Investment Focus

Views from the Observatory: Real Estate Portfolio Risk Management and Monitoring

AUTHORS

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We have never been avid followers of the stars and planets, but we have always been fascinated by comets, shooting through the galaxy and lighting up the evening sky. For the non-rocket scientists, comets are essentially remnants of stars or planets from billions of years ago, floating in space. The characteristic long tail is created by ice and other matter that melts off as the sun's gravitational pull brings the comet closer and heats its core. According to NASA, upon first observation, a comet tends to appear as a fuzzy object. As it comes closer to the sun, its appearance becomes clearer. Much like for real estate investors, who recall the period before the recent downturn of 2005 to 2007, as a time when most, if not all of us, knew something was out of sorts. Fuzzy as it may have been, very few throttled back the momentum before the approaching vision became crystal clear. Managers, consultants, investors and lenders — virtually everyone watched the comet crash right into the lens of our collective telescope.

Introduction

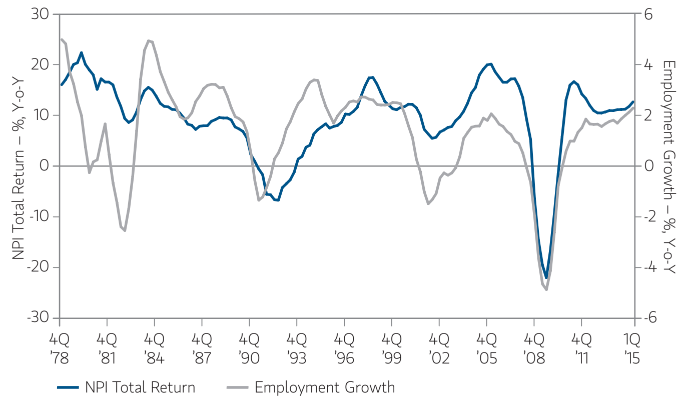
But, downturns come and go and it is part of the business cycle, right? Just like in the cosmos, Halley's Comet (probably the most famous) passes by Earth for a visit every 75 to 76 years. But we think all of us would be hard pressed to believe this past downturn was just another normal hit to the economy and our collective psyche. No, this one was different, which makes us think of another (in)famous comet—Kohoutek.

Ironically, Kohoutek made an appearance during a previous economic crisis, back in late 1973. For those unfamiliar, Kohoutek is a "long-dated" comet, which was on its first trip to our solar system in 150,000 years, back in 1973, and was hailed as the "Comet of the Century." Many expected spectacular night views as Kohoutek approached Earth, and others were calling for the end of the world. Unfortunately—and fortunately—neither came to pass. And so today the Czech astronomer Kohoutek, who first sighted the famed eponymous comet, has had his name appropriated as pop culture slang for a "dud" or a "flame-out." Still, there was no denying that for a six-month period (essentially September 1973 to February 1974) Kohoutek captured the attention of many. Ultimately, in another fortuitous astronomical coincidence, Kouhoutek's underwhelming trajectory across our night sky overlapped with NASA's famed Skylab operation. This unique circumstance made Kohoutek one of the "best observed and studied" comets in history, yielding a bounty of knowledge for the learned individuals at NASA to shed light on the mystery surrounding comets and the very formation of our solar system.

Jumping forward thirty-five years to September 2008, the (then) sky-high Dow Jones Industrial Average began a catastrophic decline from nearly 11,500 to below 6,600, a 43 percent decline in market capitalization. A total of 7.1 million jobs were lost from September 2008 through February 2010, contributing to a dramatic decline in demand for real estate. As shown in *Display 1*, from peak-to-trough the NCREIF Property Index fell approximately 32 percent from March 2008 to March 2010. Now that many of us have dusted ourselves off from the Great Recession, we have entered into a very strange recovery. There is a real anomaly, insofar as previous recoveries have been quicker to improve on the labor front but much longer to do so on the real estate return front. In the early 1980's and 1990's, it took 71 and 79 months, respectively, to replace the jobs lost, whereas the current downturn has resulted in the recovery of 11.5 million jobs, since the trough.[1] This type of disconnect is concerning all around.

Display 1: **Returns and Job Growth**

NPI Total Returns and Total Nonfarm Employment Growth



Sources: BLS, NCREIF, MSREI Strategy Calculations. Data as of March 31, 2015.

Much like the housing market bubble, wherein land and residential prices drifted far above their intrinsic values, there were parallel disconnects between the cost of a house, the cost to rent, and real wage growth. Similarly, in our current situation, commercial real estate appears clearly in recovery mode, but values are either overshooting the recovery or the downturn was just so severe that we are only now getting back to normal. Are we starting to see another "fuzzy object" in the distant sky? Just a Kohoutek, or perhaps something much worse?

In any event, it is important that we do not forget some key lessons from the hit many of us took. As the Skylab scientists did with Kohoutek, we should try to study some of the gaps we encountered in the restructurings and workouts many of us have recently lived through. With that in mind, we wanted to tackle the notion of r*isk management*. We have heard some argue that risk management is essentially nonexistent in the real estate industry. Yet, there are no "bulletproof" deals, and we can only try to insulate ourselves from "known unknowns" to a certain degree. The exogenous variables, "unknown unknowns," are almost impossible to foresee.

Therefore, we wanted to lay out some key concepts for our clients to consider in managing their portfolios. We hope this paper serves as a basis for some important concepts to keep in mind when managing portfolio risk. Several of these ideas can be embedded in the investment policies of investors and may fit well for those who follow a more direct or joint venture-based program. For those involved less in acquiring or disposing of property, and more in selecting managers and monitoring their performance due to their "indirect" business model, many of these concepts can also be carried through.

[1] As of March 31, 2015.

What Do We Mean by Risk Management in This Context?

In being part of the investment business, whether as an investment manager, pension fund, endowment, foundation, family office or otherwise, by association we are all in the risk business. The modern notion of risk management in a financial context can be traced as far back as Marco Polo's time, when 13th century Venetian merchants devised option contracts to hedge their risks or to speculate on cargos en route from the Far East. But it is Dr. Harry Markowitz who is largely credited for establishing the foundations of modern investment risk management in the 1950's.

In 1952, Dr. Markowitz introduced the concept of Modern Portfolio Theory and developed the premise that diversification can reduce the risk in an investment portfolio. The measurement of risk in a portfolio was quantified by standard deviation, which is symbolized by the Greek letter sigma (hence the saying, "a six-sigma event") and measures the dispersion, or variability, in returns. The basic idea was that since certain assets within a portfolio have varying degrees of correlation (both positive and negative) with one another, the total risk in a portfolio should be less than the sum of each asset's individual risk.

Another way of saying this is that if an investor has a degree of concentration in any particular investment type or sector, then that investor is increasing the portfolio's risk or probability for abnormally large gains or losses. It is important to understand, however, that concentrations can come in many forms—vintage year, geographic market, leverage, and others. This paper will outline a menu of approaches for investors to track and monitor the key risk factors—the "tall trees," so to speak, in their portfolio.

A solid understanding of these concentrations and risk factors in a portfolio, in fact, can lead to more informed and efficient investment decisions. As we mentioned earlier, while one can never eliminate risk, we can put ourselves in place to mitigate risk as desired by better understanding the composition of and contribution to overall risk from our respective real estate portfolios.

For the purpose of this analysis, risk management issues are classified into five categories in our framework:

- **Real Estate Exposure**–Investors' choice on overall allocation to real estate, within a multi-asset class portfolio
- **Vintage Year Exposure**–Timing and pace of real estate exposure, including some important considerations on measurement and monitoring of vintage year exposure
- **Property Sector Exposure**–Portfolio concentrations relative to managers, property types, geography, strategic risk classification, investment life cycle, and investment structure
- **Leverage**–Approach and exposure to leverage in investment ventures and portfolios, including suggested metrics for measuring and monitoring leverage
- **Exogenous Variables**–A non-quantitative category, though not necessarily specific to the assets held within a portfolio, these variables, nevertheless, merit periodic consideration and review

Real Estate Exposure

The beginning point is typically asset allocation. All investors, periodically, look at their allocations to various asset classes for the composite portfolios. In traditional asset allocation models, investors often rely on Dr. Markowitz' principles of Modern Portfolio Theory. Constructing forecasts of expected returns to stocks, bonds, cash, real estate and other alternative asset classes, and working from historically observed return, volatility and correlations, they look for an optimal allocation to the asset classes for a pre-specified expected return or volatility.

In *Display 2*, a chart depicts two key inputs into an optimization asset allocation model. There are also historical ten-year returns, ten-year standard deviations and returns per unit of risk for major asset classes.

Display 2: **Risk-Return Time Series**

ASSET CLASS	10-YEAR TOTAL RETURN	10-YEAR STD. DEVIATION	RETURN PER UNIT OF RISK[3]
Real Estate (Private)	8.4	6.3	1.3
Real Estate (Public)	9.5	25.8	0.4
Stocks (U.S.)	8.0	16.2	0.5
Bonds	5.0	4.0	1.2
International Equities	5.5	19.9	0.3
Private Equity[2]	16.3	16.9	1.0
Hedge Funds	3.0	7.0	0.4

Source: NCREIF, NAREIT, Barclays, MSCI, VentureXpert, HFR Inc., MSREI Strategy calculations. Data as of March 31, 2015. See Endnote 1.

Private real estate, which is typically classified as an illiquid alternative asset class, usually causes some hiccups with these traditional asset allocation models. As shown above, private real estate has a very attractive return per unit of risk. Due to appraisal lags and the relatively lower frequency of property valuation, the sigma (standard deviation of returns) is generally underestimated or smoothed. This leads to a less volatile return series than for stocks, which have frequent and instantaneous pricing changes due to market behavior. As a consequence, private real estate can "break the model" leading to a higher

[2] Data through September 2011.

[3] Return Per Unit of risk is calculated by dividing 10-year total return (annualized) by the 10-year standard deviation (annualized.)

allocation to real estate when compared to other asset classes. Therefore, a "white flag" is typically planted with respect to private real estate as most models put a constraint or cap on its allocation (which, in many cases, inevitably ends up as the final allocation target).

Upon establishing a target and a range around the real estate allocation, the next important element is the setting of objectives and strategy. This is more art than science and, most importantly, should be done in the context of understanding the role of the other asset classes in the composite portfolio. Thus, if real estate has a target allocation of 10 percent, for example, what are the objectives for the remaining 90 percent of the portfolio? As discussed above, Markowitz's theory of diversification is founded upon the interaction and relative behavior between the asset classes. For example, the typical objectives for real estate can be diversification, return enhancement, or partial inflation hedging. Inherent to specifying the role for real estate is the need to set return expectations and risk tolerances. Again, this should be considered within the context of the overall portfolio.

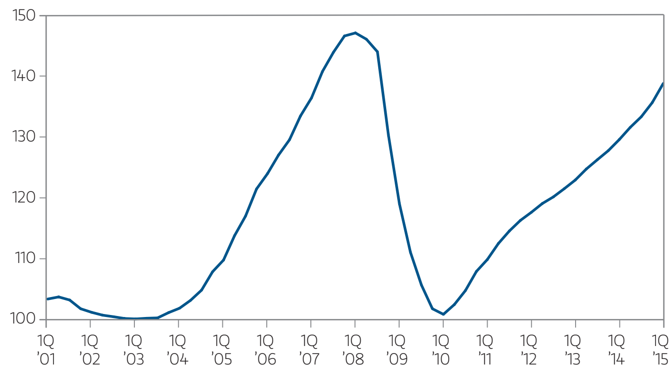
In my experience, the difficult part is not in going through the asset allocation, or even in setting strategy and risk-return targets. Rather, it is in *adhering* to the goals and objectives set out in this doctrine. Here is where the rubber hits the road in terms of managing risk across a portfolio. The following elements of real estate risk management—vintage year exposure, sector exposure and leverage—hold the key to answering whether a portfolio is aligned with a strategy and its objectives, or has drifted into another part of the galaxy.

Vintage Year Exposure

We do not believe it comes as a surprise to anyone that real estate is a highly cyclical asset class. There have been three downturns in private real estate over the past twenty years, with two of them quite severe. Cost basis is such an important variable in real estate as it drives so much of the performance of an asset. The lower the basis in an asset, the greater the ability to: a) lease-up a property with more flexible pricing in rents; and b) invest in any capital improvements in a property, which can better position an asset for performance or for disposition at a later date. Basis in real estate is largely a function of vintage year. As shown in *Display 3*, one can see the most recent eleven-year cycle from the growth to peak and decline to trough.

Display 3: **NCREIF Appreciation Index**

Index = 100 at March 2000

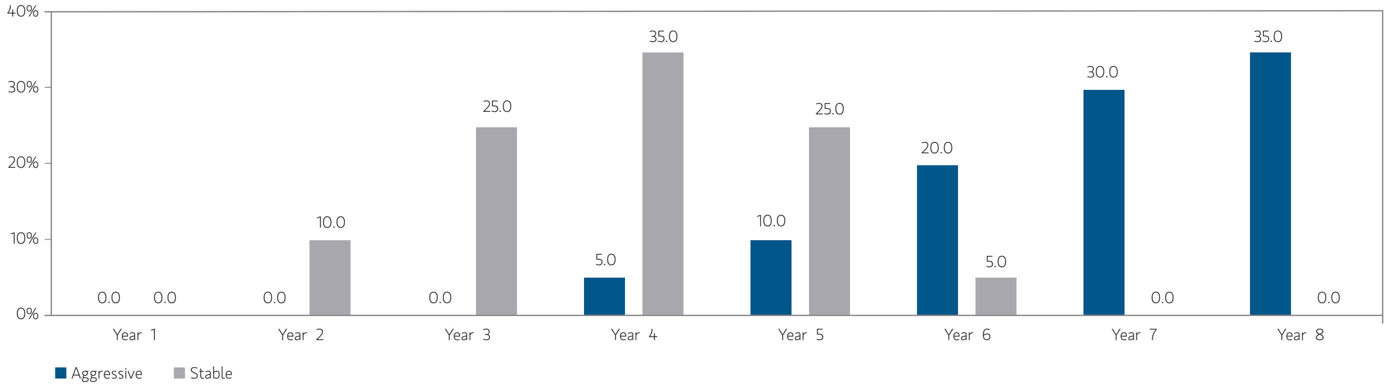


Source: NCREIF, MSREI Strategy. Data as of March 31, 2015.

How an investor deploys capital through a cycle is largely dependent on their objectives. If portfolio return enhancement is the goal, then market timing is likely to play a key role in determining the outcome. For investors who believe a more moderate objective for real estate is best (e.g., diversification from equities or income), a strategy that paces investment more consistently may be more suitable. In either event, over the past three to four years, pacing models have become much more widely used and discussed in tackling the issue of vintage year risk.

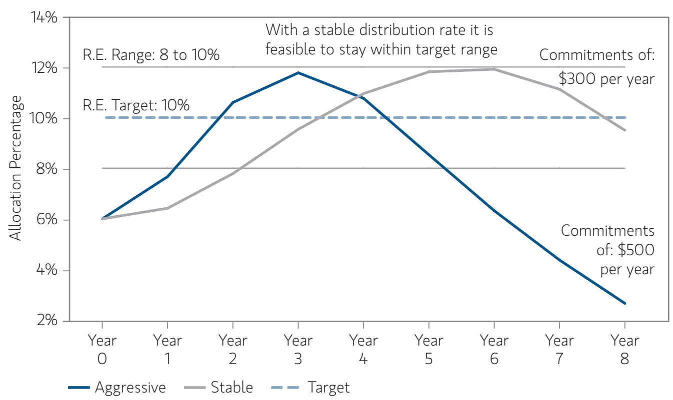
The essence is that investors first set the target allocation and ranges for real estate in the context of the overall portfolio. Upon establishing this, assumptions are made on investment multiples and contribution/distribution rates in order to set the pace for deployment of capital. The theory is that if you are invested in a large enough sample size of funds, then cash flows will generally fall in line with these assumptions; however, it is my belief that there are some drawbacks to this approach. First, contributions and distributions can occur at a much more rapid pace in the growth period of a business cycle. More importantly, during a market decline, distributions can potentially freeze up entirely. Combining these two circumstances will likely cause investors to over-invest during a rising market, as distributions are being returned to investors at a faster pace than expected. But once the market crests and shows signs of decline, there can be a drying-up of money coming back. The most recent cycle is clear evidence of this phenomenon as distributions back to investors over 2008 and 2009 were virtually nil. As shown in *Displays 4* and *5* below, one can see how an investor targeting a 10 percent allocation to real estate may actually miss its target allocation even by investing at a higher rate ($500 per year versus $300 per year) if distributions occur at a more aggressive rate.

Display 4: **Distribution Rate**



Source: MSREI Strategy. For illustrative purposes only.

Display 5: **Real Estate Allocation Under Different Commitment Amounts**



Source: MSREI Strategy. For illustrative purposes only.

The benefit of using this assumptions approach to investment pacing is that it can easily be executed and dynamically updated. An alternative approach, however, is simply to request investment managers to provide their forecasts of investment contributions and distributions on a regular basis. This may be done quarterly or semiannually, according to the investor's preference. This approach can potentially give investors a better, more realistic view of how much cash flow to expect, in or out, at various points in time.

A last consideration for vintage year exposure is whether to include annual caps as part of the investment policy. These caps can take the form of a percentage limit, or a hard dollar cap, that investors use to restrict their real estate capital deployment over any given year. Annual caps can act as useful portfolio modulators in periods of frothiness, though they can also potentially hamper the investor's ability to exploit a perceived market opportunity. Again, it all depends on the investor's vision and strategy for real estate's role, objectives, and target risk and return within the entire portfolio.

Property Sector Exposure

We have all seen the pie charts that detail the various exposures in a real estate portfolio. Monitoring of exposures is widely done and most, if not all, investors are tracking the key elements of exposure which include:

- **Property Type**—These sector classifications typically include office, industrial, retail, apartment, hotel, senior housing, student housing, self storage, land and other. Limits are generally placed on each property type with the first four main property types usually having a higher limit.
- **Geography**—This is an area that may require some classification. There may be a need to dissect first by overall region, i.e., Asia, Australia, Latin America, Europe, North America, Africa/Middle East, Other. There may also be a need to split the exposures by the FTSE Global Equity Index classification that places countries in three categories of Developed, Emerging and Frontier. Finally, there may be a need to get into specific countries or regions within a country or continent or even cities. Depending on the nature of your real estate portfolio, more detail may be required or less. It is important to note that by investing abroad investors will then need to also understand, determine and monitor any potential currency hedging policies and country risk.
- **Risk Classification**—There is some variability around the nomenclature but the widely used industry parlance has been Core, Value-Added and Opportunistic. Again, limits are put in place in the investment policy on the tolerance for each of the respective risk classifications
- **Life Cycle**—This generally covers the nature or state of the asset which may fluctuate but typically includes stabilized, lease-up, redevelopment, pre-development, development and other
- **Investment Structure**—This would cover the structure or vehicle in which your investment may be held. Sometimes

called the real estate quadrant, it would include public equity, private equity, public debt, and private debt

- **Manager**–The last area to monitor includes any firm exposure an investor may face. A limit may be placed on how much can be invested with a single investment manager

Investors should look at their overall exposure to each of these elements, on both a gross and net basis. Accounting for leverage as well (discussed in detail in the next section) can give a truer sense of investors' exposures.

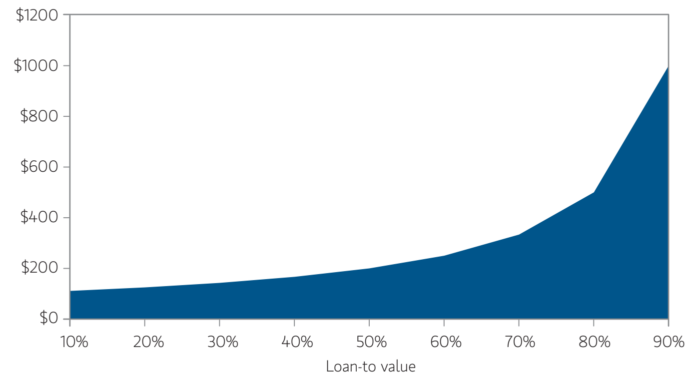
Additionally, digging deeper and monitoring cross-sectional exposure can be useful in risk management and mitigation. That is, it may be necessary to understand not just the percentage of, say, apartment exposure, but the percentage of apartments—in Texas—under development (property type—geography—life cycle). This type of information could be very important to monitor when there are multiple overlapping mandates, or when investors pursue more direct or joint venture-oriented investment programs. Still, it can be a double-edged sword, potentially creating very dense and detailed reporting that outweighs or obscures the valuable insights investors are looking for. As always, the goal in determining which exposures to monitor is to understand where potential concentrations may exist while evaluating both current investments and future opportunities.

Leverage

Greg Ip's *The Little Book of Economics* includes an apt and memorable quote: "To produce a crisis requires something else: leverage." Indeed, leverage has become a dirty word in the real estate business, and throughout the world of finance. It is both obvious and, at certain points in the cycle, dangerously easy to forget that leverage amplifies returns. Unfortunately during rising markets, it seems to be less memorable that the amplification can sink returns as well as augment them. Furthermore, as we increase the amount of leverage in our portfolio, the degree of associated volatility grows at an increasing rate. That is, added leverage has a non-linear impact on expected volatility. As one can see in *Display 6*, the potential impact on returns and purchasing power from dialing 40 percent leverage up to 50 percent is much different than when 70 percent leverage climbs to 80 percent.

Display 6: **Purchasing Power of $100**

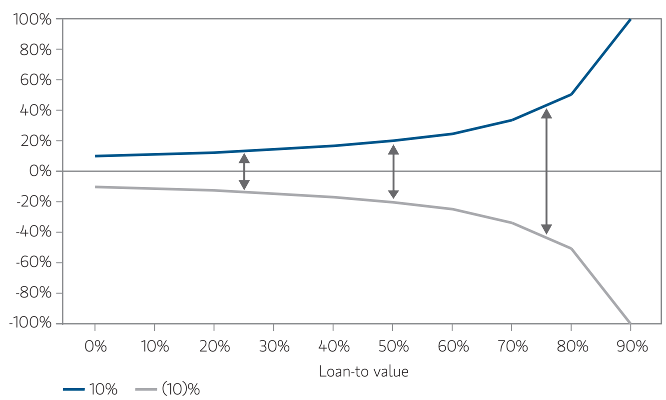
Purchasing Power



Source: MSREI Strategy. For illustrative purposes only.

Display 7: **Amplification of +/-10% Unleveraged Return**

Leveraged Return



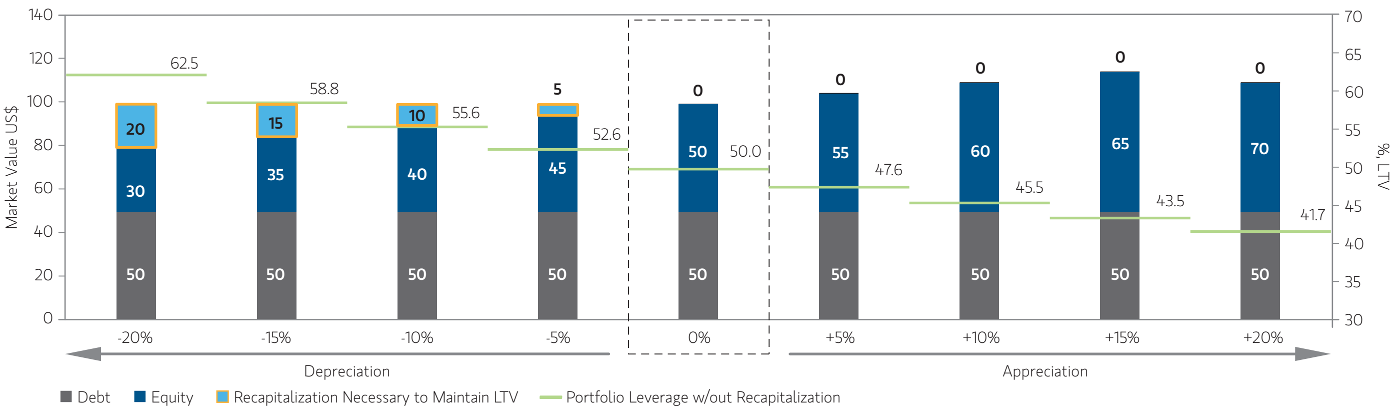
Source: MSREI Strategy. For illustrative purposes only.

The ratio of Loan-to-Value (LTV) is the most widely used metric in monitoring leverage in a real estate portfolio. Yet other metrics should be tracked as well. While the LTV ratio is important, this figure alone does not adequately measure the true risk posed by leverage across a portfolio. For example, in times when values are increasing, LTVs decline. This may give comfort to an investor that there is room to add more leverage; however, in a declining market, the LTV ratio's denominator falls but the numerator stays fixed which can quickly put an investor in an overleveraged situation. One way to mitigate this issue is to look at Loan to Cost (LTC) along with LTV, as this will relay the investor's exposure to debt on a cost basis, a fixed rather than dynamic value.

One additional concern regarding LTV or LTC is that these ratios do not capture the impact of leverage on returns or on cashflow. Addressing this, Debt Service Coverage Ratio (DSCR) measures the ratio of Net Operating Income (NOI) to Debt Service Costs (i.e., interest and principal), and is a key metric to track as well. The

Display 8: **The Effects of Change in Equity Value on LTV**

Sample Portfolio Appreciation/Depreciation



Source: MSREI Strategy. For illustrative purposes only.

DSCR measure is ideal to assess core properties and a suggestion for risk management would be to have a threshold DSCR of 1.5x to 2.0x for a core portfolio. This can ensure that core portfolio is not overleveraged and that the income in place is adequate. A DSCR less than 1.0 would imply that an investment property is not generating enough income to meet its debt payments.

However, in today's context of low interest rates, the DSCR can be a bit misleading by giving a sense that there is enough cushion to cover debt payments. Thus, the Debt Yield (DY) may also be an important metric to be monitored.

DY is defined as the Net Operating Income (NOI) divided by the loan amount. For example, if NOI is $5 million and the loan amount is $45 million, then the DY would be 11.1 percent. The DY ignores capital value changes as well as the interest rate and amortization of the loan. It simply focuses on how much leverage one should take on compared to the NOI. This ensures that low interest rates or rising values do not cause more leverage to be introduced at a potentially bad time in the cycle.

Additional items to monitor with respect to leverage include:

- Type of debt–subscription, fund-level, property-level, recourse
- Fixed vs. Floating vs. Hedged
- Recourse debt amount and percentage
- Cross Collateralization
- Maturities by year
- Lender exposure
- Calculation of Weighted Average Coupon (WAC) across fund, portfolio or sub-portfolio if applicable
- Calculation of Weighted Average Maturity (WAM) across fund, portfolio or sub-portfolio if applicable

Better understanding of leverage positions in these contexts can sharpen our vision and add clarity as investors look at prospective deals going forward. Similarly, when dealing with any potential workouts of distressed or overleveraged entities tangled from the last cycle, clear and consistent information is more readily at hand.

Exogenous Variables

As aforementioned, there is no way to eliminate all the risks. There are always unknown variables that can pop up and cause issues; however, investors should seek to evaluate known exogenous variables. These are more qualitative in nature and are not necessarily items that are monitored over months or quarters, but measured in years.

The first item is manager stability. Change is the only constant, as the saying goes, and therefore it is important to know where your investment managers stand in terms of the market. How dedicated is the team or company to the business is critical in whether or not the manager will succeed for their investors.

The next item is alignment and incentives. These variables are dynamic in nature. Many of us negotiate a contract or term sheet at some point in time. Several years later, however, the market has changed, and people may have changed as well as the status of individuals. A "hungry" manager who may have something to prove may be more likely to perform than one who has been blessed with success. There is no concrete formula, but it can only be helpful to pay attention to whether an incentive fee is "in-" or "out-of-the-money" and how much focus an out-of-the-money manager is still devoting to existing investments.

Lastly, investors should evaluate and re-evaluate their control and governance provisions on a periodic basis. Particular time and energy should be spent on establishing the non-negotiable items, the guiding principles by which any program will be designed.

Implementation and Caveats

There are some key caveats to the items discussed above. First, investors will need systems, resources and people to execute such a plan. This is not a cheap or easy exercise, but when managing hundreds of millions or in some cases billions of dollars, it can be a rounding error. In addition, successfully undertaking such an exercise will require total organizational buy-in. In fact, it will require your investment managers to buy in as well, and provide the necessary data. In my experience, implementing a structure similar to this in the past involved as much work in persuasion — getting all the managers on board, explaining how the data is used and why it is necessary, and so on — as actual setup. Generally speaking, however, most managers will provide the information once they understand its uses and value to their clients.

The last point here is that this list can be potentially long and daunting. If it appears to be too extensive, then as mentioned before, think of it not as a complete one-piece solution but as a menu. Prioritize the list and conform to what meets your needs, constraints and hot buttons.

Conclusion

In summary, *Display 9* recaps the main risk management concepts. If the full approach is too much to roll out systematically, even selecting from the menu on an a la carte basis can yield surprisingly beneficial results. Investors can choose the most relevant elements for their own business model, and start with those.

Display 9: **Summary of Risk Concepts**

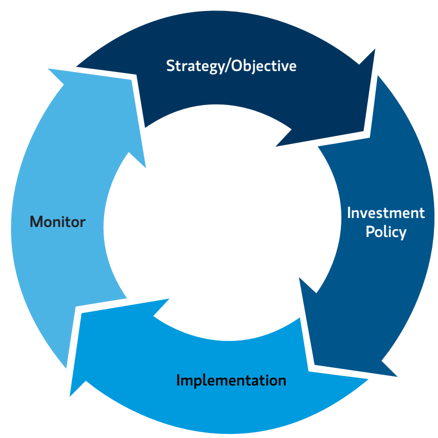
Real Estate Exposure	Asset Allocation Model, Defining Role and Objectives, Adhering to and Monitoring Role
Vintage Year Exposure	Tying Investment Pacing to Strategy, Pacing Models — Assumptions vs. Manager Forecasts, VY Data
Property Sector Risks	Property Type, Geography, Risk Classification, Life Cycle, Manager, Investment Structure
Leverage	LTV, LTC, DSCR, DY, Recourse Debt, Fixed vs. Floating Rate, Maturities, Lender Exposure, WAC, WAM
Exogenous Variables	Manager Stability, Alignment and Incentives, Control and Governance

These elements are best monitored by investors at the aggregate portfolio level. While investment managers are essentially charged with optimizing transactions and performance at the deal and fund level, it is up to the investors to optimize at their own respective portfolio level. A key insight is that the two are not always in perfect harmony.

Further, an effective risk mitigation program will be supported by two equally sound pillars: first, a well-devised investment policy and, second, a rigorous and thorough monitoring system. The investment policy must reflect and communicate both internally and externally to managers and joint venture partners the strategic focus and objectives of the real estate portfolio. The stated policy must be balanced with some built-in flexibility to position the portfolio for the ever-changing dynamics of the market. The investment policy can serve as a risk mitigation tool if it can successfully walk the tightrope between these two conflicting goals; however, focus must always remain on the strategic objective of real estate in the overall portfolio. Failing to do so may set up an investor for strategic drift and introduces risks into a portfolio that may not be properly accounted for. For example, a breakdown can occur if a strategic objective focused on income is coupled with an investment policy that allows for 60 percent investment in opportunistic strategies. In this case, one can see how the strategic role or objective of real estate may be put at risk for failure. As such, the implementation side (i.e., manager selection, alignment of interests, etc.) must be in sync with the investment policy.

Meanwhile, monitoring systems and periodic reviews are also essential to keep the portfolio aligned with its strategic objectives. Paying attention to the "tall trees" and monitoring the exposures of the portfolio can serve as a method to ensure an investor is appropriately implementing the strategic objectives.

Display 10: **Risk Management Cycle**



Source: PCA, MSREI Strategy.

The final thought to share really comes down to the people side of the equation. Each organization should strive to have a balanced view from the investment/return perspective and from the risk perspective. Investment returns are what we are all seeking, but its pursuit is on a risk-adjusted basis. Tilting too far to one side for a stretch of time will increase the volatility of outcomes. At times we may need to lean more to one side, but we should be cognizant of not going into a full force offensive or turtle into defensive mode for too long.

Some individuals are cut from one side of the cloth and others may lean more towards the other side at different points in the cycle. In general, when wearing the investor hat, the visionary in us comes out and when in risk mode we are more analytical in nature. In an organization it is important to have people with both points of view and, more importantly, to ensure that perspectives from each side are considered when decisions are made.

As such, implementing a risk management process successfully relies on making it a cultural and philosophical part of the organization. Risk should not be perceived as a "stand-alone" silo, but organizations should strive to have it permeate throughout the firm and the investment decision making and monitoring process. In the investment business, many of us strive to quantify risk, but this is not enough. There is a fundamental distinction between *risk measurement* and *risk management*. Risk measurement attempts to quantify the risk in an investor's portfolio with a series of metrics, whereas, risk management is a function of processes and human judgment. To simply rely on the quantitative side of risk measurement is not enough. This approach is fraught with assumption-making and weightings that can be arbitrary or apply historical averages that are likely not to be the same in the future. Judgment and human thought should always be part of the equation. For one cannot eliminate risk entirely, but only hope to better understand the risks in an investment portfolio – at least marginally. As Warren Buffett once said, "risk comes from not knowing what you're doing."

These tools will not prevent the next downturn, any more than a sharper telescope can avert Halley's Comet from its next approach to earth in 2061. Instead, think of these tools as blueprints for a better telescope and astronomical map with which to survey the (investment) universe. The aim, as investors, is to be more cognizant of—and prepared for—any and all fuzzy objects which may be hurtling towards us from the cosmos.

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ENDNOTES

1. Private Real Estate is represented by the NCREIF Property Index (NPI); Public Real Estate is represented by the NAREIT Index; Stocks are represented by the S&P 500; Bonds are represented by the Barclays Government and Corporate Bond Index; International Equities are represented by the Russell 2500 Index; Private Equity is represented by pooled weighted independent fund returns from VentureXpert; Hedge Funds are represented by the Fund-of-Funds Index from Hedge Fund Research, Inc. MSREI Strategy calculations on data provided from NCREIF and Hedge Fund Research, Inc © HFR, INC. Indexes do not include any expenses, fees or sales charges, which would lower performance. Indexes are unmanaged and should not be considered an investment. It is not possible to invest directly in an index.