

Real Estate as an Investment Class

A helicopter tour

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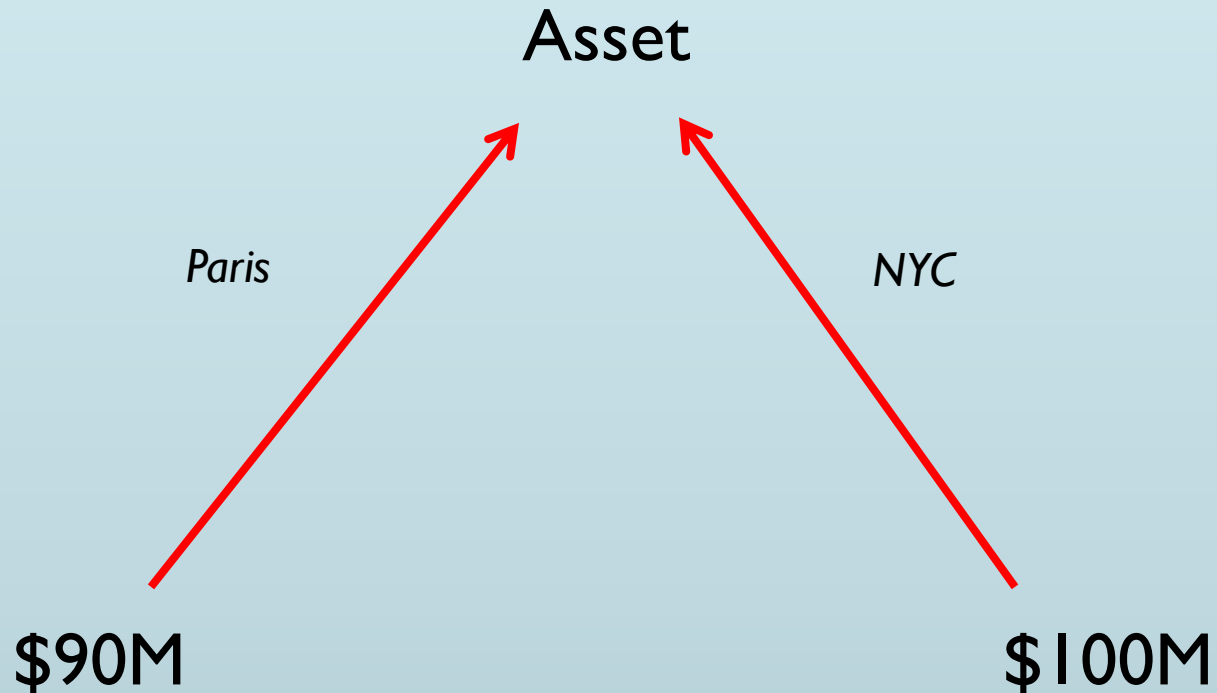


The question

- How should one price real estate assets?
- Asset: store of value with well defined property rights
- A title to a string of cash flows (or payoffs) to be received over time, and subject to some uncertainty
- Two basic tasks:
 1. Describe the distribution of payoffs (i.e. *forecast*)
 2. Price that distribution
- Arbitrage principle: “similar” assets should be priced in such a way that they earn similar returns
- Otherwise...



Arbitrage opportunities



Opportunity cost of capital

- Investing in a given asset is foregoing the opportunity to invest in other assets with similar properties
- Investor should be compensated for foregoing that opportunity
- Asset under consideration, therefore, should yield at least the same return as other similar assets



Main asset pricing recipes

1. **Discounted cash flow approach**
 - a. Write asset as a string of expected cash flows
 - b. Find return similar assets earn
 - c. Discount cash flows using that rate

2. **Ratio/Peer Group/Multiple approach**
 - a. Find a set of similar assets, with known value
 - b. Find average value/key statistic ratio
 - c. Apply that ratio to asset under consideration



The multiple approach in real estate

- Find a group of comparable properties ('Comps') with known value
- Comparable: similar location, purpose, vintage...
- Compute average ratio of value to gross rental income (**Gross Rent Multiplier** approach)
- Compute average ratio of Net Operating Income (NOI) to value, a key ratio known as the **Capitalization Rate**
- Get an estimate of the current Gross Rent and NOI for your target property, and apply ratio



Example

- A target property has a NOI of \$400,000
- You have obtained the following two recent sales data:

	NOI	Selling price
Property 1	\$424,200	\$4,200,000
Property 2	\$387,200	\$3,400,000

- What is the estimated value of your target using the cap rate approach (assign equal weights to the two sales)?



NOI vs. EBITDA

- $\text{NOI} = \text{operating income} - \text{operating expenses}$
- Like EBITDA, a fuzzy notion
- My preference is to figure cash operating expenses only, making my NOI equivalent to “Normalized EBITDA”
- But not everybody agrees...



Solid comp case in RE:

1. Quality of the comparables
2. Consistency of calculations
3. Good treatment of outliers



NOI vs. PBTCF

- NOI = Income net of operating expenses
- BT bottom line = NOI – Capital Expenses
= **Property Before Tax Cash Flow**
= PBTCF
- Before-tax IRR is the discount rate that makes the PV of all future PBTCF equal to the property's price



The holy trinity of real estate

- Consider a property with current PBTCF cap rate $y\%$
- Assume that PBTCF is expected to grow by $g\%$ for ever
- Then the before-tax IRR associated with buying this property is:

$$r = y + g$$



The real estate asset class

- Bedrock: real estate properties (land + structures affixed to it)
- Residential (deliver housing services) or Commercial (held for a business purpose)
- Real estate properties are strings of cash flows
- Real estate *assets* are all assets whose payoffs derive -- however remotely -- from some underlying property



Some language

- Debt: financial contract that gives specific claims to asset's payoff, but no ownership rights
- Equity: financial contract that gives only a residual (or subordinated) claim to asset's payoff, but carries ownership rights
- Public Markets: Markets with many buyers and sellers, observable transaction prices and sizes, and stringent disclosure rules
- Private Markets: Markets where transactions involve limited numbers of buyers and sellers, and where transaction information and financials need not be disclosed



Pricing a revenue-generating property

- Consider a property made of a collection of leasable units
- How much should a given investor pay for such a property?
- Two approaches:
 1. DCF method (forecast expected flows, discount them)
 2. Ratio approach (cap and GRM)
- Both approaches require detailed cash flow data



Three levels of cash-flows

- *Before tax cash flows* accrue to:
 1. Taxes (income and capital gains)
 2. Debt holders
 3. Equity holders

 - *After tax cash flows* accrue to:
 1. Debt holders
 2. Equity holders

 - *Equity after tax cash flows* accrue to equity holders
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Three appropriate discount rates

- *Before tax cash flows* should be discounted at before-tax WACC
- *After tax cash flows* should be discounted at WACC
- *Equity after tax cash flows* should be discounted at required return on equity
- First two calculations give the value of the firm, the last one gives the value of equity



Cash flow pro-forma

- Table of expected cash flows associated with the property over a certain horizon
- Typical horizon: 5 to 10 years, yearly data
- We will first ignore the potential role of debt and taxes, and focus on before tax cash flows



Typical Pro Forma Items

Operating (all years):

Potential Gross Income = (Rent*SF)	=	PGI
- Vacancy Allowance = -(vac.rate)*(PGI)	=	- V
+ Other Income = (eg, parking, laundry)	=	+OI
- Operating Expenses	=	- OE
<hr/>		<hr/>
Net Operating Income	=	NOI
- Capital Expenditures	=	- CE
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Property Before-tax Cash Flow	=	PBTCF

Reversion (last year & yrs of partial sales only):

Property Value at time of sale	=	V
- Selling Expenses = -(eg, broker)	=	- SE
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Property Before-tax Cash Flow	=	PBTCF



Going in IRR

- Given a proposed property price, and a full pro-forma, a “total” IRR can be calculated
- It is the discount rate that makes the present value of all expected PBTFCF equal to the price
- A sound decision rule: compute typical IRR on similar properties, and take project if property IRR exceeds this typical IRR



Equivalently, use the DCF method

- Estimate required return on similar property (*the opportunity cost of capital*)
- Discount PBTCF at rate
- Another sound decision rule: accept project if resulting value exceeds the price



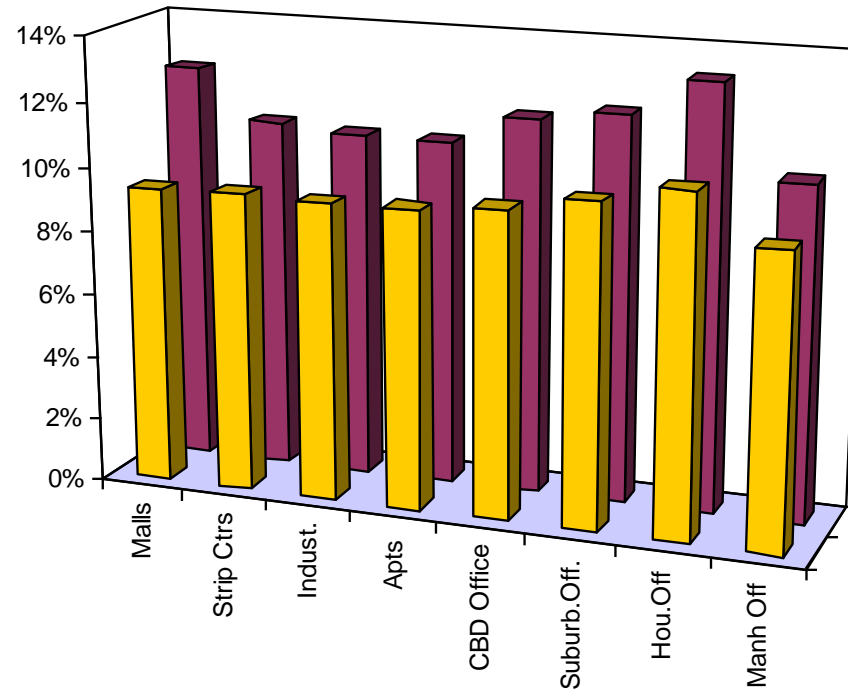
Required returns: 4.5 methods

- *Introspection*
- Survey
- Real Estate Return Indices
- Cap rate approach (holy trinity)
- CAPM



Survey evidence

Exh.11-6a: Investor Total Return Expectations (IRR) for Various Property Types*



*Source: Korpacz Investor Survey, 1st quarter 2005

	Malls	Strip Ctrs	Indust.	Apts	CBD Office	Suburb. Off.	Hou. Off	Manh Off
■ Institutional	9.27%	9.35%	9.28%	9.31%	9.56%	10.03%	10.58%	9.11%
■ Non-institutional	12.53%	11.00%	10.81%	10.80%	11.68%	12.05%	13.19%	10.38%

Real estate returns: indices

- *NCREIF property index (NPI)*: “quarterly ... total rate of return measure ... of a very large pool of individual commercial real estate properties. ...acquired, at least in part, on behalf of tax-exempt institutional investors”
- $\text{Return} \approx (\text{NOI} + \text{capital gains}) / (\text{Initial market value})$
- “Class A”, premium, institutional quality properties



Two big issues with NPI


- *Coverage*: institutional properties (owned directly or via JVs by untaxed institutional investors), large MSAs
- *Market values*: value is based on transactions when possible, but on appraisals or estimates in most cases



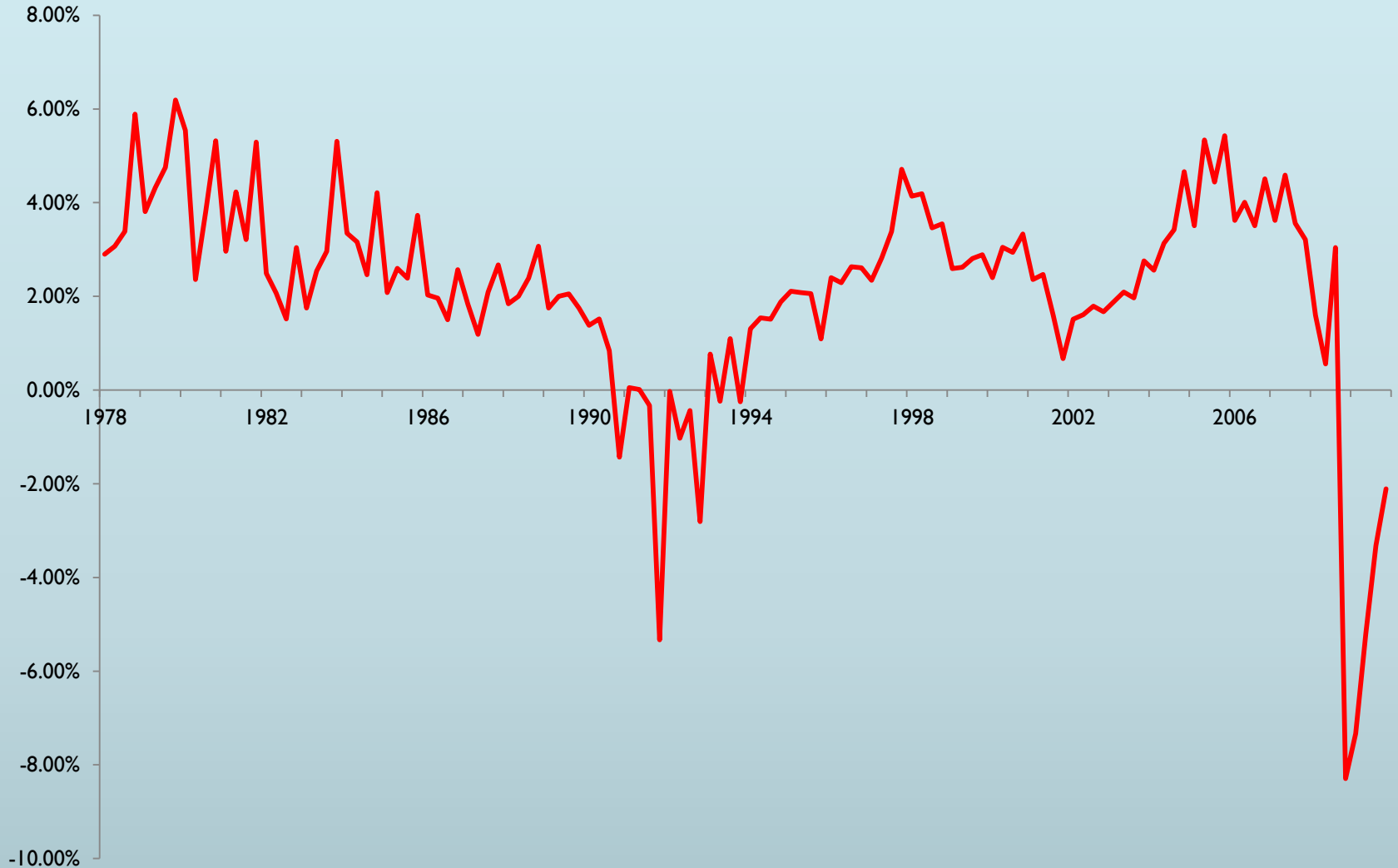
Historical evidence, 1970-2003

	Total Return	Volatility	Risk Premium
T Bills	6.30%	2.83%	NA
G Bonds	9.74%	11.76%	3.44%
Real Estate*	9.91%	9.02%	3.61%
Stocks	12.72%	17.48%	6.42%

*NCREIF: large, institutional quality commercial properties



Quarterly returns on NPI index



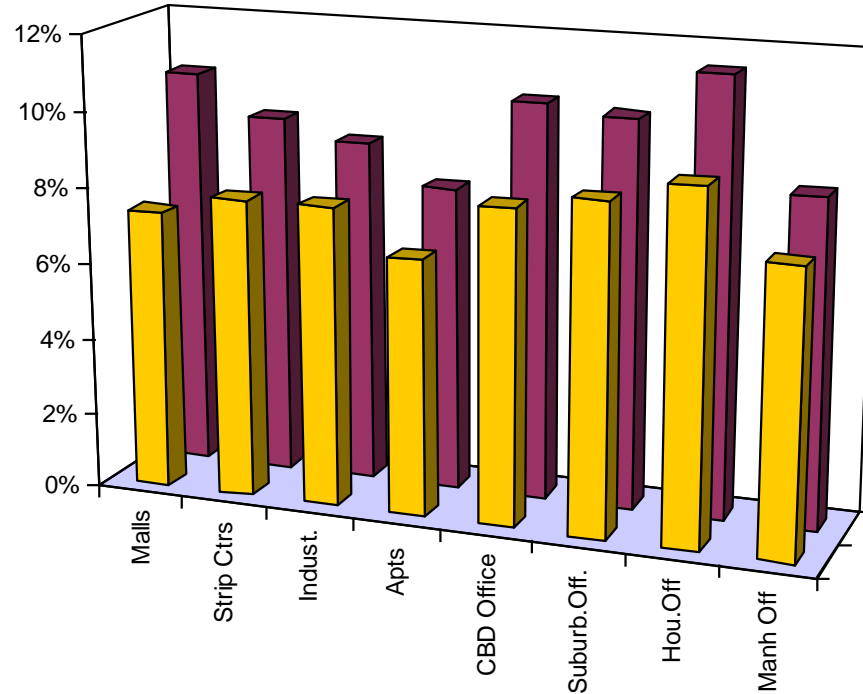
Capitalization rate approach

- Cap rate = (current NOI or PBTCF) / Property Value
- Assume current PBTCF cap rate is y , and that we expect PBTCF to grow at rate g for ever
- Then IRR on property is $r \approx y + g$



Survey evidence (!! on NOI cap rates !!)

Exh.11-6b: Investor Cap Rate Expectations for Various Property Types*



*Source: Korpacz Investor Survey, 1st quarter 2005

	Malls	Strip Ctrs	Indust.	Apts	CBD Office	Suburb. Off.	Hou. Off	Manh Off
■ Institutional	7.33%	7.86%	7.88%	6.74%	8.26%	8.63%	9.19%	7.45%
■ Non-institutional	10.51%	9.50%	9.02%	8.00%	10.38%	10.18%	11.44%	8.59%

CAPM/REIT approach

- Find the average unlevered equity beta of similar properties, using, presumably, REITs data
- Invoke CAPM to calculate required return on equity
- Calculate WACC
- Discount



Mortgages

- Mortgage: debt contract secured by a real estate property
- Two questions:
 1. How do lenders design mortgages given borrowers' need?
 2. How do lenders price mortgages given that prepayment and default are possibilities?



The design question

- Fundamental equation of mortgage design:

On loans with fixed rates, the PV of all mortgage payments must equal the loan balance

- One can shape payments in any way they see fit as long as the above equation holds



The pricing question

- Assume that lender wants to hit a given IRR on a loan
- Contract rate must exceed this IRR target because of expected losses associated with default and prepayment
- Problem: when contract rate increases, so do default and prepayment probabilities
- There may be many solutions to this problem (which do we choose?) or no solution (exclusion)



Intermediation

- Direct investments in properties or mortgages do not make sense for most investors:
 1. Illiquid
 2. High ticket price
 3. Require monitoring
 4. Full liability
 5. Heavily taxed
 6. ...
- Most investors, therefore, invest in real estate via private and public financial markets



Equity vehicles: REITs

- **Real Estate Investment Trusts**
 1. buy, sell and hold real estate assets on behalf of a diffuse shareholder base
 2. manage these and other assets
 3. **are not taxed at the corporate level**
- Three basic types: equity, mortgage, hybrid
- Can be public or private

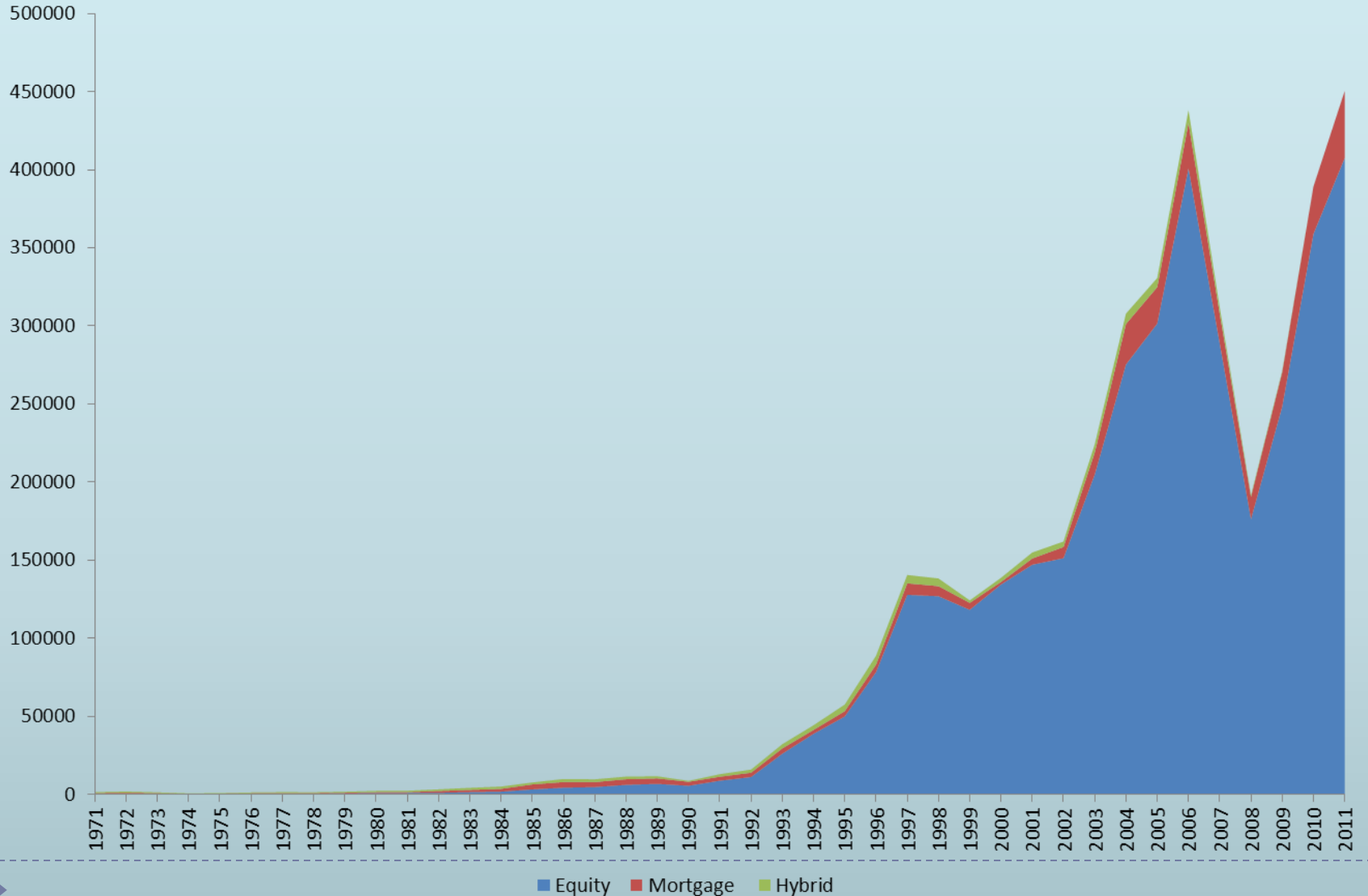


Brief history

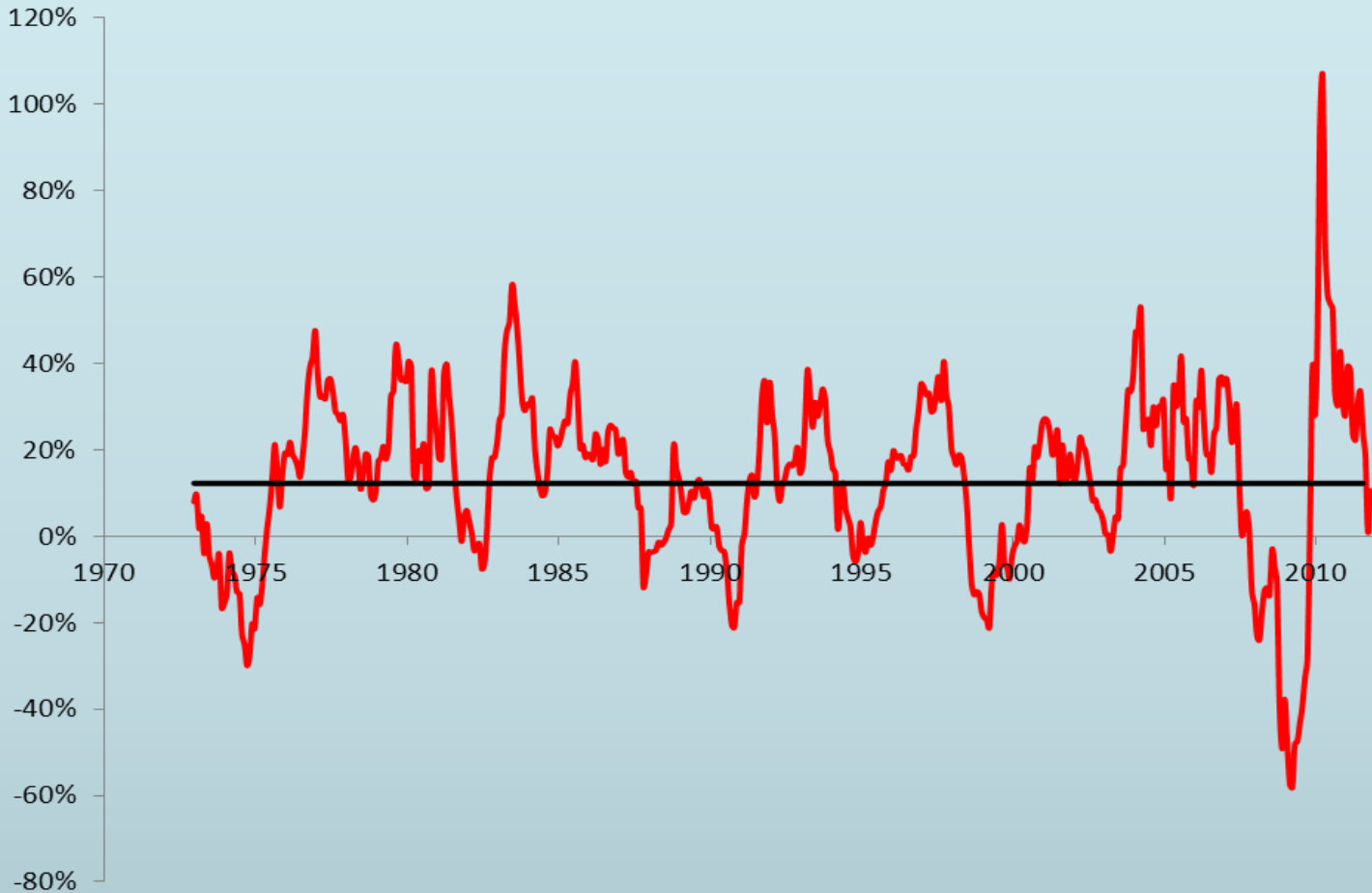
- REIT act, 1960: REITs may be treated as untaxed, pass-through entities provided they satisfy a number of requirements
- Current requirements include:
 1. 75% of holdings in RE, cash, or US paper
 2. 75% of income must come from rents, dividends, mortgage interest, gains from the sale of qualifying assets or holdings in other REITs
 3. **90% of taxable income must be distributed to shareholders***
 4. At least 100 shareholders
 5. Top 5 holders cannot hold more than 50% of shares
- 1986 tax reform removed two big downsides of REIT structure:
 1. Management activities were severely restricted
 2. Other forms of incorporations (LPs, especially) enjoyed preferential depreciation rules
- 1991 Kimco Realty IPO ushered in a new era for REITs



Market capitalization of Public REITs



Historical 12-month returns (e-REITs)



Debt vehicles: MBSs

- **Basic idea:**
 1. Pool a large number of mortgages
 2. Sell the pool as a security, or use the pool as collateral for one or more debt instruments (bonds)
- **Purpose:**
 1. Allow more investors to invest in real estate debt instruments
 2. Make that investment more liquid
 3. Pool/fine-tune risk



A machine to generate AAA paper

- Why did securitization take off after 2000?
 - Among other things because AAA paper became scarce largely due to the global saving glut (US paper hogs)
 - AAA paper lubricates many key markets, the repo market in particular
 - Where to find it? There is, after all, only so many blue chip issuers
 - Answer: CMOs
 - Housing boom created endless supply of mortgages, only trick is to somehow issue safe bonds backed by unsafe assets
 - Sounds crazy, but it “works”: no AAA tranche of any CMO deal has defaulted to date (many have been downgraded, but none have formally defaulted)
-



Securitization process

1. Mortgages are originated
2. Sold to and pooled by investment banker
3. Pool is used to create one or several securities:
 - i. Mortgage-backed bonds (MBBs)
 - ii. Mortgage pass-through securities (MPTSs)
 - iii. Mortgage pay-through bonds (MPTBs)
 - iv. Collateralized Mortgage Obligations (CMOs)



Derivatives

- Derivatives are assets whose payoffs derive from some other asset or set of assets
- Example: swaps
- A swap contract stipulates an exchange of payoffs between two assets



Real estate swap (continued)

- Two parties exchange (risky) return from some real estate asset index for a fixed return
- In practice, RE swaps involve returns on large indices such as NCREIF, for various subtypes of institutional properties
- Institutional Properties: large, safe, premium quality properties in which institutional investors invest
- Say you own lots of properties; to offset the risk associated with your investment, you sell the NCREIF return to Credit Suisse for a safe return
- Hedge vs. systematic real estate risk



Swap Market has yet to take off

- Four possible explanations:
 1. No NCREIF forwards
 2. A redundant asset
 3. “Liquidity begets liquidity”
 4. Tough to price

- More success in Europe with IPD instruments



Credit-default swap (CDS)

- Protection buyer owns asset subject to default (a MBS, say)
- Pays protection seller (AIG, say) fixed premia
- Seller covers default risk
- Perfect way to eliminate diversifiable risk
- Systematic risk remains, however
- Real-estate related CDS played a big role in the recent financial mess



Theory vs. practice

- Sometimes, practice meshes well with theory
- Sometimes, it does not
- Common sense based approach dominate practice
- We want to discuss these methods because:
 1. they are time-tested
 2. they are the industry standard
 3. we all need jobs



Cash-on-cash returns

- $\text{CoC return} = \text{Cash flow in year 1} / \text{Initial cash investment}$
- $\text{Total cash return} = (\text{CF in year 1} + \text{Loan reduction} + \dots) / \text{Initial cash investment}$
- Rule: invest provided cash return exceeds some threshold



Required cap rates

- Required cap rate = $LTV \times \text{mortgage constant}$
+ $(1-LTV) \times \text{required return on equity}$
- Rule: invest if actual cap rate $>$ required cap rate



Front-door/Back-door analysis

- Front-door criterion: What rent must the property earn to generate the cap rates similar properties are yielding?
 - Rule: invest if the property is expected to produce that rent
 - Back-door criterion: Given market rent, what is the maximum investment cost compatible with current cap rates?
 - Rule: invest if the cost is below that upper-bound
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Summary

- The arbitrage principle
- Two basics asset pricing methods: multiple, DCF
- Real estate multiples: GRM, Cap rates
- Holy trinity of real estate finance: $r \approx y + g$
- Real estate assets: properties, and beyond
- Debt/Equity, Private/Public
- REITs, CMBS', derivatives
- Basic mortgage algebra, YTM

