

How Accurate are Commercial Real-Estate Appraisals? Evidence from 25 Years of NCREIF Sales Data

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Summary

- ▶ In this study, we compare sales prices with 2–Qtr.–prior appraised values for a sample of more than 7,000 properties sold out of the NPI during 1984–2010.
- ▶ On average, we find that appraisals are more than 10% above, or below, subsequent sales prices.
- ▶ Even in a portfolio context where errors can cancel out, appraisals are off by an average of 5%.
- ▶ Appraisals appear to lag the true sales prices, falling below in hot markets and remaining above in cold markets.
- ▶ The largest deviations are observed during the two peaks and two valleys of the past two cycles in the commercial real estate market

Introduction

- ▶ The commercial real estate industry is emerging from the worst downturn since the crash of the early 1990s.
- ▶ Once again, the issues of performance evaluation and reporting have taken center stage.
- ▶ As sales prices plummeted during 2008 – 2009, what happened to the appraised values upon which investors rely for quarterly valuations?
- ▶ Did they accurately reflect the declines in value apparent in sales prices, or did they lag these declines, resulting in overvaluations within their portfolios and within the NPI?

Introduction

- ▶ In this study, we provide new evidence regarding how much confidence an investor can place in the appraisal of a single property, as well as how much confidence an investor can place in the appraisal of a portfolio of properties.
- ▶ We also provide evidence on how well appraisals track the cycle of the CRE market.
- ▶ This new evidence provides guidance to investor about how to interpret appraised values, as well as property indices, such as the NPI, that are based upon those values, in both a rising and falling market.

Introduction

- ▶ Why is this important?
- ▶ Investors rely upon appraised values to assess return in the \$4 trillion U.S. CRE market because these properties transact infrequently.
- ▶ Investors in the open-end CREFs can buy in and sell out based upon aggregated appraised values of fund properties. If appraised values differ materially from market values, then well-informed investors may be able to expropriate wealth from less-informed investors by moving in and out of these funds based upon their superior information.
- ▶ Investors compensate fund managers based upon appraisal-based performance benchmarks, so managers may be under- or over-paid in rising or falling markets.

Literature Review

- ▶ Cole, Rebel, David Guilkey and Mike Miles. 1986. Toward an Assessment of the Reliability of Commercial Appraisals. *The Appraisal Journal*, July, 442 – 432.
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Toward An Assessment of the Reliability of Commercial Appraisals

by Rebel Cole, David Guilkey, and Mike Miles

INTRODUCTION

The appraisal of a major commercial property is a complex and challenging task. Typically, the client requests an opinion of market value, often with his or her own unique definition of value. Although definitions vary and "a current definition of market value" cited in the Appraisal Institute's principal text¹ is quite distinguishable from a most probable selling price,² most practitioners are comforted when arms-length transactions between astute buyers and sellers take place at prices close to appraised market value.

1. American Institute of Real Estate Appraisers, *The Appraisal of Real Estate*, 8th ed. (Chicago: The Appraisal Institute, 1983), 33.

2. Developed by Richard U. Ratcliff and popularized by James A. Graskamp, University of Wisconsin, and Halbert C. Smith, University of Florida.

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Literature Review

- ▶ Cole, Guilkey Miles 1986: examined 147 sales, reported avg. abs. diff of 9%.
- ▶ Webb 1994: examined 569 sales 1978–92, reported avg abs. diff. of 13% prior to 1986, 10% 1986–90, and only 7% 1991–92.
- ▶ Fischer, Miles, Webb 1999: examined 2,739 sales 1978–1998, reported avg. abs. diff. 9%–12%, avg. diff 2.6%, but positive in up market and negative during down market; worst 1991 at -13.4%.

NCREIF National Property Index: Sample Selection

- ▶ 9,439 properties sold 1982 Q1 through 2010 Q2.
- ▶ 8,281 properties entered into the NPI at some point during this period.
- ▶ 7,575 are “true sales,” defined by NCREIF as a “full sale of the property.”
- ▶ More than half have sold since 1998, the last year analyzed by Fisher, Miles and Webb (1999).

NCREIF National Property Index: Sample Selection

- ▶ We drop:
 - 3 sales in 1982, 5 sales in 1983 (one office, 7 industrial).
 - 105 hotel properties.
 - 63 properties have no quarterly appraisal data prior to sale.
 - 185 properties have only one quarter prior to sale.
 - Too few for meaningful analysis.
- ▶ Final sample of 7,214 properties
 - 1,436 apartments,
 - 2,473 industrials,
 - 2,085 offices
 - 1,220 retails

Table 1A:
Properties Sold from NPI

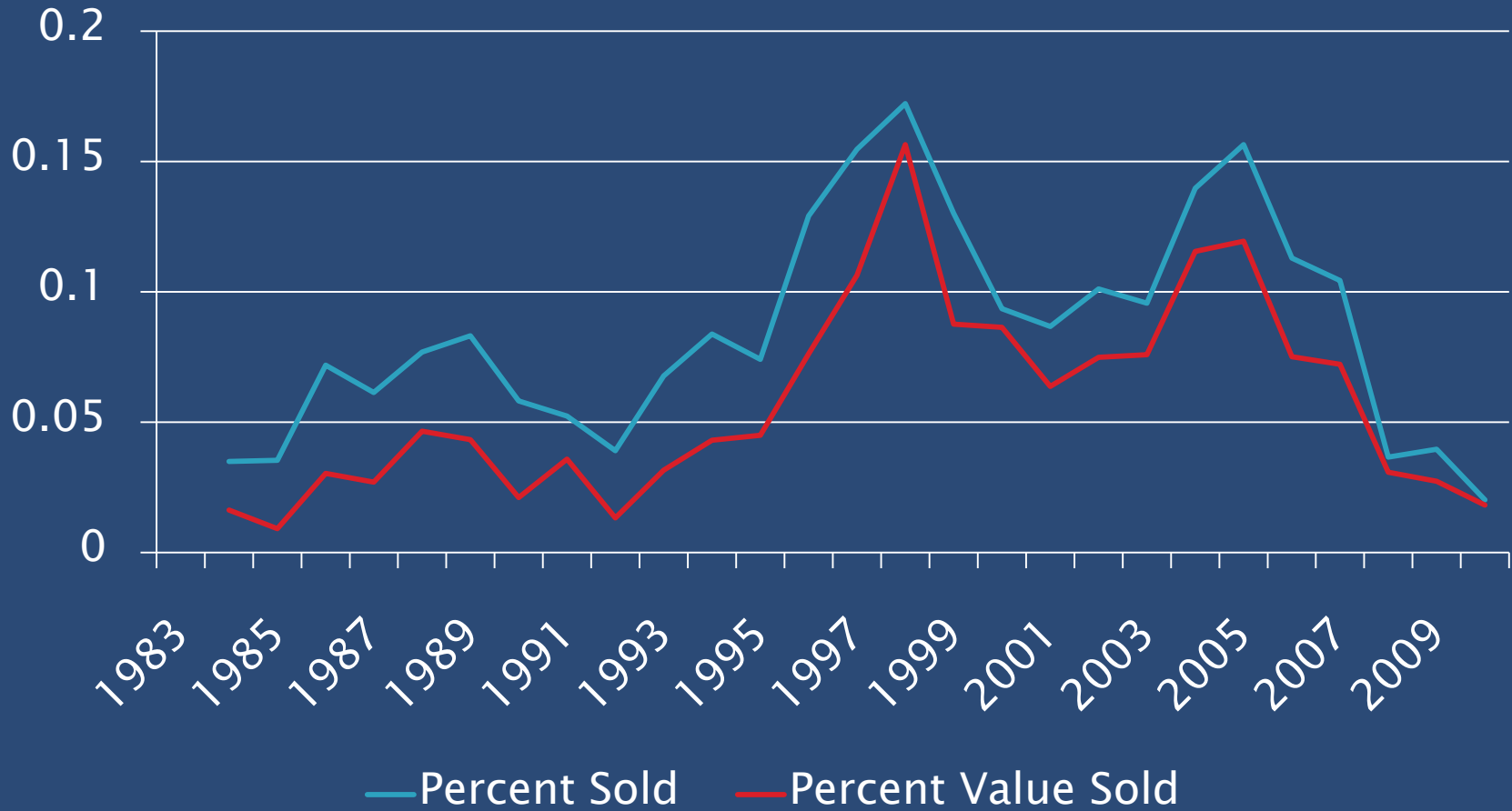
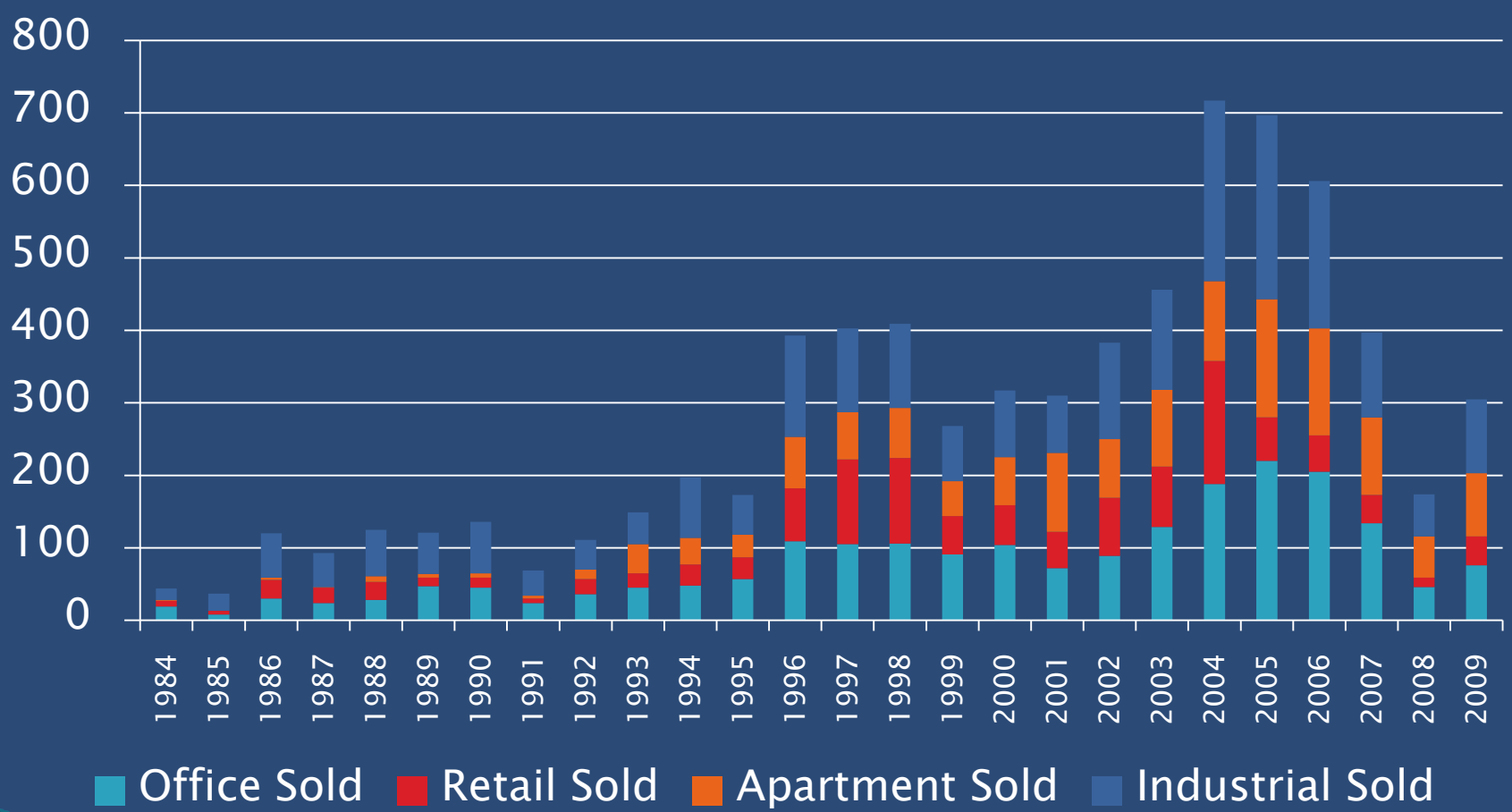


Table 1 B: NPI Sales by Property Type



Methodology: Calculating the Forecasting Error

For Portfolio i:

Percentage Appraisal Error $_i =$
[Transaction Price $_{i, t-0}$ - Appraised Value Price $_{i, t-2}$]
/ [Appraised Value Price $_{i, t-2}$]

For Individual Property i:

Absolute Percentage Appraisal Error $_i =$
ABS [Transaction Price $_{i, t-0}$ - Appraised Value Price $_{i, t-2}$]
/ [Appraised Value Price $_{i, t-2}$]

Methodology: Adjusting for Capital Improvements

Many properties report significant capital improvements during quarters prior to sale date.

We adjust for this by subtracting the amount of capital improvements subsequent to an appraisal from the reported sale price.

Methodology: Adjusting for Capital Appreciation

Properties also experience capital appreciation during the quarters between an appraisal and sale date.

To mitigate this effect, we “roll back” the sale price by dividing the sale price by one plus the capital appreciation in each quarter subsequent to the appraisal.

We do not adjust for the last quarter prior to sale because most valuations come in at the actual net sales price.

Methodology: Determinants of the Forecasting Error

OLS Regression Model:

$$\text{Average Percentage Appraisal Error}_t = \sum \beta_j \times \text{Explanatory Variables}_{j,t} + \epsilon_t$$

*Explanatory Variables*_{*j, t*} is a vector of explanatory variables measured for property *j* at time *t* and thought to explain the percentage appraisal error;

β_j is the coefficient on explanatory variable *j*; and

ϵ_t is a random error term.

Table 2A:
Equal-Weight Percentage Difference
in Sales Price and Appraised Value

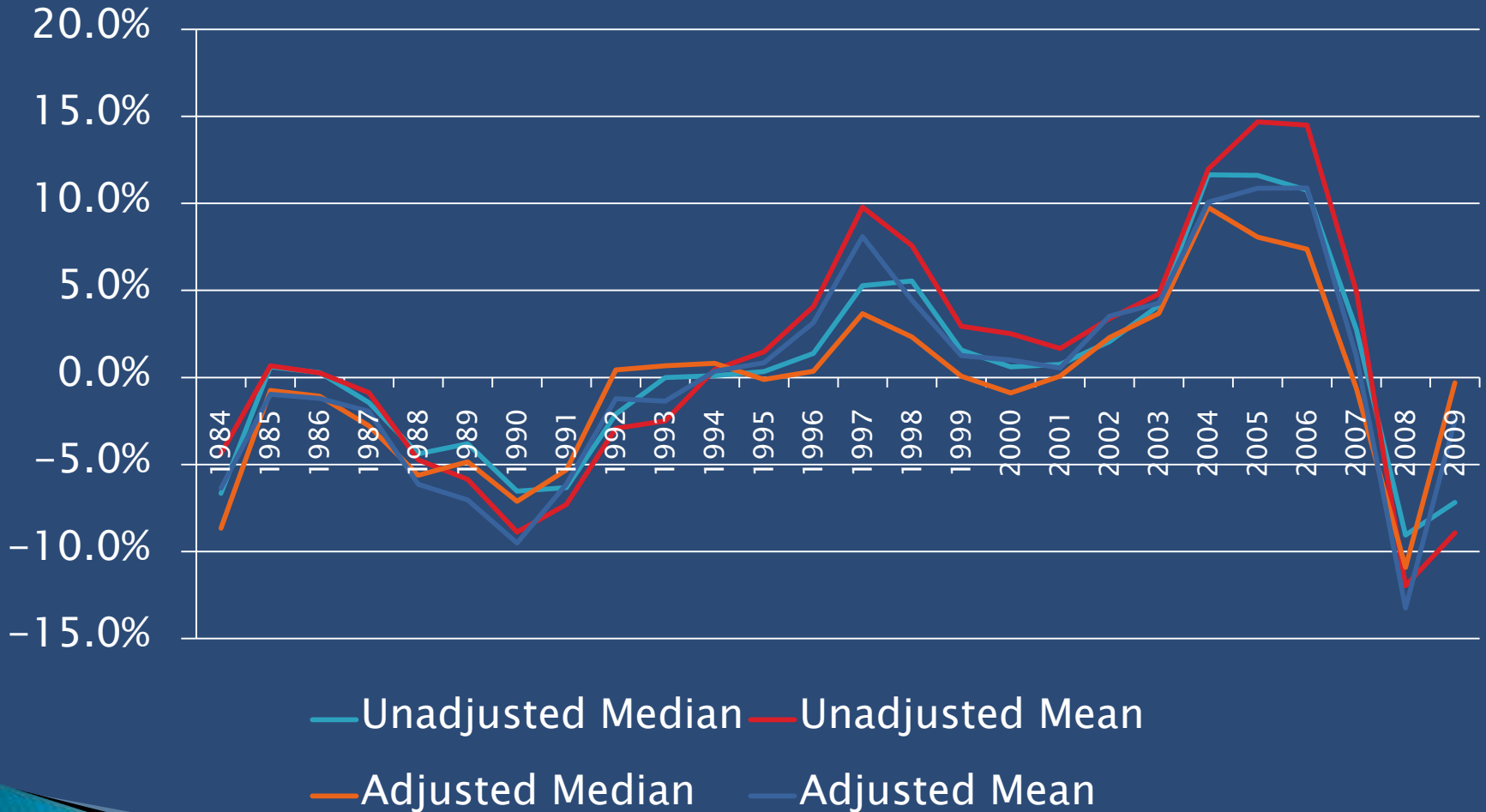


Table 2B:
Equal-Weighted Percentage Difference
by Property Type

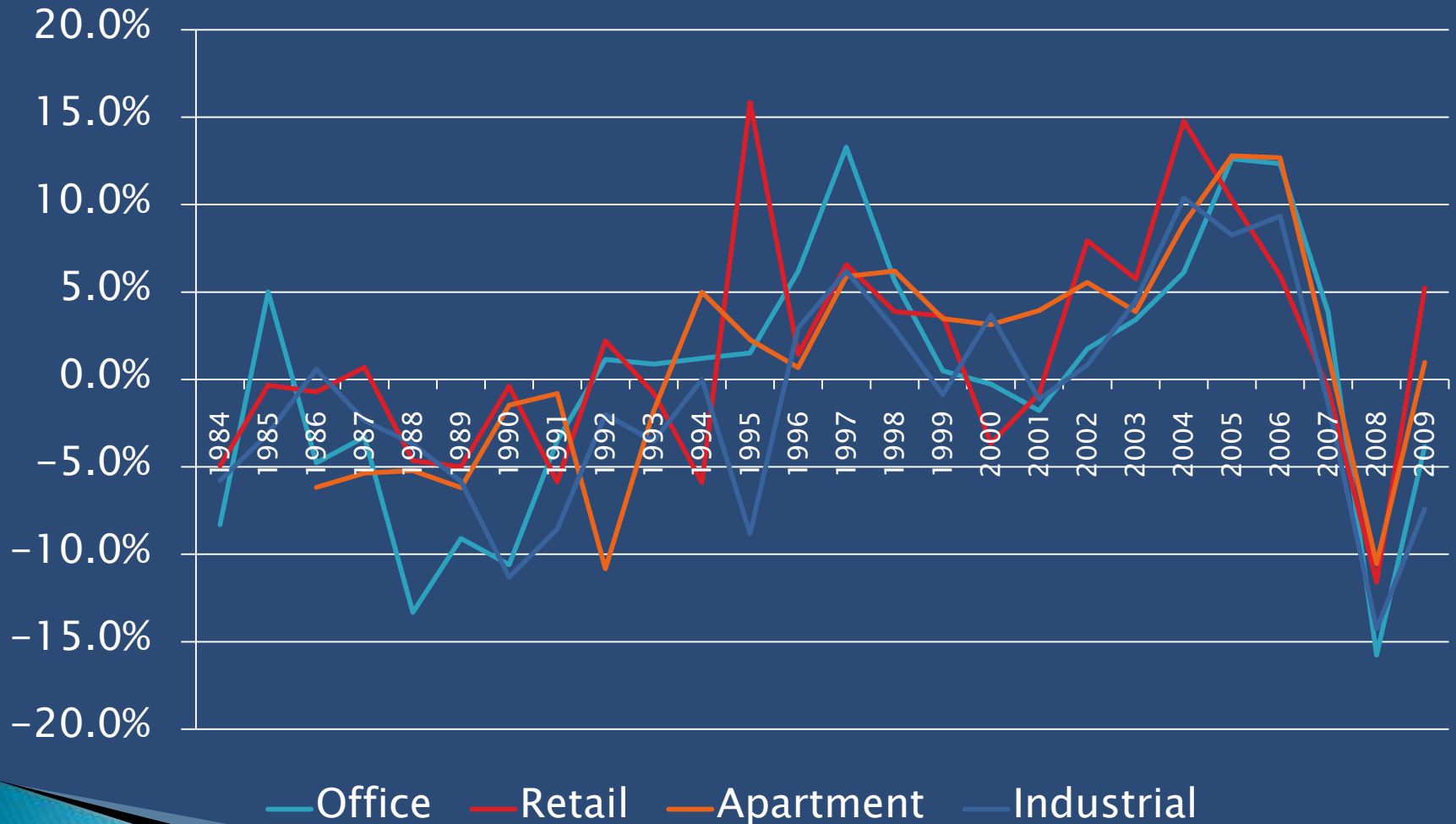


Table 3A:
Value-Weight Percentage Difference in
Sales Price and Appraised Value

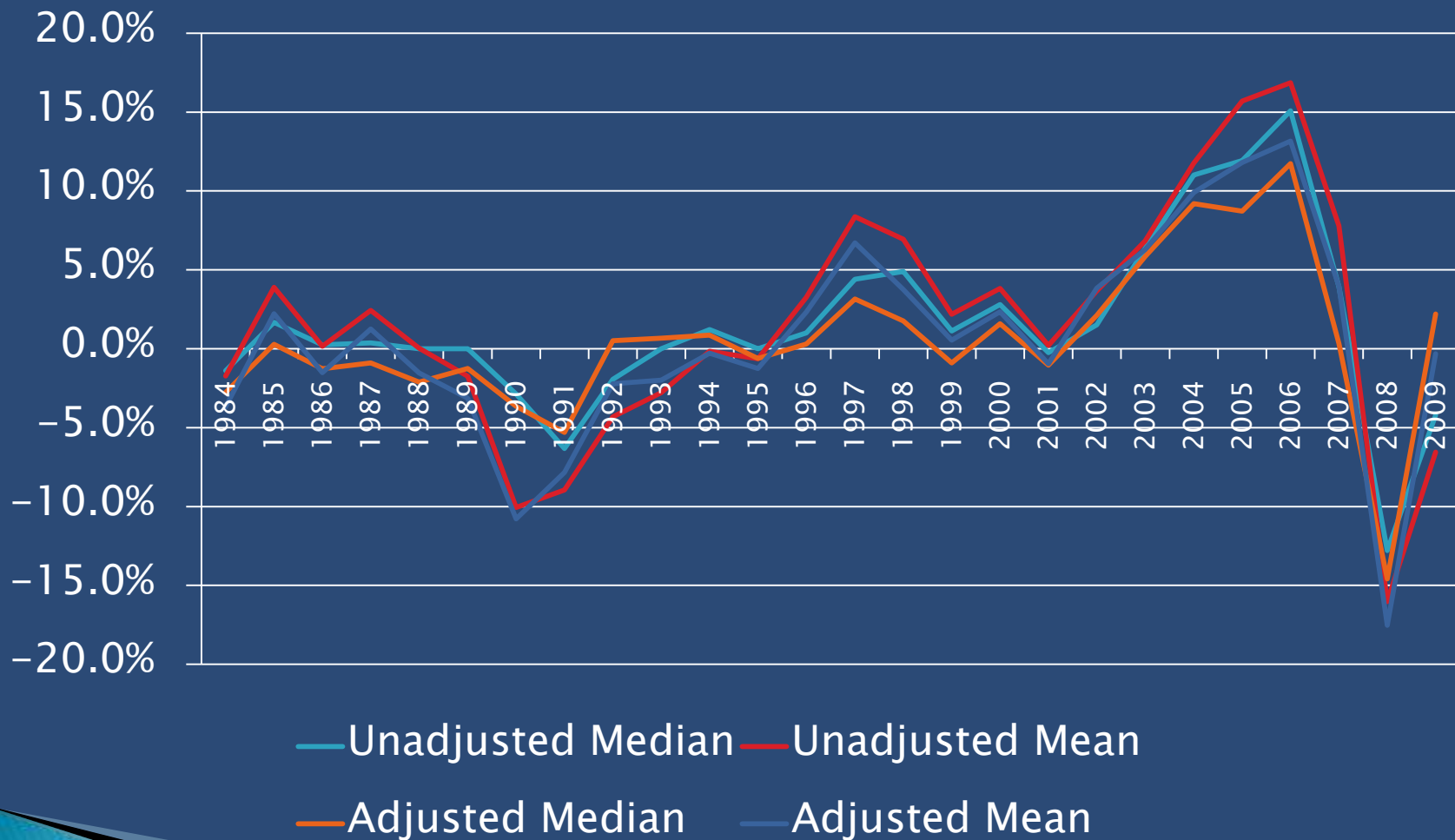


Table 3B:
Value-Weight Percentage Difference in Sales Price
and Appraised Value, by Property Types

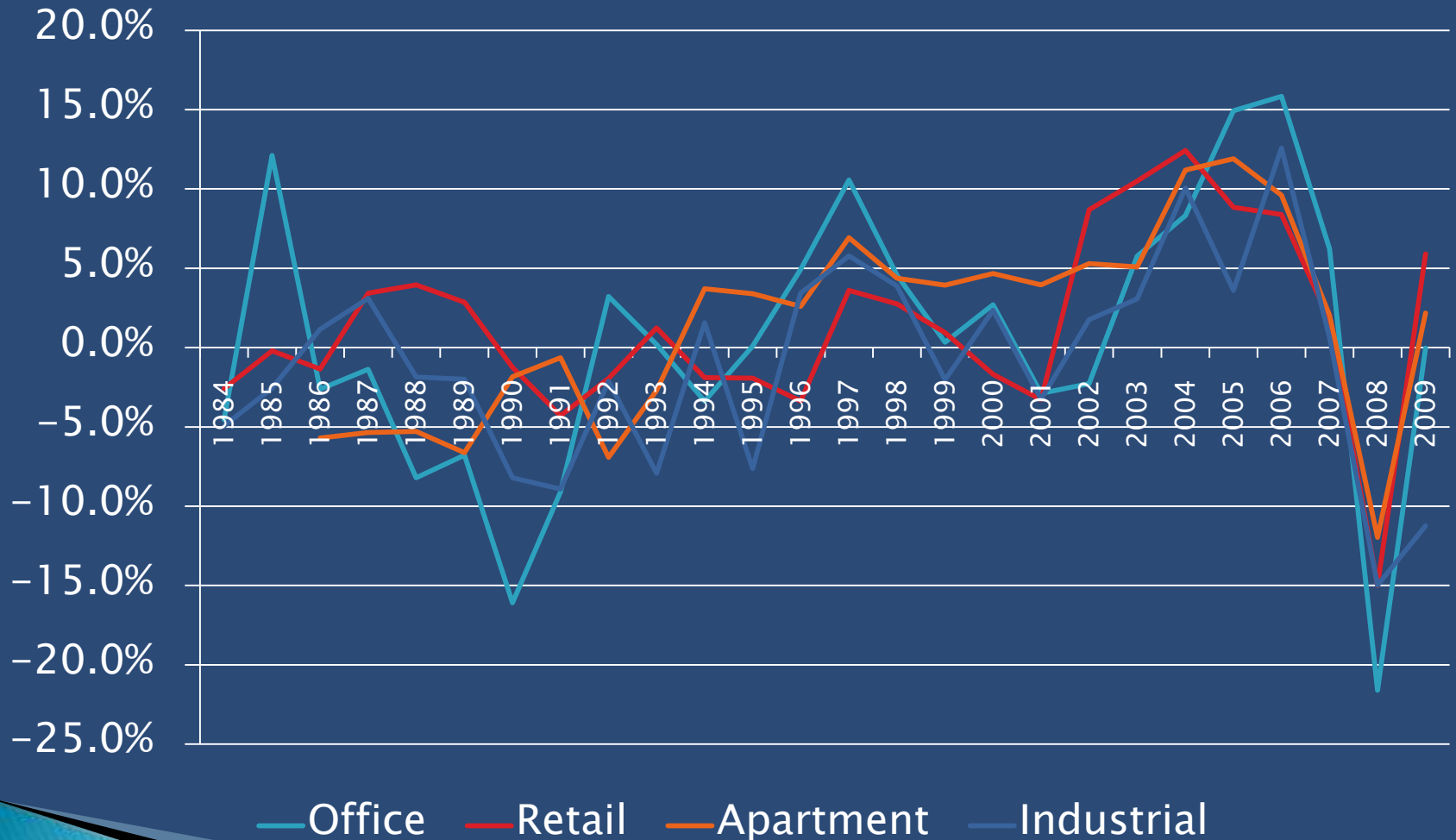


Table 4A:
 Equal-Weighted Absolute Percentage Difference
 in Sales Price and Appraised Value

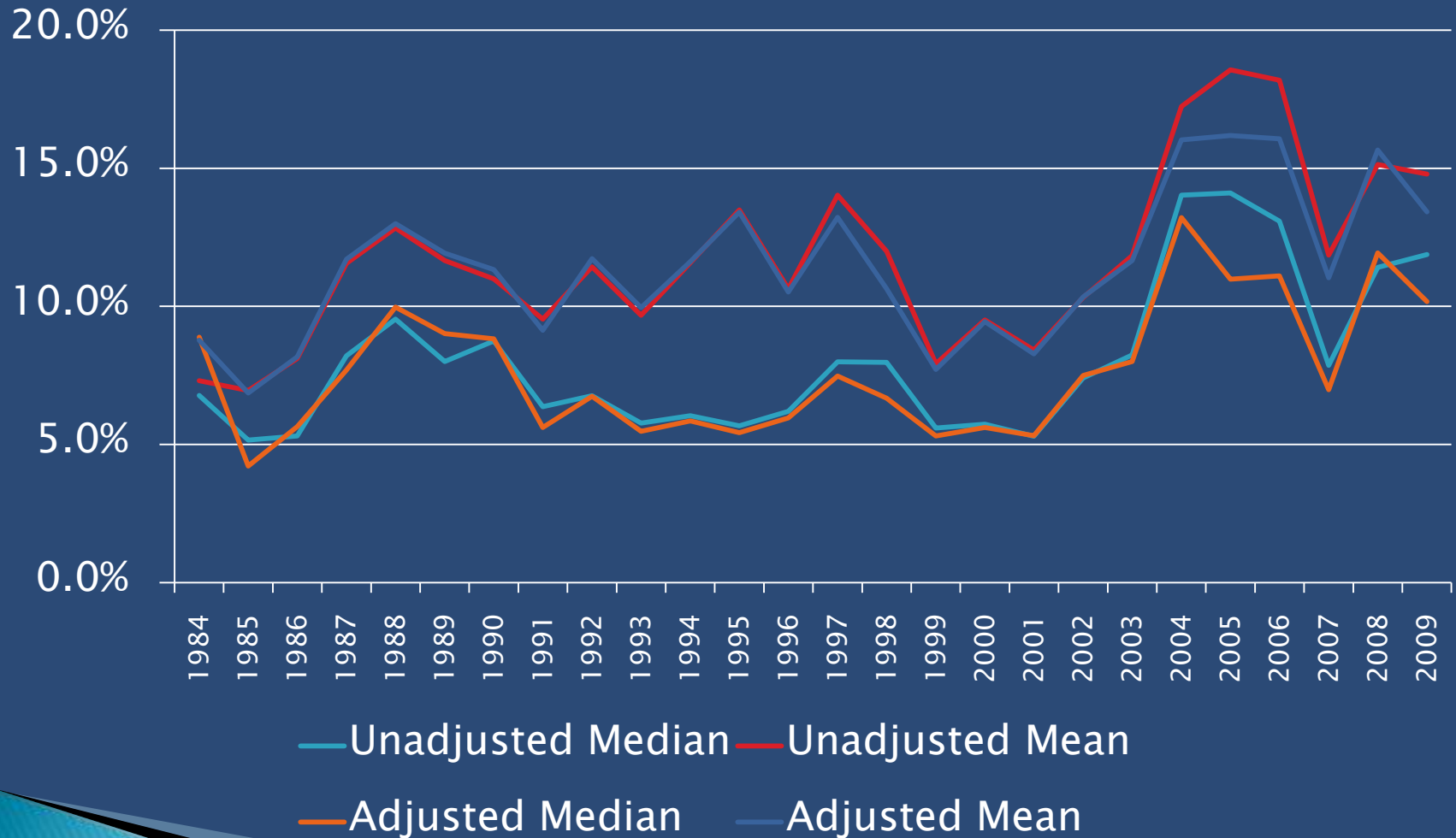


Table 5A:
Value-Weighted Absolute Percentage Difference in
Sales Price and Appraised Value

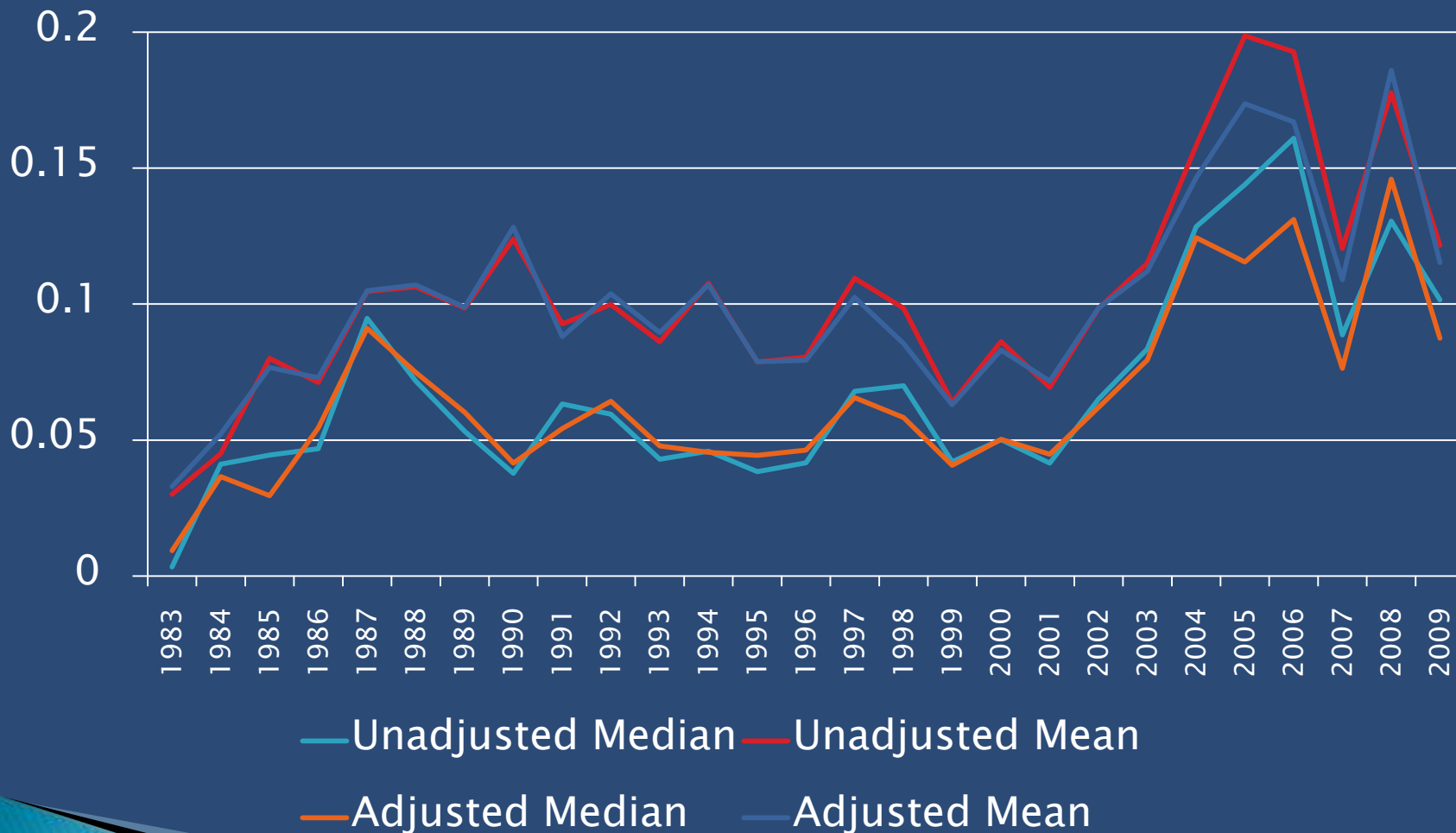


Table 6A:
Percentage Difference
by Type of Appraisal

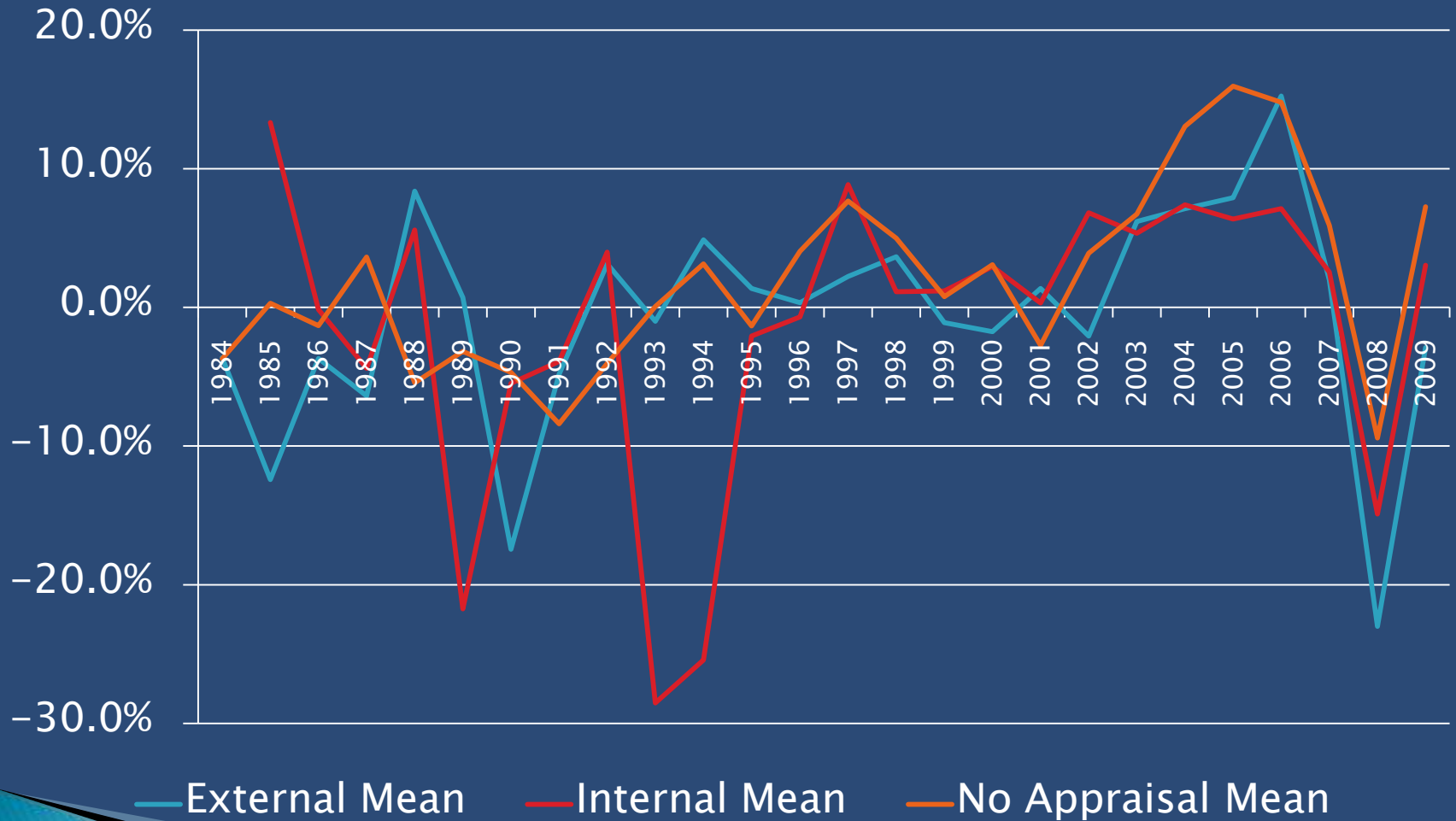


Table 6B:
Absolute Percentage Difference
by Appraisal Type

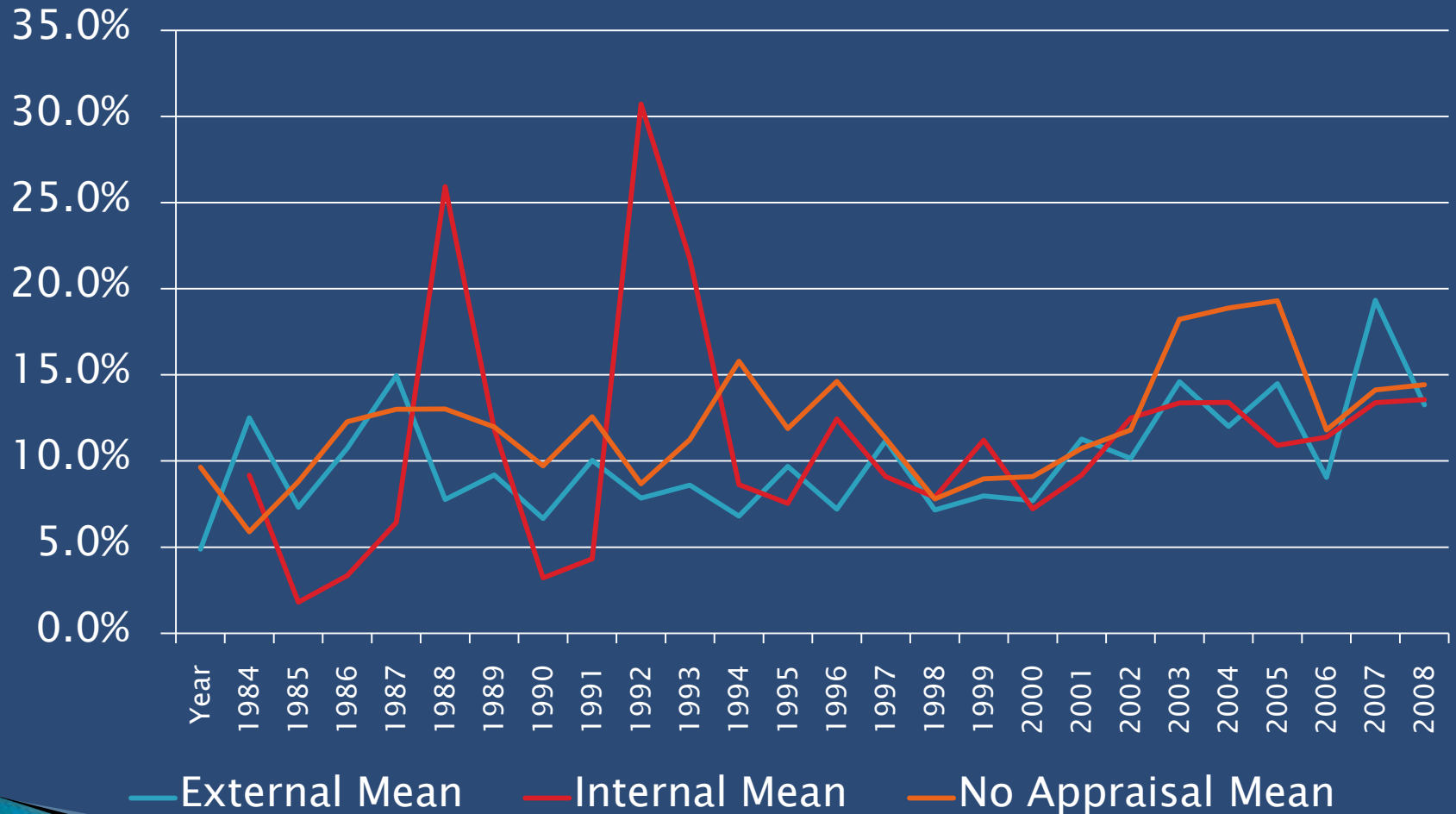


Table 7:
Determinants of Difference in
Sales Price and Appraised Value

Panel A: NPI Total Return by Decade								
	1984-2009		2001-2009		1990-1999		1984-1989	
NPI Total Return	1.14***		1.37***		1.05***		1.05	
t-Stat	5.09		4.48		3.46		1.01	
Adjusted R-Square	0.192***		0.328***		0.220***		0.0001	
Obs.	106		40		40		26	

Table 7(cont.):
Determinants of Difference in
Sales Price and Appraised Value

Panel B: NPI Return Components Only								
NPI								
Total Return	1.14***							
	5.09							
NPI								
Appreciation								
Return			1.10***				0.99***	
			4.73				4.38	
NPI								
Income								
Return					7.30***		5.95***	
					3.44		3.00	
Adjusted								
R-Square	0.192***	0.169***	0.094***				0.229***	
Obs.	106	106	106				106	

Table 7(cont.):
Determinants of Difference in
Sales Price and Appraised Value

Panel C: NPI Total Return and Misc. Macro Variables										
NPI Total Return	1.14***								0.75***	
	5.09								3.78	
GDP Growth			3.32***						2.01**	
			3.9						2.45	
Change in Unemployment					-0.52***				-0.40***	
					-5.23				-3.61	
10-Year Treasury Rate							-0.008***		-0.014***	
							-3.37		-7.62	
Adj. R-Square	0.192***	0.119***	0.201***	0.090***	0.523***					
Obs.	106	106	106	106	106					

Table 8:
Determinants of Difference in
Sales Price and Appraised Value

Variable	Coef.	t-Stat	
Intercept	-0.060	-0.65	
NPI Appr.	0.467	1.89	*
NPI Inc.	6.281	1.26	
Liquidity	0.000	5.09	***
T-Bond	-0.011	-1.96	**
Chg. Unemp.	-0.113	-3.34	***
Open	-0.008	-1.20	
ODCE	-0.018	-1.69	*
External	-0.035	-6.73	***
Internal	-0.031	-6.45	***
Levered	0.024	5.94	***
Office	0.027	4.84	***
Retail	0.021	3.16	***
Apt	0.031	4.90	***

Table 8 (cont.):
Determinants of Difference in
Sales Price and Appraised Value

Variable	Coef.	t-Stat	
Y1989	-0.016	-0.54	
Y1990	-0.060	-2.29	**
Y1991	-0.030	-0.80	
Y1992	-0.004	-0.10	
Y1993	-0.052	-1.59	
Y1994	-0.038	-1.25	
Y1995	-0.058	-1.62	
Y1996	-0.032	-1.05	
Y1997	-0.004	-0.12	
Y1998	-0.044	-1.27	
Y1999	-0.036	-1.26	
Y2000	-0.037	-1.22	
Y2001	-0.033	-0.92	
Y2002	0.002	0.05	
Y2003	-0.002	-0.05	
Y2004	0.003	0.09	
Y2005	0.028	0.90	
Y2006	0.067	2.29	**
Y2007	0.008	0.24	
Y2008	-0.133	-3.57	***
Y2009	0.069	2.02	**

Summary and Conclusions

- ▶ In this study, we have analyzed the accuracy of commercial real-estate appraisals using data from properties sold out of the NCREIF NPI during the last 25 years.
- ▶ We find that, on average, appraisal are more than 10% above, or below, subsequent sales prices.
- ▶ Even in a portfolio context, where we allow positive and negative errors to cancel out, appraisals are off by more than 5% because errors are highly correlated at any point in the real-estate cycle.

Summary and Conclusions

- ▶ We also find that appraisals appear to lag the true sales prices, falling below in hot markets and remaining above in cold markets.
- ▶ The largest deviations are observed during the two peaks and two valleys of the past two cycles in the commercial real estate market.
- ▶ Not surprisingly, the worst performance occurred during the recent financial crisis.