

REAL ESTATE

I. Overview of Basic Real Estate Concepts

▪ Valuation Methods

- **Cost Approach** → Appraiser calculates what it would cost to Construct a Building New (Replacement Cost) and Subtracts an amount that adjusts this value for estimated wear & tear on the property. The land value of the property is then added. The result is the Appraised Value of the Real Estate.
- **Market Data Approach** → A property is valued at a price at which similar properties in the area have recently sold with a subjective differential added (or subtracted) to adjust for the unique characteristics of the property that make it different from the benchmark properties
- **Income Capitalization Approach** → Property is valued at the present value of estimated future net operating incomes that it will produce, assuming it is put to its highest and best uses. This is similar to valuing a company with the free cash flow model

$$\text{Real Estate Value} = [\text{NOI}_1/(1+r_{re})] + [\text{NOI}_2/(1+r_{re})^2] + \dots + [\text{NOI}_n/(1+r_{re})^n]$$

NOI is the Net Operating Income of the property (before interest expense, income taxes, and capital gains taxes; but after real estate (property) taxes
 R_{re} is the discount rate applicable for real estate

If NOI is assumed to grow at a constant rate, the valuation formula may be simplified to:

$$\text{Real Estate Value} = [\text{NOI}_1/(r_{re} - g_{\text{NOI}})] = \text{NOI}_1/R_0$$

R₀ is the Capitalization Rate

▪ Real Estate in Asset Calculation

- Most Empirical Studies Conclude that Real Estate →
 - Offers an attractive LONG-RUN Return comparable to equities
 - These returns are Correlated with Inflation, making it an inflation hedge
 - The Volatility (σ) of the returns are much less than that of stocks & bonds
 - The Returns are NOT highly CORRELATED with those of other major asset classes. This makes it a good vehicle for diversification to reduce portfolio risk.

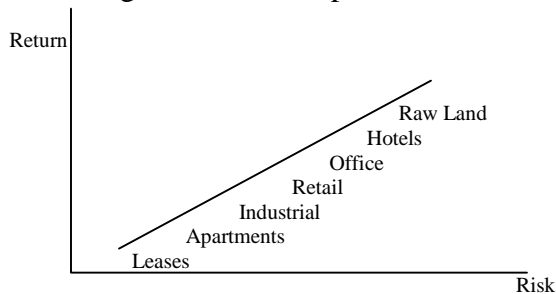
Return/Risk Characteristics of Real Estate & Other Assets, 1947-1987							
Asset Class	Returns	Standard Deviations			Autocorrelation		
Stocks	12.6%	16.3%			-.09		
Bonds	4.6%	9.8%			.16		
T-Bills	4.7%	3.3%			.53		
CPI	4.6%	3.9%			.55		
Real Estate:							
Commercial	9.1%	5.0%			.73		
Residential	8.2%	5.2%			.53		
Farm	9.9%	8.2%			.66		
Correlation Matrix							
Asset Class	1	2	3	4	5	6	7
Stocks	1.00						
Bonds	0.11	1.00					
T-Bills	-.07	0.48	1.00				
CPI	-.02	-.17	0.26	1.00			
Real Estate:							
Commercial	0.16	0.79	0.53	0.70	1.00		
Residential	-.13	-.22	0.13	0.77	0.53	1.00	
Farm	-.10	-.44	-.32	0.49	0.06	0.51	1.00

- Problems with the Empirical Evidence due to the fact volatility measures may be biased downward because →
 - Real Estate Transactions (≠ Stock & Bond Trades) are INFREQUENT. Typical property only trades once every 7 years. If stocks prices were measured only once per 7 years, there would appear to be relatively little volatility
 - Most real estate valuations used in studies represent APPRAISALS rather than true trading prices. Appraisals tend to be much less volatile than actual prices at which exchanges take place
 - Real estate is usually financed heavily with DEBT. This Leverage makes the volatility of investor returns much greater than the volatility of the price of the underlying real estate. If the return on real estate (pre-interest & tax) exceeds the pre-tax cost of the debt used to finance it, leverage is positive and the return on the investor's equity invested in the property will be greater than the return on the property itself. But, the reverse can happen, too, so that even though the underlying property appreciates, the investor return is negative due to the financing costs.
 - Real Estate is ILLIQUID. The total return is comprised of 2 Components: a RISK PREMIUM (which is low because the standard deviation of real estate is low) and a LIQUIDITY PREMIUM (which is high because real estate is illiquid).
- But, even with these problems regarding volatility, real estate should be added to a portfolio because it helps diversify away risk.

Asset Class	Expected Return	σ	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
US Stocks	12.0%	17.5%	1.00						
Foreign Stocks	11.8%	19.5%	0.60	1.00					
Venture Capital	18.5%	45.0%	0.35	0.15	1.00				
Dollar Bonds	8.1%	7.5%	0.45	0.25	0.15	1.00			
Foreign Bonds	8.2%	9.0%	0.25	0.60	0.10	0.30	1.00		
Real Estate	10.2%	14.0%	0.35	0.30	0.25	0.20	0.15	1.00	
Cash	6.4%	1.5%	- .10	- .15	- .10	- .05	0.10	0.20	1.00

- ***Real Estate Values Tend to Move in Trends***
 - Autocorrelation measures the degree to which trends tend to persist. High positive autocorrelations suggest trends persist, near-zero correlations indicate random walks, very negative autocorrelations indicate cyclical behavior. Real estate, like inflation & T-bill rates, exhibit strong trend-persistent behavior.
- ***Real Estate Market is Inefficient***
- In an efficient market, prices tend to be an unbiased estimate of value. This is because all relevant information is embodied in the price. Real Estate markets tend to be inefficient because →
 - Real Estate values are highly dependent upon LOCAL CONDITIONS (i.e., large specific risk component). Thus, it is not possible to bring national expertise to evaluate local properties. Local expertise is required meaning the number of independent assessments or evaluations of available information will be small
 - FEW BUYERS/SELLERS in a Local Real Estate market at a Given time
 - NO SHORT SELLING in Real Estate
 - Supply can only adjust SLOWLY to changes in demand due to the nature of the construction process
 - INFORMATION is not as READILY AVAILABLE in the real estate market as it is in the securities markets (real estate market is not transparent). Cost of ACQUIRING information is HIGH.

- RETURNS on real estate depend upon the personal management skills of the investor
- In efficient markets, the amateur investor has approximately the same probability of success as the professional. In inefficient markets, the professional has a distinct advantage.
- ***Real Estate is Illiquid***
- Real Estate trades infrequently. Plus, it is not traded in an organized market. Trades are negotiated. Thus, the Transaction costs are high and mistakes cannot be easily corrected. Plus, liquidating premiums are a major component of returns and investment time horizons should be long.
- ***Factors Causing Uncertainty in Real Estate Markets***
- Factors that affect real estate within the context of the ENTIRE Market for Capital Investments:
 - Competition among asset classes for investment funds
 - Inflation
 - Interest Rate Levels
 - Tax Code
- Factors affecting real estate returns in the markets themselves:
 - Supply of Space
 - Global Competition
 - Technology
 - Demographic Change
 - Environmental Issues
- Factors leading to return/risk spectrum in real estate



2. *The Portfolio Management Process Applied to Real Estate*

- Traditionally, Real Estate has been analyzed on a property-by-property basis, similar to the Graham & Dodd approach to individual security valuation. Recently, real estate investors have begun to shift emphasis toward a portfolio strategy approach. Factors influencing this shift include →
 - Collapse of Real Estate prices in the 1980s cause reassessments on how to conduct analyses
 - Databases are being developed so the real estate market can be more transparent at least re: regional supply & demand factors
 - Real Estate professionals are becoming more sophisticated
 - Academics have found ways to apply MPT & other statistical techniques to the Real Estate market
- ***The Role of the Portfolio Manager with Respect to Real Estate***
- The Portfolio Manager is responsible for implementing the 6 Steps of the portfolio manager →
 - IDENTIFY the CLIENT'S RETURN OBJECTIVES & RISK CONSTRAINTS and to develop a PORTFOLIO POLICY that correctly addresses these issues.
 - ANALYZE or be AWARE of Market Conditions, especially the expected returns and risks of various asset classes and the correlation of the returns between all pairs of asset classes
 - Integrate the Client's portfolio policy with market conditions to CONSTRUCT an OPTIMAL ASSET ALLOCATION
 - CREATE a Portfolio STRATEGY and communicate it to those responsible for making the specific investment recommendations or decisions on the portfolio.
 - REBALANCE the portfolio whenever Market Conditions or Client Return Objectives/Risk Constraints change sufficiently to warrant it
 - MEASURE & PRESENT Portfolio Performance to the client in a FAIR & PROPER manner
- ***Investor Objectives & Risk Constraints***
 - The first step in the portfolio management process is to define the investor's return objectives & risk constraints. (see Portfolio management section)
 - When considering real estate, the most important Risk Constraint is the ILLIQUIDITY of the investment. This should generate higher returns due to the Liquidity Premium, but it means investors requiring liquidity cannot be heavily invested in real estate
 - Time Horizon for Real Estate tends to be long-term. This is because →
 - Real Estate is purchased via Negotiations which makes the cost of buying & selling high. Thus, it is not practical to trade real estate often
 - Real Estate is Illiquid making it difficult to find ready buyers. This, too, makes trading impractical
 - Real Estate requires large amounts of capital. Even one mistake can have an adverse affect on the entire portfolio. Thus, every investment decision needs to be carefully analyzed.

- UNIQUE NEEDS & PREFERENCES → the value often depends on the management. Therefore, investors not willing to take on an active role should try to avoid the direct ownership of real estate. Or, they may hire professional managers for the property, but this is costly.
- ***Estimating the Value of, Return on, and Risk in Real Estate***
 - The valuation of real estate can be analyzed using techniques similar to those of other securities valuations. There are three 4 approaches in a cash flow analysis.
 - **Conventional Discounted Cash Flow Approach**
 - This approach employs the FREE CASH FLOW model in which an analyst forecasts the NET OPERATING INCOME expected to be generated by the property in the future and discounts these cash flows to their present value.

$$V_{re} = [NOI_1/(1+r_{re})] + [NOI_2/(1+r_{re})^2] + \dots + [NOI_n/(1+r_{re})^n]$$
 - Here, NOI is defined as the net cash flow generated by property from RENTS, LEASES, & OTHER INCOME, Less Cash Paid for OPERATING EXPENSES, REPAIRS, MAINTENANCE, & CAPITAL EXPENSES. Usually, NOI is calculated before debt service payments & taxes. (note: real estate is not a tax-paying entity, the owner of real estate is, thus the taxes are dependent upon his other income)
 - The REQUIRED Return on Real Estate (r_{re}) can be determined using the BUILD-UP Approach

$$r_{re} = (1+r_{RRF})(1+r_I)(1+r_{LP})(1+r_{RP}) - 1$$

r_{re} is the expected return on the real estate asset
 r_{RRF} is the real risk-free rate
 r_I is the expected rate of inflation
 r_{LP} is the liquidity premium
 r_{RP} is the risk premium
 - If it is ASSUMED that NOI will grow at a constant average annual growth rate forever, can use the DIRECT CAPITALIZATION MODEL:

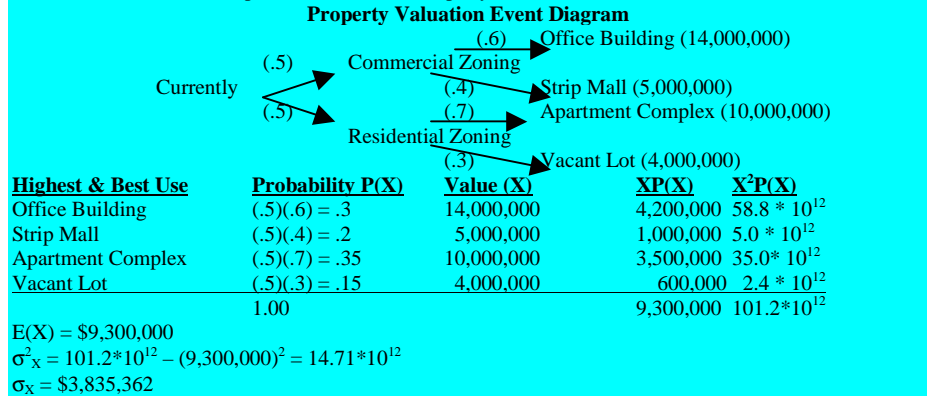
$$V_{re} = [NOI_1/(r_{re} - g_{NOI})] = (NOI_1/R_0)$$

R_0 is the Overall Capitalization Rate
 - If the value of real estate is known and future net operating incomes are estimated, these valuation models can be used to determine the expected return on Real Estate. The riskiness of a real estate asset is measured by the degree of confidence the analyst has in the NOI projections and stated capitalization rate.

▪ **Scenario Forecast Approach**

- Introduce probability into the valuation process. Construct event diagrams to assess valuations based upon the probabilities of what the highest and best use of a property might be.

For Example: Suppose there is a parcel of Raw Land which has a 50% chance of being zoned commercial and a 50% chance of being zoned residential. If zoned commercial, there is a 60% chance that demand will support an office building whose cash flow would give it a present value of \$14,000,000; and 40% chance that demand will only support a strip mall whose value would be \$5,000,000. If zoned residential, there is a 70% chance that demand would be high enough to support an apartment complex whose value would be \$10,000,000 and 30% chance demand would support holding the land vacant at value of \$4,000,000. What is the Expected Value of the Property?



- By Requiring the Analyst to develop several scenarios and to link them together in an event diagram, this approach enables valuations to be described as probability distributions with expected values (returns) and variances (which can measure asset risk)
- **Monte Carlo Simulation Approach**

- A disadvantage of the scenario approach is that there are only so many ‘branches’ that may be explicitly determined for every node of an event diagram. Monte Carlo simulation solves this problem by permitting an infinite number of ‘branches’ to emanate from each node. This is done by defining possible events and their probabilities of occurrence as probability distributions rather than discrete functions. The computer then goes on and selects different events at random and produces a probability distribution with expected returns and risks (variances).
- Monte Carlo simulations are good analytical tools for determining expected outcomes and the possible ranges of outcomes for events that are probabilistic. But, the accuracy of the approach depends upon the skills of the analyst in constructing the proper relationships that are to be simulated as well as in specifying the probability distributions for each of the variables with reasonable accuracy. GIGO. “Garbage In Garbage Out”

▪ **Modern Portfolio Theory Approach**

- The modern portfolio theory (MPT) approach to real estate valuation employs either SINGLE FACTOR MODELS (\cong CAPM) or MULTI-FACTOR MODELS (\cong Arbitrage Pricing Theory).
- A Single Factor Model relates the expected return on real estate to the risk-free rate and the sensitivity of a target property's return to changes in the return on investments in the real estate market

$$\boxed{R_{re} = R_F + \beta_{re}(R_M - R_F)}$$

- The risk associated with real estate in this approach is measured by the β term. There are TWO problems with applying a CAPM approach here \rightarrow
 - In the CAPM Model, it is assumed that the market for securities is efficient and that returns are only earned by taking market risk. But the real estate market is Inefficient and inefficient markets do not pay a return on unsystematic or non-market risk.
 - Good information about the market index is available in the equities market; but the real estate market is NOT well-organized, nor is it transparent. And, since it is highly dependent on local conditions, there is no real "market return" that can be used in the model. Without a market index upon which R_M & β can be based, it is difficult to use a CAPM-type model.
- Thus, most real estate professionals prefer the Multi-factor models to specify the expected return & risk on real estate assets. These models contain several risk variables (F_i) such as inflation, growth rate of economy, liquidity & equity risk premiums, terms structure of interest rate, etc.

$$\boxed{R_{re} = b_0 + b_1F_1 + b_2F_2 + \dots + b_nF_n}$$

- Some characteristics of a GOOD Multi-Factor Model are \rightarrow
 - Model should NOT have a **MULTICOLINEARITY** problem; i.e., no independent factor should be highly correlated with any other independent factor
 - Model should NOT have a **AUTOCORRELATION** problem; i.e., the differences between the returns predicted by the model and the actual returns should not be correlated with each other. If they are, it could mean an important factor has been OMITTED.
 - Model should be **PARSIMONIOUS**; i.e., it should predict real estate returns reasonably well without requiring a very large number of independent variables (factors)

- There are Several Practical PROBLEMS with Multi-factor models →
 - Factors that should be included in the Model are difficult to determine using *A Priori* Reasoning
 - Factor Betas are usually determined by regressions based on **HISTORICAL** Data. Since good data on current & historical real estate returns are either unavailable, cost-prohibitive to obtain or not indicative of future returns, the analysis may not provide good results.
 - Risk associated with the forecasted real estate returns must be based on either Historical Patterns or scenario or Monte Carlo simulations. These rely heavily upon the analyst to make reasonable accurate appraisals of possible scenarios and probabilities of occurrence.
- **Determining the Asset Mix**
- The optimal Asset mix is determined in the same manner as discussed in the Portfolio Management section. But, for real estate, the asset allocation has 3 Steps
 - **Determine what percentage of the Overall Portfolio should be Invested in Real Estate**
 - Determine the Expected Returns & σ for various Asset Classes
 - Construct a Correlation matrix
 - Use this data to generate the expected return and standard deviation of all possible mixes of asset classes. Essentially, create an efficient frontier
 - If know the client's risk aversion factor and time horizon, find the optimal overall mix of asset classes from the relationship:

$$U_P = R_P - \frac{1}{2}[(A\sigma^2_{PI}) / n]$$
 - **Determine what percentage of the Real Estate portion of the Portfolio should be invested in various Geographical Locations or Regions**
 - Determine the Expected Returns & σ for Various Locations/Regions
 - Construct a Correlation matrix
 - Use this data to generate the expected return and standard deviation of all possible mixes of asset classes. Essentially, create an efficient frontier
 - If know the client's risk aversion factor and time horizon, find the optimal overall mix of asset classes from the relationship:

$$U_P = R_P - \frac{1}{2}[(A\sigma^2_{PI}) / n]$$
 - **Determine what percentage of the Real Estate in Each Location should be invested in Apartments, Office Buildings, Shopping Centers, Etc.**
 - Determine the Expected Returns & σ for Various Segments
 - Construct a Correlation matrix
 - Use this data to generate the expected return and standard deviation of all possible mixes of asset classes. Essentially, create an efficient frontier
 - If know the client's risk aversion factor and time horizon, find the optimal overall mix of asset classes from the relationship:

$$U_P = R_P - \frac{1}{2}[(A\sigma^2_{PI}) / n]$$

- ***Portfolio Strategy***
- Real Estate is unique since it is ILLIQUID, in an INEFFICIENT MARKET, and much depends on LOCAL CONDITIONS
 - *Illiquidity* means that a real estate portfolio tends to be INFLEXIBLE. Therefore, investment decisions must be well thought-out and based on long-term considerations
 - *Inefficiency* means that incremental returns can probably be earned by taking unsystematic risk. Thus, an ACTIVE Management approach is more appropriate for real estate than a Passive approach. (requires expensive real estate experts)
 - *Locality* means more attention needs to be given to the analysis of local economic supply & demand conditions than in the analysis of stocks or bonds. Though a top-down approach is not completely useless. Many national factors affect local real estate. But, the BOTTOM-UP approach focusing on regional & local conditions is vital. Thus, need an interactive top-down/bottom-up approach.
- Ergo, the portfolio manager needs to consult real estate professionals in deciding which properties to add to the portfolio. But, the manager needs to maintain control over the Overall Portfolio Process and not be blinded by the real estate expertise he employs.
- ***Monitoring & Rebalancing the Real Estate Portfolio***
- Markets & Client needs change continuously, thus the manager needs to have a DYNAMIC process in portfolio management. Managers must always monitor→
 - Changes in MARKET CONDITIONS that could warrant a change in the allocation of client assets. (returns, variances, correlations, etc.)
 - Changes in CLIENT CIRCUMSTANCES (lifestyle changes, divorce, college tuition financing, etc.)
- Though it is important to change the asset mix from time to time, these should be relatively rare circumstances due to the costs →
 - Commissions (high in real estate)
 - Market Impact (should not do it in a thin market)
 - Cost of NOT Trading a property that is overpriced no longer fits in the strategy

- **Measuring the Performance of a Real Estate Portfolio**
- AIMR-PPS has special rules for measuring and reporting the performance of real estate in a portfolio. (see Portfolio Management section). Must also ATTRIBUTE the real estate portfolio's performance to →
 - General Performance of the REAL ESTATE MARKET
 - Effects of MARKET TIMING (Segment Allocation)
 - Effects of PROPERTY SELECTION
- The General Principles of Attribution analysis can do this.

Sector	Indexed Portfolio		Managed Portfolio	
	W_I	R_I	W_M	R_M
Apartments	60%	12%	20%	10%
Office Buildings	20%	10%	50%	15%
Shopping Centers	15%	15%	20%	12%
Parking Lots	5%	15%	10%	20%

(I) Indexed Returns	= $\sum w_I R_I$	= (.6)(.12)+(.2)(.10)+(.15)(.15)+(.05)(.15) =	12.20%
(II) Index & Allocation R	= $\sum w_M R_I$	= (.2)(.12)+(.5)(.10)+(.2)(.15)+(.1)(.15) =	11.90%
(III) Policy & Selection R	= $\sum w_I R_M$	= (.6)(.10)+(.2)(.15)+(.15)(.12)+(.05)(.20) =	11.80%
(IV) Manager Return	= $\sum w_M R_M$	= (.2)(.10)+(.5)(.15)+(.2)(.12)+(.1)(.20) =	13.90%

The Manger's 13.90% Return can be attributed as follows:

Market Return (I)	12.20%
Asset Allocation (II-I)	- 0.03% → aka Market Timing
Property Selection (III-I)	- 0.04%
Joint Effects (I-II-III+IV)	2.40% → texts merge Property Selection & Joint Effects into single Property Selection
Manger's Return (IV)	13.90%

Of the overall 13.9% return, 12.2% was due to the general performance of the real estate market and the remaining 1.7% was due to the manager, mostly through Joint Effects.

▪ **“Public & Private Real Estate: Performance Implications for Asset Allocation” by Geltner & Rodriguez**

- Real Estate is a different asset class from stocks, bonds & foreign securities. Indeed, real estate has a low correlation with other asset classes. Thus, by including real estate in a portfolio, the benefits of diversification can be achieved and the return/risk ratio can be improved.
- If investors want to include real estate in their portfolios, they are often faced with a “SIZE” problem. Most mean-variance allocation models produce an optimal asset mix in which 10-15% of the portfolio consists of real estate. To obtain a diversified portfolio of real estate assets (by region, type, etc.) while staying in the 10-15% range of portfolio size, is nearly impossible without a sizable portfolio. Investors with portfolio under \$1 billion need a method of investing in real estate without having to own properties. Thus, there are securitized forms of real estates, such as Real Estate Investment Trusts (REITs), Commingled Real Estate Funds (CREFs) and Real Estate Limited Partnerships (RELPs).
 - **Forms of Securitized Real Estate (REITs & CREFs)**
 - **REITs** are public companies whose shares trade on national securities exchanges. They enjoy special TAX STATUS as long as they meet specific regulations (payout 95% of income to shareholders in dividends, invest at least 75% of assets in real estate, and do not have a high concentration of ownership in the hands of few entities) the REIT itself does NOT pay Federal profits tax on its income (avoid double taxation of dividends. The 75% requirement can be in the form of mortgages on real estate, construction loans, or equity investment in

real properties. Investors wanting to use REITs as substitute for owning real properties in the real estate portion of its portfolio must invest in equity REITs – invest in real properties, not fixed-income securities backed by real estate)

- **CREFs** are private business entities who raise funds in the form of PRIVATE PLACEMENTS and invest the proceeds in real estate properties. Owners of CREFs receive NEGOTIABLE ownership certificates that represent a pro rata share of the properties owned by the CREF. But, unlike REITs there is NO ACTIVE PUBLIC MARKET where CREF ownership certificates trade. To sell an ownership in a CREF, must find a willing buyer and negotiate a private sale. (\cong limited partnership)
- As REITs are publicly traded securities, their market value is easily established by trade prices. As CREFs are not actively traded, their value is determined by Appraisal (done periodically on all the properties owned by the CREF). As appraisal values are less volatile than market values, CREFs have more stable share prices than REITs. But, an appraised value \neq the value one can receive if one wants to sell the CREF. Plus, as REITs are liquid and CREFs are illiquid, it may take awhile before one can sell a CREF.
- *Problems with Real Estate Return Data*
 - As Real Estate values are determined primarily by APPRAISAL, and as real estate properties trade, on average, only once every seven years, it is difficult to measure real estate returns. Plus, the infrequency of trading leads to the false conclusion that real estate prices are more stable than they may actually be (low variances are not necessarily true).
- *How Useful are the Primary Real Estate Indexes?*
 - Indexes measure the value of real estate. The **Russell-NCREIF** Index and the **Evaluation Associates Index** are the major private real estate indexes. Both of these are based on Appraised Values, and thus have the inherent shortcomings.
 - Though the properties are appraised annually, the indexes report returns quarterly as they appraise $\frac{1}{4}$ of all properties per quarter. Thus, they are mainly annual valuations partially updated each quarter, rather than quarterly valuations.
 - The **NAREIT All-REIT** Index is the most commonly used index of publicly traded REITs. It is calculated using real trading prices reported on a real-time basis. But, as REITs are typically leveraged entities, the returns reflect the effect of leverage and not just the underlying real estate assets themselves. The effect of leverage needs to be removed from the index in order to make it reflective of what is happening to valuations in the real estate market itself. Plus, REIT values are also dependent upon market opinions of their management, conditions, etc (like stocks). Thus, there is some correlation between

REITs & Stocks that make the index unacceptable as a proxy for real estate values.

	<u>Private Real Estate</u>	<u>REITs</u>	<u>S&P500</u>	<u>LT Gov Bond</u>	<u>T-Bill</u>
Return	7.88%	11.62%	16.09%	7.40%	5.64%
σ	10.98%	13.54%	13.59%	12.34%	3.25%
Sharpe Ratio	.04	.31	.64	.29	--

- *Modern Portfolio Theory Applied to Real Estate*
 - Most analyses that indicate including real estate in a portfolio increases the return/risk ratio use the mean-variance asset allocation concept derived from modern portfolio theory. The principal conclusion from MPT is that prudent diversification reduces overall risk.
 - Problem with real estate is that the market is inefficient & MPT assumes efficient markets.
 - However, market inefficiencies allow traditional equity valuation analysis easier to apply in the real estate sector. Thus, skilled analysis can increase the return/risk ratio more than diversification
- *Applying MPT Techniques to Real Estate*
 - While it is difficult to apply MPT to real estate due to the problems outlined above, common sense does indicate that real estate has a place in an optimal portfolio. Real Estate does have good returns, and these returns are not highly correlated with other asset classes.
 - Can try to adjust data so that one can perform a mean-variance asset allocation analysis including real estate →
 - Adjust for the statistical & data problems caused by the effect of appraisals in the market indexes. These adjustments generally raise the standard deviation of the index returns so that they would more closely resemble the standard deviation of stock returns. Also, the correlations between real estate & some asset classes had to be decreased.
 - Adjust for the effects caused by the use of leverage by companies in the NAREIT All-REIT index. This tends to reduce the return and risk of REIT data relative to what was calculated from the index itself
 - Adjust for the effects of real estate market inefficiency on investors with long time-horizons.
 - After making the adjustments, authors found that both private real estate and REITs should be included in the optimal portfolio of the typical pension fund. The amount to be included depends upon the objectives of the fund.

▪ **“Real Estate Investment Performance & Portfolio Considerations” by Brueggerman & Fisher**

- There are only a few sources of data which can be used to measure the performance of real estate as an asset class. These include:
 - *The National Association of Real Estate Investment Trusts’ (NAREIT) Equity Index (EREIT)*
 - A MONTHLY Index based upon the ending market prices of equity REIT shares. This measures the returns earned by investors in the common equity REITs, it does NOT measure the returns earned by the REITs themselves on the properties which they own. Thus, it is a POOR measure of real estate returns *per se* because equity REITs do not correlate well with the value of their underlying real estate holdings. Factors, other than Real Estate Value that are used to determine the value of Equity REITs include:
 - The LIQUIDITY of the common shares, which is higher than that of the underlying real estate
 - The Quality of MANAGEMENT of the REITs
 - The DIVERSITY of the REITs portfolio of properties
 - The Quality of the underlying properties
 - The Behavior of the overall stock market itself, which affects REIT valuations via the β concept (CAPM)
 - *The FRC Property Index*
 - Measures the performance of UNLEVERAGED income-generating properties that have been acquired by open-end commingled investment funds that are owned by pension & profit-sharing trusts, or by investment advisors for clients. Index is constructed by measuring the total return generated by the properties quarterly. The fees paid for managing individual properties are subtracted but fees paid to managers of fund or investment advisors are included in the total return.
 - *The Mortgage REIT Index*
 - Index of price behavior by mortgage REITs
 - *The Hybrid REIT Index*
 - Index of price behavior by REITs that purchase both equity interests in real estate and make loans on real estate

	1978-1990							
<u>Return</u>	<u>Stocks</u>	<u>Bonds</u>	<u>Bills</u>	<u>CPI</u>	<u>EREIT</u>	<u>FRC</u>	<u>Mortgage REIT</u>	<u>Hybrid REIT</u>
Arithmetic	4.06%	2.72%	2.14%	1.49%	3.51%	2.63%	1.63%	2.57%
Geometric	3.73	2.47	2.14	1.49	3.29	2.61	1.23	2.06
σ	8.07	7.19	0.61	0.92	6.75	1.56	9.14	10.24
Coefficient of Variation	1.99	2.64	0.29	0.62	1.92	0.59	5.62	3.99

- According to theory, return & risk are positively correlated. The Three Sources of Risk in real estate are→
 - *Business Risk* → relates to the characteristics of an individual property, such as location, design, lease structure, etc.
 - *Default Risk* → probability the property will not produce sufficient cash flow to pay the debt service on its mortgage (exists only for leveraged properties)
 - *Liquidity Risk* → associated with the difficulty of selling a property quickly
- Thus, it is expected that real estate properties whose returns are highly volatile would generate higher returns than those with less volatile returns. One method of measuring an asset's risk-adjusted return is to calculate its COEFFICIENT of VARIATION (the lower this number, the higher return per unit of risk taken)

Coefficient of Variation = (σ_i / Average Return_i)
- Notice, FRC has better risk-adjusted return than EREIT; this is likely due to the fact FRC uses unleveraged properties. (plus it is comprised of appraised values, with their associated problems)
- Author's Study Suggests
 - Return/Risk Ratio is enhanced significantly by adding ACTUAL Real properties to a portfolio of stocks & bonds
 - REITS are NOT good substitutes for actual real estate properties because they behave more like stocks than real estate
 - Returns on Actual Real Properties (FRC) seem to be positively correlated with inflation while REIT returns are NOT.
 - But, results are only from small sample of data over a 12 year period.

▪ ***“International Real Estate Investment: A Realistic Look at the Issues” by Arnold & Grossman***

- In order to evaluate international real estate investment decisions, must evaluate key macro- & micro-economic variables in a number of markets
 - *Macro-economic Variables (measure Systematic Risks)*
 - **Economic Outlook** → GDPs, Inflation Rates, National Debt, Savings Levels, Household Incomes, Currency Exchange Rates, Expected Returns on various asset classes within EACH country
 - **Political Stability** → frequency of elections, leadership tenure, likelihood current policies could change due to a change in ruling party, probability of national unrest, economic disturbances, etc.
 - **Social Stability** → current & prospective demographic composition, possibility for ethnic violence, crime, unrest, etc.
 - **Organizational/Bureaucratic Structure** → efficiency, stability, professionalism, ethical composition
 - **Financial Structure & Stability of Financial Institutions**
 - **Market Structure** → development plans, real estate & zoning laws, mode of transactions, etc.
 - **Past & Prospective Real Estate Returns**
 - **Political & Consumer Psychology & Cultural Factors** which could impact real estate values
 - *Micro-economic Variables (measure Unsystematic Risks)*
 - **Supply & Demand for Real Estate** → look at local vacancy rates and absorption trends
 - **Local Economic Conditions** → mainly employment conditions & opportunities
 - **Sociopolitical Issues**
 - **Property Market Structures** → local planning, zoning laws, local real estate management firms, transaction costs
 - **Leasing Conditions** → lease terms & conditions which predominate
 - *Basic Approaches to Decision Making*
 - **Systematic Approach** → can be formalized as a written procedure
 - Most employ a Top-down methodology where countries are assessed first for SCREENING out those nations where real estate investment is viewed unfavorably. Once narrow down to 10-30 nations, can analyze on the local level.
 - Method tends to be by the numbers. Usually, a formalized procedure specifies numerical values that must be achieved for each statistic in order to pass the SCREEN.
 - **Intuitive Approach** → based on the skill, experience, background and intuitive reasoning of the analyst. Depend mostly on the skill of the analyst.

- *Problems with International Statistics*
 - Though share a name, a statistic may not be calculate or collected in the same manner from nation to nation
 - Some countries publish concepts or statistics with which foreigners may not be familiar.
 - Some statistics considered vital by the US investor may not be collected or available in another nation
 - In many nations, the collection of statistical data has low priority and the data is not always current. (may have a 1-3 year lag).
 - Most European nations lack RETAIL sales data and usually lack the kind of detailed income data routinely collected in the US
 - Publications presenting annual statistics for European nations usually have a 3 year lag
 - Statistics from Eastern Europe are notoriously unreliable and biased
 - Some nations periodically destroy their census date for reasons of confidentiality.
- *International Real Estate Decision Process*
 - Create a working group of experts who can determine an appropriate course of action. Should be comprised of real estate officers, international equity experts, outside consultants. Should have the primary responsibility for determining whether or not international real estate investment has the appropriate risk/reward configuration for the firm and, if so, to develop the overall strategy and subsequent managerial tactics to pursue it
 - Develop a network of national experts around the world who can provide timely advice and information on what is occurring in individual nations. Also develop a network of local real estate experts in various regions around the world.
 - Develop a network of local legal & real estate consultants that can assist in buying(selling) and managing properties.
 - Devote lots of time & expense in researching & appraising international real estate opportunities. Fiduciary duties mandate the time & expense be expended if it is desirable to make such an investment