio returns and volatilities through the cycles

In the last chapter of the book, Kenneth Riggs discusses the recurring cycles in the market and commercial real estate's role within those cycles. The aim is to connect real estate investment with these larger business cycles, and furthermore, to identify which portfolio strategies are most successful in certain cycles.

Understandably, any project such as this owes a great deal to its contributing authors. Their dedication and knowledge is evident in every page, and the freshness they have brought to this process cannot be understated. I extend my sincerest thanks to each of them. I also want to thank Wanching Leong of PEI for her professionalism and understanding. She was instrumental in bringing the project to life and contributed greatly to its smooth execution.

Last but not least, I would like to thank and acknowledge my co-editor, Tim Wang at Clarion Partners. His dedication has often meant bearing a heavier load, and this endeavour would not have come to fruition without his tireless efforts. Also thanks to Sabrina Martin for her organisational and editing skills, for keeping us on track and assisting in the copy-editing process.

Many thanks to all involved,

David Lynn, PhD

Section

I

Fundamentals

1

Private real estate allocations in multi-asset investment portfolios

By Greg MacKinnon, Pension Real Estate Association

Introduction

A wide variety of commercial real estate investment strategies can be employed within a multi-asset portfolio depending on the needs of the specific investor. For instance, opportunistic investment strategies tend to be alpha-oriented, attempting to generate excess risk-adjusted return, while core strategies tend to be geared towards diversification and ongoing income-generation. This chapter looks at commercial real estate investment from the perspective of a strategic asset-allocation decision.

In setting policy portfolios, it is typical to consider the investment characteristics of an asset class in general, rather than specific strategies that could be employed within the class. Hence, the focus is on the broad characteristics of equity investment in institutional-quality commercial property. Higher risk developments, turnaround situations and other strategies within the opportunistic and value-add spaces can certainly provide benefits to a portfolio if executed properly, but are not the focus here as the decisions involved with each investment are situation-specific. Rather, the chapter examines decisions taken from a portfolio-level: what benefits might an allocation to the broad real estate market provide to a mixed-asset portfolio, and how much should that allocation be?

The average institutional real estate allocation was 3.7 percent in 2010, although this varied by type of investor (see Table 1.1). A number of institutional investors have zero allocations to real estate, bringing down the overall average; among members of the Pension Real Estate Association (PREA), a trade association of the institutional real estate community whose members presumably have a high interest in the asset class, the average allocation to real estate was 9.8 percent in 2010.[1] It appears that once an institution makes a commitment to real estate as a viable asset class, real estate is allocated a significant portion of the overall portfolio.

Table 1.1: **Average real estate allocations of institutional investors, 2010**

All investors	3.7%
Public plans	5.0%
Corporate plans	1.3%
Others	4.4%

Source: PREA Investor Report 2011, Pension Real Estate Association.

The standard arguments for real estate

The value of the global institutional-grade commercial real estate market has been estimated at $23.9 trillion, versus a total equity market capitalisation of $58 trillion.[2] An investor wishing to take a market-neutral approach would therefore need to have a sizeable allocation to property. Apart from its sizeable role in the universal market portfolio, several key arguments are often used to promote a real estate allocation, specifically real estate's provision of steady income, potential as an inflation hedge, good risk-adjusted returns and diversification benefits.

Income

In Figure 1.1 it is apparent that over the long-term price appreciation accounts for little of the total return to real estate, with income dominating.

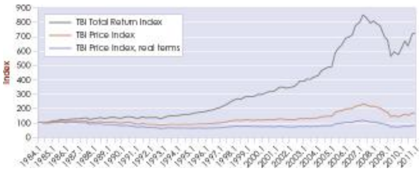
As well as being the dominant source of long-run returns, income returns from a diversified portfolio of real estate tend to be relatively stable. Using the variance of quarterly returns to the transaction-based index (TBI) as a measure of real estate risk for the 1984–2011 period:

$$\frac{\sigma^2_{\text{price}}}{\sigma^2_{\text{total}}} = \frac{0.00204}{0.00207} = \text{98\% of variance from prices}$$

$$\frac{\sigma^2_{\text{income}}}{\sigma^2_{\text{total}}} = \frac{0.000009}{0.00207} = \text{0.4\% of variance from income}$$

with the remainder of total risk arising from the correlation of income and price. Obviously, in a well-diversified real estate portfolio, income accounts for the majority of returns to real estate but very little of the risk. For institutional investors with ongoing cash outlay commitments, the provision of a stable income stream is an important advantage of the asset class that lends itself to higher real estate allocations.

Figure 1.1: **Income dominates as long run source of returns, 1984–2011**



Note: For period Q1-1994 to Q1-2011.

Source: MIT Centre for Real Estate, Bureau of Labour Statistics.

Inflation

While many discussions of real estate take its inflation-hedging abilities as accepted wisdom, the evidence is far from conclusive. In a research report prepared for the Investment Property Forum (IPF), Blake et al. conclude that UK property is actually related to GDP growth, rather than inflation. As inflation often, but not always, increases when GDP growth is strong it can appear that property returns and inflation are linked. According to the IPF report, real estate does best when GDP is strong and inflation is low, but does badly in stagflation situations in which the economy is performing poorly and inflation remains high. Other research on real estate and inflation has shown decidedly mixed results (Hoesli et al. provide an overview of past research in the area).

Note that over the long term values actually do not keep up with inflation; in Figure 1.1 they end the first quarter of 2011 at only 76 percent of their 1984 value in real terms. Given ongoing obsolescence in properties, some lag behind inflation should be expected. Figure 1.1 implies an average loss in real value of approximately 1 percent per year due to obsolescence (the addition of return from income, of course, will result in positive real returns overall). This is generally consistent with Wheaton et al. who found that Manhattan office prices lag inflation somewhat (although not statistically significantly so) over a 100-year period. Of course, even with some expected obsolescence, real estate values can still provide long-run inflation protection.[3]

However, in their study Wheaton et al. also found that property prices can depart substantially from inflation in the medium term. Values in real terms often rise or fall 20 percent to 50 percent within a single decade, thus over medium-term investment horizons on which many investors place great emphasis, real estate may not be an effective hedge against inflation.

Huang and Hudson-Wilson examine short-term returns (annual and quarterly) and report that real estate does act as a short-term inflation hedge, although the strength of the hedge varies by property type. However, the inflation hedge is due to capitalisation (cap) rate compression, not increasing income. Cap rate effects, however, are susceptible to being unwound in subsequent periods. This would be consistent with the findings of MacKinnon and Al Zaman who find evidence that real estate tends to overshoot inflation and mean revert later. Of course, short-term relationships between real estate and inflation may not even be of interest to institutional investors who typically have long investment horizons.

While real estate appears to provide inflation protection over long (although not medium) horizons, a relevant question in asset allocation is whether it is any better as a hedge than other asset classes. It is well-known, for example, that equities typically suffer during periods of high inflation. However, research indicates that this may be only a short-run phenomenon due to investor overreaction and equities may, in fact, be an inflation hedge over longer horizons (see Campbell and Vuolteenaho, and Boudoukh and Richardson). Over the long run, there is no evidence that real estate is any better or worse than equities as an inflation hedge. Companies, after all, are 'real' assets just as real estate is and can also pass inflation on to customers, at least in the long run.

So real estate universally is not necessarily any better as a long-term inflation hedge than other asset classes such as equities. However, it may be possible to construct a real estate portfolio with good inflation-hedging characteristics. Lease terms are obviously important; triple net leases and those with rent increases to cover expected or realised inflation help investors pass inflation through to tenants during the life of the lease. As leases roll, the ability to continue to pass through inflation depends on the supply/demand dynamics of the location and sector. In locations and property types with excess demand and constrained supply due to barriers to building from regulations or long required lead times, inflation will be able to be passed on to tenants. A real estate portfolio could be constructed around such properties to provide a good inflation hedge in both the medium and long terms. However, building such a portfolio is dependant on appropriate property selection rather than the asset-allocation decision.

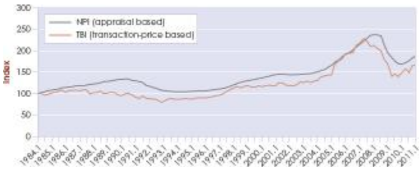
Risk-adjusted returns and diversification

The risk/return benefits that real estate brings to an overall portfolio are well-known: it has historically provided good returns with relatively low volatility, resulting in very good risk-adjusted performance. Further, due to low correlations with other asset classes, real estate provides diversification which can further increase the risk-adjusted performance of the overall portfolio.

Examining issues of diversification and performance relative to other asset classes is complicated by the fact that real estate is not a continuously traded asset, as are equities and fixed income. Investors typically calculate returns based on appraised property values, rather than actual transaction prices. Many of the most common commercial real estate indices tracking the market are also based on appraised values, and are well-known to suffer from 'appraisal smoothing'; they tend to lag changes in prices and exhibit lower volatility than do actual prices. This also results in correlations with other asset classes being lower when real estate is represented by appraised values. Figure 1.2 shows both appraisal-based (NPI) and transaction-based (TBI) indices; the higher volatility of the TBI and its tendency to hit turning points first is apparent.

As investors record investment returns based upon appraised values, the use of appraisal-based indices to represent real estate performance would be consistent with returns as experienced by investors. However, because appraisals result in volatility and correlations that are artificially low, such an approach will tend to result in allocations to real estate that are higher than truly optimal. For this reason, it is generally better to use transaction price-based indices to compare real estate performance to other asset classes, and in estimating optimal allocations.[4]

Figure 1.2: **Appraisal versus transaction price-based indices, 1984–2011**



Notes: For period Q1-1994 to Q1-2011. To facilitate comparability with the TBI, the NPI shown is the 'cash flow' version of the index which does not net capital expenditures (capex) out of values, not the more commonly reported version of the NPI for which capex is subtracted from capital appreciation.

Source: MIT Centre for Real Estate, NCREIF.

Table 1.2: **Performance by asset class, 1994–2011**

	Real estate	**Treasuries**	**Inv. Grade corporates**	**Equities**	**Hedge funds**
Average return (per quarter)	2.5%	1.6%	1.8%	2.4%	2.4%

Volatility (per quarter)	4.8%	2.9%	3.1%	8.6%	4.3%
Sharpe ratio	0.33	0.26	0.29	0.17	0.35

Notes: For period Q1-1994 to Q1-2011. Real estate is represented by the TBI, Treasuries by the Barclays US Treasury Index, investment-grade corporate bonds by the Barclays US Corporate Investment Grade Index, equities by the S&P 500 and hedge funds by the Dow Jones Credit Suisse Hedge Fund Index. Sharpe ratios are calculated using the yield on 6-month T-Bills as the risk-free rate.

Source: MIT Centre for Real Estate, Barclays Capital, Dow Jones, S&P, Thomson Reuters Datastream.

Table 1.3: **Asset class correlations, 1994–2011**

	Real estate	**Treasuries**	**Inv. grade corporates**	**Equities**	**Hedge funds**
Real estate	1				
Treasuries	-0.02	1			
Inv. grade corporates	-0.11	0.58	1		

Equities	0.22	-0.39	0.17	1	
Hedge funds	0.23	-0.24	0.23	0.68	1

Notes: For period Q1-1994 to Q1-2011. Real estate is represented by the TBI, Treasuries by the Barclays US Treasury Index, investment-grade corporate bonds by the Barclays US Corporate Investment Grade Index, equities by the S&P 500 and hedge funds by the Dow Jones Credit Suisse Hedge Fund Index.

Source: MIT Centre for Real Estate, Barclays Capital, Dow Jones, S&P, Thomson Reuters Datastream.

Table 1.2 compares the investment performance of real estate to other asset classes over the 1994–2011 period (the start of the time period is dictated by the availability of hedge fund data). Real estate as represented by a TBI had the highest average return, just ahead of equities and hedge funds. At the same time, real estate also showed relatively low volatility; as is often assumed as a rule of thumb, it falls between the volatility of equities and corporate bonds. Using the Sharpe ratio, only hedge funds performed better than real estate on a risk-adjusted basis, and then only slightly better.

However, comparing risk-adjusted performance of asset classes essentially treats them as stand-alone investments. It does not consider the potential for diversification that occurs when the asset classes are held simultaneously within a portfolio.

As can be seen in Table 1.3, real estate had negative correlations with fixed income over this period, and quite low correlations with both equities and hedge funds. This indicates that real estate returns do not move in lock-step with returns on other asset classes and therefore will stabilise returns to the overall portfolio, the essence of diversification. Note that hedge funds, despite having the best stand-alone performance in Table 1.2, are actually quite highly correlated with equities and therefore may not provide gains from diversification as great as real estate.

Overall, real estate possesses risk/return characteristics that are quite attractive relative to other asset classes, and an allocation to real estate can improve the risk-adjusted performance of a portfolio.

Leverage and its effect on performance

The performance indicators presented above are based on unlevered returns to real estate. Using debt financing changes some of the investment characteristics of an asset, and its effects should be kept in mind when making allocation decisions.

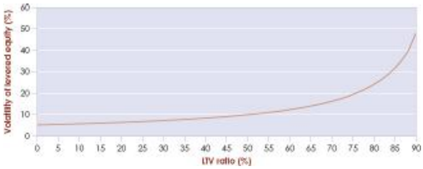
Leverage serves to increase both risk and expected return (assuming the cost of debt is less than the unlevered expected return) on an investment. Using the standard cost of capital equation, the unlevered return on a property can be written as function of the levered return on equity, the cost of debt and the loan-to-value (LTV) ratio:

$$R_{unlevered} = (1 - LTV)R_{levered} + LTV \cdot R_{debt}$$

which can then be rearranged to show the sources of return to a levered equity position:

$$R_{levered} = \frac{R_{unlevered} - LTV \cdot R_{debt}}{1 - LTV}$$

Figure 1.3: **Effect of leverage on volatility**



Source: PREA Research.

Assuming the cost of debt to be fixed, the above can be used to relate the volatility of levered and unlevered returns:

$$\sigma_{levered} = \frac{\sigma_{unlevered}}{1 - LTV}$$

Note that the volatility of returns to levered equity increases at an increasing rate as higher and higher LTVs are employed, as shown in Figure 1.3.

Mean-variance optimisation

Mean-variance optimisation provides a shorthand way of examining the risk, return and diversification attributes of the asset classes under consideration within a single framework. The basic portfolio theory approach does not consider all aspects of the allocation decision, for instance not considering the role of asset classes as inflation hedges has already been discussed. There are also other important issues that the most basic form of mean-variance optimisation ignores, some of which will be discussed later in the chapter. Optimised portfolio allocations from a portfolio theory approach should therefore not be taken as a final answer, but rather as a useful ingredient which should be considered along with other issues in reaching a final strategic asset allocation.

Let the portfolio weight on each of N asset classes be w_i, for $i = 1$ to N. Let μ_i and σ_i be the expected return and standard deviation of asset class i, respectively. Using matrix notation, define:

$$\Sigma = \begin{bmatrix} \sigma_1^2 & \sigma_{1,2} & \cdots & \sigma_{1,N} \\ \sigma_{2,1} & \sigma_2^2 & \cdots & \sigma_{2,N} \\ \vdots & \vdots & \ddots & \vdots \\ \sigma_{N,1} & \sigma_{N,2} & \cdots & \sigma_N^2 \end{bmatrix}$$

where $\sigma_{i,j}$ is the covariance between asset class i and j. Σ is therefore the covariance matrix of the asset class returns. Also define:

$$\mu = \begin{bmatrix} \mu_1 \\ \vdots \\ \vdots \\ \mu_N \end{bmatrix}$$

and

$$w = \begin{bmatrix} w_1 \\ \vdots \\ \vdots \\ w_N \end{bmatrix}$$

as the expected return vector for the asset classes under consideration, and the vector of portfolio weights for each asset class (that is, w_i is the percentage allocation to asset class i), respectively. Finally, define $\boldsymbol{e}$ as vector of ones (note that bold is used to distinguish a matrix from a scalar).

The mean-variance optimisation problem can be written as:

$$\min_{w} \mathbf{w}^T \Sigma \mathbf{w}$$

Subject to:

$$\mathbf{w}^T \boldsymbol{\mu} = \mu_{target}$$

$$\mathbf{w}^T \mathbf{e} = 1$$

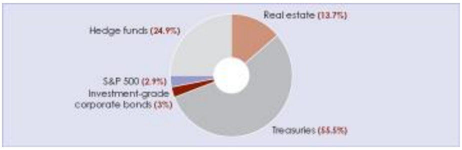
$$w_i \geq 0, \forall i$$

where the last constraint reflects no short positions being allowed, a common situation in an asset-allocation context.

Estimates of the required parameters are most commonly obtained from historical data, although the process does not require that. Mean-variance optimisation is sometimes mistakenly criticised for relying on historical data. However, in theory, the parameters should represent the going-forward estimates for each asset class, as determined by the decision-maker. In practice, the most convenient estimate is usually obtained from historical data, but there is nothing to prevent the decision-maker from using other sources or their own expertise to estimate going forward numbers.

Figure 1.4 shows the results of a mean-variance optimisation based on the historical data underlying Tables 1.2 and 1.3 and a target return of 8 percent per year (in line with the actuarial rate of return target for many public pension plans). The optimised allocation to real estate is almost 14 percent of the portfolio, which is far in excess of the average actual allocations seen at the beginning of the chapter. Hence, at least using data from 1994–2011 and for an 8 percent target return, based on its risk, return and diversification properties it would appear that real estate deserves an allocation in institutional portfolios at levels quite a bit above current practice.

Figure 1.4: **Mean-variance optimised allocation for an 8 percent target return**



Notes: For period Q1-1994 to Q1-2011. Real estate is represented by the total return on the TBI, Treasuries by the total return to Barclays US Treasury Index, investment-grade corporate bonds by total return to Barclays US Corporate Investment Grade Index, equities by total returns to the S&P 500 and hedge funds by the Dow Jones Credit Suisse Hedge Fund Index.

Source: PREA Research, MIT Centre for Real Estate, Barclays Capital, Dow Jones, S&P, Thomson Reuters Datastream.

Of course, the portfolio in Figure 1.4 is only a specific example; different target returns or data will give different results. Nevertheless, that optimal allocations to real estate are substantially higher than those seen in practice is typical of mean-variance results including real estate (see Chun et al. for an overview of research findings in the area).

However, mean-variance analysis does not constitute the entire story that should be considered by the portfolio decision-maker; it is simply one piece of the puzzle. There are important portfolio management issues that are not considered in the simple optimisation procedure above, some of which are described below.

Portfolio theory issues

The basic mean-variance model ignores certain issues of importance to practical decision-making regarding policy portfolio allocations. In some cases, there are more advanced forms of the optimisation process which can help to incorporate these issues in the decision-making process.

Portfolio theory is often criticised for relying on an assumption of normally distributed returns.[5] Under this assumption only mean and variance of returns matter to an investor. This abstracts from the reality of the situation for most asset classes, especially real estate. First, returns tend to have fatter tails than a normal distribution. This implies that extreme events occur more frequently in actuality than they would be expected to under normal conditions, and that standard deviation is not a good measure of risk as it does not encompass the complexity of the situation in reality. Second, the normal distribution is symmetric, each side around the mean being a mirror image, but the distribution of returns in reality is not. Actual return distributions being asymmetric implies that: (a) standard deviation again does not capture the complexity of the risk situation, which should depend on how skewed is an asset class's return distribution; and (b) standard deviation is too simplistic because it includes both upside and downside risks, which are obviously not of equal concern to investors and not equal in asymmetric distributions.

There are various ways to address the concerns about return normality in portfolio theory. One is to use different measures of risk, such as semi-variance. Semi-variance is calculated based only on observations that fall below the average and therefore is meant to capture downside risk. Alternatively, to address non-normality one could explicitly model returns as being from a more realistic distribution and estimate optimal portfolios based on that. For instance the t-distribution has fatter tails than the normal and may be a more realistic way to represent real estate returns. Coleman and Mansour provide an example of applying both a fat-tailed t-distribution and a measure of downside risk to formation of optimal portfolios in a real estate context.

Of course, another way to deal with the fact that returns in reality are non-normal is to simply ignore it and continue to use standard portfolio theory. This approach may at first seem disingenuous. However, Kritzman, and the citations discussed therein, provides evidence that even though portfolios resulting from mean-variance optimisations may not be 'truly' optimal because the normal distribution assumption is not realistic, the portfolios are so close to the truly optimal portfolios that the differences are economically negligible in many cases. In effect, more complicated models may be more realistic than mean-variance analysis, but there may not be much practical difference between the results in the end. Further, mean-variance analysis has the benefit of being widely known, intuitive and relatively easy to implement.

An issue in portfolio optimisation that has garnered a lot of recent attention, and is not addressed in standard portfolio theory, is liquidity. Especially during the financial crisis of 2008-2009, the downside of real estate's illiquidity became very apparent to investors. Not being able to liquidate a position when one would like to (at a reasonable price) is a risk not included in the standard mean-variance approach. For many investors the illiquidity of real estate is the main reason to limit the allocation within the portfolio. In a real estate context, Lin and Vandell introduced the concept of ‘marketing-period risk’ as a reflection of the illiquidity of real estate. Marketing-period risk reflects the fact that the outset of an investment the exact holding period for a property is unknown to the investor because it is uncertain how long it will take to sell once a decision to divest has been made. Lin and Vandell show that marketing-period risk can add significantly to the risk of a property investment, although the effect declines with the horizon of the investor.

Bond and Slezak take another approach to the liquidity issue, describing a portfolio optimisation procedure that accounts for liquidity issues, as well as another issue not accounted for in traditional mean-variance analysis: Knightian uncertainty. In the traditional concept of risk, the actual returns to an asset come from a random distribution of possibilities; an investor has an expected return, but risk exists because the realised return can be different from that expected upfront. Knightian uncertainty arises when the investor does not even know for sure what the distribution of possibilities looks like. This can arise because parameters such as expected returns are only estimated (often from historical data) and do not necessarily equal going-forward values (this is referred to as estimation error). Bond and Slezak account for both risk and uncertainty, and incorporate liquidity issues by estimating a time-varying bid-ask spread for real estate and combining that with an assumed probability of liquidation for the real estate portfolio each quarter. They find that portfolios formed by accounting for Knightian uncertainty provide significant improvements in risk-adjusted performance. These portfolios have allocations to real estate that are lower than those suggested by traditional mean-variance analysis. However, the allocations are more stable over time and much more realistic relative to traditional methods which often give very extreme portfolios. Importantly, optimal real estate allocations are still higher than seen in the average institutional portfolio. Illiquidity, often seen by investors as a major drawback to real estate as an asset class, has a reasonably small effect on the optimal real estate allocation, even for quite high probabilities of liquidation. Further, even allowing for liquidity costs and uncertainty, adding real estate to a multi-asset portfolio improves performance.

Investment horizon can have tremendous effects on optimal allocations even beyond liquidity issues and should be carefully considered by the policy portfolio decision-maker. Mean-variance optimal portfolios are typically estimated using short-term returns. However, an optimisation based on, for instance, quarterly returns is really only optimal for an investor with a one-quarter investment horizon. Obviously, the typical institutional investor has a horizon far longer than that, and could quite easily have an investment horizon of 25 years or more.

If returns on asset classes are uncorrelated through time (that is, future returns are unrelated to past returns) then investment horizon is not an issue. Long-horizon and short-horizon investors will have the same optimal portfolios as both risk and return will scale with time leaving the asset classes in the same relative position with respect to one another and the optimal mix of classes unaffected. However, it is known that returns on most asset classes mean revert, resulting in the volatility of long-horizon returns being less than the volatility of short-horizon returns. This means that optimal portfolios can be very different for long-and short-horizon investors.

MacKinnon and Al Zaman examine the role of investment horizon on real estate allocations within a multi-asset portfolio. They report that real estate returns do mean revert and real estate risk therefore decreases with investment horizon, but not to the same extent as does the risk to equities. In fact, for investment horizons greater than ten years, real estate and equities have close to the same level of risk. However, they also report that optimal portfolios have large allocations to real estate at all investment horizons. Based on those results, while investment horizon is an important issue, and institutional investors must carefully consider its effects on their real estate allocation and overall portfolio construction, it does not negate the benefits of real estate within a multi-asset portfolio.

Rehring simultaneously examines liquidity, investment horizon and transaction costs, three issues which are often mentioned as affecting the real estate investment decision. Rehring attempts to determine which effects are the most important. He concludes that traditional mean-variance analysis can be very misleading because it does not account for these characteristics. However, the effect of illiquidity as measured by marketing-period risk appears to be of negligible importance. Transaction costs, typically high for real estate compared to other asset classes, are very important for investors of short-and medium-term horizons, but less so for long-horizon investors. Finally, incorporating the effect of investment horizon and mean reversion into the analysis is found to be crucial.

All of these results provide insights into the limits of mean-variance analysis, and more importantly insights that are useful to investment professionals in deciding upon policy portfolio allocations to real estate. However, each of these issues is complicated and research on them continues. The jury is still out on how best to incorporate issues such as liquidity, investment horizon and transaction costs into the asset-allocation decision.

An alternative allocation paradigm: liability-driven investing

An approach to asset allocation that has become increasingly popular recently, especially among corporate pension plans, is liability-driven investing (LDI). LDI challenges the assumption that return volatility is the appropriate measure of risk for a pension plan. Returns are obviously desirable, but ultimately a pension plan is not in the business of earning returns; it is in the business of paying benefits. Under LDI, a pension plan's portfolio is structured around the goal of being able to meet future benefit payments. The ability of a fund to meet its liabilities can be measured by its funding status (for example, the size assets relative to liabilities), and under LDI, risk is redefined as volatility in the funding status rather than in asset returns. A low-risk asset portfolio under LDI is not one with low-return volatility, but rather one whose returns are highly correlated with changes in fund liabilities. In that way, when liabilities rise asset values also tend to rise, leaving funding status relatively unchanged.

Sharpe and Tint show how a portfolio optimisation can be done in an LDI context. They show that rather than the expected value and volatility of returns to the asset portfolio, R_A, being the variables of interest, it is the expected value and volatility of Z, where:

$$Z = R_A - k\frac{L}{A}R_L$$

L and *A* are the beginning of period market values of fund liabilities and assets, respectively, so the ratio is a measure of funding status. R_L is the liability return, that is, the percentage change in liability value. *k* is a weighting variable that indicates how much importance the fund places on LDI versus traditional asset-only optimisation; if $k = 0$ then *Z* becomes the asset-portfolio return and the optimisation is equivalent to traditional mean variance, if $k = 1$ then full emphasis is placed on surplus as the key variable.

Conducting a mean-variance analysis, using mean and variance of *Z* rather than of portfolio return, results in an LDI-optimised portfolio. Note from the definition of Z, the worse the funding status of the plan (that is, the higher *L/A)* the more weight is placed on liabilities. Conversely, plans that are in a surplus position (low *L/A)* will have optimal allocations closer to a traditional asset-only allocation.

Several studies examining the role of real estate within an LDI framework (see Craft [2001, 2005a, 2005b] and Chun et al.) show LDI-optimised multi-asset portfolios having an allocation to real estate in the neighbourhood of 12 percent for more conservative portfolios. The optimal allocation drops off for more aggressive portfolios, but increases with improved funding status. While 12 percent is less than often found in asset-only portfolio optimisations based on traditional mean-variance analysis, it is still far higher than actual allocations typically seen in most pension fund portfolios (see Table 1.1). Based on these studies, private real estate would appear to have a significant role to play within both traditional asset-only portfolios and liability-driven portfolios.

Conclusion

A commercial real estate allocation can provide a stable income stream and attractive returns, as well as stabilise an overall portfolio through its low volatility and diversification from other asset classes. It can therefore play a significant role within most institutional portfolios, including those arranged around a liability-hedging framework. The precise allocation is very much dependant on investor-specific issues, such as risk tolerance and the need for liquidity, but most analyses show optimal allocations at levels above the average seen in practice. While analyses based on methods such as mean-variance optimisation do not incorporate all of the intricacies of the real world asset-allocation decision, research continues to make advances. Such advances will help investors to make more informed allocation decisions in the future, and thus far continue to show a major role for real estate in institutional multi-asset portfolios.

□

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[1] Pension Real Estate Association Investor Report 2011.

[2] Figures as of 2010 and May 2011, respectively. Sources: Prudential Real Estate Investors's A Bird's Eye View of

Global Real Estate Markets: 2011 Update and World Federation of Exchanges.

[3] Obsolescence would not necessarily detract from real estate's role as an inflation hedge. A hedge is not dependent on an asset outperforming inflation, but rather on an asset providing higher returns when inflation is high and lower returns when inflation is low. This is possible even if prices increase at a rate somewhat lower than inflation on average over the long run.

[4] There may be other situations in which appraisal-based indices may be more relevant, such as benchmarking portfolio performance.

[5] Alternatively, mean-variance optimisation can be justified based on non-normal returns but quadratic utility of the investor.

2

Forecasting real estate returns

By Timothy Bellman

Introduction

Intrinsic to all investment decisions is a view on the future. The real estate asset class is no different. Whether it be residential or commercial real estate, listed or unlisted, or whether the investor is a private individual or a sophisticated institution, a view on current pricing, likely future investment performance and an evaluation of potential risks are all essential.

Clearly it is impossible to predict the future with absolute certainty and accuracy. Consequently some argue that it is better not to try. For example, some might argue that it is best simply to look opportunistically for mispriced assets, perhaps acquiring where pricing is below long-term trends (and vice versa). Others, emphasising risk, argue that it is the careful combination of assets within a portfolio (asset type, duration and nature) that deliver the highest returns and mitigate the risk in the long term. The challenge is that both these approaches still involve a view on the future, albeit an implicit one.

Why then is explicit forecasting important? Behavioural economics suggests a potential pitfall without formal forecasts of likely future investment performance. It is well understood that the natural behaviour of many investors is to focus on asset classes that have performed well in the recent past. This may be ill-advised. It is rare for an asset type to outperform consistently and rarer still for an investor to be able to pick it. In its millennium issue, *The Economist* told the story of Henry Hindsight and Felicity Foresight, both of whom started by investing one dollar in 1900. Each year Henry invested in the asset class that had been the best performing in the previous year. For much of the second half of the 20th century this would have led to losses in as many years as profits. Nevertheless, by 2000 Henry's dollar would have become $793. On the other hand, gifted with perfect foresight each year Felicity invested the dollar and all profits in the asset class destined to be the best-performing worldwide in the following year. By 2000 she would have amassed an unimaginable $9.6 quintillion, a 55 percent annual return!

Both Henry and Felicity invested on the basis of a view of the future. Henry predicted that the previous year's investment trend would continue, while Felicity considered a wider range of outcomes. Few would claim the level of prescience of Felicity Foresight, but the parable does suggest the potential of investment strategies that seek actively to identify outperformance.

It is not possible within a single chapter to do full justice to the statistical basis of the various quantitative techniques that can be employed in forecasting real estate performance.[1] Instead, this chapter will provide a general discussion of some of the quantitative options and focus in more detail on a blended technique that combines quantitative and qualitative techniques from a pragmatic perspective. In doing so the chapter seeks to address a number of basic questions: why forecast? What to forecast? How to forecast? Perhaps most importantly, how to forecast in practice?

Why forecast real estate performance?

This chapter focuses largely on the mathematics that underpins forecasting techniques of real estate performance from the perspective of an investor. The resulting forecasts, however, can be used to inform the choices of other market participants (developers, lenders, occupiers and regulators) as well.

Investors can use forecasts of real estate returns in order to try to improve their investment decisions. This may be used from one of two broad perspectives: investment strategy or asset selection/management.

•From a *strategic perspective* investors can compare future returns by city, sector and market in order to identify target markets which may offer a better return or a risk-adjusted return.

•From an *asset selection/management perspective* investors can use forecasts in the underwriting process for acquisition, disposition or annual asset management plans.

In practice, the same underlying forecasts can provide an input into both investment strategy formulation and asset selection/management, if combined carefully into a clear framework.

What to forecast?

Underpinning the challenge of forecasting real estate returns is an obvious but key question: what type of return to forecast? Essentially this has two dimensions: the nature of the return and the universe of real estate assets.

Type of return

The income return (IR) is often a key metric for long-term, low-risk institutional investors. Generally for an occupied investment property the income return is positive and largely stable. Over the long term, research suggests that it is the income return that delivers the majority of the total return from a core real estate investment and does so with comparatively little volatility.[2] The income return is essentially the net operating income (NOI) in a given period divided by the value (P) from the previous period:

$$IR = \frac{NOI_t}{P_{t-1}}$$

The capital return (CR) can be driven either by a change in NOI or by a change in the yield or capitalisation (cap) rate used to capitalise the current and future cash flows from the asset. Consequently the capital return in a given period can be positive or negative. A distinguishing feature of the real estate asset class compared to stocks and bonds is that the capital return at an asset level is often estimated based on appraised values, which may or may not have clear transactional evidence to support the appraisal in a given period. The capital return is simply the change in the value of a real estate asset from one period to the next:

$$CR = \frac{P_t}{P_{t-1}}$$

The simple total return (TR) from an asset or portfolio in a given period is the sum of the income and capital return from the asset or portfolio in the period:

$$TR_t = IR_t + CR_t$$

Markets, sub-markets and assets

A routinely prepared and updated forecast of real estate returns for a benchmark property sector or market can be a useful piece of data in the determination of a client or portfolio strategy, but it is not enough for the evaluation of a specific investment opportunity. In real estate, location and asset-specific issues can mean that the performance of a specific asset could reasonably be expected to be significantly different from the market as a whole. One way of establishing a clear framework that considers the various influences on performance is adopting the 'four-column approach' (see Table 2.1).

The principal responsibility for the forecast of real estate returns falls on professionals with different skill sets at each spatial level. As an example, for benchmarking the national office market for a country, a strategic forecast routinely prepared by research professionals can suffice for an overall view. However, for underwriting this view needs to deepen by specific sub-market and sub-sector, taking into account trends and characteristics of the local market, for example, City of London prime office properties. This is often best done through a combination of local research and local asset management, as well as a combination of quantitative and qualitative techniques. At the asset level, a detailed understanding of the unique attributes and potential of the property is probably best driven by the asset manager who primarily adopts a more qualitative forecasting approach.

In the hypothetical example shown in Table 2.2, the strategic forecast for the benchmark market suggests that historical average returns have been 7 percent. Following a recent period of below-average returns of 5 percent (in the period T-3 to T-2), the outlook is for a period of above-average returns of 10 percent (in the period T+1 to T+2).

The return characteristics and forecast of sub-market/ sub-sector in which the asset is located are different. Historically the average return is a little higher at 8 percent, which suggests the sub-market/sub-sector both appears more volatile than and lags the benchmark market by one period (lower when below average and higher when above average).

Historically the specific asset has underperformed both its sub-market and the benchmark market. The asset-specific forecast includes a refurbishment of the asset in time period T, following which the asset is expected strongly to outperform both its sub-market and the benchmark for two years (T=1 to T+2) as it is re-leased at higher rents before performing at sub-market average rates (T+3).

Table 2.1: **The four-column approach in a real estate investment process**

Total return	**Strategic forecast**	**Asset-specific forecast**

Spatial unit	Benchmark market	Specific sub-market	Specific asset	Comment
Responsibility for forecast	Research	Research/ asset management	Asset management/ research	The primary responsibility for forecasting changes with greater asset level specificity.
Predominant forecast technique	Quantitative	Quantitative and qualitative	Qualitative	The primary technique for forecasting changes with greater asset specificity.

Table 2.2: **Hypothetical Illustration of the four-column approach**

Total return	**Strategic forecast**	**Asset-specific forecast**		
Spatial unit	Benchmark market	Specific sub-market	Specific asset	Comment

Historic average	7%	8%	6%	The asset has underperformed.
***T*-3**	5%	8%	6%	The asset has a lower income return than the average.
***T*-2**	5%	4%	4%	Asset to perform at sub-market average.
***T*-1**	7%	4%	4%	Asset to perform at sub-market average.
T	7%	8%	0%	Refurbishment of the asset.
***T*+1**	10%	8%	15%	Repositioning of asset attracts uplift in value.
***T*+2**	10%	12%	15%	Repositioning of asset attracts uplift in value.
***T*+3**	7%	12%	12%	Asset expected to perform at sub-market average.

The principal merit of the four-column approach lies in the explicit presentation of the interconnection between the strategic forecast and the asset-level forecast. It has the additional virtue that it allows reasoned adjustments to be made to the asset-level forecast should the outlook for the benchmark market change. The fourth column – comment – is perhaps the most important of all in that it permits a clear explanation of why an individual asset may be expected to outperform or underperform the wider market.

How to forecast?

There are many and various approaches to forecasting. There is no right or wrong approach. Much depends on the means and motives of the forecaster and the availability of data. A conceptual framework is illustrated in Figure 2.1.[3] There are two main approaches to forecasting:

•*Informal approaches* are in essence based on market experience and intuition, and reflect the professional and entrepreneurial traditions of real estate investment and development. Often informal forecasts place great reliance on market sentiment alongside an appreciation of market fundamentals.

•*Formal approaches* can be quantitative, qualitative or a combination of the two. Quantitative approaches may be sub-divided into methods that focus on time-series/ trend-based analysis (generally without looking for explanatory theories) or causal/structural analysis (generally building, testing and using models with strong theoretical underpinnings). Qualitative approaches can include surveys of expert opinion, Delphi methods and historical or geographical analogy.

Figure 2.1: **Approaches to forecasting**

Source: Lizieri, Colin. Forecasting and Modelling Real Estate, presentation at the Henley School of Real Estate and Planning at the University of Reading on 27 March, 2009.

Bearing in mind that an investor may wish to forecast the income return, capital return or total return, the most appropriate forecasting technique may vary.

•In forecasting the *income return* the emphasis is on understanding trends and forecasting real estate occupational markets in order to forecast NOI. This lends itself to formal quantitative approaches – perhaps time-series/trend-based for supply and causal/structural for demand, occupancy and rent.

•In forecasting the *capital return,* an understanding of the likely change in the NOI needs to be combined with an understanding of trends and forecasting of capital markets.

This requires both a quantitative and qualitative approach, the latter in the forecasting of capital market trends – perhaps with reference to a forecast risk premium over a forecast risk-free rate.

Quantitative modelling approaches

There are two broad categories of quantitative models that can underpin forecasts of real estate market performance:

•Time series/trend-based

•Causal/structural

To a significant extent, both trend-based and structural models rely on a common critical assumption: the past is a good guide to the future. In trend-based models this is direct and explicit – the total return in the next period will in some way be dependent on the total return in the previous period. In structural models which seek to identify and explain causal relationships, it is often more indirect and implicit – the total return in the next period will be dependent on the past relationship of the dependent variable to one or more independent variables.

In some ways, trend-based models overcome a critical challenge in forecasting real estate returns, namely the lack of data availability and projections/forecasts of that data that can be used in more theoretically grounded models. However, both trend-based and structural models face a practical constraint because the forecast results tend to be more accurate for the early years of a forecast than the later years as the inputs tend to deviate further from the original assumptions as time progresses. For this reason, many investors choose to run scenarios using the model and to carry out sensitivity tests on key assumptions or input variables.

Time series/trend-based

A trend-based or time-series model does not generally involve theory. It is an empirical approach that seeks to identify patterns in historic data that may be repeated in a predictable manner in the future. For example, a model might assume there is a long-term trend in identifying seasonal or cyclical patterns. Or, a model might emphasise short-run patterns such as momentum or mean reversion.

Such models in effect accept that while there is no real explanatory power in the model, there is a reasonable chance that it might be used to forecast future events with a satisfactory degree of accuracy. Time-series/trend-based models have limited data needs, can be quickly and easily developed, and provide a useful baseline against which other models can be compared. They often have considerable practical success for basic forecasting of non-volatile data series – the best indication of the income return in next period is often the income return in the previous period, for example.

Table 2.3: **Examples of time-series/trend-based models for total returns**

	Smoothing models	Regression models

Equation	$TR_t = \alpha + \rho_t + \beta_2\rho_{t-1} + \beta_2\rho_{t-2} + \ldots + \beta_q\rho_{t-q}$	$TR_t = \alpha + \beta TR_{t-1} + \beta TR_{t-2} + \ldots + \beta TR_{t-q} + \varepsilon_t$
Critical properties	Constant mean Constant variance Autocovariance is non-zero to lag q	Stationarity
Terms	TR_t is the total return in period t α is a constant ρ is a disturbance term β is a coefficient ε is an error term q is the period over which the model is calculated	

There are perhaps two principal classes of technique within the family of trend-based quantitative models:

•*Smoothing* (for example, moving averages or exponential smoothing)

•*Regression* (for example, autoregressive or partial autocorrelation)

Examples of basic time series models are shown in Table 2.3 for both the smoothing and regression techniques. In essence each seeks to determine total returns (TR) in period t by reference to historical evidence over the time period q. The assumption underlying each model is that the total return in the current period will be influenced by some relationship to the previous period and all previous periods up to and including period *q*. In the moving average model, the underlying assumption is that observations are normally distributed and therefore that an understanding of the mean and variance can help calculate a pattern – the predicted value for total returns depends on the current and previous values of a disturbance term *p*. The autoregressive model is more explicitly linked to previous values for total returns – in this model the predicted value for total returns depends only on previous values of total returns and an error term.

Causal/structural

Intrinsic to causal/structural models is a strong theoretical underpinning of the model. The model links the dependent variable (real estate return) with one or more fundamental independent variables (for example, demographic economic) that drive the performance of the dependent variable in a consistent and therefore predictable manner. Often, perhaps ideally, the dependent variable may lag by one or more periods any change in an independent variable. Such lagging reduces the influence of forecasts of the independent variable, the need for which is one of the weaknesses of casual structural approaches. Both in theory and practice, simplicity is an advantage. In mathematical terms the more variables that are required in a causal/structural model, the more problematic any shortage of data points becomes in calculating diagnostic tests of the forecast and hence the less confidence there is in the calibration of the model. In practical terms, a simple robust model is easier to explain and take into account in the investment process. There may therefore be a balance to be struck between the explanatory power of a model and its suitability for use in investment decisions. Until such time that real estate return data is considerably more robust, produced more frequently and in many places is available over much longer historic time periods, simple models well-grounded in theory will likely continue be preferable to more complex models with stronger mathematical specification.

Table 2.4: **A single equation causal/structural model**

	Single equation (for example, multiple regression)
Equation	$TR_t = \alpha + ß_1 X_{1t} + + ß_2 X_{2t} + + ß_3 X_{3t} + ß_4 X_{4t} + \varepsilon_t$
Critical properties	Identify independent variables from theory Model diagnostics should be statistically significant and consistent with theory Error term ε should be minimised
Terms	TR_t is the total return in period t α is a constant $ß_1$ is the coefficient for variable X_1 X is an independent variable ε is an error term

There are two main modelling techniques within the family of causal/structural quantitative models, with the principal difference lying in the trade-off between simplicity and complexity:

•*Single equation:* typically a multiple regression-based equation, with strong theoretical underpinnings and rigorously tested model specification (see Table 2.4).

•*Systems of equations:* a nested set of individual equations in which the results from one equation feed into another as an input; each equation with strong theoretical underpinnings and rigorously tested model specification.

While simpler than the system of equations, the single-equation approach tends to be a little more 'grey box' in that the potential interaction between variables is not necessarily made explicit. The system of equations therefore has a practical advantage in that it allows the forecaster more explicitly to understand the intermediate steps. However, the greater complexity triggers questions about the potential for positive and negative feedback loops within the model and a prerequisite of the approach is that the nested system of equations should be stable (namely that a change in an input variable in one of the equations leads only to a change in the output of that equation and outputs of other equations in the system but does not lead to a change in the specification of the other equations).

Qualitative approaches

For a whole host of reasons quantitative modelling of real estate returns remains fraught with difficulty. For example, poor quality or inconsistent data inputs for real estate and other independent variables may reduce confidence in the model specification and forecasts. Often the need for forecasts of independent variables as inputs to the real estate return model (for example, economic growth as a driver of real estate demand) simply transfers the problem of forecasting to another field. As a result it is generally advisable to hold the quantitative results loosely – they are a simply a guide to potential future outcomes. In this context and more for some measures of real estate returns than others, qualitative approaches retain a valuable function either as a pure alternative, a check on the quantitative result or perhaps in combination with the quantitative technique.

Table 2.5: **Qualitative modelling of yields and cap rates**

	Qualitative modelling of yields/capitalisation rates
Equation*	$K = RFR + RP - G + D$
Critical properties	Real estate value is determined in relation to the performance of other asset types. Investors will determine the risk premium required in relation to wider appetite for risk.
Terms	*K* is the yield or capitalisation rate of an asset *RFR* is the risk-free rate (usually taken to be the long-term government bond rate of the country in which the asset is located) *RP* is the risk premium that an investor would demand for an investment in real estate compared to the *RFR* *G* is the long-term average rental growth rate *D* is the long-term average depreciation rate of the

property (or the annual average amount of investment required to maintain the quality of the asset)

* The equation adopts the form of a Gordon's growth model.

Expert opinion or surveys of expert opinion and Delphic methods all provide a sense that a forecast is grounded in a 'market view' and hence a degree of reassurance that an investment decision is being rationally made. The consensus approach implicit in these methods suggest that even if the forecast turns out to be wrong, there would be few who could criticise a decision based upon it. Indeed, pure qualitative techniques can be well suited to the prediction of turning points and non-linear changes, for example, where the past is no longer a good guide to the future (but of course may/may not be correct).

When used alongside quantitative techniques, qualitative methods can be used to introduce and inform judgement in the forecast process. This can come in a number of ways:

•Whether to use a quantitative model.

•Which quantitative model(s) to use.

•Which variable(s) to use in the model.

•Whether to adjust the model inputs or results manually.

There is considerable appeal in grounding the judgements required in real estate return forecasting in robust qualitative techniques but it does carry inherent risks. For example, there may be a temptation for expert opinion to read too much into data than is warranted (especially where it is confirming an underlying bias in the forecaster's outlook). Most qualitative forecasts suffer from 'anchoring', namely that the current value or trend has a disproportionate influence on predicted values – which can be a benefit where momentum and sentiment is thought to be a key influence but may make it harder to identify turning points or mispricing.

One aspect of real estate return forecasting in which qualitative techniques may provide a valuable input is in the estimation of the yields or cap rates at which a real estate transaction might be expected to take place (and hence the capital value of an asset). Notoriously difficult to forecast quantitatively, yields or cap rates are in essence a reflection of market sentiment and risk appetite among investors. An illustration of a model to quantify the yield or cap rate is shown in Table 2.5. In the model, perhaps the most critical variable is the risk premium (RP). This is a product of the real estate investment market (influenced by the availability of equity and debt and the demand for and supply of investment properties for sale). It is driven by a relative assessment of the risk inherent in investment in real estate compared to other asset classes and is strongly influenced by sentiment and momentum. Consequently expert opinion, surveys, Delphic techniques and historical or geographical analogy are all techniques that can help a forecaster estimate an appropriate value against either long-term trends or a life-cycle analysis.

Forecasting in practice

In practice many organisations take a pragmatic view. The best forecasting system is the one that works or appears to work; that is, it appears to have some significant correlation to actual results over time. Therefore, where quantitative techniques are involved it is essential that the model is subjected to the range of relevant statistical diagnostic tests and wherever possible back-tested against historical data.

A conceptual framework for forecasting real estate returns is illustrated in Figure 2.2. It comprises three main stages:

1.A system of equations to model the occupational markets and forecast the various determinants of NOI using causal/ structural quantitative techniques in order to derive the income return.

2.A qualitative technique to forecast yield or cap rate as an input to the calculation of capital value and hence the forecasting of the capital return.

3.The summation of the income and capital return to calculate the total return.

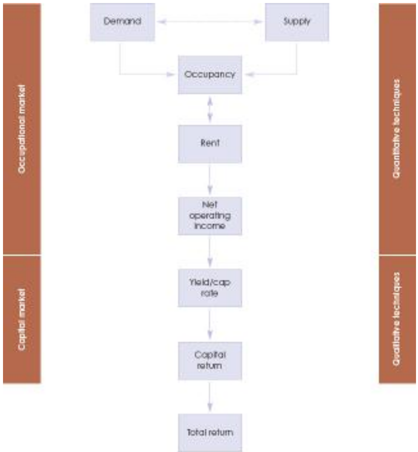
Demand

Forecasting real estate demand is one of the building blocks for forecasting real estate returns that is perhaps best suited to the application of causal/structural econometric techniques. For example, it would be reasonable for a forecaster to promote the theory that the demand for real estate (commercial or residential) is a product of the number of people in a defined trade area and their average wealth, and inversely related to the price of real estate in the previous period. Data and forecasts of each of these variables are often readily available or can be derived. Although the most appropriate precise variable will vary from city to city and sector to sector, a combination of demographic, economic and price variables are generally likely to form a robust base to an econometric model. The main generic variables and their interrelationships are shown in Figure 2.3, with demographic and economic factors interacting through the medium of employment (numbers in employment or unemployment), which in turn tends to be a key influence in many models of real estate demand.

Supply

Forecasting real estate supply presents a different type of challenge for the short term (two to three years) and long term (more than three years). In the short term, the real estate supply can be forecast either by monitoring real estate projects under construction and building a granular database (the approach taken by most brokerages) or simple causal/ structural techniques (in which say, the new supply in period t will depend on for example construction permits issued in period T-3). Over longer time periods, new supply can be forecast by projecting completions using time-series/ trend-based techniques (in which say, the new supply in period t will depend on new supply in the previous period).

Figure 2.2: **A conceptual framework for a causal/ structural model to forecast real estate returns using a system of equations**



Source: INGREIM.

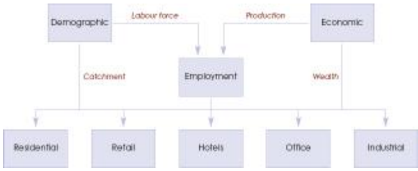
Occupancy, rent and NOI

Armed with forecasts of demand and supply as inputs, the forecaster can forecast occupancy (vacancy) rates, rent (gross, net and net effective) and hence calculate NOI. In many cases these will be forecast using a system of equations – many of which may have common input variables, or input variables that are the output of one or more of the other equations. The result is a forecast of the income return.

Yield or cap rate

This chapter has already argued that qualitative techniques may provide a reasonable basis to forecast yields or cap rates and hence to estimate the capital return.

Figure 2.3: **The demographic and economic underpinnings of real estate demand**



Source: INGREIM.

Total return

In this forecasting framework the total return is simply the sum of the income and capital return.

What is the future of forecasting?

In this chapter, the case has been made for the importance of forecasting real estate returns to inform investment decisions both at the strategic and asset-specific levels. A variety of quantitative and qualitative techniques have been introduced and discussed. A potential framework for forecasting and for integrating forecasts into investment decisions has been described.

Underlying all this has been an undercurrent that the available quantitative, statistical techniques are to some extent let down by the lack of good quality, long-term data sets both of real estate investment performance and of many of the independent variables that theory suggests would help to forecast real estate returns.

This is beginning to change. As time goes by and as the industry becomes more sophisticated and data become more widely available and cost effective. The industry is on the cusp of an era in which quantitative techniques can be applied more widely and more sophisticated data intensive methods can begin to be used. Looking forward, one can envisage a time when sophisticated real estate products, including real estate index derivatives, start to become pervasive (due to largely to liquidity and transaction cost advantages). As they do so, the range and nature of models underpinning real estate forecasts is likely to change radically and the mathematical underpinnings will become more important, just as they have in other asset classes. It is likely that the balance will start to shift a little away from those that approach forecasting in the manner of Henry Hindsight and towards those that approach forecasting more in the manner of Felicity Foresight.

Nevertheless, for the present and likely for some time to come, a healthy element of practicality and pragmatism needs to be combined with quantitative rigour in the forecasting of real estate returns. Forecasting is a tool, not a product. For the time being, forecasting real estate returns will remain both a science and an art.

□

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[1] For a full discussion on the subject see, for example, Brooks, Chris and Sotiris Tsolacos. 2010. *Real Estate Modelling and Forecasting.*

[2] See, for example, ING Real Estate Investment Management's The Case for Real Estate, March 2011.

[3] *Source:* Lizieri, Colin. Forecasting and Modelling Real Estate, presentation at the Henley School of Real Estate and Planning at the University of Reading on 27 March, 2009.

3

Real estate investment capital structure

By Hugh Kelly, Real Estate Economics

Introduction

'Location, location, location' is the oft-cited formula for real estate success, as are asset selection, timing and exit strategy. Behind the scenes, however, a formula known as OPM rivals the location cliché. OPM, or other peoples' money, refers to the real estate industry's standard practice of relying on debt financing.

Although there is a certain cynical overtone to the OPM label,[1] the use of combined debt and equity is a strength of the capital investment market. It permits investors to select the level of risk and yield that suits their individual requirements, an attribute of the market called investor heterogeneity. Investor heterogeneity promotes overall liquidity and maximises value across all classes of investors in an efficient market.

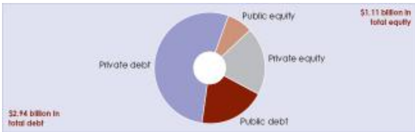
Properly employed, the use of debt financing has proven to be an essential tool for virtually all capital investment for centuries. In the case of household lending, borrowing a portion of a sale price using conventional long-term, self-amortising debt made home ownership a pillar of US economic stability and household upward mobility until the decay of the system in the middle of the first decade of the 2000s. As has become apparent in the subprime crisis, overly complex and poorly underwritten loans – and secondary debt instruments derived from them – can push default risk to unacceptable levels and lead to a systemic risk that threatens institutional viability.

Residential debt provides the most recent lesson that the key to the debt-equity structure is the lender's expectation that borrowed money will be repaid in full, and interest payments made in a timely fashion. This principle undergirds commercial real estate's capital structure, too.

Capital structure at the industry level

Perhaps the most dramatic indication of the comparative roles of debt and equity can be seen at the industry level (Figure 3.1). Of the $4.06 trillion[2] of institutionally held[3] real estate investments as of mid-2010, approximately 72.5 percent, or $2.94 trillion, was debt financing. Of this total, $790 billion was in the form of public-market debt financing, including commercial mortgage-backed securities, mortgage REITs and debt financing on the books of equity REITS. This leaves more than $2.1 trillion of debt investment held by institutions such as banks, insurance companies and government-sponsored enterprises like Fannie Mae and Freddie Mac. The size of the equity investment pool was much smaller, $1.11 trillion, with private capital sources accounting for approximately $800 billion and public-market entities such as REITs and publicly held investment funds totalling $310 billion.

Figure 3.1: **US real estate capital structure (in $ billion)**



Note: The totals refer to institutional investment only, estimated at mid-year 2010.

Source: Emerging Trends in Real Estate 2011, Urban Land Institute and PricewaterhouseCoopers.

At the industry level, the simplest of the mathematical formulas relating to capital structure is the one where total value (V) is equal to the sum of debt (D) and equity (E).

Industry structure reflects individual investment characteristics

Since the value of real estate fluctuates with changes in market conditions but indebtedness is fixed by the contractual provisions of commercial mortgages, the first and critical transformation of the cumulative equation of value is the residual definition of equity:

$$V - D = E$$

This means that fluctuations in value translate directly into changes, positive or negative, in the equity position. This volatility is a form of investment risk, and the greater level of risk borne by the equity position is compensated by greater expected return of equity, when compared with debt. The divergence in expected returns, when combined with the leverage (or gearing) typical of commercial property investments, is expressed in the weighted average cost of capital (WACC) formula. The WACC states that overall investment return is a function of the proportions of equity and debt used in acquiring an asset along with their respective costs. Hence:

$$WACC = (\%D \times D_R) + (\%E \times E_R)$$

where:
D_R and E_R indicate the expected rate of return to the debt and equity positions, respectively.

To illustrate, assume that mortgage capital is available at 6 percent, lenders will provide 70 percent of the price of a prospective purchase and an equity investor requires a 10 percent return on the cash invested in a commercial property. Then, the WACC for the investment will be 0.072 or 7.2 percent.

In real estate investment, the WACC calculation is often synonymous with the capitalisation (cap) rate, or the relationship of a property asset's initial net operating income (NOI) to its value or purchase price.[4] Therefore, the income-capitalisation approach to value is expressed in a classic formula:

$$V = \frac{I}{R}$$

where:
I is the NOI
R is equivalent to the WACC

So if a commercial property is generating $1 million in NOI, its value would be $13.9 million.

Leverage generates risk and opportunity for the equity investor – and the lender

Lenders want to have assured payment above all else and tend to be more risk-averse in comparison to equity investors. Commercial real estate loans are extended at some fraction of the value of the property asset, and are collateralised by full value. The mathematical expression of this relationship is the loan-to-value (LTV) ratio, which quantifies the level of debt as a percentage of asset value, or

$$LTV = \frac{D}{V}$$

In the example above, the LTV is 70 percent, since the proportion of debt in the WACC is 0.70. At this LTV, a lender would provide $9.73 million of mortgage capital against a property value of $13.9 million. This would leave an equity requirement of $4.17 million for the investment.

Looking at the investment from the equity investor's point of view, the LTV equation is easily transformed arithmetically into the leverage ratio (LR), or the multiplier derived by dividing the equity position into the overall value, or

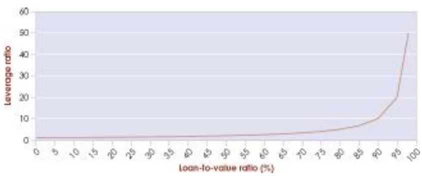
$$LR = \frac{V}{E}$$

Using the 30 percent equity requirement presumed for the $13.9 million property we have been considering, the LR would be 3.33. An all-cash (no debt) acquisition would have an LR of 1.0; a property with an LTV of 50 percent would have an LR of 2.0; a property with an LTV of 75 percent would have an LR of 4.0. The higher the LTV, the higher the LR (see Figure 3.2).

Why not 'borrow to the max'?

Lenders receive priority in payments and debt must be serviced in a timely way, before the equity position's cash distribution. The greater the LTV and LR, the greater the amount of NOI devoted to debt service. However, cash flows of the property are variable – sometimes unpredictably so. Tenants may not renew leases, or may suffer business reverses that cause them to be delinquent in rental payments. Market conditions may deteriorate, and renewal leases may have a lower rent than the expiring leases. Building operation expenses or real estate taxes may increase suddenly. A need for capital improvements may arise, requiring funding beyond the level of reserves that have been set aside for such costs. Lenders therefore typically require a margin in the debt service coverage ratio (DSCR); it is the relationship of NOI to debt service. Debt service is the scheduled loan repayment amount, including both interest on the loan and such repayment of principal (amortisation) as specified in the loan agreement.

Figure 3.2: **Leverage ratio increases risk exponentially**



To illustrate, take a simple case of a building where there are four tenants, each with an equal amount of leased space, with the property producing an NOI of $1 million at the time of investment. In year 2 of the investment holding period, one of the tenants renews its lease, with a modest increase in NOI of $7,500. In year 3, some extraordinary repair and maintenance expenses are incurred, reducing NOI by $30,000. In year 4, one of the tenants declines to renew its lease, with a negative impact on NOI of $125,000. In year 5, that space is once again occupied, and the NOI reverts to its year 2 level.

What is the building's financial situation if the lender required a 1.15 DSCR at the point of investment? What if the loan negotiation had moved to a much higher LTV and LR, such that the initial DSCR was only 1.05? As Table 3.1 presents this case, the more conservative LR, with an initial DSCR of 1.15 enables the building's income to service the debt, even in the year when income plummets due to vacancy. More aggressive leverage, though, means that in year 4, there is not sufficient income to service the debt. Then, the equity owner must either make up the shortfall from other financial resources, or allow the loan to go into default and suffer the 100 percent loss of equity as the lender forecloses.

Table 3.1: **The effect of debt on net operating income**

Year	**NOI**	**Debt service (more conservative)**	**DSCR (more conservative)**	**Debt service (more aggressive)**	**DSCR (more aggressive)**

1	$1,000,000	$869,565	1.15	$952,380	1.05
2	1,007,500	869,565	1.16	952,380	1.06
3	977,500	869,565	1.12	952,380	1.03
4	882,500	869,565	1.02	952,380	0.93
5	1,007,500	869,565	1.16	952,380	1.06

What is the lender paid for?

Commercial property lending is risky, even when good discipline is exercised in underwriting the mortgage loan – neither lender nor borrower has the ability to accurately predict or reliably control the future. It is for this reason that commercial mortgage loans require collateral values above the original loan balance, and must charge interest rates reflective of the many risks that will affect the loan over its lifetime.

To begin with, there is a notional price for a 'risk-free' loan, and risky loans must earn a higher rate than such a 'risk-free asset'. The difference between the risk-free rate (or some similar benchmark rate) and the mortgage rate is the spread. US government securities have long been the standard for risk-free rates, although this concept is under serious pressure in 2011 as political debate over the statutory debt limit has raised a spectre of the US Treasury possibly failing to make payments to its creditors in a timely way. Putting the resolution of this controversy aside, at the risk-free level the price of borrowed money begins with the cost of allowing the borrower to use the lender's funds, or its opportunity cost. This may include some provision for the corrosive effects of expected inflation on purchasing power over the term of the loan, or may be established net of inflation by using a benchmark such as TIPS (Treasury inflation-protected securities).

The longer the term of the loan, the greater the uncertainty of economic and real estate market changes, and ordinarily, the higher the interest rate will be. The Treasury yield curve reflects this basic principle, as it is upwardly sloping to a moderate degree (higher rates for longer maturities) under normal economic conditions. This reflects the liquidity preference theory of the yield curve: borrowers want to hold on to borrowed money as long as they can, lenders want their money back as quickly as possible and therefore each must be incentivised away from their natural preference by a change in the price of money. Interest rates must rise as loan maturity lengthens.

One of the most significant drivers of commercial mortgage loan pricing is the loan default rate. This is true even given the presumption of sophisticated lenders exercising good discipline in their lending practice. Over the years, life insurance companies have been the archetype of such lending, as most life insurance companies hold such loans to maturity in their asset portfolios to match their long-term liabilities. Repeated studies of life insurance commercial mortgage loan portfolios, covering many thousands of loans over a 30-year period of time, have found that the cumulative default and delinquency rate is more than 16 percent.[5] Most of the problems emerge within the first seven years of the loan's life. Such a high level of non-performance, with consequent investment losses, needs to be priced into all loans as a foreseeable element of risk.

Lenders also must be compensated for illiquidity. Although commercial mortgage loans are a fungible capital asset, they are typically somewhat difficult to sell because they are often nonstandard contracts, negotiated on a case-by-case basis with individual borrowers, rather than a 'commodity instrument' such as a typical government or corporate bond. It was thought that with the emergence of the commercial mortgage-backed securities (CMBS) market, that liquidity was less of a concern. However, the collapse of the CMBS market in 2008 and 2009, and its slow revival thereafter, makes the illiquidity premium a concept of continued relevance.

With all of these risks taken into consideration, the spread of contract interest rates for life insurance company mortgages loans over the ten-year Treasury rate has been approximately 100 basis points (bps) to 150 bps in strong market periods since 1996, and 150 bps to 250 bps in weaker markets. In the 2008 financial crisis that spread widened to about 400 bps, as the Treasury benchmark was driven to 3 percent or lower.[6] Properly structured, underwritten and priced, commercial real estate mortgage debt has proven to be an effective investment vehicle for portfolio lenders over many decades of experience, but cyclical risk must be realistically priced.

The premium for taking real estate equity investment risk

Returns should rise commensurately with risk. Since debt has priority in cash-flow distribution vis-à-vis the equity position, it follows that equity should demand higher returns. Furthermore, given the rise in risk as leverage increases, the greater the LR or LTV, the higher the expected equity return should be in the capital structure. This is because the volatility of cash flow from all causes – market cycles, tenant choices, expense inflation or unpredictable events – translates into magnified swings in the net income after debt service, also called pre-tax equity cash flow. This was seen in the simple illustration in Table 3.1.

Both debt and equity should earn a risk premium, measured as the spread between the risk-free rate and the expected return to their respective positions in the capital stack. The risk premium on debt is simply the return to debt minus the relevant risk-free rate, or in other words, the spread over the benchmark Treasury instrument. Expressed in arithmetic terms:

$$RP_D = D_R - T_R$$

where:
RP_D is the risk premium on debt
D_R is the return to the debt position
T_R is the risk-free Treasury rate

The formula for the equity risk premium reflects the need for the equity return to exceed the debt return, and indicates that the leverage ratio proportionally affects the degree to which the return on risky equity should exceed the return on risky debt. That formula reads:

$RP_E = RP_D + LR(RP_P - RP_D)$

where:
RP_E is the risk premium on equity
RP_P is the risk premium at the property level (the capitalisation rate minus the risk-free Treasury rate).

Putting some numbers to this formula, let us say we have a cap rate of 7 percent, a mortgage rate of 5 percent, a Treasury rate of 3 percent and a 75 percent LTV (or LR of 4). Then:

$$\begin{aligned} RP_E &= (5\% - 3\%) + 4([7\% - 3\%] - [5\% - 3\%]) \\ &= 2\% + 4(4\% - 2\%) \\ &= 10\% \end{aligned}$$

and the expected equity yield would be 13 percent (RP_E plus T_R). If, however, more aggressive debt is placed on the capital structure, say an 80 percent LTV (equals LR of 5), then the required equity risk premium rises to 12 percent and the expected equity yield to 15 percent. This analysis, by the way, is convertible easily into the WACC structure where:

Debt @ 0.75 × 5%	= 0.0375	or @ 0.8 × 5% = 0.0400
Equity @ 0.25 × 13%	= 0.0325	@ 0.2 × 15% = 0.0300
Cap rate or WACC	= 0.0700	= 0.0700

The mezzanine

Frequently the LTVs that senior lenders are willing to finance and the amount of cash equity that a borrower can commit leaves a gap in value that makes it difficult or even impossible to sustain the simple capital structure outlined up to now. In periods where market conditions warrant some optimism, the senior lender may permit subordinated debt in the form of a second mortgage or mezzanine financing. Although sometimes these two forms of junior debt are taken to be synonymous, there is an important difference.

Second mortgages are simply additional debt layered into the capital structure. The senior debt, or the first mortgage, continues to have cash-flow priority as before, and the junior lienholder typically stands next in line – with a higher rate of interest, because of a lower priority in the cash-flow distribution sequence. The equity position remains the owner of the residual cash flow (and all property appreciation after repayment of loan principal) in this sequence, which is commonly referred to as the waterfall. Under conditions of foreclosure, the second mortgage's rights are subordinated to the senior mortgage, and the junior lender is subject to being repaid at some fraction of principal, or not at all, if the property must be sold out of foreclosure at a discount to the debt balance.

An alternative is mezzanine financing in the form of a loan advanced against the value of the equity position (akin to a stock valuation), rather than secured by the real property per se. While it is expected that this form of mezzanine financing will be paid off by property cash flow, it is legally a claim on personal property (that is, the stock value) and has equity-like features such as shared appreciation, continent interest or an exit fee payable by the borrower. Mezzanine financing can be complex in its legal documentation and therefore tends to be negotiated for a minimum of five years and for significant amounts. Because of the stress that high leverage places on equity and the practice of using mezzanine financing to reach LRs of eight or ten or more, the strategy of mezzanine lenders is sometimes termed 'loan to own'. In this case, the mezzanine lender can step into the equity position and operate the property, provided that the obligations to the senior lender continue to be satisfied.

Hybrid financing, which combines features of both debt and equity, is not especially new. In the high interest rate environment of the early 1980s, for instance, many financial institutions wrote mortgages with stipulated interest rates that were below the level of spread that would otherwise have been dictated by market conditions, in order to keep the coupon rate affordable to borrowers. In return, the lenders had a right to share in a portion of cash flow after minimum debt service, plus a share in the equity appreciation of the property. This kept the real estate debt market functioning and supported values at a time when extremely high interest rates would otherwise have made the market functionally illiquid.

Another device that combines a conventional debt instrument with an equity-like feature is a loan with a simultaneously executed option to purchase at a below-market purchase price or even simply for the forgiveness of the loan principal. In this, the equity owner receives a needed capital infusion at less than the cost of borrowing in the market plus the ability to defer the taxable event of a sale of the property for years into the future. For a lender, this can be a way to use the cyclicality of the market to great advantage.

Following the financial meltdown of 2008 and 2009, a recognition of the overleverage of commercial real estate during the prior boom is the systematic delevering of the property market. In effect, this indicates that when loan terms expire, the available leverage ratio on refinancing will be lower. Since the imperative is to bring down LTVs, the use of second mortgages or mezzanine debt is not an option in most cases. Mezzanine equity, however, may be. In this capital structure, new equity fills in the gap between the debt and primary equity positions, but takes a preferred return in the equity cash flow as well as a share in the resale or refinancing proceeds. The concept in mezzanine equity is that there is a structured partnership crafted between the primary equity and the mezzanine investor to bridge the difficult period when delevering would either force the property into foreclosure or would pressure the primary equity to sell into a weak market at a distressed price.

How the mezzanine preferred equity solution works

To illustrate how such a structured equity infusion can help resolve the distress of overleveraged property owners, while providing appropriate risk-adjusted returns to all participants in the capital structure, consider the following hypothetical case.

Some years ago, a real estate investor purchased an office property for $70 million and was able to finance it with an interest-only loan at a 75 percent LTV ratio. The principal amount of the mortgage, therefore, is $52.5 million. The loan is now maturing but, sadly, the value of the property has declined to $62.5 million due to a cyclical downturn in the real estate market. Reflecting the riskier market, a replacement loan can be secured only if much more conservative underwriting standards are met. A maximum 70 percent LTV ratio limits the amount of available debt, and lenders demand a 1.50 DSCR.

In current circumstances, the owner must deal with certain limitations. The maximum loan amount will be substantially lower than the debt that is being paid off on the original loan. At 70 percent of a $62.5 million value, the replacement debt will be just $43.75 million. The NOI of the property is $5 million, which will support debt service of $3.33 million, or an effective interest rate of 7.62 percent. This still affords some positive leverage to the equity, at an overall cap rate of 8 percent ($5 million in NOI divided by $62.5 million in value). However a total of $18.75 million in equity is required and the owner's putative equity is just $10 million ($62.5 million in value, less the repayment of the $52.5 million original loan). The owner could sell the property at a loss of $7.5 million, but is reluctant to do so.

Mezzanine preferred equity can make up the $8.75 million shortfall. The new equity investor seeks to be compensated for resolving the distress of the original owner by securing a first preference in after-debt cash flow at a return reflecting equity risk, while allowing the original owner to capture the benefits of managing the property through its cyclical recovery. A deal might be structured whereby the preferred mezzanine equity earns a guaranteed 10 percent annual return from the cash flow, and participates pro rata in the appreciation of the property value upon resale.

For the purpose of this simplified analysis, let us assume that a recovery in the real estate market will support a 2 percent annual increase in NOI, and that the stronger market will support a cap rate of 7.0 percent at the time of resale. Given these assumptions, Table 3.2 indicates the investment flows to each position in the capital structure.

Table 3.2: **Resolving an overleveraged situation with mezzanine preferred equity**

Year	**NOI**	**Debt service**	**Preferred equity cash flow**	**ROE on mezzanine equity**	**Cash flow to original equity**	**ROE on original equity**
1	5,000,000	3,333,333	875,000	10%	791,667	7.9%
2	5,100,000	3,333,333	875,000	10%	891,667	8.9%
3	5,202,000	3,333,333	875,000	10%	993,667	9.9%
4	5,306,040	3,333,333	875,000	10%	1,097,707	10.8%
5	5.412,160	3,333,333	875,000	10%	1,203,821	12.0%
6	5,520,404	3,333.333	875,000	10%	1,312,071	13.1%
7	5,630,812	3,333,333	875,000	10%	1,422,479	14.2%

Resale proceeds	**80,440,170**	**43,750,000**	**17,122,079**	**17.9%***	**19,568,091**	**18.2%**

Note: *Return on equity over period is IRR assuming resale at the end of year 7.

In the scenario presented in Table 3.2, the lender benefits from holding a well-collateralised loan at a coupon rate of 7.62 percent. The mezzanine preferred equity investor enjoys a steady 10 percent return on invested capital over the holding period and, with a 46.7 percent interest in after-debt sales proceeds, can earn a 17.9 percent internal rate of return (IRR) on the $8.75 million invested. The original equity investor not only avoids take a loss on the property through sale into a depressed market in year 1, but captures increasing returns on the $10 million of equity contributed to the recapitalisation. The IRR on that $10 million is 18.2 percent over the new seven-year holding period, and even allows the original equity to book a gain on its initial position in the property ($70 million less the $52.5 million old mortgage, or equity of $17.5 million, versus its share $19.57 million (53.3 percent) of the ultimate sale proceeds.

Concluding observation

The academic literature has many instances of mathematical attempts to deduce the ‘optimal capital structure’. There is no such thing, no ideal Platonic form of a ‘one best capital structure for real estate investment’. The one-size-fits-all approach is as much a Procrustean bed in finance as it is in Greek mythology. Investor heterogeneity suggests that the many participants in commercial property investment can provide multiple solutions to deal structuring, and that what is best at one time may be entirely impractical at another.

Some basic rules should guide investor judgment. One is a sense of proportionality. As Figure 3.2 suggests, riskiness turns upward significantly with LTVs of 80 percent and higher. A Wall Street adage states that 'hogs get slaughtered'. There is ample evidence that this observation holds true for commercial property investment.

Flexibility is also important, and with the recognition of uncertainty as an element in the human condition, capital structures that can accommodate reasonable modifications in the face of unexpected stress have much to recommend them. Traditional lending has always understood that workouts may be necessary and that it is in the interests of both lender and borrower to craft solutions in all but the most dire circumstances. One of the lessons in the recent financial crisis has been that excessive rigidity in some of the structured finance programmes (CMBS and derivatives such as collateralised debt obligations) have created pressure to liquidate loans even when foreclosure may drive down the collateral value of the remaining assets in the issuance. This is self-defeating, and flies in the face of long experience in lending. Though it is sometimes decried, 'relationship lending' has survived as a banking strategy for quite Darwinian reasons: it has evolved as a survival mechanism.

Lastly, risk and reward should always be used in the same sentence. Both on the debt and the equity side – and in mezzanine positions between them – risk can never be eliminated, only managed and priced. If that is done well, the capital structure is sound. If not, great losses ensue.

□

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[1] That cynicism came into broad daylight in the early 1980s when a fraudulent scheme adopted the name of OPM Leasing Services hoodwinked several major corporations and financial institutions in a computer leasing scheme using the same equipment to collateralise multiple loans.

[2] *Emerging Trends in Real Estate 2011.*

[3] The delineation of 'institutional investments' includes assets where pooled capital is aggregated and deployed in either public or private markets, but excludes direct purchases of relatively small assets by individuals or by private partnerships.

[4] In practice, reported cap rates need to be scrutinised carefully to understand how the details of both income and price are constructed. For example, NOI can represent the most recent year's income, expected income in the first year of the investment, 'stabilised' income derived from a pro-forma statement of revenues and expenses, or some other measure. Price, similarly, may be the contracted transaction price, adjusted for financing terms or additional capital expenditures to be assumed by the buyer.

[5] See Esaki and Goldman.

[6] Lepcio and Droesch.

4

Contrasting approaches to quantifying risk in real estate investments

By Jon Southard, CBRE Econometric Advisors

Introduction

Nothing has highlighted the importance of having an understanding of risk for real estate practitioners like the worst-case economic scenario that occurred in 2008. Rather than the abstract risk of missing their benchmark or underperforming expectations, private real estate funds found themselves facing foreclosure of properties or even bankruptcy and liquidation of funds. Heightened awareness has led to an increased appetite for thinking not just about the expected return of real estate investments, but also quantifying the risk of each investment.

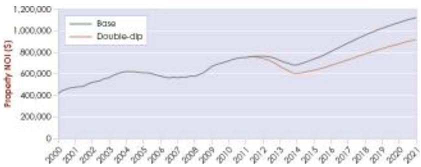
This chapter contrasts three major approaches taken in quantifying the risk of an individual investment: scenario analysis, Monte Carlo simulation using historic standard deviation, and forward-looking distributions of results using standard errors of the estimate. Each approach has practical advantages and disadvantages, and all may have a role in providing different perspectives on the potential risk of investments within a real estate portfolio or potential acquisition.

The need for quantitative analysis of risks has intensified as regulators around the world have embraced stress tests as an approach to understanding the risks that financial companies and banks face. As more chief investment officers (CIO) and risk managers see results of these tests on their debt portfolios, calls for a comparable understanding of equity investments will surely follow and make their way into different financial organisations like pension plans. The approaches contrasted in this chapter all provide a means of understanding risk by testing for results in cases that depart from the single forecast imbedded into pricing and acquisition models.

Scenario approach

The need for a separate analysis to understand the risk of an investment stems from the typical pro-forma approach to valuation and investment taken by most real estate practitioners. Given the long-run nature of the real estate asset, many believe the best approach to understanding an asset value is to complete a long-run net present value (NPV) analysis utilising assumptions about the future of the property to create a stream of cash flow. With the complexity of some assets, the creation of even a single estimate of cash flow over five to ten years can be a daunting exercise. In the worst case, the ability to create elaborate pro formas to value real estate could lead investors to consider their work done with the creation of a single stream of cash flows, allowing them to calculate a NPV for an appraisal or an internal rate of return (IRR) on a prospective acquisition. While the single forecast is not a mistake the institutional investor is likely to make, the immediate and prominent issue is that any of these single estimates will be fraught with risks that result from variations from the assumptions or errors of estimation. How then to provide a 'second dimension' of analysis to supplement the seemingly exact nature of the discounted cash-flow (DCF) analysis?

Figure 4.1: **Base case and double-dip recession forecast of net operating income**



Source: CBRE Econometric Advisors.

The most obvious answer is to do the analysis a second (or third or fourth) time, but to alter the assumptions put into the analysis, particularly in constructing scenarios that could have a negative effect on value. Tracing the effect of a recession not included as part of base-case assumptions is surely a useful exercise in understanding a fund's exposure to probable events at the top of investment manager's minds. Whatever the approach in arriving at base-case assumptions, most methods allow room for an exercise in varying the inputs to those assumptions. Notably, for funds using econometric forecasts of rents, particularly those that outsource their forecasting, most forecasting firms now offer the results of alternative scenarios such as a recession as an option that can be used. Market and submarket forecasts or differences from the base case can be used to influence the pro-forma rent assumptions in the DCF model.

The advantages of such an approach follow from its ease of explanation as seen in Figure 4.1. While the example given is for net operating income (NOI), understand that this and all figures that follow are examples and risk measurement may be applied to rents, NOI, cash flow, value or any other real estate risk. It is quite intuitive for investment officers to ask 'what if' and furthermore have a concern in mind that they would like analysed to see what their portfolio of investments would look like under the circumstances. As a means to answer such questions, the scenario approach is uniquely *prescriptive* as not only can a final answer be given, but the steps to arrive at that answer can be broken down for examination. For example, in contrast to the approaches described later in this chapter, a scenario that analyses the effect of a European default crisis (a current example) would answer not just what a new expected IRR might be on an investment, but also be able to trace through how the new IRR was arrived upon because employment of X amount leads to less absorption which in turn leads to higher vacancy and lower rent. Such a detailed prescriptive accounting can improve confidence in the analysis.

Still, while the explanatory power of a scenario analysis can be compelling, the probability of any single scenario occurring, whether base case or a stylised alternative, is zero. That is, looking at a single forecast or even a handful of forecasts will always leave open the question of what would happen if the scenario were slightly different than the one chosen. This is particularly problematic when leverage is employed, as the risk of default may be hidden by two forms of error. First, any forecast model is subject to error and the forecast or scenario may be different than expected because the model is not perfect. Additionally, when utilising scenarios to understand risk, the choice of scenario will also fall short of perfection. To take an example, while a CIO may want to know what will happen under a scenario of an unexpected double-dip recession, and separately want know what will happen if a period of overbuilding were to begin, looking at these scenarios separately ignores the possibility that recession and overbuilding could happen simultaneously, leading to a scenario worse than either of the two provided!

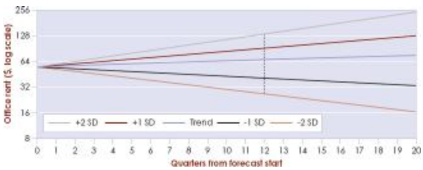
Stochastic Monte Carlo analysis

Financial economists have long associated the quantification of risk with the standard deviation of an asset. In analysing the stock market especially, the literature often refers to standard deviation as the risk of an asset. Less understood is that this shorthand is derived from the model specification used to understand the asset in question. Because stock price changes are often argued to be a random walk, the risk in a random walk with drift truly is the historic standard deviation of growth. However, the forecast in this case is the historic mean of growth. This model can also be applied to real estate, but is at odds with the long-term focused forecasting methods often used in real estate, especially those that attempt to understand the real estate cycle.

The use of standard deviation as synonymous with risk can also form the foundation of a simulation that can be used to answer questions via a method that in some ways is more robust than a scenario analysis. Monte Carlo simulation uses mean and standard deviations of value change (or any choice of variable) to create an array of forecasts. Unlike with single scenarios, a Monte Carlo analysis where period-by-period growth is chosen from a distribution hundreds or thousands of times produces an array of results such that the probability distribution can be examined for any particular time period (see Figure 4.2).

One use for these distributions is the debt concept of value at risk (VaR). Rather than understanding risk through a descriptive scenario, VaR chooses a point in the distribution where a specified percentage of results fall below the point. For example, a risk officer might be interested in a result so severe that only 2 percent of the distribution falls below that point (see Figure 4.3). This approach purposely avoids the difficulty of specifying inputs that create a sufficiently severe scenario to examine risk and instead focuses on outputs.

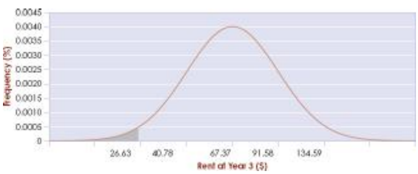
Figure 4.2: **Monte Carlo analysis results**



Note: SD is standard deviation.

Source: CBRE Econometric Advisors.

Figure 4.3: **Two percent VaR point within the Monte Carlo distribution**



Source: CBRE Econometric Advisors.

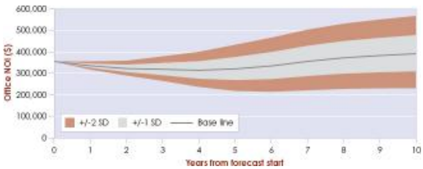
The Monte Carlo approach is far more common in the financial world but more rarely used in real estate. Part of the reason is the long-term nature of real estate investment. For investors looking at multi-year real estate holding periods, the random-walk approach to determining the distribution creates wide variance of results further out in the forecast period. Of additional concern to real estate practitioners, a forecast produced by Monte Carlo is only as good as the historical distributions that can be calculated. Where real estate data is more likely to be quarterly and cover a decade or two, this can be problematic compared to daily stock movement that can be calculated over multiple decades.

Finally, the lack of any deterministic description can also be problematic for some investors. While the Monte Carlo process can identify what the 2 percent VaR level is, it cannot identify what events would cause values to get to that level. There is also no tracing back through to what inputs correspond to the identified output. That is, while the 2 percent VaR GDP economic result can be identified and the 2 percent VaR value result can be identified, we do not truly know that the first result led to the second.

Using the standard error of the estimate (SEE)

Given the widespread use of econometric forecasts in commercial real estate, particularly for rent and vacancy inputs in a pro-forma analysis, there is a desire for risk measures to make use of these forecasts. Unlike a purely stochastic forecast, most econometric models attempt to capture the cyclical dynamics of real estate and not just the expected return. Returning to first principles, however, while the historic standard deviation remains interesting, it is no longer technically the *risk* of the forecast as it is for a purely stochastic model. A proper measure of risk in this case is not the historic standard deviation, but the standard error of the estimate (SEE). In the case of a system of equations used to forecast, to obtain such errors requires the system to be converted to a structured vector-autoregressive model (VAR, not to be confused with VaR above).

Figure 4.4: **Distribution around the forecast based on standard errors of the estimate**



Note: SD is standard deviation.

Source: CBRE Econometric Advisors.

The SEE differs from historic standard deviation in that, first, the forecast itself is an attempt to capture some of the standard deviation (the cycle) and, second, the interaction of the equations will not lead to uniformly expanding standard deviation over time. In real estate, the second point becomes important given the tendencies for real estate returns to exhibit signs of both autocorrelation and (over longer periods) mean reversion. Note in comparing the figures of standard errors in the two approaches, the SEE approach exhibits a limit to the width of the errors as the time frame gets longer and the mean reversion characteristic measure starts to kick in (see Figure 4.4). Also note, however, that the SEE approach also tends to have narrower measures of standard error even in years close-in to the forecast date due to the expectation that the model has explained part of the future volatility.

The SEE approach can be referred to as forward-looking as the use of a forecast can create more risk or less risk than the past simply because of the point in the cycle that creates the autocorrelation in the series. If vacancy is low, most results would show rents and values to be more likely to increase as the balance of pricing power between tenants and landlords in the forecast period begins to be tilted towards landlords. In this sense, the use of a more complex forecasting process begins with an assumption that current conditions make prices more predictable than a random walk. Also looking forward, the ability to track the square footage under construction for the near term is information that can be used by a more complex forecast that is thrown out in a random-walk approach.

The SEE approach is also forward-looking in that the results need not be confined to the range found in the data available whereas in the case of a stochastic model, the 'worst case' is dictated by the worst results in the history available. The model at the heart of the SEE approach can avoid this limitation if the inputs to the model have a longer history (for example, employment) than what is being varied and will dictate how bad the downside can get. As a clarifying example, if the time series of commercial mortgage-backed securities (CMBS) prices is quite short, a Monte Carlo draw based on that time series will be limited to the price changes during that period. In the SEE approach, while the behaviour in the model is established using the short time period, the errors can utilise the longer time series of the employment inputs and are not just limited to the period with CMBS prices.

The difficulty of using the forward-looking approach lies in implementation. The more complex the model, the more difficult the conversion of the model to a structured VAR form, and the software used must be sophisticated enough to produce errors (usually decomposing them as well). Furthermore, the use of the errors from the equation is less transparent to investors when the forecasting process is outsourced. In short, some trust needs to be placed in the forecaster that the forecasting equations are a reasonable effort and that the errors seen in the final results are a result of the equation used.

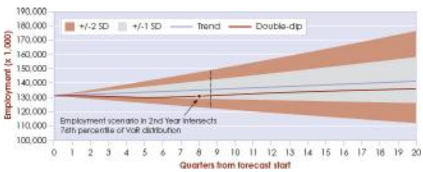
Combinations of the three approaches

Tying a scenario to a VaR stress level

With the attention placed on scenario analysis by the various stress tests mandated to banks and insurance companies as a means of checking for appropriate capital levels, the need for a ready ability to see stress test results across a broad portfolio has intensified. In cases where either government regulators or even just corporate risk officers are looking at results stemming from a specific GDP or unemployment scenario, the process of creating a result from scratch for commercial real estate where understanding the difference across hundreds of market and property-type combinations is part of the expectation of practitioners presents a challenge. One way to address the challenge is to utilise pre-existing SEE results on the market and property-type combination level and comparing VaR results to scenario results at the national level (see Figure 4.5).

The combination stems from the ability in VaR methodology (whether stochastic or SEE) to identify a specific VaR level. In cases where a scenario is specified, the process of identifying a VaR level can work in reverse. At the national level, the results of the scenario can be used to determine an intersection point with the VaR distribution for a particular time period. For a normal or pseudo-normal distribution, the scenario intersection point can be used and from there the standard deviations from the base forecast can be calculated. The amount of standard deviations can then be converted into a VaR level using an inverse normal distribution function. Once this VaR level is designated, existing results across even large portfolios can be examined quickly (see Appendix A).

Figure 4.5: **Based on Year 2, the appropriate VaR estimate for a double-dip scenario is 76 percent**



Note: SD is standard deviation.

Source: CBRE Econometric Advisors.

The utility of including historic standard deviations with forecasts

Given the relative difficulty of calculation of the SEE to the more easily calculated historic standard deviations, the temptation is great to combine the use of a forecast with errors estimated from history. With historic standard deviation commonly referred to as risk, it is only upon reflection that it is apparent that the combination has no direct basis in economics. By this it is meant that while a historic standard deviation is the error of a simple autoregressive model, more complex models will have different errors. The use of historic standard deviation on a complex model is in combining approaches. With that said, it is also not apparent how much is lost by taking the shortcut of using historic standard deviation.

Essentially, the use of historic standard deviation can be thought of as an estimate of the error around the forecast. Given that historic standard deviations are often larger than estimates of risk to the forecast taken from the SEE (due to the forecast's capture of the cycle), we know that the historic standard deviation would be a conservative estimate in terms of more adverse results created. Because historic standard error and SEE are often related ('noise' will drive up both measures), historic standard deviation can indeed be thought of as a shortcut to the more complicated estimate. The decision to use historic standard deviation is then a matter of methodological purity. That is, if a forecast more complicated than a stochastic approach is used, there is no question that the SEE is a more appropriate measure of risk, but results will still be informative if historic standard deviation is substituted.

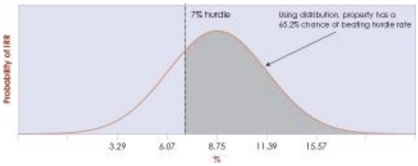
Converting forecast distributions to probability of equity loss

While VaR has a clear importance in the analysis of appropriate capital levels for banks and insurance companies in the mortgage world, some equity investors may find creation of a distribution around forecasts as a means to understand risk less intuitive. One way to translate the use of distributions in the Monte Carlo or SEE approaches into the equity investor's mindset is to convert the calculation into a probability of achieving a goal or avoiding a catastrophe.

As with the translation of scenarios into a VaR level, the distribution around the forecast can be used to take an intersection point in a particular period and then calculating the percentage of the distribution above or below that point. For example, rather than listing an estimate of mean and standard deviation of expected future returns, where standard deviation can sometimes be hard to translate into a decision even if it is understood that more standard deviation is bad, the same numbers can be used to calculate the probability of beating a hurdle rate. Particularly with the earnings structure of pension fund advisers and the requirements of pension funds, this focus on insuring that returns are at least their required rate of return can provide a single number to help advisers make investment decisions (see Figure 4.6).

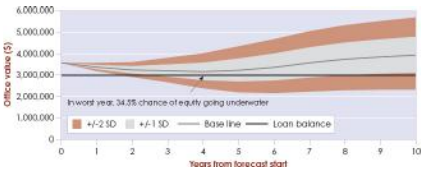
Crucially, this examination of probability also works when leverage is applied. One of the biggest errors of real estate practitioners leading up to the crisis was the lack of understanding of the risk of applying leverage. In a pro-forma analysis without an attempt to understand risk, investments expected to have positive returns will always appear to improve when leverage is applied. However, this will not be the case in examining the probability of beating a hurdle rate as leverage will increase both the expected return and its standard deviation. It is possible that analysis of this type would have caused more investors to pass on the excesses offered by the frenzied debt market of 2005 to 2007 (see Figure 4.7).

Figure 4.6: **Use of IRR distributions to calculate probability of beating hurdle rate**



Source: CBRE Econometric Advisors.

Figure 4.7: **Use of value probability distribution to determine probability of remaining 'above water' on mortgage**



Note: SD is standard deviation.

Source: CBRE Econometric Advisors.

Alternately, examination of a distribution around an estimate can provide a probability of a negative result such as an investment being underwater at anytime in the life of its loan or at loan maturity. Similarly, distributions around NOI forecasts can be used to determine the ability for investors to make their loan payments throughout the life of a mortgage. Both the comparison to target return rate and the ability to stay above water on a mortgage are useful criteria that cannot be arrived upon without the use of distributions as a quantification of risk.

Conclusion

The three methods for quantifying risk in real estate investments each entail advantages and disadvantages. All three methods can certainly be thought of as 'arrows in the quiver' for mathematically inclined real estate analysts. Nevertheless, matching the choice of the approach or combining of approaches in quantifying risk should be done thoughtfully with a background in the economic properties driving the need for the choice. Ideally, this chapter can provide some initial approaches in quantifying and assessing risks.

□

Appendix A: **Procedure for approximating VaR level of a specific scenario**

1) Produce SEE distributions.

2) Separately, generate scenario that differs from base case.

3) For specific time period of the forecast, calculate or identify standard deviations from the base case for the forecasted value from the scenario in that year.

4) Compute percentage of distribution falling below that forecasted value. In the case of a normal distribution, the standard normal distribution function in Microsoft Excel can calculate the percentage based on the standard deviation entered.

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5

Modelling uncertainty: Monte Carlo analysis and the pricing of real estate

By Randall Zisler and Matthew Zisler, Zisler Capital Associates, LLC

The nature of real estate and recent encounters with risk

Historically, the real estate business has been long on marketing and short on financial analysis. This is changing with the increasing institutionalisation of real estate – and especially after the bubble market of 2005–2007 which clouded most investors' judgment regarding risk. Some professionals, in their hyperbolic exuberance, referred to this period as the 'new paradigm'.

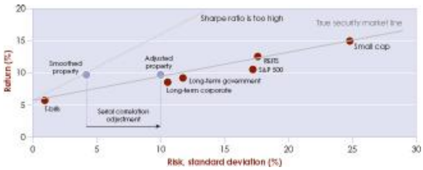
If risk had been a concern at the time, how would investors have measured, much less managed and mitigated risk? Risk management tools today seem to be as conspicuously absent from the real estate investment process as is the will to use those tools, especially when markets are at the most bubbly and riskiest. Would investors rely on risk management tools if they were more ubiquitous in the practice of real estate? Fear and loss have revived interest in risk. However, the authors fear that with the return of high tide, investors' memories may dim. We hope we are wrong.

Even if the industry were serious about risk management, what tools would be used? The authors believe that numerical techniques, such as Monte Carlo, provide fruitful avenues for modelling real estate risk in a way that recognises the nature of risk, especially catastrophic and left-tail risk.[1] In the aftermath of the recent recession, the onus is on having and using proper risk management tools. Going forward, investors who ignore risk measurement and management will operate at a comparative disadvantage.

Standard measures of private real estate risk may underestimate true risk, distort the investment process and lead to portfolio losses. For example, due to serial correlation, the standard deviation, variance and betas may be biased downward, which can increase the Sharpe ratio by as much as 75 percent. Figure 5.1 illustrates this bias. All assets should plot roughly along the security line which describes the linear relationship between risk and return. The raw or unadjusted standard deviation of property is biased downward because returns over time are smoothed or serially correlated. Property plots to the left of the security market line.

Appropriate statistical techniques[2] can remove the serial correlation, thus restoring property to the security market line. Without this correction, investors underestimate property risk and establish asset allocations that are not optimal. A result of this deficiency might include under-allocating to common stock equity (including publicly traded REITs) and over-allocating to property.

Figure 5.1: **Unadjusted property returns appear too safe**



Source: Zisler Capital Associates, LLC, Ibbotson Associates, LLC.

The authors do not propose or believe that Monte Carlo is the magic elixir that will fill in the valleys and straighten life's curves, or even anticipate the next crash. We do believe, however, that Monte Carlo will help the prudent investor better understand and manage risk, especially shortfall losses.

Monte Carlo analysis

Compared with deterministic analysis

Deterministic investment analysis stresses single-point analysis and sensitivities. The chief criticism of this approach is that it typically focuses on three or five values for each variable, ignoring the full distribution of all possible values for each variable and the correlation among these distributions. Therefore, it can inadvertently lead to inaccurate correlations. Another problem with this approach is that it assigns equal weighting to each of the three considered values.

Monte Carlo, by contrast, uses every possible value of a random variable and weights each variable by its frequency or probability of occurring. This approach calculates a probability distribution representing the combined impacts of the model's total uncertainty, as represented by the probability distribution associated with each random variable, and the correlation among the distributions of the various random variables.[3] Alternative approaches, such as mathematical closed-form solutions, tend to be intractable and therefore impractical, especially for cases with extensive complications, such as embedded options, nonlinearities and interaction terms.

In Monte Carlo, each distribution is sampled in a way that replicates the underlying distribution. Consequently, each outcome occurs with the same probability as the distribution indicates. A common failure of Monte Carlo analysis is using the wrong probability distribution.

Considerations when selecting distributions

The precision and usefulness of Monte Carlo analysis depends on the ability to select the right distribution. There are basically two considerations in choosing a distribution. The first is to be consistent with theory. For example, finance theory postulates that stock prices and the nominal interest rate cannot be negative. In practice, the distribution should best fit the data. The second is whether the data is continuous or discrete. In practice, discrete data is often treated as continuous, especially when the number of observations is large. What matters most is for the distribution to fit the data, or the model will not reflect the underlying risks properly. Additionally, any interdependences or correlations among the random variables should be taken into consideration.

The process that generates the data should be understood and this structure should be reflected in the model. Sometimes a random variable has a trend or some other underlying structure, a significant portion of which can be modelled using regression analysis. For example, office construction starts, S_t, is an example of a random variable. However, ordinary least squares regression construction starts as a function of explanatory variables, X_t, that include prices, vacancy rates, lagged construction starts, interest rates and other variables that can be econometrically modelled. The regression might be $S_t = X_t + \varepsilon_t$, where X_t is a vector or explanatory variables and ε_t an error term with a mean of zero. Knowing X_t and the nature of the error term, random numbers for S_t can be generated. Of course, if the error term and explanatory variables are correlated – a sign of simultaneity or two-way causality – then ordinary least squares produces inconsistent and biased results. Other methods, such as two-stage lease squares are required to deal with the two-way causality.

Sometimes, a mathematical distribution that fits the data adequately cannot be found. In such cases, a histogram is used; it divides the data into bins and calculates the proportion of the data in each bin. The art is in determining the number and width of each bin. Whether or not there are a priori considerations as a result of experience or theory which might constrain the shape of the distribution should be determined.

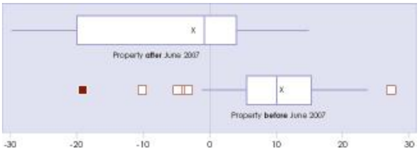
Box-whisker plots: another way to describe distributions

The box and whisker diagram, or box plot, is a convenient way to represent batches of data, especially data that is not normally distributed. A technique new to real estate but widely accepted by applied statisticians, a box plot is a compact way to depict groups of numerical data through five-number summaries. These summaries are the smallest observation (sample minimum), lower quartile, median, upper quartile and largest observation. The width of the box represents the interquartile range (IQR). The band near the middle is the 50th percentile, or the median. The cross is the mean. The lowest whisker represents data within 1.5 IQR of the lower quartile; the highest within 1.5 IQR of the upper quartile. Data beyond the whiskers are plotted as open squares. The solid outliers are the most extreme data points. Box plots are compact and are especially amenable to data that is highly skewed, flat or peaked, or multi-modal. For example, if the mean is located to the right of the median, the distribution is skewed to the right or non-symmetrical.

We apply the box plot to return data before and after the crash (see Figure 5.2). During the crash, the IQR expanded dramatically and the mean shifted well to the left of the median, indicating that the return distribution became more skewed to the left; the likelihood of upside performance increased. Even more dramatic is the lengthening of the fifth median return barely moved from 'before June 2007' and 'after June 2007'. This result is due to the recovery of equity REIT returns in 2009.

The left skewness of property returns after the crash compared with equity REIT returns increased. Why did skewness increase? We believe that an important reason is sample bias.

Figure 5.2: **The post-crash property distribution shifted dramatically to the left**



Source: Zisler Capital Associates, LLC.

During the crash, certain buyers without compulsion, such as certain private owners and REITs with strong balance sheets, chose not to sell. Transaction volume fell and the quality of price discovery eroded. Distressed sales dominated the comparable sales data available to appraisers. We argue that institutionalised conservatism in the appraisal process and low transactions volume hurt the property index more than the REIT index, and with a lag. The composition of the property indexes and the units of measurement changed much like an elastic yardstick.

Correlation

The correlation coefficient, which measures the extent to which there is a linear relationship between two variables, can assume any value between -1 and +1. Zero indicates no linear relationship.[4] If we create a Monte Carlo investment analysis of an office building in San Jose, we would clearly identify random variables such as employment growth, vacancy rates, office rental change and capitalisation (cap) rates. We take into consideration the correlations between pairs of these variables, as seen in Table 5.1.

Table 5.1: **Correlations between random variables are significantly different from zero**

	Change in total employment	Vacancy rate	Rental change	Cap rate
Change in total employment	1.000	-0.306	0.643	-0.552
Vacancy rate	-0.306	1.000	-0.503	-0.206
Rental change	0.643	-0.503	1.000	-0.486
Cap rate	-0.552	-0.206	-0.486	1.000

Source: Zisler Capital Associates, LLC.

Calculating stochastic prices: why analysts sometimes mishandle growth in a stochastic world

In Monte Carlo analysis, it is important to properly account for growth, especially stochastic growth. In a deterministic world, we might grow prices at an exponential continuous compounded rate of μ. However, if prices fluctuate randomly along an exponential trend, then the price in period T is as follows:

$$P_T = P_0 \bullet e^{[(\mu - 0.5 \bullet \sigma^2) \bullet T + \sigma \bullet Z \bullet T]}$$

where:
P_T is a random lognormal variable whose logarithm is normally distributed

Z is a standard normal random variable, which has a mean of 0 and a standard deviation of 1

Stock prices are typically lognormal and skewed to the right. A lognormal distribution cannot include negative numbers, which is equivalent to saying that a stock price can never be negative.

In the authors' opinion, some analysts incorrectly believe that the exponential path is defined just by μ, but it is not if the variable is random. The greater the standard deviation, the more the distribution spreads out to the right over time. (Remember that a lognormal distribution means the price can never be negative.) Therefore, the mean value increases with greater volatility. This correction, $0.5 \bullet \sigma^2$, can be significant in high volatility markets. If σ is zero, then the above formula simplifies to the standard exponential growth formula.

When evaluating options, the rate of growth is not a critical input. The price of the stock already reflects the expected rate of growth. The critical input is the volatility. See the example below on upward-only adjusting leases.

Building a Monte Carlo model

The following is a non-exhaustive list of criteria and considerations to keep in mind when building a Monte Carlo model:

•Every iteration of the model – specifically every combination of values for the random variables – must make market sense. It is unlikely that loan volume would be high when mortgage interest rates are high; the two variables should be negatively correlated.

•Structure.

•Variables and constants.

•Structural relationship among the variables. In the case of a pro forma, the structure is usually intuitive and straightforward, although highly structured financial transactions, such as mortgage-backed securities, are more challenging.

•Software.

•Relevance.

The purpose of a Monte Carlo model and rare events

The kind of events worth modelling should be carefully considered. Some events are rare but, should they occur, catastrophic. If a rare event, such as a meteor impact, is at the heart of the problem, then it is appropriate to consider such as event. On the other hand, sometimes the market fails to discount certain risks which hidden information suggests are not insignificant. Unfortunately, knowing the difference is more art than science.

In this section, we build a simple real estate pro forma. The model demonstrates the limitations of deterministic models and highlights the many useful insights which Monte Carlo affords. Three of the variables – rental growth, expense growth and exit cap rate – are converted to random variables.

We select for each of the three variables the normal distribution, which is symmetric and defined by its mean and standard deviation. In addition, we define the correlation coefficients between these random variables. For example, if the correlation between rental growth and cap rates is -0.5, then the computer samples each of the random variable probability distributions so that, on average, the correlation among the two sets of random variables is -0.5.

The model calculates the present value of the discounted cash flow (DCF), which is the present value of the annual net operating incomes (NOIs) for the first ten years and a reversion value in the year 10. We calculate the latter by capitalising year 11 NOI by the cap rate, which itself is stochastic. NOI is the difference between rent and expenses, which are both stochastic. We start with initial rental income and expense, and increase each by a growth factor which evolves stochastically. Therefore, NOI and the reversion values are stochastic.

We stipulate a purchase price, which the buyer sets below his/her estimate of the DCFs. In addition to the DCF, we calculate the IRR, which is also stochastic.

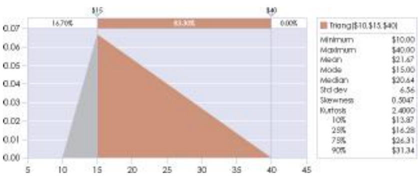
Fitting the distributions and determining correlations among the distributions

When not much data exists, a triangular distribution is appropriate to estimate the minimum, maximum and most likely outcome. For example, Figure 5.3 is shows a triangular distribution where the minimum rent is $10, most likely is $15 and maximum is $40. The distribution is skewed to the right. The mode is $15, the most likely, but the mean is $21.67 and the median is $20.64.

Defining random variable inputs

Our model's random variables consist of the rental and expense growth rates and the exit cap rate at the time of sale. The base case correlation matrix in Table 5.2 assumes that there is no correlation between the pairs of random variables. Assuming that a normal distribution defines each variable with means and standard deviations as indicated, we simulate the three random variables in the first period, 2012. These variables are rent, expense and cap rate (see Figures 5.4, 5.5 and 5.6).

Figure 5.3: **Triangular distributions are useful when ample data are lacking**



Source: Zisler Capital Associates, LLC.

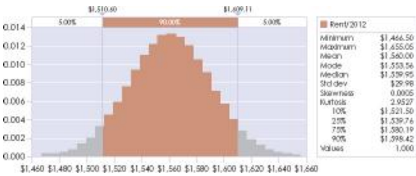
Table 5.2: **Base case assumptions**

Distribution	**correlation coefficients**

	Mean	Std dev	Rental growth	Expense growth	Exit cap rate
Rental growth	4.0	2.0	1.0	0.0	0.0
Expense growth	2.5	1.0	0.0	1.0	0.0
Exit cap rate	8.0	1.0	0.0	0.0	1.0

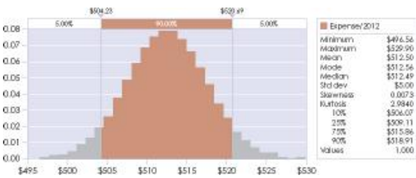
Source: Zisler Capital Associates, LLC.

Figure 5.4: **Base case distribution of rents**



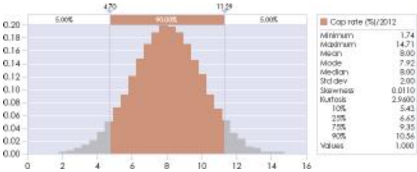
Source: Zisler Capital Associates, LLC.

Figure 5.5: **Base case distribution of expenses**



Source: Zisler Capital Associates, LLC.

Figure 5.6: **Base case cap rates**



Source: Zisler Capital Associates, LLC.

Figure 5.6 shows the implications of our assumptions regarding the cap rate distribution. In year 1, there is a 90 percent probability that the cap rate will be greater than 4.7 percent and less than 11.3 percent. Were we given, for example, historical data for trophy office property cap rates, we could estimate a distribution that might resemble the normal distribution or an alternative. We would guess that the better fitting alternative would be skewed to the left.

Use of multiple regression

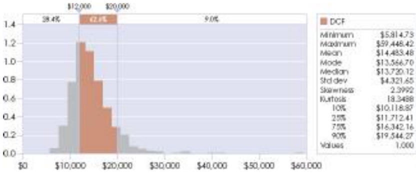
Using a more sophisticated approach, we build an econometric model of the property market. This model includes supply and demand variables, certain disequilibria features, predicted (or determined) component such as rent growth, and an error term. Estimating a model, such as the one described, should explicitly incorporate the dynamics linking the variables. This reduces the variance compared to a simple statistical approach, which we employ in this example for didactic purposes. In our model, rental growth rate, which may be low in one period, has no effect on whether the rental growth rate is high or low in the next period. Since rents are not a random walk, this assumption is unrealistic. In practice, rents display significant inertia, especially in weak markets, and tend to exhibit significant serial correlation.

Output distributions

One of the advantages of Monte Carlo is that the output explicitly reflects the implications of risk, whereas the usual deterministic approach fails to do so. We present the base case output distributions for the DCFs (including reversionary value), IRR, net cash flow (or the DCF after subtracting the purchase price), and bonus or promoted return (promote) after payment of a preferred lump sum. The base case purchase price is $12,000 (in thousands).

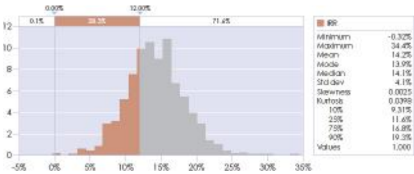
Figure 5.7 shows that there is a 63 percent probability that the DCF will be in the range of $12,000 and $20,000, but a 28 percent likelihood that the sale will generate a loss. Note that this distribution has a skewness of 2.4 (where a symmetric distribution has skewness of zero). This skewness indicates that the discounted value has more upside than downside risk; it has a long right-hand tail. Note also that even though the random input distributions are symmetrical, the DCF output distribution is not symmetrical.

Figure 5.7: **Discounted cash flow distribution of NOI and the reversion**



Source: Zisler Capital Associates, LLC.

Figure 5.8: **The IRR distribution**



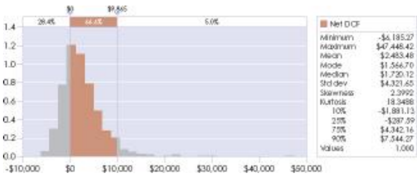
Source: Zisler Capital Associates, LLC.

The IRR distribution is symmetrical (see Figure 5.8). The probability of a negative IRR is negligible. However, there is a 28 percent probability that the IRR at the time of sale will be less than the discount rate used at the time of purchase.

The net DCF distribution indicates that after subtracting the purchase price from the DCF, there is a 28 percent chance of a loss and only a 5 percent chance that the net will exceed $20,000 (see Figure 5.9). This distribution is highly skewed to the right. The high kurtosis indicates fat tails or a greater likelihood of extreme net DCF events.

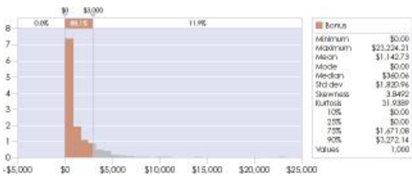
We model the promote structure as follows. If the DCF (at the time of sale) exceeds the purchase price, then, after paying the senior party a preferred return of $1,000, the subordinate party receives 50 percent of the remainder. The promote distribution is highly skewed to the right; the DCF is always zero or positive; it cannot be negative in this example. There is an 88 percent chance that the promote value will be in the range of zero to $3,000 (see Figure 5.10).

Figure 5.9: **Net discounted cash flow distribution after subtracting acquisition price**



Source: Zisler Capital Associates, LLC.

Figure 5.10: **Bonus or promote distribution**



Source: Zisler Capital Associates, LLC.

Effect of variations in correlation and standard deviation on output

The area where sensitivity analysis is not only helpful, but also warranted, is in the exploration of alternative assumptions with regard to the shape of distributions and the correlations among these distributions.

Using the base case as a starting point, we vary the standard deviation of the rental growth rate from 2 percent to 4 percent and the correlation of the distributions of the rental growth and the cap rates from zero to -1.0. (Minus one would indicate that there is a perfect inverse relationship between the cap rate and the rate at which rents grow.) One of the model's embedded behavioural assumptions, which is open to debate, is that momentum excites investors and that they like to chase price. The results can be seen in Table 5.3.

Table 5.3: **Analysis of selected parameters**

Increase in standard deviation (volatility) of rental growth rate from 2% to 4%		**Change in correlation of rental growth rate and the exit cap rate from zero to -1.0**	
Mean of DCF	**Mean of bonus (promote)**	**Mean of DCF**	**Mean of bonus (promote)**
$15,062	$1,434	$14,456	$1,121
$15,194	$1,887	$15,127	$1,619
Increase 0.9%	Increase 31.6%	Increases 4.6%	Increases 44.4%

Source: Zisler Capital Associates, LLC.

Increasing just the standard deviation of the rental growth rate – for example, investing in a riskier market without changing the discount rate – barely affects the DCF value. (We assume for purposes of this example that increased market risk is hidden from the view of the investor and the market, which may not be realistic.) The promote increases dramatically by 32 percent; it behaves as a call option. If the discounted value is less than the purchase price, the promote is 'out of the money'.

Working off the base case and reducing the correlation between the rental growth rate and the cap rate from zero to -1.0 produces even more dramatic results. The DCF value increases by nearly 5 percent since a rising rental growth rate and falling cap rate are mutually reinforcing. However, the bonus recipient really benefits, as the expected value of the promote increases from $1,121 to $1,619, which represents a 44 percent increase.

A sample application of Monte Carlo modelling

Bidding wars and the winner's curse

The urge to buy and overpay is irrepressible even within a slowly recovering market. How can investors avoid the winner's curse?[5] Monte Carlo analysis can provide some important insights, especially in the presence of hidden information and volatility, and can reveal risk. By contrast, standard deterministic approaches conceal risk.

The incidence of the winner's curse is a direct consequence of the number of auction bidders. Asset value uncertainty exacerbates the severity of the winner's curse. Auction participants fail to adapt their bidding strategy to the degree of competition. As a result, behaviour is suboptimal.

A cognitive illusion causes investors to make systematic errors. Do investors learn from their errors? Are bidders repeatedly surprised? If so, can markets indeed be rational? How should the intrepid bidder navigate the bidding process and profit, while still avoiding the winner's curse, which is the propensity for successful bidders to overpay?

Example. The leitmotif of this example is 'bubble within the crash' and the venue is sunny Phoenix, Arizona, land of 'perpetual' growth. The firm, Red in Tooth and Claw, LLC (Claw),[6] believes it can consistently buy low and sell high; it wants to determine the profit-maximising bid for a portfolio owned by the seller, Innocent Lamb Properties (Lamb).

Lamb embraced high leverage and assembled most of its portfolio at the market's peak in 2007. Since then, Lamb has taken a fleecing. This portfolio, which is owned by a now impecunious and financially traumatised covey of co-investors, features land which either lacks entitlement or requires down-zoning. The exact value of this overleveraged portfolio is highly uncertain. The downturn has savaged the investors and they are motivated to sell. The bidding will be intense, although the number of bidders is unknown. The number of players bidding against Claw will be no more than seven. The value of this portfolio is unknown, but it is equally likely to be any value between \$10 million and \$110 million. Each bidder's (including Claw's) estimate of the value of the portfolio is equally likely to be between 50 percent and 150 percent of the actual value of the portfolio. Based on past history, Claw believes that each competitor is equally likely to bid between 60 percent and 80 percent of its respective value estimates. Given this information, what fraction of Claw's estimate should Claw bid in order to maximise its expected profit?[7]

We want to demonstrate with this example the way in which uncertainty and volatility affects optimal bidding strategy. The method of choice is stochastic-constrained optimisation which combines the power of genetic algorithms, constrained optimisation and Monte Carlo analysis. Stochastic-constrained optimisation entails the minimisation or maximisation of a function subject to one or more constraints. These constraints can be equalities or inequalities. The decision variables or the parameters themselves can be random. For example, a developer might want to maximise portfolio value subject to funding constraints in which the funding amounts in each period are random variables. Another example is maximising development profit subject to the constraint that net worth volatility does not exceed a defined ceiling. Most developers deal with numerous spatial and inter-temporal constraints. A good example is maximising the net present value of a development subject to receipt of certain entitlements, which may be subject to uncertainty. Investors are usually concerned about downside risk. Stochastic-constrained optimisation can incorporate downside risk protection in real estate development analysis and complex security design.

The objective of our example is to estimate Claw's optimum bid. Claw's base case analysis assumes that the actual value of the land, a random variable, follows a uniform probability distribution. The lowest and highest bounds are $10 million and $110 million, respectively. Claw's estimate of the actual value is also drawn from a uniform random distribution between 50 percent and 150 percent of the actual value. (In market analysis, the real value is never 'seen'.)[8] Claw's bid is 'drawn' from a uniform distribution of numbers bracketed by 50 percent and 150 percent of Claw's estimate of value – Claw's acquisition team may be off as much as 50 percent either way, but that is the land business! Claw computes its bid as the bid fraction (of the estimate of value) times Claw's bid.

What is the optimal bid fraction? Each competitor's estimate of value reflects a stochastic or random process similar to Claw's, which is why we call this auction 'a common value bidding process'. If Claw's bid exceeds all other bids, Claw wins and pockets the actual value minus the bid, or its profit.[9]

We use Monte Carlo analysis and a special search algorithm to calculate the optimal bid. Our estimate required over 100,000 calculations.[10]

Results. Our simulation produces important practical insights:

•The optimal bid is sensitive to the number of competing bidders. The greater the number of bidders, the higher is the optimal bid fraction.

•However, the average profitability declines exponentially as the number of bidders increases.

•The higher the volatility or uncertainty of value, the lower both the optimal bid and bidding profitability.

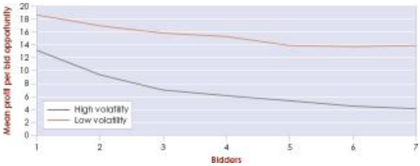
•Profitability as a function of the number of bidders declines faster in more volatile or more uncertain markets.[11] (See Figures 5.11 and 5.12.)

What other lessons can we learn? If engaging in auctions is necessary, avoid crowded bidding situations. In order to win, the bidding fraction must be increased, which, in turn, dramatically increases the probability of losing. (Remember, just because the mean profitability is low, but positive, does not mean that there is not a substantial likelihood of loss.[12]) In auctions, avoid volatile markets or markets when lacking a competitive (informational) edge.

If large auctions in volatile markets cannot be avoided, go deeper than the competition. Study the properties, owners and tenants. Increase the odds of winning even further by raising discretionary capital to offer immediacy and take properties off the market before competitors have a clue.

The winner's curse predicts that the average bid will be less than a property's or portfolio's value, while the winning bid will exceed the value. The winning bid is often much greater than the second-to-highest bid, and the dispersion of bids increases with the number of bidders and their uncertainty regarding true value. Since markets are prone to irrational exuberance or fads, certain 'hot market' property bids, influenced more by capital flows than underlying fundamentals, may produce junk returns. The winner, meanwhile, is cursed by a bid exceeding true value and an acquisition that is less profitable than expected.

Figure 5.11: **Bid profitability falls as the number of bidders increase (profitability falls with higher volatility)**



Source: Zisler Capital Associates, LLC.

Figure 5.12: **The bid as a fraction of estimated value rises as the number of bids increase (bid fraction declines with higher volatility)**

Source: Zisler Capital Associates, LLC.

Rational bidding requires that a distinction is made between the expected[13] property value conditioned only on prior information available and the expected value conditioned on winning the auction. The two are usually quite different. Even if bidders understand this concept, they can still overpay if they underestimate the necessary adjustment to compensate for the presence of other bidders. The greater the number of bidders, the more aggressive must the bid be in order to win, so a winning buyer is more likely to overestimate the property value. While the former suggests aggressiveness, the latter finding implies conservatism. What, then, is the optimal bid?

A seller usually possesses inside information and a bidder must calculate the expected property value conditioned on the seller's bid acceptance. Therefore, a successful bidder will almost certainly lose since it is cursed at the outset. This makes playing a winning game very difficult.

Monte Carlo analysis demonstrates that avoiding this problem is not easy, especially when bidders, wracked with conflict, must balance relatively certain asset management fees with uncertain future returns (and promotes). Most potential buyers do not appreciate the need for conservative bidding.[14]

The future of real estate risk analysis

There are reasons why the spread and evolution of quantitative risk analysis in real estate real estate may face headwinds. Real estate investing is dominated by deal-making, when, in fact, risk analysis investors might do better by remaining on the sidelines. Investment advisers feel the need to invest and generate fees, especially when the client imposes a deadline by which time all money must be invested, or when the adviser is struggling to accumulate assets under management. The incentives can work against risk analysis, especially if the attitude is 'tomorrow is another day'.

The authors believe that the courts, institutional investors, rating agencies, professional standards-setting associations and governments will play an important role in establishing standard risk analysis procedures. The analytic products of these procedures will be a required component of any investment analysis. When we look back at the appraisal process before the 1970s and compare it with present-day standards and tools, we cannot help but be impressed with the progress. Today, we benefit from cheap and ubiquitous computational resources, new and rich databases, and financial professionals schooled in principles of finance, which, 35 years ago, represented the cutting-edge.

As with any quantitative model, data inputs and the structure of the model itself critically affect the accuracy and relevance of the model's outputs. Often, a naïve extrapolation of history leads to bad results, so the reasonableness of each assumption should be questioned. A bad model can be worse than none at all. Quantitative analysis is no substitute for good judgment and healthy scepticism. A good model does far more than generate forecasts; it provokes creative thought and acts as a framework for speculation.

Model-building is a creative process. How simple should the model be? It should be as simple as possible, but not too simple. It should not attempt to replicate reality. To do so defeats a major purpose of any model, which is to clarify and illuminate. The model, however, should incorporate just enough complexity. Omitting essential detail artificially constrains the model and possibly biases the results.

Quantitative risk analysis is not new. Due to software innovations and computer graphics, Monte Carlo is now much more accessible to a broader audience of analysts, investors and other professionals. While thinking rigorously about risk may be new (and even frightening) to many practitioners, the necessity to do so has never been more compelling.

□

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[1] Lessons can be learned from other disasters. The Titanic's designers did not provide a sufficient number of lifeboats for passengers. When crisis arose, whatever had established Titanic as the greatest example of maritime engineering quickly became an afterthought to those desperate people unable to reach safety. The tragedy of the current financial

crisis is that the gatekeepers, watchdogs, consultants and fiduciaries never knew, or perhaps cared, that there were too few lifeboats; nobody, including the US Federal Reserve System, was prepared to sound the alarm.

[2] Stephen Ross of the Massachusetts Institute of Technology and Randall Zisler developed a technique to remove the smoothing from property returns. See Multilayered Themes on Real Estate Risk, November 16, 2010, which is part of the Dagwood Series on risk and portfolio strategy.

[3] To prepare exhibits for this chapter, the authors used @RISK, a software package distributed by Palisade Corporation.

[4] The points along a circle have a correlation coefficient of zero. A circle is clearly a specific shape for which there is a non-linear relationship. Hence, a correlation of zero does not mean there is no relationship.

[5] The winner's curse states that the optimal property bidding strategy entails bidding a substantial amount below the bidder's assumed value for the property. The idea is that if the bidding price is not below the assumed value, the uncertainty about the actual value of the property will often lead the bidder to win bids for properties on which the bidder, after paying his/her high bid, loses money. In other words, the winning and highest bidder pays too much.

[6] Alfred Lord Tennyson in In Memoriam A. H. H.wrote, "Tho' nature, red in tooth and claw", underscoring the Darwinian nature of life. The real estate downturn has been a herd-thinning event. Bidding wars are implements of natural

selection. Will the winning investors be predators or will they be prey?

[7] Claw believes that high-net-worth investors have often outbid the institutions, probably because some wealthy individuals, focusing excessively on capital preservation, ignore the time value of money and overestimate the speed of recovery.

[8] The real value is shrouded in uncertainty, which we attempt to penetrate with varying degrees of success. At best, we can only estimate this value, and the precision of this estimate reflects the uncertainty or dispersion of the underlying distribution and the sample size which our market research budget supports.

[9] A complete analysis including spreadsheet can be found in Wayne Winston's Decision-Making Under Uncertainty with Risk Optimiser. Palisade Corp., 1999.

[10] There are many real-life complications we could add. For example, think of random samples as comparable sales statistics drawn from the market population. The population is shrouded in uncertainty. Our samples give us a highly refracted 'peek'. We could add a budget constraint and a cost per sample, since market research is expensive. We could also record for each sample certain physical characteristics and estimate a hedonic regression to explain comparable values in terms of site area, frontage and location. This refinement would narrow the distribution that governs Claw's estimate of value.

[11] We estimate mean profitability, which itself has a variance or standard deviation. Therefore, depending on the circumstances, the left-tail, or downside, could be quite large.

[12] Had we calculated value-at-risk (VAR), this point would be quite evident.

[13] 'Expected' means 'probabilistically most likely'.

[14] We are aware of some pension investment money managers who face the certainty of 'returning' capital to the pension client if the managers cannot invest the money by year's end. How does the fear of forfeiting capital colour the bidding strategy of the manager, especially if the incremental capital may affect the likelihood of firm survival?

6

Analysing and pricing risk in international real estate markets

By Maurizio Grilli and Richard Barkham, Grosvenor

Introduction

Since 2000 we have seen a substantial increase in the level of cross-border property investment. Even as real estate markets have boomed, slumped and rebounded in response to extreme monetary-policy settings, investors have been more interested than ever in deploying capital outside their home markets. Increased returns and reduced risk through diversification are often stated as the main motivating factors behind international real estate investing. This may be true, but a more detached perspective suggests that globalisation and 'herd behaviour' also play a role. As industrial production has shifted from the OECD to the emerging markets and the latter have adopted more sophisticated free market macro-economic policy frameworks, opportunities for international real estate investing have opened up. While institutional investors were at first relatively slow to see the benefits of international investing there is now a great deal of interest, if not exactly an unseemly scramble, to deploy OECD capital in emerging markets. No doubt the poor economic prospects for the OECD, vis-à-vis the BRICs[1], are also an influencing factor.

Investment managers need to be mindful of the fact that good investment theses, such as international diversification and emerging markets exposure, are often overplayed and exaggerated. Real estate investors are particularly fixated on high rates of GDP growth. This chapter arises from Grosvenor's concern that capital be deployed only in markets where the returns are demonstrably commensurate with the risks to investing the said capital and its expected cash flow. We present a relatively simple framework, based on publicly available data for measuring the risk associated with deploying capital in the real estate market of any country and its pricing. By 'pricing' we mean setting a minimum acceptable level of return, or hurdle rate for a market, based on various characteristics of a market that can serve as a proxy for the real risks of investing in those markets.

Hurdle rates

A large amount of academic research has so far failed to show a very clear relationship ex post delivered returns among equity, debt and real estate, and the risk incurred in achieving these returns. This may be due to the fundamental conception of risk contained in the dominant asset pricing models of capital (CAPM) and arbitrage pricing theory, namely actual or relative volatility, or it may be due to the obfuscating vagaries of the real world. Certainly there is more work to be done to understand the impact of investor time horizons on conceptions of risk. This work proceeds on the basis of two key assumptions: 1) investors require returns that are commensurate with the risks of investing, however they conceive them; and 2) there are many ways of defining risk and an even wider array of possibilities for measuring it. Even in the most complex quantitative risk measurement systems there is an element of judgement and estimation: mature analysts and mature organisations recognise the weaknesses inherent in their risk systems and make them explicit.

The framework contained in this chapter is a relatively simple yet robust way of estimating the appropriate level of return for investing in real estate markets. The appropriate use of these hurdle rates is as a benchmark for market-level internal rates of return (IRRs) or forecast rates of return for 'typical' investment-grade real estate. Such forward rates of return are usually based on going-in income return, forecast rental growth and capitalisation rate change, less an allowance for depreciation. A comparison of objectively determined hurdle rates with forecast rates of return allows markets to be ranked, with, as it were, risk held constant. Put another way, the purpose of these hurdle rates is to reveal those markets which offer the best return for a somewhat intuitive but standardised and rigorously calculated measure of risk. Above all, the purpose of these hurdle rates is to protect investors from deploying capital in markets that look attractive because of their forward rates of return or, what is sometimes assumed to be an equivalent measure, projected GDP growth rates, but do not offer a sufficiently high rate of return for the risks involved.

The risk-return equation

Real estate is riskier than government bonds because its cash flow derives from households and businesses which are more unpredictable than governments.[2] So it is logical that real estate investors should require higher required returns than those offered by government bonds. The real estate target return (RETR) of the investment maybe described as:

$$RETR = RFR + RP$$

where:
RFR is the risk-free rate
RP is the risk premium

For international real estate investors the risk premium needs to compensate for country risk and within-country real estate risk. In this model, it should be noted, the premium reflects an investment in a stabilised 'investment-grade' real estate asset, so undertaking real estate development requires a further additional risk component. Although the risk premium is time-varying, reflecting investor preferences and real estate and non-real estate events, for ease of operation we treat the determinants of the premium as long term in nature and incorporate long-term average values. In effect, the time-varying component of the risk premium is captured by regularly updating the hurdle rates to take account of movements in the input variables.

The expected return of a real estate market (REER) is based on rental growth and yield forecasts.

$REER = y + i + g$

where:
y is the yield
i is the expected inflation rate
g the expected rate of real rental growth

If the forecasts are accurate, or at least unbiased, when risk is taken into account, the market is investible if RETR>REER. In the opposite case, the market may look attractive due to assumptions about future rental levels or GDP growth, but capital deployment would not be justified by this metric. This type of analysis conveys a quick and reasonably accurate way to gauge whether we should go long or short in a market. One interesting use of the approach is to assess the investibility of low-return markets, such as Japan or Germany. As long as projected returns are above the hurdle rate, such markets are investible. The inclusion of low-return markets in the 'investible universe' improves the ability of investors to diversify their portfolios. Moreover, where returns are low, but highly secure, they can be augmented with gearing.

The risk-free rate

The risk-free rate of return (RFR) is attributed to an investment with zero risk and represents the interest expected from an absolutely risk-free investment over a specified period of time. The risk-free rate is the minimum return an investor should expect for any investment, since any amount of risk would not be tolerated unless the expected rate of return was greater than the risk-free rate. In practice, however, the risk-free rate does not exist, since even the safest investments carry a very small amount of risk. Investors commonly use the interest rate on government bonds as it is assumed to have virtually zero risk of default. Ten-year bond yields are a reasonably appropriate proxy for a risk-free rate for the real estate investor, as they reflect both the intrinsic illiquidity of the asset and compare well to the typical lifespan of a real estate fund.

At present, the risk-free characteristic of government bonds, a keystone of financial theory, has come into question as the sovereign crisis expands. Government bonds are no longer perceived as the risk-free assets they once were and this also applies to the largest and formerly safest market, the US

Treasury bills. We have therefore constructed a synthetic risk-free rate, calculated as a GDP-weighted average of the bond rates for a number of high credit quality countries. These countries include Australia, Switzerland, Germany and the Scandinavian countries.[3] We have also included the US, despite concerns about the country's fiscal position and quantitative easing, as US Treasury bills are still widely held by investors and generally perceived as risk-free. However, as the global economic and financial outlook is changing rapidly, there is no guarantee that today's 'safe' countries will be the same in the future.

Estimating a 'fair' risk premium for international real estate investment

This section aims to identify the source of real estate returns and determine the value of a 'fair' risk premium required by an investor operating in a different market from the property. The real estate risk premium is defined as the sum of the income yield from the investment plus income growth minus the risk-free rate. In the long term income growth will generally rise with inflation. Real growth in income will occur if there are limitations on the supply of land due to natural factors or land-use planning. In the short term, real rental growth is highly cyclical, as the supply response lags the increase in demand. The frequent and sometimes chronic under-supply of commercial space provokes real rental growth increase, which, in turn, stimulates development, and, in turn, decreases periodic real rental as markets are oversupplied.

In Figure 6.1 we show the evolution of the risk premium in the City of London office market from 1989–2011. We have chosen this market for various reasons, including the availability and quality of data, its high liquidity and transparency and its overall importance in the real estate world. It is also a market which is not characterised by land use shortages or real rental value growth, so the risk premium can be calculated by deducting the risk-free rate from the income return. Over the whole period, the risk premium has averaged 3.8 percent, although it has varied significantly and especially during turbulent times such as the current one (as of August 2011). This number is important because it helps us to understand what the long-term risk premium is on internationally traded real estate.

Figure 6.1: **City of London office risk premium, 1989–2011**

Source: Global Insight, IPD, Grosvenor Research, 2011.

The income from real estate comes from rents paid by occupiers for the use of space. This income is comparable to the coupon received when investing in a bond. However, unlike bonds, there is an equity component in real estate. When the lease expires, the real estate investor is left with the value of the real estate itself, which, in turn, is a function of the prevailing market rent at the time. This value is uncertain and therefore similar to an equity investment. Our analysis looks at UK data for reasons of convenience but is applicable to other markets. IPD produces an annual survey which assesses the credit quality of commercial real estate tenants. The results of the survey show that one quarter of income is derived from 'low-risk' tenants (roughly equivalent to AAA corporate rating), while some 50 percent of the income is derived from tenants ranking 'medium risk' (roughly equivalent to corporate A rating). The remaining 25 percent of the income is therefore attributable to 'higher-risk' tenants, which can be better represented by an equity risk premium. This conclusion implies that the real estate risk premium is composed of roughly 75 percent bonds and 25 percent equity, which seems reasonable in principle, given the long-run composition of real estate returns.

The equity risk premium (RPE) has been obtained by subtracting the average yield on the ten-year index-linked bond from the sum of the long-run average dividend yield on UK equity plus the long-run GDP growth rate of the economy.[4,5] The components of the real estate risk premium on the fixed-income part are then calculated by subtracting the average yield on the index-linked gilt from the AAA and the A bond yield, respectively. Using these proportions and values delivers a risk premium of 3.7 percent. This number is higher than the risk premium on AAA corporate bonds, but is lower than risk premium on equities[6]. Moreover, it is consistent with the ex post risk premium for the City of London office market shown in Figure 6.1. It is then reasonable to assume that this number is a fair representation of the risk premium of the City of London office market. These results are important because, along with the findings of next section, they will allow us to estimate a risk premium for all markets.

The risk premium

In this section we relate the determination of the fair risk premium for real estate investment to its components as they are perceived by real estate investors. In our framework, the risk premium is made up of country risk and real estate risk.[7] All these components are summed up, in order to create an unadjusted risk premium for each market. The different components are explained below.

Country risk premium

Economic risk is lowest in economies that are broadly diversified, have high 'automatic stabilisers' due to welfare systems, enforceable contracts, independent central banks and world-class companies. An analysis of all these factors will produce an overall measure of country risk with countries typically depicted as being least risky in relatively mature and stable economies such as the US, UK and Western Europe; risk is higher in emerging economies such as in countries in Eastern Europe, Mexico and parts of Asia; risk is then highest in underdeveloped countries in some parts of Asia and Africa. Also, some countries may enjoy a period of good economic performance but can be subject to high levels of political risk. These risks can include major policy changes, regime changes, economic collapses and war. Again, countries such as the UK, the US and the euro zone are seen as having very low country-specific risk as they have stable borders, democratic institutions, a long history of democracy and a rule of law, all which lead to more continuity and less risk of civil disorders. Other countries, such as Russia or China, are thought to pose a greater risk to investors.

The higher the country-specific risk, the greater the compensation investors will require. There are a variety of country risk assessment methodologies that are publicly available and in our view the best one is produced by the New York University Stern School of Business.[8] This methodology is based on Moody's country credit ratings and is calculated by looking at bond spreads. It is easy to replicate and uses public data that is updated frequently. The assumption is that this will be a fairly accurate measure of the main types of country risk, namely sovereign debt, currency, banking, political and economic risk. The values of the risk premia range from 0 percent in markets such as the Germany and Singapore to 3.6 percent in emerging India or 10.5 percent in high-risk Cuba. The August 2011 US downgrade by Standard & Poor's and more likely downgrades in other OECD countries are a testament that the common perception about country risk has changed and that there is a steady shift of economic credibility from West to East.

Real estate risk premium

In our model, the within-country real estate risk can be subdivided into several categories.

Transparency risk is often mentioned by real estate investors when investing in countries characterised by scarce information and no benchmarks. Jones Lang LaSalle has created an index where a transparent market is defined as an open market that scores highly on the following items: ability to measure accurately market performance, availability of market information, presence of listed vehicles, respect of real estate rights and presence of an efficient regulatory system, and guarantee that the transaction process is performed through the use of advisers/brokers operating with recognised professional standards and qualifications.[9] According to the index, Australia and Canada are the most transparent countries in the real estate world, while Vietnam and Colombia rank among the least transparent countries. For our calculation, the index has been again standardised[10] with premia ranging from 25 basis points (bps) to 125 bps.[11] In this fashion, Calgary carries only a 25 bps premia, while a relatively non-transparent market such as Shanghai carries 125 bps.

Liquidity risk derives from the uncertainty associated with exiting an investment, both in terms of time and costs involved. Real estate tends to trade rarely and bid-ask spreads can be quite high. The greater the time and/or the higher the cost of selling the asset, the more compensation investors will require. The indicator we use is based on two measures. First, the size of the average[12] turnover in a specific market is compared to the turnover of the global market (the higher turnover the more liquid is the market). Second, relative liquidity (RL) is measured by calculating the share of the transacted assets to the size of the investible stock[13].[14] The two measures are then combined and standardised to create a liquidity premium for every market. Values range between 50 bps and 150 bps for office markets and between 75 bps and 175 bps for retail markets.[15] For example, our calculations show that New York City office is the most liquid market in the world with a 50 bps premium, while more illiquid markets such as Calgary office and Portugal retail each carry a 150 bps premium.

Business risk is associated with the uncertainty of a company's future cash flows, which are affected by the operations of the company and the environment in which it operates. The higher the cash-flow volatility, the greater the compensation required by investors. We have proxied the business risk of real estate markets by using the standard deviation of notional long-run historic market rental growth. For our calculation, the index has been again standardised with premia ranging from 55 bps to 125 bps.[16] As a result, with 60 bps the relatively less volatile Brussels office market scores better than the highly volatile New York office market with its 125 bps.

Depreciation risk is the loss in value of an asset over time due to wear and tear, physical deterioration, age and locational obsolescence. While there is plenty of literature on this subject, the value of depreciation is difficult to estimate. Overall, depreciation is lower if the proportion of total value due to land is higher; it is also lower the longer the lease, as tenants stay longer in the building and new construction levels are lower. As it was difficult to create market-specific values for depreciation risk, a rather crude approach was adopted. In short, the office sector was supposed to carry a premium of 125 bps, while the retail sector was carrying 75 bps.[17]

Income-security risk is based on typical lease lengths for the specific sector, rent guarantee period and recovery of insurance cost from tenant. Typically, the longer the contract, the lower is the risk of income loss. We have proxied this type of risk by using data from DTZ.[18] The raw data has been standardised and values range between 25 bps and 1,500 bps. Results show that landlord-friendly UK scores better than China.

The unadjusted risk premium is the summation of all the aforementioned risks: country, liquidity, transparency, business, depreciation and income security.

Finally, the actual risk premia for all markets are scaled up or down relative to the risk premium for the City of London office market which we have defined as the international benchmark. Results are shown in Table 6.1. As it would be expected by its relatively benign environment, City of London office is one of the least risky markets globally.[19]

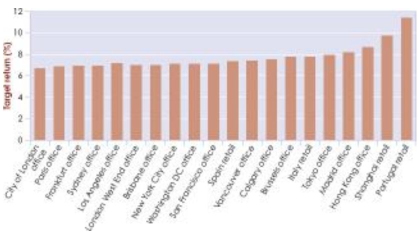
In general, risk premia are lower in the UK and the US and higher in Asia.[20] By adding the risk-free rate to the risk premium we then calculate the target return. Results for a selected number of markets are shown in Figure 6.2. The range of values varies from 7.0 percent for City of London offices to 11.6 percent for the Portuguese retail market. We believe both the range of values and the ranking of markets are reasonable, given our knowledge of global real estate markets. We are conscious that the balance of risks in the global economy is changing and these results are only current estimates. However, the method is flexible enough to be adapted to changing circumstances.

Table 6.1: **Risk premia compared across sectors and regions**

	Continental Europe	**UK**	**US**	**China**	**All markets**
Country risk	0.7	0.0	0.0	0.9	0.3

Transparency risk	0.4	0.3 0.31.0	0.4
Liquidity risk	1.5	1.1 1.41.5	1.4
Business risk	0.6	0.7 0.80.8	0.7
Depreciation risk	1.2	1.1 1.21.0	1.2
Income risk	0.4	0.3 0.51.2	0.5
Overall risk premia	**4.8**	**3.5 4.26.5**	**4.6**

Figure 6.2: **Estimated target rates of return**

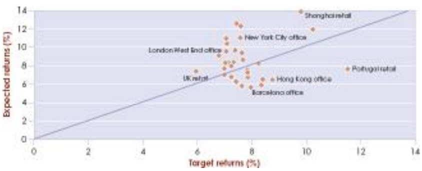


Source: Grosvenor Research, 2011.

Target versus expected returns

By comparing the hurdle rate with the expected return each year from 2011–2016, we are able to gauge whether or not a market is investible, given that our assumptions on income growth are correct. If the expected return is greater than the hurdle rate, we would invest in the market, and vice versa. Figure 6.3 shows our results: the markets above the 45-degree line are investible and the ones below are not, according to this metric. Bear in mind that our results look at prime office and retail properties. As a result, other segments such as out-of-town shopping centres and business parks may be more likely to satisfy the return requirements, as expected returns may be higher. However, note that the risk for non-prime assets is higher as well. As a rule of thumb, this analysis should be adapted at the asset-specific level.

Figure 6.3: **Target versus expected returns**



Source: Grosvenor Research, 2011.

Conclusion

Assessing the risk associated with investing in international real estate markets is difficult but critical to investors. Understanding real estate risk is important from both a risk-adjusted return perspective and from the point of view of diversification. To this purpose, we have compared expected to target returns, to gauge the worthiness of investing in specific markets.

Our results should be seen in the context of a deeper understanding the different risk components involved in investing in international markets. It should also be noted that the risk premium varies over time, as do market conditions.

□

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[1] Brazil, Russia, India and China.

[2] We assume that the sustaining 2008 financial crisis will not render this statement inaccurate, in the longer term.

[3] Countries were selected on a number of criteria, including debt/GDP, term structure of debt, share of domestically held debt, default history, reserve currency status, current account position, bank credit quality, and size and political considerations. For background, see BlackRock's Introducing the BlackRock Sovereign Risk Index: A More Comprehensive View of Credit Quality, June 2011.

[4] The long-run GDP growth rate for the UK economy was calculated at 2.15 percent (1992–2010 data. Source:Global Insight).

[5] RPE = (eg + dye) – yilb, where eg is the long-run GDP growth rate, dye is the long-run average dividend yield and yilb is the average yield on the ten-year index-linked bond.

[6] The average AAA and equity premia are 3.31 and 4.04 percent, respectively.

[7] There are other types of risk, including leverage, currency and taxation. The analysis of these types of risk is beyond the scope of this chapter.

[8] Damodaran, Aswath. 2003. Measuring Company Exposure to Country Risk: Theory and Practice. Stern School of Business, New York University.

[9] Jones Lang LaSalle, Real Estate Transparency Index, 2010.

[10] According to Jones Lang LaSalle, the score for the most transparent country, Australia, was 1.22 while the score for the most non-transparent, Algeria, was 4.74. The scores for each market were then standardised around a distribution with a new average and minimum and maximum values.

[11] The minimum premium cannot be zero as even the most transparent market carries some non-transparency.

[12] This is measured over a number of years.

[13] Investible stock is defined as the stock of commercial property in each market that is deemed of institutional quality.

[14] $RL = t/s$, where t is the total average turnover over a number of years and s is the total stock of investible product in a specific market.

[15] Both the minimum and maximum premia are higher than for transparency as we believe transparency is less important for investors, which sometimes actually see it as an opportunity for extra returns. The maximum value is higher for retail as this sector is more illiquid than offices.

[16] High volatility is perceived as slightly less important than illiquidity.

[17] We are conscious of the need to refine this approach, to account for specifities of markets and segments.

[18] Source: DTZ Investor Friendliness Matrix.

[19] This finding helps to explain a puzzle in the UK property market. London offices are widely regarded by local market participants as poor investments because of their low average return relative to the long-term standard deviation of that return. No doubt part of the reason for this is that international investors regard London offices as very safe investments and therefore price these assets accordingly. The low risk premium available to undiversified local investors is not sufficient to compensate for volatility.

[20] Our analysis was undertaken for markets in Europe, North America and the Asia Pacific region, as these are the most important markets for real estate investors. Nonetheless, the analysis can be extended to other regions such as Africa, the Middle East and Latin America.

7

Special considerations in sustainable property financial analysis

By Scott Muldavin, Green Building Finance Consortium

Introduction

Financial modelling and analysis are key components of underwriting a sustainable property investment. Fortunately, fundamental property financial analysis and valuation methodologies do not need to be changed. However, there are special considerations and refinements to the execution of financial analysis and valuation that need to be considered to properly assess the financial implications of investment in sustainability.

Given the dramatic increase in demand by regulators, tenants/ occupants and investors for sustainable properties, proper property valuation and financial analysis must consider the impact of sustainability. As with most real estate financial analyses, the biggest challenge is not the modelling but the integration of sustainability considerations into the determination of model input assumptions. 'Too hard' or 'not enough empirical data' are neither legitimate nor correct responses to factoring in the influence of sustainability on property returns and value. Real estate financial analysts and valuers need to accept and 'own' the qualitative nature of their work, and get down to business to doing a better job of it.

This chapter presents a six-step process of sustainable property financial analysis and guidance on some of the special considerations in executing such analysis.[1] The six steps to sustainable property financial analysis are:

1. Selecting the financial model;

2. Evaluating property sustainability;

3. Assessing the costs/benefits of sustainability;

4. Evaluating the financial implications of costs/benefits;

5. Determining the financial model inputs; and,

6. Conducting a risk analysis and presentation (RAP).

Step 1:
Selecting the financial model

There are many different types of financial analyses used for making sustainable investment decisions and special consideration is needed to select the appropriate approach that is suited for the decision being made. Financial analyses alternatives can logically be separated into four categories: traditional sustainability financial analyses, traditional real estate financial analyses, sustainability sub-financial analyses and public sustainable benefits analyses (see Table 7.1).

Traditional sustainability financial analyses are the dominant methods used to make energy efficient/sustainable investment decisions for buildings, features and equipment.

Table 7.1: **Sustainable property financial analysis alternatives**

A.Traditional sustainability financial analyses	**C.Sustainability sub-financial analyses**
1.Simple payback	1.Comparative first-cost analysis
2.Simple return on investment (ROI)	2.DCF lease-based cost-benefit allocation models
3.Simple change in asset value: direct capitalisation (SCAV-DC)	3.Sustainability options analysis
4.Simple ROI and general cost-benefit analysis	4.Churn-cost savings analysis
5.Life-cycle costing (LCC)	5.Productivity benefits analysis
6.Value engineering	6.Health cost savings analysis
7.ENERGY STAR building upgrade value calculator for office properties	7.Government/utility incentives and rebates analysis
8.ENERGY STAR cash-flow opportunity	8.Enterprise value analysis
9.Life-cycle assessment (LCA)	
10.Post-occupancy analyses (POE)	

	9.ENERGY STAR financial value calculator
	10.Risk analysis and presentation (RAP)
C.Traditional real estate financial analyses	**D.Public sustainability benefits analyses**
1.Cost management	1.Reduced infrastructure costs
2.Discounted cash-flow (DCF) analysis	2.Environmental and resource conservation benefits
•Change in asset value	3.Land-use benefits
•Net present value (NPV)	4.Climate change reduction
•Internal rate of return (IRR)	5.Economic benefits
3.After tax cash-flow analyses	6.Security benefits
4.Valuation	
5.Total occupancy cost (cost of ownership) analysis	
6.Economic value-added	

Source: Green Building Finance Consortium.

Traditional analysis, such as the simple payback and simple return on investment (ROI) models, are appropriate and sufficient for many types of sustainable investment decisions that can be justified on cost savings alone. Even life-cycle costing, the most sophisticated and comprehensive of the traditional sustainable financial analyses, only focuses on costs and cost savings.

However, major retrofits, the acquisition of an existing sustainable building or a new construction, will require more sophisticated analyses that consider all costs, benefits (revenue enhancement) and risks to ensure proper allocation of sustainable property investment dollars. In these cases, traditional real estate analyses like a discounted cash flow (DCF) will need to be employed.[2]

Dramatic increases in regulator, space user and investor demand reinforce the importance of integrating value beyond cost savings as shown in Figure 7.1. If valuers only considered resource use (such as energy costs) and ignored market performance (measured by demand), key value issues affecting entitlements, rents, capitalisation rates and other issues would be ignored. In essence, revenue and risk considerations would not factor into decision-making, thus producing a recipe for long-term underperformance.

An important consideration in analysing sustainable properties is the employment of sustainability sub-financial analyses such as those identified in Table 7.1. Sustainability sub-financial analyses provide quantitative support – like the potential health value or churn-cost savings for occupants – to analysts trying to assess how sustainability investment will influence tenant or investor demand, and thus influence rents, occupancies, tenant retention and other revenue variables. Done well, property-specific analyses can significantly influence the incremental value and financial performance attributable to sustainable property investment.

Figure 7.1: **Sustainability demand affects value inputs**

Source: Green Building Finance Consortium.

Step 2:
Evaluating property sustainability

Property-specific financial analysis requires explicit consideration of the potential benefits that will accrue through meeting regulator, space user and investor thresholds for sustainability. Regulators typically have a whole series of required thresholds in building codes and ordinances in order to meet their regulatory requirements and/or obtain incentives, while space user definitions of sustainability might incorporate an environmental rating such as LEED, internal company energy efficiency guidelines or broader measures such as the Global Reporting Initiative or Carbon Disclosure Project.

The specific certifications/definitions required by regulators, users and investors will also vary dramatically by country, government level, property type, property size, tenant mix and other factors. Fortunately, while evaluating sustainable certifications from a financial perspective can be complicated, analysing regulator, user and investor requirements at the property level is a core expertise practiced for decades by real estate appraisers and underwriters.

Importantly, existing green building certifications like LEED, BREEAM, GreenStar or Green Globes measure environmental outcomes, not financial outcomes, and thus cannot be the sole basis for underwriting from a financial perspective. Practically, investors will also be confronted with underwriting properties with varying sustainable features, performance and green certifications.

Step 3:
Assessing the costs/benefits of sustainability

After selecting the most appropriate financial models and assessing a property's sustainability, the property's sustainable costs and benefits must be evaluated. The list of potential sustainable investment costs and benefits is long. Government incentives, health and productivity benefits, reduced energy and water costs, and increased tenant interest are just a few of the benefits. Construction risk, increased development costs, contractual risks and energy use underperformance are just a few of the risks.

The secret to incorporating cost-benefit analysis into a sustainability financial analysis is to organise both positive and negative risks around eight categories: development costs, development risks, space user demand, operating costs, building operations, cash-flow/building ownership risks, public benefits and investor demand. Organising around these categories provides the information and structure to assess 'net' costs and benefits by category.

Step 4:
Evaluating the financial implications of costs/benefits

Once sustainable property costs and benefits have been identified and categorised, the next step is to determine how a property's sustainable costs and benefits will influence its financial performance. This is done by evaluating the costs and benefits in the eight categories listed in Step 3, to assess the 'net' impact of sustainability on each category.

Next, the financial implications of the net impact analysis for each category need to be assessed. While the specific type of financial model will vary based on the type of decision being underwritten, the logic and structure of a DCF model provides the conceptual framework needed for interpreting how sustainable features influence return and/or value. Even if perfect data is not available, by thinking through the specific assumptions within a DCF model users can gain important insights into the magnitude of the financial implications of sustainable property investments. The key financial model inputs of the DCF model directly affected by sustainable costs and benefits are shown in Table 7.2.

Table 7.2: **Linking sustainable costs/benefits to financial model inputs**

Sustainable costs/benefits	**Affected financial model inputs**

Development costs	•Rebates/incentives •Financing costs •Tax cost •Cash flow received earlier
Development risks	•Discount rates •Capitalisation rates •Sales prices
Space user demand	•Contract rents •Rent growth •Occupancy •Absorption •Tenant retention: renewal probability •Downtime between tenants
Operating costs	•Energy costs •Water costs

	•Waste costs •Insurance costs •Maintenance costs
Building operations	•Tenant retention: renewal probability •Tenant improvement costs
Cash-flow risks	•Discount rates •Capitalisation rates •Sales prices
Public benefits	•Revenues – through impact on space user demand •Development costs/risks – through impact on government demand •Capitalisation and discount rates – through impact on investor demand
Investor demand	•Capitalisation rates •Discount rates •Sales prices

Source: Green Building Finance Consortium.

Step 5:
Determining financial model inputs

Key DCF model inputs influenced by sustainability

In step five, the goal is to identify specific financial model inputs taking into consideration, all factors, both sustainable and non-sustainable, that affect the financial model inputs.

The financial performance (internal rate of return value or IRR, and value) of a property is most typically determined for income-producing properties using a DCF model. The DCF model takes into consideration revenues and operating expenses to calculate net operating income (NOI). The value of the property is factored in based on an assumed sale of the property at a time in the future (typically varies from three to ten years). Tax and financing implications can also be factored into the analysis. The implications of lease lengths and terms, which are critical to financial performance and sustainability assessments, can also be incorporated into DCF models.

The key financial model inputs for the DCF model are shown in Table 7.3. These inputs highlighted are some of the assumptions most influenced by sustainable property investment. Some assumptions, like rent, occupancy or energy costs are very important, and others, like water costs, trash removal or insurance, are less important.

However, just because features like water, trash removal and sewage generate less significant operating cost savings does not mean they have no value. Sustainability features, systems and practices that reduce water, sewage and trash, or achieve other sustainable goals, contribute significant public value and enable high-level sustainability certifications, which can be critical to meeting the increased demand by regulators, space users and investors. Demand by these groups drives potential revenue enhancement and risk reduction. Accordingly, 'value engineering' that focuses only on costs as it is typically done today can potentially lead to cuts that will significantly reduce the value of a sustainable property.

As the DCF input sheet in Table 7.3 illustrates, many factors beyond rents or sales prices influence financial performance. In many cases, depending on the particular market conditions and nature of the sustainability improvements, market rental rates or annual growth rates may not change significantly. However, renewal probabilities, downtime between tenants, absorption levels, operating expenses and other changes can result, thus increasing value.

Perhaps most importantly, sustainable property investment can reduce the risk associated with a particular property's cash flow. As discussed above, lower risk could reduce capitalisation rates applied to final year NOI, thus increasing potential appreciation on a property and reducing the discount rate to apply to the property's cash flow over the holding period.

The process for determining financial model inputs

The starting point for determining DCF financial model inputs are the 'net impact' analyses from Step 4 for each of the eight categories. The next step is to identify and assess the ‘non-sustainable’ factors influencing the financial model inputs. As shown in Table 7.4, many key factors, beyond sustainability issues, affect space user demand and input assumptions. The relative importance of sustainability factors will be dependent on the importance of specific issues like location, building and space for the particular tenants in a particular building.

Table 7.3: **Discounted cash-flow model inputs**

Our hypothetical example of a DCF analysis is based on a 25-storey, 375,000 square foot CBD office building located in one of Southern California’s primary metropolitan areas. The building is a conventional (non-green) office building built in the mid-1980s. In addition to revenue received from office space leasing, the property also derives revenues from approximately 12,000 square feet of ground floor retail space and 750 parking spaces located in a subterranean parking garage. The DCF analysis presented reflects a 20 percent office vacancy rate during the first year.

Revenue	
• Contract rental rates and other lease terms	
• Market rental rates:	
– Ground floor retail	$1.50/SF NNN
– Office: floors 2–5	$2.50/SF FSG
– Office: floors 6–10	$2.60/SF FSG
– Office: floors 11–15	$2.85/SF FSG
– Office: floors 16–19	$3.00/SF FSG
– Office: floors 20–23	$3.20/SF FSG
• Annual rent growth	
– Year 1	3.0%
– Year 2	6.0%
– Year 3	5.5%
– Year 4	5.0%
– Year 5	4.5%
– Years 6–10	4.0%
• Vacancy and collection loss	5.0%
• Office lease terms and other assumptions – new and renewing tenants	
– Lease term	5 years
– Free rent	0 months
– Annual rent escalations	3.5%
– Downtime between tenants	9 months
– Renewal probability	65.0%
• Parking revenues	
– Reserved parking	$225/space
– Unreserved parking	$190/space
– Annual parking revenue growth	5.0%

Expense	Year 1
• Janitorial	$222,572
• Porter	72,816
• Window cleaning	44,625
• Supplies	42,483
• Trash removal	28,150
• Fire and life safety supplies	31,760
• Repairs and maintenance	505,807
• Tools and equipment	13,500
• Utilities	
– Electricity	647,633
– Gas	43,883
– Chilled water	588,000
– Water and sewer	21,797
• Security	209,200
• Landscape contract	23,200
• Administrative	259,890
• Advertising and promotion	25,900
• Real estate taxes	2,376,310
• Non-reimbursable expenses	37,670
• Insurance	188,000
• Management fee	2.0% of effective gross income
• Growth factor for real estate taxes	2.0%
• Growth factor for other expenses	3.0%

Leasing expenses and capital reserve	
• Office tenant improvements	
– New tenants/2nd general space	$15/SF
– Renewing tenants	$10/SF
– Shell space	$55/SF
• Leasing commissions	
– New leases	4.0%
– Renewing leases	2.0%
• Capital reserves	$0.35/SF

Property acquisition and disposition	
• Property acquisition inputs	
– Purchase price	$110.0 million
– Closing costs	1.75% of purchase price
– Loan fee	0.75% of loan amount
– Total acquisitions costs	$112.5 million
• Property disposition inputs	
– Residual capitalisation rate	8.5%
– Broker's fee and closing costs	2.0% of sales price

Investor tax	
• Ordinary income marginal tax rate	35.0%
• Capital gains tax rate	15.0%
• Cost recovery recapture tax rate	25.0%
• Allocation of cost basis to improvements	80.0%
• Depreciation schedule for improvements	39 years

Financing	
• Loan amount	$73.0 million
• Loan-to-value	65.0%
• Interest rate	7.5%
• Loan term	10 years
• Amortisation schedule	25 years
• Loan points	1.0%
• Annual debt service	$6.5 million

Source: Green Building Finance Consortium.

Table 7.4: **Factors influencing space user demand for office space**

Location-specific	•Proximity to executive housing
	•Proximity to qualified employees
	•Proximity to clients/customers
	•Proximity to vendors/suppliers
	•Proximity nearby amenities (restaurants, shops and services)
	•Proximity to public transportation
Building-specific	•Quality of property management service
	•Level of building security
	•Age-functionality of building

	•Adequacy of building systems
	•Operating expense costs
	•Building energy efficiency
	•Building ceiling heights
	•Floor plate size and configuration
	•Paid versus free parking
Space-specific	•Lease terms
	•Location of space (lower, middle or upper floors)
	•Amount of natural lighting
	•Open versus built-out floor plan
	•Specific configuration and size versus requirements
	•Common versus dedicated restrooms
Space user-specific	•Supportive of strategic mission; goals
	•Internal integration with other business units

	•Flexibility to meet changing space needs •Rental rate (cost) for space •Perceived building prestige •Quality/mix of other building tenants •Amount and cost of parking •Appeal of lobby/exterior design
Select sustainability factors	•*Resource use:* energy, water, materials •*Occupant performance:* indoor environmental quality (IEQ) improvements, day-lighting, certification •*Reputation/leadership:* certification, energy efficiency, etc. •*Internal policy compliance:* separate meters, measurement, certification •*Reduced earnings risk:* IEQ improvements, leases, contracts

Source: Green Building Finance Consortium.

A well-constructed DCF model that enables detailed sensitivity analysis can be an important tool in determining the financial implications of alternative sustainable property investments. For example, in our real world office property, a 30 percent reduction in electricity costs can result in a 0.5 percent increase in the IRR. Interestingly, the effect on financial performance of a 30 percent reduction in energy costs is equivalent to:

•2.5 percent increase in contract and market rental rates;

•2.1 percent increase in effective gross revenue; or

•60 basis point change in the year 11 capitalisation rate.

In contrast, a 30 percent decrease in water costs results in an insignificant 1 basis point change in the IRR. This reinforces the critical importance of integrating water use reduction into revenue and risk considerations due to its potential positive effect on regulator, space user and investor demand.

More likely, if the evidence shows that space user and investor demand for a sustainable property would be higher than for a conventional property, this will result in small changes in a variety of key variables, including market rental rates, annual growth rates, tenant retention, vacancy and collection loss, office lease terms, office tenant improvements, leasing commissions and other demand-related variables.

Next, the relative importance of each of the sustainable and non-sustainable factors needs to be evaluated. Some of the key analyses to be utilised include:

•*Detailed analysis of comparable properties.* This analysis is done with a particular eye on the relative benefits of sustainable property attributes.

•*Analyse existing national or local space user surveys.* The key here is to evaluate survey research to see how the opinions and results might influence the specific space users identified for the subject property. Critical to this analysis is a very clear understanding of the respondents and the nature of the questions asked in these surveys. Many such surveys are done on a regular basis.

•*Develop a clear understanding of the existing and/or likely tenants in the property,* and conduct an analysis of the potential demand for green buildings currently and in the future. Key factors that will influence this are the specific region, industry, ages of occupants, specific ties to green or sustainable businesses and other factors.

•*Conduct market research.* Do independent surveys of tenants, brokers and others in the marketplace. Focus not only on existing trends or opinions, but on expected trends over time. This will provide additional understanding of rollover risk.[3]

The process of measuring the relative importance of factors is by its nature a qualitative process, but should be based on significant quantitative research. This often relies on sophisticated forecasts of rents, occupancies and other market factors. Market information allowing segmentation of demand for green by different types of tenants (CoStar data on leases for example) and survey data that reflect different demographics, geographies and other key issues are becoming more available.

Step 6:
Conducting a risk analysis and presentation (RAP)

RAP is key to the future of sustainable property investment. Sustainable properties face increased risks due to new processes, products, materials and regulations, but also benefit from reduced or mitigated market, regulatory, construction, legal and operating risks. Sustainable property decisions require a clear and organised presentation of both positive and negative risks to provide an appropriate context for assessing sustainable options and related ROI calculations.

RAP should be part of the investment package that goes to decision-makers for any investment decision. The form and content of the RAP will vary based on the context of the investment decision, but should be directly linked in the presentation to the quantitative valuation and return rate calculation.

RAP is key to many types of property decisions including building retrofits, commercial interior build-outs, acquisition of an existing building or new construction. The presentation and discussion of risk occurs in many different situations including selection of features like a new HVAC system, selection of capitalisation or discount rates, acquisition due diligence, corporate real estate investment decisions, valuation and loan underwriting.

How to do a RAP

There are as many ways to do a RAP as there are types of sustainable property investment decisions. The following guidelines should be helpful in thinking through the preparation of any RAP.

•*Clarity:* The presentation should be logically consistent, discuss positive and negative risks, and provide rationale for how net risk impacts are assessed. Discussions of positive and negative risks need to be specifically tied to the particular financial assumptions or other key assumptions in the investment package and/or financial model.

•*Comprehensive:* Perhaps one of the most important guidelines is that risks be fully presented. Real estate decision-makers are well versed in dealing with highly complex and risky decisions.

•*Process and feature focus:* The success of a sustainable property can be significantly increased if sustainable processes and features are appropriately undertaken. Proper integrated design, energy modelling, commissioning and related processes are particularly critical to sustainable property risk mitigation.

•*Enhanced sensitivity analysis:* Enhanced sensitivity analysis that enables decision-makers to understand the relative importance of particular risks can be particularly helpful in sustainable property investments.

•*Risk mitigation:* Risk mitigation undertaken through contracts, leases, surety, insurance and employment of sustainable processes like integrated design and commissioning should be clearly delineated. In many cases, sustainable properties have both risk-increasing and risk-decreasing attributes. Development costs are a good example where the direct cost may be somewhat higher, but through entitlement benefits, better planning and reduced change orders, the additional direct costs can be mitigated through potential cost reductions.

•*Advanced risk analysis techniques:* These types of risk techniques will vary based on the industry and situation, but would include multiple scenario analyses, alternative contracts and compensation, and value-at-risk tools.

Investors have a significant opportunity to maximise the level of investment in sustainable properties through better RAP. Real estate people like risk; it is how money is made. They just want to be able to understand it well enough to properly price and mitigate it.

Sustainability investment performance

Most financial analyses of sustainable property investment focus on the simple return and payback of energy cost savings from individual features like high-performance HVAC, day-lighting or underfloor air ventilation. One interesting example from a features-based analysis of an existing building owned by Adobe documented spending of $1.2 million on 53 separate projects, which together saved $1 million per year in energy costs and received $349,000 in rebates.[4] ROI for lighting retrofits (249 percent), motion sensors and surge protectors in every office (253 percent), and real-time electric meters (200 percent) were impressive.

Studies of underfloor air ventilation systems have also been impressive. Carnegie Mellon BIDS™[5] identifies four case studies that indicate an average 15 percent reduction in annual HVAC energy consumption due to UFA systems. Five studies demonstrate an average 80 percent reduction in annual churn cost due to UFA. (Churn cost is the cost of office moves and changes.) These studies, like the Adobe study, ignore risk and value considerations.

Many other performance/financial analyses focus on overall energy use or cost savings from a combination of features. Evidence from the key studies looking at actual energy-use savings from LEED certified buildings[6] suggests such buildings use 15 percent to 40 percent less site energy than non-LEED buildings, consistent with the anecdotal evidence accumulated from numerous case studies.[7] Actual energy savings in ENERGY STAR buildings has also been found to be in the 30 percent range. These studies also ignore value and risk considerations.

The studies of the influence of sustainability on overall property financial performance are relatively limited but are typically of two types: 1) expert-based financial analyses conducted primarily by valuers/market analysts on a property-by-property basis following traditional valuation practices; and 2) statistics/modelling-based financial analyses conducted primarily by academics applying statistical modelling techniques to large databases of properties.

Expert-based studies provide the best evidence of sustainable property market and financial performance. A review of seven of the best studies support the following conclusions:[8]

•Faster absorption of tenants – improved pre-leasing;

•Achieve competitive rents – in some cases higher than competitors;

•Reduced tenant turnover;

•Higher equilibrium occupancies;

•Competitive lease terms;

•Reduced operating and maintenance costs;

•Attract superior grants, subsidies and other inducements; and,

•Achieve high or moderately high tenant satisfaction scores.

As to the magnitude of potential value increases, this was not specifically quantified, but on average incremental value increases of around 10 percent were suggested. Results from the most recent and best statistically based studies, while flawed statistically in many ways, are generally consistent with the 10 percent value enhancement rate.

It is important to note that all of the overall financial analysis studies cited focus on larger scale office buildings. Large office buildings have been a key initial focus of sustainability pioneers given substantial energy use, focus by governments and corporate real estate users, as well as the relative sophistication of owners, occupants and managers.

Multifamily property owners have moved aggressively towards sustainability since 2010, particularly with larger and/or affordable properties. Multifamily properties have presented some challenges financially because evidence of tenant demand has been limited to date, success in saving energy is closely tied to adjusting tenant behaviour, and many investments cut tenant energy costs but are difficult for landlords to directly recoup through energy cost savings. However, many investments in lighting, controls, programmable thermostats, commissioning and insulation are no-brainers.

Industrial property owners have also been slower in adopting sustainability than office property owners. Most industrial properties are on triple net leases that allow owners to pass on all costs to tenants, thus reducing the incentive to invest in sustainability. However, for larger industrial assets, the issue of carbon emissions of buildings is growing in importance. Prologis has reduced carbon emissions on average 34 percent to 58 percent across a large number of properties in its portfolios. These kinds of savings, even if passed on to tenants, should have an increasing influence on the demand by tenants and investors.[9]

Large retailers like Walmart, Target and Kohl's have been sustainability leaders for many years. Large retail property owners have also become more active with the release of LEED for retail in 2010 and continuing pressure from pension investors and internal corporate responsibility compliance initiatives. Strategies like centralised energy-management systems, occupancy-sensor lighting and high-efficiency lighting, heating and cooling systems can reduce energy costs by 30 percent or more. Large rooftops enable production of renewable energy. For example, nearly 70 of Kohl's stores generate energy from rooftop solar panels, which provide 20 percent to 50 percent of the stores' energy needs.[10]

Conclusion

Financial models that generate results based solely or primarily on initial development costs and operating costs savings, like the most commonly used simple pay-back or simple ROI models, are inherently flawed because they fail to consider critical elements of sustainability analysis. These limitations are not new, but dramatic increases in regulator, user and investor demand for sustainable properties since 2009 underscore the limitations of these practices.

Traditional real estate analytic models, including DCF analysis, are well suited to incorporate the financial implications of sustainability investment. This is because the heart of DCF analysis is the qualitative determination of the scores of assumptions driving the model including rents, rent increases, tenant retention, occupancy and operating costs. This is a methodology that enables sustainability-related information to be incorporated.

While many sustainable property investment decisions do not employ a full or even partial DCF analysis, decision-makers must employ the logic and linkages inherent in a DCF model to accurately articulate potential implications of sustainable property attributes on financial performance. For example, even if energy and health cost savings for a property could be calculated with certainty, the markets (regulators, tenants and investors)' response to the performance still needs to be assessed, in order to understand how sustainability investment influences property value or ROI.

Finally, sustainable property financial modelling and analysis requires a more sophisticated and explicit analysis and documentation of the risks and opportunities that influence the cash flow to provide decision-makers the proper context for interpreting the rate of return, net present value or valuation conclusions. Sustainable property investment introduces many risks, and a thorough assessment will show if effective risk mitigation processes have been employed and will uncover many offsetting opportunities.

□

Scott Muldavin is executive director of the Green Building Finance Consortium. His book, *Value Beyond Cost Savings: How to Underwrite Sustainable Properties,* is the first to detail the mechanics of how to value and underwrite sustainable properties from the perspective of capital providers.

Scott's sustainability work builds on his recognised expertise in real estate finance and investment. He has been a lead real estate partner at Deloitte & Touché, co-founded Guggenheim Real Estate, a $3+ billion private real estate company, served on the Advisory Board of Global Real Analytics, an adviser to $2 billion of REIT and CMBS funds, and completed over 300 consulting engagements involving real estate finance, mortgage lending, investment, valuation, securitisation and sustainability.

Scott speaks and teaches frequently around the world and has authored over 200 articles. He is a graduate of the University of California at Berkeley and Harvard University, is a Counselor of Real Estate (CRE) and is a Fellow of the Royal Institute of Chartered Surveyors.

[1] This chapter is derived from the author's book, *Value Beyond Cost Savings: How to Underwrite Sustainable Properties,* which can be downloaded as a free public service of the Green Building Finance Consortium at (www.GreenBuildingFC.com).

[2] For many decisions it is not necessary or appropriate to complete a DCF analysis, but in order to properly account for present and potential revenue and risk implications, a conceptual understanding of the DCF model is required.

[3] Rollover risk refers to the risk of not being able to secure new tenants at favourable rates and terms when existing tenant leases in a building terminate. The risk also incorporates the leasing and tenant improvement costs to resign new tenants if tenants choose not to renew their leases. The rollover risk of a property will be unique to its particular portfolio of leases and markets conditions.

[4] Adobe: Outsource Energy Efficiency Upgrades and Reap the Benefits. Rocky Mountain Institute and CoreNet Global, April 2007.

[5] One of the most comprehensive sources for feature/ system-based performance analysis is the Carnegie Mellon BIDS programme. Carnegie Mellon's BIDS (trademark for Building Investment Decision Support) is a case-based

decision support tool that generates a calculation of the economic value-added of investing in high-performance building systems, based on the findings of building owners and researchers around the world.

[6] It should be noted, and considered in evaluating the results, that even the studies cited here published in 2008-2009 only evaluate buildings certified through 2006.

[7] Most building managers are familiar with site energy, the amount of heat and electricity consumed by a building as reflected in utility bills. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery and production losses, thereby enabling a complete assessment of energy efficiency in a building. For more information, see http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_benchmark_comm_bldgs.

[8] Value Beyond Cost Savings.

[9] Cox, Simon and Lisa Graham. 'Sustainability Measured: Gauging the Energy Efficiency of European Warehouse'. Prologis Research Insights, Spring 2010.

[10] A Closer Look at Green Retail Facilities. Buildings, June 1, 2009.

8

Real estate loans and real estate debt

By Sam Chandan, Chandan Economics

Introduction

A diversity of credit sources is a central feature of most well-functioning commercial property investment markets. The availability of secured debt, principally mortgages backed by property income, and unsecured debt allow investors to engage in transactions where they otherwise could not. Debt also has important implications for the attractiveness of investments, increasing investor returns as compared to equity-only investments and influencing property prices as a result.

Since the early 2000s, and in the period leading up to the global financial crisis and recession, the use of debt in commercial property markets became increasingly widespread. The self-reinforcing relationship between rising prices and competition among lenders fomented a market with lower underwriting standards and borrowing costs, supporting higher leverage across the asset class. The US offers the clearest example of the procyclical nature of credit flows and rising commercial property debt levels. Between 2004 and the commercial property market peak in 2008, building inventory increased at a relatively slow pace. In the apartment sector, for example, rental completions fell below 200,000 units in each of 2005, 2006 and 2007; over the prior decade, completions were generally between 30 percent and

50 percent higher.[1] During the period of slower construction, however, commercial mortgage debt outstanding increased by approximately 60 percent, from $2.4 trillion to $3.4 trillion.[2] A difficult period of deleveraging has followed in the US and will continue for several years as loans made during the peak of activity come to maturity.

Where can mortgages play a beneficial role in supporting commercial real estate markets? What is the relationship between higher leverage and default risk? In this chapter, we shall examine several key issues relating to the use of debt in commercial property markets, as well as some fundamental calculations used by borrowers, lenders and risk managers. While the exact structure of debt markets and of individual loans will vary across countries and regulatory authorities, the features of the debt market described here are broadly applicable.

Leverage and the incentive to borrow

When investors have access to credit markets, financing of property acquisitions can rely on a combination of debt and equity. When purchasing a property at price P and at time 0, the investor can reduce the required equity commitment by increasing the level of debt. Ignoring transactions costs, the combined equity (E) and debt (L) will sum to P. In this simplest case:

$$E_0 + L_0 = P_0$$

The leverage ratio (LR) is defined as the price of the property relative to the equity investment. The higher the price relative to the equity investment, the higher the leverage, as the investor has had to commit less equity as a share of the total transaction price. At the point of the investment, in time 0, the LR relationship can be written as follows:

$$LR_0 = \frac{P_0}{E_0}$$

In future periods, however, the value of the property may be different from the price paid. In fact, the lender may appraise the asset at a different value from the market price, resulting in a higher or lower LR_0 than one based on the transaction price itself.

Even if the property value does not change over time, the equity investment may change because some of the loan's principal balance is paid down. In either case, the leverage ratio will change. If we allow for the possibility that property value (V) may be different from P, we arrive at the following expression for leverage ratio in time i.

$$LR_i = \frac{V_i}{E_i} = \frac{V_i}{(V_i - L_i)}$$

Uncertainty around the future value of the asset introduces one of the first elements of risk into the lending calculus. The lender may seek to originate a loan that meets anticipated underwriting standards for leverage at maturity, to facilitate refinancing. However, if the value of the property declines, leverage may be substantially higher in the maturity year.

Why borrow?

In spite of risks, buyers are incented to borrow and to introduce debt into the financing structure because it increases their return on investment and, under most circumstances, can do so without introducing material risk of default. Example 1 illustrates this principle by calculating the buyer's return with and without leverage. For tractability, the analysis considers the first year of the investment.

When to borrow

Even controlling for default risk, investors will not seek to increase leverage in all cases. Instances where increasing leverage will result in higher return on levered equity are referred to as positive leverage. Conversely, negative leverage refers to cases where increasing leverage will lower the return on levered equity.

Leverage will be positive where the following condition is met:

$$r_e = r_d + LR(r_p - r_d),\ r_p - r_d > 0$$

Stated simply, as long as the return on the property (r_p) exceeds the return on debt (r_d), the return on the buyer's equity (r_e) is increasing as LR rises. Under such a condition, the investor has a positive incentive to increase leverage. Where the condition is not met, the investor will either seek to reduce or maintain the current level of encumbrance. In either case, borrowing may be a constrained maximisation if underwriting standards are binding on the borrower's optimisation.

Mortgage descriptors and measures of quality

In general, a wide range of primary secured mortgage structures and their ensuing repayment obligations can be described in terms of a basic set of characteristics. It is important to note that these descriptors will necessarily fail to capture the idiosyncrasies of individual loan covenants and any local peculiarities pertaining to the enforceability of the mortgage contract and seniority of the lender.

Example 1: Return on equity with and without leverage

The buyer's purchase

The buyer acquires a property for €1,000,000 at the end of t_0. The property generates net operating income (NOI) of €50,000 during t_1. On a forward-looking basis, the capitalisation (cap) rate of the acquisition was 5 percent. As a result of changing investment market conditions, the property value at the end of t_1 is €1,040,000. It has increased in value by 4 percent.

Calculating return without leverage

There are two components to the buyer's return: the income return of €50,000 and the appreciation return of €40,000. The total return during the first time period is the sum of these values, or €90,000. The return can be calculated in percentage terms as a function of the initial investment, which is all equity in this case, that is, $P_0 = V_0 = E_0$.

$$\text{Income return}_1 = \frac{NOI_1}{V_0} = \frac{€50{,}000}{€1{,}000{,}000} = 5\%$$

$$\text{Appreciation return}_1 = \frac{V_1}{V_0} - 1 = \frac{€1{,}040{,}000}{€1{,}000{,}000} - 1 = 4\%$$

The total return on the buyer's investment is 9 percent.

Calculating return with leverage

Suppose the buyer finances the investment with a €700,000 loan, such that LR_0 is 3.33 and LTV_0 is 0.7. Assume the loan is interest-only during the first year and that the buyer makes an interest payment *(Pmt)* of €35,000, that is, a 5 percent interest rate on the loan's principal balance. The buyer has a higher return on the levered equity investment of €300,000:

$$\text{Income return}_1 = \frac{NOI_1 - Pmt_1}{E_0} = \frac{€15{,}000}{€300{,}000} = 5\%$$

$$\text{Appreciation return}_1 = \frac{E_1}{E_0} - 1 = \frac{€340{,}000}{€300{,}000} - 1 = 13\%$$

Note that all of the appreciation on the property accrues to the buyer, even though the buyer's equity represents only 30 percent of the initial value. Having financed the acquisition with leverage, the total levered equity return is 18 percent. What is the lender's incentive in facilitating this arrangement? The lender has earned an income return of 5 percent. If that interest rises, however, the benefit of leverage for the buyer diminishes.

Loan balance. L_0 is the initial principal balance of the loan. L_i is the principal balance in period i. If a loan is interest-only, no principal payments are made and the principal balance does not change over the term.

Interest rate. r_i is the interest rate in period i. For a fixed-rate mortgage, where the interest rate does not change over the term, r_i may be stated as a constant r.

Mortgage payment. Pmt_i is the mortgage payment in period i. Int_i is the interest component of Pmt_i. Amt_i is the amortised principal in period i and is equal to the difference between the payment and the interest component of the payment. If the mortgage is interest-only, $Int_i = Pmt_i$.

M is the number of periods over which the balance is amortised. At origination, the term of the loan, denoted here as *T*, is the number of periods before the outstanding principal balance is due to the lender and the loan contract matures or expires.

If *T* is equal to the amortisation period, the principal balance will be zero when the loan matures. This is a full amortising loan. In most amortising commercial real estate loans, *T* is shorter than M, implying a non-zero loan balance that must be repaid when the loan matures.

Measuring loan risk

It is an inevitable feature of debt markets that some borrowers will fail to meet their repayment obligations. All things being equal, this possibility increases with leverage. This presents a challenge for lenders and investors. In an effort to gauge the riskiness of loans, lenders may employ a wide array of statistical and qualitative measures of loan quality in approving a loan and over the course of the life of the loan.

Few, if any, models of commercial real estate mortgage performance have been proven robust in anticipating mortgage defaults and loss severity, including probability of default (PD), loss severity or loss given default (LGD), and the product, expected loss (EL). The pervasiveness of poor underwriting and the major credit rating agencies' evaluation of commercial mortgage-backed securities (CMBS) deals in 2006 and 2007 are examples of how models may be inadequately calibrated to the causal drivers of mortgage default and the marginal contribution of individual loans to portfolio performance. In fact, the use of complex models of loan quality that have not been rigorously tested may prove counterproductive if the results systematically overestimate loan quality and underestimate default and loss.

For most market participants, relatively simple measures of loan quality can substitute for projections of loan performance. These more tractable measures present interpretive challenges, as well.

Loan-to-value (LTV) ratio. Captures the size of the loan relative to the value of the property it secures. Lower LTV ratios mean the borrower has a greater equity stake in the asset and, implicitly, is less likely to default on the mortgage because of the equity cushion. A borrower with lower LTV will also be able to find new financing more easily when the mortgage matures, an important consideration if property values fall or underwriting standards tighten.

Where *L* is the size of the loan and V is the value of the asset, LTV is defined as follows:

$$LTV_t = \frac{L_t}{V_t}$$

If the borrower finances 80 percent of the value of the property at the point of acquisition, $LTV_0 = 0.8$. LTV is related to LR as follows:

$$LTV_t = 1 - \frac{1}{LR_t}$$

LTV in itself can be misleading since the static measure does not account for risks introduced by the determinants of value. During periods where credit is constrained and underwriting standards are conservative, LTV will tend to be low and the value in the denominator may also be near a cyclical low. The same LTV during periods where debt levels and value are rising may fail to reflect greater underlying risk relating to future changes in property value.

Debt service coverage (DSC) ratio. Measures the ratio of NOI to the debt payment:

$$DSC_t = \frac{NOI_t}{PMT_t}$$

Underwriting standards generally require that NOI exceed the payment by some margin to account for the possibility that income will decline in future periods, because of rising costs or a decline in rent revenue. Errors in the forward-looking projection of property cash flow are a source of risk in using debt coverage as a measure of risk. In the extreme case, current debt coverage may be stated in terms of a future cash flow several periods ahead.

Alternative measures of the coverage include interest coverage (IC) ratio, which captures the ratio of income to the interest component of the payment and the fixed charge (FC) ratio that captures the ratio of income to all fixed expenses, including recurring debt service.

Regulation of lending

The 2008 financial crisis has spurred new initiatives to regulate the use of leverage, principally by imposing new restrictions on banks and other lenders. Country-specific regulatory initiatives remain the most significant sources of variation in geographically localised credit availability. In mainland China, for example, concerns about rising property and land prices have prompted curbs on lending even as credit availability has been constrained in many other markets.

International regulation of mortgage lending is not focused on commercial property, specifically, but is intended to enhance the stability of the global banking system. Following the immediate crisis, the Group of Governors and Heads of Supervision of the Bank of International Settlements announced its endorsement of the Basel Committee's agreement on bank capital reforms, one of the regulatory efforts that is most broadly applicable across countries.

Among the country-specific initiatives, the Dodd-Frank Wall Street Reform and Consumer Protection Act was passed into law in the US in July 2010. Implementation will take pace over several years, during which the law's implications will become clearer. Concerned that cross-country imbalances in the strength of regulatory oversight will, all things being equal, drive capital to less costly havens, there is a significant potential for implementation to be weaker than originally anticipated.

Under the terms of Basel III framework, banks' minimum total capital, the definition of which has been in play throughout this process, rises sharply, from 2 percent to 7 percent of risk-adjusted assets. Supplemented by a conservation buffer intended to help institutions absorb losses during periods of unusual financial stress, capital rises further. An additional countercyclical buffer will range from 0 percent to 2.5 percent according to country-specific circumstances and in support of macroprudential goals in constraining the growth of credit.

The Basel Committee has stated that the changes support its goal of reducing the procyclicality of credit by improving the quality and quantity of banks' capital cushions. Still, few changes will be immediate. A phase-in period begins in 2013. The common equity requirements come into force in 2015; the additional buffer, in 2019. As compared to the antecedent Basel II accord, the new framework was negotiated far more quickly, is far simpler, and reflects agreement among a larger number of participants. While the Basel Committee has been keen to focus attention on the need for countercyclical capital buffers, these contrasts in the two accords highlight shifting regulatory priorities over time, as well. Basel II, which has never been fully implemented, may have allowed banks using more advanced risk metrics to reduce their capital levels. It is widely expected that Basel III, on the other hand, will curtail banks' discretion.

Laying the groundwork for the shift in perspective, the Financial Stability Board and Basel Committee released a separate report outlining the macroeconomic implications of a stricter capital and liquidity framework. The report concludes that '… the benefits of higher capital and liquidity requirements accrue from reducing the probability of financial crisis and the output losses associated with such crises.'[3] Given heterogeneous incentives among countries, the direction of global regulation is unclear in the aftermath of the financial crisis.

Agreement on Basel III has not been effortless and, as of early 2011, there was still considerable uncertainty relating to its implementation and the related implications for credit availability in the commercial property sector. Apart from resistance from banks, regulators from Australia and Canada, where the banking systems have been more stable through the financial crisis, are perceived as less enthusiastic about the new accord. Germany was the only participating nation to withhold its support during the July meetings where the reforms were finalised. Among the large advanced economies, French, German and Spanish banks are viewed as having the most to do in meeting new capital requirements.

In an early assessment of Basel III's implications for commercial real estate, new risk calculations could exert a drag on the re-emerging securitisation market. It is unclear if the higher costs are commensurate with any quantifiable assessment of risk. Separately, there is an open question about whether small borrowers will be disproportionately impacted by higher loan costs.

There are ample tools that domestic regulators have at their disposal – should they wish to use them – to offset any observable and negative impact on small businesses and small commercial real estate borrowers. For the time being, Basel III offers leveraged commercial real estate investors in most major economies no cause for immediate alarm. As part of its balancing act, there is little in the new accord that might undercut the basic incentives to lend or borrow, or that will systematically require banks to undertake suboptimally timed new capital-raising activities.

Investing in distressed loans

Where forward-looking changes in bank regulation were still taking shape in early 2011, regulators in many economies have focused considerable energy in mitigating losses resulting from deleveraging and in managing legacy commercial property loans. These issues will remain features of the marketplace for several years in many European economies and in the US as legacy loans mature, often in larger volumes than have been observed up through early 2011. In fact, policymakers seeking to support price stability have hampered the outflow of distressed loans and commercial property into the open market. In the US, in particular, regulators promulgated specific guidance aimed at facilitating loan modifications rather than foreclosures. This has impeded the capacity of market participants to invest in distressed loans, at least in the initial phases of the recovery.

The case of the US is instructive. Price discovery and credit availability were severely impaired in the early stages of the financial crisis, fuelling regulatory concerns that aggressive action by banks against delinquent and defaulting commercial mortgage borrowers would undercut the heath and viability of the lending institutions themselves. A degree of prudence was called for if modifications of existing loan terms would serve to mitigate losses. Stated succinctly in guidance released by US regulators in late 2009, 'financial institutions and borrowers may find it mutually beneficial to work constructively together.'[4]

Even as price discovery improved, policymakers' assessments of the market generally remained circumspect. In her remarks at a mid-recovery Urban Land Institute meeting, Federal Deposit Insurance Corporation (FDIC) Chairman Sheila Bair was cautious, reflecting a focus on the management of legacy issues on bank balance sheets:

Credit availability has… been limited as lenders have tightened standards, issuers have virtually stopped offering *commercial mortgage-backed securities, and the credit standing of many borrowers has declined. FDIC-insured institutions hold about half of the $3.5 trillion in CRE loans outstanding, which means we've been focused on commercial real estate for a very long time. Lenders will continue to face some tough choices when loans come up for renewal with collateral values that have declined significantly from peak levels.*[5]

The minutes of a coincident meeting of the Federal Open Market Committee was similarly mixed:

Commercial real estate markets continued to face difficult financial conditions, although some further signs emerged that this sector might be stabilising. The prices of commercial properties appeared to have edged up in the first half of the year, and the volume of commercial real estate sales rose again in August. A few small commercial mortgage-backed securities (CMBS) deals were issued over the intermeeting period and were reportedly well received by investors… Nonetheless, the volume of CMBS issuance in 2010 remained quite low compared with the levels seen before the onset of the financial crisis, and total commercial mortgage debt continued to contract amid further increases in delinquency rates on commercial mortgages.[6]

In the months that have followed these comments, and over the first half of 2011 in particular, transaction activity and credit availability improved markedly in the US. Where some policy assessments remained mixed, they reflect in part that transaction activity has been uneven, favouring highly liquid primary metros, especially in North America and Europe. The overhang of unresolved distress – in part a result of the

Federal Financial Institutions Examination Council guidance – hangs over a marketplace unsure of the next policy move or the ultimate impact of greater sales out of distress on market health.

Policy intermediation and recovery rates

While it bears heavy costs in terms of the market's progress towards balance sheet normalisation, greater control over the selection and timing of the supply of distressed assets for sale has succeeded in limiting the losses internalised by many banks in the short term. According to data compiled by Real Capital Analytics, recovery rates on first mortgages remain well above policymakers' and distressed investors' a priori expectations going into the crisis.

Toward the end of 2010, as prices showed greater signs of firming, lenders were able to liquidate loans at lower loss rates. The higher market clearing prices for distressed assets were an intended outcome of the policy intervention. Recovery rates on liquidated multifamily and commercial mortgages in the third quarter of 2010 were 66 percent for acquisition and refinancing loans and 56 percent for development loans, before costs and fees. A rise in resolution activity accords with measurable increases in the volume and share of total sales out of distress, including from bank real estate-owned properties, that may signal a greater readiness among lenders and their supervisors to unload troubled assets.

There is evidence that the broader improvement in credit market health and transaction activity has been instrumental in mitigating loss severities and improving recovery rates, frustrating distressed investors. The policy success includes a large number of acquisition and refinance loans resolved at par – with full recovery of the lender's first mortgage exposure. Distinguishing full recoveries from the wider market, the former have been weighted toward loans originated before 2006 and for which the value adjustment has generally been less severe. Split roughly evenly between CMBS and non-CMBS loans, almost all of the full recoveries have been in the handful of major markets where core asset sales have dominated activity.

□

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[1] Bureau of the Census, New Residential Construction by Purpose of Construction.

[2] Federal Reserve Flow of Funds, Table L.217, amounts outstanding at end of period.

[3] Financial Stability Board and Basel Committee, press release, August 18, 2010.

[4] Federal Financial Institutions Examination Council, Policy Statement on Prudent Commercial Real Estate Loan Workouts, October 30, 2009.

[5] Remarks by FDIC Chairman Sheila C. Bair to the Urban Land Institute, Washington, DC, October 13, 2010.

[6] Federal Open Market Committee and the Board of Governors of the Federal Reserve System joint meeting minutes, September 21, 2010.

9

Distressed debt investing

By David Lynn and Tim Wang, Clarion Partners

Commercial real estate debt and its innovations

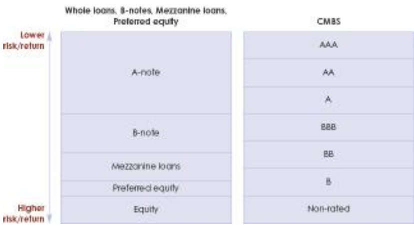
In the US, the traditional process of an individual taking out a mortgage to finance the purchase of a commercial real estate asset has evolved substantially since the early 1990s. Today, there is a wide range of commercial real estate debt products to meet the risk and return characteristics sought by investors. In general, these innovations can be characterised in two, sometimes overlapping, ways: securitisation and subordination.

Securitisation allows for the bundling of individual debt assets into bond-like securities, primarily as commercial mortgage-backed securities (CMBS) and collateralised debt obligation (CDO) products. Subordination refers to the development of intermediate investment vehicles that fill in the gap between traditional first-lien mortgages and traditional equity. The variety of commercial real estate debt structures, and relations vis-à-vis the capital stack, are illustrated in Figure 9.1. Debt structures are differentiated by priority of payment, which relates to relative risk and can range from more equity-like to more debt-like. The following is an overview of the various financing alternatives, beginning with the most ‘equitylike’ options.

Preferred equity

Preferred equity provides a capital contribution to a mortgage borrower in exchange for an equity share in the borrowing entity. This equity has a preferred position for payments over the common equity, receiving excess cash flow until the equity is repaid plus an agreed on return. Preferred equity is distinguished from common equity in the debt-like payment expectations.

Figure 9.1: **Risk and return profile of commercial real estate debt products**



Source: Clarion Partners Research & Investment Strategy.

Mezzanine debt

Mezzanine debt provides a loan to the equity holder of a first mortgage and is secured by a pledge of equity interests in the mortgage borrower. The mezzanine lender has the ability to foreclose on the equity in the borrower in the event of a default, providing the opportunity to assume ownership and take control of the property.

A/B-notes

The A/B structure is a variation on the typical first mortgage, with the first mortgage loan divided into tranches. The B-note is subordinate to the A-note. Additional tranches are possible, but the structure is usually limited to a maximum of three tranches. As a first mortgage, the debt is secured against the underlying property itself. In the case of default, the A-note has the highest payment priority and losses are allocated to lower priority notes.

CMBS/conduit loans

These securities are backed by first mortgage loans that are pooled, rated and sold in different tranches, each which different risk and return characteristics. Investors choose which CMBS bonds to purchase based on the level of credit risk/yield/duration that they seek. Each month, the interest received from all pooled loans is paid to investors, starting with those investors holding the highest rated bonds, until all accrued interest on those bonds is paid.

Whole loans/first mortgage/senior debt

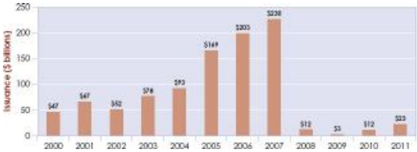
Non-securitised first mortgage senior loans, which use underlying real estate property to secure repayment. Traditionally, many commercial mortgages are non-recourse, although recourse loans are gaining popularity in today's dislocated capital market where repayment is uncertain.

Loan terms and underwriting standards

US capital markets were greatly disrupted by the 2007-2008 financial crisis and credit freeze, hampering commercial real estate lending. From 2003-2007, CMBS became an increasingly important component of the commercial mortgage lending industry, largely replacing traditional balance sheet lenders such as life insurance companies and commercial banks. As massive subprime write-downs negatively impacted bank balance sheets and investor portfolios, the appetite for CMBS plummeted in 2008-2009 (see Figure 9.2). According to the Mortgage Bankers Association, total commercial mortgage origination volume in the fourth quarter of 2008 was down 80 percent from the fourth quarter of 2007. Since the collapse of the CMBS market in late 2007, there has been minimal new US CMBS issuance. Compounding difficulties, many balance sheet lenders have been under stress due to more conservative capital requirements and only recently began to increase lending, but mostly for small and midsized loans (below $150 million).[1]

The lack of liquidity in the capital markets combined with increased fears of commercial real estate defaults changed the rules of commercial real estate lending. Balance sheet lenders are now using much more conservative loan terms for borrowers (see Table 9.1) and limiting financing mostly to high quality properties and high quality sponsors. Loan-to-value (LTV) ratios declined substantially as debt service coverage ratios (DSCR) climbed. In addition, in-place rents are providing the sole basis for cash-flow expectations, with minimal anticipated rent growth that was commonly factored into the equations in earlier years. Lenders are also carefully examining rent rolls, increasing spreads and demanding amortisation to help mitigate and account for increased default risk. Finally, recourse has re-entered the market, with lenders more regularly looking for personal liability from borrowers. Even with these changes, the majority of lending is expected to go towards refinancing existing loans, as opposed to originating new ones.

Figure 9.2: **New US CMBS issuance**



Note: 2011 issuance to August.

Source: Commercial Mortgage Alert, August 2011.

Table 9.1: **Summary of changing loan terms**

Standard	**2007 Pre-credit crunch**	**2010 Post-credit crunch**
Selectivity	Borrower market	Lender market
Net cash flow	Pro forma rents with rent growth	In-place rent roll
Reserves	\$0.00–\$0.15 per sq ft	\$0.15–\$0.25 per sq ft
DSCR after reserves	1.00x (or less) on interest-only	1.25x-1.40x amortising

Maximum LTV	80%–90% of purchase price	55%–60% based on third-party valuation (typically lower than purchase price)
Coupon floors	None	Increasingly common (6.5%+)
Interest-only term	7–10 years	0–2 years (depending on LTV)
Deal size	Bigger is better	Smaller is better

Sources: Eastdil Secured, Clarion Partners Research & Investment Strategy, 2010.

Table 9.2 illustrates the impact of these changing underwriting standards on the availability of debt financing for acquisitions or refinancings. Using a hypothetical asset (350,000 square foot office property with a current value of $100 million), we demonstrate how changes in the calculation of cash flow, interest rates and DSCR requirements limit the available proceeds impacting LTV and maximum loan amount. Because of these changes, the current owner seeking refinancing will need to put up additional equity. Otherwise, a distressed sale may be forced, either initiated by the owner or as the result of a foreclosure. For the opportunistic investor, this situation presents several potential investment options.

Table 9.2: **Comparison of underwriting standards before and after the credit crunch**

	2007	**2010**
Asset value	**$100,000,000**	**$100,000,000**
In-place NOI	5,500,000	5,500,000
Anticipated rent increases/decreases	250,000	75,000
Total NOI	5,750,000	5,575,000
Capex and reserves	0	50,000
Underwritten net cash flow	**5,750,000**	**5,525,000**
10-year Treasury	4.82%	3.10%
Plus: Spread	1.50%	3.25%
Interest rate	**6.32%**	**6.35%**
Mortgage constant	6.32%	7.25%

Amortisation period (years)	0	30
Minimum debt service coverage	1.10	1.25
Maximum annual debt service	5,227,273	4,420,000
Maximum loan available	**82,710,012**	**60,965,517**
Maximum proceeds (rounded)	**82,700,000**	**61,000,000**
LTV	**82.7%**	**61.0%**

Source: Clarion Partners Research & Investment Strategy, 2010.

Debt maturity and refinancing needs

More than $1.5 trillion dollars of US commercial real estate debt will mature between 2011 and refinancing and 2014 (see Figure 9.3). Most local and regional banks are either still under stress or reluctant to lend. CMBS securitisation has begun to show signs of life, but volume is still only a fraction of the peak in 2007. Some distressed real estate investors will choose to default, while others are forced to recapitalise existing deals or to sell assets at a large discount. Many lenders are playing the 'pretend and extend' game to buy time, rather than pursue foreclosures and take mark-to-market losses. Due to more conservative lending standards, the growing amount of debt maturities over the next few years indicates that refinancing existing debt could be difficult, which will inevitably lead to asset recapitalisation, maturity defaults or foreclosures. We examined commercial mortgage originations from 2003 to 2010 and determined that an additional $250 billion to $300 billion in equity would have been required if those loans had been subject to stricter underwriting standards.

Figure 9.3: **Estimated US commercial mortgage maturities**

Sources: Deutsche Bank, Intex, SNL, Federal Reserve, Q4 2010.

Distressed debt investment strategies

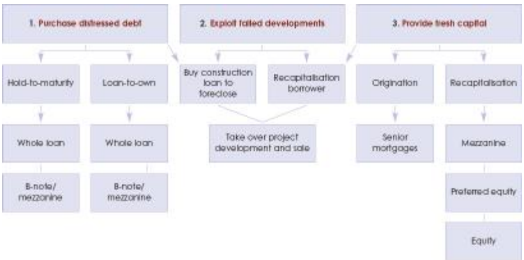
Given the wide variety of debt opportunities in the current market, the critical questions are where and what are the best and most accessible opportunities, and what are the trade-offs between returns and risks. Because loan performance will primarily rely on property performance, it is essential that any debt investment be based on properties and markets with strong underlying fundamentals. Whether the strategy is to ‘collect coupons’ or ‘loan-to-own’, the target should be quality real estate in top markets. There are three investment approaches to capitalise on distress in the debt markets, which are illustrated in Figure 9.4:

1.Purchase distressed debt.

2.Recapitalise failed development projects.

3.Provide fresh capital to distressed situations.

Figure 9.4: **Commercial real estate debt investment strategy outline**



Source: Clarion Partners Research & Investment Strategy.

Within these major strategies, the following deal evaluation criteria should be considered:

•Pricing that provides an appropriate return in both hold-to-maturity and loan-to-own scenarios.

•Underlying assets that meet primary investment objectives of institutional quality real estate in core markets/sectors with solid operating characteristics.

•Position in the capital stack that provides an opportunity to take controlling interest; relatively simple capital stack that minimises the need to interact with large number of parties.

•Clear path to ownership that acknowledges costs and timing involved in a foreclosure process.

•Demand conservative cash flow and vacancy assumptions in underwriting.

•Model refinancing risk and substantial value losses to ensure exit opportunities.

•Incorporate reasonable expectations of additional capital contributions necessary to cure defaults.

•Target pre-2007 vintage debt.

Table 9.3 lists each potential strategy, along with its corresponding expected risk and return expectations. While many of these strategies are anticipated to generate high returns, the risk associated with them will also be high due to uncertain market fundamentals. For this reason, strategies that offer medium to high returns with correspondingly low or medium levels of risk are preferred for most investors.

1. Purchase distressed debt

Due to the significant amount of existing debt on the balance sheets of many financial institutions, an opportunity exists to acquire loans at potentially significant discounts primarily through two strategies, loan-to-own and hold-to-maturity.

Table 9.3: **Risk and return expectations by strategy**

Strategy	Expected returns	Risk
1. Purchase distressed debt		
Whole loans – hold-to-maturity	Medium	Low
Whole loans – loan-to-own	High	Medium
Subordinate loans – hold-to-maturity	High	High
Subordinate loans – loan-to-own	High	Very high
2. Exploit failed developments		
Buy construction loan/foreclose	High	High
3. Provide fresh capital		
Origination – senior mortgages	Medium	Low
Recapitalisation – mezzanine	Medium	High
Recapitalisation – preferred equity	High	High

Recapitalisation – equity	High	Medium

Source: Clarion Partners Research & Investment Strategy.

Loan-to-own

This strategy entails buying distressed debt at a discount to par value with the expectation of acquiring the property through foreclosure. This could be executed for senior loans or sometimes subordinate loans. The implementation strategy, pricing and return expectations will vary based on position in the capital stack.

In the event of default or foreclosure of a non-recourse loan, the lender has only the property securing the debt. As it is possible that the value of the property could be less than the outstanding loan balance, the borrower holds a type of option, known as a ‘put option’. In essence, the borrower has the right (but not the obligation) to return the property to the lender with the outstanding balance remaining on the loan.

In the residential market, this is referred to as ‘jingle mail’ – mailing in the keys to the property and walking away from the mortgage debt. By defaulting, the borrower ‘puts’ the property to the lender. The mortgage interest rate should reflect this default risk. The cost associated with the foreclosure process, which can be substantial, further deteriorates the value to the lender of the property in a foreclosure setting. As such, it is not uncommon, especially in difficult markets, for a borrower to purposely default on a loan. The lender, at that point, must weigh the cost of going through foreclosure proceedings to gain control of the property against the benefits. In some cases, the lender and borrower will instead enter a workout situation, aiming to amicably renegotiate loan terms.

For the loan-to-own strategy, there are three foreclosure scenarios.[2] Taking a loan maturing with a balance of $10.6 million and foreclosure costs of $2 million, the scenarios are as follows:

•*Scenario 1:* Property value of $13 million. Borrower will not default, as he/she could sell the property, pay off the loan and net $2.4 million.

•*Scenario 2:* Property value of $11 million. Borrower may purposely default in hopes of forcing a workout that benefits both sides.

•*Scenario 3:* Property value of $9 million. Borrower will default, walking away from the property rather than making the final payment.

The priority of claims in foreclosure goes according to the date of the recording of the lien, which would normally be the date the mortgage was issued. Exceptions to this standard apply for government liens, (sometimes) mechanics' liens and any explicit subordination clauses in loan documents. The first mortgage is the most senior debt position. A second mortgage would be an example of junior or mezzanine debt. Senior claims must be fulfilled completely before any remaining available proceeds from a foreclosure sale are applied to the next highest claim.

Hold-to-maturity

While taking ownership should be the base case assumption, all deals should be underwritten to ensure they provide adequate risk-adjusted returns in a hold-to-maturity setting, should the existing owner be willing and able to meet all debt obligations. This strategy can be executed for senior loans or subordinate loans.

Acquiring whole loans. The whole loan market is flush with availability, either buying whole loans or buying tranches of whole loans. Recent loans trading in the secondary market have been priced using the debt-yield metric. This metric is similar to a cap rate, and is calculated by dividing the property's cash flow (NOI) by the loan amount. Investors are increasingly using this metric to value loan acquisitions.

Table 9.4: **Examples of mezzanine loan pro forma**

Annualised loan cash flow –3-year term

Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Loan draw	-12,000,000	–	–	–	–	–
Commitment fee	60,000	–	–	–	–	–
Extension fee	–	–	–	–	–	–

Interest	405,000	1,620,000	1,620,000	1,080,000	–	–
Return of principal	–	–	–	12,000,000	–	–
Total	-11,535,000	1,620,000	1,620,000	13,080,000	–	–

Mezzanine loan IRR	**14.60%**
Multiple	**1.40**

Annualised loan cash flow –4-year term

Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Loan draw	-12,000,000	–	–	–	–	–
Commitment fee	60,000	–	–	–	–	–
Extension fee	–	–	–	60,000	–	–
Interest	405,000	1,620,000	1,620,000	1,620,000	1,080,000	–

Return of principal	–	–	–	–	12,000,000	–
Total	-11,535,000	1,620,000	1,620,000	1,680,000	13,080,000	–

Mezzanine loan IRR	**14.67%**
Multiple	**1.54**

Annualised loan cash flow –5-year term

Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Loan draw	-12,000,000	–	–	–	–	–
Commitment fee	60,000	–	–	–	–	–
Extension fee	–	–	–	60,000	60,000	–
Interest	405,000	1,620,000	1,620,000	1,620,000	1,620,000	1,080,0
Return of principal	–	–	–	–	–	12,000,

Total	-11,535,000	1,620,000	1,620,000	1,680,000	1,680,000	13,080,

Mezzanine loan IRR	**14.72%**
Multiple	**1.68**

Source: Clarion Partners Research & Investment Strategy.

Mezzanine loans. A mezzanine loan bridges the gap between the first mortgage debt and the equity investment. This means that instead of following the normal foreclosure procedure in the case of default on the mezzanine loan, the mezzanine lender would engage in legal proceedings that would give it an equity interest in the property.

The mezzanine lender usually enters into an inter-creditor agreement with the first-mortgage lender having the right to take over the first mortgage in the event of default. The first-mortgage lender is willing to enter into this agreement because it gives it another party to look to for payment of the first mortgage. This can also result in more rapid control of the property by the mezzanine lender because equity is considered a personal asset and can be seized through a legal process that is faster than a foreclosure on a mortgage that is in default.

Unleveraged returns for debt-oriented transactions have typically ranged from the low-to mid-teens, but capital market dislocations could push those rates higher. A simplified mezzanine loan pro forma is illustrated in Table 9.4.

2. Exploit failed developments

Purchase construction loans to foreclose on project

Construction loans are relatively short term and are intended to finance new development projects. They are expected to be paid off on completion of the construction phase (typically one to three years) with no repayment during this period, and are often replaced with a permanent loan (also called a 'take-out' loan). In the construction loan model, the lender provides cash to the borrower as needed to complete the development project. The lender monitors construction progress to help mitigate potential (overrun) risk. Construction loans are often made at floating interest rates, which helps to minimise interest rate risk (the risk that the value of the loan on the secondary market will fall due to a rise in prevailing rates).

However, construction loans have substantial default risk, given the many variables which can derail a development project. They are typically issued largely by commercial banks, whose short-term liabilities match the short-term nature of these loans. Permanent loans, on the other hand, have historically been dominated by life insurance companies and pension funds. The long-term liabilities of those institutions are more compatible with longer duration permanent loans. Often, lenders work together to provide both construction and permanent lending, requiring a permanent loan to 'take out' the construction loan prior to the approval of the construction loan.

Table 9.5: **Distressed US real estate volume by sector**

Sector	**Number of properties**	**Value of properties ($ billions)**
Development	1,284	$121
Office	1,805	$115
Apartment	2,503	$93
Retail	1,836	$73
Hotel	1,774	$69
Industrial	1,230	$24
Other	398	$6

Source: Real Capital Analytics, August 2011.

Because of aggressive underwriting and impacts from recession, many construction loans/projects originating in 2005-2007 are facing default or are already in foreclosure (see Table 9.5). If banks are willing to sell these loans at steep discounts, it may be profitable to foreclose and take ownership of the property.

3. Provide fresh capital

Recapitalisation

For owners with loans coming due, there are typically two options: refinance the loan or sell the asset to retire the debt. Current pricing is still substantially below prior peak levels, suggesting that a sale in today's market may not be able to cover all debt obligations. However, refinancing may also be difficult, given the change in lending terms discussed above. In evaluating any debt opportunity, it is important to include a refinancing analysis to better understand the default probabilities.

Often, the new loans available from lenders to refinance existing debt are less than the funds needed to repay the existing mortgage. This is because permanent loans are often sized not on the actual debt service constant (a rate that includes the actual interest rate and amortisation), but rather on a 'stress constant'. A stress constant (sometimes referred to as a 'refinance constant'), is a rate used by lenders (typically in the 8 percent to 11 percent range) to assure that, at the end of their loan term, they will be able to refinance out of their existing loan position. The assumption is that in a few years, interest rates will return to a more normalised level and the new lender will size the loan with appropriate coverage based on prevailing interest rates.

This juxtaposition between a temporary depressed cash flow and lenders using 'stressed' underwriting criteria has created problems for some owners in refinancing their current loans. Owners are faced with a choice of either losing their property because they cannot pay off the existing loan or putting in additional cash to bridge the gap between the new lower loan proceeds and the amount necessary to pay off the existing loan.

Preferred equity

Like other forms of mezzanine financing, preferred equity is intermediate financing that straddles the gap between debt and equity. Befitting this middle ground, preferred equity offers risk and return levels somewhere between traditional debt and equity. When carefully selected and structured, preferred equity positions offer the opportunity for equity-level returns with debt-level risk.

A comparison to preferred stock is instructive. Preferred stock in a corporation provides a stated dividend that must be paid before dividends are paid to common stock holders. In addition to the dividend payment, preferred stock holders also potentially benefit from appreciation of the stock price, and take on the risk that it may decline. In the preferred equity model in real estate finance, an investor provides capital to a first mortgage holder. In exchange, the preferred equity holder receives an equity interest in the borrowing entity. This interest generally carries a preferred return and payment priority over the common equity. The structure is distinct from a mezzanine loan in that the equity role also carries an opportunity to benefit from additional returns on the 'back end' of the deal.

Preferred equity has become an increasingly common method of providing mezzanine financing because it helps to skirt a standard limitation in securitised loans against the assumption of additional debt. In most CMBS transactions, loan documents generally prohibit borrowers from incurring additional debt that may hinder the borrower's ability to support and maintain the asset in the future. The preferred equity cash contribution is not debt because there is no maturity date, and the impact of payments to the preferred equity party comes directly from the equity investor, so that ability to repay the first mortgage is not impaired. The preferred equity position is secured by the equity ownership, not the real estate. Failure to make preferred equity payments will not create a debt obligation as to the real property. Distributions to the preferred equity investor are subordinate to all debt and property expenses.

Conclusion

The collapse of the securitisation and credit markets in 2008-2009 has resulted in billions of dollars of distressed commercial real estate assets, especially assets that were purchased at the peak of the market. As these debts continue to mature over the next few years, excellent opportunities will emerge for investment in distressed commercial real estate debt through various strategies. Due to complexity and risks, patience and discipline should be exercised when making distressed real estate investments. By focusing on strategies that aim to maximise risk- adjusted returns, real estate investors should be able to navigate this tumultuous period and achieve above-average returns.

□

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[1] Commercial Real Estate/Multifamily Quarterly Data Book, Q4 2008, p. 40.

[2] Examples based on Geltner, et al., p. 402.

Section

II

Investing

10

CMBS securitisation and investing

By Josh Younger, JPMorgan Chase & Co.

The rise, fall and rebirth of the CMBS market

Though commercial mortgage-backed securities (CMBS) were issued as early as 1983, modern securitisations grew out of the savings and loan crisis in the US. Following the overbuilding, weaker underwriting standards and generally lax market discipline that characterised the 1980s commercial real estate boom, the market found itself in a vicious cycle of declining liquidity and price depreciation. With portfolio lenders unwilling or unable to provide financing, investors recognised the value of tapping the public capital markets. The Resolution Trust Company (RTC) and Federal Deposit Insurance Company (FDIC) in particular, faced with the daunting task of disposing tens of billions of commercial and multifamily mortgages seized from failing institutions, turned to securitisation to facilitate their sale.

The RTC/FDIC programme helped to establish CMBS as a viable product with a broad investor base. Between 1991 and 1997, a total of 74 deals were brought to market with a total principal balance of more than $45 billion. Of these, 40 percent were backed by commercial and multifamily collateral. Although nearly $13 billion of private-label CMBS had been issued prior to 1990, these transactions tended to be small private placements by commercial banks and insurance companies – on average, $100 million of initial principal balance was split among fewer than ten loans. Structures were generally simple, consisting of one or two tranches. The RTC programme was the first to bring larger deals to market, including many with an original balance in excess of $500 million split among dozens of loans. The programme also introduced more complex structures, often with four tranches of rated pass-through certificates – including both fixed and floating classes – as well as residual interests and additional credit support via a reserve fund to cover losses.

Over the next few years, the CMBS market matured dramatically. Securitisations, which accounted for only 1 percent of commercial mortgage debt in 1990, represented more than 12 percent of the market by the end of the decade. Conduit lenders, sourcing loans under an originate-to-distribute model, developed more standardised underwriting processes, while investors gained access to extensive collateral performance data via third-party reporting systems. At the same time, expanded secondary trading of CMBS greatly improved market liquidity and enabled better deal execution.

The market grew because securitisation offered economic advantages to all parties involved. Issuers could efficiently use their balance sheet and regulatory capital by unloading risk relatively quickly, rather than retaining it for several years. This enabled greater origination volume (and fee income). They, in turn, offered more competitive financing terms to borrowers. Finally, investors – including insurance companies, money managers, banks and hedge funds – saw CMBS as an attractive alternative to corporate bonds, with a better duration and convexity profile than residential mortgages.

As the market developed and the investor base broadened, deals were categorised by collateral characteristics and diversity. By 2003, six distinct types of CMBS transactions were being issued with some regularity:

•*Conduit.* Diverse pools of fixed-rate, first-lien commercial mortgages wherein no one or several loans make up too large a fraction of the initial pool balance.

•*Fusion.* Fixed-rate pools with greater exposure to individual assets than traditional conduit transactions.

•*Single asset/borrower.* Pools backed by either individual assets or pools of assets owned by the same entity.

•*Floaters.* Diversified pools of first-lien, floating-rate commercial mortgages, typically with shorter weighted-average lives (WALs) than fixed-rate transactions.

•*International.* Deals containing collateral secured by non-US assets.

•*Other.* Any deal that does not fall into any of the above categories.

Conduit/fusion transactions continued to dominate issuance, particularly in the US. Approximately half of CMBS issued domestically between 1997 and 2003 (measured by original principal balance) fell into this category, versus 18 percent international, 13 percent floaters and 9 percent single asset/ borrower. As the market expanded, conduit collateral became more diversified, including eight distinct property types – but primarily focused on the retail, office and multifamily sectors.

By 2003, US domestic CMBS supply totalled approximately $80 billion. Beginning in 2004, a rapidly expanding credit bubble in the US drove a dramatic acceleration in issuance. US domestic commercial mortgage debt grew by 50 percent in just three years, as borrowers relied more and more heavily on the capital markets for financing. At the peak in mid-2007, nearly half of all commercial real estate debt in the US was securitised. Approximately $230 billion of domestic CMBS was issued that year, almost triple the amount issued just four years earlier.

Competition to source collateral for new transactions caused underwriting standards to deteriorate rapidly. At the peak, almost 90 percent of conduit loans were interest-only for at least part of their term, and more than half did not amortise at all. Issuers also increasingly relied on pro-forma financials, often utilising extremely optimistic assumptions regarding rent growth and occupancy trends to justify inflated property valuations. Therefore, while underwritten loan-to-value (LTV) ratios were relatively stable between 2004 and 2007, real leverage levels were rising rapidly. Rating-agency-stressed LTVs, which use stabilised cash-flow estimates to derive more realistic property valuations, rose from 87 percent in 2004 to 110 percent in 2007, while debt service coverage ratios (DSCRs) declined from 1.4 to 1.1.

There is no singular culprit for this dramatic expansion in lending. Rather, a number of factors collaborated to fuel surging issuance and to hasten declining collateral quality:

•*Originate-to-distribute business models.* Originators were sourcing loans expressly for securitisation and sale to investors. This separated credit risk from the issuer, creating perverse incentives.

•*Strong demand from fast money.* The investor base for CMBS shifted significantly and abruptly going into the peak of the market. Attractive financing rates (LIBOR +5 basis points [bps] to +10 bps with a 5 percent to 10 percent haircut for the AAAs) drew in levered investors, especially bank proprietary trading desks. By 2006, these fast money buyers were taking down roughly two-thirds of AAA CMBS supply and making up more than 30 percent of overall investor participation, versus 10 percent in 2002.

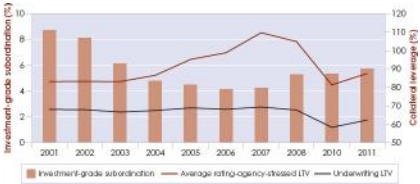
•*The growth of the commercial real estate CDO market.* Historically, mezzanine and B-piece buyers provided an important check on underwriting standards. However, the emergence of collateralised debt obligations (CDOs) backed by CMBS and other commercial real estate collateral represented an opportunity to quickly sell these bonds at a profit. As annual commercial real estate CDO supply picked up from an average of roughly $8 billion from 2001 to 2004 to more than $40 billion in 2007, these investors could quickly and easily offload their risk at a profit, and thus were far less diligent in policing issuers. At its peak, CDO issuers represented more than 80 percent of investor participation in the mezzanine portion of the capital structure.

Just as originators were growing more aggressive in their lending practices, rating agencies were loosening their credit enhancement requirements. Going into the peak of the market, subordination levels declined at the same time as leverage was rising and underwriting standards deteriorating (see Figure 10.1). Credit enhancement to the AAA part of the capital structure dropped from an average of 19.5 percent in 2002 to only 12 percent in 2007; the subordination of BBBs fell from 8.3 percent to 4.3 percent over the same period.

By late 2007 to early 2008, the train was veering off the tracks. Amid declining home prices and signs that commercial real estate had peaked, demand evaporated. BBBs, which as of June 2007 were routinely pricing inside of a 150 bps spread to swaps (S +150) were launching as wide as S +1500 bps in the second quarter of 2008 (and traded wider than S +8000 bps by the end of that year). Extensive use of leverage in the boom years had left financial institutions themselves undercapitalised and overly reliant on short-term funding. As a credit crunch set in, and the financial crisis accelerated, the securitisation markets – including CMBS – essentially collapsed.

In the recession that followed, CMBS collateral performance was directly related to underwriting quality. By the end of 2010, for example, the serious delinquency rate – defined as more than 60 days delinquent, including foreclosed and real estate-owned property – for loans written closer to the peak of the market (the 2006 and 2007 cohort, or vintage) was more than double those originated in 2004 (see Figure 10.2). Because these loans were underwritten to more aggressive standards, which frequently relied on strong cash-flow growth to justify property valuations, they were less resilient in times of economic stress.

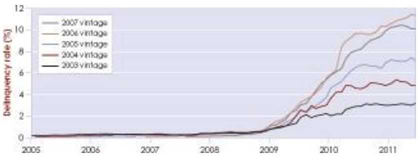
Figure 10.1: **Investment-grade subordination and collateral leverage by vintage, 2001–2011**



Note: 2011 data to June 30.

Source: Trepp, rating agency reports, deal documents.

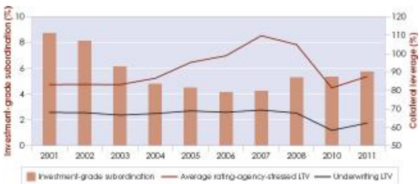
Figure 10.2: **Serious delinquency rate (60+ days, including foreclosed and real estate-owned) by current balance and loan vintage, 2005–2011**



Note: 2011 delinquency rate to June 30.

Source: JPMorgan, Trepp.

Figure 10.3: **US CMBS issuance, 1985–2011**



Note: 2011 issuance to June 30.

Source: Commercial Mortgage Alert.

Beginning in late 2009, the market reopened and deals were getting done (see Figure 10.3). At press time, the economic recovery has driven sufficient spread compression and demand for commercial mortgages to support the resurrection of CMBS. Total issuance in the first six months of 2011 stands at approximately $20 billion, which is roughly twice the previous year’s total.

Although a far cry from its peak in 2007, CMBS is once again an important source of liquidity to the commercial real estate market. It therefore serves market participants on both the debt and equity side to understand CMBS as a lender and as an asset class. In this chapter, we review the basics of securitisation with a focus on conduit transactions, including process and deal structure, as well as the risks investors should consider when evaluating new deals. Finally, we provide an overview of some important differences between recent and peak-of-the-market transactions.

The securitisation process

The first step in any securitisation is sourcing loans. Broadly speaking, CMBS collateral is originated by commercial banks, insurance companies or mortgage finance companies, and consists almost exclusively of first-lien commercial mortgages. In addition to issuing the loan, the originator is responsible for assessing loan financials and the creditworthiness of the borrower. The three most important loan characteristics considered are:

•*Debt yield.* A measure of the cash flow supporting the loan, defined as net cash flow divided by loan size.

•*Leverage.* The loan LTV, which is calculated by estimating a value for the property or properties securing the loan (typically using net cash flow and assumed capitalisation rates), and supported by an independent appraisal.

•*Debt service coverage.* Full-year net cash flow supporting the loan as a fraction of the annual debt service.

These loans are typically warehoused for two to four months until an initial collateral pool has been established by the underwriter or issuer. Currently, it typically takes ten to 12 weeks to bring a conduit transaction to market. The first four to six weeks are spent on due diligence, as potential B-piece buyers and rating agencies evaluate the collateral quality, as well as initial document preparation and servicing bids. During this phase, B-piece buyers can request that certain loans be removed from the pool. After eight weeks or so, the B-piece buyer is selected and signs off on the final collateral pool composition and the bond structure set according to final subordination levels received from the rating agencies.

Marketing generally begins in the eighth week and lasts up to a month. The term sheet, which contains details on the deal structure and top mortgage loans, serves as the focal point for this process. Over the next week, the issuer conducts investor road shows and takes indications of interest from accounts. Once the deal is launched, it typically takes two to four business days to price. A final offering circular is prepared, and the transaction settles the following week.

Overview of a typical securitisation

The vast majority of modern securitisations are organised as real estate mortgage investment conduits (REMICs). Electing REMIC status allows certificate holders to avoid double-taxation (at a corporate and personal level) of income received from the collateral pool. There are three primary requirements: the REMIC must have only one residual interest (the interests test), contain only ‘qualified mortgages’ or ‘permitted investments’ (the assets test), and ensure that residual interests are not held by disqualified organisations (the arrangements test).

The trust then issues tranched certificates of beneficial ownership (that is, CMBS securities) which are funded via cash flow from the collateral pool. Since the market reopened in 2009-2010, these have almost all been private placement 144a transactions. This primarily limits liability exposure for issuers, which helps to motivate greater transparency and disclosures than would be feasible for public deals. It also reflects issuers’ hesitance to invest in registering securities – either by revamping existing shelves or starting new ones – under a cloud of regulatory uncertainty. There are, however, downsides to private placement: some argue that public transactions would attract a broader investor base, which could improve liquidity and execution for new issues.

Table 10.1: **Representative new issue CMBS deal structure in 2011**

Tranche	Rating	WAL (yrs)	C/E	Face value ($ m)	Coupon	Spread to swaps	Bond-equivalent yield	Pr
A-1	AAA	3	17.0%	$58	2.09%	70	2.06%	$1
A-2	AAA	5	17.0%	$206	3.98%	125	3.76%	$1
A-3	AAA	7	17.0%	$202	4.58%	130	4.42%	$1
A-4	AAA	10	17.0%	$364	4.81%	110	4.70%	$1
B	AA	10	14.3%	$28	5.23%	165	5.25%	$1
C	A	10	10.8%	$35	5.32%	215	5.75%	$9
D	BBB	10	8.3%	$25	5.32%	275	6.35%	$9
E	BBB-	10	5.0%	$33	5.32%	345	7.05%	$8
B-piece	NR	10	0.0%	$50	4.50%	1,351	17.00%	$4
Interest-only	AAA	8	N/A	$1,000	0.84%	275	5.84%	$5
Total				**$1,000**	**5.32%**	**184**	**5.14%**	**$1**

Collateral composition

Term	Type	% of pool	Coupon
5-year	Amortising	20	5.05%
7-year	Amortising	20	5.25%
10-year	Amortising	40	5.45%
10-year	Interest-only	20	5.50%

Notes: C/E is credit enhancement. Amortising loans assume 30-year schedule with balloon. 2011 data to June 30.

Source: JPMorgan.

As an example, Table 10.1 presents a simplified deal structure that is representative of CMBS transactions issued in the first half of 2011. For this exercise, the collateral pool consists of five, seven- and ten-year amortising mortgages, as well as ten-year full-term interest-only loans with a weighted average coupon (WAC) rate of 5.32 percent. Generally speaking, conduit transactions employ sequential-pay, senior/ subordinate structures; principal is paid from the top down, while losses are allocated from the bottom up.

In our example, all AAA-rated tranches have 17 percent credit enhancement. This means that once realised losses exceed 17 percent of the original principal balance, they are attributed pro rata among each of these classes. The AAAs are further time-tranched into shorter- and longer-duration bonds – three-, five-, seven- and ten-year WALs are typical. This expands the investor base by offering products that meet a wide a range of duration requirements: banks typically buy shorter paper, while longer-duration assets provide a better match to life insurance company liabilities. During the first half of 2011, these bonds typically priced at a 100 bps to 130 bps spread to swaps, and were often sold at a premium.

Recent transactions also typically include a number of lower-rated, but still investment-grade tranches. These bonds are often referred to collectively as the 'mezzanine' part of the capital structure. In our example, the AA, A, BBB and BBB-classes have credit enhancement levels of 14.3 percent, 10.8 percent, 8.3 percent and 5.0 percent, respectively. They commonly have WAC coupons and ten-year WALs, and are priced according to credit quality or rating. The investor base for these bonds is primarily money managers and private real estate funds, but also includes some life insurers and hedge funds.

Below the investment grade part of the capital structure is the unrated B-piece. These bonds are privately placed in advance, usually with one of a relatively small group of investors. The coupon rate follows ten-year Treasury yields; in this case, Treasuries +150 bps or 3.75 percent. Because of the credit risk and liquidity premium, 17 percent all-in returns (as in our example) are not uncommon. This means that the bonds are sold at a deep discount, often below $50. As the most subordinate bondholder at issuance, the B-piece is the controlling class, which entitles these investors to direct the special servicer to take or not take certain actions with respect to workouts of any mortgage asset in the trust.

Finally, excess interest is sold separately after the deal prices as an interest-only class. These bonds pay a coupon equal to the strip rate, which is the difference between collateral WAC and the weighted average of a specified group of pass-through certificates. Therefore, they have no principal balance, but rather a notional value equal to the total balance of the referenced classes. Though many recent transactions include more complex structures with both AAA and unrated interest-only classes, in our example the interest-only references all of the principal balance certificates.

Risks in CMBS investing

As with any financial asset, CMBS expose investors to a range of risks. Some are straightforward and reminiscent of other credit products such as corporate bonds. Others, however, are specific to the asset class, arising from the way deals are structured as well as the lumpy and idiosyncratic nature of the collateral. Below, we review some of the primary risks present in CMBS transactions. However, it is important to bear in mind that we will not attempt an exhaustive list. Given the structural complexity of these kinds of financial instruments, risk factors can vary from deal to deal. Investors should take care to study each transaction separately before participating.

Asset-level credit risk

Because losses are attributed from the bottom up, investors in the mezzanine part of the capital structure, and the B-piece buyer in particular, are exposed to the credit quality of individual assets. Commercial real estate is cyclical business, and loan performance is often tied closely to the broader economy and business cycle. Modelling collateral performance in detail is quite complicated, made even more difficult by the relatively small loan count and sometimes unpredictable behaviour of borrowers. However, on average the usual rules apply: if at any point the property is characterised by negative equity (LTV>100 percent) or the borrower unable to cover debt service payments out of net cash flow, the probability of default rises rapidly.

It is also important to distinguish term-from-maturity defaults. Borrowers that default during the loan term typically do so because of fundamental problems with the asset. Either they are having difficulty covering the debt service out of net cash flow or the negative equity is so extreme that their upside is very limited, and they little incentive to continue debt service. As a result, these loans tend to have the highest severity.

Maturity defaults, by contrast, occur if the property cannot be refinanced at the end of its term. Because commercial mortgages are almost always structured as balloons, borrowers have to roll their funding at maturity. Sometimes when the maturity date arrives, the property is ‘cashflowing’ – that is, net cash flow is sufficient to cover debt service payments – but its market value has declined significantly. If the asset is too highly levered at maturity to refinance, in many cases the borrower will end up defaulting.

Concentration risk

The lumpy nature of CMBS collateral results in deals that tend to be less diversified than other types of securitisations. Therefore, any given transaction frequently contains significant exposures to both individual and groups of assets. CMBS investors primarily consider three forms of these outsized exposures or concentration risk: large loans, property types and regions.

Large loan exposures occur when one or several assets account for a large fraction of the initial principal balance. These exposures can be significant: among 2011-vintage deals to June 30, the three largest loans have accounted for roughly one-third, and the ten largest make up nearly 60 percent of the collateral. This is a particularly important consideration down in credit, as the lower investment-grade tranches essentially amount to a participation in the several largest loans.

In addition to large loans, CMBS can have disproportionate exposures to particular property types. Because these assets tend to perform similarly, this reduces the benefits of diversification. An important consideration here is the rent-roll effect, which relates to the leasing structure of each property type. Hotel rates, for example, reset daily, meaning their income is essentially marked to market in real time and thus very sensitive to current economic conditions. Office, retail and industrial tenants, by contrast, tend to sign much longer leases which lock in their rental rate for several years, while multifamily leases are renewed annually. Longer lease terms can help insulate borrowers from sharp declines in market rents and dampen income volatility in periods of economic stress.

Finally, CMBS deals often have significant exposure to particular metropolitan statistical areas and/or states. This makes them more sensitive to economic conditions in those areas, which are a key determinant of property income and prices. Therefore, to the extent that they have a view on a given geography, these concentrations can inform investor opinion of a given deal's risk profile.

Prepayment risk

As with any fixed income instrument, early return of principal affects the duration and yield of CMBS. However, unlike residential mortgage securitisation, CMBS includes strong call protection provisions to mitigate the impact of voluntary prepayments on bondholders. While other forms exist, the most common include:

•A lockout period, during which the loan may not be retired.

•Defeasance, or a substitution of collateral, in which the lien is released provided the borrower provides high credit-quality securities (typically US Treasury strips) that exactly replicate the anticipated future cash flows of the loan.

•Yield maintenance, in which the borrower must prepay at a premium, which includes a penalty that ensures the trust earns its expected yield on the mortgage loan. In most cases, the penalty is at least 1 percent of the outstanding principal.

In recent transactions, 100 percent of the collateral has some combination of these forms of call protection. As a result, bondholders are essentially indifferent to voluntary prepayments. This gives CMBS a limited convexity profile that (for example, prepayments are insensitive to interest rates), combined with relatively long durations, makes it an appealing alternative to corporate bonds.

While strong call protection minimises voluntary prepayment – that is, early refinancing – risk, CMBS investors must also consider early return of principal from involuntary prepayments. This occurs when a delinquent loan is liquidated and the proceeds returned to bondholders. In addition to causing write-downs, which are clearly the most important consideration for subordinate bondholders, these early principal distributions shorten the duration of the front-pay AAAs. The result is an accelerated pull to par which will decrease the realised yield for bonds bought at a premium, and increase it for those acquired at a discount.

Extension risk

Over the past few years, special servicers have increasingly modified troubled loans, rather than foreclose and liquidate. One of their favoured strategies, particularly for properties that are performing but have negative equity, has been to push out the maturity date. Out of the roughly $25 billion of loans that were modified as of July 2011, most obtained some sort of extension. Though this process has sometimes been derided as ‘extend and pretend’, more often than not these kinds of modifications are in the best interests of all parties involved: the borrowers can hang on hoping asset prices recover, while bondholders can avoid liquidating the property into a relatively illiquid commercial property market that would almost certainly result in a higher loss severity.

Regardless of whether these loans are liquidated down the road, the immediate impact on investors is longer bond durations. By slowing down the pull to par and providing additional coupon income during the extended term, premium bond yields – particularly the front-pay – rise when loans are extended; discount bonds, on the other hand, realise lower yields.

Interest shortfalls

Whenever the interest income collected by the trustee is insufficient to fund scheduled interest payments to bondholders, the shortfall is allocated in reverse-sequential order (that is, bottom up). Therefore, there is some risk that investors will not receive their full coupon payment at some point in the future. As these interest shortfalls creep up the capital structure, they negatively impact realised yields.

Interest shortfalls are primarily caused by appraisal reductions. When loans go delinquent, the master servicer continues to advance principal and interest to provide liquidity to the transaction. However, they are only obligated to do so on a notional balance equal to the lesser of the outstanding loan balance and 90 percent of the re-appraised property value. Therefore, if commercial prices decline precipitously (as they have over the past few years), accumulated appraisal reductions can significantly reduce interest collected by the trustee and lead to large interest shortfalls.

At the moment, no recently issued deals are currently experiencing shortfalls. However, the experience of legacy investors sounds a note of caution. Should prices decline and delinquencies jump, as they have for later-vintage legacy collateral, shortfalls can rise quite high up the capital structure. As of early August 2011, 2007-vintage deals, for example, are experiencing shortfalls all the way up to classes with 6 percent original subordination, and some deals as high as 12 percent. Investors, particularly in the lower mezzanine part of the capital structure, should be cognisant of the risk interest shortfalls pose.

Important differences between legacy CMBS and more recent transactions

Underwriting standards

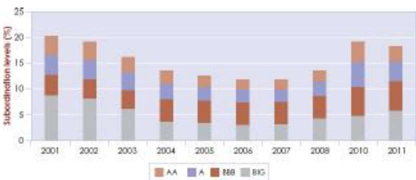
One of the most important differences between new issue CMBS and legacy deals is a significant improvement in underwriting standards relative to 2006-and 2007-vintage loans. Perhaps most importantly, originators and rating agencies now focus on in-place cash flow, rather than pro-forma financials. Many of the sins of the boom years can be traced back to overly optimistic cash-flow growth expectations, which inflated property values and underestimated leverage. Therefore, while the average deal issued in 2007 had a stressed-rating-agency LTV close to 110 percent, 2011-vintage transactions have thus far averaged closer to 90 percent. Combined with bottom-of-the-cycle underwriting, which is naturally more conservative, new issue collateral is therefore significantly less levered than later-vintage legacy deals.

In addition to lower overall leverage, originators are making significantly fewer interest-only loans than they did at the peak. In 2007, approximately 60 percent of CMBS collateral did not amortise at all, and nearly 90 percent was interest-only for at least part of the term. By contrast, recently issued transactions are, on average, backed by approximately 80 percent fully amortising collateral, and only 8 percent is interest-only for the full term. Amortising in particular carries less refinancing risk, because they de-lever the term; assuming a ten-year term, 30-year amortisation schedule and 5 percent coupon rate, a loan originated at an LTV of 75 percent will mature in the low-60s.

Credit enhancement

New issue deal structures are also more conservative than legacy transactions. As the market has reopened, rating agencies have required more enhancement at a given credit rating than they did at the end of the previous cycle (see Figure 10.4). AAA and investment-grade subordination levels have both increased significantly, from an average of 12.0 percent and 4.3 percent in 2007 to 18.1 percent and 5.8 percent, respectively, for the 2011-vintage. Tranches are also thicker than they were at the peak of the market.

Figure 10.4: **Average CMBS subordination levels by rating and deal vintage year**



Note: 2011 data to June 30.

Source: JPMorgan, deal documents.

Control rights

Control rights have also been revised to provide more protection to investors. Because they can direct and replace the special servicer, the majority owner of controlling class certificates (or directing certificate holder) can have a great deal of influence over loan workouts. Historically, this control rested with the most subordinate outstanding class of certificates. However, in recent years it has become clear that this arrangement can lead to a conflict of interest. Following a sharp decline in prices, the controlling class could effectively have no economic interest in the transaction, but maintain control while troubled loans work their way through the delinquency pipeline. This is particularly true if the special servicer is also the directing certificate holder – which was commonplace at the peak of the market. In such a scenario, they could seek to maximise cash flow and fee income to the detriment of more senior bondholders.

In recent transactions, this was remedied by allowing the controlling class to be 'appraised out'. In other words, if the principal balance net of appraisal reductions ever falls below 25 percent of its initial value, control shifts to the next most junior class of certificates. This helps to ensure that the directing certificate holder has an economic interest in loan workouts and avoids potential conflicts of interest.

Transparency

In addition to attempting to better align the interests of bondholders, many issuers have introduced senior trust advisers to enhance transparency. These third-party consulting firms review the actions of the special servicer, have certain consultation rights and under some circumstances can replace the special servicer for cause (subject to a vote by the bondholders). The intent is to provide investors with an alternative source of information on loan workouts, as well as a remedy if the adviser believes the special servicer is not acting in their interests.

Conclusion

Since the early 1990s, CMBS has been a significant provider of liquidity to commercial real estate investors. Though the securitisation markets were severely disrupted by the global financial crisis of 2008-2009, the CMBS market has since affirmatively reopened. Robust demand from both borrowers and investors suggests that securitisation is primed to resume this role, at least to some degree.

There are also signs that the market has begun to learn the lessons of the credit crisis. Despite a clear deterioration in underwriting quality over the past year or so, standards remain quite conservative relative to historical norms. At the same time, the investor base is more actively engaged in policing issuers, for example, forcing Goldman Sachs to restructure its most recent deal to include a junior AAA class when credit enhancement levels were seen as insufficient. Going into the peak of the market, by contrast, many abdicated their responsibilities in this regard, choosing instead to outsource due diligence to the rating agencies. A more balanced market, in which investors enforce discipline on underwriting and structuring, should go a long way towards preserving a still-high credit quality product. This makes it important for market participants to understand CMBS as a source of financing as well as a financial asset. A familiarity with the asset class should provide more diverse financing and investment options, which could represent a competitive advantage going forward.

□

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11

Key considerations in joint-venture projects

By Roy Schneiderman and Dean Altshuler, Bard Consulting LLC

Introduction

Joint-venture structures are typically, but not exclusively, used for development or redevelopment projects. Real estate joint ventures (JV) in an institutional context come in various incarnations:

a)*A single-asset JV* is involves just one asset, generally with an established business plan, which is known at the inception of the venture. The duration of the venture would be based on the nature of the asset and its business plan.

b)*A multi-asset JV* includes more than one asset, with each asset identified at the outset. From an economic standpoint, it is little more than an amalgamation of single-asset JVs but with the economics – particularly incentive fees – likely cross-collateralised.

c)*A programmatic JV* is an arrangement where an operating partner[1] and an investor form an entity which will seek out new deals. Although some early assets might be pre-identified, new assets can be added from time to time. The duration for this type of JV can be several decades, although in all probability there would be a mechanism for the partners to terminate new investments earlier, if desired.

Most of this chapter will focus on single-asset JVs as it is generally easier to illustrate mathematical concepts using a simple structure.

Allocation of cash flow, waterfalls and incentive fees

Unlike fund structures, the incentive fee is often the primary source of profit for the operating partner in a JV. This is because JV operating partners are typically real estate operating entities, while fund managers are generally financial institutions.[2]

In the simple incentive fee structure described in Table 11.1, the operating partner receives 30 percent of cash flow after the project achieves a 10 percent internal rate of return (IRR). Much of the rest of this chapter will be spent making this simple example more complex.

In the example in Table 11.1, the initial investment is $10 million. There is limited operating cash flow, consistent with a development project. Three years later, the JV's asset is sold, producing a final year distribution (including operating cash flow) at the asset level of $19,031,250, which results in an IRR at the asset level of exactly 25 percent.

The mathematics are straightforward with the exception of the calculation of the 'Cash flow needed to hit the 10 percent hurdle' in year 3.[3] Although sometimes derived simply through trial and error, the precise number can easily be computed by calculating the net future value of the prior cash flows, using a discount rate equal to the hurdle rate.

Table 11.1: **Single-hurdle waterfall**

	Time 0	Year 1	Year 2	Year 3	IRR
Asset cash flow	-$10,000,000	$0	$400,000	$19,031,250	25.0%
Less: Management fee to operating partner*	0	0	-100,000	-100,000	
Net cash flow before incentive fee	**-10,000,000**	**0**	**300,000**	**18,931,250**	**24.5%**
Cash flow needed to hit the 10% hurdle	-10,000,000	0	300,000	12,980,000	10.0%
Excess cash flow				5,951,250	
Less: Incentive fee paid to operating partner (30%)				-1,785,375	
Remaining cash flow paid to investor (70%)				4,165,875	

Total cash flow to investor	**-10,000,000**	**0**	**300,000**	**17,145,875**	**20.5%**
Total cash flow to operating partner	**0**	**0**	**100,000**	**1,885,375**	**N/A**
Cash flow from management fees			100,000	100,000	
Cash flow from incentive fees				1,785,375	

* To keep the example simple, the management fee is charged only when there is positive asset cash flow. In reality, the management fee in Year 1 could be paid by calling capital, or perhaps from a construction loan.

Operating partner co-investment

Table 11.2 illustrates what occurs when the operating partner provides capital (in this case 10 percent) to the JV, making the operating partner also a co-investor. This is common in institutional JVs.

There are several items of note. First, while the operating partner IRR does not apply to Table 11.1 as there is no initial investment against which to calculate an IRR, an IRR can be calculated for the operating partner in Table 11.2, an impressive 56.1 percent as compared with the 20.5 percent achieved by the investor. However, the operating partner's return is comprised of three separate and distinct types of cash flow: 1) return of/on invested capital; 2) management fees; and 3) incentive fees. Operating partners tend to bristle somewhat when these three cash flows are added together, and with some justification. Management fees, after all, are fully or partially used to cover the expenses of managing the JV, while the incentive fee is a reward for both the 'sweat equity' which went into sourcing and securing the deal at the outset as well as managing the deal to its successful conclusion. Below are the operating partner IRRs based upon a variety of approaches:

•*All operating partner cash flow:*	56.1 percent
•*All cash flow except management fee:*	52.5 percent
•*Only return on/of co-investment capital:*	20.5 percent

Note that if only the return on/of capital is considered, the operating partner's IRR is the same as the investor's which is logical since, in this regard, the operating partner is treated exactly the same as the investor.

Remaining cash flow (70%)				4,165,875	
Remaining cash flow to investor (90%)				3,749,288	
Remaining cash flow to co-investor (10%)				416,588	
Total cash flow to investor	**-9,000,000**	**0**	**270,000**	**15,431,288**	**20.5%**
Total cash flow to operating partner	**-1,000,000**	**0**	**130,000**	**3,599,963**	**56.1%**
Cash flow as co-investor	-1,000,000	0	30,000	1,714,588	20.5%
Cash flow from management fees		0	100,000	100,000	

Remaining cash flow (70%)				4,165,875	
Remaining cash flow to investor (90%)				3,749,288	
Remaining cash flow to co-investor (10%)				416,588	
Total cash flow to investor	**-9,000,000**	**0**	**270,000**	**15,431,288**	**20.5%**
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Cash flow as co-investor	-1,000,000	0	30,000	1,714,588	20.5%
Cash flow from management fees		0	100,000	100,000	

Cash flow from incentive fees	1,785,375

* To keep the example simple, the management fee is charged only when there is positive asset cash flow. In reality, the management fee in Year 1 could be paid by calling capital, or perhaps from a construction loan.

Splits versus promotes

The introduction of operating partner co-investment creates some confusion, for the real estate industry still has not fully developed clear jargon. The example above follows the more typical construction in which the fundamental distinction is made between cash flow applied to invested capital (irrespective of the source of the investment) and cash flow applied as incentive fee that goes to the operating partner as the 'promoter' of the investment. This formulation, sometimes referred to as the 'promote' formulation. In a promote formulation, first cash flow is distributed to investors, *pari passu* until each has received a 10 percent IRR. After reaching the 10 percent IRR hurdle, cash flow is distributed 30 percent to the operating partner and 70 percent to the investors.

In this promote formulation in Table 11.2, the operating partner is also an investor and receives its return of/on capital just like any other investor. For a $100 distribution in excess of the hurdle, $30 would go to the operating partner as an incentive fee payment (promote). The remaining $70 would go to the investors, with 90 percent (or \$63) going to the capital partner and 10 percent (or \$7) going to the operating partner as co-investor. Therefore, the total to the operating partner would be \$37.

However, some JVs use the ‘splits’ formulation to describe this same situation. Using this formulation, first cash flow is distributed 10 percent to the operating partner and 90 percent to the investor until each has received a 10 percent IRR. Any subsequent cash flows will be distributed 37 percent to the operating partner and 63 percent to the investor.

By inspection, it is clear that in the split formulation, the operating partner would receive the same \$37 which was calculated using the promote approach. Although there is a trend towards using the promote formulation in documenting incentive fees, the split construction is still widely used. Incentive fees are articulated for the two formulations below:

$$Sp = Pr + ((1 - Pr) \times A) \qquad 0.37 = 0.3 + (1 - 0.3) \times 0.1 = 0.3 + 0.07 = 0.37$$

$$Pr = (Sp - A) / (1 - A) \qquad 0.3 = (0.37 - 0.1) / (1 - 0.1) = 0.27 / 0.9 = 0.3$$

where:
Sp is the incentive rate using the split formulation
Pr is the incentive rate using the promote formulation
A is the operating partner co-investment

Multiple hurdles

The multiple tiers of incentive fees structure is generally created to allow the operating partner to realise a greater percentage of the cash flow as the underlying asset performance improves. Most multi-tier incentive fee structures utilise two or three separate tiers, although the number of tiers can be higher if a 'catch-up' structure (discussed later in this chapter) is used. For purposes of illustration, an example with just one additional incentive fee tier is shown (see Table 11.3). For simplicity, this example will assume no operating partner co-investment.

•*Incentive fee Tier 1:* 30 percent over a 10 percent IRR

•*Incentive fee Tier 2:* 50 percent over a 20 percent IRR

Comparing Table 11.3 with Table 11.1 illustrates the additional computational complexity associated with even a single extra hurdle. The first five rows are identical, resulting in an excess over the first hurdle of 10 percent or $5,951,250. However, with the two-hurdle structure it is necessary to determine whether there is sufficient cash flow to also exceed the second hurdle of 20 percent, in which this case, a portion of the cash flow will be promoted at the higher 50 percent rate. Key data from Table 11.3 is summarised below:

•*Profit dollars (the sum of cash flow after management fees):*	$9,231,250
•*Amount needed to meet the 10 percent IRR threshold in final year:*	$12,980,000

•*Amount needed to meet the 20 percent IRR threshold in final year:* $16,920,000

•*Amount in excess of 20 percent hurdle:* $322,679

Therefore, in this example, the operating partner would receive an incentive fee payment of $1,849,911 which would be comprised of 30 percent of the cash flow in excess of that necessary to generate a 10 percent return, and an additional 20 percent (for a total of 50 percent) of the dollars in excess of the amount needed to generate a 20 percent IRR. Put another way, the operating partner would have earned $1,688,571 for the portion of the asset performance between a 10 percent and a 20 percent IRR, and an additional $161,339 for performance in excess of the 20 percent IRR hurdle.

Table 11.3: **Waterfall with a second hurdle added**

	Time 0	**Year 1**	**Year 2**	**Year 3**	**IRR**
Asset cash flow	-$10,000,000	$0	$400,000	$19,031,250	25.0%
Less: Management fee to operating partner*		0	-100,000	-100,000	

Net cash flow before incentive fee	**-10,000,000**	**0**	**300,000**	**18,931,250**	**24.5%**
Cash flow needed to hit the 10% hurdle	-10,000,000	0	300,000	12,980,000	10.0%
Excess cash flow above first hurdle				5,951,250	
Additional amount for investor to hit 20% hurdle				3,940,000	
Proof of 20% hurdle	-10,000,000	0	300,000	16,920,000	20.0%
Additional amount grossed up for post-first hurdle split				5,628,571	

Lesser of prior row and excess cash flow	5,628,571
Promote to operating partner at 30%	1,688,571
Excess cash flow paid to investor at 70%	3,940,000
Excess cash flow above second hurdle	322,679
Promote to operating partner at 50%	161,339
Excess cash flow paid to investor at 50%	161,339

Total cash-flow to investor	**-10,000,000**	**0**	**300,000**	**17,081,339**	**20.4%**
Total incentive fees payable to operating partner				**1,849,911**	

* To keep the example simple, the management fee is charged only when there is positive asset cash flow. In reality, the management fee in Year 1 could be paid by calling capital, or perhaps from a construction loan.

Multiple hurdles: a practical application

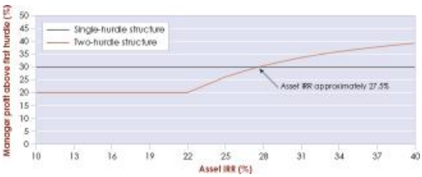
In some cases, there may be disagreement between an operating partner and an investor as to the proper level of incentive-fee compensation. Perhaps the operating partner believes the appropriate incentive-fee percentage is 35 percent over the hurdle, while the investor believes that it is 25 percent, but is willing to consider a higher number if the asset performs exceptionally. In such a circumstance, it is instructive to compare the results from two alternative structures:

• *'Compromise' single-hurdle structure:*	30 percent of profits above a 10 percent hurdle

• *'Compromise' multi-hurdle structure:*	20 percent of profits over a 10 percent IRR hurdle and 50 percent of profits over a 20 percent IRR hurdle

Figure 11.1 compares the results from these two structures. The two-hurdle approach allows the investor to realise its objective of limiting the incentive fee in the event that performance is 'good', and allows the operating partner to earn additional dollars if the asset performance is 'very good'.

Figure 11.1: **Comparison of single-hurdle and two-hurdle structures**



Notes: Single-hurdle structure includes a promote of 30% over a hurdle of 10%, and an asset management fee of 0.0%. Two-hurdle structure includes a promote of 20% over a hurdle of 10%, increasing to a promote of 50% over a hurdle of 20%, and an asset management fee of 0.0%.

Multiple hurdles advanced topic: investor-centric versus investment-centric

The term 'hurdle' has been used above without fully specifying its definition. Using the example in Table 11.3, there were two hurdles: one at a 10 percent IRR and one at a

20 percent IRR. However, this begs the question, just where in the analysis are these hurdles applied? For most institutional deals, hurdles reflect the net IRR earned by the investor. That is how the example in Table 11.3 is calculated. Therefore, the 30 percent operating partner participation begins when the investor has achieved a 10 percent IRR and the second-tier 50 percent operating partner participation in cash flow begins when the investor has achieved a 20 percent IRR. This approach is ‘investor-centric’.

However, it is also possible to interpret hurdles as ‘investment-centric’. There are two versions of investment-centric hurdles. First, the hurdle applies to the IRR that an asset achieves without consideration of JV expenses. In the examples used, this is the line in the tables titled ‘Asset cash flow’. At this level there has not yet been an accounting for the JV management fee, or any incentive fee that might be paid to the operating partner. Second is to apply the hurdle after subtracting the management fee, but before accounting for any incentive fee payment. In the tables in this chapter, this is found on the line titled ‘Net cash flow before incentive fee’.

Clearly it is easier (that is, it takes smaller amounts) to reach an IRR hurdle if it is measured at the asset cash flow level than if the hurdle is tested at the net cash flow before incentive fee level. Similarly it is easier to reach an IRR hurdle at the net cash flow before incentive fee level than at the ‘Total cash flow to investor’ level. Table 11.4 summarises the results that are obtained by applying the deal parameters used in Table 11.3 at the various levels discussed in this section.

As one would expect, the operating partner does better with investment-centric hurdles, and the investor does better with investor-centric hurdles. In theory, as with the splits versus promotes formulation, one could mathematically adjust the numbers to make the three approaches summarised in Table 11.4 equivalent. As a practical matter, however, the algebra is more difficult and perfect comparability can only be achieved at a single rate of return for the underlying investment. Therefore, rarely is this issue resolved in that manner.

Table 11.4: **Applications of hurdles at different points in the waterfall**

Where hurdle is applied	**Manager promote**	**Investor IRR**
Asset cash flow	$2,294,625	19.3%
Net cash flow before incentive fee	$2,187,625	19.6%
Investor cash flow	$1,849,911	20.4%

Subordinated equity[4]

In all of the examples discussed above, there has been an implicit assumption that all capital contributed to the JV is treated equally (or *pari passu)* regardless of whether it has come from the investor or the operating partner. This is not always the case. By far the most common way for capital to be treated is for the operating partner's capital to be treated as subordinate to other investors' capital.

When all capital is not treated equally, waterfalls are more commonly expressed in terms of preferred returns rather than IRRs. Using the simple example from Table 11.2, these two formulations would read:

•*Preferred-return formulation (no subordination).* First, investors get their capital returned. Second, investors get a 10 percent preferred return. Third, of the remaining proceeds, the investors receive 70 percent and the operating partner receives 30 percent.

•*IRR-hurdle formulation (no subordination).* First, investors get a 10 percent IRR. Second, of the remaining proceeds, the investors receive 70 percent and the operating partner receives 30 percent.

There are a variety of ways in which an operating partner's equity could be subordinated. One of the more common ways is stated below, using the preferred-return formulation, with the parameters shown in Table 11.2:

•Sample waterfall with subordination of operating partner equity:

–First, the investor gets its capital returned.

–Second, the operating partner gets its capital retuned.

–Third, to the investor until it has achieved a 10 percent return on its capital.

–Fourth, to the operating partner until it has achieved a 10 percent return on its capital.

–Fifth, 30 percent to the operating partner and 70 percent to the investor.

Table 11.5 runs the cash flows from Table 11.1 through this waterfall with subordination of operating partner equity. Note that the end result in this simplified case is virtually identical to the result in Table 11.2. This occurs because there is sufficient cash flow to satisfy all of the hurdles in the waterfall.

Table 11.5: **Single-hurdle waterfall, with subordination**

	Time 0	**Year 1**	**Year 2**	**Year 3**	**IRR**
Asset cash flow	-$10,000,000	$0	$400,000	$19,031,250	25.0%
Less: Management fee to operating partner*	$0	$0	-$100,000	-$100,000	
Net cash flow before incentive fee	**-$10,000,000**	**$0**	**$300,000**	**$18,931,250**	**24.5%**

Less: Return of investor's capital	-$300,000-8,700,000
Less: Return of co-investor's capital	-1,000,000
Less: Return of investor's preferred return	-2,949,000
Less: Return of co-investor's preferred return	-331,000
Excess cash flow	5,951,250
Less: Incentive fee paid to operating partner (30%)	-1,785,375

Remaining cash flow (70%)				4,165,875	
Remaining cash flow to investor (90%)				3,749,288	
Remaining cash flow to co-investor (10%)				416,588	
Total cash flow to investor	**-$9,000,000**	**$0**	**$300,000**	**$15,398,288**	**20.5%**
Total cash flow to operating partner	**-$1,000,000**	**$0**	**$100,000**	**$3,632,963**	**55.9%**

* To keep the example simple, the management fee is charged only when there is positive asset cash flow. In reality, the management fee in Year 1 could be paid by calling capital, or perhaps from a construction loan.

Table 11.6: **Applications of waterfall with subordination of operating partner equity**

	Operating partner	Investor
Capital treated pari passu		
Capital returned	$945,000	$8,505,000
Return on capital	$0	$0
Incentive fee	$0	N/A
IRR (excluding management fee)	-1.9%	-1.9%
Operating partner's capital is subordinated		
Capital returned	$450,000	$9,000,000
Return on capital	$0	$0
Incentive fee	$0	N/A
IRR (excluding management fee)	-23.4%	0.0%

However, should the project not be particularly successful, results can vary dramatically when operating partner equity is

Introduction and acknowledgements

By David Lynn, Clarion Partners

In the aftermath of the 2008 real estate crash, real estate investment professionals were forced to re-evaluate long-standing approaches to investment practices. Once the worst of the crisis had passed, investors and managers were left with the task of carefully reappraising risks and revisiting performance expectations of real estate in order to rebuild investment portfolios.

Real Estate Mathematics seeks to examine the more mathematical and analytical aspects of current trends in real estate investment. Some questions we pose are: What are the mathematical equations behind successful real estate investment? How can these functions be applied to such a diverse asset class as real estate, and what are the most applicable tools for adequately measuring returns in this current climate?

It is the intent of this book, then, to offer explanations to those inquiries, as well as others. *Real Estate Mathematics* addresses the issues that come with a quantitatively-driven market. Among these issues, we thought it would be most beneficial to focus on two of these: the effects of an increase in value-based investing, and the associative variations between real estate equities and real estate debt.

This content is most useful to those investors whose primary focus is on real estate investment, acquisitions and portfolio management.

subordinated. Table 11.6 summarises the returns if the underlying asset results in net sales proceeds that are only slightly less than the amount invested.

Catch-ups

More common in funds, catch-ups are occasionally found in JVs as well. Catch-ups are an 'operating partner-friendly' concept that states rather than receiving a specific percentage of cash flow after a hurdle has been reached, the operating partner is entitled to a specified percentage of all profits, but not until after the investor has reached the hurdle. Going back to the asset in Table 11.1 as a point of reference, the incentive fee can be formulated as follows:

•*No catch-up.* The operating partner will receive 30 percent of cash flow after the investor has received a 10 percent IRR.

•*With catch-up.* After the investor has received a 10 percent IRR, the operating partner receives 100 percent of the cash flow until the operating partner has received 30 percent of the total profits. Thereafter, the operating partner receives 30 percent of the cash flow and the investor receives 70 percent.

Table 11.7: **Single-hurdle waterfall, with 100 percent catch-up**

	Time 0	Year 1	Year 2	Year 3	IRR

Asset cash flow	-$10,000,000	$0	$400,000	$19,031,250	25.0%
Less: Management fee to operating partner*	0	0	-100,000	-100,000	
Net cash flow before incentive fee	**-10,000,000**	**0**	**300,000**	**18,931,250**	**24.5%**
Cash flow needed to hit the 10% hurdle	-10,000,000	0	300,000	12,980,000	10.0%
Excess cash flow				5,951,250	
Catch-up algorithm					
Amount of profit to investor necessary to				3,280,000	

Total cash flow to investor	**-10,000,000**	**0**	**300,000**	**16,161,875**	**18.2%**
Total incentive fees payable to operating partner				**$2,769,375**	

* To keep the example simple, the management fee is charged only when there is positive asset cash flow. In reality, the management fee in Year 1 could be paid by calling capital, or perhaps from a construction loan.

Table 11.7 shows the results of applying the catch-up described above to the example used in Table 11.1. It should also be noted that catch-ups, like subordination, have many variations which can have a high degree of complexity.

Periodicity and compounding

Whether using the IRR-hurdle formulation or the preferred-return formulation, it is necessary to understand the periodicity of the cash flows that are used in the incentive fee calculation. Before computers and user-friendly spreadsheets, annual data or even aggregate total dollars might have been used. Now quarterly or monthly cash flows are the norm. In the case of the IRR-hurdle formulation, the XIRR (and XNPV) functions in Microsoft Excel allow for easy automation of daily analysis.

With respect to compounding hurdle rates, the IRR-hurdle formulation moots the need for this to be specified. However if an incentive fee is documented using the preferred-return formulation, it is important to specify both the periodicity and whether the any unpaid accrued return itself earns a preferred return, and how, if at all, it is compounded.

Items more likely to arise in multi-property or programmatic JVs

There are some issues that are unlikely (although not impossible) to arise in a single-asset JV, but which can be common in a multi-property JV.

Portfolio true-ups and clawbacks

In a fund context, there are several ways in which incentive fees can be cross-collateralised including, at the margin, simply calculating incentive fees based on portfolio performance. Although there is nothing that theoretically precludes a multi-property or programmatic JV from having an incentive fee structure that is entirely based upon performance at the portfolio level, such arrangements are atypical. More common are structures where some, or all, of the incentive fee is paid on an asset-by-asset basis, but the JV agreement includes a mechanism that allows for a return of some of that incentive fee to the investor should the overall portfolio not meet or exceed a pre-specified, portfolio-based test. This is sometimes referred to as a ‘true-up’. The mechanism for returning to the investor some of the incentive fee previously distributed to the operating partner[5] is called a ‘clawback’. The specific mathematics of a clawback are wholly dependent on the particular provisions that are incorporated into the JV's operating agreement. The clawback provision is frequently heavily negotiated. In most cases, operating partners are able to negotiate the provision so that only the after-tax portion of the incentive fee is subject to clawback, which increases the mathematical complexity, as it becomes necessary to determine the precise amount of the after-tax incentive fee.

Phantom income and tax distributions

Presuming that every asset within a multi-property JV is held in a separate special purpose entity, when that asset is sold profitably, taxes will be due. For the most part, these profits will not matter to tax-exempt institutional investors. However, taxable investors and the operating partner will be keenly interested in the tax liability associated with the disposition of an asset. This is particularly true because, often, not all of the cash from the sale of an asset will be distributed. Reasons for retaining some cash could include: a) increasing JV reserves; b) potential contingent liabilities;[6] c) using the returned capital for other projects; or d) funding an incentive fee reserve account. For whatever reason, it is possible that an operating partner (and a taxable investor) might have a tax liability based upon profits from an asset sale even though there was no cash distributed.[7] This phenomenon is referred to as 'phantom income'. Many JVs have a provision that allows for payment to the operating partner of a 'tax distribution' sufficient to pay the tax liability associated with the phantom income.[8]

The mathematics of these tax distributions can be very complicated depending on the number of relevant taxing jurisdictions and the number of taxable investors. One simplifying assumption that is often made is to use the highest marginal tax rate of any taxable investor as the relevant rate for calculating the tax distribution for all investors.

Non-incentive fees

Unlike funds which charge a management fee and an incentive fee, the types of fees found in JVs are limited only by the imagination of the operating partner. While asset management fees are not uncommon in JVs, they are by no means universal and are, in some cases, replaced by a basket of other fees as described below. It would be rare to have all of these fees in any one JV.

•*Management/asset management fee.* In JVs this fee can be calculated as a percentage of a wide variety of factors including gross asset value, equity value, capital invested, unreturned capital, revenue or net operating income (NOI). In some cases, if the operating partner is earning a development fee (on a development asset) or a property management fee (on an operating asset), there may be no management fee, but rather management services will be baked into the development or property management fee.

•*Development fee.* This would apply to development projects and compensates the operating partner for sourcing and supervising development activities. This fee is generally a fixed percentage applied to project costs, although there can be some negotiation over just precisely which costs are allowed for purposes of this calculation. For example, land value and construction interest are sometimes excluded.

•*Construction management fee.* This fee compensates the operating partner for construction management services.[9] This fee could apply to both new construction and rehabilitation or redevelopment strategies. This fee is generally a fixed percentage applied to project hard costs and sometimes some or all soft costs.

•*Property management.* In some cases, the operating partner will be a real estate company that provides property management services. This fee is typically either a fixed percentage; a sliding scale of percentages, applied to revenue; or occasionally NOI.

•*Acquisition fee.* This fee compensates the operating partner for the costs associated with the acquisition of a project. When there is an acquisition fee, the fee is typically a fixed percentage or a sliding scale of percentages, applied to gross asset value or equity invested. In some cases, operating partners forego this fee and instead directly charge the JV for acquisition costs.[10]

•*Financing/refinancing fee.* An operating partner may charge a fee for sourcing and securing financing for a project. This is more likely if no external broker is utilised, although occasionally a small fee may be charged even if a broker is used. This fee is generally a percentage applied to the amount of the financing secured. In cases where an external broker is used, the cost of the external broker may be deducted from the fee due to the operating partner.

•*Leasing fee.* An operating partner may provide brokerage services for a project. This fee is generally whatever is normal and customary in a given market for brokerage services. In cases where an external broker is used, the cost of the external broker will likely be deducted from the fee due to the operating partner.

•*Disposition fee.* This is a fee for disposing of an investment. This fee is more likely to be found if no external broker is used, although occasionally a small fee may be charged even if a broker is used. This fee is generally a percentage applied to the sales price. In cases where an external broker is used, the cost of the external broker may be deducted from the fee due to the operating partner.

Conclusion

Many of the mathematical issues discussed in this chapter are also found in other structures such as separate accounts and commingled funds. Although the underlying principles are relatively straightforward, the application of these principles in real-world situations can become very complex, whose degree is limited only by the imagination of the partners in a JV.

□

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[1] The non-technical term 'partner' will be used throughout, although actual JVs could be limited liability companies or other structures which do not technically have 'partners'.

[2] This is, of course, a significant oversimplification, but this distinction does drive some of the historical differences between fund waterfalls and JV waterfalls.

[3] In this example, the IRR hurdle will not be met prior to the sale date, so this computation need only be considered for the final distribution.

[4] There is also the related concept of ‘preferred’ capital which can be contributed in the form of either debt or equity. This usually occurs when a project has unbudgeted capital needs and one or more partners contribute additional funds. These funds will typically earn a priority return and be first in the waterfall when capital is returned. There are many variations on this theme, and a discussion of this point is beyond the scope of this chapter.

[5] In some cases, a portion of the incentive fee is actually held in a reserve or holdback account.

[6] This is often an issue for development projects, particularly for-sale residential.

[7] More realistic would be a distribution of some cash, but not the full amount of the profit from the disposition of the asset.

[8] In some instances even tax-exempt investors negotiate for a ‘tax-equivalent distribution’.

[9] In some cases some or all of these services are contracted out.

[10] In the case of a ‘cost recovery’ approach, there may be a spirited negotiation over the extent to which the operating partner can allocate its own internal costs to the JV.

12

Cash-flow considerations for value-added deals

By Pip White and Nigel Allsopp, MGPA

Discounted cash-flow analysis is widely understood to be a cornerstone of real estate investment appraisal. However, in respect to value-added deals, cash-flow analysis is also an integral part of the asset management process. Value-added returns usually contain an element of both income return and capital growth, with the need for capital improvements competing with the need for an income-producing asset. Liquidity is therefore a key concern and is best understood in terms of cash-flow analysis. This chapter will look at the key considerations for conducting such an analysis, with a focus on repositioning strategies.

Introduction to value-added deals: a hybrid approach

In Europe, an attempt to more stringently classify investment styles has been led by the European Association for Investors in Non-listed Real Estate Vehicles (INREV). The INREV Style Framework is based on six risk factors: leverage, development exposure, income distribution (percentage of total return), country exposure, sector exposure and diversification. Each investment style represents a bundle of these risks, with core at the lower end of the risk/return spectrum and opportunistic at the higher end. Value-added sits somewhere between these two and is defined by INREV as:

A fund which may invest in any property type and deliver returns from a ***balance of income return and capital appreciation.*** *The fund may allocate part of its investments in development. Typically it will also invest in forms of active management, such as* ***active leasing risk, repositioning or redevelopment*** *to generate returns through adding value to the property. The fund will use moderate leverage.* [emphasis added]

Value-added projects typically have some internal cash flow that can provide financing for capital expenditure and therefore result in lower leverage levels than opportunistic investments. Such projects often require capital improvements in some parts of the building, while other parts continue to produce income. Both cannot be done equally at the same time. In addition, cash flow has to service the debt undertaken and potentially provide cash distributions to investors along the way. Clearly, cash-flow management is a critical success factor.

Investment strategies: refurbishment, redevelopment and repositioning

In a basic corporate finance class we learn there are only two ways to increase the value of an investment: increase net cash flow or lower the cost of capital. Value-added deals will often take on leasing challenges in under-rented buildings, restructure in-place leases to institutional standards, reposition the building for both occupiers and investors, or combine any of these strategies. Repositioning will usually involve either refurbishment or redevelopment, or some other form of capital improvement. For many buildings, the initial challenge might be to improve cash flow by leasing vacant space.

Ultimately, repositioning should be grounded in a marketing strategy that demonstrates that the building meets occupier's needs. For financial service tenants, power requirements and information and communications technology infrastructure are important. For retail tenants, features that improve footfall and sight lines should be emphasised. Equally, the building's specification should be appropriate for its location; there is no use in trying to lease grade B space in prime locations or to redevelop grade A space in secondary or tertiary locations.

Beyond improving the rental value to investors, there might be other ways to add value to physical aspects of the building. Structural works might improve spatial efficiency and increase rentable area. Mechanical and engineering works might improve energy efficiency and reduce costs. Remedial works may be required to comply with health and safety standards or to achieve environmental accreditation. By adding value to the physical asset, the investor should increase the rental value to the occupier and the net operating income (NOI) to the investor, though any increase in value is ultimately contingent on the investment markets: how the market values future cash flows at exit will be the ultimate determinant of value. The repositioning strategy should therefore seek to have an institutional-grade asset at exit, with the appropriate location, building quality, occupancy, lease terms and weighted-average lease expiry.

Business planning: a balancing act

In terms of cash flow, the risk/return profile of value-added deals requires a mixture of income return and capital appreciation. The need for income must be balanced against the need for capital expenditure. These competing concerns have several implications.

Firstly, outgoing tenants must be managed. Improvement works can seldom be undertaken with tenants in situ, thus creating an opportunity cost in terms of lost rental income. The timing of improvement works will therefore be largely contingent on the lease-expiry profile. However, there may be other alternatives to waiting for a lease to expire, such as offering a surrender premium or assigning a lease. Local regulation may make it difficult to terminate leases or to move tenants; this factor needs to be investigated during the due diligence process. Maintaining cash flow while work is taking place is a delicate balance, particularly if building cash flows are being used as part of the financing.

Secondly, incoming tenants must be managed. Capital improvements may necessitate taking on leasing risk where the void period is unknown at the time. There is no guarantee that the unit will be leased as assumed in the underwriting process. Improvement work may take longer than expected and either add to void periods or, worse still, cause the project to miss a leasing opportunity.

Thirdly, interest cover and distributions that may have been promised to investors must be managed. The timing of lease events and capital expenditure should be such that there is sufficient free cash flow to service debt to maturity and meet investors' distribution expectations. The quantum and timing of distributions will ultimately drive the internal rate of return

(IRR) that determines the investment's performance and the fund manager's remuneration.

Finally, there is an opportunity cost for improvement works not undertaken and therefore not producing a higher economic rent. This last opportunity cost can be minimised by targeting the highest marginal income or other low hanging fruit early on, such as changing the building's use from office to retail, or from bulky goods retail to fashion retail. In short, it is all about doing the right things in the right order.

In order for managers to truly add value, the economic benefits must outweigh the economic cost; in other words the present value of marginal income has to outweigh the present value of marginal expenditure. It is all too easy for managers to destroy value by 'gilding the lily' and to undertake improvements that erode cash flow and fail to improve a building's worth. Therefore, managers need to create a robust cost plan and cash-flow model to establish whether or not the benefits outweigh the cost.

Scenario planning: expect the unexpected

Scenario planning requires managers to test their underwriting assumptions and create a margin of safety in the final business plan. What happens if void periods are longer than expected? Is there a plan B if capital expenditure goes over budget? Is there enough margin to comfortably service debt? Can an investor afford to hold the asset for an extra year? What happens if there are adverse market movements?

It is important to hold a regular review process that assesses the original plan's feasibility, given progress with asset management initiatives and prevailing market conditions. Have project milestones been met? Does the market support the underwriting? If the assumptions no longer stand up, then the plan should be revised accordingly. The review is an iterative process and the cash flows have a reflexive relationship with the business plan; there is a feedback loop between the two. The cash-flow analysis will have to support any decision to hold or sell an asset. Not having a robust cash-flow analysis and clear decision-making process increases the risk of a poorly timed exit, perhaps the surest way to destroy value.

In the example of the accompanying case study in this chapter, we were faced with the global financial crisis halfway through a project's life cycle. This scenario forced us to reassess all of our assumptions. As it happens, we were able to meet our investors' expectations, albeit by an alternative route. Investment markets shutdown, closing off development finance to an already supply-starved market, and we were forced to hold our asset longer than originally anticipated. We could have panicked and produced a significant loss, but our cash-flow analysis suggested otherwise. Although cautious occupiers held off on leasing decisions, the fundamentals remained supportive of rental growth. We eventually leased the vacant space at rents higher than we had assumed in our underwriting. The decision to extend our hold period was undoubtedly the right one and it had been supported by our cash-flow analysis. For a more detailed example, refer to the cash-flow analysis at exit (see Appendix A).

In another instance, an unforeseen incident necessitated repair works for which we simply had not budgeted. The space was eventually leased, but several months later than was planned. Fortunately, the leasing market had picked up in the interim and the marginal increase in rental value exceeded the cost of repair works. Had we not managed our cash flow and maintained sufficient internal liquidity, we would likely have taken a loss on our investment.

Cash-flow analysis

Given the need for value-added deals to generate an income return and capital appreciation, the strategy might be seen as a hybrid style of investment. A value-added deal should generate a running yield, like a core deal, but will experience a J-curve effect on returns, like an opportunistic deal. As already discussed, this is very much a balancing act. Too much capital expenditure will weigh on free cash flow, too little will not generate sufficient capital growth.

Operating cash flows

Given the constraints and opportunity discussed above, the timing of cash flows is essential in order to maximise returns. It is also imperative to maintain sufficient internal liquidity to maintain cash-flow solvency. It is not good if the cash-flow model generates a high return in the long run, but insolvency in the short run. While current income may be sufficient to service current debt levels, future capital expenditure may be dependent on internal financing from income growth. Invariably this will be highly dependent on leasing activity.

Case study: **Adding value to a mixed-used building in a major city**

MGPA had the opportunity to reposition an under-rented, mixed-use building in a major city. The asset in question was a 30-story grade B+ office tower with a four-level retail podium. Originally built in the late 1980s, it had been refurbished the previous year, so there was limited scope for improving the tenants' accommodation. However, several value-added opportunities were identified during due diligence: lease vacant space and maximise occupancy, realise reversionary value within existing leases, reduce the corridor width of the office floors, create direct access to the subway system, improve the retail tenant mix and improve the common areas.

The ongoing recovery of the local economy and property market were also a driving factor. Average office rents within the central business district were expected to increase over 20 percent in the first year, owing to acute supply constraints, and thereafter a more modest 4 percent per year. In recent years, larger occupiers had dominated take-up in the city's core, pushing smaller occupiers out to the fringe. In addition, the completion of a sizeable development nearby shifted the centre of gravity such that the subject property could be marketed to small-and medium-sized tenants as having a central location.

The business plan was to maximise occupancy and capture reversionary value in a relatively short period of time. The first challenge was to lease vacant space to new tenants. In total, there were 101 tenants, consisting of 24 retail tenants and 77 office tenants. The reversionary potential of re-leasing currently occupied space was identified during due diligence, with 77 percent of leases expiring over the first two years of ownership. Tenants that could not afford market rents were identified early. It was also clear that the current landlord did not have a retail strategy. The mix of retail tenants would be changed to improve the overall retail offering. The leasing strategy for the retail podium would target mid-priced fashion retailers that would be attractive to office workers during the week and passing trade from nearby department stores at the weekend.

Although no major refurbishment work was planned for the subject property, a number of value-added opportunities were assessed. The corridors in the office space were found to be particularly wide, beyond what the building and fire codes required, so they could be reduced on multi-tenant floors to increase area efficiency. The newly renovated floors would then be leased based on expanded area measurements to increase rental income. Footfall would be improved by providing direct access to the light railway station from the retail podium. The retail podium would also be commercialised by erecting a billboard on an external wall, where it faced an arterial road. Other minor capital works were undertaken to improve the external cladding of the retail podium. A new security and surveillance system was installed and firefighting systems were upgraded.

Once rental income was maximised and the retail offering improved, the building was repositioned as a prime asset. The plan was to dispose of a stabilised asset to an institutional investor. New legislation had improved access to public equity markets and listed property companies were identified as potential buyers from the outset. Even though the capitalisation rate was higher at exit than at entry, the project generated an IRR of 16 percent and an equity multiple of 2.4x. This was the value-add to income.

Reducing operating cost may be another way to increase operating cash flow, though it may ultimately destroy value. Unless greater operating efficiencies can be found, the building's management should avoid cutting corners and reducing the quality of service, particularly if one is trying to create a prime asset. It will be harder to achieve higher rents in a building with reduced service levels.

Tax planning is also an important cash-flow consideration. Creating a tax-efficient structure will entail not only mitigating the overall liability of the asset, but also the timing of payments, to the extent that the tax jurisdiction permits. The higher an investor's cost of capital is, the more important it will be to defer payment. Lastly, the fund manager should ensure that adequate provisions are made to meet any obligations, as this will likely be one of the last cash flows after the last distributions have been made. Any shortfall would require an unwelcome equity call to investors and delay in winding-up the investment's structure.

Investment cash flows

For value-added real estate investment, capital expenditure should ultimately drive capital growth. However, a project is only adding value when its economic benefits outweigh its economic costs. That is not to say that any project that has capital growth is proof that a project is adding value – capital growth can be driven entirely by market growth, in spite of capital expenditure that destroys value; a rising tide lifts all boats. Perhaps the greatest test for a value-added deal is whether or not it can generate capital growth in a falling market, as in the example of the case study.

In terms of discounted cash flows, if a project is genuinely adding value, the present value of its inflows should exceed the present value of outflows. Assuming there is some degree of causality between costs and benefits, it makes sense to front-load capital expenditure in order to front-load rental growth and capital growth, thus maximising net present value (NPV). In a more practical sense, any redevelopment or refurbishment will incur overheads for as long as the construction company is on-site. It is therefore imperative to reach practical completion as soon as possible in order to minimise fixed costs and maximise profitability. This is a critical success factor in real estate development.

Value-added investment is somewhat more complicated than outright development insofar as capital expenditure that generates capital growth has to be balanced against rental income that maintains an income return. For refurbishment or redevelopment projects, occupancy provides income, but also acts as a bottleneck for improvement works. The lease-expiry profile will ultimately determine when works can begin. Alternatively, desirable tenants can be relocated elsewhere in the building, while works are underway; undesirable tenants can be induced to leave early by breaking onerous leases or offering surrender premiums.

Vacancy is also a double-edged sword; it provides an opportunity to undertake the necessary improvement works to add value to the building, but it also adds construction risk and leasing risk; the project may run overtime and over-budget, missing a window of opportunity in the leasing market. The leasing market might take an unexpected turn, extending void periods and driving rental decline.

Overall, works should begin and capital expenditure incurred as soon as possible in order to maximise NPV and overall profitability, though there are several qualifications. First, works can usually only begin once a tenant has vacated. Second, enough tenants must remain in place to provide a satisfactory income return. Third, exposure to vacancy and leasing risk must be managed throughout the project's life cycle.

In order to benefit from capital growth, the project must achieve a timely exit. Regardless of whether a project has created value in an economic sense, a successful exit will be ultimately contingent on market liquidity and largely dependent on market prices. The underwriting process should have included some analysis of fundamentals that supports assumptions about future rents. Ideally, an asset would be sold during the upswing in the rental cycle, which usually acts as a pricing signal to the investment market. Selling an asset once it is clear the rental cycle has passed its peak may prove difficult.

In the case of portfolio deals, an investor may have to accept some assets that do not necessarily fit with their investment strategy. If so, they might sell non-strategic assets early and focus on the strategic assets, where they can add value. For example, after The Blackstone Group's acquisition of Equity Office Properties' $39 billion portfolio, they immediately sold $30 billion of assets. In fact, this may even represent a form of arbitrage. Where a portfolio is worth less than the sum of its parts, value can be realised simply by breaking up the portfolio. However, these opportunities are more likely to arise in distressed situations associated with opportunistic styles of investment.

In any case, a portfolio disposal will need to be packaged thoughtfully. A portfolio may contain assets of varying quality, with each asset appealing to a different investor group. The investment market should be analysed into market segments and the assets should be prepared for disposal accordingly. The liquidity for any given type of asset will vary depending on where the market cycle is; all assets will be easy to dispose of during an upswing, whereas there may only be a market for quality assets during a downswing. Moreover, a sale may have to be facilitated by providing vendor financing or arranging some form of stapled financing when credit conditions are poor.

Financing cash flows

As with any investment, financing cash flows are a key concern for investors. The amount and timing of equity drawdowns and distributions will ultimately determine an investment's rate of return. A project's operating and investment cash flows might generate strong free cash flow, but if financing costs are too high, the lion's share of returns will accrue to the lender and not the investor. Clearly it would be unacceptable for the lender to earn a higher rate of return than an investor where the latter is the one taking equity risk. Further, if a project's leverage is too high and loan covenants are breached, there is the risk that the lender assumes negative control and the investor suffers a permanent loss of capital.

INREV's style classification suggests that a maximum loan-to-value (LTV) ratio of 40 percent to 60 percent is commensurate with value-added styles of investment. This should prove sufficient leverage to augment returns without necessarily relying on debt to finance capital expenditure. The loan in the case study was used to finance the acquisition, while capital expenditure was financed by retained earnings thereafter. Further, the dividend decision might be framed in the context of balancing the need for early distribution against the need for internal financing for capital works.

In terms of risk management, the cash-flow model should be stress tested to ensure that there is sufficient liquidity in the project in the event that loan covenants are breached. To complicate matters, there should also be a sensitivity analysis of returns to any interest rate movements and foreign exchange exposure. Hard-won profits from operations and investment can easily turn to losses from poor treasury management.

Case study: **Cash-flow analysis**

	2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Rental income		130	140	150	160	160	
Operating expenses		-20	-24	-28	-30	-30	
Net operating income		110	116	122	130	130	
Tax			-6	-6	-6	-7	-7
Capital expenditure		-10	-20	-10			

Free cash flow		100	91	106	124	124	-7
Acquisition/disposal	-2,500					3,765	
Loan	1,500					-1,500	
Finance cost	-15	-75	-75	-75	-75	-75	
Net cash flow	**-1,015**	**25**	**16**	**31**	**49**	**2,314**	**-7**

IRR	20%					
Exit multiple	2.4					
Net initial yield	4.0%					4.25%
Loan to value	60%					
Total expense ratio		15%	17%	19%	19%	19%
Tax rate	5%					
Running yield		-3.4%	-4.0%	-4.6%	-5.4%	-5.4%

2003 The subject property was acquired at an initial yield of 4 percent, based on rental income of $100 per year. The acquisition was financed by an investment loan at 60 percent LTV, with an arrangement fee of 1 percent. Importantly, and in contrast to many (re)development projects, the loan was not financing capital expenditure.

Immediately, works began on the vacant office space: narrowing corridors and upgrading ceiling panels, wallpapers and carpets. The first upgraded unit was used as a marketing suite. Simultaneously, leasing agents were appointed and began marketing the space.

2004 Improvement works on vacant space were completed and the majority of space was leased to new tenants at market rents. A handful of tenants renewed leases at higher market rents and moved into the remaining upgraded space. Immediately, work started on improving the space vacated. Throughout the improvement works, some frictional vacancy was required as works could not be untaken while tenants were in situ.

Given that NOI was sufficient to finance minor capital expenditure and free cash flow could service debt, net cash flow was distributed to investors.

2005 A number of leases expired in the third year. Some tenants renewed at market rents and moved into upgraded spaces. Others vacated, and improvement works began in these spaces. Tenant churn would continue until all of the space was upgraded and rack-rented.

Property management services were significantly improved in line with standards of the central location. Operating expenses increased accordingly, though at a slower rate than rental income. This has to be seen in the context of adding value to the space. Works started on direct access to the retail podium from the subway station. A billboard was erected outside the retail podium and leased to an advertising company.

2006 The last few office units were upgraded and leased to new tenants. Improved access to the retail podium from the subway station increased footfall and sales revenue. The leasing agent was now able to begin marketing retail units where incumbent tenants, whose leases were about to expire, did not meet with the new retail strategy. Final capital improvements we made to common parts such as the building's security and fire alarm.

2007 A few retail leases were renewed at higher market rents while those that did not fit the proposed retail strategy vacated. New leases were signed to tenants offering mid-range fashion commensurate with local demand.

With capital improvements completed, the building was repositioned to tenants and fully occupied. Office tenants paid higher rents on more lettable areas; retail tenants paid higher rents with significantly improved footfall. Common parts and building management were improved.

2008 The asset was successfully repositioned as a stabilised asset and sold to an institutional investor. The loan was repaid and a final distribution made to investors. Though the investment market had weakened and cap rates had moved out by 25 basis points, the investment achieved an IRR of 16 percent and an equity multiple of 2.4x. The value was created solely through the repositioning, increasing the rental value by 60 percent over the hold period.

NOI was sufficient to finance capital expenditure. This is important as the project's successful completion was not dependent on capital markets or financing from third parties. Moreover, income growth was sufficient to generate a running yield after the first year.

2009 A final tax payment was made in arrears.

Source: MGPA.

Conclusion

For value-added deals, cash-flow analysis has uses far beyond investment appraisal. It is a multifaceted tool that continually informs the decision-making process. The cashflow model will have a significant influence on project planning, as it will help determine the extent and timing of any improvement works and leasing activity, and ultimately feed into the budgeting process. The feasibility of initial assumptions may be tested with a scenario analysis, such that the cash-flow model feeds back into the project plan by exposing sensitivities.

During the hold period, a robust cash-flow model is crucial in order to manage an investment's return profile, to balance the need for income return against the need for capital growth in order to produce a value-added style return. The cash-flow model will be essential for managing internal liquidity and may also influence capital structure, assisting management in the dividend decision and helping to determine target leverage. For value-added deals, cash-flow analysis is an essential decision-making tool throughout an investment's life cycle, from initial planning through to disposition.

□

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Nigel has over ten years experience in real estate. Prior to joining MGPA he worked for AEW Europe, Legal & General Investment Management and CB Richard Ellis. Nigel has a BA in Philosophy from the University of Greenwich.

Appendix: Cash-flow analysis at exit

	2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Rental income		130	140	150	160	155	165	175	
Operating expenses		-20	-24	-28	-30	-30	-30	-30	
Net operating income		110	116	122	130	125	135	145	
Tax			-6	-6	-6	-7	-6	-7	-7
Capital expenditure		-10	-20	-10					

Free cash flow		100	91	106	124	119	129	138	-7
Acquisition/ disposal	-2,500							3,889	
Loan	1,500							-1,500	
Finance cost	-15	-75	-75	-75	-75	-75	-75	-75	
Net cash flow	**-1,015**	**25**	**16**	**31**	**49**	**44**	**54**	**2,452**	**-7**

IRR	16%							
Exit multiple	2.4							
Net initial yield	4.0%							4.50%
Loan to value	60%							
Total expense ratio		15%	17%	19%	19%	19%	18%	17%
Tax rate	5%							

Running yield	-3.4%	-4.0%	-4.6%	-5.4%	-4.9%	-5.9%	-6.9%

Source: MGPA.

13

Cross-border investment: Considerations and risks

By Paige Mueller, GIC Real Estate[1]

Introduction

The global economy doubled in size from 1998 to 2010. Trade markets opened, and as global exports doubled in volume from 2003 to 2010, the Chinese economy tripled in size to become the second largest economy in the world.[2] As part of this transformation, many countries improved their sovereign capital structure and legal framework which investors must have to protect their investments, and new capital market products were created to give business owners access to capital and the ability to grow their businesses. Going forward, a new middle class which has only started to emerge will redistribute global wealth. By 2030, more than 2.5 billion people are expected to reach middle-income class status in Asia alone, a possible six-fold increase. Asia will then account for two-thirds of the global middle-class population, up from only a quarter today.[3] The impact of new wealth has already started to be seen as new institutional-quality housing, formal retail markets and other types of real estate are being constructed at a fast pace in many emerging markets. As such, many real estate investors now reach out beyond their own borders to invest in other countries and even continents as international investing has become a more viable option.

Why invest internationally?

Investors have been investing internationally for decades. Japan invested billions of dollars in US real estate in the 1980s, and the Dutch have also been active international investors. Going forward, investors from larger economies may find limited growth opportunities in their home markets and start to look elsewhere for growth prospects given the high debt burdens, aging populations and fiscal deficits of many developed countries as of 2011. International expansion can also improve portfolio risk/return metrics and better meet investor needs.

Market size and growth

As emerging markets grow, the US becomes an increasingly smaller part of the global real estate market. The US represented 36 percent of the global real estate market as of 2003, 27.5 percent in 2010 and is expected to fall to less than 23 percent by 2030. Conversely, Asia is expected to rise from 26 percent in 2010 to 45 percent by 2030.[4] Urbanisation trends in emerging markets will amplify this trend even further.

Diversification

Portfolio diversification should help to reduce return volatility and increase risk-adjusted returns. The US commercial real estate produced an average annual return of about 6.9 percent in 2001 to 2010, with a standard deviation of 11.4 percent. As a simple example, if an investor had put equal parts of the portfolio into each of the US, UK and China during the same time period, the average return would have increased by almost 430 basis points (bps), with a 60 bps decline in portfolio volatility.[5] The lack of correlation between markets provides significant diversification benefits, but correlations in total returns between some of the major markets have been rising over time (see Table 13.1).

Table 13.1: **Correlations in total returns between countries, 2000–2010**

	Japan	**China**	**Australia**	**US**	**UK**
Japan	1.00				
China	0.30	1.00			
Australia	0.33	0.34	1.00		
USA	0.06	0.42	0.41	1.00	
UK	-0.15	0.10	0.71	0.45	1.00

Source: NCREIF, IPD and Jones Lang LaSalle.

Returns or yield

While some markets do provide higher returns than others, many countries have, in fact, very low yields, perhaps due to low interest rate environments, high expected future growth or limited investment opportunities. In some countries, global capital focuses on a few core cities which tends to drive prices up. In emerging markets, there may be a lack of institutional-quality product or ownership in forms that are not conducive to easy sales; for example, condominium structures where different floors have different owners, or family or government ownership which is not prone to selling. Investment opportunities for existing institutional-quality real estate can often be quite limited in emerging markets which necessitates exposure to development risk. In this case, the higher expected returns are reflective of much higher construction risk profiles.

Inflation hedge

Real estate can provide some inflation-hedging abilities over long cycles, but it can miss in the short term due to construction and economic cycles that may reduce returns, or long-term leases may be fixed or only reflect increases in expected inflation. Investors can better hedge cash flows to inflation in markets that have shorter-term leases or where leases are indexed to inflation as these instruments better allow adjustment for unexpected inflation. However, values are still subject to broader capital market factors that may vary in the short term. Inflation risk can also be diversified by investing in countries with more stable inflationary trends.

User needs

As economies have become more open, multinational companies often have a need for institutional-quality real estate, contracts and, in some cases, environmental standards. Global developers, service providers and investors who have local offices can help real estate users navigate the globe and provide consistent quality and standards.

Product availability or lack thereof

While capital markets have matured and expanded substantially since the 1990s, financing and public-market structures remain limited in some countries. A lack of debt in some emerging markets creates an opportunity to provide debt or joint-venture capital as local companies need access to capital to grow. Likewise, certain types of investments such as development, non-performing loans or other opportunistic investments tend to cycle at different times in different countries. Conversely, non-US investors may want to invest in the US or other developed markets in order to gain access to capital market structures such as commercial mortgage-backed securities which remain highly overweighted to the US.

Geographic availability

For cross-asset-class investors, private investments such as real estate provide access to countries that may not have developed public markets. Even where public equity investment opportunities exist, governance and transparency standards vary by country and stocks in some markets may be majority owned by governments or families, increasing the risks to other investors. Direct investments in real estate (preferably with a local partner) can provide another opportunity to gain portfolio exposure to some of these high-growth emerging markets.

Sovereign economic and political market analysis

Real estate remains an immobile investment which is subject to the laws, politics and economic forces of a country. Therefore, when considering investing in another country, the first step is to review sovereign factors that could affect the economic environment that will drive property demand, rents and values. Factors to consider include: stability and structure of the country's government, economic dependency on certain industries or trade with particular countries, expected growth, and availability and sources of capital. These big picture trends set the overall environment for tenant demand, volatility, ownership rights and values. If the country-level analysis pans out, real estate market due diligence including strategy, local market analysis and underwriting begins.

Market size and investment vehicles

It takes a tremendous amount of effort to learn the local market, players, laws, customs, ownership rights and taxes when investing in a new country. In addition, when investing directly, it is critical to have a local presence in the market, either directly or through a partnership agreement. Therefore, some thought must be given to whether the country is large enough to warrant the expense needed to enter the market; the economies of many countries are smaller than large US cities.

Investors with smaller portfolios may want to invest in a limited number of countries with strong diversification benefits and/or invest in funds or public markets (REITs) which provide indirect and more liquid methods of investing. They can also opt for separate accounts or commingled funds with large advisory firms. Investors can also enter other markets through joint ventures in which equity capital is invested in real estate with a local partner, or through a private investment in a local real estate company. Debt investments should also be considered, particularly in countries that have limited or immature capital markets.

Political stability

A stable and functioning government must be in place to provide a durable economic environment in which real estate investments can exist. Understanding how a country's government works, what its priorities are and how effective it is in maintaining a stable and prosperous environment can be determined by analysing the current political party's term and ascendancy to power; concentration of political power and influence in certain industries, such as government-owned monopolies or oligopolies; fairness and transparency of political systems; government elections, regulation and taxation; corruption and crime levels; openness to or restriction of foreign ownership of companies and properties; incidences of sovereign default or nationalisation of certain industries; and consistency in application of laws to local and foreign owners.

Laws and regulations can also impact the ability of potential tenants to operate and grow. Considerations include openness to private business enterprise; rigidity of labour markets; nature of labour, whether seasonal or long term; consistency and predictability in application; and restrictions, whether tariffs or to international trade.

Lastly, it is important to draw the above analysis to a conclusion as to how the political environment will impact growth, stability and operations going forward. While democratic environments may provide economic freedom, they may also be slow to react and short term in focus. Other governments may be faster to react and generate more long-term plans, but represent special interests.

For real estate investors, a number of firms provide information and rankings that can be used to assist in analysing the political stability of a country.[6] In addition, measures such as growth in foreign direct investment or foreign direct investment as a percent of GDP give some idea of international investors' comfort level with a particular government.

Corruption

Business practices vary by country and the lack of a comprehensive legal environment and/or enforcement of laws can lead to various degrees of corruption as evidenced by incidents such as bribery of public officials, kickbacks in public procurement, embezzlement of public funds and other political scandals. Corruption indices are produced by a number of global banks, economists and other independent agencies.[7] Risk of contract repudiation or the government's ability and history of breach of contract without penalty should also be understood.

Economic stability and growth

Just as corporate income and balance sheets are analysed before investing in stocks, the revenues, expenses and debt balances of sovereign governments are indicators if the country is prone to bouts of high inflation, volatile economic growth or currency volatility that will impact property income and pricing going forward. While this topic warrants a book on its own, Table 13.2 shows a few key indicators.[8]

First, the source and structure of revenues should be reviewed, to obtain some idea of the growth potential and volatility going forward. Many developed markets are now facing aging population bases which will reduce the ratio of the working to non-working populace going forward, in turn putting downward pressure on economic growth and fiscal balances. These countries will also then be more dependent on in-migration for growth which can be influenced by politics, potentially increasing risk and volatility of population growth, the very foundation of growth fundamentals. The government's budget or fiscal balance indicates if government revenues are running ahead of expenses or vice versa. The source of government revenues is also important; for example, they may come from taxes, commodity sales or even land-usage rights. If a fiscal deficit is present, determine how it will be financed.

Table 13.2: **Basic indicators of economic structure and growth potential***

Economic structure	•Origin of GDP – percent in agriculture, manufacturing, services
	•Expenditure on GDP – percent from private consumption, government, fixed investment and imports/exports
	•Dependence on exports – percent of GDP, largest trading partners, type of exports, that is, are exports primarily based on oil or a particular commodity?

	•Size of import market, trading partners and types of imports •Availability of natural resources and dependency on other countries for critical resources such as water, food and energy
Fiscal structure and public finances	•Sources of government revenues, for example, taxes, oil and land rights •Fiscal balance (government budget) as percentage of GDP •Current account as percentage of GDP •Public debt as percentage of GDP •Debt service paid as percentage of GDP •Cost and maturity of public debt •Borrowings, if any, from global capital providers such as the International Monetary Fund (IMF) •Foreign exchange reserves as percentage of GDP •Foreign exchange reserves/short-term debt or gross external financing requirement

	•Foreign direct investment trends and size
Demographic structure impacting economic growth	•Age structure of population and ratio of working to non-working •Dependence on in-migration and remittances sent home from overseas workers
Basic economic growth trend indicators	•GDP growth •GDP per capita in US dollars, adjusted for purchasing-power parity •Unemployment rate and employment growth (may be influenced by seasonal employment) •Retail sales growth •Industrial production •Size and growth in middle-income households •Inflation (and government inflation target if applicable) •Government bond rates – short and long term; are they denominated in local currency?

•Monetary policy/money stock, for example, M1 and M2 growth

•Exchange rate

* Table shows only a few key indicators and is not intended to provide a thorough economic analysis.

On the balance-sheet side, identify how indebted the country is, to whom and at what cost. Shorter-term debt presents a refinancing risk and debt denominated in other currencies introduces currency risk. Purchasers of government debt may be other countries, banks or the private sector and based inside or out of the country. The interest of the bond purchasers can have a large influence on the cost of debt, particularly if they are located elsewhere.

Overall, countries that have low debt burdens, low costs of financing, substantial reserves and fiscal surpluses should be able to handle external shocks to both their economies and capital markets with less volatility than countries that are highly indebted and running fiscal deficits that need to be financed. The willingness and ability of the government to offset such shocks in the past should also be analysed as well as the country's history as far as stability in interest rate and currency markets.

Table 13.3: **Comparison of economic structures**

	2010	2010 Nominal GDP		Real GDP growth (%)		2010	2010	2010	2010	2010	2010	
Country	Population (m)	$ bn at PPP	Per capita ($)	2010	Forecast 2011–2015 per year	Inflation	Lending interest rate*	Exports as % of GDP	Current account balance as % of GDP	Total debt as % of GDP	International reserves/ total debt (%)	TI Corruption Index Rank**
Brazil	191	2,172	11,386	7.5	4.5	5.0	40.0	10	-2.3	17	83	69
Mexico	112	1,835	16,313	5.4	3.6	4.2	5.3	29	-0.5	19	62	98
Argentina	41	643	15,871	9.2	5.0	10.5	10.6	19	0.8	35	41	105
Chile	17	258	15,085	5.2	5.1	1.4	4.8	35	1.9	41	33	21
China	1,312	10,203	7,777	10.3	8.5	3.2	5.8	27	5.2	9	544	78
India	1,184	4,184	3,534	8.8	8.4	12.0	10.2	14	-3.0	15	114	87
South Korea	50	1,476	29,812	6.2	4.0	3.0	5.5	46	2.8	38	77	39
Indonesia	243	1,030	4,239	6.1	6.3	5.1	13.3	22	0.9	22	63	110
Malaysia	28	415	14,700	7.2	5.6	1.7	5.1	84	10.8	30	149	56
Vietnam	88	277	3,150	6.8	6.7	9.0	13.1	69	-5.4	32	39	116

* Indicative of lending rates from banks to individuals and businesses.

** 2010 ranking by Transparency International. Score of 1 = Lowest perception of corruption. Score of 178 = Most corrupt.

Source: Economist Intelligence Unit.

Table 13.3 exemplifies some of the large differences that exist in economic size and structure between countries. These factors should also be considered when comparing real estate markets across countries. For example, when comparing the maturity level of retail markets in countries that have large income disparities,[9] it will be more productive to compare retail space per disposable income rather than retail space per capita.

Monetary policy and capital market structure

Sound monetary policy and a stable banking system are also critical to a functioning economy and stable currency.

Monetary policy also gives some indication of the direction of interest rates and economic growth. Who drives monetary policy, what are the monetary priorities and how it is implemented? Is there an inflation target and an independent central bank? The structure and activity of the local banking system affects mortgage markets, the ability of tenants to grow, and the level and volatility of interest rates. Considerations include the ownership of banks, whether by the government, local or international companies; lending volumes, including to the private sector; consistency of lending and reporting policies with international standards; size of non-performing loan portfolios; and the existence of a functioning stock and corporate bond market.

Sovereign real estate market analysis

If the country is deemed to have a stable political and economic structure and a sound capital market that is large and liquid enough to support investment and hopefully justifies some expected growth, analysts then focus on other factors such as the legal and tax environment that have a direct impact on real estate investments, ownership structures and returns.

Legal

Investor rights, protection of outside shareholders, quality of legal enforcement, efficiency of the judicial system and rule of law vary by country. Some countries limit foreign ownership to particular jurisdictions, particular property types or limit the ownership of land. Foreclosure laws, processes and thus the time to recover and the amount that can be recovered vary by market. Rental contracts may also be more flexible in some countries as far as the tenant's ability to break the contract with minimal penalty. Local laws may also be layered on top of national laws so it is critical to understand what the local laws are, how they are enforced, who and how judicial decisions are made and whether laws are enforced similarly for different parties.

Expropriation, or the government's ability to take private property with or without compensation, is a real risk in some markets. In addition, some governments expropriate property in growth corridors as part of planning for new development. Land-use rights may be purchased for land that has been cleared (expropriated) or may be purchased for land that has yet to be cleared which is a higher risk. Investors should also consider whether they want to participate in deals where land has been expropriated. Clear titles may also be difficult to obtain in emerging markets that have not had a historically enduring title-recording process.

Taxes

Tax structures can have a significant impact on local mandates and the ability of foreign investors to compete in a market. For example, it may be more tax efficient for an investor to invest through debt, public or corporate entities rather than direct private equity in some markets; foreign investors may need to structure to be minority owners. Taxes can also alter the income versus capital-gain components and thus risk associated with return expectations, particularly when leverage is used to minimise tax leakage. Repatriation of funds back to the home market may also be taxed, so usage and movement of cash needed to support an investment should be considered within the tax environment. Therefore, tax implications can drive investment mandates (deal structure and investment type), and after-tax return expectations and vehicles should be gauged before entry into the market and evaluated as to whether they meet the investor's broader risk and return mandates.

Local partners and competitors

Informational disadvantages have been shown to exist in companies that spread too thinly into too many markets.[10] Therefore, it is critical to have representation in the market through experienced local talent who not only understand the local language, culture and conventions, but also are proven to operate and report by international standards. Owners such as families who may be potential partners may have different goals and return expectations than international investors. Exit strategies are also critical, and so it is important to understand potential buyer motivations as well. While cross-border buyers such as sovereign wealth funds accounted for 20 percent to 30 percent of global purchases from 2007–2010,[11] they may have different interests in terms of property type and secondary markets than local buyers.

Transparency

In addition to government, legal and regulatory market transparency, real estate market transparency is needed such as:

•*Availability of market trend indicators* such as the size of the institutional market, new construction pipelines and pre-leasing, demand, occupancy, rental rates, sales prices and yields, identity of owners, operators and tenants.

•*Availability of benchmarks* that allow investors to compare the performance of their investment or portfolio to a comparable indication of broader market performance.

•For benchmarks and indicators to be collected, the market must have some agreement on *standard ways to measure and report real estate performance* and what parameters will be reported. Open and standard methods of drawing sales and leasing contracts also improve transparency.

•*History, timeliness, depth and frequency of reporting.* Benchmarks and market trend indicators need to be reported in a reasonable frequency and within a reasonable amount of time so that investors can make meaningful decisions and react in time to changes in the market. Data also needs to be available with enough detail to be meaningful and for a historical time period that is long enough from which to draw meaningful inferences and conclusions. For example, data is needed at a minimum for a full economic or real estate cycle, and preferably longer.

•*The existence of public markets* both in the equity and debt side of the business tends to raise transparency as analysts track and report on public companies and vehicles.

Local standards/language

Languages, standards and measurements vary by country. For example, rent terminology and standards vary widely. 'Prime' rents are often quoted which typically indicate average rents for top buildings in the market, but can also mean the top rates for the top buildings or an average rate for the top buildings. Moreover, what are the 'top' buildings – one or two buildings or a larger market representation? The inclusion of expenses in the prime rent should be understood. For example, prime rents may be gross rents (typically including utilities, common area maintenance [CAM], taxes and insurance), net rents (typically excluding utilities, CAM, taxes and insurance), or some sort of modified gross rent which would include some but not all of utilities, CAM, taxes or insurance. In addition, some brokers may quote net rents inclusive of a straight-line amortisation of capital expenditures, leasing commissions or tenant improvements.

Because of the various measurements used, rental growth may be difficult to compare across countries. Rents, therefore, should be considered on a like-for-like basis. For example, a $20 gross rent may increase by 5 percent, resulting in a $21 gross rent the following year. However, assuming that expenses only increased by inflation, say 2.5 percent and that expenses are 40 percent of gross rents, when quoted on a net basis, that same rent could be quoted as $12 in year 1, changing to $12.80 in year 2, or a 6.7 percent increase which would appear to be more volatile than the gross rent – but is really just a denominator impact (see Table 13.4).

Table 13.4: **Comparing net-rent growth to gross-rent growth**

	Gross rent	**Expenses**	**Net rent**
Year 1	$20.00	$8.00	$12.00

Year 2	$21.00	$8.20	$12.80
% increase	5.0%	2.5%	6.7%

Given the differences in rent structures, capitalisation (cap) rates or yields can also be misleading and should be analysed as cash yields rather than income yields. For example, assume that landlords in Country A charge a net rent of $7 per square foot (psf) and then provide $2 in capital expenditures back to the tenant. The cap rate in this case would be 7 percent (assuming a $100 psf value) with a cash yield of 5 percent (($7 - $2)/$100). In Country B, the tenants generally cover most of the capital expenditures. Therefore, the investor who similarly needs a 5 percent cash yield in Country B could charge a $5 net rent and separately charge $2 for capital expenditures. In this case, both the cap rate and the cash yield are 5 percent. Therefore, it appears that Country A has a higher cap rate than Country B (7 percent versus 5 percent), but in reality the cash yields are similar and the cap rates only reflect a difference in lease structures.

Measurements also vary by market, from square feet (sf) to square meters (10.76 sf) to tsubos in Japan (35.58 sf), and as to whether the rent is quoted on a per month or per annum basis.

Product quality

Building standards vary significantly by country. In emerging countries where capital markets are not fully developed, mortgage and construction financing may be limited and builders may rely on the sale of condominium-style interests to fund construction. Therefore, even if the construction quality is sufficient, it may be difficult to purchase the building if it has multiple owners. In these types of markets, investors may find limited opportunities to purchase buildings and may need to build new buildings to enter the market.

Underwriting

Underwriting standards as far as the use of discounted cash-flow methods, yield analysis, replacement cost and sales comparisons are used similarly across countries. However, there are a few special considerations worth mentioning when underwriting investments in other countries as lease structures and return expectations do vary by country. In addition, it is important to have a clear exit strategy which may vary by country depending on the market's liquidity, typical investors and maturity of the local capital market.

Lease structures

Lease structures vary significantly by country, which changes the risk structure of the investment.[12] For example, Table 13.5 shows typical office lease terms for different countries. Risk increases where lease structures are shorter and can be more easily broken. Therefore, an office strategy in a country that uses long-term leases may represent a much lower risk profile than an office strategy in a country where lease terms are shorter. Leases, particularly in some emerging markets, may be denominated in currencies such as the US dollar or the euro. Operating and transaction costs also vary by country, and fees for multi-country funds tend to be higher than those for a single country.[13]

Table 13.5: **Comparison of office lease terms by country**

Country	Typical office lease term
US	5–10 years, may be longer for larger tenants
Brazil	1–10 years, often 5 years
Canada	5–10 years; 10–15 years for larger tenants
Mexico	3–5 years; 5–10 years for larger tenants
France	3/6/9 years that provide tenants the right to break every 3 years; 6–9 years for larger tenants
UK	10+ years + 5-year renewal option for larger tenants; 5 years + 3-year break option for smaller tenants
China	2–3 years; 5–6 years for larger tenants + 3-year renewal option
India	3 years + two 3-year renewal options
Hong Kong	3 years, 6 years for larger tenants with a 3-year rent review

Source: Global Office Occupier Guide 2011, CBRE.

Hurdle rates

While there is no one correct method for creating country-level hurdle rates, one method is to view the hurdle rate as three components: government risk, real estate risk and deal risk. The government portion of the hurdle rate can be estimated as differences in the long-term government bond rates, which theoretically represents the difference in risk for sovereign economic and political risks. It may also be estimated from factors such as the sovereign bond credit rating, exchange-rate volatility and measures of economic structure. The hurdle rate is further adjusted for real estate risk, which is generally thought to be somewhere between the bond and stock market risk premium and generally represents differences in the structure and maturity of the real estate market.[14] Deal-specific risks include occupancy and leasing assumptions, new construction and leverage metrics.

Execution risk, liquidity and exit strategy

While an exit strategy may be easy to execute in one country, it may not be as easy to execute in another country given the size, structure and portfolio objectives of other investors in the market. Some investment strategies may depend on public markets for either capital or exit strategies and in this case, the stability, size and growth in the local public markets should be considered.

Portfolio strategy and risk

Many top-down portfolio strategy, allocation and risk exercises can be applied for cross-country portfolios just as they are used in single-country portfolios. However, multi-country portfolios introduce a few new metrics such as currencies and sovereign risks that must be considered.

Currency hedging

Currency movements can have a large impact on portfolio returns, even when only investing in developed markets. For example, the US dollar depreciated against the broad index by 8 percent year over year as of mid-2011.[15] A few different methods can be used to manage currencies, although each has it setbacks and most likely some combination of different approaches to managing currency risk will be used.

One approach to managing currency risk is to hedge the currency, although currency hedges are often expensive and short term in nature whereas direct equity investments in commercial real estate are often made for the long term. Another option for managing currency risk is to allocate the portfolio to a 'currency-neutral' position which involves setting allocation limits by country so that currency appreciation in countries in one part of the portfolio will be offset by currency devaluation in other countries in the portfolio, thus neutralising the impact of currency movements within the portfolio. This method may be hard to execute as the currency neutralising allocation may not correspond with the investor's optimum risk-return allocation. In addition, it implies that either currencies will move similarly going forward as they have in the past or that the investor is able to forecast currency movements, either of which are unlikely with a small margin of error.

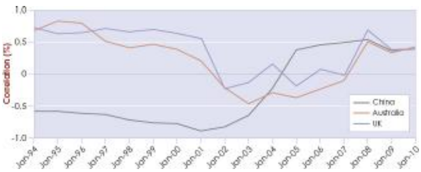
A third option is to use leverage to offset currency exposure, although it introduces a significant volatility or risk exposure into the portfolio itself and, if used across all international investments, could significantly increase the volatility of the portfolio depending on the size of the international portfolio. A fourth option is to invest in other countries that have leases that are denominated in the home country currency, for example, some emerging markets have leases which are denominated in US dollars or euros. However, if expenses remain in the local currency, the potential currency mismatch should be evaluated in terms of currency risk.

Allocations by country

As when constructing a domestic portfolio, various allocation methods can be used from strategic (for example, efficient frontiers or modern portfolio theory [MPT] and Monte Carlo simulations) to constant weighting (rebalancing to a market weight) to tactical (identifying short-term opportunities and inefficiencies). International investing introduces a few new considerations into each of these strategies, most notably the lack of data for emerging markets and changing inter-country interactions. For example, MPT analysis is extremely sensitive to correlations. Figure 13.1 shows the rolling ten-year correlations of total returns between the US and a few countries. While the correlation table used in a MPT analysis should be indicative of forward expectations during the upcoming holding period, the changing historic pattern between countries is not helpful. Simply changing the correlation table to trends from different years can create a drastic difference in results. Similarly, volatilities change over time, assuming that data is even available to calculate the above.

For these reasons, investors may want to consider using multiple allocation techniques, for example, do the results from the MPT analysis make sense given the size and growth patterns of each country and is the strategy executable given market conditions at the current time? Other diversification techniques typically used within national markets such as cluster analysis or exposures to particular industries or trade relationships may also be used.

Figure 13.1: **Rolling ten-year total return correlations to the US, 1994–2010**



Source: NCREIF, IPD and Jones Lang LaSalle.

Investors sometimes classify international allocations by core versus non-core, or developed versus emerging countries. This differentiation can also be blurred by changing country dynamics such as the high debt burdens recently incurred by many developed markets which were historically more typical of emerging markets. Additionally, core deals can be done in non-core countries and highly opportunistic deals can be done in core markets. Therefore, the risk and volatility of the underlying investments should be considered when measuring against the investor's risk and return objectives.

Conclusion

There are many benefits to cross-border investment, including diversification of sovereign and real estate risk, access to high growth and large markets, improved risk-adjusted return, and inflation hedging. However, adding another country may not provide portfolio benefits if it is highly correlated to the home country and/or produces relatively low returns. Before embarking on traditional real estate market analysis, international investors must first consider the economic and political risks, size and economic growth prospects of the country. Tax laws may play a large part in country level mandates as will the legal environment, particularly if it restricts foreign investment in certain areas or property types. Having a local presence either through the firm's own employees or a partner is critical as real estate remains an immobile and local investment. Lease terms, language and return expectations vary by country. At the portfolio level, returns may be impacted by additional factors such as currency movements.

□

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Paige has an MBA in Finance from Indiana University and has more than 24 years of industry experience. She has published in leading academic journals and presented to organisations such as NCREIF, PREA and ULI among others. She has co-authored and co-instructed appraisal classes, and is recognised as a Hoyt Fellow, Vice Chair of the ULI Global Exchange Council and Advisory Board member of the Real Estate Research Institute.

[1] Views represented herein are solely those of the author and do not represent GIC.

[2] World Bank, in current US dollars.

[3] Kharas, H. and G. Gertz. 2010. The New Global Middle Class, a Cross-over from West to East. Wolfensohn Centre for Development at Brookings.

[4] Prudential Real Estate Investors. A Bird's Eye View of the Global Real Estate Markets. 2003 and 2011 Update.

[5] In US dollars.

[6] For example, the Political Risk Index produced by the Economist Intelligence Unit, and the Index of Economic Freedom produced by the Heritage Foundation and the *Wall Street Journal.*

[7] For example, the Corruptions Perceptions Index produced by Transparency International.

[8] Note that urban growth and income trends may vary significantly from national trends as major urban centres may

have substantially higher income levels and growth rates than the national average as rural populations continue to move to urban regions for more available and higher-paying jobs.

[9] Note that incomes may vary significantly in the cities of some countries and thus comparisons should always be done using typical local metrics rather than broad country metrics where significant differences exist between rural areas and prime cities.

[10] Eicholtz, P.M.A., K. Koedijk and M. Schweitzer. 2001. Global Property Investment and the Costs of International Diversification. Journal of International Money and Finance, 20.

[11] Real Capital Analytics.

[12] See, for example, the CBRE Global Office Occupier Guide.

[13] PREA Management Fees Terms Survey 2010.

[14] See, for example, Liang, Y., and W. McIntosh. 2000. Country Risk Premiums for International Investors. Prudential Real Estate Research, and Bradford H. Dockser, Kenneth T. Rosen and Daniel T. Van Dyke. 2001. Hurdle Rates for International Real Estate Investing. Institute for Fiduciary Education.

[15] Economy.com, Federal Reserve Board: Exchange Rates G.5 (405).

14

Benchmarking real estate performance

By Kevin Scherer, BlackRock*

Why benchmark?

Benchmarking is the process of comparing the performance of a business segment against the industry or its peers. Without a benchmark, performance has no reference and an investor has no basis to measure a manager's effectiveness. In the context of real estate investment management, it is commonly used to evaluate a fund against its peers that have similar investment mandates and styles for purposes of incentive compensation. Benchmarking is also used to evaluate an investment management firm, the overall real estate sector against other asset classes and a single property against other properties in the same market.

Proper benchmarking should be performed at multiple levels. At the highest level, an organisation should monitor its relative performance against a broad index to evaluate the effectiveness of a line of business and to enable the business to define and control the internal alignment of interests. This allows a management team to set and stay focused on its goals and objectives to ensure departments are properly incentivised in their respective disciplines.

At the lower levels of an organisation, investment managers should perform a comparative analysis of each of its investments (properties) to understand the operational effectiveness of their management styles. Understanding the details of how a fund or property performed relative to multiple benchmarks provides additional clarity for the reasons of outperformance or underperformance.

Everything from financial and investment structure to allocation (life cycle, property type, vintage, geography) to selection and operational management decisions should be compared to other industry measures to monitor that the portfolio is on track to exceed the overall benchmark. Decomposition of a benchmark can assist in risk management as well as in formulating strategies through research and portfolio attribution. These disciplines lie at the heart of a strategic organisation's ability to outperform and add value for its clients.

Available benchmarks

Tables 14.1 and 14.2 summarise some of the key private real estate information providers focusing on commercial properties in the US and internationally and the role they can play in benchmarking the performance of a portfolio. These tables are not complete and numerous other sources exist which are beyond the scope of this chapter. While most of the discussions in this chapter are based on examples from US information sources, a growing body of global information is available to apply these techniques.

In the US, the most commonly used benchmark has been the NCREIF Property Index (NPI), which is based on property-level financial statements submitted on behalf of institutional tax-exempt investors. The NPI has over 30 years of history and has been an extremely important research database for the US real estate industry. It has substantial depth to explore the performance at detailed (sub)sector and geographic levels, and with the new query tool, provides the ability to perform custom benchmarking and analysis.

Table 14.1: **Private real estate information providers in the US**

Vendor	**Product**	**Primary use in benchmarking**	**Additional uses in benchmarking**	**Description**
NCREIF	NCREIF Property Index	Private equity unlevered property-level total return benchmark.	Descriptive trends are available for income/ expense datum, operational measures (occupancy, LTV ratios) and pricing trends (cap rates and dividend yields).	Headline property-level index, consisting of over 6,000 properties performance. Total rate of returns measure is produced for institutionally owned, private commercial real estate on a quarterly basis that have been acquired, at least in part, on behalf of tax-exempt

				institutional investors.
NCREIF	NCREIF Fund Index: Open-End Diversified Core Equity (ODCE)	Private equity core open-end fund-level total return benchmark.	Quantitative risk measures, financial ratios and capital flows, such as LTV, cash levels and net contributions.	All inclusive headline fund-level index, consisting of returns from 26 open-end commingled funds pursuing a core investment strategy.
NCREIF/ Townsend	NCREIF Townsend Fund Index	Private equity core, value-added and opportunistic open-and closed-end fund-level total return benchmark.	Vintage year IRR benchmarks.	All inclusive headline fund-level index, consisting of returns for open-end and closed end funds with core, value-added and opportunistic investment strategies.
Investment Property	IPD US Open-End	Private equity core open-end fund-level	Descriptive trends are available for	Custom market-segment benchmarking

Databank (IPD)	Fund Benchmark	unlevered total return benchmark.	income, rental rates, pricing trends and operational measures. Indicies are available globally in 22 other countries.	and risk analysis to support investment decision-making. Fund-level performance is computed from detailed operational performance from individual investments.
REIS CBRE-EA PPR CoStar	REIS SE Outlook Market Fundamentals Property Professional	Commercial real estate property, peer group and market vacancy and rental rates.	Descriptive trends and forecasts are available for construction, absorption, vacancy, rents, cap rates and sales volume.	Provide benchmarks for vacancy, rent levels, rent growth rates for properties, peer groups, metro areas and submarkets.

Source: NCREIF, IPD, Townsend, REIS, CBRE-EA, CoStar.

The NPI, however, has been criticised for focusing solely on property-level information.[1] While excellent as a research index, it is not ideal for evaluating the performance of funds as it lacks important impacts of fund-level financial decisions such as leverage, fees, cash levels and investment structures (joint ventures).

Table 14.2: **Private real estate information providers in Europe and Asia**

Vendor	Product	Primary use in benchmarking	Additional uses in benchmarking	Description
Investment Property Databank (IPD)	IPD Global, Regional and Country Property Indices	Private equity unlevered property-level total return market indices.	Descriptive trends are available for income/capital returns, operational measures (void rates, ERV growth) and pricing trends (net yields and capital values).	Headline global property-level performance indies. Consisting of over 50,000 properties in 22 countries, in over 1,000 funds and totalling over €3,000 billion. Return and supporting measures are reported on an unlevered property-level basis by index, market and key centres.
Investment Property	IPD Portfolio	Full-service reporting and	Peer group analysis, risk	Custom market-segment

Databank (IPD)	Analysis Service (PAS)	management tool for portfolio benchmarking.	exposures, portfolio attribution, simulation and reporting.	benchmarking and risk analysis to support investment decision-making. Fund-level performance is computed from detailed operational performance from individual investments.
European Association for Investors in Non-Listed Real Estate Vehicles (INREV)	INREV Fund Index	European non-listed real estate investment vehicle performance.	Custom indices available by vehicle, sector and country. Country/sector target exposures, gearing, distribution yields and income and capital growth components of return.	Searchable database to create tailor-made indices from the INREV Index of 269 funds with a gross asset value of €147 billion.

Property Market Analysis Jones Lang LaSalle	PMA European, Asia-Pacific Service JLL REIS Intelligence Service	Commercial real estate property market vacancy, rental rates and pricing.	Descriptive trends and forecasts are available for construction, absorption, vacancy, rents, net yields and capital volumes.	Provide benchmarks for vacancy, rent levels, rent growth rates for properties, peer groups, cities and submarkets.

Source: IPD, INREV, PMA, JLL.

To enhance fund-level benchmarking, NCREIF and Townsend have partnered to create a series of indices called the NCREIF/Townsend Fund Indices (NFI). The first of the NFI series is the Open-End Diversified Core Equity Index (ODCE). It is a headline index which captures all of the effects of managing a core fund, and has quickly been adopted as the primary benchmark for US core commercial real estate strategies.

The NFI captures the full range of investment styles and has indices for open- and closed-ended value-added and opportunistic funds that offer the ability to measure managers on non-core investment styles. Both these indices, the ODCE and its value-added and opportunistic fund sisters, are providing transparency to these styles for the first time in the US.

The Investment Property Databank (IPD) offers a Portfolio Analysis Service (PAS). The analysis is available in 22 countries and regularly analyses over 50,000 properties globally. Subscribers are provided a full-service attribution analysis against the appropriate strategy focused peer group; its flagship product in the US is very similar in structure to the NFI-ODCE.

Fund strategies which have different risk profiles and investment styles (such as high loan-to-value (LTV) ratios, development, repositioning and tertiary market exposures) should carefully select and monitor the available benchmarks and understand the inherent high level of dispersion and volatility which is associated with the higher risk benchmarks above what is observed in an operating property-level benchmark like the NPI.

To understand the performance of individual properties, a number of global real estate market information providers have expanded to report peer group and individual property indicators. Companies such as CBRE Economic Advisors, CoStar/PPR, Jones Lang LaSalle and Property Market Analysis have useful tools to understand a property's competitiveness in its market. These data sets allow property fundamentals (such as vacancy, rents and expenses) to be compared to markets, submarkets and peer group fundamentals.

The mathematics

The mathematics of real estate performance measurement and benchmarking generally utilise standard approaches from financial literature. (However, it has developed a few additional industry-specific methods.) Two of the most commonly used methodologies are the time-weighted return

(TWR) and the internal rate of return (IRR). There are several reasons to use one approach over the other depending on the investment style, valuation policies and other operational issues. Each approach has positive and negative considerations of which managers should be aware.

The CFA Institute has developed the Global Investment Performance Standards (GIPS) to set guidelines for the performance-measurement industry. GIPS rely primarily on the time-weighted modified Deitz methodology (1,4) that is based on a time series of periodic returns. It is best suited in cases where a manager does not control the timing of capital flows. In the TWR, all periods are weighted equally and the effects of market timing and the size and growth of an investment are neutralised. However, in situations where the manager controls the cash flows, such as in a closed-ended opportunity fund, the GIPS standards suggest that the IRR is a better measure. Since the IRR is a dollar-weighted return, it is very sensitive to the size and growth of an investment.

Time-weighted methodology

The time-weighted methodology employs a geometric average rate of return (1) and requires a current market value measure for each period. These periods are typically quarterly in the US and vary from monthly to annually in Europe and Asia. For public markets, the requirement of fair market value this is easily obtained; however, for private market investments, it requires a consistent valuation discipline, which is not always available. Some real estate investments, such as developments, lack the discipline and/or industry agreed upon standard for valuation policy. Additionally, non-operating real estate investments may have very volatile cash flows and are less suited for time-weighted methodologies. For example, when a highly levered property is valued below the outstanding level of debt, a levered time-weighted return will not be computable. In these circumstances, the IRR may be better suited.

Time-weighted returns differ from the arithmetic-mean return in their compounding effect and are preferred in performance measurement, whereas arithmetic returns are preferred in statistical analysis of performance. They will differ with more volatility in the return series by roughly half of the variance of the returns.

$$r_{time\text{-}weighted} = \sqrt[N]{(1+r_1) \times (1+r_2) \times (1+r_3) \times \ldots (1+r_N)} - 1 \tag{1}$$

$$r_{arithmetic} = \sum_{i=1}^{N} \frac{r_i}{N} \tag{2}$$

$$r_{time\text{-}weighted} \approx r_{arithmetic} - \frac{\sigma^2}{2} \tag{3}$$

$$r_{delta} = \frac{EMV - BMV - CF}{BMV + \sum_{i=1}^{n} W_i \times CF_i} \tag{4}$$

where:
r_i is the return for period *i*
N is the number of periods
σ is the standard deviation of returns
EMV is the ending market value of investment
BMV is the beginning market value of investment
CF is the net cash flows for the period (contributions should be positive cash flows and distributions negative cash flows)
W_i is the weighting for number of days in the period

The real estate community has developed its own extensions of these techniques that remove the effects of structuring and financial engineering. While controversial in that other asset classes do not perform these transformations, removing them from the analysis provides clarity to the underlying real estate strategies that form the foundation of the performance of the underlying asset class. In these approaches, the industry has utilised a standardised income statement or balance sheet approach in a wholly owned investment construct. This said, other industries do not perform this de-levering approach and caution should be applied when comparing NPI returns to other asset classes.

The US academic community has developed an approach[2] to mimic the modified Deitz methodology utilising quarterly cash flows derived from a typical real estate cash-flow statement. It assumes that partial sales and capital improvements occur in the middle of the performance period and are therefore weighted by half. Net operating income (NOI) is assumed to be derived from collection of rents that occur at the end of each month. Since the index is quarterly, a ⅓ weighting was derived. These equations form the basis for the NCREIF Property Index (NPI) methodology (5–8).

NCREIF operating property returns:

$$R_{income} = \frac{NOI}{(BMV + 0.5 \times (CI - PS) - ⅓ \times NOI)} \tag{5}$$

$$R_{capital} = \frac{(EMV - BMV) + PS - CI}{(BMV + 0.5 \times (CI - PS) - ⅓ \times NOI)} \tag{6}$$

NCREIF levered operating property returns:

$$R_{income} = \frac{NOI - IE}{(BMV - BL) + 0.5 \times (CI - PS - ND + OP) - ⅓ \times (NOI - IE - PP)} \tag{7}$$

$$R_{capital} = \frac{(EMV - EL) - (BMV - BL) + PS - CI + ND - OP - PP}{(BMV - BL) + 0.5 \times (CI - PS - ND + OP) - ⅓ \times (NOI - IE - PP)} \tag{8}$$

where:
NOI is the net operating income

PS is partial sales
CI is capital improvements
EMV is the ending market value of investment
BMV is the beginning market value of investment
IE is interest expense
BL is beginning loan balance
EL is ending loan balance
ND is new debt
PP is principal payment
OP is other debt payments

IPD has similar equations as the NPI for the basis of the IPD benchmark (9,10). Based on monthly data and the assumption that capital expenses are paid in the beginning of the month and capital receipts at the end of the month, its denominator is slightly different.

IPD operating property returns:

$$R_{income} = \frac{NI}{CV_{t-1} + Cexp} \tag{9}$$

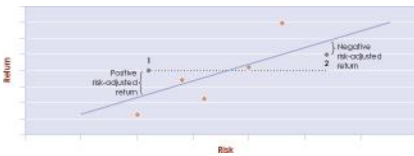
$$R_{capital} = \frac{CV - CV_{t-1} - Cexp + Crec}{CV_{t-1} + Cexp} \tag{10}$$

where:
NI is net income
CV is capital value
Cexp is capital expenses
Crec is capital receipts

Variations to these equations have been proposed that criticise the usage of NOI as the income return.[3] Since most asset classes report distributable cash yields paid to investors, researchers have adjusted the numerator and moved the capital improvements or expenses from the capital to the risk-adjusted returns and investment 2 produces negative risk-adjusted returns.

Risk, particularly on a forward-looking basis, is more than simply analysing ex-post returns. Just because an event did not occur does not mean it was not at risk of occurring. Risk monitoring should be critical part of benchmarking in the investment management business. It has also been shown that the private nature of the industry and its appraisal-based valuation measures have lowered the measured volatility of the asset class and created a pricing lag compared to publicly priced asset classes. Therefore, caution should be used in performing quantitative analysis, such as optimisation without proper adjustment to the data series.

Figure 14.1: **The risk and return relationship**



Several quantitative measures assist in evaluating risk-adjusted performance, the most common being the Sharpe ratio. William Sharpe developed the ratio in 1966 and later refined the ratio in 1994 (12). It measures the consistency with which an investment exceeds the risk-free rate (typically, the return of short-term, 30-day Treasuries); however, longer-term ten-year Treasuries can be used for real estate's longer-term investment horizon.

The information ratio (13), a useful variation to the Sharpe Ratio, replaces the risk-free rate of return with the portfolio risk-adjusted returns and investment 2 produces negative risk-adjusted returns.

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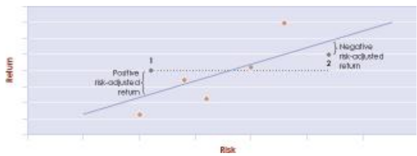

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The information ratio (13), a useful variation to the Sharpe Ratio, replaces the risk-free rate of return with the portfolio benchmark. Negative information ratios typify underperformance and ratios above 0.45 signify consistent portfolio outperformance.

The denominator, also known as tracking error (14), is the volatility of the excess return (15)and is also the generic term used to describe how closely a portfolio follows the structure of a benchmark. The more a portfolio varies in its structure from the benchmark, the more tracking-error risk is being taken. In a stock or bond portfolio, tracking error can measure the active risk of a portfolio against its benchmark quite accurately. However, since real estate is a highly idiosyncratic asset class, in addition to the quantitative methods, comparative analysis should also be performed to monitor the risks of a portfolio. Active exposures should be monitored by (sub) property type, geographic exposures (division, metro, economic base), life cycle and asset size to provide some clarity on the diversification of the portfolio against the benchmark.

$$S = \overline{\frac{r_p - r_f}{\sigma_{r_p - r_f}}} \tag{12}$$

$$IR = \overline{\frac{ER}{\sigma_{ER}}} \tag{13}$$

$$TE = \sigma_{ER} \tag{14}$$

$$ER = r_p - r_b \tag{15}$$

where:
r_p is the portfolio return
r_f is the risk-free rate return
r_b is the benchmark return

These risk-adjusted methods all employ the ex-post standard deviation of total returns to represent risk. Another approach is to use the capital asset pricing model (CAPM) equations and represent risk in its correlation to the market movement. This is intended to measure the amount of systematic risk. Beta (16) measures the relative sensitivity of the property's or portfolio's return to the market. For example, a beta of zero implies the portfolio has no relationship to the market (that is, its returns move independently to the market). A beta of 1 implies the portfolio's returns will move in sync with the overall market and a higher beta implies the portfolio's returns will move up or down more than the market.

Low beta implies the asset is less correlated and/or less risky than the overall market and offers good downside protection, but may underperform in an up market. However, a high or low beta does not mean it will outperform or underperform; beta is only one-half of the CAPM theory. The other important measure is alpha (17), which is the risk-adjusted excess return of the portfolio relative to the return of the benchmark.

$$\beta = \frac{Cov(r_p, r_b)}{Var(r_b)} = \rho_{r_p, r_b} \times \left(\frac{\sigma_{r_p}}{\sigma_{r_b}}\right) \quad (16)$$

$$\alpha = r_p - \beta \times r_b \quad (17)$$

where:
r_p is the portfolio return
r_b is the benchmark return

Performance attribution

Attribution is an analysis of the ex-post performance of a portfolio that attempts to explain the excess return in respect to active management decisions. As such, attribution should provide evidence of the effects of the organisation's strategy. Brinson, et al.[5] proposed a simple framework to represent each strategic decision measured in the context of active or passive exposure to the benchmark. In Figure 14.2, we isolate each of the effects influencing a real estate portfolio with a goal to understand their effects on the portfolio using a series of attribution models. For example, if a firm adds value by strategically investing in select locations in the country, attribution should look to isolate those strategic allocation decisions in its approach. Alternatively, a portfolio could seek to match its allocations to that of the benchmark and create excess return by having its individual assets outperform the market.

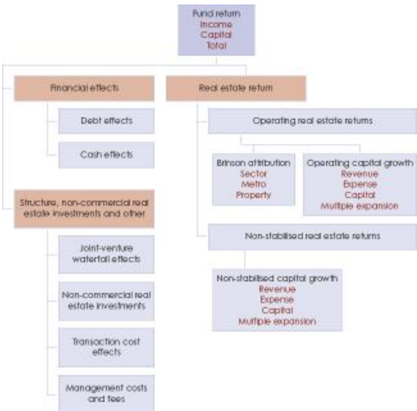
At the heart of this exercise, most real estate practitioners want to understand the relative performance of their core business real estate strategies without the effects of financial engineering. Just as is done with the NPI, the financial effects are first isolated from the real estate so that they can be measured separately.

Financial effects

For portfolios which use moderate amounts of leverage, ODCE may be a better benchmark than the NPI. However, varying degrees of leverage can impact a portfolio substantially different than the benchmark. The methodologies below allow the fund to estimate the relative impacts of leverage against ODCE, until NCREIF adds additional transparency to the index.[6] Ideally, leverage attribution should be performed using detailed investment-level constituent data, such as those performed by IPD, but these techniques should provide a good estimation of the effects of leverage on returns for the purpose of attribution.

To de-lever the index, this methodology uses a derivation of the Modigliani-Miller theorem to convert levered returns to unlevered returns (18).[7] While the approach was designed as a one-period model and makes a number of simplifying assumptions (for example, no volatility in the unlevered return, interest rate and/or LTV ratio, fixed-rate debt), it also works reasonably well for multiple periods.

Figure 14.2: **Factors that influence a real estate portfolio**



Similarly, the riskiness of a levered position can be inferred from the volatility of the asset-level returns (19). Note here that the use of leverage magnifies the volatility in a geometrically increasing way with the increasing LTV ratio. While in attribution we are focusing primarily on the effects on return, good risk-management practice should monitor other important debt-related measures including LTV ratios, debt-service coverage ratio (DSCR), debt maturity rollover, interest rate swaps and derivatives and loan covenants.

$$R_{equity} = \frac{(R_{asset} - LTV \times k_d)}{(1 - LTV)} \Rightarrow R_{asset} = R_{equity} \times (1 - LTV) + LTV \times k_d \quad (18)$$

$$\sigma_{equity} = \frac{\sigma_{asset}}{(1 - LTV)} \Rightarrow \sigma_{asset} = \sigma_{equity} \times (1 - LTV) \quad (19)$$

where:
R_{equity} is the levered return
R_{asset} is the unlevered return
k_d is the effective interest rate
LTV is the loan-to-value ratio

To estimate the ODCE index without debt:

$$UR_{ODCE} = (R_{ODCE} - NoteApprEffect_{ODCE}) \times (1 - LTV_{ODCE}) + LTV_{ODCE} \times k_d \quad (20)$$

where:
R_{ODCE} is the reported ODCE return
$NoteApprEffect_{ODCE}$ is the reported mark-to-market value of the debt in ODCE
k_d is the average interest rate (derived from the NPI)
LTV_{ODCE} is the reported loan-to-value ratio of ODCE

While the above methods can also be utilised to de-lever a portfolio, internal analysis should utilise the general ledger or performance-system data to compute the exact effects on the portfolio. In the methodology below, income statement and balance sheet line items are adjusted to remove debt from the time-weighted return computation. Interest payments are added back to the income return numerator, note appreciation is added back to the capital return numerator, the average loan balance is added to the denominator and the cumulative note appreciation subtracted from the denominator. To properly adjust for joint-venture agreements, all computations should use either the ownership rate at their initial contractual rates or, to be more exact, at the effective ownership share for each performance measurement period.

To de-lever fund-level investment returns:

$$UR_{income} = \frac{(NII + IE \times OS)}{(WNA + \overline{LB} \times OS - CNA \times OS)} \quad (21)$$

$$UR_{capital} = \frac{(PA + NA \times OS)}{(WNA + \overline{LB} \times OS - CNA \times OS)} \quad (22)$$

where:
NII is net investment income
IE is interest payments
LB is loan balance
OS is the ownership share (either contract rate or effective rate)
NA is the note appreciation for period
CNA is the cumulative note appreciation
WNA is the weighted net assets

Non-real estate investments, cash, joint-venture structure effects, management fees and overhead costs (legal and appraisal) need to also be removed from the performance returns. However, except cash, neither ODCE nor the NPI contain enough information to measure these effects, so the analyst can only measure these as an absolute effect on a fund's performance. In the portfolio, each effect can be estimated by removing the cost from the numerator and denominator of the return computation. For example, cash effects can be removed with equation 23 and 24.

To remove cash effects from a portfolio:

$$CR_{total} = \frac{(NII + PA - CI \times OS)}{(WNA + \overline{CB} \times OS)} \quad (23)$$

where:
NII is the net investment income
PA is the portfolio appreciation
CI is the cash income
OS is the ownership share (either contract rate or effective rate)
CB is the cash balance
WNA is the weighted net assets

To estimate the ODCE index without cash:

$$CR_{ODCE} = \frac{(UR_{ODCE} - R_{cash} \times W_{cash})}{(1 - W_{cash})} \qquad (24)$$

where:
UR_{ODCE} is the de-levered ODCE return
R_{cash} is the estimated return on cash (30-day Treasury-bill)
W_{cash} is the reported cash level in ODCE

Now that we have an estimate of the unlevered real estate performance of the fund and benchmark, we can discuss the ways to understand the how a portfolio's real estate strategy has impacted the relative performance of the said portfolio to the benchmark. Depending on the portfolio and the contents of the benchmark, the portfolio analyst can choose to include or omit non-operating real estate. Since the NPI does not contain non-operating real estate, some forms of attribution suggest including them in the analysis and using a zero weighting, zero relative return for the benchmark. However, one can also argue that these activities are in the ODCE index; unfortunately, the ODCE does not currently provide the transparency to determine the level or performance of these investments. As such, the author feels they should not be included in the Brinson-style attribution for an

ODCE-benchmarked fund until the NPI/ODCE has the transparency to report non-operating performance and exposures. Again, IPD is currently performing this analysis in its core benchmarking service and includes all real estate as part of its attribution.

Two common attribution approaches can be then applied to analyse the remaining investments. First, we will discuss Brinson-style attribution and second, we will discuss components of return attribution.

Brinson attribution

The standard Brinson-style of attribution separates the excess or active return into two main components: asset selection, and allocation or market timing. The most common approach is based on some variation of the seminal paper by Brinson, Hood and Beebower. For the real estate industry, most attribution methodologies utilise one of the three proposed methods from the Bradford, et al. paper.[8] In this paper, the authors make some fine-tuning to the Brinson model and propose three variants, one original model (Method III, 31–33) that includes a selection, allocation and interaction component and two other methods move the interaction effect into either the selection effect (Method I, 25–27) or the allocation effect (Method II, 28–30).

Table 14.3: **Relative effects of strategic allocations**

	Underperforming	**Overperforming**

Overweighted	Negative effect	Positive effect
Underweighted	Positive effect	Negative effect

The allocation contribution is the effects of a strategic over-or under-weighting to a sector which is over- or under-performing. Table 14.3 shows the relative effects of the strategic allocations. For example, when a portfolio overweights an underperforming sector, it has a negative allocation contribution effect.

The selection contribution is then simply the sector's relative performance multiplied by the portfolio's exposure to this sector. A property or sector that has a lower return than its benchmark component has a negative effect and one which has a higher return than the benchmark sector will have a positive effect.

The interaction contribution is the effects from the combination of both selection and allocation. This can sometimes be a large contributor and one strong argument for including the interaction effect in the analysis is that it represents when a manager may have a particular specialty in a sector that may compensate for its over-or under-weighting in the index.

Method I:

$$R_{selection} = \sum W_{ps} \times (R_{ps} - R_{bs}) \quad (25)$$

$$R_{allocation} = \sum (W_{ps} - W_{bs}) \times (R_{bs} - R_{b}) \quad (26)$$

$$R_{interaction} = 0 \quad (27)$$

Method II:

$$R_{selection} = \sum W_{bs} \times (R_{ps} - R_{bs}) \tag{28}$$

$$R_{allocation} = \sum (W_{ps} - W_{bs}) \times (R_{ps} - R_{b}) \tag{29}$$

$$R_{interaction} = 0 \tag{30}$$

Method III:

$$R_{selection} = \sum W_{bs} \times (R_{ps} - R_{bs}) \tag{31}$$

$$R_{allocation} = \sum (W_{ps} - W_{bs}) \times (R_{bs} - R_{b}) \tag{32}$$

$$R_{interaction} = \sum (W_{ps} - W_{bs}) \times (R_{ps} - R_{bs}) \tag{33}$$

where:
R_{ps} is the portfolio sector return
R_{bs} is the benchmark sector return
R_{b} is the benchmark return
W_{ps} is the weight of the sector in the portfolio
W_{bs} is the weight of the sector in the benchmark

Most of the attribution analysis performed today is typically done comparing a portfolio's exposure to a combination of the property sector and geography against the exposures of the selected benchmark. While these are useful analyses, they are just two angles to think about allocation strategies and the analyst should test additional stratifications and the combination of multiple strategies. There are numerous allocation strategies portfolios can use to extract alpha; the methods employed should strive to match the portfolios' strategic approach. For example, some geographic-related allocations include urban versus suburban, major versus secondary, knowledge-based versus demographic growth. Additionally a series of asset-oriented strategies include stabilised income-producing versus renovation versus development, modern class A versus functional class B and long-term versus short-term leases.

Some equity literature has adopted a two-sector allocation model, which the author believes is useful in real estate. In the two-sector model, one sector could be the property type or subtype and the second could be a geographic breakdown, such as continent, country, region or metro area. This can be presented as a matrix of effects as shown in Table 14.4.

Income/expense components of return/IRR attribution

Another useful attribution approach involves decomposing the effects of a return into its income versus growth components similar to how real estate is underwritten in a discounted cash-flow analysis. This analysis can be performed at an asset-level or sector-level and can be as simple as income versus capital appreciation as performed by the NPI or into more detailed components as proposed by Pagliari.[9] and in a similar approach by Feng.[10] These methods utilise the dividend discount model (34), which is common in financial analysis and is similar to a typical underwriting pro forma for purchasing or valuing a property. This approach allows the portfolio to think in terms of how well did the portfolio execute on its strategy and provides additional clarity into the real estate-specific drivers which may have led to the property selection effects.

Table 14.4: **Two-sector allocation model matrix**

	Property $type_1$	Property $type_2$	…Property $type_N$	Total
Geography$_1$				
Geography$_2$				
Geography$_3$				
…				
Geography$_N$				
Total				

$$P_0 = \sum_{t=1}^{T} \frac{CF_t}{(1+k)^t} \Rightarrow k = \frac{NOI \times DPR}{P_0} + g_{NOI} + \nabla + \varepsilon \tag{34}$$

$$g_{NOI} = \prod_{t=1}^{T} \left(\frac{NOI_t}{NOI_{t-1}}\right)^{1/T} - 1 = \frac{(g_{rev} - g_{exp} \times ER)}{(1 - ER)} \tag{35}$$

$$\nabla \approx \frac{\left(\frac{NOI_1}{P_0}\right)}{\left(\frac{NOI_N}{P_N}\right)} - 1 \tag{36}$$

where:
P_0 is the initial price
CF_t is the cash flow in period
k is the total return for NPI
g_{NOI} is the NOI growth rate
DPR is the dividend pay-out ratio (NOI – CI)/NOI
? is the effect of changing cap rate
ε is the residual effects
g_{rev} is the revenue growth rate

g_{exp} is the expense growth rate
ER is the expense ratio

The initial yield component can be viewed in a number of ways. A low initial yield is an indicator of some form of growth strategy. The growth can be market-oriented growth (as in the case with a low capitalisation (cap) rate market such as Washington, DC) or it can be property-oriented growth (as in the case with a vacant office building). On the other hand a high initial yield can occur due to multiple reasons. From a market perspective, it can be in a lower liquidity or tertiary market, such as Tuscaloosa, Alabama; or from the property perspective, a high initial yield can be in-place rents which are above market, a lower quality building or tenant, or it can be the property was acquired at an attractive price.

The NOI growth component (35) is highly related to the abovementioned strategies and can be driven by the market growth through strong/weak market rent growth and/or falling/rising market vacancies. NOI can also be driven by property operations through revenue growth from loss-to-lease or strong leasing strategies. Additionally, expense reduction can have a strong operating leverage effects.

The effects of yield change can be dramatic. In a strategy consisting of a long-term stabilised property, the effects of yield change are generally small; shorter investment horizons and non-core strategies typically have the yield change be the driving force of performance. Again these can be market-driven, such as in the case of the 2003–2007 market cycle, or they can be property related, such as in a leasing strategy.

In the example in Table 14.5, a property is compared to its sector and the overall benchmark. While all three examples have similar total returns, the component of return analysis shows that each achieved the return using different real estate strategies.

Table 14.5: **Sample return analysis achieved using differing real estate strategies**

	Property	**Sector**	**Benchmark**
Initial NOI yield	8.50%	8.50%	7.00%
Multiplied: Average dividend payout ratio	50.00%	75.00%	75.00%
Equals: Dividend yield	4.25%	6.38%	5.25%
Revenue growth	2.50%	2.00%	3.00%
Expense growth	2.50%	2.50%	2.50%
Expense ratio	45.00%	45.00%	45.00%
Plus: NOI growth	2.50%	1.59%	3.41%
Equals: Fundamental return	6.75%	7.97%	8.66%

Plus: Cap-rate shift and other effects	1.26%	0.00%	-0.69%
Equals: Total return	8.01%	7.97%	7.97%
Going-in cap rate	8.50%	8.50%	7.00%
Going-out cap rate	7.50%	8.50%	7.50%
Percent return from dividend yield	53%	80%	66%
Percent return from NOI growth	31%	20%	43%
Percent return from cap-rate shift	16%	0%	-9%

Note: Holding term is ten years.

The property was purchased with a high cap rate, had high capital requirements (that is, low dividend payout ratio), grew its NOI at inflation and sold the asset at a lower cap rate. The data implies that the strategy for the asset was a renovation, where 50 percent of the income was spent on capital improvements and the property was able to be sold for a 100 basis point lower cap rate. In this example, 53 percent of the total return was achieved from its dividend yield, 31 percent from the NOI growth and 16 percent from residual pricing.

The sector started and ended the analysis period with a high cap rate, but had average capital requirements, which resulted in a high dividend yield, contributing to 80 percent of its total return. Low revenue growth, further diluted by negative operating leverage, resulted in a low NOI growth and contributed 20 percent to the total return. In this example, the data implies that the sector was a secondary, lower growth market.

Some concluding thoughts on the future of real estate benchmarking

We have covered some of the more commonly used techniques on evaluating the performance of commercial real estate, but just scratched the surface in understanding all of the quantitative and qualitative methods for understanding the performance of the sector.

The private real estate investment industry has long had its challenges to benchmarking and has evolved considerably since the first widespread US commercial real estate benchmark was created in 1982 by the Frank Russell Company, later to be created into NCREIF Property Index and IPD's creation in the UK in 1985. Partly due to the private nature of the industry it may never reach the transparency of the broader equity market, but I expect the industry will continue to resolve some of its issues.

Several notable improvements to the benchmarking process would include: more frequent reporting of returns (versus annually in many European countries and quarterly frequency in the US), further transparency in the US-based fund indices with the ability to understand the idiosyncratic details of each investment in the benchmark, more transparency into the effects of the private market appraisal process and additional transaction metrics. Additionally, while most of the benchmark data today is based on core properties, a number of initiatives are currently underway which will provide additional clarity into the non-core aspects of the business. Better techniques and information sources are also needed for measuring and attributing risk. While many of the systematic and non-systematic market risks can today be measured utilising real estate fundamental measures (for example, future supply, vacancy and market liquidity), a large number of property-level idiosyncratic level risks (for example, tenant credit quality and lease rollover) are not available to benchmark or research.

Some of the improvements from above can be achieved through the creation of synergies from numerous information providers. For example, linking performance data from IPD and NCREIF to valuation assumption data collected by the appraisal industry would allow a clearer understanding on the effects of lease-level decisions on performance.

This all said, the amount of information available to analyse commercial real estate has grown exponentially in my 25-year real estate career and I am hopeful additional transparency in the asset class will continue.

□

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Kevin has co-authored a number of papers, including:

•Pagliari, J., K. Scherer, R. Monopoli. 2003. Public vs. Private Real Estate Equities: A More Refined Comparison. *Journal of Real Estate Economics,* Vol. 33, No. 1, pp. 147–187.

•Scherer, K. 2003. Leverage and the NPI. *NCREIF Real Estate Performance Report.*

•Valente, J., K. Scherer, D. Harper. 2003. The NPI vs. A True "Passive Index" – Implications for Portfolio Rebalancing. *NCREIF Real Estate Performance Report.*

•Ziering, B., J. Pagliari, K. Scherer. 2004. The Specter of Rising Interest Rates: Is Institutional Real Estate at Risk? *PREA Quarterly.*

•Valente, J., K. Scherer. 2004. Micro Markets and the Effect Of Property Location. *PREA Quarterly.*

Kevin holds a computer science degree from the Rochester Institute of Technology, has taught at New York University's Real Estate Institute, is actively involved in NCREIF's Data Products Council, Index Policy and Research Committees and has spoken at many industry gatherings.

* The author would like to thank Steve Cornet and Joe Pagliari for assistance with the paper. Of course, any mistakes or omissions are the fault of the author.

[1] In 2000, the Real Estate Research Institute (RERI) and the Pension Real Estate Association (PREA) commissioned a paper to discuss some of the industry's need to continue to evolve and expand the industry's indices and benchmarks. See Benchmarks & Index Needs in the US Private Real Estate Investment Industry: Trying to Close the Gap by David Geltner and David Ling.

[2] Brueggeman, W.B. and S.M. Giliberto. 1987. Measuring Real Estate Investment Performance: A Revised Approach.NCREIF.

[3] Young, Michael, David Geltner, Willard McIntosh and Douglas Poutasse. 1996. Understanding Equity Real Estate Performance: Insight from the NCREIF Property Index. *Real Estate Review,* Vol. 25, No. 4, Winter 1996, pp. 4–16.

[4] Phalippou, Ludovic. 2009. Measuring private equity performance: a closer look. *Private Equity Mathematics,* pp. 3–17.

[5] Brinson, G, L.R. Hood and G.L. Beebower. 1986. Determinants of Portfolio Performance. *Financial Analysts Journal,* Vol. 42, No. 4, pp. 39–44.

[6] An effort is currently underway to resolve this issue and to make all leverage financial information a required data submission for all members of the ODCE.

[7] Pagliari, Jr., J.L. 2007. The Pricing of Non-Core Real Estate Ventures. *Journal of Portfolio Management,* Vol. 33, No. 5, pp. 119–133.

[8] Liang, Y., R. Hess, D. Bradford and W. McIntosh. 1999. Return Attribution for Commercial Real Estate Investment Management. *Journal of Real Estate Portfolio Management,* Vol. 5, No. 1.

[9] Pagliari, Jr., J.L. 1991. Inside the Real Estate Yield. *Real Estate Review,* Vol. 21, No. 3, pp. 48–53.

[10] Feng, T. 2010. Property-Level Performance Attribution: Demonstrating a Practical Tool for Real Estate Investment Management Diagnostics. Master's thesis, Massachusetts Institute of Technology.

Section

III

Fund and portfolio management

15

Principles of real estate appraisal

By Aart Hordijk, ROZ/Tilburg University, and Peter van Arnhem

Introduction

This chapter discusses the principles of the real estate appraisal. It starts with a brief history of the appraisal, followed by an explanation of the importance of international valuation standards for determining the market value of a property and a discussion on appraisal concepts. The three appraisal methods – sales comparison, income capitalisation and cost approach – are described and explained using simple spreadsheets to illustrate the mathematics. The chapter will end with the challenges ahead for the appraisal profession.

Appraisal history

Contemporary valuation theory finds its roots in the Wall Street crash of 1929. During the Roaring Twenties, appraisal was the domain of mostly estate agents and engineers, and the 1930s saw the formation of a valuation profession which resulted in the establishment of professional bodies like the American Institute of Real Estate Appraisers (1932) and the Society of Real Estate Appraisers (1935).

Although at that time useful valuation literature already had been published, both in the US and in the UK, the first edition of *The Appraisal Journal* was introduced in October 1932.

Soon after, the framework of valuation theory was formed. Topics like ‘(open) market value’, ‘the three approaches’, ‘highest-and-best use’, ‘risk and capitalisation’, ‘apportionment’, ‘obsolescence’, ‘land residual’, ‘DCF versus initial yield’ and ‘business value’ were thoroughly reflected upon and discussed.

In property valuation the Royal Institution of Chartered Surveyors (RICS) by far is the oldest institution, established in 1868 and later granted a royal charter. The RICS produced the first valuation standard in 1974, when the institution initiated the Asset Valuation Standards Committee (AVSC). The resulting rules for financial reporting were first adopted by the London Stock Exchange, and later, in 1976, the European Community used the standard for its Fourth Directive (financial reporting directive), which in 1978 became mandatory for the whole of Europe. The 1976 RICS *Guidance notes on the valuation of assets* were revised in 1981 and 1990. The present Red Book (May 2011) is the seventh edition.

International valuation standards

The International Valuation Standards (IVS) were established in 1984 by the IVS Committee, of which the Appraisal Institute, Appraisal Foundation and RICS were important founding fathers. The ‘market value’ definition has been adopted by many countries, including the US, Europe and many developing economies. Furthermore, there is a mutual understanding that fair value as defined by the International Accounting Standards Board (IASB) and market value as defined by IVSC should converge as much as possible. The market value definition has also been adopted by the

'...on the date of valuation...' requires that the estimated market value is time-specific as of a given date. The valuation amount will reflect the actual market state and circumstances as of the effective valuation date, not as of either a past or future date.

'...between a willing buyer...' refers to one who is motivated, but not compelled to buy. This buyer is neither overeager nor determined to buy at any price. The assumed buyer would not pay a higher price than the market requires.

'...a willing seller...' is neither an overeager nor a forced seller, prepared to sell at any price, nor one prepared to hold out for a price not considered reasonable in the current market. The willing seller is motivated to sell the property at market terms after proper marketing, whatever that price may be.

'...in an arm's-length transaction...' is one between unrelated parties, each acting independently.

'...after proper marketing...' means that the property would be exposed to the market in the most appropriate manner to effect its disposal at the best price reasonably obtainable. The length of exposure time may vary with market conditions, but must be sufficient to allow the property to be brought to the attention of an adequate number of potential purchasers.

'...wherein the parties had each acted knowledgeably and prudently...' presumes that both the willing buyer and the willing seller are reasonably informed about the nature and characteristics of the property, its actual and potential uses, and the state of the market as of the date of valuation.

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'...wherein the parties had each acted knowledgeably and prudently...' presumes that both the willing buyer and the willing seller are reasonably informed about the nature and characteristics of the property, its actual and potential uses, and the state of the market as of the date of valuation.

'...and without compulsion...' establishes that each party is motivated to undertake the transaction, but neither is forced or unduly coerced to complete it.

Market value is understood as the value of an asset estimated without regard to costs of sale or purchase and without offset for any associated taxes.

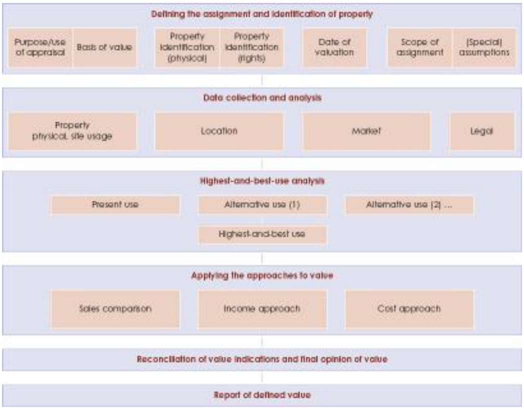
Appraisal concepts

The IVS, as well as the RICS Valuation Standards (also known as the Red Book) and the Appraisal Foundation's USPAP encompass fundamental concepts and principles, often referred to as generally accepted valuation principles (GAVP). The following principles are addressed in this chapter: the appraisal process, highest-and-best use, land residual, apportionment and business value.

The appraisal process

It is meaningful to picture a property valuation as a process. Each of the approaches in Figure 15.1 is based on the principle of substitution and comparison. Not all appraisal approaches are always applicable; it depends on factors such as marketability of the property. Application of the various methods results in indications of value which have to be reconciled and motivated by the valuer.

Figure 15.1: **The appraisal process**



Source: IVS and The Appraisal of Real Estate, 12th edition, The Appraisal Institute, Chicago, 2001.

Highest-and-best- use analysis

The IVS defines highest-and-best use as '[t]he most probable use of a property, which is physically possible, appropriately justified, legally permissible, financially feasible, and which results in the highest value of the property being valued.'

A property does not necessarily reach its highest value on the basis of its present appearance, state and usage. Only after it has been brought into an optimal state (which may imply a (re)development) in the perception of the willing buyer, is the highest-and-best use met and is the highest value of a property reached. It implies that, before methods can be applied, various scenarios of usage must be taken into account. It is significant that the use is feasible, from a legal (for example, zoning and permits), physical (grid) and financial perspective. Market demand, and the nature and risk-perception of the potential buyer have to be analysed.

This underlines the importance of thorough market research and analysis as an essential part of the valuation process.

It is sometimes thought of that the highest-and-best-use analysis may be neglected on the basis of the adoption of a special assumption that any (re)development is not taken into account and the valuation is merely based on the present use. Indeed in the past such 'existing use value' was regarded as a legitimate basis for valuation. However, at present, such special assumptions do not necessarily comply with most valuation standards (IVS, RICS) that prescribe that 'special assumptions may only be made if they can reasonably be regarded as realistic, relevant and valid, in connection with the particular circumstances of the valuation' (RICS PS 2.2).

Moreover, the recent international accounting standard on fair value measurement (IFRS 13, from May 2011) specifically provides that rather than the value in its existing use, the highest-and-best-use principle has to be applied in order to assess fair value.

Land residual

The highest-and-best use principle is applied in its most immanent form in the valuation of development land. For sound appraisals for either greenfield development or brownfield (re)developments, the market value of the development interest (the property) is assessed by applying the income approach and deducting the total cost of construction (plus development cost plus entrepreneurial profit) from the expected income of the development. The latter will highly depend not only on which scheme meets the highest demand in the market (and is financially feasible), but also what is legally permissible. This is different from the apportionment of the component land in the overall property which is to be discussed hereafter.

The problem with the residual method is that the uncertainty of the inputs adds to the residual in disproportion. As an example, a land residual where there is certainty about the scheme (in this case, the number of lots) has income of 100 lots × 300,000 FU/lot; less construction cost and developer's cost of 100 × 200,000, less entrepreneurial profit, of say 10 percent, provides a residual (market) value of the site of 70,000 × 100 = 7 million in total. Now suppose the income decreases by 5 percent (a most legitimate margin of error of any valuation of a property to be created) while total cost rises by 5 percent. As a result, the residual drops by 34 percent (100 × 285,000/100 × (210,000 + 28,500) = 4,650,000). As all uncertainties are reflected in the residual in disproportion, one could question the legitimacy of the method – at least as a stand-alone valuation method. However, it is no doubt that, intertwined with the comparison method, the residual approach is very useful as it provides transparency to expected cash flows.

Apportionment

When valuing real estate, not so much is the physical land and improvements valued, but the real property is – all interests, benefits and rights inherent in the ownership of real estate. The most complete ownership, the fee interest, refers to a complete bundle of various real-estate-attached rights. Partial interests (for example, the right to occupy, use and lease a property) may or may not be separately marketable. Marketable minority interests such as certain leases may be valued by direct comparison. However, unmarketable partial interest with less market appeal (that is, relative to the total, complete bundle of rights) has value that can only be assessed by means of apportionment. Typical issues of apportionment include: land and improvements, (ground) leasehold and leased fee interests, equity and debt, and tangibles (property, plant, equipment) and intangibles (in allocating business value).

The market value of an entity will refer to a coherent economic and legal unit that is fit to be sold. It is the responsibility of the valuer to determine what is the 'marketable entity'. For residential real estate, this will be the inseparable combination of land and buildings, in full ownership for most countries. Only that bundle of rights can be valued according to the mark-to-market principle of IVS1. The market value of the 'marketable whole' can then be allocated to the less-marketable components. This apportionment will not have a market basis, but will be based on principles such as logic and consistency. The premise is that the sum of the parts equals the market value of the total or combined entity – in this example, the residential property. As market conformity has no falsifying criterion, various ways to apportion may be valid. This can be illustrated in Table 15.1.

All values are valid as long as they are logical and consistent, as they cannot be falsified by market evidence.

Table 15.1: **Ways to apportion a property**

Facts:

Market value	1,000,000
Building cost	900,000
Obsolescence (% accrued depreciation of the improvements)	20%
Market price parcel (vacant) by comparison	250,000

Building residual:

Market value	1,000,000
Less: Parcel value	250,000
Equals: Building value	750,000

Land residual:

Market value	1,000,000
Less: Depreciated replacement cost (DRC) building	720,000
Equals: Land value	280,000

Land value by % land in new development:

Market value	1,000,000
% land (quote): Vacant parcel priced by comparison	250,000
Plus: building cost	900,000
Total cost	1,150,000
% land in new property	22%
Equals: % land in property to be valued	22%
Land value	217,391
Remains: Building value	782,609

Land value by % land in DRC:

DRC building (900,000 × 0.8)	720,000
Vacant parcel value	250,000
DRC property	970,000

% land in DRC	26%
Equals: % land in market value	26%
Market value total	1,000,000
Land value	257,732

Summary:

Building residual	250,000
Land residual	280,000
Land value by % of land in new development	217,391
Land value by % of land in DRC	257,732

Business value

As mentioned above, it is significant that market value is assigned to a clearly defined entity that is optimally marketable from an economic as well as a legal perspective. In the RICS Red Book the concept *'operational entity'* is used; in IFRS the comparable concept is *'cash generating unit'*.

Using the example of a gasoline station, the operating unit comprises real estate, stock, brand and personnel. In this configuration, the entity is optimally marketable and valuable. Therefore, the business enterprise can be valued. When, for example, one wants to know what is the portion of real estate in the total valuation for financing or financial reporting purposes, allocation is necessary. To the extent that the value of the business cannot be allocated to the various assets (whether tangible or intangible), a floating surplus or goodwill exists. Goodwill and allocation go hand in hand.

Both the RICS and the IVSC look on appraisals of trading properties or special purpose properties (such as gasoline stations, hotels, leisure and bars/restaurants) as the domain of the property valuer and not so much to that of the business valuator. This makes sense for two reasons:

1.The allocation problem is surmountable: the 'lion's share' of business value is to be allocated to the real property; and

2.Trading property is usually quite marketable, with the result that the comparison method is applicable and market evidence for value indeed can be found (while property valuers seem more willing to apply direct sales comparison as a valuation method).

Where the value of the business cannot be allocated to all (in) tangible assets, the issue of goodwill arises. For the assessment of the value of the real property, it is crucial to determine whether goodwill is attached to either the property or to the user. To take the example of the gasoline station further; if a station was previously operated under an AAA brand and it has to be valued on the basis of vacant possession, the portion of the goodwill that is attached to the previous brand is excluded from the market value and the portion attached to the location is included. To distinguish one from the other, the British make the remarkable distinction between cats-goodwill ('stays home' is attached to the property) and dogs-goodwill ('moves out' is attached to the user).

The valuation of trading properties or special purpose properties differs greatly from business valuation in a professional sense. Some valuation methods and techniques are used by property valuers to value trading properties. With business valuation, the *object* of valuation differs from property valuation; it is all about the (market) value of a business enterprise (that is, the value of interests or (equity) shares). Property-related business valuation therefore deals with REIT-interests, (OTC)-derivatives, (mortgage-backed) securities, shared development-options and participations in ventures such as public-private partnerships.

Distinctive elements of business valuation are the valuation of debt and issues like the 'degree of control'.

Appraisal methods

Appraisal methods have been developed over time and have resulted in three approaches: sales comparison, income capitalisation and cost. Appraisals in the US require that all three methods are used, followed by a reconciliation resulting in the opinion of the appraiser as to the value of the property. In Europe, most of the time only one method is chosen, depending on the scope of the appraisal. The IVS describes the appraisal methods in general terms and some in detail in technical notes. The Appraisal Institute in the US and RICS in the UK enunciate in their textbooks *Real Estate Appraisal* and the Red Book, respectively, in more detail the different methods and in what way those should be applied by the appraisers. The content of this section relies in some parts on these two texts and also on the *Real Estate Valuation* textbook, authored by Kenneth Lusht (2001).

Sales comparison

The direct sales comparison approach produces an estimate of the market value of the subject property based on the sale prices of similar properties. The approach is rooted in two fundamental assumptions: 1) that sale prices are a reliable indicator of market value and 2) that equal/similar properties should sell for equal/similar prices. These are the same assumptions that are used when estimating the value of other investments. However, unlike the securities markets where the homogeneous shares of a firm are traded frequently, real property rights are generally heterogeneous and tend to be traded infrequently. On the other hand, market imperfections are the main reason that appraisers exist.

The appraisal process using direct sales comparison consists of two steps. First, find transactions involving property right(s) comparable to the subject property and second, adjust the observed prices of the comparables for any differences from the subject property to arrive at an estimate of value for the subject property. Important differences to consider are the location, age and size of the lot (acres), and building (number of floors, structural system, garages, HVAC systems, class of building). Be warned that the relationship is not always linear. For example, the marginal contribution of an additional square foot tends to be smaller than the addition of the previous square foot.

How many comparables suffice? There are no hard and fast rules, except that quantity is a function of quality; the higher the quality, the fewer comparables will be necessary. In choosing comparables, the professionalism of the appraiser will play an important role. The rule of thumb is that in homogeneous real estate markets like the housing market, three comparables will be sufficient. Research has found that appraisal accuracy, as measured by the difference between appraised value and market price, increased as the number of comparables went from one to three or four, but very little increase in accuracy was achieved by using more than four comparables.[2] One of those studies also showed the importance of the location; accuracy was much higher when choosing comparables in the same or similar neighborhood than if there were no restrictions on the choice of the location of the comparables.[3] This might be true under 'balanced' market circumstances but in depressed markets it is sometimes hard to find any comparables. The solution could be to assemble comparables from other comparable neighbourhoods in other comparable cities, or to look at the history of the subject neighbourhood and adjust the historic transactions by the value development over time.

The mechanics of direct sales comparison are straightforward:

1.Information is gathered on sales what appear to be comparable properties.

2.The selling prices are adjusted for differences in characteristics between the comparable properties and the subject property to arrive at an adjusted selling price.

3.The value of the subject property is estimated using the calculated values for the comparable properties, weighted based on the appraiser's judgment.

Table 15.2 is a simple illustration using the direct sales comparison method. Be aware of the time adjustment, which is necessary to reflect the movement in value between the transaction date and the valuation date of the subject property. The adjustment can be expanded by using an analysis to create matched pairs and to include financing in the model as well. These issues are extensively described in Lusht (2001).

Income capitalisation

The rationale of the income approach is straightforward: the value of a property is a function of the income it is expected to produce. The value can be calculated in two different ways, using a ratio model or a discounted cash-flow (DCF) model.

Table 15.2: **Direct sales comparison approach**

Residential adjustment grid	**Subject**	**Comparable sales**			
		1	**2**	**3**	**4**
Transaction price		**105,000**	**115,000**	**122,000**	**100,000**
Transaction date	Current	6 months ago	9 months ago	10 days ago	1 year ago

Adjustment		**2,625**	**4,313**	**0**	**5,000**
Condition		Similar	Similar	Similar	Similar
Location		Similar	Similar	Similar	Similar
Age	15	22	12	8	20
Adjustment		**2,800**	**-1,200**	**-2,800**	**2,000**
Living area (sq ft)	2,200	2,100	2,350	2,400	2,000
Adjustment		**3,000**	**-4,500**	**-6,000**	**6,000**
Adjusted price comparables		**116,425**	**109,113**	**107,200**	**119,000**
Average estimate (rounded)	**113,000**				

Ratio model

The most fundamental way of comparing properties using the ratio model is to use a gross income multiplier (GIM) and compare the GIM to GIMs for similar properties. Although attractive because of its simplicity, in most cases using a ratio will be an oversimplification. First, the contract rent will very rarely be equal to the market rent at any point in time. Especially when the contract rent has been indexed for a number of years and the market has slid into a depression, the market rent could be lower or higher depending on market conditions. There are significant differences regarding how these costs are treated in different countries. For example, the freedom to negotiate the division of the operating costs over the landlord and the tenant (Germany); a full repair and maintenance lease, in other words all costs are for the tenant (UK); or only daily maintenance for the tenant and the other costs are for the landlord (most European countries). Another factor could be that a landlord will not always be allowed to increase the contract rent at the expiry date to market rent, but only gradually (the Netherlands). Because of those reasons it is clear that a GIM has its limitations and that it will be better to calculate based on net rental income. This is demonstrated in Table 15.3.

The calculation starts by determining the market rent based on recent comparables. After that, the gross rental income is calculated using the net rentable space. The next step is to deduct the average operating costs from the gross rental income to arrive at the net rental income (especially important to calculate the average for maintenance costs). Then calculate the capital value gross by dividing the net rental income by the market yield for net rental income for similar properties or other investments like bonds adjusted for the real estate risk premium.

Table 15.3: **Direct income capitalisation for a small building or one tenant**

1. General data	
Client name	
Object reference number	
Object name	
City/town	
Street and number	
Postal code	

2. Cash flows in/out

a	Rental income	Number m²	Rent/m²	Units	Rent/Unit	Rental value
	Retail	2,000	200			400,000
	Offices					0
	Residential					0
	Industrial					0
	Other					0
		Total gross market rental value				400,000

b	Operating costs		
	Fixed costs, e.g. property tax leasehold fee, insurance, sewerage		20,000
	Management costs, e.g. property management, leasing fee, fitting out costs		26,000
	Maintenance cost		30,000
	Other costs, e.g. unrecoverable VAT, bad debt, owner service charges		12,000
		Total operating costs	88,000
		As a % of gross rental value	22.0%
	Net rental income		312,000

c		
	Capitalisation rate (net)	6.0%
	Gross capitalised value	5,200,000

d	Adjustments	
	Actual contract rent	360,000
	Market rental value	400,000
	Difference	-40,000

Discount rate	7.00%
Years-to-expiry date	2

		2011	2012	2013	2014	2015	
+ or -/-	PV contract-/-Market rent	-37,383	-34,938	0	0	0	-72,321
-/-	Vacancy				10,000		
	Discounted vacancy	0	0	0	7,629	0	-7,629
-/-	Leasehold buy off future						
	Discounted value LBOF	0	0	0	0	0	0
-/-	Capital expenditure						
	Discounted value capex	0	0	0	0	0	0
-/-	Other adjustments						
	Discounted value other	0	0	0	0	0	0

	Total adjustments		-79,950
	Value including purchase costs		5,120,050
-/-	Purchase costs	7.00%	334,957
	Value excluding purchase costs		4,785,094
	Value, rounded		4,785,000

Source: ROZ Real Estate Council.

However, there might be some other adjustments to take care of like the difference between contract rent and market rent, vacancy allowance, renewal of a short leasehold or a major renovation in the near future. Last but not least, the purchase costs have to be deducted. After all these adjustments, the appraised value is determined to meet the required yield.

DCF model

The DCF model bases the value estimate on explicit forecasts of income and costs over the entire holding period of a property. Since the DCF method will be discussed in detail in the real estate valuation chapter in this book, we restrict ourselves to the salient points.

Most DCF models will have a time horizon of ten years. Assumptions and estimates have to be made about rent and rental growth or decline, operating costs and its increase or decrease, vacancy allowances, incentives, renovation and refurbishment and, last but not least, what the value of the property will be at the final year of the DCF model.

Since the cash flows will occur in the future, a discount rate has to be applied. The discount rate can be determined in different ways (Lusht, 2001):

•The summation approach, which requires estimates of the expected returns for the individual parts of the DCF model.

•The use of observed capitalisation rates and forecasts of income and value.

•The use of historical relationships of the yield from real estate to the yield of other kind of investments.

•The use of surveys of investor expectations.

The beauty of a DCF model is that the calculations and assumptions are transparent. However, unrealistic assumptions may also become the model's Achilles heel.

Analysis of the income-capitalisation methods

The various valuation methods vary, from explicit ones that have the benefit of insight and transparency, to very implicit ones that have the benefit of an easy 'mark to market' and good testability. The various methods relate to each other as Table 15.4 shows.

Cost approach

The cost or reproduction approach is widely used. The value according to the cost approach is the reproduction (or replacement costs) of the subject property's improvement as if new accrued depreciation of the improvements plus land value.

Table 15.4: **Comparison of valuation methods**

	Income capitalisation methods	**Business valuation-related methods**	**Residual (land) valuation**	**Cost-based methods**

Detail	DCF	Free cash-flows model	DCF models (future value-basis)	Explicit DRC (components)	**T m c (c**
Transparency	Ratio models (GIM)	Gross operating profit and turnover capitalisation	Land residual (nominal basis) Sales comparison	Implicit DRC (comparative units method)	

The cost approach has its limitations because it does not consider the effect of loss of utility, change of tenant requirements, depreciation of older properties, and friction between technical and economic life span of the subject property.

Challenges ahead

Although the principles of real estate appraisal have not changed much over time, its applications have and will continue to do so. A good example is the appraisal of green buildings, which is increasingly required because of burgeoning energy efficiency regulations. In that context, in what way should we deal with split incentive between landlord and tenant as a result of energy efficiency? What will be the impact of the longer economic life of a green building and will that be possible in all locations? Another example is the effect of decreasing demand for office space because of budget cuts by most Western governments as a result of the financial crisis, not to mention the different way people work, in offices and at home because of the IT possibilities, which decreases demand for office space as well. Sufficient challenges for appraisers ahead, which also requires them to keep up to date with the developments.

□

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[1] The definitions in this chapter, sometimes shortened, have been taken from the IVS. The full definitions are available at www.ivsc.org.

[2] For example, see Lusht, K.M. and Pugh, F. 1981. Appraising Houses: A Research Note on the Effects of Changing the Search Area for Comparable Sales. *Real Estate Appraiser and Analyst,* Vol. 46, No. 6, pp. 34–36; and Isakson, Hans R.1985. Arbitrage Pricing Theory, Adjustment Grid Methods and the Market Data Approach to Value. *American Real Estate Society*, October 1985.

[3] Vandell, Kerry D. 1991. Optimal Comparable Selection and Weighting in Real Property Valuation. *AREUEA Journal,* Vol. 19, No. 2, pp. 213–239.

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Valuation of income-producing real estate

By Phillip H. Gainey IV, Royal Institute of Chartered Surveyors

Introduction

Traditionally, property investments have been valued by applying an all-risks yield (ARY) to the estimated market rent of the property. Market rent, as defined by the International Valuation Standards Council (IVSC), is '…the estimated amount for which a property, or space within a property, should lease (let) on the date of valuation between a willing lessor and willing lessee on appropriate lease terms in an arm's-length transaction after proper marketing wherein the parties had acted knowledgeably, prudently and without compulsion.' For example, an investment property with an ARY of 6 percent that is expected to generate an annual market rent of $120,000 per year can be valued at $2 million. The calculation is demonstrated in Example 1.

Example 1

ARY = 6.0%
Market rent = $120,000 (per annum)

If ARY is defined as observed market rent/observed gross market price, then the estimated market value of the property would be:

Market rent/ARY = 120,000/.06 = $2,000,000

The use of the ARY method imbeds assumptions about future cash flows that are not explicitly modelled (for example, future rental value changes, vacancies, capital expenditures or structural shifts in market yields). In periods of rapid structural change with respect to everything from the broader economy (such as recessions and market rents) to legislation, the ARY model does not allow the valuer to be flexible, thus compromising accuracy.

Additionally, valuation techniques like the ARY method are typically used to estimate the price at which a property could be bought or sold in a market environment (commonly referred to as 'market value'). Another potential value that might be of interest is often referred to as investment value or worth, which is an estimate of the value of a property to a particular investor (for example, a private real estate firm). Investment value will usually differ from market value due to different income requirements, assessments of risk, expectations of growth and capital expenditures, and tax positions. Therefore, a model that allows for the explicit incorporation of various components will help an investor better judge the appropriateness of a particular property investment.

One method of real estate valuation that specifically takes into account several of these variables, which makes it a useful tool for comparing alternative investments, is discounted cash flow (DCF).

This chapter will discuss the DCF framework, key assumptions used in estimating property investment value and how variations in the assumptions affect the resulting estimate of value. We will use a simple DCF example for a commercial, income-producing property as the framework in this chapter.

The DCF framework

A DCF model estimates the value of a property by discounting back to the valuation date all future expected cash flows arising from that property. In practical terms, it requires the following:

1.An explicitly forecasted stream of cash flows over a given investment horizon or holding period.

2.An expected value that is assumed to exist at the end of the holding period (often referred to as the 'terminal value' or the 'exit value').

3.A discount rate that reflects the market and specific project risks.

Explicitly forecasted cash flows

The estimated cash flows of a property should reflect both income (for example, rental receipts) and expenditures (for example, property taxes and capital investments). Typically, cash flows are explicitly forecasted for five, ten or 15 years. The duration of the forecast period should be based on lease expiry dates, lease renewal periods and break clauses (including the probability of breaks from the lease occurring). Valuation is impacted by the timing of cash flows. Therefore, the more accurate the cash flow frequency is (monthly or quarterly rather than just annually), the more accurate the resulting valuation will be.

Cash outflows that should be included in the DCF model are:

•Cash used in the initial investment, including loan points and fees if financing is part of the structure.

•Cash expenses associated with operating and owning the investment property, including income and capital gains taxes.

•Capital expenditures for redevelopment or refurbishment of the property during the holding period.

•Expenses associated with the disposal of the property (selling costs).

Cash inflows that should be included in the DCF model are:

•Periodic income or rents collected from the investment property.

•Expected proceeds from the disposal of the property at the end of the investment holding period.

Exit value

The exit value represents the price that the investor expects to receive for the property at the end of the holding period. This expected value should take into account the anticipated physical condition of the property, rental growth, leasing terms and remaining tenure on the exit date, and movements in interest rates and property yields.

Typically, exit values are calculated by applying an ARY to the expected market rent at the end of the holding period. All else equal, the higher the terminal cap rate used, the lower the exit value and vice versa. Historical evidence indicates that terminal cap rates have varied dramatically from 3 percent to 12 percent. A typical rule of thumb would be 7 percent to 10 percent, with a higher cap rate used for properties with a riskier profile. Refer to Example 1 above for a simplified example of the calculation of the exit value at the end of the holding period.

Discount rate

The DCF method of valuing an asset is based on the concept of the time value of money. In other words, \$1 one year from now is worth less than \$1 today because of inflation. The discount rate used in a DCF model serves to bring all future explicitly forecasted cash flows and the exit value back to a value at the same point in time – the valuation date. Additionally, since the cash flows generated by an investment property (and most assets) carries a level of risk, the discount rate should be appropriate to compensate the investor for the risk taken by investing in the property.

A common method of determining the discount rate to use when valuing an asset is the capital asset pricing model (CAPM). The CAPM, however, is based on a few underlying assumptions that may not apply to real estate valuation, including:

•An efficient market environment.

•The fact that market risk is rewarded in the form of higher returns, but specific risk is not rewarded because it can be diversified away.

Because no two properties are exactly the same and real estate is not traded on an organised market with regularity (just to name two of many reasons), property markets are not considered efficient. Empirical evidence on the performance of property assets indicates a huge variation in the relationship between risk and return in a way that would not be predicted by the CAPM. So, for real estate it may be concluded that specific risks matter and should be taken into account in the discount rate. Therefore, the desired rate of return (discount rate) can be calculated as follows:

the risk-free rate + a market risk premium + a specific-risk premium

The risk-free rate is usually defined as a medium-term government bond, preferably with a time to maturity that corresponds to the holding period of the property being valued. The market risk premium and specific investment risk premium are a little more challenging to define. In general, the market risk premium is associated with structural change risks for the overall property market. Specific investment risks are based on the specific characteristics of the property being valued. The following factors could be taken into account when determining the level of each premium:

•Market premium:

–The level of liquidity expected in the market at the time of final sale of the property

–Failure to meet rental growth and market yield expectations

–The risk of location, economic, physical and functional structural changes related to the property market

–Legislative risks

•Specific-investment risks:

–Tenant or operational default

–Costs of property ownership and management

–Changes in lease terms at lease renewal dates

Some of these risks can be incorporated in the cash-flow forecasts for a specific property and/or through scenario analysis where a range of discount rates is used to determine multiple valuation outcomes.

Using the discount rate equation and the discussion on determining the inputs, we can calculate an example discount rate as follows:

Risk-free rate	1.0%
Market risk premium	6.3%[1]
Specific-investment risk premium	4.0%[2]

Calculated discount rate	11.3%

In the end, investment value can be defined as ‘the value of property to a particular owner, investor, or class of investors for identified investment or operational objectives.’[3] As such, alternative approaches for determining the discount rate applied to cash flows in a model designed to calculate investment value include:

•A single, standardised discount rate for all property investments.

•Discount rates that vary by property class (for example, shopping mall, office, restaurant and gas station).

•A hurdle rate based on minimum returns needed from an investment to adequately support total portfolio returns. These rates, typically used in private real estate investing, could be 20 percent, 30 percent or even 35 percent.

A DCF model example

The following example will illustrate how to build a DCF model to estimate the investment value of a commercial building as of December 1, 2011.

The assumptions needed to start setting up the DCF model are found in Table 16.1.

The left half of Table 16.1 outlines the main leasing details, including the current contracted annual rent, expected rental value at expiry, rent review dates and lease expiry dates. We assume that rents are paid quarterly at the beginning of the period. The right half of the table shows the expected number of months each space will remain vacant after lease expiry, forecasted carrying costs and real estate taxes that an investor will incur while the spaces are vacant, estimated costs of refurbishing each space during the vacant period, and number of months of free rent tenants after the vacancy period. These assumptions will be used to estimate the property cash flows over the investment holding period (which is assumed to be five years).

Building the cash flow forecast (refer to Table 16.2)

The first step in building the cash-flow forecast is to spread the quarterly rental payments out over the investment holding period using the current annual rents, expiry dates and rent review dates shown in Table 16.1. For example, the first floor generates a rental income of $30,000 per quarter through December 2012 (annual rent of $120,000 divided by four quarters). After the rent review date for the first floor on December 2012, we assume the rental income will increase to a rent-inflation adjusted level of $37,870 ($150,000/4 × 1.01) per quarter until expiry. The first floor lease contract expires one year after the end of our investment holding period in December 2017, so vacancy and refurbishment costs do not need to be taken into account until the calculation of the exit value.

Table 16.1: **Assumptions to build a DCF model for a commercial real estate investment**

	Current assumptions					Assumptions at lease exp		
	Total sq ft	Annual rent ($)	ERV* ($)	Rent review	Expiry	Vacancy (in months)	Rent free (in months)	Carryin costs s ft ($)
1st floor	1,000	120,000	150,000	Dec 2012	Dec 2017	12	6	120
2nd floor	2,000	240,000	300,000		Sep 2012	12	6	120
3rd–9th floors	14,000	1,680,000	2,100,000		Dec 2014	6	6	120
10th floor	1,500	180,000	225,000	Dec 2015	Dec 2020	6	3	120

* ERV is the estimated rental value and is an annual forecast of rent after expiry.

Note that all future cash flows, other than currently contracted rental rates, need to be adjusted for inflation by multiplying the cash flow by either the rent or the expense growth index. The index is set at 1 at the beginning of the investment holding period and is calculated by multiplying (1 plus the expected quarterly growth rate of either rent or expenses) by the previous period index level.

The second floor lease contract expires at the beginning of September 2012. Therefore, cash-flow forecasts during our investment holding period will be based on current rental rates before the expiry date; refurbishment costs, carrying costs and taxes, and a leasing fee during the expected vacancy period; and the expected rental value forecast after the rent-free period. All of the costs post-lease expiry and the subsequent expected market rents should be adjusted for price inflation by multiplying those numbers by the appropriate indexed growth number (either the rent or expense growth index).

Let us demonstrate the calculation of each of these cash flows. Current rental rates are $60,000 per quarter ($240,000/4). Refurbishment costs will be incurred at the beginning of the first quarter after lease expiry, September 2012, for the second floor. From Table 16.1, we see that refurbishment costs are estimated at $500 per square foot for the 2,000 square foot space, for a total of $1 million. The total refurbishment costs must then be multiplied by the cost-inflation index as of September 2012 (1.015), yielding an inflation-adjusted level of $1.015 million.

Carrying costs and real estate taxes need to be charged for each period that the space is expected to be vacant. These costs are calculated by multiplying the cost per square foot by the square footage of the space. The totals in each period are then adjusted by that period's cost-inflation index, generally implying rising costs over the vacancy period. The final cost to include is a charge to re-lease the space. We have added a charge of 10 percent of the annual expected rental value (ERV) in the first period following the vacancy period.

The last cash-flow stream that we need to explicitly include in our model during the investment holding period is the rent-inflation adjusted ERV. Table 16.1 shows an annual ERV for the second floor of $300,000. Multiplying the quarterly ERV of $75,000 by the rent-inflation index of 1.061 in the first period of the new lease (March 2014), we calculate quarterly market rent of $79,500.

The cash flow streams over the investment holding period for the third to ninth floors can be calculated similar to those of the second floor, with current rental rates shown quarterly before lease expiry, price-inflation adjusted refurbishment and other costs included during the vacancy period, and price-inflation adjusted estimated rental values beginning after the rent-free period.

The final cash flow forecasts that need to be made are for the tenth floor. The data in Table 1 indicates that the tenth floor comes up for rent review in December 2015 and expires in December 2020. As with the first floor, refurbishments, carrying costs, taxes and the leasing fee do not need to be calculated during the investment holding period, but will be considered as part of the exit value. Quarterly rental income of $45,000 will be included through September 2015, with the step up to the rent-inflation adjusted ERV of $63,283 ($56,250 × 1.125) occurring at the beginning of December 2015 corresponding with the rent review.

Estimating the exit value (refer to Table 16.3)

The next step in the process of building our DCF model is to estimate the exit value. The exit value is made up of three parts, all of which are discounted back to the same date – the last day of the investment holding period – using an estimated capitalisation (cap) rate. The three parts are:

1.The value of the remaining rental payments as per the contracts in place at the end of the holding period. We will call these payments the ‘passing rent’.

2.The value of any refurbishments, vacancy carrying costs, real estate taxes and leasing fees needed to bring the state of the property back to a long-run equilibrium.

3.The value of all future expected market rents after the final refurbishment and carrying period. This value is typically calculated by dividing the final rent-inflation-adjusted ERV by a capitalisation rate that takes into account the risk profile of the investment at exit date and anticipated market conditions.

For the purpose of our example, we assume that a cap rate of 7.5 percent is appropriate for calculating the various components of the exit value.

The exit value model shown in Table 16.3 is built out in an explicit manner through one period after the last lease expiry date shown in Table 16.1. Building the model out through April 2021 will make it easier to demonstrate how the streams of cash flows *after* the end of the holding period play into our overall valuation.

The lease on the first floor expires December 2017. Since the investment holding period ends December 1, 2016, there is one year (four quarters) left on the first floor lease at the forecasted passing rent level ($39,870/quarter). At expiry, we need to calculate refurbishment costs, vacancy carrying costs, real estate taxes and a leasing fee to bring the state of the property back up to long-run market equilibrium. The remaining value at the end of the vacancy period can then be calculated by dividing the ERV by the cap rate ($179,083 divided by 7.5 percent). The ERV at this point is the passing rent of $151,478 multiplied by the rent growth index of 1.194 at the end of the vacancy period, December 2018.

Therefore, the exit value attributed to cash flows generated by the first floor can be calculated as follows:

1.The value of the remaining rental payments (discounted back to December 1, 2016 at a cap rate of 7.5 percent) of $147,500.

2.The value of all costs incurred to bring the state of the property back to long-run equilibrium (also discounted back to December 1, 2016 at 7.5 percent) of $1,874,300.

3.The value of all future expected market rents after the vacancy period (discounted back to December 1, 2016 at 7.5 percent) of $2,221,200.

These three components sum to a single exit value attributed to the first floor of $2,368,600.

The lease on the second floor expired September 2012. As such, we included costs for refurbishment and vacancy in our explicit cash-flow forecasts during the investment holding period. To estimate the exit value attributable to the second floor, we only need to calculate the value the passing rents after the exit date and the value of the reversionary ERV thereafter. Hence, the exit value attributed to cash flows generated by the second floor can be calculated as follows:

1.The value of the remaining rental payments (discounted back to December 1, 2016 at a cap rate of 7.5 percent) of $1,233,200.

2.The value of the reversionary ERV (discounted back to December 1, 2016 at 7.5 percent) of $3,624,000.

These components sum to a single exit value attributed to the second floor of $4,857,200.

Following the steps above for the third to ninth floors and the tenth floor results in exit values for those spaces of $33,908,200 and $3,893,100, respectively.

The final step in calculating the total exit value as of the exit date is to deduct the purchaser's costs and a charge for sales costs. In our example, the total net proceeds at exit date of $38,993,700 (refer to Table 16.3 for this calculation).

Pulling the investment value together (refer to the bottom of Table 16.2)

Once we have calculated the total forecasted cash flows over the investment holding period (total current property rents, refurbishment and vacancy costs, re-leasing fees and net proceeds at exit), we can estimate the investment value of the property by discounting these cash flows back to the investment date using a discount rate that reflects the time value of money and the risk of the investment and summing these cash flows. In our example, we have discounted the cash flows at three different rates, resulting in a range of potential valuations. The rates used were 10 percent, 15 percent and 20 percent. The higher the discount rate used, the lower the resulting investment value.

Our model indicates that the example property has an investment value of:

•$24,602,200 using a discount rate of 10%.

•$19,959,500 using a discount rate of 15%.

•$16,395,400 using a discount rate of 20%.

Table 16.2: **Building the cash-flow forecast**

		Dec 2011	Mar 2012	Jun 2012	Sep 2012	Dec 2012	Mar 2013	Jun 2013	Sep 2013	Dec 2013	Mar 2014	Jun 2014	Sep 2014	Dec 2014	Mar 2015	Jun 2015	Sep 2015	Dec 2015	Mar 2016	Jun 2016	Sep 2016	Dec 2016
Growth assumptions																						
Annual rent growth rate			0.0%	0.0%	0.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	3.0%	3.0%	3.0%	3.0%	2.0%	2.0%	2.0%	2.0%
Indexed rent growth		1.000	1.000	1.000	1.000	1.010	1.020	1.030	1.040	1.050	1.061	1.071	1.082	1.092	1.100	1.109	1.117	1.125	1.131	1.136	1.142	1.148
Annual expense growth rate			2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Indexed expense growth		1.000	1.005	1.010	1.015	1.020	1.025	1.030	1.035	1.040	1.046	1.051	1.056	1.061	1.066	1.072	1.077	1.082	1.088	1.093	1.099	1.104
Cash-flow forecast																						
1st floor	Rent	30.0	30.0	30.0	30.0	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	
2nd floor	Rent	60.0	60.0	60.0	vacant	vacant	vacant	vacant	rent free	rent free	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	
	Refurbish				-1,015.0																	
	Carry				-60.9	-61.2	-61.5	-61.8														
	Taxes				-91.3	-91.8	-92.3	-92.7														
	Leasing fee								-30.0													
3rd-9th floors	Rent	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	420.0	vacant	vacant	rent free	rent free	593.6	593.6	593.6	
	Refurbish														-5,972.3							
	Carry														-667.9	-650.1						
	Taxes														-671.9	-675.2						
	Leasing fee																-210.0					
10th floor	Rent	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	63.3	63.3	63.3	63.3	
Net proceeds at exit																						38,993.7
Total forecasted cash flows		555.0	555.0	555.0	-672.2	349.9	349.1	348.3	472.9	502.9	582.4	582.4	582.4	582.4	-6,929.6	-962.9	-47.6	180.7	774.3	774.3	774.3	38,993.7
Present value (Total forecasted cash flows)																						
10% discount rate		555.0	541.9	529.2	-625.8	318.1	309.9	301.9	400.2	415.6	470.0	458.9	448.1	437.6	-5,063.8	-689.8	-33.3	123.4	516.4	504.2	492.4	24,212.0
15% discount rate		555.0	535.9	517.5	-606.3	304.2	293.2	282.5	370.3	380.2	425.3	410.7	396.6	382.9	-4,399.9	-590.4	-28.2	103.3	427.5	412.8	398.6	19,386.8
20% discount rate		555.0	530.3	506.6	-586.3	291.6	278.8	265.0	343.7	349.2	384.4	369.3	352.8	337.0	-3,831.5	-508.7	-24.0	87.1	354.8	340.9	325.7	16,470.7
Investment value @ 10%		24,602.2																				
Investment value @ 15%		19,959.5																				
Investment value @ 20%		16,395.4																				

Table 16.3: **Estimating the exit value**

		Dec 2016	Mar 2017	Jun 2017	Sep 2017	Dec 2017	Mar 2018	Jun 2018	Sep 2018	Dec 2018	Mar 2019	Jun 2019	Sep 2019	Dec 2019	Mar 2020	Jun 2020	Sep 2020	Dec 2020	Mar 2021	Apr 2021
Growth assumptions																				
Annual rent growth rate		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Indexed rent growth		1.148	1.153	1.159	1.165	1.170	1.176	1.182	1.188	1.194	1.200	1.206	1.212	1.218	1.224	1.230	1.236	1.242	1.248	1.254
Annual expense growth rate		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Indexed expense growth		1.104	1.110	1.115	1.121	1.126	1.132	1.137	1.143	1.149	1.154	1.160	1.166	1.172	1.177	1.183	1.189	1.195	1.201	1.207
Exit value calculation																				
1st floor	Rent	37.9	37.9	37.9	37.9															
		37.9	37.2	36.5	35.9															
		147.5																		
2nd floor	Rent	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	79.5	
		79.5	78.1	76.7	75.3	74.0	72.7	71.4	70.1	68.8	67.6	66.4	65.2	64.0	62.9	61.8	60.4	59.6	58.5	
		1,233.2																		
3rd – 9th floors	Rent	593.6	593.6	593.6	593.6	593.6	593.6	593.6	593.6	593.6	593.6	593.6	593.6							
		593.6	582.9	572.5	562.2	552.2	542.3	532.5	523.0	513.6	504.4	495.4	486.5							
		6,461.2																		
10th floor	Rent	63.3	63.3	63.3	63.3	63.3	63.3	63.3	63.3	63.3	63.3	63.3	63.3	63.3	63.3	63.3	63.3			
		63.3	62.1	61.0	59.9	58.9	57.8	56.8	55.8	54.8	53.8	52.8	51.9	50.9	50.0	49.1	48.3			
		687.2																		
1st floor	Refurbish					-676.7														
	Carry					-135.1	-135.8	-136.5	-137.2											
	Taxes					-202.7	-203.7	-204.7	-205.7											
	Leasing fee									-15.0										
	Total V/costs					-1,013.5	-339.5	-341.2	-342.9	-15.0										
	Present value	-1,874.3				**-942.6**	**-310.2**	**-306.1**	**-302.1**	**-13.0**										
10th floor	Refurbish																	-896.3		
	Carry																	-215.1	-216.2	
	Taxes																	-322.7	-324.3	
	Leasing fee																			-2.3
	Total V/costs																	-1,434.1	-540.5	-2.3
	Present value	-1,472.9																**-1,073.9**	**-397.4**	**-1.6**

Exit valuation	[A]	[B]	[C]	[D]	[E]	[B/E]	
	Passing rent	ERV at exit	Def'd rev.	PV of [A]	Cap rate	Present value of ERV	Total present value
1st floor	151.5	179.1	1.0	147.5	7.50%	2,221.2	2,368.6
2nd floor	318.2	376.8	4.5	1,233.2	7.50%	3,624.0	4,857.2
3rd – 9th floors	2,374.3	2,557.8	3.0	6,461.2	7.50%	27,447.0	33,908.2
10th floor	253.1	301.1	4.0	887.2	7.50%	3,005.9	3,893.1
1st floor vacancy cost							-1,874.3
10th floor vacancy cost							-1,472.9
Exit value							41,680.0
– purchaser's cost					5.50%		-2,292.4
							39,387.6
– sales cost					1.00%		-393.9
Net exit proceeds							**38,993.7**

Sensitivity to assumptions

The valuation process and the resulting bottom-line value are highly sensitive to the assumptions used in the model. Since many investment decisions are ultimately made based on the results of valuation models, care should be taken to use realistic, well-reasoned assumptions in the process. Using a range of assumptions for certain key variables may be a good way to see how sensitive the underlying value estimate is to the modeller's choices.

The following is a list of several assumptions that affect the bottom-line valuation and a brief discussion of how they affect value in the model.

Changes in the size of the property

Adding a level to the property or adding square footage to one of the existing floors will change the size of the property being valued. All else equal, increasing square footage should have a direct impact on cash flows. Costs will probably be incurred to pay for the initial increase in size, carrying costs and taxes may increase, and rental income on the additional space should increase. The net effect in the longer run should be a higher valuation.

Vacancy rates

Higher vacancy rates or longer periods of vacancy built into the model will serve to increase costs and reduce rental income at the same time, lowering the resulting valuation. Vacancy rates and lease renewal probabilities can both be addressed in a valuation model through the use of scenario analysis. Scenario analysis would involve:

1.Calculating estimated cash flows under various scenarios by using different vacancy and renewal assumptions (typically three to five scenarios).

2.Applying probabilities to each scenario, where the sum of the probabilities equals 100 percent.

3.Summing the probability-weighted scenarios to arrive at a single estimate of value.

Rental and cost growth rates

Rental and cost growth rates are used to calculate the price-inflation indices that affect future cash flows. Higher growth rates have a larger effect on expected future cash flow. Since rental cash flows are dictated by contracts and are typically flat during the contract period, cash inflows tend to change less frequently than the costs incurred.

The need for and cost estimates of refurbishment

The cost of refurbishment can be the largest single cash outflow in the model. Lower refurbishment costs, whether due to longer property life, use of sustainable materials or lower cost estimates, will increase the underlying valuation.

Changes in interest rates

The effects that interest rates have on a DCF model are varied. One of the most direct influences, however, is on the discount rate used to calculate the present value of all of the cashflow streams. Lower interest rates imply a lower discount rate. In turn, lower discount rates increase the property valuation.

Changes in lease terms

Changing the lease contract terms will have an impact on the valuation of a property in many different ways. Longer lease durations improve the visibility of rental income streams, thus reducing some of the property risk. However, lease contracts lock in the dollar amount of rent charged. If the contract locks in rental rates that are below market levels, the resulting valuation may suffer. A more direct impact on valuation can be seen with the inclusion of ‘rent-free’ periods in the model.

The longer the rent-free period, the less rent is collected and the lower the overall valuation.

The length of the estimated holding period

The length of Longer holding periods mean that more of the cash flows from the property will be explicitly the estimated forecasted, thus lessening the impact of the exit value on the overall valuation. However, the holding period further out the exit value, the less accurate the forecast of market rent and the ARY.

□

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Before AMT, Phillip worked in equity research at Citigroup in New York, where he was the valuation and accounting analyst for US and Latin American Equity Research. He was also a core member of the Equity Research Oversight Committee, monitoring the overall quality and accuracy of research reports and analyst recommendations in US and Latin American fundamental research, as well as, reviewing report and model submissions for analyst's initiations of coverage.

In addition, Phillip advised analysts, associates, and assistants internally (and portfolio managers and money managers external to the firm globally) on various accounting and valuation topics, and taught classes department wide on pertinent accounting and valuation topics and trends. Phillip has worked with a range of institutions including Harvard Business School, CFA Institute, Securities and Exchange Commission, Merrill Lynch, JPMorgan and Deutsche Bank.

Phillip holds an MBA in Finance from Columbia Business School (Dean's List, Recipient of the James L. Freeman Scholarship) and a BA in Finance from University Of Washington (Phi Beta Kappa, Dean's List). Phillip is also a CFA charter holder.

[1] Ibbotson Associates's Commercial Real Estate: The Role of Global Listed Real Estate Equities in a Strategic Asset Allocation 2006 reports expected future returns on commercial real estate of 11.3 percent less current risk-free rate (1 percent) and specific-investment risk (4 percent). Roughly corresponds to long-run equity risk premium estimates, supported by empirical evidence indicating a high correlation between US stocks and US commercial real estate returns in recent years.

[2] Assumes current industry rule of thumb for medium-or normal-risk small commercial property of 4 percent.

[3] IVSC, 2007.

17

Management fee, carried interest and other economic terms of real estate funds

By Derek Williams, Russell Investments

Introduction

The jargon associated with investing in a private real estate fund is numerous. Given that an investor is signing a contract to invest in a fund, and the sponsor of the fund is promising to manage the fund in certain ways, it is not surprising that legalistic language has permeated into the real estate industry. The purposes of this chapter are twofold. First, to provide clear definitions and insights into the main fund terms associated with most (but not all) private real estate funds. Second, to provide an overview of fund terms that have stood the test of time and to highlight those that are currently being debated in the industry. This second part involves a look at the alignment issue – how fund terms align the interests of the fund sponsor and investor.

Fees

Base management fee

In general there is a base management fee that is charged to the fund and paid by investors. This fee should be designed to cover the day-to-day costs of investing in, managing and perhaps ultimately selling real estate. There are a variety of ways that this fee is structured. In some cases there is a straight fee, say 1.5 percent on commitments to the fund. So, a commitment of $10 million will involve a fee of $150,000 normally billed quarterly to the investor. After the end of the investment period the fee would normally be based on net invested capital (or words to that effect). The investment period is the period in which the fund is acquiring real estate assets and typically would be in the three- to four-year range.

However, the level and basis of the base management fee can vary depending on the specific fund considered. A core fund might levy the fee on net asset value (or NAV – essentially the valuation of the underlying real estate less the debt). Some core funds do still levy management fees on gross asset value (GAV) – although in most cases the level of the fee would be lower to account for the leverage associated with the assets. There is a lot of debate in the industry in terms of whether the fee should be charged on gross or net asset value in relation to core funds. The pro-GAV camp suggests that GAV represents a better proxy for the work required in managing a portfolio of assets. The pro-NAV camp argues that leverage can distort the fee when charged on GAV and calculating the fee based on NAV simply cuts through that distortion as debt is excluded. The recent price correction, post-2008 global financial crisis, in commercial real estate meant that some core portfolios which went into the downturn with moderate to high leverage (45 percent to 70 percent loan-to-value or LTV) became ‘overleveraged’ after the price correction. For investors in those funds it became a key issue that, although the manager was still being paid a smaller fee than before (because the values had fallen), the investors’ NAV or equity was in some cases severely impacted and yet they were still paying a fee. In fact, when funds were compared on an apples-to-apples basis by calculating the fee load based on

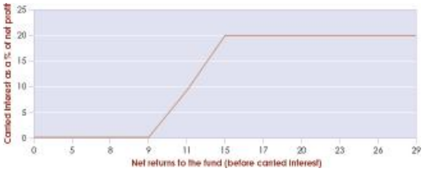
NAV (which is what investors care about), the funds with management fees based on GAV were shown to be ‘overloaded’ in certain cases due to the leverage effect. Generally, the market view is that an appropriately set fee on GAV with quantifiable leverage limitations probably offers good alignment, but that a fee on NAV is cleaner and offers overall stronger alignment.

There are certain closed-end funds that do not charge base management fees on commitments during the investment period, but charge fees on NAV. While these are not the market norm, they were a reaction to the following situation. Some funds were raised at the peak of the market and did not invest as markets collapsed in the face of the global financial crisis. Investors who had just committed to a fund for say, ten years, were suddenly paying fees on their full commitments despite a low prospect of that capital getting invested in the 2008-2009 period. To a certain extent the fund sponsor had a valid counterargument: they were still appraising opportunities and running a team in order to do that. The fund sponsor also argued that overall alignment was good particularly if they had co-invested their own capital into the fund and were personally paid part of the carried interest. This in some part explains why some of the new funds coming to the market in the 2008-2009 period opted to have their base management fee on NAV rather than on commitments. One could also argue that a fee based on NAV could overly incentivise the fund sponsor to invest the capital so as to earn fees. From a big picture perspective, however, it is preferable to look at the overall alignment of fees and analyse how a combination of base fee, carried interest and catch-ups would impact the investor’s net of fee return.

Carried interest

Carried interest is also known as carry, promote or performance fee. Put simply, carried interest is the profit that accrues to the fund sponsor. It is normal practice for a non-core strategy fund to have a preferred return or hurdle rate over and above which the carried-interest calculation would kick in, hence the term 'distribution waterfall' (see Figure 17.1). The first waterfall is that the investor is entitled to get all of its capital returned (including management fees, broken-deal costs and fund organisational expenses). The next level is dictated by the hurdle rate, the level of which can vary widely depending on which country or region the fund is investing in. There is a general view that the hurdle rate – whether 8 percent, 9 percent or 11 percent – should be set based on the underlying performance of the core real estate market. In such a way the manager of the fund will be rewarded for outperformance by generating added value over and above normal market conditions. It is worth noting that some funds targeting emerging markets have higher hurdle rates than those funds investing in established markets like the US. This spread reflects the incremental required return associated with the higher perceived risk in emerging markets relative to developed markets. Once the investor has received his capital back, and the hurdle rate has been reached, then the profit is generally split between the investor and the fund sponsor. Typically a fund sponsor might get 20 percent of profits over a hurdle rate of 8 percent or 9 percent.

Figure 17.1: **Carried interest distribution waterfall**



Source: Russell Investments.

A minority of fund sponsors offer a tiered hurdle-rate structure with differing distributions of profit in each tier. For example, the structure might be 15 percent to the fund sponsor over a 9 percent hurdle and 20 percent over a 15 percent hurdle. While the market does buy into these funds, some commentators would argue that, although designed with the best intentions, it can skew the manager to take on additional risk in order to achieve that incremental share of profits. Once again it is difficult and probably misleading to opine on individual fee mechanisms. The key question is how the fund is set in terms of overall alignment on fees, sponsor commitment and buy-in of the team.

There are core funds that have a performance fee element to their fee structure. Sometimes this is linked to a market index, net operating income (NOI) or to an absolute return. Given that most core funds have some element of leverage it is important that, if a market-type benchmark is being used, there is a like-for-like comparison in terms of leverage. An NOI-based performance fee offers alignment with the income yield orientation of core investment strategies. Another issue with performance fees on core funds is whether the performance is unlimited (as is the case with their opportunity fund cousins) or limited by a cap. At the very least a cap is appropriate given the nature of core funds being low-risk vehicles for investors to access real estate. This leads to the overall challenge of applying a performance fee to core funds – it creates an incentive for the fund sponsor to take on more risk for an investment strategy that is specifically designed to be at the low end of the risk spectrum.

Catch-up

Catch-ups are more prevalent in the opportunity fund sector. This is a defined split of profits that go to the investor and fund sponsor. A high catch-up split would be 80/20 that is 80 percent to the fund sponsor and 20 percent to the investor until such time as the sponsor has received its 20 percent return on overall profits. Even though the catch-up mechanism would normally kick in at the preferred return – for example, 9 percent, it would mean that for every dollar of profit over and above the 9 percent return, the fund sponsor would get 80 cents until the sponsor has received its 20 percent return on overall profits. Clearly post-global financial crisis there has been pushback from investors on the basis that it is their capital that is being managed and an aggressive catch-up skews the upside to the investor. Catch-ups do not exist in all opportunity funds, however. Many funds were launched in the 2008-2009 period with no catch-up provisions. In general, opportunity funds launched in 2010 and beyond with catch-up provisions have been 50/50 or 40/60 in terms of the split between the fund sponsor and the investor.

Clearly the catch-up mechanism is an incentive to the fund sponsor to outperform the preferred return as they will get a high proportion of the overall profits. However, it is questionable how an aggressive catch-up of say 80/20 (fund sponsor to investor) offers strong alignment where there is an appropriate balance of risk between the investor committing its capital, and the fund sponsor generating an appropriate level of incentive fee commensurate with good returns to the investor. Funds have been brought to the market without a catch-up provision – both value-added and opportunity funds. Where there is no catch-up provision, the preferred return is a hurdle rate over and above which the profits are shared in a defined way between the fund sponsor and the investor.

Clawback

A clawback is where the fund sponsor and investors agree to use prior distributed profits to offset any shortfall in profits. To take an example of the following 'since inception' fund returns:

Year 1	15%
Year 2	15%
Year 3	15%
Year 4	8%
Year 5	5%

If we assume that the carried interest is 20 percent over a 10 percent hurdle, then the performance fee for the first three years would be 1 percent per year (that is, 20 percent of 5 percent). However, the fund had low performance in years 4 and 5, which pulls down the since-inception return to 8 percent in year 4 and to 5 percent in year 5. In this case, the clawback provision would kick in and certain amounts of the profit paid in years 1 to 3 would be used to offset the ultimate performance in years 4 and 5. In practice often an escrow account (or sometimes called a 'segregated reserve account') is used in to which a proportion (perhaps 50 percent) of the profits would be paid. Another term that is used is a 'portfolio test' where each distribution is subject to a test to ensure that the performance of the overall fund is given priority. For example, an individual deal that delivers a 30 percent return would clearly be above a 10 percent hurdle but if the overall fund was expected to perform at 8 percent (based on most recent valuations) then the portfolio test would ensure that the sponsor did not get paid for projected underperformance. It should be noted that a portfolio test is a 'look-forward' mechanism, and clawback is a 'look-back' one. It might seem that either clawback or a portfolio test should be in place, but it should be noted that having both would ensure stronger alignment.

Organisation and fund set-up costs

This is one of the more straightforward fees. This is where the costs of setting up and structuring the fund are expensed to the fund and ultimately paid by the investors. The organisational costs should not recompense the fund sponsor for the general overhead of set-up costs associated with running the firm. It is normal to have a cap amount stated in the legal documentation which can vary considerably depending on the complexities associated with the target investor base and the target countries for investment.

Transaction fees

There are funds that charge a transaction fee – whether on acquisition or disposition of real estate assets. Funds with these types of fees are in the minority; it is normal to assume that the costs of running the portfolio including buying and selling assets are part of the base management fee outlined above.

There are distinct regional variations regarding the prevalence of transaction fees. There are many funds in Europe that have either an acquisition fee and/or disposition fee. This practice is less common in the US. Once again the question is how the overall alignment of the fund incentivises the fund sponsor and how the net-of-fee returns flow through to the end investor. As an overall comment, a transaction fee could be argued to foster churning in the portfolio, particularly on core or core-plus funds that do not have a carried-interest mechanism. This is because the fees that flow to the fund sponsor would be directly linked to how much trading it does. Furthermore, the market has found ways to set the base management fee at an appropriate level, that when combined with appropriate carried-interest language orientates the fund sponsor to focus on generating returns to the investor irrespective of the amount of transactional activity it does.

Sponsor commitment

Strong alignment comes from those funds where the fund sponsor has committed capital to the fund. Since the global financial crisis the market has increasingly focused on the quality as well as quantity of the sponsor commitment. Small start-up firms will normally have less personal capital to commit to their funds. Larger established firms may have eye-catching amounts of capital committed to their own funds. In each case investors make their own judgment and it should often be made alongside how the carried interest is allocated to the team and the vesting schedules associated with any payments.

The market has also witnessed large sponsor commitments from parent companies even as the team on the ground that is tasked with generating returns does not have appropriate incentives in place that are aligned with investors. Another way for sponsors to incentivise the team of individuals working on the fund is to offer loans (either recourse or non-recourse). While nothing substitutes for 'skin in the game' (that is, personal equity), schemes involving fund sponsors lending to individuals should be looked at closely. In theory it can offer strong alignment but it can and has meant personal overleverage in some cases. It can also lead to odd situations in a workout situation on a fund where an individual is not being incentivised to chase after the last dollar because its company loan is non-recourse. It is preferable to look closely at the nature of the sponsor commitment and right size it to the key investment professionals and their personal backgrounds.

Total expense ratio (TER)

The TER is sometimes called the 'total fee load'. There is no one standard global definition of total expense ratio. For most funds a simple comparison of the gross of fee return (including leverage) to the net of fee return (including leverage) would provide an indication of the total fees that would be paid to the fund sponsor. TERs can be historic or forward-looking based on cash-flow projections with a number of specific assumptions on when the profits are made. Either way it is preferable to analyse the impact of the total fee load under a range of possible returns. For example, an opportunity fund that hits its target return of 20 percent gross IRR might have a net IRR of 15 percent (that is, a total fee load of 5 percent). However, if a return of 18 percent is met then the fee load might still be close to 5 percent. Then at a gross IRR of 15 percent the fee load is 4 percent. Catch-up provisions can skew the fee load considerably, in addition to the overall preferred return and base management fee.

Bid-offer spreads and 'at-NAV' priced funds

Many open-ended funds investing in Europe have an issue that is not significant in other countries like the US. Investing in European real estate comes with high costs called stamp duty land tax (SDLT) or transfer costs that are paid to the government on the acquisition of real estate assets. Although most investors look to minimise this tax leakage through innovative structuring, it is generally difficult to bring the tax leakage down to an insignificant level when investing in pan-European real estate. As an example, the SDLT paid to the UK government when buying UK real estate is as follows:

Purchase price	Stamp duty land tax rate
Up to £150,000	Zero
Over £150,000 to £250,000	1%

Over £250,000 to £500,000	3%
Over £500,000	4%

Source: HM Revenue & Customs, 2011.

This high cost of acquiring real estate assets produces an issue when running an open-ended fund. The issue is that the incoming investor is buying into a portfolio of assets which have already been ‘written down’ in terms of SDLT. To take an example, investor A seeds a fund that invests $100 million into real estate. The SDLT paid to the government might be $5 million so that the investor has borne $105 million in terms of total outlay in order to get exposure to $100 million of assets (the market would only pay $100 million as that is the intrinsic value of the real estate). Investor B, who looks to enter the fund subsequent to Investor A, would be advantaged if it invested at $100 million as it would not have borne the costs of acquiring the portfolio. Similarly Investor A would be disadvantaged as it had invested the extra $5 million which is benefitting Investor B. The market has found two ways around this issue. One way is to operate a bid-offer spread where the offer price is set at a level that equates to the SDLT associated with the investment. In our example, the offer rate would be 5 percent above the mid-price, that is, $5 million on the $100 million portfolio. The bid price is to cover the costs of selling the portfolio – but this is a smaller issue compared with the costs of acquiring the portfolio.

Another method is to accrue the acquisition cost over a period of years (say five) and for the NAV to reflect that accrual method. Investors entering or exiting the fund trade at NAV. The logic of this is that the acquisition cost is smoothed to allow investors not to be hit with a writedown on day 1 (effectively absorbing the $5 million in our example above). Assuming the fund is of critical size, and that investors generally do not overly trade their exposure to the fund, this approach can work. Some funds that operate this at-NAV approach also combine it with a lock-in period that ties the investor to the fund for a number of years (anything from two to five years is typical). From an investor's perspective it is preferable to buy in at NAV and to avoid a day 1 write-down of $5 million using the example above. However, the complexity is acute for open-ended funds that are in their start-up phase. Again, a lock-in period is a potential way around the issue.

Right of first refusal (ROFR)

The ROFR is a mechanism whereby existing investors in a fund have a right to refuse an offer that an exiting investor has received from a third-party investor. In practice this right is clearly framed as an option for the existing investors to purchase the shares of the exiting investors. The ROFR process is normally very strict in terms of the time existing investors can exercise their option and execute the transaction. In practice not all funds have ROFRs in place, but most do. As long as there are strict procedures surrounding the ROFR, it should work smoothly for both fund sponsor and investors alike.

Conclusion

This chapter has highlighted and explained the key economic terms in private real estate funds. Given the thousands of funds launched over the past decade, it is difficult to generalise in terms of what is the market norm, or even best practice, as it relates to specific individual terms and clauses. However, the market is keenly aware of getting strong alignment between fund sponsor and investors alike. While a holistic approach is advisable – to examine all fund terms together – it should be appreciated that it is necessary to pour over the details of specific fund terms in order to make that holistic judgment call.

□

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18

Mathematical concepts in building a real estate multi-manager portfolio

By Edward Casal and Tiffany Thomas, Aviva Investors

Introduction

Real estate multi-manager (REMM) is a service whereby clients engage a team of real estate professionals to create a portfolio of investments in a variety of underlying private real estate funds in order to achieve their return objectives and risk tolerance level. A multi-manager seeks to construct a portfolio that is diversified by geography, stage and sector. Each underlying private real estate fund may be dedicated to a particular geography, stage or sector (a specialist fund), or may invest across different geographies or property types to provide a degree of internal diversification. Client mandates are typically invested over a number of vintage years, allowing investment across various phases of the market cycle in order to avoid market-timing risk.

REMM clients range from corporate and government pension plans to high-net-worth investors. They invest either through a separate account structure or through a commingled fund structure. The commingled fund structure is often referred to as a 'fund of funds' because the fund invests in other funds which are generally specialised in nature. In either case, separate account or fund of funds, the analytical processes on behalf of the client are the same.

This chapter will discuss the mathematics of real estate analysis, as well as areas that are specific to multi-managers, including investment process overview, model allocation development, investment analysis, portfolio construction and asset management.

Investment process overview

The REMM methodology combines top-down analysis and bottom-up analysis. The three main components of a multi-manager process are (i) research and strategy, (ii) investment implementation, and (iii) asset management. In each case, the manager seeks to maximise the opportunity set while limiting the amount of risk exposure.

Research and strategy often involves a broad assessment of opportunities and focuses on macroeconomic, geopolitical, capital market and property market fundamentals. Ultimately, this leads to development of model portfolios for each client with country and sector weightings that are based on total return forecasts. Demographic drivers, economic growth and real estate cycle considerations are examined to develop projections of potential future returns for an underlying strategy. This comes together to form a model allocation, which is based on the multi-manager's view of potential outcomes over the medium to long term.

The investment implementation stage takes the model allocation that has been developed and constructs an actual investment portfolio for a client. This 'bottom-up' stage often takes two to four years of dynamic analysis, investment, re-evaluation, analysis and further investment of property, funds and managers selected. Simple mathematical analysis regarding historical costs and returns can serve as a valuable tool with which to probe a manager's philosophy and actual capabilities.

Portfolio construction in private real estate is an imprecise science as historical data can be extremely poor, particularly when allocating capital globally. Nevertheless, the multi-manager must take into account the risks being taken within a portfolio, their impact on value and the potential amount and timing of cash-flow distributions. Further, covariance of returns based on common susceptibility to individual economic factors is a key factor in building portfolio diversification.

During the asset management stage the REMM re-evaluates the status of the investment portfolio on a periodic basis. Factors for evaluation include projected returns, liquidity and financial leverage as well as geographic, sector, currency and manager risk. The portfolio may be rebalanced by selling an interest or reinvesting distributions into strategies considered more favourable.

Developing a model allocation

The objective of developing a portfolio allocation model is based on Harry Markowitz's modern portfolio theory (MPT), using a mean-variance model. MPT assumes that investment returns are normally distributed and can be measured on a continuous basis. In the case of private real estate funds, neither assumption holds true. First, given the private nature of the investment vehicles, returns are not publicly available and are further protected by confidentiality agreements. Where data is available, it is not measured on a continuous basis but rather on a quarterly or annual basis. The lack of availability and the infrequency with which returns are measured present a significant challenge in the direct application of many portfolio allocation techniques.

Finally, where large samples of data can be tested, it does not appear that such returns are normally distributed. While a normal distribution is characterised by symmetry around a mean and skinny tails, private real estate returns tend to have fat tails and are generally skewed, reflecting a small number of exceptionally positive or negative outcomes. Figure 18.1 highlights this trend utilising data from NCREIF.

Figure 18.1: **Non-normal real estate return distribution**

Source: Aviva Investors, NCREIF.

Table 18.1: **Hypothetical global model allocation**

	Office	Residential	Industrial	Retail	Total	Benchmark
North America	5%	8%	8%	4%	**25%**	**40%**

South America	0%	4%	1%	0%	**5%**	**0%**
UK	7%	0%	0%	8%	**15%**	**8%**
Continental Europe	5%	8%	0%	7%	**20%**	**34%**
Australia	6%	0%	2%	7%	**15%**	**4%**
Asia	7%	0%	4%	9%	**20%**	**14%**
Total	**30%**	**20%**	**15%**	**35%**		
Benchmark	**44%**	**15%**	**13%**	**27%**		

Source: Aviva Investors, IPD.

Practical application for REMMs

While MPT cannot be perfectly applied within the real estate universe due to the data limitations discussed above, multi-managers seek diversification when constructing real estate portfolios because past experience has shown its benefits.

Model allocations are developed with the primary focus on the long-term investment objective of the mandate. Importantly, consideration is also given to the short-term horizon, which enables a more tactical element and is particularly helpful in planning the investment phasing of the mandate. As a result, model allocations address stage and sector diversification based on industry analysis and timing within the real estate market cycle.

The model allocation in Table 18.1 assigns portfolio weightings across both geography and sector on the basis of a top-down macroeconomic analysis. In the investment implementation phase of the process, consideration will be given to the optimal number of fund investments to achieve diversification without approaching declining marginal benefit. It is also important to consider the number of potential investments available within a given geographic and sector allocation. While there may be an attractive opportunity for market exposure, the optimal investment vehicle may not be available. Finally, it is important to note that the ultimate risks and returns of a new private real estate fund may not be known at the time of investment. This is particularly true with regard to a blind-pool investment programme, where one seeks to gain exposure to a given market through a defined strategy, but details of the ultimate capital deployment are unknown.

Investment analysis

During the investment implementation phase of the process, individual fund investments are evaluated as a means to achieve the model portfolio allocation. Analysis of investment opportunities in private real estate attempts to address three paths of inquiry:

1.Is the investment strategy sound given the objective?

2.Is this the best fund manager to implement the strategy?

3.Does the structure provide appropriate alignment between the fund manager and the investor?

In many cases a multi-manager may enter an investment by acquiring a secondary interest in a fund or partnership from a party who wishes to exit the investment, for whatever reason. This often allows an investment team to accelerate exposure to a sector, and often to mitigate the J-curve effect typical of investing in newly formed private real estate funds. Analysis of a secondary transaction includes significant emphasis on the existing property portfolio and the status of capital contributions and distributions.

Strategy

The first purpose of investment analysis is to gain comfort that the strategy the investor intends to pursue is feasible given the current market environment and that the risks to which the strategy is exposed are tolerable. A multi-manager team examines, among others, macroeconomic and political issues, real estate market fundamentals, leverage, currency, hedging policies, existing portfolio attributes and valuation. A multi-manager's view is then verified through research, modelling and on-site due diligence.

Financial modelling allows the investment team to assess the likelihood of the fund achieving its projected returns and to understand the risks inherent in the investment. At the top of market cycles, for example, a simple cash-flow model may show that one needs extremely high (and arguably unreasonable) rental growth rates in order to achieve the returns projected by fund managers. By independently modelling market-based assumptions with regard to property rents, expenses, initial yields, leverage and exit valuations, the investment team can evaluate whether an investment strategy is likely to have merit (see Table 18.2).

Every assumption underlying an investment decision involves an expectation with regard to future events. A thorough risk analysis will consider the implications of such eventualities. Sensitivity tables are frequently used to highlight returns in an upside and downside scenario with regard to critical assumptions. A sensitivity table with regard to exit capitalisation (cap) rate and stabilised vacancy assumptions is shown in Table 18.2. Sensitivities are also useful in evaluating a full range of factors including the impact of going-in price, leasing assumptions, leverage levels and the cost thereof. Further, for any investment, the going-in price deserves thorough analysis as it underscores the investment's vulnerability to new market supply.

In addition to highlighting the key assumptions driving investment returns, the simplified property-level projection model outlines the attribution of investment returns between current cash flow and expected capital gain. Understanding the attribution of return for a given strategy is critical to understanding investment risk as well as making comparative investment decisions across similar funds. In the example in Table 18.2, 46 percent of the investor's capital will be returned based on operating cash flows, while the remainder and any potential upside are dependent on residual value. This may compare favourably or unfavourably to peer funds depending on the strategy's risk profile.

In the REMM context, investments may include existing funds with seeded portfolios or new funds which constitute blind pools. In either case, property-level cash flow modelling is essential. However, an existing portfolio offers the additional opportunity to evaluate historic performance and current valuation relative to comparable properties and market transactions.

Manager

The underlying management's capability and integrity are essential ingredients in a successful real estate investment programme, particularly because there is such a substantial return gap between top-quartile and bottom-quartile private real estate fund managers over long periods of time. It is imperative to understand how each manager has earned its return, what risks the manager has taken to achieve such return and whether the manager can deliver attractive risk-adjusted returns repeatedly.

Table 18.2: **Simplified property-level projection**

Sources			Uses		
Mortgage debt	70,000,000	70.0%	Acquisition cost	100,000,000	100.0%
Investor equity	30,000,000	30.0%			
Total sources	100,000,000	100.0%	Total uses	100,000,000	100.0%

Property		Debt	
Total square feet	500,000	Loan amount	70,000,000
Acquisition price (psf)	$200	Interest rate	6.00%
Going-in cap rate (Year 1)	6.42%	Amortisation period	Interest only
Exit cap rate (Year 6)	7.00%	Annual debt service	-4,200,000
Disposition costs (% of residual value)	2.00%		

Assumptions

	Acquisition	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Vacancy/concession loss	12%	12%	8%	8%	8%	8%	8%
Market rent		$15.00	3.0%	3.0%	3.0%	3.0%	3.0%
Other income		3.00	2.5%	2.5%	2.5%	2.5%	2.5%
Expenses		3.00	2.5%	2.5%	2.5%	2.5%	2.5%
TI/LC		$1.25	–	–	–	–	
Capex reserve		$0.30	2.5%	2.5%	2.5%	2.5%	2.5%

Cash flow

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Gross potential rent		7,500,000	7,725,000	7,956,750	8,195,453	8,441,316	8,694,556
Other income		1,500,000	1,537,500	1,575,938	1,615,336	1,655,719	1,697,112
Vacancy/concession loss		-1,080,000	-741,000	-762,615	-784,863	-807,763	-831,333
Effective income		**7,920,000**	**8,521,500**	**8,770,073**	**9,025,925**	**9,289,273**	**9,560,334**
Expenses		-1,500,000	-1,537,500	-1,575,938	-1,615,336	-1,655,719	-1,697,112
Net operating income		**6,420,000**	**6,984,000**	**7,194,135**	**7,410,589**	**7,633,553**	**7,863,222**
NOI growth			8.8%	3.0%	3.0%	3.0%	3.0%
TI/LC		0	-25,000	0	0	0	
Capex reserve		-150,000	-153,750	-157,594	-161,534	-165,572	
Net cash flow		**6,270,000**	**6,805,250**	**7,036,541**	**7,249,056**	**7,467,981**	
Acquisition cost	(100,000,000)						
Residual value						112,331,745	
Disposition costs						(2,246,635)	
Unlevered cash flow	**(100,000,000)**	**6,270,000**	**6,805,250**	**7,036,541**	**7,249,056**	117,553,091	
Loan amount	70,000,000						
Debt service		(4,200,000)	(4,200,000)	(4,200,000)	(4,200,000)	(4,200,000)	
DSCR		1.53	1.66	1.71	1.76	1.82	
Principal repayment						(70,000,000)	
Levered cash flow	**(30,000,000)**	**2,070,000**	**2,605,250**	**2,836,541**	**3,049,056**	**43,353,091**	

Return and sensitivity

Unlevered IRR	**8.6%**
Unlevered return multiple	1.45
Levered IRR	**14.0%**
Levered return multiple	1.80
From cash flow	0.46
From residual	1.34
Value creation (Residual/acquisition)	**12.3%**
Value expansion (Going-in/exit cap)	-8.3%
Cumulative NOI growth (Year 6)	22.5%

		Levered IRR				
		Exit cap rate				
		8.5%	**7.5%**	**7.0%**	**6.5%**	**6.0%**
Stabilised vacancy	**14.0%**	-4.3%	4.4%	8.4%	12.3%	16.3%
	12.0%	-1.5%	6.5%	10.4%	14.2%	18.1%
	10.0%	1.0%	8.6%	12.3%	16.0%	19.7%
	8.0%	3.3%	10.5%	14.0%	17.6%	21.3%
	6.0%	5.5%	12.3%	15.7%	19.2%	22.8%
	4.0%	7.4%	14.0%	17.3%	20.7%	24.2%

Source: Aviva Investors.

To evaluate whether a manager is appropriate for carrying out the chosen investment strategy, a REMM must assess the underlying manager's level of experience, and determine whether the skills and judgment capability match the chosen strategy in the future environment. The top five criteria for evaluating a manager are: business culture and investment philosophy, depth and strength of personnel, transparency and cooperation, proven investment acumen and financial strength. In addition, one must focus on the financial motivation of key investment personnel in order to assess the likelihood of continuity as well as the financial capability of the underlying fund manager to attract and retain appropriate resources and personnel to support its operations and service its investors.

A number of quantitative measures can also be employed to evaluate a manager's investment track record. Such analysis focuses on investment performance relative to peer managers as well as industry benchmarks. With all measures, it is important that comparisons are made across similar strategies and similar market conditions in order to draw a meaningful conclusion. While past performance is never a guarantee of future performance, the goal of such relative performance analysis is to gauge one's confidence that the manager will be able to deliver strong results going forward. While no single tool is sufficient in isolation, collectively the following metrics begin to form a thorough understanding of the manager's investment capability.

Attribution of returns

A discounted cash-flow (DCF) model, similar to the simplified property-level projection model in Table 18.2, forms the basis for an attribution analysis. The goal here is to understand the key drivers of a manager's past performance by isolating the effects of leverage, market timing and property management. In doing so, one can determine a manager's primary strengths and weaknesses. If a substantial portion of return comes from cap-rate compression, for example, it draws into question whether the investment performance is repeatable or simply fortunate market timing.

In Table 18.3, two managers were able to achieve the same 20 percent IRR over a five-year holding period, yet the methods for achieving those results were quite different. Manager A increased net operating income (NOI) substantially with moderate leverage. Manager B was not able to increase NOI, utilised very high leverage and sold the properties at a much more attractive cap rate. In this very simplified situation, there is reason to believe that Manager A may have superior operating skill while Manager B benefitted from fortunate market timing. A multi-manager's task is to then determine which is more likely to be repeated: skilled execution or market timing.

Return multiple

The return multiple is performance calculated by dividing total investment proceeds, including realised distributions and unrealised residual value, by the initial investment amount. A return multiple of 1.0 would imply that the investment returned the investor's initial investment without gain or loss, and a multiple of 2.0, for example, would imply that the fund doubled the investor's money.

The downfall of the return multiple is that it ignores the dimension of time. Clearly, an investment that achieves a 2.0 multiple over one year would be significantly more attractive than an investment that achieves a 2.0 multiple over ten years. Therefore, it is important to evaluate investment performance with measures that also address the duration of a fund's investment period.

Table 18.3: **Attribution of returns**

	Manager A	**Manager B**
IRR	20%	20%
Return multiple	2.19	2.48
Leverage	60%	90%
Cap rate (going in)	7.5%	7.5%
Cap rate (exit)	7.5%	6.1%
Cumulative NOI growth	22%	-7%
Return multiple attribution		
From cash flow	0.65	0.00

From residual value	1.54	2.48

Source: Aviva Investors.

Internal rate of return (IRR)

IRR incorporates the dimension of time with investment returns. Mathematically, the IRR corresponds to the annually compounded discount rate that would make the net present value (NPV) of all cash flows from a given investment equal to zero. IRR is thus interpreted as an annualised return measure.

IRR has a number of shortcomings. As can be seen in Table 18.4, IRR does not always equal an investor's effective rate of return. An IRR of 80 percent, for example, does not necessarily mean that the investor actually received an 80 percent return on initial investment each year over the ten-year investment period. This discrepancy arises because the IRR calculation makes the implicit assumption that all investment distributions can be reinvested at the IRR for the duration of the investment period. However, this is not necessarily the case. Note that Fund A's IRR and effective rate of return are equal because the investment return occurs only in the final year and the reinvestment assumption consequently holds true. As a result, investments with a high IRR tend to have effective rates of return which are lower than their IRR, and vice versa. Consequently, the dispersion of investment performance across managers can be exaggerated when measured on an IRR basis.

While IRR does account for the time dimension of performance, it can be a misleading performance measure in real estate due to the inherent volatility of the asset class and frequency of large intermediary cash flows. The difference in IRR between Fund A and Fund B highlights the fact that large intermediary cash flows can have a significant impact on IRR, particularly in early years. In the case of Fund C and Fund D, two funds with large distributions in the early years can have the same IRR despite very different cash flows in the final years. This again is a result of the reinvestment assumption and a flaw in IRR, as the return multiple, effective rate of return and certainly a traditional NPV comparison would rank Fund C as preferable to Fund D.

Shortcomings in IRR can be used to hide poor performance. Consider a manager with five prior funds, as outlined in Table 18.4. If IRR is reported based on aggregate cash flows, the blended IRR would be reported as 12 percent. However, this attractive overall return is not indicative of the poor performance in Fund E. This, again, is a result of the reinvestment assumption.

Table 18.4: **IRR and return multiple**

Period													
0	1	2	3	4	5	6	7	8	9	**10**	**Return multiple**	**IRR**	**Effective CAGR**

Fund A	-1000 0 00000002002.0	7%	7%
Fund B	-1001000 00000001002.0	20%	7%
Fund C	-1001800 00000001002.8	80%	11%
Fund D	-1001800 00000001 1.8	80%	6%
Fund E	-100-50 -4000000001000.1	-7%	-21%
Total	**-500410-4000000005011.7**	**12%**	**6%**

Source: Aviva Investors.

Modified IRR

Modified IRR, or MIRR, is an alternative IRR calculation that addresses flaws in the reinvestment assumption. The calculation assumes that the amount of investment committed to a fund resides in an account earning a hurdle rate of return. Any capital withdrawn for investment will reflect the actual gains and losses of the fund investment. Any capital returned to the investor is again assumed to reside in the account earning a hurdle rate for the remainder of the investment period.

In the example in Table 18.5, one assumes a 10 percent annual hurdle rate is a plausible reinvestment assumption for the duration of the investment period. Capital flows in and out of the hypothetical capital account in accordance with actual fund investments and distributions. The resulting MIRR is 18 percent as compared to a traditional IRR of 50 percent. This is because the MIRR assumes early distributions are reinvested at the hurdle rate, whereas IRR assumes capital is reinvested at the IRR.

Given that the hurdle-rate assumption can dramatically impact the MIRR calculation, it is important that one carefully considers plausible reinvestment options and remains mindful of embedded hurdle-rate assumptions when comparing MIRRs across multiple investments. Similarly, the investment-period assumption can also have a significant impact on the MIRR, by assuming reinvestment at the hurdle rate for periods following a fund's liquidation.

Table 18.5: **Modified IRR calculation**

	Period										
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Investment fund											

Initial investment	100										
Fund distributions	-100	75	75	50	0	0	0	0	0	0	100
Capital account											
Beginning balance		0	75	158	223	246	270	297	327	360	396
Plus: assumed 10% return		0	8	16	22	25	27	30	33	36	40
Plus: fund distributions		75	75	50	0	0	0	0	0	0	100
Ending balance		75	158	223	246	270	297	327	360	396	535

Ending capital account	535	[a]
Initial investment	100	[b]
Investment period	10	[c]
Modified IRR	**18%**	$([a]/[b])^{(1/[c])} - 1$

Traditional IRR 50%

Source: Aviva Investors.

One further alternative for calculating MIRR is the isolated modified IRR, or IMIRR. This calculation is the same as MIRR, but the investment period stops with the final distribution to the investor. As a result IMIRR is useful for measuring performance of individual funds, as it does not impact actual performance by assuming a pre-determined reinvestment rate beyond the date of the fund's liquidation. MIRR is most useful for measuring a portfolio of investments with differing liquidation schedules over a broad investment horizon.

Time-weighted return

Time-weighted return is an often-used alternative to IRR in certain regions and industries, as it is not distorted by interim contributions or distributions. Time-weighted return effectively measures the compounded growth rate of a $1 investment over the holding period of an investment. In this way, the time-weighted return is money-neutral, as compared to IRR, which is money-weighted. However, many practitioners feel time-weighted return fails to reflect the practicalities of investment risk.

Time-weighted return is calculated by measuring the return for each period (independent of capital flows), compounding those interim period returns, and then quoting the result on an annualised basis. To the extent the amount of capital invested increases or decreases during the holding period, it is necessary to have market value pricing for the date of each investment contribution or withdrawal. The formula for calculating time-weighted return is:

$$\text{Period return } (R_i) = \frac{(MV_i - MV_{i-1} + D_i - CF_i)}{(MV_{i-1} + CF_i)}$$

$$\text{Compounded rate of return} = [(1 + R_1) \times (1 + R_2) \times (1 + R_3) \ldots \times (1 + R_n)] - 1$$

$$\text{Annualised rate of return} = (1 + \text{Compounded rate})^{(1/Y)} - 1$$

where:
MV_i is the market value at the end of the period
MV_{i-1} is the market value at the end of the prior period
D_i is the investment income for the period
CF_i is the additional capital flows into the investment (withdrawals are negative amounts)
Y is the number of years

An example calculation of time-weighted returns is provided in Table 18.6. Note that the return is not sensitive to the amount invested, but rather measures the effective compounded growth rate of a $1 investment over the holding period.

Sharpe ratio

The Sharpe ratio, which measures investment performance on a risk-adjusted basis, is an effective tool for understanding the consistency of a manager’s returns. Conceptually, it represents the investor’s dual objective of maximising return while minimising risk. The Sharpe ratio is calculated by dividing excess investment returns (relative to the risk-free rate) by the standard deviation of investment returns. A Sharpe ratio of 1.0 thus implies that for each unit of risk (as measured by standard deviation) an investor received an equal amount of excess return. Investment strategies that exhibit higher Sharpe ratios are considered preferable to those with lower ones.

Table 18.6: **Time-weighted return calculation**

	Period				**Period return**	
	0	**1**	**2**	**3**		
Initial investment	100					
Market value	**100**	**110**			**10%**	[a]
Contribution/ (withdrawal)		50				
Market value		**160**	**180**		**13%**	[b]
Contribution/ (withdrawal)			-25			
Market value			**155**	**190**	**23%**	[c]
Time-weighted return						

Compounded return	= (1 + [a]) × (1 + [b]) × (1 + [c]) - 1	52%	[d]
Annualised return	$= (1 + [d])^{(1/3)} - 1$	15%	

Source: Aviva Investors.

The Sharpe ratio, like many other measures, has its downfalls. While useful to evaluate, certain key assumptions in the theory behind the Sharpe ratio do not always hold true in the REMM context. The Sharpe ratio assumes that investment returns are independent, continuously priced and normally distributed. However, it is generally observed that real estate returns are serially correlated (that is, not independent across time given real estate market cycles), infrequently priced and not normally distributed. Correlation across time and infrequent pricing intervals can have the effect of significantly overstating or understating the volatility of returns. Furthermore, the comparative utility of the Sharpe ratio is limited by available data points in the REMM context. It is inappropriate to compare the Sharpe ratio of individual investments within a portfolio, as the intended diversification benefit of the portfolio construction will be lost.

Finally, it must be noted that the Sharpe ratio is a backward-looking measure. Confidence in the manager's ability to earn outsized risk-adjusted returns in the future requires careful consideration of the investment strategy and market conditions.

Structure

Without an appropriate legal and financial structure, even a wisely chosen strategy and manager may fail to produce the expected results. The focus of this analysis is on how all of the terms combine to provide for alignment of interest between the parties. This includes evaluating control, voting and governance; strategy limitations and concentration restrictions; and liquidity provisions, fees, taxes and reporting requirements.

A thorough review of fees, expenses and carried interest must be conducted to identify the key drivers of return to the manager.[1] A multi-manager wants to see that the fees of the underlying manager and fund expenses are reasonable relative to the investment strategy and the manager’s peer group, and that fees and carried interest are sufficient to motivate and compensate the underlying manager to seek attractive risk-adjusted returns and provide good fiduciary care.

It is also important to determine whether operational fees, including asset management fees, generate so much revenue to the manager relative to the incentive compensation that the manager may be motivated to hold assets longer than market conditions and the investment strategy would dictate or may be motivated to churn assets by buying and selling frequently. One must also be aware as to whether fees are calculated on a property-by-property transaction basis or on an aggregate portfolio basis.

Carried interest generally represents the strongest force of alignment between the manager and the investor, as the manager stands to gain or lose in proportion to each dollar earned or lost. However, one must be careful to evaluate the manager's return profile across a range of potential outcomes. Depending on the carried interest structure, it is possible that, on the downside, the manager has little to lose and the investor holds all the risk.

Portfolio construction

In practice, a model allocation must eventually become an investment portfolio. Some managers utilise an interim step to create a target portfolio that allows the portfolio manager to consider the ultimate portfolio construction in a more tangible way.

In order to adapt the model allocation structure and to arrive at the target portfolio, the client's return objectives and mandate constraints are considered along with constraints the multi-manager believes are appropriate to avoid excessive risk. Examples of such constraints include:

•Limit on percentage ownership of a vehicle

•Limits on portfolio leverage

•Limits or diversification of investment duration

•Minimum/maximum number of fund allocations

•Sector allocations relative to a benchmark

•Limits on exposure to development

•Limits on exposure to a single fund or single manager

•Limits on exposure to a single sector

•Limits on exposure to emerging or frontier markets

•Limits on exposure to a single region or country

•Limits on, or diversification of, currency exposures

•Legal and tax structure considerations

•Investment style and/or ethical considerations

Once the target-portfolio map is developed, a return-projection model is constructed. During the entire portfolio-construction process a number of different scenarios are modelled, enabling stress testing to be done on the existing and alternative portfolio allocations against projected aggregate cash flows, distributions, IRR and investment multiples.

Under ideal conditions, one might consider a linear programme or Monte Carlo simulations in order to consider alternative combinations of funds. Accordingly, at this stage in the evolution of portfolio construction, multi-managers run individual iterations of aggregated cashflow projections in order to consider alternative combinations of funds and investment amounts, seeking an optimal combination which maximises the probability of achieving the desired return at the least risk and to test against mandate guidelines and restrictions.

Invested capital at risk

Diversification is the cornerstone of both model allocation and portfolio construction. Empirical studies in the private equity industry have shown that diversification across vintage year and number of funds can reduce the volatility of returns and potentially increase expected return. One such study was conducted by Capital Dynamics, based on private equity, venture capital and buyout fund returns.

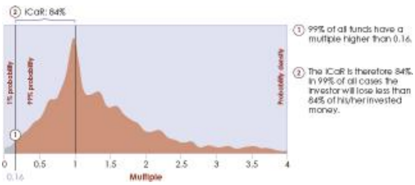
Invested capital at risk (iCaR) measures the maximum amount of money an investor would expect to lose within a 99 percent confidence level in a probability distribution of returns. iCaR is calculated by measuring potential capital loss in a 1 percent probability downside scenario for a given return distribution and subtracting that amount from total invested capital.

In Figure 18.2, the sum of the shaded area totals 100 percent probability. In a 1 percent probability-downside scenario, the expected return multiple is 0.16x, meaning the investor expects to recover 16 percent or less of invested capital. Consequently, one can conclude that in 99 percent of all cases, an investor expects to lose less than 84 percent (that is, 100 percent minus 16 percent) of capital invested. The iCaR is then 84 percent for a single fund investment.

The study goes on to show the impact that diversification across vintage year and number of funds has on iCaR, expected return and volatility. In Figure 18.3, the probability distribution of returns is shown for four portfolio simulations.

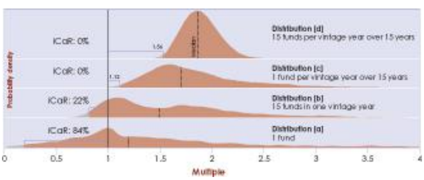
The simulations in Figures 18.2 and 18.3 show that investing across multiple funds reduces iCaR as the return distributions for diversified portfolios shift further into positive territory (that is, a return multiple greater than 1). Interestingly, the simulation highlights the fact that diversification across vintage years is more impactful than diversification across a number of funds. Distribution C has zero iCaR and a higher median return than Distribution B. This is intuitive, as diversification across vintage year reduces exposure to market timing and potentially reduces the correlation of returns across funds.

Figure 18.2: **Invested capital at risk**



Source: Diller, C. and I. Herger. 2009. Assessing the Risk of Private Equity Fund Investments. *Private Equity Mathematics,* pp. 29–41. Capital Dynamics analysis based on Venture Economics data up to June 30, 2007 including European and US funds, as well as venture capital and buyout funds with vintage years 1983 to 2003 (2,699 funds). Monte Carlo simulation with random selection.

Figure 18.3: **Diversification simulation**



Source: Diller, C. and I. Herger. 2009. Assessing the Risk of Private Equity Fund Investments. *Private Equity Mathematics,* pp. 29–41. Capital Dynamics analysis based on Venture Economics data up to June 30, 2007 including European and US funds, as well as venture capital and buyout funds with vintage years 1983 to 2003 (2,699 funds). Monte Carlo simulation with random selection.

As demonstrated in Distribution D, the combination of diversification across both vintage year and number funds produces the best result with regard to reducing volatility and increasing expected return. While one may sacrifice the opportunity for extraordinary upside, the mitigation of downside exposure and potentially increased returns supports the methods implemented in a multi-manager portfolio construction process.

Asset management

The asset management function for a multi-manager encompasses a number of activities including investment monitoring and rebalancing, and performance measurement and reporting.

A significant aspect of the investment reporting process is the determination of NAV. In general, multi-managers are required to report the 'fair value' of their underlying investments according to prevailing accounting regulations. As private real estate funds are not traded frequently, a lack of market price data makes the reporting of NAV for a multi-manager portfolio an imprecise science.

In practice, the multi-manager receives an NAV from each underlying fund manager on a periodic basis, although the frequency and method for calculating such NAVs may differ across funds. Most often, the NAV presented by the underlying manager is used. However, in some situations, the multi-manager may choose to adjust the NAV presented by the underlying manager. This can be done in a number of ways and, in all cases, auditors will require a robust and well-documented determination of fair value by the fund manager in order to support the valuation methodology.

Conclusion

There is significant complexity involved in building a multi-manager investment portfolio as strategy, manager and structure must all be analysed and approved. Starting with a model allocation, a multi-manager considers macroeconomic and political risks, two key determinants of investment success across a global portfolio. Thereafter, detailed quantitative analysis aids in understanding manager philosophy and success factors.

A key element of a successful analytical process is to pay close attention to real estate fundamentals at all times. While a multi-manager is in effect an allocator and seemingly distanced from the operational implementation at the real estate level, a thorough understanding of the micro real estate issues prevents serious errors of judgment. The simplified property-level projection facilitates this feel for the markets and dialogue with underlying managers.

The chapter points out a number of difficulties with performance measurement, in particular, pitfalls with IRR, MIRR, time-weighted returns, DCF and return multiples. No one measure seems to satisfy all needs, yet each can convey useful information. We find value in attribution analysis in understanding investment risk, and propose that the Sharpe ratio is a valuable tool for evaluating a manager's track record on a risk-adjusted basis.

With regard to portfolio construction, cash-flow projections and sensitivities thereon can assist the multi-manager. We reference work in the private equity industry indicating that investment programmes which diversify investments across multiple funds and multiple vintage years have the highest probability of success.

□

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Ed has over 30 years of experience in real estate and capital markets. Prior to joining Aviva Investors in 2008, he was a co-founder of Madison Harbor Capital, a real estate multi-manager firm based in New York. Previously, he was a real estate investment banker at UBS, and its predecessor firm Dillon, Read & Co. Ed also worked for two years at Goldman, Sachs & Co. in a number of areas including equity research, municipal finance and real estate.

Ed is a graduate of Tulane University (where he received the *Wall Street Journal* award for Excellence in Finance) and has an MBA from the Harvard Graduate School of business. He is a member of the Global Exchange Counsel of the Urban Land Institute, and of the Pension Real Estate Association. Ed also chairman and CEO of Madison Harbor Balanced Strategies, Inc., a member of the Executive Board of AFIRE, and a board member of Parkway Properties, Inc.

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[1] For a discussion on management fees, carried interest and other economic terms in a fund, please refer to Chapter 17 in this guide.

19

Portfolio returns and volatilities through the cycles

By Kenneth Riggs, Real Estate Research Corporation

Introduction

Over the past 30 years, the analytical framework and institutional sophistication of commercial real estate portfolio management has evolved to a level that now strongly parallels that of the stock and bond markets. As a result, institutional investors now expect (and demand) portfolio managers to provide value-added risk management investment advice on commercial real estate that incorporates economic, financial and capital market rigour within a modern portfolio theory (MPT) context.

Since the late 1970s, the importance of formulating an opinion on the economic, capital and space markets through econometric modelling, cash-flow programming, market research and financial data within the real estate industry has greatly increased. These enhancements to the decision-making process are particularly helpful in making asset-level decisions (bottom-up analysis) and in analysing portfolios.

Commercial real estate return data is now becoming more robust, which allows portfolio analytics to draw more thoughtful conclusions about the cyclical nature of commercial real estate, and to link those perspectives to the risk and return characteristics for commercial real estate in a portfolio. The purpose of this chapter is to understand business cycles, connect that understanding with the commercial real estate market and identify if a certain portfolio strategy is better suited to certain business cycles. For the purposes of this discussion, this chapter will focus on commercial real estate investment in the US.

Identifying and understanding business cycles

A building block for this chapter is linking the business cycle to formulating portfolio risk and return expectations for real estate. Like any economic phenomenon – and this is especially true of what we have learned about the global nature of our capital markets post-2008 credit crisis – the real estate market is rapidly changing as the various capital sources for real estate evolve and mature under a myriad of return requirements, liability exposures, regulations and structures. Further, the sources of capital and participants in real estate stock and bond market investing are becoming more varied.

Since the 1940s, there have been 12 business cycles, each with an average recessionary period of around 11 months. However, since 1981, the economic expansion periods have been longer and the recessionary periods have been shorter than average, at least until the recent recession. As reflected in Table 19.1, over the past 30 years, the three most recent expansions lasted around nine, ten and six years, respectively, with two eight-month recessionary periods followed by the 18-month recessionary period of 2008–2009.

Business cycles reflect the relationship among the broad economy, capital markets and investment markets that include commercial real estate. US business cycles historically have lasted approximately ten years and have five phases: peak, recession or slow-down, trough or bottom, initial recovery and expansion. We have seen five recessionary periods over the past 30 years with varying degrees of severity. Figures 19.1 to 19.3 focus on 30-year data for business cycles relative to real estate because of the economic cycles experienced, and more importantly, because this is the window of time in which the most institutional investment has occurred.

Table 19.1: **Postwar business cycles**

Peak		**Trough**		**Previous expansion**	**Recession**	**Total**
Month	**Year**	**Month**	**Year**	**Months**	**Months**	**Months**
November	1948	October	1949	37	11	48
July	1953	May	1954	45	10	55
August	1957	April	1958	39	**8**	47
April	1960	February	1961	24	10	34
December	1969	November	1970	106	11	117
November	1973	March	1975	36	16	52

January	1980	July	1980	58	6	64
July	1981	November	1982	12	16	28
July	1990	March	1991	92	8	100
March	2001	November	2001	120	8	128
December	2007	June	2009	73	18	91
Average				**58**	**11**	**69**

Source: National Bureau of Economic Research (NBER).

Figure 19.1: **GDP versus unemployment in the US, 1978–2011**

Source: BEA, BLS, NBER, Q1-2011.

Unemployment levels are a key barometer of the health of the economy, which plays out in its significance to GDP expansion and contraction levels (thus, demand for real estate also expands or contracts). Further, real estate lags economic contractions and expansions because of the long-term leases in place for commercial real estate, as well as the lack of continuous broad-based reporting mechanicals needed to make quick adjustments to the economy. As such, commercial real estate has very positive duration effects for large segments of the property categories (hotels are an exception, as they have daily durations for revenues and reflect the business climate). Bank prime loan rates are typically lowered during recessions, and continue to remain relatively low for several years after the recession. Recessions are an optimum time for leveraging real estate and deleveraging of assets.

Figure 19.2: **Financial data in the US, 1978–2011**

Source: US Treasury, Federal Reserve, RERC, NBER, Q1-2011.

Figure 19.3: **Real estate returns, 1978–2011**

Source: NCREIF, NBER, Q1-2011.

Over the past 35 years, net operating income (NOI) for real estate has been mostly steady in comparison to the major spikes and dips of capital returns and total returns. Generally, we have seen lower return requirements, given the weight of global capital flows across all asset types, and in particular, real estate. As will be discussed, the maturity of the real estate asset class has contributed to reduced discount rates/internal rates of return (IRRs), coupled with diversification benefits. Cycles do persist throughout time, and recent past expansion business cycles have been longer and smoother (until the recent recession). However, every cycle is different, both in occurrence and severity, and it has become more evident that business cycles are exceedingly difficult to anticipate. Just when we thought it was safe, we experienced a boom-to-bust cycle not seen since the Great Depression of 1933; this says a lot about the animal spirits that drive markets and the need for risk management tools as they relate to MPT.

Table 19.2: **Phases of a typical business cycle**

Phase	**Economic perspective**	**Monetary policy**	**Consumer perspective**	**Commercial real estate**
Peak	Inflation is increasing above expectations	Balanced toward restrictive policies	Confidence begins to weaken	Interest rates are beginning to peak, commercial real estate prices are topping out,

				fundamentals peak and financial leverage is neutral to negative.
Recession	Businesses begin contracting and inflation peaking	Stimulative monetary policies	Confidence is weak	Rates are declining, commercial real estate prices and fundamentals weaken, financial leverage is negative.
Trough or bottom	Inflation is still declining	Stimulative monetary policies	Confidence starts to rebound	Rates are low or declining, commercial real estate fundamentals are at their weakest point but financial leverage is

				very favourable.
Initial recovery	Healthy economic growth, inflation remains low, business is expanding	Accommodative	Increasing confidence	Rates are moving up, commercial real estate prices rise on improving space fundamentals with positive financial leverage.
Expansion	Inflation becomes more evident and a concern	Accommodative leaning towards balanced	Bullish outlook with reduced savings	Rates are rising, commercial real estate prices are still robust, fundamentals are still improving and financial leverage is favourable.

Table 19.2 provides an overview of the nature of cycles and the responses of real estate to these cycles from a qualitative

perspective. This overview establishes the general psychology and framework in a portfolio risk and return analysis.

Analysing commercial real estate attributes relative to business cycles

All individual investment risks combined is called portfolio risk. Generally, portfolio risk is categorised into two main risks: systematic and unsystematic.

Systematic risk is the risk associated with the structural macroeconomic changes impacting the entire market. It cannot be diversified away or reduced through asset selection or diversification. All assets (stocks, bonds or real estate) are exposed to market risk, including: recessions, tax law changes, structural changes in the economy, wars, terrorism and consumer preferences. The major components for the broad market comprising systematic risk usually include: business cycle risk, market volatility, inflation, interest rate risk, liquidity risk (related to real estate) and marketability.

Unsystematic risk is the unique risk(s) associated with a particular company or industry. Unlike systematic risk, unsystematic risk can be reduced or even eliminated through asset diversification. Unsystematic, or non-market risk, in real estate has been difficult for portfolio managers to wrestle with over the past 30 years. Portfolio managers have concluded that much of traditional real estate unsystematic risk could be reduced or even eliminated through geographic and property-type diversification. Unsystematic risk decreases as more investments are added to the portfolio, and interestingly, the level required to achieve this is not as great as one might expect. For example, various stock market studies place the number of stocks as low as 15 to gain adequate diversification and elimination of unsystematic risk.

The risks generally associated with real estate include:

•*Liquidity.* Real estate is considered to be an illiquid investment because it is difficult to quickly sell an asset for cash at the asset's market value.

•*Unique (non-market) or 'unsystematic'.* Described above.

•*Market or 'systematic'.* Described above.

•*Interest rate.* Associated with the movement in interest rates, and where an inverse relationship exists between price and interest rates. However, unlike debt, real estate has an income component that can change with economic conditions and can lessen the impact of an increase in interest rates with a decrease in prices. The stimulative interest rate environment between 2003 and 2006 has created significant real estate price appreciation, which has driven returns to near all-time highs.

•*Purchasing power.* Also known as inflation risk, this is the risk associated with the decline in real returns of an investment with the increase of inflation. As with interest rate risk, nominal interest rates often increase with the increase in inflation, thus compensating for the loss of purchasing power.

•*Pricing.* Private real estate does not continuously trade on the open market. As such, an asset's market value must be developed through an appraisal rather than through efficient market pricing.

•*Exchange rate.* The risk that exchange rates move against domestic currencies will continue to be an increasing risk characteristic for real estate, as international real estate investment continues to increase.

The risk profile of a real estate asset that is owned free and clear can be changed by adding leverage (debt) on the property and by creating a joint-venture investment structure with another investor.

Historical return performance

In Table 19.3, the compounded annual rates of return are provided for stocks, bonds and real estate. As shown, ten-year Treasury rates are very consistent, much less risky and less volatile when compared to commercial real estate (NCREIF Index and NAREIT Index) and stocks.

The level of real estate inclusion in an investment portfolio that is required for optimal risk and reward benefits is often debated. Generally the target of real estate investment is 10 percent, with a range of 5 percent to 20 percent for institutional investors. This is significant, and among the most important investment decisions an investor makes, particularly since strategic asset allocation determines about 90 percent of the variability[1] and portfolio volatility (risk)[2] in a mixed-asset portfolio.

Table 19.3: **Compounded annual rates of return for real estate versus equity and debt, as of March 31, 2011**

Market indices	YTD****	1-year	3-year	5-year	10-year	15-year
Consumer price index*	1.47%	2.65%	1.57%	2.29%	2.41%	2.45%
Ten-year Treasury bond**	3.46%	3.15%	3.33%	3.84%	4.13%	4.72%
Dow Jones Industrial Average	7.07%	16.51%	3.12%	4.87%	4.73%	7.73%
NASDAQ Composite***	4.83%	15.98%	6.86%	3.52%	4.22%	6.37%
NYSE Composite***	5.54%	12.85%	-1.51%	0.41%	2.93%	5.68%
S&P 500	5.92%	15.65%	2.35%	2.62%	3.29%	6.80%
NCREIF Index	3.36%	16.03%	-3.63%	3.46%	7.49%	9.23%

NAREIT Index (Equity REITs)	7.50%	25.02%	2.63%	1.70%	11.52%	10.91%

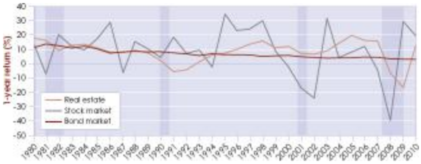
Notes: * Based on the published data from the Bureau of Labour Statistics (seasonally adjusted). ** Based on average end of day T-bond rates. *** Based on price index and does not include the dividend yield. **** Year-to-date averages are not compounded annually.

Source: BLS, Federal Reserve Board, S&P, Dow Jones, NCREIF, NAREIT, compiled by RERC.

Figures 19.4, 19.5 and 19.6 illustrate the one-, five-and ten-year moving average annual rates of return for real estate, respectively.

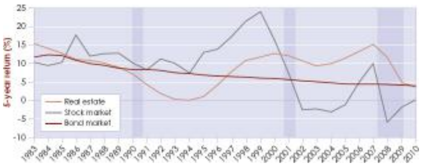
Generally, the five-or ten-year forecast period is used and typically historical return patterns over a ten-to 15-year time period are reviewed. Examining the ten-year returns in Table 19.4, we see that both real estate and stocks have a cyclical nature to them – there are troughs, growth periods and peaks. The bond market is predictable, and we use its promised return and holding the bond until maturity. (We do not use a mark-to-market annualised realised return for bonds, as the promised return at inception is its realised return over ten years.) The recessions, as determined by NBER, are depicted in Figures 19.4 to 19.6 as the vertical bars. As demonstrated, equities overcorrected during the last recession, while real estate held up reasonably well and the debt market remained steady.

Figure 19.4: **Real estate versus equities and debt, 1980–2010 (1-year returns)**



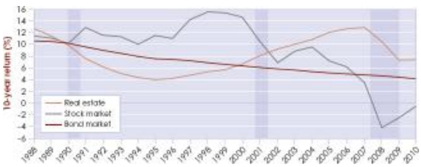
Source: NCREIF, S&P 500, US Treasury, 2010.

Figure 19.5: **Real estate versus equities and debt, 1983–2010 (5-year returns)**



Source: NCREIF, S&P 500, US Treasury, 2010.

Figure 19.6: **Real estate versus equities and debt, 1988–2010 (10-year returns)**



Source: NCREIF, S&P 500, US Treasury, 2010.

As shown in Figures 19.4 to 19.6, during the past few decades real estate has at times out-performed the other asset classes by a large margin. Given the conditions resulting from the recent recession and the future relationship of these various asset classes from an investment perspective, we anticipate real estate to be in a position to continue to provide strong risk-adjusted returns. Table 19.4 reflects the mostly negative correlations between real estate, and stocks and bonds. This is a good attribute in a MPT context, but it is recognised that the NCREIF Index has a valuation bias.

The intent of this analysis is to consider the investment alternatives and their historical relationship, and to begin to draw inferences on investment attributes of real estate during various cycles to determine if the total return changes over economic cycles and to examine the correlations. The latter suggests high allocations to real estate; however, the nature of NCREIF returns being appraisal-based provides unsuitable execution allocation levels (potentially above 30 percent or more) for real estate within an MPT context.

Quantifying portfolio risk and return cyclical considerations and conclusions for portfolio returns

In this section, we will focus on total returns on an unleveraged basis.

Given that the IRR is an expected return, the actual return for an investment may differ and is referred to as the ‘realised or actual or historical’ return, which means that the assumptions and cash-flow projections do not materialise. This is done based on historical cash flows from the initial purchase until the property is actually sold (or assuming it could be sold at the current appraised value). The expected return (IRR) reflects the probability view of a portfolio manager that the return will be achieved, and thus reflects uncertainty that a return will be realised.

As demonstrated in Figure 19.7, the realised returns being equal would be 0 percent (that is, a realised return of 12 percent with an expected return of 12 percent for a specific period of observation, yields a 0 percent difference). We do not expect the realised and expected returns to match exactly, but to demonstrate a variance over time that equals out. Further, we are examining what happens to this spread before, during and after the recessionary periods studied and depicted in the figures as the vertical bars. During the past two recessions, realised and expected returns were equal to each other right as the recessions began. The returns after the 2008 recession rebounded much more quickly than those after previous recessions.

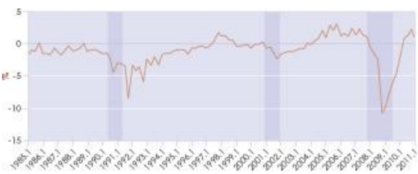
Table 19.4: **Equity and debt correlations to real estate**

	NCREIF	**Equity**	**Debt**
1-year returns			
NCREIF	1.000		
Equity	0.104	1.000	
Debt	-0.561	0.546	1.000

5-year returns			
NCREIF	1.000		
Equity	-0.054	1.000	
Debt	-0.056	0.546	1.000
10-year returns			
NCREIF	1.000		
Equity	-0.487	1.000	
Debt	-0.489	0.650	1.000

Source: NCREIF, S&P 500, US Treasury, Q1-2011.

Figure 19.7: **NCREIF realised returns versus RERC expected returns, 1985–2011**



Source: NCREIF, RERC, NBER, Q1-2011.

Table 19.5: **Comparing real estate returns on a risk-adjusted basis**

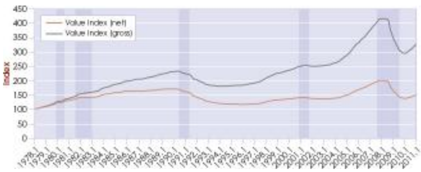
	10-year average returns, Q1-2011				
Property type	**NCREIF returns**	**NCREIF std. dev.**	**RAR* metric**	**RERC returns**	**NCREIF vs. RERC**
Regional mall	10.94%	10.95%	1.0	9.48%	1.46%
Neighborhood	9.59%	11.26%	0.9	9.51%	0.08%
Power centre	8.45%	11.79%	0.7	9.76%	-1.30%
All property types	7.49%	11.57%	0.6	9.83%	-2.34%
Industrial warehouse	7.09%	11.28%	0.6	9.41%	-2.32%
Apartment	7.52%	12.13%	0.6	9.08%	-1.56%
Office – CBD	8.04%	14.15%	0.6	9.38%	-1.34%
Office suburban	–5.44%	11.87%	0.5	9.94%	-4.49%

Industrial research & development	–5.34%	12.27%	0.4	10.05%-4.71%
Hotel	5.36%	13.96%	0.4	11.73%-6.37%

Note: * RAR is risk-adjusted returns.
Source: RERC, NCREIF, Q1-2011.

Risk-adjusted returns, measured as a return per unit of risk, are often used to enable an investor or user to be able to evaluate risky investments on a comparable basis. Table 19.5 provides an example of a risk-adjusted return analysis. The risk-adjusted return (RAR) metric analyses the property types and orders them in terms of their return relative to the risk taken. The higher the RAR metric, the better the risk/return.

Figure 19.8: **Comparing NCREIF value indices, 1978–2011**



Source: NCREIF, NBER, Q1-2011

Figure 19.9: **Commercial real estate returns versus Treasuries, 1990–2011**

Source: RERC, US Treasury, NBER, Q1-2011.

Figure 19.8 presents the historical performance (risk versus return) of different property subtypes within the overall NCREIF Property Index. The last column (NCREIF versus RERC returns) provides a comparison of realised versus expected total returns.

Figure 19.9 shows the spread of expected total returns for real estate versus those for ten-year Treasuries. Since 1990, the spread has averaged approximately 540 basis points. This is an excellent barometer of the richness of real estate pricing. Interestingly, in 1990 and 2007, the relative level of the spread dipped below 400 basis points, which preceded two major price corrections for real estate that exceeded a broad-market downward adjustment of over 30 percent.

Conclusion

Historically, investment cycles in commercial real estate were known for their 'boom-to-bust' psychology and tended to be viewed separately from the investment cycles in the stock and bond markets, although clearly attached to the general business cycle. That 1970s detachment from the market cycles has dissipated as commercial real estate has come of age, but understanding business cycles and the relationship of commercial real estate portfolio risk and return in these cycles has not been studied adequately in the past. The increasing maturity of the market and historical data, however, is growing real estate's acceptance within the modern portfolio theory construct.

Real estate has done well in a mixed-asset portfolio during recessionary periods (except for the 1990s), and even outperformed stocks and bonds on a risk-adjusted basis by a large margin. Additionally, real estate has demonstrated low-to-negative correlations to equity and debt. One way to consistently measure the relative attractiveness of real estate is to examine the spread of its expected yield to ten-year Treasuries, which provide guidance as to where we are in economic cycles.

The deep impact from the recent recession should lead to a longer period before the next boom-to-bust cycle (probably more than eight years), but animal spirits have always ruled, and always will.

□

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[1] This pertains primarily to highly diversified pension funds, as discussed in Asset Allocation: The 90% Question by James D. Peterson, The Schwab Centre for Investment Research.

[2] Brinson, Gary P., L. Randolph Hood and Gilbert L. Beebower. 1986. Determinants of Portfolio Performance. *Financial Analysts Journal,* Vol. 42, No. 4, pp. 39–44.

About PEI

PEI is the leading financial information group dedicated to the alternative asset classes of private equity, real estate and infrastructure globally. It is an independent company with over 70 staff based in three regional offices – London, New York and Singapore – and is wholly owned by its management and employees.

We started in London in November 2001 when a team of managers at financial media group Euromoney Institutional Investor PLC, with the backing of US-based investors, bought out a group of assets that centred on the website *PrivateEquityInternational.com*. At the time the new company was called InvestorAccess, and the aim was to grow a specialist media business that focused on alternative assets – and private equity in particular.

In December 2001 we launched our first magazine: *Private Equity International.* A year after, we had run our first conference in London and published our first book. A year later, we had opened our New York office and launched two more magazines: *PE Manager* and *PERE.* Next came the opening of our Singapore office in 2005 and the launch of our fourth magazine *PE Asia* in 2006. In 2007 we released our first online database and the year after we added specialist training to the portfolio as well as an awards business. In 2009 we launched our fifth magazine, *Infrastructure Investor.*

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Today we publish five magazines, host five news websites, manage a very extensive set of databases dedicated to alternative assets, run in excess of 25 annual conferences globally, publish a library of more than 30 books and directories and have a fast-growing training business.

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