Reflection Questions

Please consider the following questions before class begins:

- **Why do we adjust for terms of the transaction at the beginning of a comparable sales valuation?**

- **How are rental leases usually structured?**

- **What renovations or capital investments can be made on an office building? What about an apartment building? Hotel?**

Readings

- *Chapters 7 & 8* of Real Estate Principles: A Value Approach, Ling and Archer.

- *Chapter 10* of Real Estate Finance and Investments, Brueggeman and Fisher.

Upcoming assignments

- HW2 now live and **due on February 15th**

- First case study **due on March 5th**

Homework 1 commentary

- Average in the 90s, good work
- Deadlines will be more heavily enforced in future problem sets, be mindful of submission preparation
- Do not need to copy the question in your submission, but be sure to label everything carefully – 1(a), 1(b), ….

Homework 1 commentary

- Bid-rent model

  Cost per-mile

$$\frac{w \text{ per hour}}{s \text{ miles per hour}} = \$\frac{w}{s} \text{ per mile}$$

  Total travel cost

$$(T \text{ round trips per month}) \times (X \text{ miles per round trip}) \times \left(\frac{\text{W}}{\text{S}}\right)$$

$$= (\$ \text{ time value of closer location})$$

Homework 1 commentary

$$\frac{w \text{ per hour}}{s \text{ miles per hour}} = \$\frac{w}{s} \text{ per mile}$$

$$(T \text{ round trips per month}) \times (X \text{ miles per round trip}) \times \left(\frac{w}{s}\right)$$

Wage: \$30/hour & Speed: 15 mph => \$2/mile

Assuming 20 work-days in a month

Miles	2	4	6
Travel cost	20*4*\$2 = \$160	20*8*\$2 = \$320	20*12*\$2 = \$480

Homework 1 commentary

Miles	2	4	6
Travel cost	$160	$320	$480

These are travel costs, but not the bid-rent curve!

Distance from CBD	Travel-cost	Bid-rent	Travel + bid-rent
6 miles out	$480	$0 rent premium	$480

Homework 1 commentary

Miles	2	4	6
Travel cost	$160	$320	$480

These are travel costs, but not the bid-rent curve!

Distance from CBD	Travel-cost	Bid-rent	Travel + bid-rent
6 miles out	$480	$0 rent premium	$480
4 miles out	$320	$160	$480

Homework 1 commentary

Miles	2	4	6
Travel cost	$160	$320	$480

These are travel costs, but not the bid-rent curve!

Distance from CBD	Travel-cost	Bid-rent	Travel + bid-rent
6 miles out	$480	$0 rent premium	$480
4 miles out	$320	$160	$480
2 miles out	$160	$320	$480

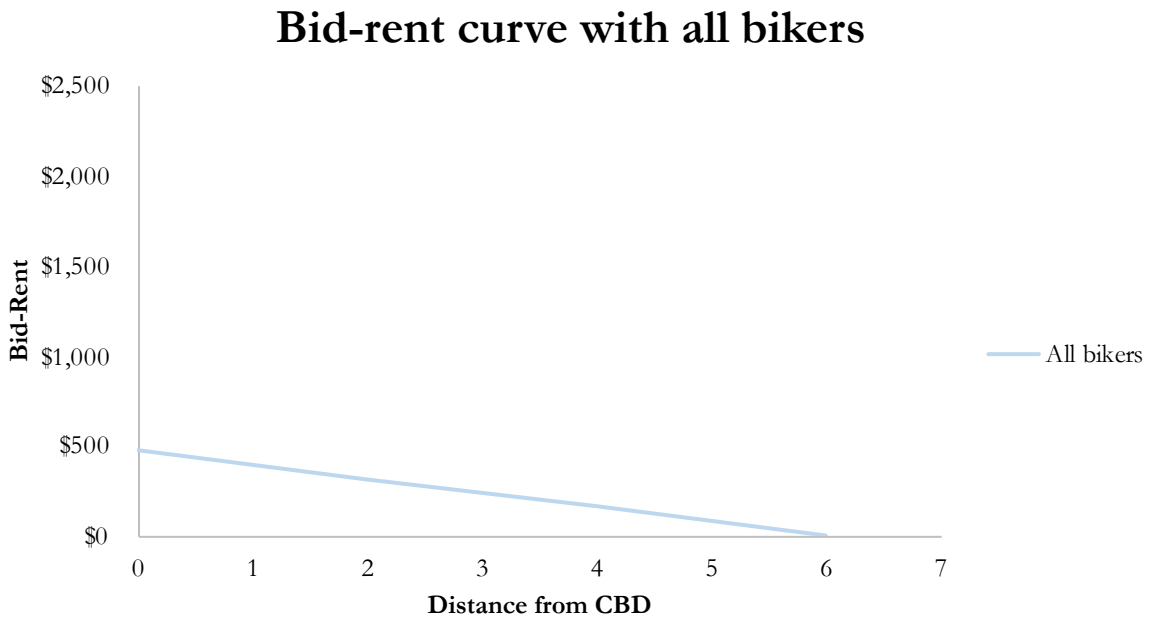
Homework 1 commentary

Miles	2	4	6
Travel cost	$160	$320	$480

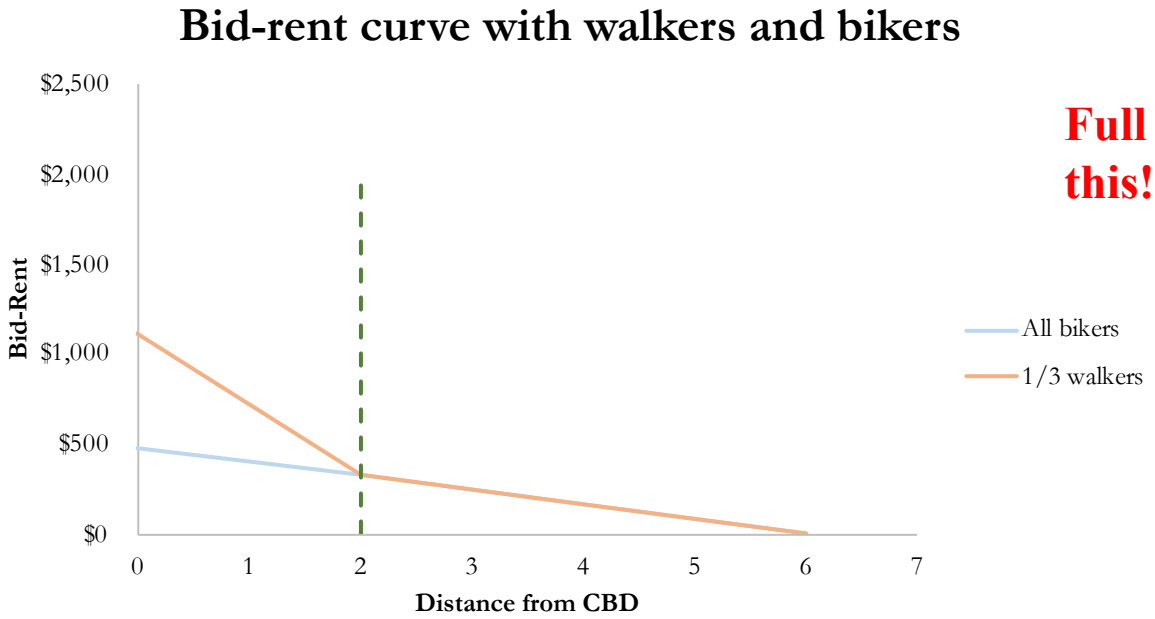
These are travel costs, but not the bid-rent curve!

Distance from CBD	Travel-cost	Bid-rent	Travel + bid-rent
6 miles out	$480	$0 rent premium	$480
4 miles out	$320	$160	$480
2 miles out	$160	$320	$480
0 miles out	$0	$480	$480

Homework 1 mixing borrowers



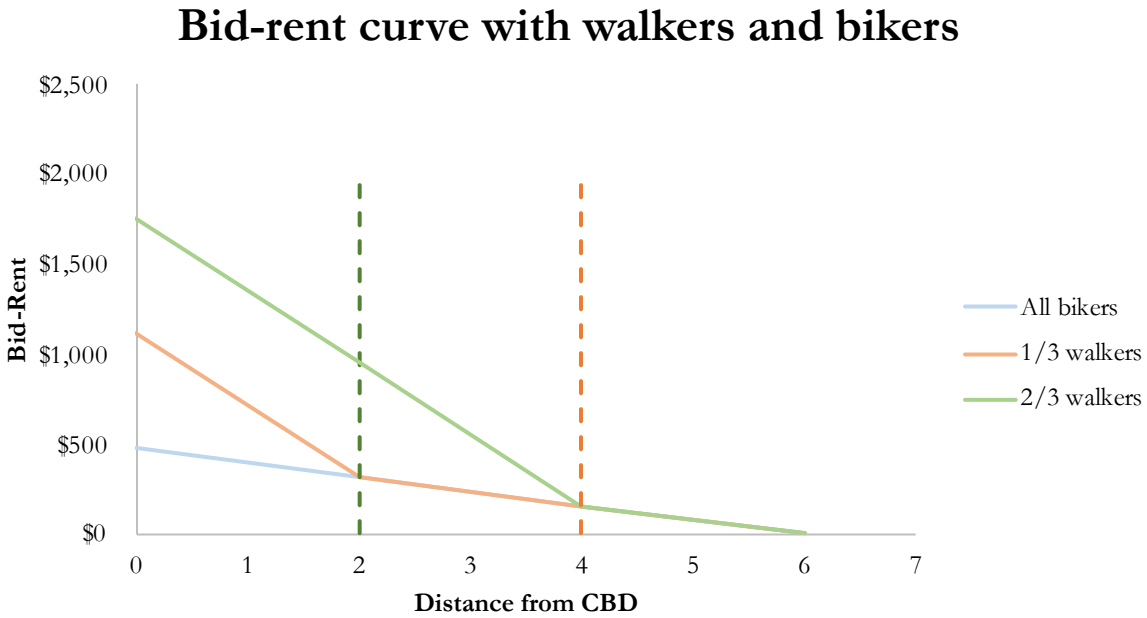
Homework 1 mixing borrowers



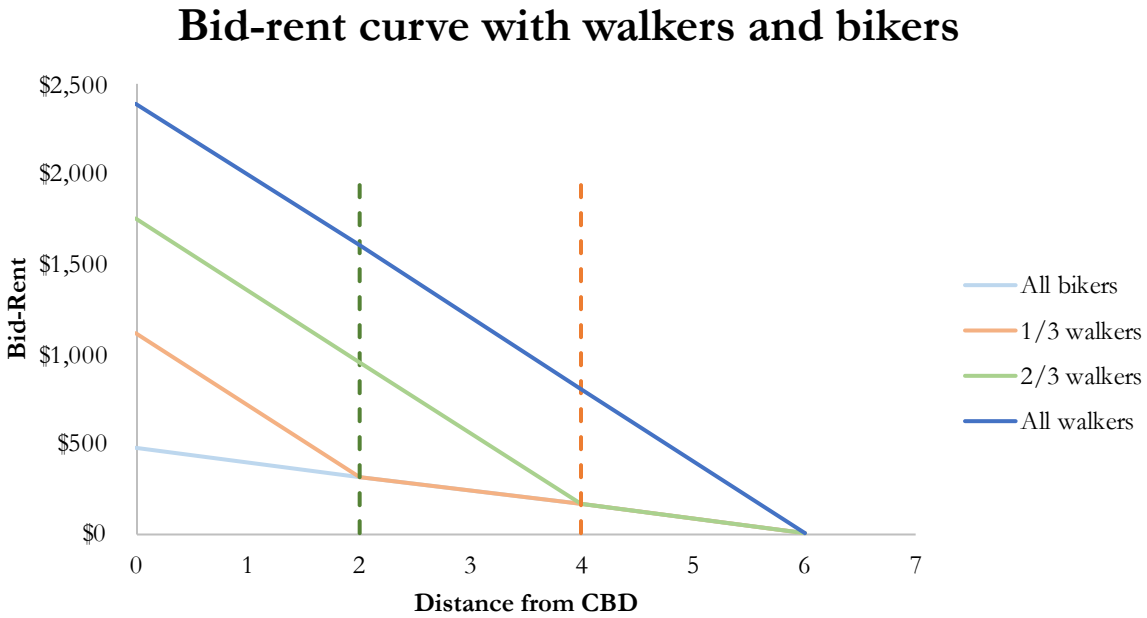
Full credit for this!

In reality, this question was badly specified…

Homework 1 mixing borrowers



Homework 1 mixing borrowers



Today's class

- Brief reflection on last lecture – sales comparison approach to valuation

- Real estate valuation: **Income approach**
  - Estimating the net operating income (NOI)
  - Direct capitalization and discounted cash flow valuation

Valuation of real estate – Income approach

HADM 4200, Spring 2024

Professor Lauri Kytömaa

Three approaches to valuation

Sales comparison approach	Income approach	Cost approach
Common approach for **residential property**	Common approach for **income-producing** commercial property	When reliable comparable sales or income **data are absent**

Review –
Sequence of adjustments to sale price of comparable

Sale price of comparable	
Transaction adjustments:	
Adjustment for property rights conveyed	+/−
Adjusted price	
Adjustment for financing terms	+/−
Adjusted price	
Adjustment for conditions of sale	+/−
Adjusted price	
Adjustment for expenditures immediately after purchase	+/−
Adjusted price	
Adjustment for market conditions	+/−
Adjusted price	
Property adjustments for	
Location	+/−
Physical characteristics	+/−
Economics characteristics	+/−
Use	+/−
Nonrealty components	−
Final adjusted sale price	

Source: Ling & Archer Chapter 7

Review – Might have many adjustments in practice

Elements of Comparison	Subject	Comp Sale 1	Comp Sale 2	Comp Sale 3
Sale price of comparable		$169,900	$167,200	$157,100
Transaction adjustments				
Adj. for property rights conveyed	Fee simple	0	0	0
Adjusted price		$169,900	$167,200	$157,100
Adjustment for financing terms	Conventional	0	0	0
Adjusted price		$169,900	$167,200	$157,100
Adjustment for conditions of sale	Arm's length	0	0	0
Adjusted price		$169,900	$167,200	$157,100
Adjustment for expenditures immediately after purchase		0	0	0
Adjusted price		$169,900	$167,200	$157,100
Adjustment for market conditions	Today	0	1,500	1,900
Adjusted price		$169,900	$168,700	$159,000
Property Adjustments for				
Location	Suburban	0	0	0

Source: Ling & Archer Chapter 7

Three approaches to valuation

Sales comparison approach	Income approach	Cost approach
Today Feb. 6th	Thursday Feb. 8th	Next week Feb. 13th

Might need to read ahead for homework!

Income approach to valuation

- Value of commercial real estate property should be thought of as a function of **expected cash flows**

- At a high level:
  1. Define and estimate cash flows
  2. The apply a multiplier or discount rate to **convert cash flows into a current market value**

Getting at cash flows

- In the commercial real estate setting, lease terms are closely tied to cashflows. We want to use these terms to build an **operating statement**
- General structure:
  - Gross income
  - Account for losses and expense
  - Account for improvements
  - Find estimate for **net operating income (NOI)**

Estimating net operating income (NOI)

	Abbrv.	Description
	PGI	Potential gross income
-	VC	Vacancy & collection loss
+	MI	Miscellaneous income
=	EGI	Effective gross income
-	OE	Operating expenses
-	CAPX	Capital expenditure
=	NOI	Net operating income

- May be referred to as a "pro forma" or a "reconstructed operating statement"
- There could be some difference – pro forma (accounting), reconstructed operating statement (appraisal specific)

Rental income comes from leases

- General types of commercial real estate leases:
  - **Level lease payments:** Constant over time
  - **Step-up or graduated lease:** Increases on a schedule
  - **Indexed leases:** Rent tied to an inflation index, like the consumer price index (CPI)
  - **Percentage lease:** Rent includes a % of tenant sales (retail)

What does your rental lease look like?

Rent concepts

- **Market rent:** Rental income that a property would be able to earn if leased out at current market rates
- **Contract rent:** Actual rent being paid under contractual commitments. Could differ from current market rent!

- **Natural vacancy rate:** The proportion of gross income not collected in stable markets / in equilibrium

Potential gross income

	Abbrv.	Description
	PGI	Potential gross income
-	VC	Vacancy & collection loss
+	MI	Miscellaneous income
=	EGI	Effective gross income
-	OE	Operating expenses
-	CAPX	Capital expenditure
=	NOI	Net operating income

- Rental income assuming 100% occupancy

- Includes:
  1. Contract rent from in place leases
  2. Rent that could be collected from vacant space if leased at market rental rates

Centre Point Office Building (L&A)

- Property consists of eight office suites, three on the first floor and five on the second.
- Contract rents: two 1,000-square-foot suites on the first floor renting at $1,800 per month, one 2,000-square-foot suite on the first floor renting at $3,600 per month, and five second-floor suites renting at $1,560 per month.
- Annual market rent increases: 3% per year
- Vacancy and collection losses: 10% per year
- Operating expenses: 40% of effective gross income each year
- Capital expenditures: 5% of effective gross income each year
- Expected holding period: 5 years

Centre Point Office Building (L&A)

Three offices on first floor:

- 2 suites renting at $1,800 per month
- 1 suite renting at $3,600 per month

Five offices on second floor:

- 5 suites renting at $1,560 per month

5 mins: What is the collective annual income from these properties?

Vacancy & collection loss

	Abbrv.	Description
	PGI	Potential gross income
-	VC	Vacancy & collection loss
+	MI	Miscellaneous income
=	EGI	Effective gross income
-	OE	Operating expenses
-	CAPX	Capital expenditure
=	NOI	Net operating income

VC based on:

- Historical experience of property
- Competing properties in the market
- Natural vacancy rate

Assumed 10% loss per year in example

Miscellaneous income

	Abbrv.	Description
	PGI	Potential gross income
-	VC	Vacancy & collection loss
+	MI	Miscellaneous income
=	EGI	Effective gross income
-	OE	Operating expenses
-	CAPX	Capital expenditure
=	NOI	Net operating income

MI includes:

- Garage rentals & parking fees (office)
- Laundry and vending machines (apartments & office)

What else could be miscellaneous income?

Effective gross income

	Description	
	Potential gross income (PGI)	$180,000
-	Vacancy & collection loss (VC)	18,000 Based on 10%
+	Miscellaneous income (MI)	0
=	Effective gross income (EGI)	$162,000

Example assumed that OPEX was 40% of EGI and CAPEX was 5% of EGI

Operating expenses

	Abbrv.	Description
	PGI	Potential gross income
-	VC	Vacancy & collection loss
+	MI	Miscellaneous income
=	EGI	Effective gross income
-	OE	Operating expenses
-	CAPX	Capital expenditure
=	NOI	Net operating income

Ordinary and regular expenditure for property function

- *Fixed:* Don't vary with occupancy
  - Insurance, property tax
- *Variable:* Vary with occupancy
  - Utilities
  - Maintenance

Operating expenses

	Abbrv.	Description
	PGI	Potential gross income
-	VC	Vacancy & collection loss
+	MI	Miscellaneous income
=	EGI	Effective gross income
-	OE	Operating expenses
-	CAPX	Capital expenditure
=	NOI	Net operating income

Doesn't include:

- Mortgage/financing payments
- Tax depreciation
- Capital expenditures
- Leasing commissions

Capital expenditure

	Abbrv.	Description
	PGI	Potential gross income
-	VC	Vacancy & collection loss
+	MI	Miscellaneous income
=	EGI	Effective gross income
-	OE	Operating expenses
-	CAPX	Capital expenditure
=	NOI	Net operating income

Non-recurring expenditures that increase value of structure or prolong its useful life

- HVAC replacement
- Resurfacing parking

What are some other examples?

Capital expenditure – Need to be wary

Most appraisers treat CAPX as "above line" expense

Above Line
EGI
- OE
- CAPX
= NOI

Institutional investors usually treat CAPX as "below line" expense.

Below Line
EGI
- OE
= NOI
- CAPX
= Net Cash Flow

First-Year Pro Forma – Bringing it together

Potential gross income (PGI)	$180,000
Less: Vacancy and collection losses (VC)	18,000
Effective gross income (EGI)	162,000
Less: Operating expenses (OE)	
Fixed expenses	25,100
Variable expenses	39,700
Total operating expenses	64,800
Less: Capital expenditure (CAPX)	
Roof and other exterior	2,800
Tenant improvements	3,200
Leasing commissions	2,100
Total capital expenditures	8,100
NOI	$89,100

Fixed expense detail	
Taxes	15,900
Insurance	9200
	$25,100

Variable expense detail	
Utilities	12,800
Garbage collection	1,000
Supplies	3,000
Repairs	5,200
Maintenance	10,500
Management	7,200
	$39,700

Sources of industry expense data

Getting all this information can be tricky

Starting points:

- Institute of Real Estate Management: Link
- Building Owners and Managers Association: Link
- International Council of Shopping Centers: Link
  Urban Land Institute (ULI): Link
- Conversations with local participants, other financial reports

Net operating income additional

- Projected stream of future NOI is fundamental for valuation
- NOI must be sufficient to:
  - Service mortgage debt
  - Provie equity investor with an acceptable return on equity
- NOI and net cash flows (NCF) are not the same

Other lease terms

- Lease contracts could expire while property is still being held by investor – one would expect this to cause some vacancy
  - Two months of vacancy in a year would mean vacancy loss of (2/12)*Rent

- Possible to have tenant pay for operating expenses in the lease terms
  - "Expense stops" are common in office leases. This makes tenant responsible for opex over a certain amount. Owner covers all expenses up to the stop.
  - "Reimbursable expenses" are the total amount of expenses above the stop that the tenant must reimburse the owner for

Other lease terms

- **Management fees** are common in retail, office, hotel and multifamily
  - This involves having a third-party entity manage property
- Compensation for management of tenants and property
- Management feeds could reduce EGI or PGI

Valuation overview

With NOI estimate, we are ready to estimate property value using the **income approach**

We will focus on:

1. Direct capitalization with cap rates
2. Discounted cash flow analysis using discount rates

Direct capitalization

Current market value given by:

$$V_0 = \frac{NOI_1}{R_0}$$

- $V_0 - Current\ value/value\ today$
- $NOI_1 - Projected\ income\ over\ next\ year$
- $R_0 - Capitalization\ rate$

Direct capitalization

$$V_0 = \frac{NOI_1}{R_0}$$

- $V_0 - Current\ value/value\ today$

Unknown, we are trying to figure this out

- $NOI_1 - Projected\ income\ over\ next\ year$

Estimated from operating statements

- $R_0 - Capitalization\ rate$

Computed based on comparable properties

Direct capitalization - Extracting R

- We still have to think of the set of comparables!
  - Location, size, scale, age, construction quality
  - Operating efficiency, existing leases and lease terms

- For each comp, can compute:

$$R_0 = \frac{NOI_1}{Selling\ Price}$$

Purchase cap rate is known as the "going-in" cap rate

Direct capitalization - Extracting R

- With many comparable properties, we'll have many R_0 "going-in" cap rates

- Like the comparable sales approach, we can now take a weighted average of the R_0 estimates to find our relevant cap rate

Centre Point Example and Cap Rates

Comparable	First-year *NOI*		Sale Price		R_o
A	$ 80,000	÷	$ 919,540	=	0.087
B	114,000	÷	1,390,244	=	0.082
C	100,000	÷	1,250,000	=	0.080
D	72,000	÷	808,989	=	0.089
E	90,000	÷	1,097,561	=	0.082
			Average	=	0.084

Defining our comparables market equally important here!

What could lead to a misleading cap rate?

Excel

Centre Point Example and Cap Rates

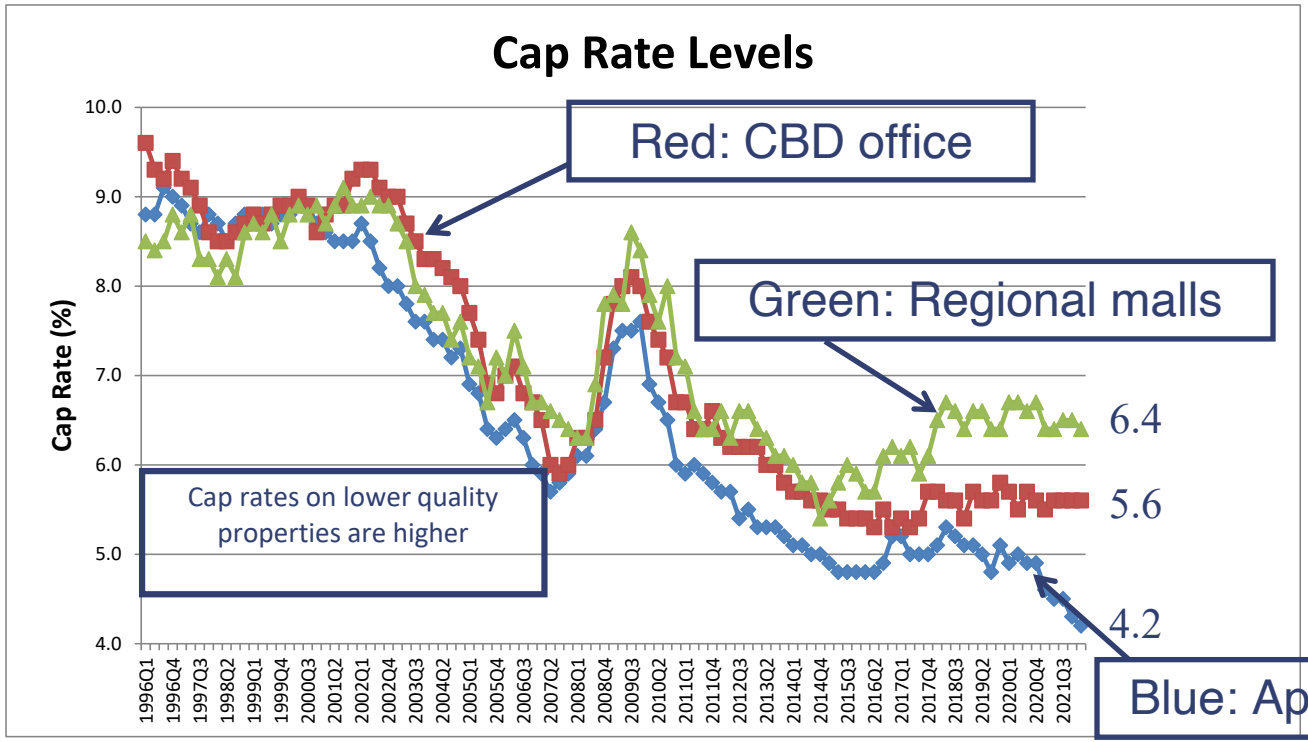
Compute estimated market value, using expected first year NOI (i.e., next 12 months):

$$Value = \frac{\$89{,}100}{0.084} = \$1{,}060{,}714$$

Where can we get cap rates?

- CoStar (www.costar.com/products/analytics)
- RERC (www.rerc.com)
- Grubb & Ellis (www.grubb-ellis.com)
- Moody's (https://cre.moodysanalytics.com/capabilities/data/)
- RCA (https://www.msci.com/our-solutions/real-assets/real-capital-analytics)
- Other appraisers & market participants

U.S. Cap Rates 1996 Q1 to 2021 Q3



Exercise:
Take the cap rates of 6.4% (mall), 5.6% (office), and 4.2% (apartment) and find the NOI multiple for each

How does the mall multiple compare to the apartments multiple?

Source: Real Estate Research Corporation's *Real Estate Report*

Capitalization rate notes

Cap rate is a multiplier – not a discount rate

- Similar to price/earning multiple or dividend yield in equity valuation

Relationship with value

- Lower cap rate – implies higher property value
- Unanticipated increases in demand and/or lower financing costs drive cap rate lower Why?

Capitalization rate notes

Private vs investment value

- Direct capitalization does not say anything about the **investment potential** of a property
- It only allows us to determine a fair **market price**

Comparability assumptions must be satisfied for market-derived cap rates to make sense

Comparability assumption example

Suppose we have two office buildings with identical floorplans, location and square footage but differences in their tenant leases:

- **Office one: 4 large tenants** on long-term lease basis
- **Office two: 30 small tenants** with shorter-term average lease maturities with other different lease characteristics

Discounted cash flows (DCF)

A key downside of the capitalization rate method is that it **relies exclusively on the first year of NOI** and ignores all other cash flows

- Value should tell us about all future cash flows!

Using a DCF approach we account for **all future cash flows** and use those those to find a present value

Discounted cash flows (DCF)

Process for DCF valuation:

1. Select a holding period – **What makes sense?**
2. Forecast annual NOI over this period
3. Forecast future sales price
4. Choose a discount rate r and use it to estimate value

What could go wrong with this approach?

Discounted cash flows (DCF)

1. **Select a holding period —** T varies by property type, investor
2. **Forecast annual NOI —** Use previously discussed methods
3. **Forecast future sales price —** Different approaches
   - Use T+1 NOI forecast with **"terminal" cap rate R_T**
   - Observed data from older comparable property
   - Used estimated change in property value

DCF example

- 5 year holding period
- NOI grows 3% per year with initial NOI of $92,000
- Estimate sales price using T+1 NOI forecast, terminal cap rate $R_T = 8.75\%$
- Assume discount rate 10%

Excel

DCF vs cap rate

- Fewer **explicit** assumptions and forecasting under the direct capitalization method

- But what **implicit** assumptions are we making?