Explaining the Puzzle of High Apartment Returns

2018 NMHC Research Forum

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ESTIMATING PROPERTY HOLDING PERIOD RETURNS --OVERVIEW

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Research Purpose:

Using NCREIF Data:

Determine holding period returns for commercial real estate

Explain ex-post holding period returns using ex-ante attributes

DETERMINE HOLDING PERIOD RETURNS (I.E. TOTAL PROPERTY RETURNS). . . . .

. . . . .across the five major property types,

. . . . . after adjusting for risk,

. . . . . across geographic area, and

. . . . . across market employment size/growth

The NCREIF, NPI Data

- Quarterly data – income and appreciation (unlevered returns)

- By property type (office, industrial, retail, hotel and apartment)

- By region of the U.S. and at the MSA

- 2016Q4 market value of over half a trillion dollars and over 10,000 properties

- Limited to institutional property owners and mainly core assets

. . . . USING THE RIGHT DATA FOR THE ANALYSIS. . . .

The 1987-2016 NCREIF data (not the entire 1978-2016 NCREIF data range), why?

- 1980-1986 apartment consisted of less than 3% ($216 million in market value) of the NPI Index

    - Inadequate data for analyzing U.S. sub-regions, MSAs, and other analysis subdivisions

- Since 1986 apartments averaged 17% ($36 billion in market value) of the NPI Index

- At year end 2016, the portion of apartments was 24.3% and $128 billion in market value

- Analyze 7-year holding period (also look at 3-year, 5-year, 10-year, and 15-year returns)

. . . . APARTMENTS DOMINATE HOLDING PERIOD RETURNS AND RISK-ADJUSTED RETURNS FOR 3, 5, 7, 10, AND 15-YEAR HOLDING PERIODS . . . .

7-year Holding Period Returns
(1987-2016)

Property Type	Mean	S.D.	Sharpe Ratio
All	7.87%	3.56%	0.62
Apartment	**9.05%**	**2.81%**	**1.21**
Industrial	8.27%	3.75%	0.70
Office	6.99%	4.76%	0.28
Retail	8.68%	3.54%	0.85
Hotel	8.63%	4.43%	0.67

. . . . APARTMENT RETURNS ALSO BEST OTHER PROPERTY TYPES ACROSS REGIONS OF THE U.S. . . . .

EAST

7-year Holding Period Returns

Property Type	Mean	S.D.	Sharpe Ratio
Apartment	**9.15%**	3.84%	**0.91**
Industrial	8.15%	3.97%	0.63
Office	7.90%	4.87%	0.46
Retail	8.54%	**3.61%**	0.80

SOUTH

7-year Holding Period Returns

Property Type	Mean	S.D.	Sharpe Ratio
Apartment	**8.69%**	**2.32%**	**1.31**
Industrial	6.51%	2.80%	0.30
Office	6.07%	4.62%	0.09
Retail	8.44%	3.30%	0.84

MIDWEST

7-year Holding Period Returns

Property Type	Mean	S.D.	Sharpe Ratio
Apartment	**8.77%**	2.54%	**1.22**
Industrial	6.88%	2.85%	0.43
Office	5.03%	3.79%	-0.17
Retail	7.95%	**2.53%**	0.91

WEST

7-year Holding Period Returns

Property Type	Mean	S.D.	Sharpe Ratio
Apartment	**9.93%**	3.12%	**1.37**
Industrial	9.27%	4.47%	0.81
Office	7.20%	5.40%	0.29
Retail	9.24%	4.32%	0.83
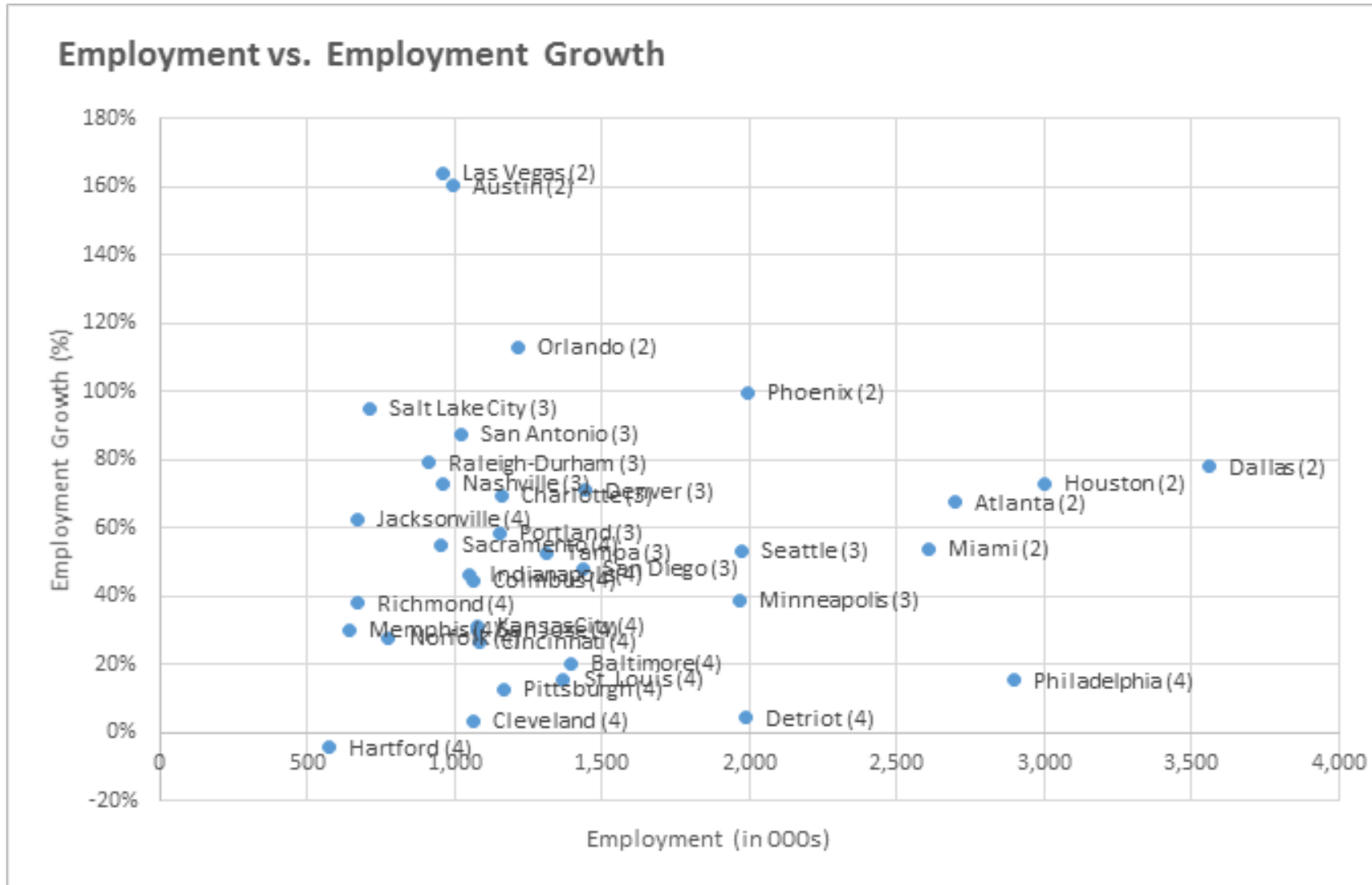
Employment vs. Employment Growth

INTERACTION OF EMPLOYMENT AND EMPLOYMENT GROWTH TO DETERMINE CITY TIER . . . .
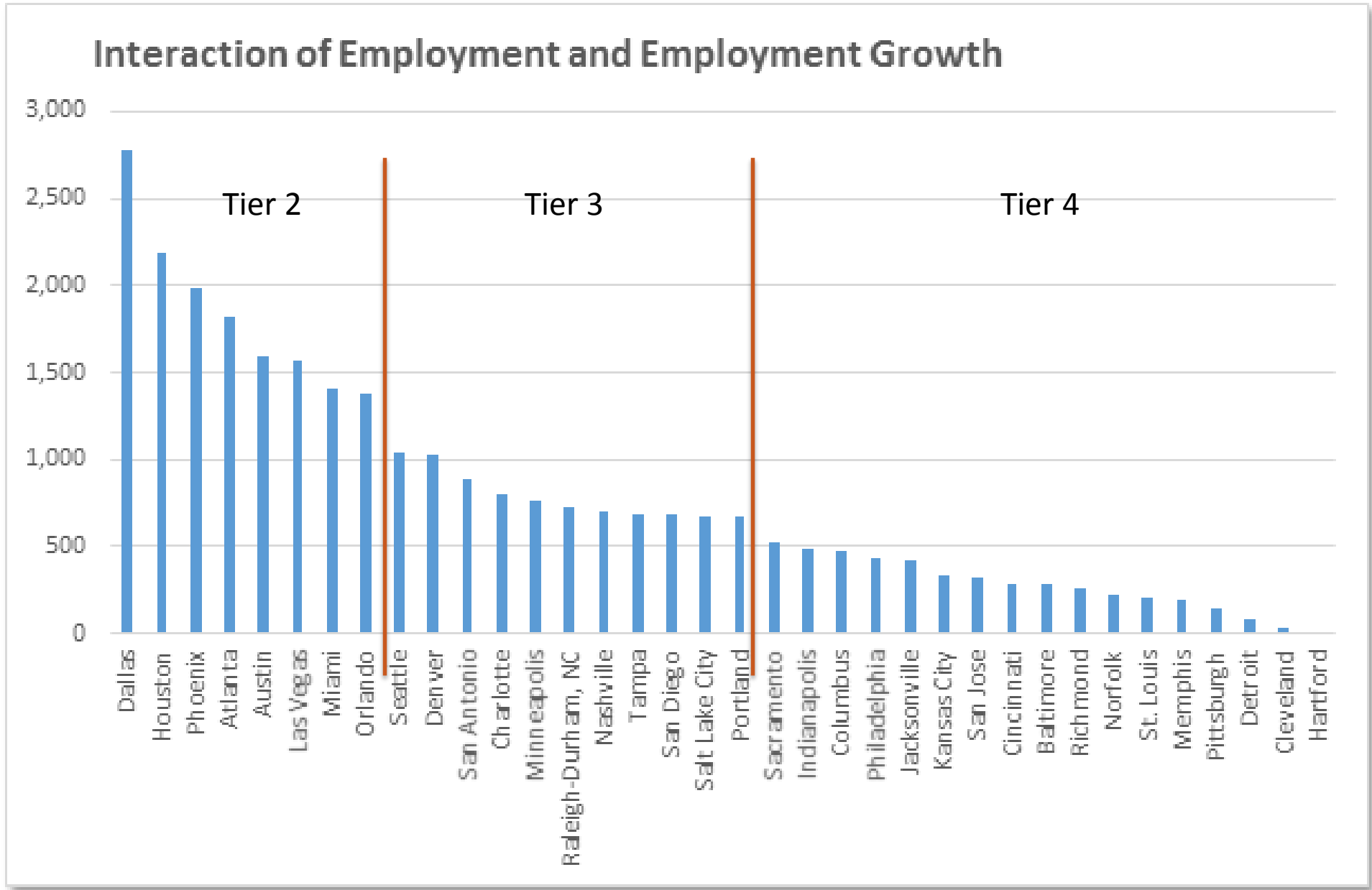
. . . . . ACROSS CITY TIERS APARTMENT RETURNS ARE CONSISTENT AND DOMINANT. . . .

Tier 1

7-year Holding Period Returns			
Property Type	Mean	S.D.	Sharpe Ratio
Apartment	**9.63%**	4.36%	**0.91**
Industrial	8.54%	4.26%	0.68
Office	7.57%	5.05%	0.38
Retail	9.14%	**3.92%**	0.89

Tier 2

7-year Holding Period Returns			
Property Type	Mean	S.D.	Sharpe Ratio
Apartment	**8.70%**	**2.29%**	**1.33**
Industrial	7.51%	3.42%	0.54
Office	6.07%	4.70%	0.09
Retail	8.61%	3.69%	0.80

Tier 3

7-year Holding Period Returns			
Property Type	Mean	S.D.	Sharpe Ratio
Apartment	**9.62%**	**2.39%**	**1.66**
Industrial	8.74%	3.24%	0.95
Office	6.43%	4.85%	0.16
Retail	9.00%	3.62%	0.92

Tier 4

7-year Holding Period			
Property Type	Mean	S.D.	Sharpe Ratio
Apartment	**8.91%**	**2.81%**	**1.16**
Industrial	7.80%	3.54%	0.60
Office	5.76%	3.88%	0.03
Retail	8.45%	3.11%	0.90

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7-Year Holding Period Returns (1987-2016)

. . . . APARTMENT RETURNS ARE ALSO CONSISTENT ACROSS TIME . . . .
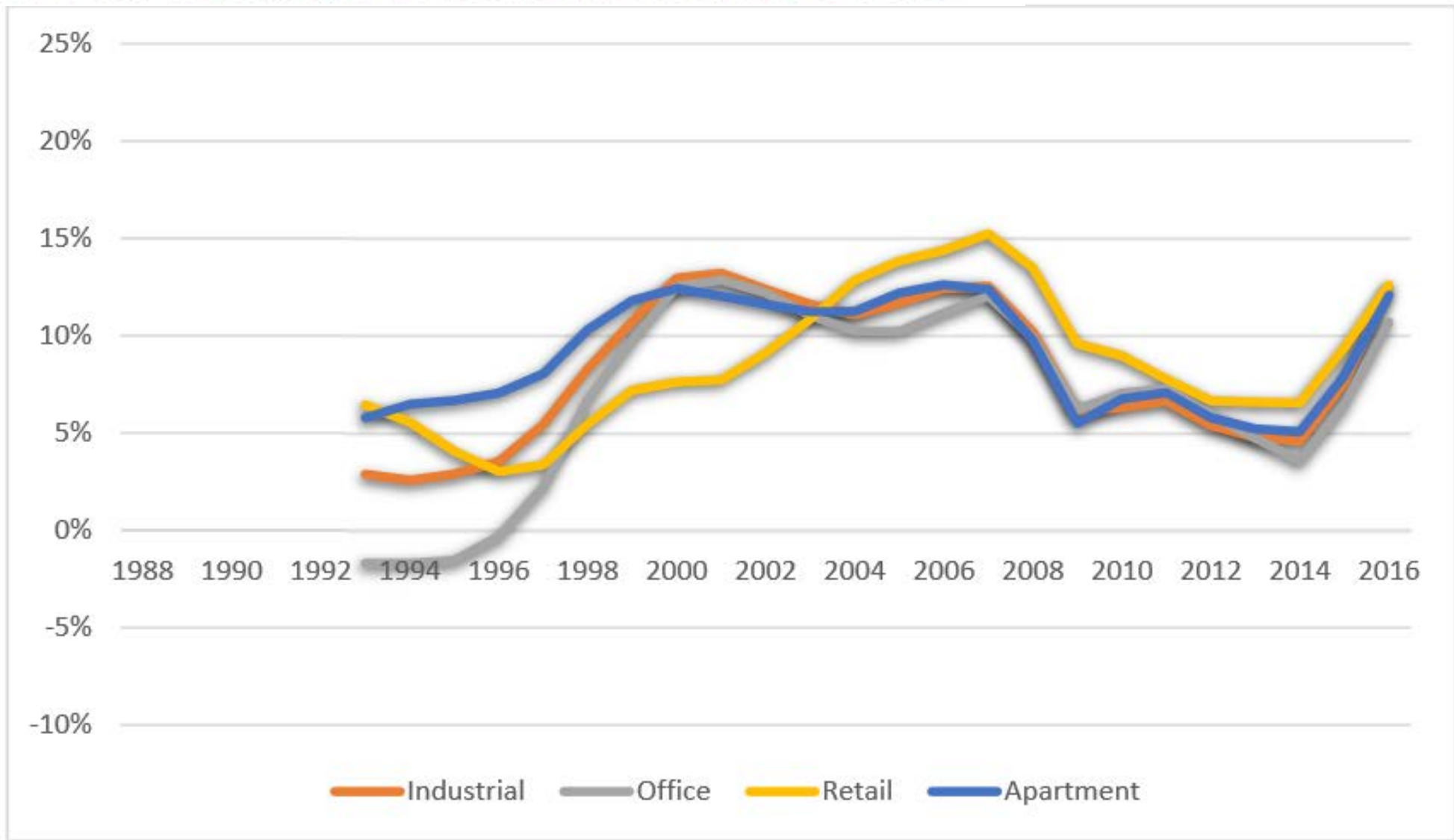
QUESTION . . . .

What are total unlevered return distribution for income and appreciation for all NCREIF NPI properties 1987-2016?

A. 7% income and 1% appreciation

B. 6% income and 2% appreciation

C. 5% income and 3% appreciation

D. 4% income and 4% appreciation

QUESTION . . . .

What are total unlevered return distribution for income and appreciation for all NCREIF NPI properties 1987-2016?

The 7.87% total unlevered return for the NCREIF Index, for the period 1987-2016, is apportioned:

- Income return: 7.38%

- Capital appreciation return: 0.48%

. . . . APARTMENT RETURNS ARE THE BEST INFLATION HEDGE WITH INFLATION AVERAGING 2.3% DURING THE ANALYSIS TIME PERIOD . . . .

7-year Holding Period Returns by Income and Capital Appreciation Returns

| Property Type	Income	Capital Appreciation	Total
Apartment	6.98%	**1.97%**	**9.05%**
Industrial	7.96%	0.30%	8.27%
Office	7.44%	-0.43%	6.99%
Retail	7.29%	1.33%	8.68%
Hotel	**8.95%**	-0.31%	8.63%

. . . . HOW CAN INDUSTRIAL, OFFICE, AND HOTEL APPRECIATION RATES BE NEAR ZERO OR NEGATIVE DURING A PERIOD OF CAP RATE COMPRESSION?
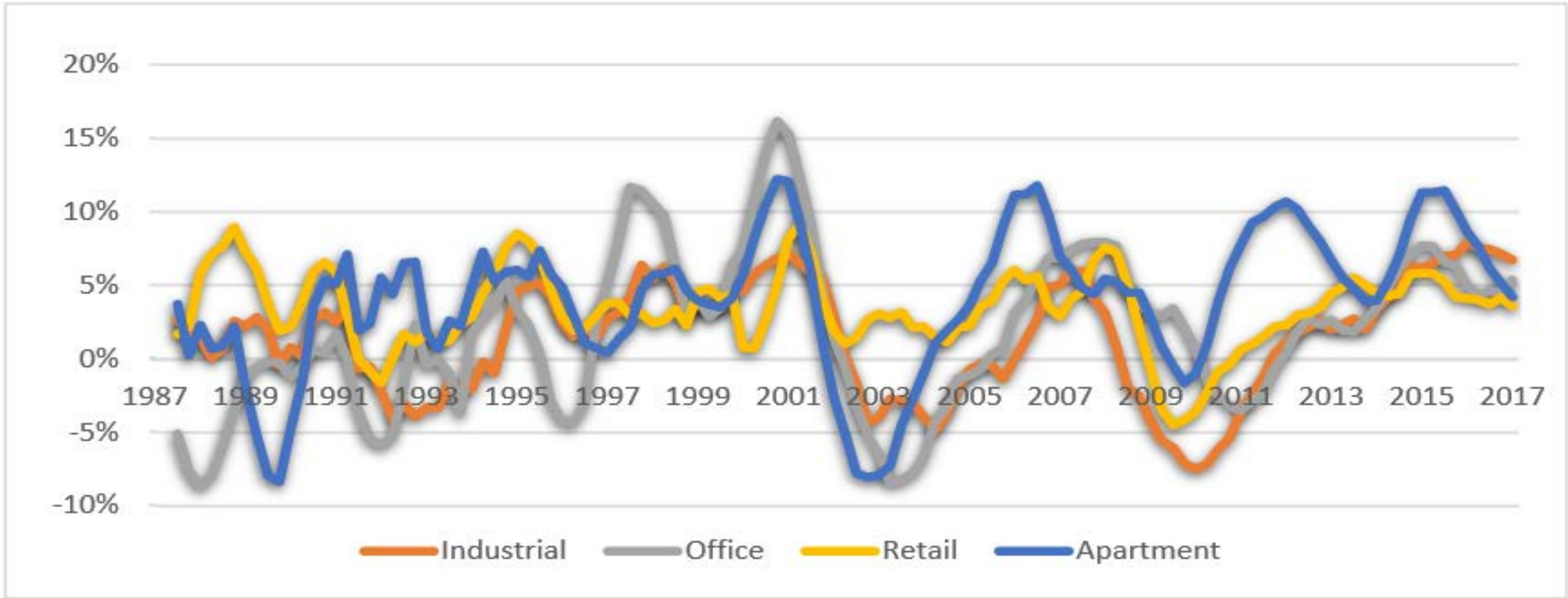

NCREIF Cap Rates by Property Type (1987-2Q 2017)

Legend: Industrial, Office, Retail, Apartment

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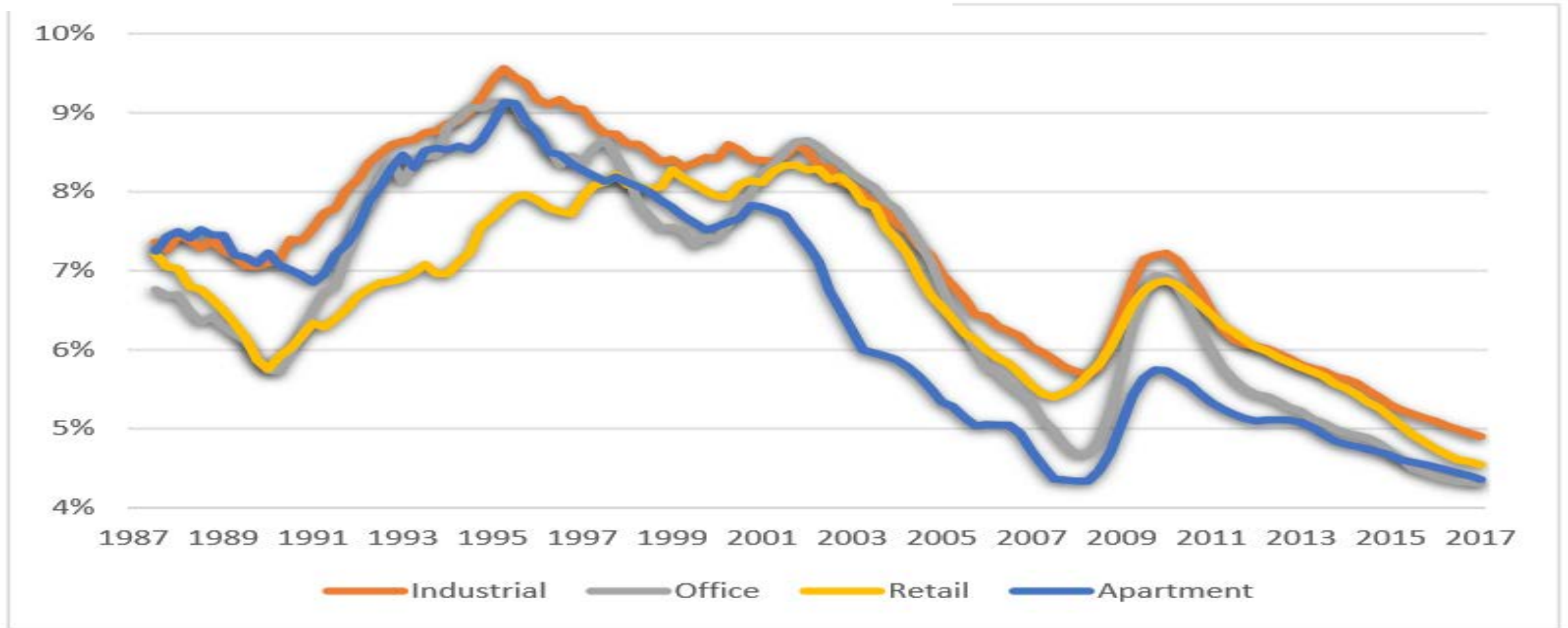
. . . . AND WITH GENERALLY POSITIVE NOI GROWTH?

NCREIF NOI Growth Rate by Property Type (1987-2Q 2017)
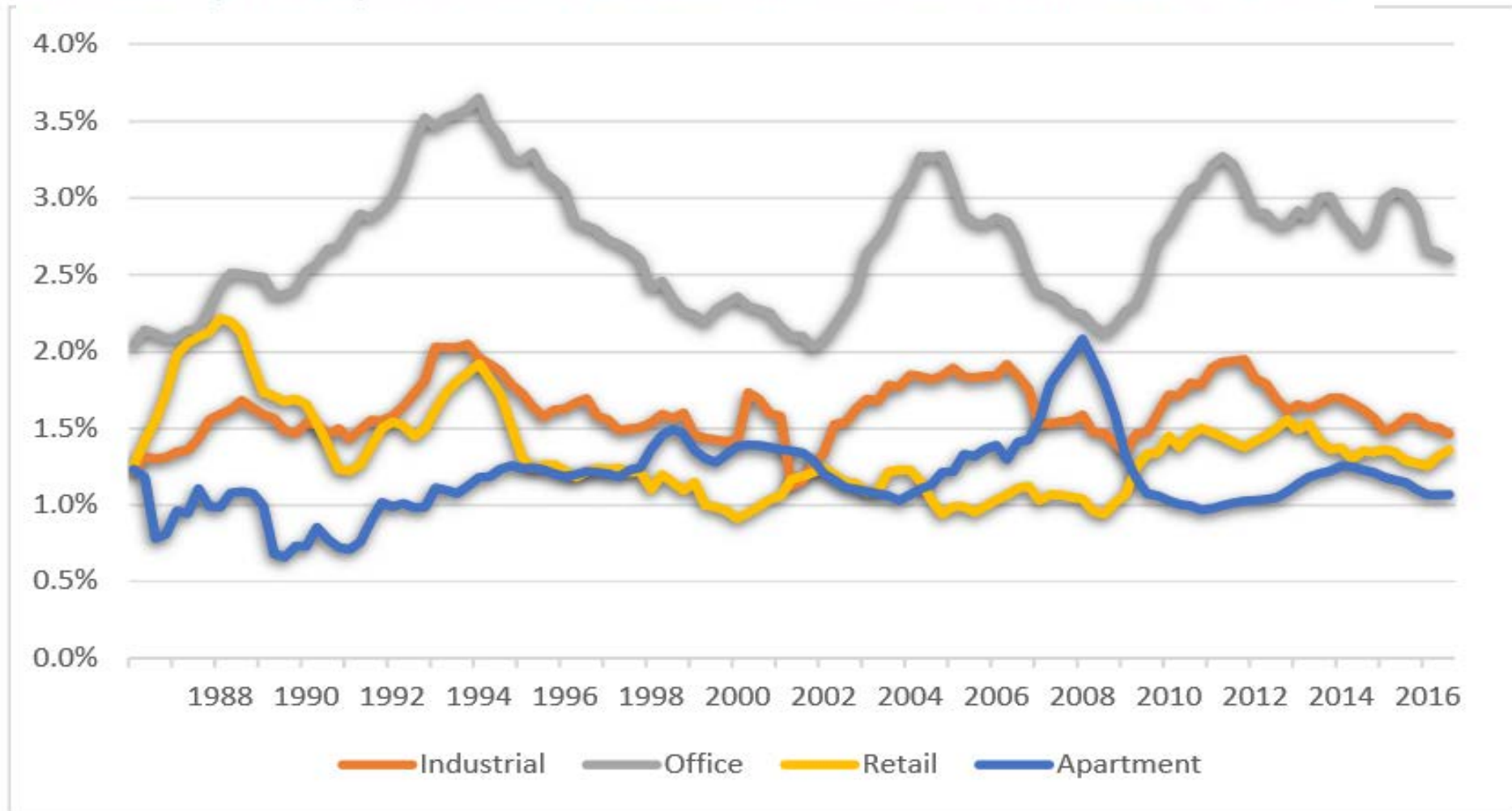
. . . . CAPITAL EXPENDITURES ARE CONSUMING PROPERTY APPRECIATION FOR OFFICE, AND INDUSTRIAL PROPERTIES . . .

Annual Capital Expenditures as a Percent of Market Value (1987-2016)

Legend: Industrial, Office, Retail, Apartment

Source: NCREIF data used in "New NCREIF Value Index and Operations Measures," Michael S. Young, Jeffrey D. Fisher, and Joseph D'Alessandro, *Journal of Real Estate Literature,* 25:1 (2017), 221-235.

7-year Holding Period Returns with and without Capital Expenditures

Property Type	Returns Excluding Cap Ex	Capital Expenditures	Holding Period Returns Including Cap Ex
All	9.86%	1.99%	7.87%
Apartment	10.22%	**1.18%**	**9.05%**
Industrial	9.89%	1.62%	8.27%
Office	9.71%	2.72%	6.99%
Retail	10.02%	1.34%	8.68%
Hotel	**11.71%**	3.10%	8.63%

$$IRR = Cap\ Rate + Growth\ Rate \qquad\qquad (1)$$

$$E(HPR) = Cap\ Rate + Growth\ Rate + \varepsilon \qquad\qquad (2)$$

$$E(Cap\ Rate) = f(Real\ Return, Property\ Risk\ Premium, Liquidity\ Premium) + \varepsilon \qquad (3)$$

$$E(Growth\ Rate) = f(Occupancy\ Rate, Rent\ Growth, Job\ Growth, Inflation) + \varepsilon \qquad (4)$$

$$E(HPR) = f(Real\ Return, Property\ Risk\ Premium, Liquidity\ Premium,$$
$$Occupany\ Rate, Rent\ Growth, Job\ Growth, Inflation) + \varepsilon \qquad (5)$$

. . . . SUMMARY STATISTICS FOR THE EMPIRICAL ANALYSIS . . . .

Variable	No. of Observa-tions	Mean	Std. Dev.	Max.	Min.
Independent Variables					
Seven-Year Real Return (%)	88	1.76	1.47	4.68	-1.14
Inflation (%)	88	2.22	1.16	5.25	-1.61
Baa Spread over Treasuries (%)	88	2.50	0.79	5.58	1.40
Fed Lending Survey (%)	88	13.26	25.62	87.00	-23.70
Multifamily Debt Growth (%)	88	1.71	1.16	4.97	-0.62
Job Growth Rate (%)	1,890	0.31	0.76	3.68	-3.63
Occupancy Rate	1,890	0.95	0.02	0.99	0.87
Rent Growth Rate (%)	1,890	0.74	1.23	12.85	-9.78

. . . . REGRESSION RESULTS PROVIDE:

- GOOD EXPLANATORY POWER

- CORRECT VARIABLE SIGNS/ SIGNIFICANCE

- REASONABLE PARAMETER ESTIMATE MAGNITUDES

Estimating Apartment Holding Period Returns (1987-2016)		
Variable	Estimate	t-statistic
Intercept	-0.3183	-8.26
Real Return	0.0101	10.23
Inflation	0.0153	9.79
Risk Premium	0.0144	10.54
Fed Survey	-0.0002	-5.94
Debt Growth	-0.2977	-16.37
Occupancy	0.3631	8.55
Tier 2	-0.0144	-4.01
Tier 3	-0.0043	-1.88
Tier 4	0.0041	1.88
Midwest	-0.0063	-2.83
South	0.0168	5.28
West	0.0154	7.82
R2	**40.2%**	

KEY TAKEAWAYS

- Apartment returns dominate the other property types when measuring

    Unadjusted returns

    Risk-adjusted returns

     Across geographic regions

     Across city tiers

- Apartment provide anecdotal hedge for inflation (i.e. positive property appreciation)

- Apartments have the lowest ratio of Annual Cap Ex to Property Value of the property types

- Explanatory results (regression) reveal that ex-post apartment returns can be estimated with ex-ante inputs with robust results

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