Rising Interest Rates Will Not Necessarily Increase Cap Rates

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Beware the received wisdom. Some people have stubbornly maintained over the past five years that interest rates (and inflation) will rise and that increased interest rates will necessarily increase capitalization rates (and depress property prices). Some disposition brokers have even opportunistically exploited this myth in an effort to promote property sales.

This article presents compelling evidence that contradicts the received wisdom: Rising interest rates will not necessarily increase unleveraged property capitalization rates and, thereby, depress prices. We find that macroeconomic factors determine most of the movement in national office cap rates over time and that local real estate factors determine much of the cross-sectional variation among metropolitan statistical area (MSA) cap rates in any one year. Furthermore, we believe that an increase over the next two years in office cap rates *just because* Treasury bond yields increase is unlikely, even though the property cycle is maturing.

Many People Have a Tough Time Defining Cap Rate Components

The cap rate is the ratio of net operating income (NOI) over the property price; it is also the sum of the risk-free rate and the credit spread minus the expected rate of growth of NOI, including other variables:

> Cap Rate = Risk-Free Rate + Credit Spread – Expected Growth of NOI + Other Variables

The cap rate is not an interest rate, and as such, it is not correlated with interest rates. Why might this be true? Even if the risk-free rate (e.g., Treasury yields) increases, as it likely would in a booming economy with low unemployment, credit spreads might shrink and expected NOI growth rates strengthen, thus offsetting or even swamping any increase in interest rates. Hence, cap rates could fall even in a rising interest rate environment.

What Do the Data Say?

Office cap rates, which have fluctuated within a 4% to 10% band, as shown in Exhibit 1, display volatility, seasonality, and significant trending from 1994 through 2016.

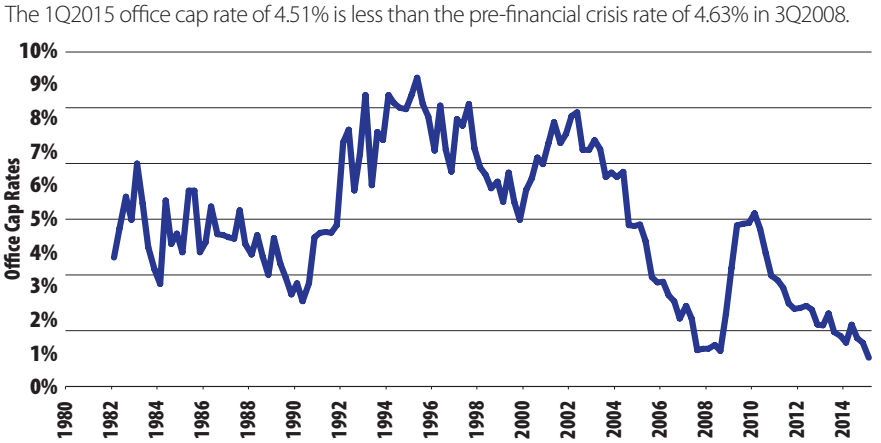
Averages Versus Probability Distributions

Most analysts fall prey to the "flaw of averages." Charts such as Exhibit 1, while very useful, show the movement of only average cap rates over time. The distribution (or histogram) of cap rates in any one year can shift and the shape of the distribution can change, possibly indicating a change in downside risk. Two distributions with radically different shapes can have the same average but radically different risk attributes.[1]

Distributions change in predictable ways. The right and left tails, defined as national office cap rates below 6% and cap rates in excess of 8%, respectively, are much more volatile over the cycle than the average cap rate or the probability of a cap rate between 6% and 8%. In other words, the action is in the tails. Cap rate distributions move to the left in strong

Exhibit 1: Appraisal-Based Office Cap Rates

The 1Q2015 office cap rate of 4.51% is less than the pre-financial crisis rate of 4.63% in 3Q2008.



Sources: Real Capital Analytics, Zisler Capital Associates, LLC

1. In addition to the mean, important statistical information includes the standard deviation, the skewness, and the kurtosis. A right-skewed distribution, wherein the skewness exceeds zero, presents a greater likelihood of larger cap rates. Distributions with significant kurtosis, greater than 3, have fat tails, or a greater likelihood of extreme values.

Exhibit 2: Volatility of Office Cap Rates

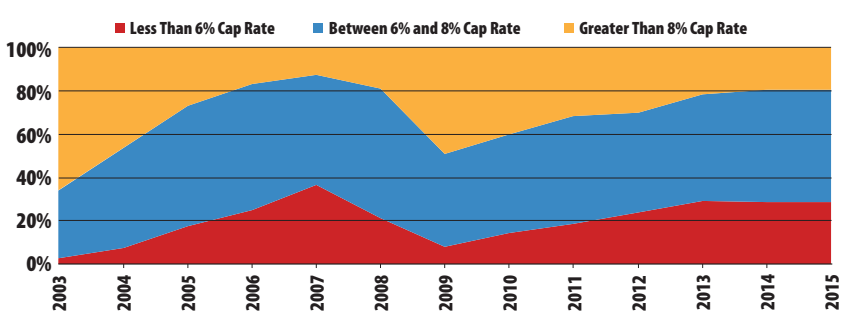
Office cap rate tails are highly variable, much more so than the mean (average) cap rate. The relative volatility (coefficient of variation) of the tails greatly exceeds the relative volatility of the average mean cap rates (8.4%).

	Mean Within A Year	Standard Deviation	Skewness	Kurtosis	Less Than 6% Cap Rate	Between 6% and 8% Cap Rate	Greater Than 8% Cap Rate
2003	8.58%	1.30%	–0.256	4.38	2.60%	31.50%	66.00%
2004	8.00%	1.43%	–0.146	4.3	7.50%	46.10%	46.40%
2005	7.32%	1.48%	0.169	4.5	17.50%	55.60%	26.90%
2006	6.89%	1.51%	0.269	4.69	25.10%	58.00%	16.90%
2007	6.50%	1.54%	0.016	3.67	36.70%	50.80%	12.50%
2008	7.10%	1.45%	0.211	4.45	21.30%	59.70%	19.00%
2009	8.17%	1.54%	0.456	3.19	7.90%	43.00%	49.00%
2010	7.70%	1.58%	0.019	3.18	14.30%	45.80%	39.90%
2011	7.32%	1.46%	–0.403	3.38	18.80%	49.50%	31.80%
2012	7.11%	1.52%	–0.069	3.07	23.90%	46.30%	29.80%
2013	6.87%	1.54%	–0.156	3.67	29.10%	49.40%	21.50%
2014	6.82%	1.61%	–0.001	3.84	28.50%	52.00%	19.40%
2015	8.81%	1.56%	0.077	3.68	28.80%	51.80%	19.40%
Mean	7.32%				20.15%	49.19%	30.65%
Standard Deviation	0.62%				10.00%	7.23%	15.62%
Coefficient of Variation	**8.4%**				**49.60%**	**14.70%**	**51.00%**

Sources: Real Capital Analytics, Zisler Capital Associates, LLC

Exhibit 3: Cap Rate Distribution Shares

The left (red) and right (yellow) tails are highly variable.



Sources: Real Capital Analytics, Zisler Capital Associates, LLC

markets and to the right in weak markets, but the greatest change occurs in the tails of the distributions, and therein lies most of the risk.

Exhibit 2 provides a summary of the shapes and movements of cap rates from 2003 through 2015. The average of the mean for each year is less volatile than that of the tails, as measured by the coefficient of variation, or the ratio of the standard deviation to the mean.

Exhibit 3 graphically depicts the same results, specifically the volatility of the tails. The red portion represents the share of the cap rate distribution found in the left tail; the yellow represents the right tail.

Cap Rates and Interest Rates

A simple scatter of cap rates and bond yields shows there is no obvious, simple, empirical relationship between the two (Exhibit 4). We divide the sample into two regimes: "Cap Rates Greater Than Bond Yields" and "Cap Rates Less Than Bond Yields." About 57% of quarterly office cap rates are less than the Baa corporate bond yield and show greater variation than those cap rates that, as a group, exceed the corporate bond yield.

There is no simple relationship between cap rates and bond yields; this in no way suggests that interest rates have no impact on cap rates. Other variables can mask the relationship between interest rates and cap rates. Depending on the reason the risk-free rate increases, low or even falling cap rates are sometimes associated with a rise in the Treasury bond yield.

National cap rate trends are inherently so complex that they hide more than they reveal. Exhibit 5 shows that MSA cap rates are quite variable around the national trend. In other words, the national trend hides the distribution of cap rates about the trend.

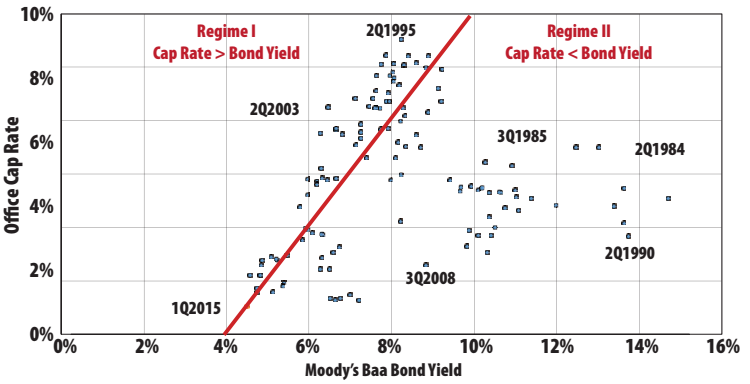
Furthermore, as shown in Exhibit 6, the five-year rolling correlation of cap rates and Treasury yields and Baa bond yields is not stable over time. The simple bivariate correlations alternate between positive and negative. Our multiple regression model, however, indicates that once we account for all sources of variation in cap rates, Treasury and corporate bond yields indeed play a role in explaining changes in cap rates.

The ZCA Office Cap Rate Model[2]

We created a regression model to investigate the impact of each variable on cap rates, holding other variables constant. The results are statistically significant.

Exhibit 4: Cap Rates Versus Bond Rates

An office cap rate and bond rate yield scatter shows no trend.



Sources: NCREIF, Moody´s, Zisler Capital Associates, LLC

2. We econometrically modeled the determinants of office cap rates (CAP) using multiple regression. Our model explains 92% of the variation in office cap rates from 4Q1983 to 1Q2015, and most of the explanatory variables are statistically highly significant.

$$LOG(CAP_t) = -0.247 + 0.612\ LOG(CAPRATE_{t-1}) + 0.307\ LOG(CAPRATE_{t-2}) + 0.088\ LOG(REALTBOND)$$
$$(-1.588) \quad (6.956) \quad (3.539) \quad (3.673)$$
$$+ 0.102\ LOG(BAASPREAD) - 0.018\%CHDEBTGDPRATIO * INFLATIONADJUSTEDRENTINDEX$$
$$(3.662) \quad (-2.493)$$
$$+ 0.014\ \%CHDEBTGDPRATIO + 0.280\ REALRENTINDEX + 0.004\ SECONDQUARTER$$
$$(2.283) \quad (1.567) \quad (0.257)$$
$$-0.049\ THIRDQUARTER - 0.048\ FOURTHQUARTER$$
$$(-3.317) \quad (-3.260)$$

R-squared (adjusted) = 0.918; N = 124; t-statistics are in parentheses. (The last three variables are quarterly dummy variables that remove seasonality.) The critical t-statistic test at the 95% confidence interval is about 1.98.

Variables are defined as follows:

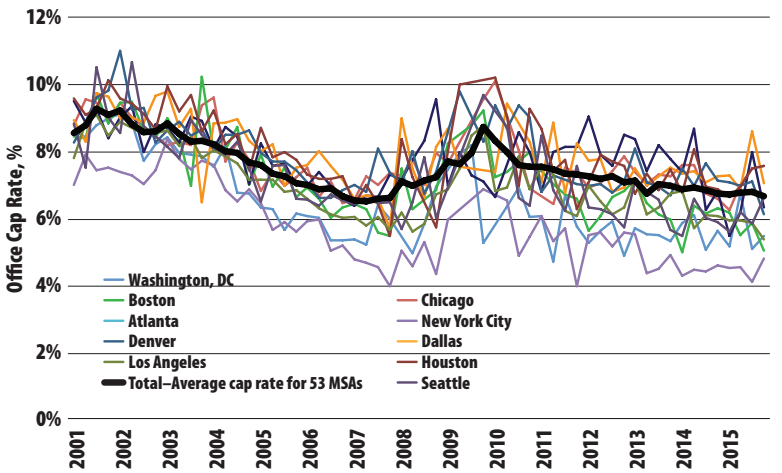
CAPRATE The NCREIF unleveraged, appraisal-based office capitalization rate
%CHDEBTTOGDPRATIO The ratio of change in total debt outstanding (net borrowing lending) to nominal GDP
INFLATIONADJUSTED BOND The geometric difference between the nominal yield for the ten-year Treasury bond and the inflation rate
BAASPREADOVERTBONDS Moody's yield on Baa-rated corporate bonds
INFLATIONADJUSTEDRENTINDEX The ratio of office real rent data from CBRE Econometrics to the historical average of real rent.
SECONDQUARTERDUMMY Dummy variable equals 1 for the second quarter; zero for other quarters
THIRDQUARTERDUMMY Dummy variable equals 1 for the third quarter; zero for other quarters
FOURTHQUARTERDUMMY Dummy variable equals 1 for the fourth quarter; zero for other quarters

Most of the following variables exhibit low correlations. RTB (inflation-adjusted Treasury yields) and the ten-year Treasury bond yield are highly correlated. Office cap rates and Treasury yields have a low positive correlation.

The significance of the coefficient estimates in the regression for $LOG(CAP_{t-1})$ and $LOG(CAP_{t-2})$ indicates that cap rates are highly smoothed or serially correlated: Past cap rates can forecast future cap rates. Our results validate the expected positive role of interest rates, other factors held constant, but also indicate that other variables, especially the growth of debt in relation to GDP, can swamp the effects of interest rate changes. Holding other factors constant, an increase in the inflation-adjusted ten-year Treasury bond yield (INFLATIONADJUSTEDBOND) or the Baa bond spread over Treasuries (BAASPREADOVERTBONDS)—a proxy for credit risk—will increase cap rates. These results are statistically significant, and the signs are consistent with theory. However, the strength of the impact is not strong. Other macroeconomic factors, including lagged cap rates, matter more. We examined the effects of the inflation-adjusted office rent index (INFLATIONADJUSTEDRENTINDEX), the rate of change of the ratio of total economy (less financial sector) debt to GDP (%CHDEBTGDPRATIO), and the multiplicative effect of the two variables on cap rates. A rise in economy-wide debt in relation to GDP will reduce cap rates, holding all else constant; this effect is stronger when the real rent index is greater, in excess of its 32-year average. The coefficient on the real rent index is positive but not statistically significant. A positive sign suggests that when the rent index is cyclically high, investors expect a downward rental growth adjustment.

Exhibit 5: Office Cap Rates for Select MSAs

MSA cap rates vary from the national trend, even though national factors play a dominant role in determining cap rates.

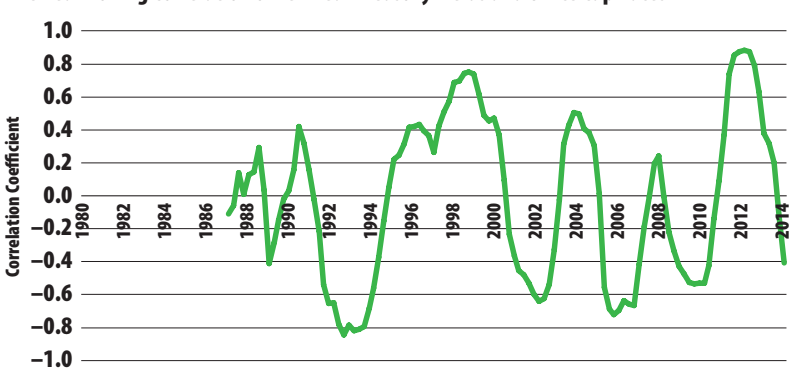


Sources: Real Capital Analytics, Zisler Capital Associates, LLC

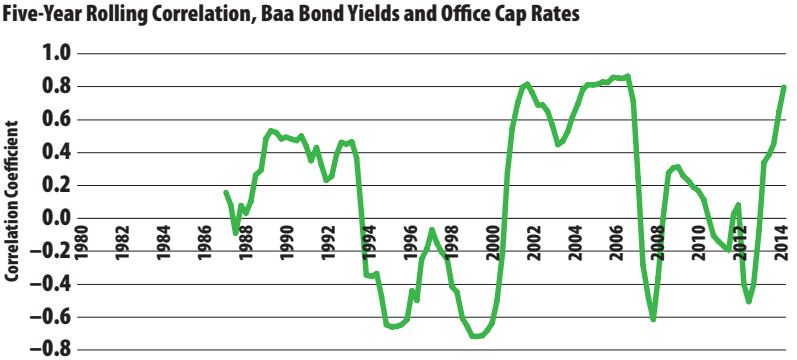
Exhibit 6: Exhibit 6: Five-Year Correlation of Ten-Year Treasury Yields and Office Cap Rates

The correlations between office cap rates and ten-year Treasury and Moody's Baa bond yields are not stable; there are other intervening factors.

Five-Year Rolling Correlation of Ten-Year Treasury Yields and Office Cap Rates



Five-Year Rolling Correlation, Baa Bond Yields and Office Cap Rates



Sources: NCREIF, Governors of the Federal Reserve System, Moody's, Zisler Capital Associates, LLC

Our statistical analysis indicates the following:

- Cap rates are highly correlated with past cap rates; there is a significant amount of smoothing, which masks the true volatility of cap rates.
- An increase in interest rates, *holding other factors constant,* will increase cap rates. However, other factors are not constant, and these factors typically swamp the effect of interest rate changes.
- An increase in the credit spread will increase cap rates.
- Rising economy-wide liquidity will decrease cap rates; this effect is strongest when there is excess demand in the property sector.

Conclusion

We believe that real estate factors are not important in determining the time path of national office cap rates. However, real estate factors critically affect the variation in cap rates between metropolitan statistical areas and within MSAs at any point in time.

Furthermore, we believe that even though the property cycle is maturing, a significant increase over the next two years in office cap rates is unlikely even if Treasury bond yields increase. In fact, we would not be surprised if office cap rates, especially in some non-gateway MSAs, fall a bit further if credit spreads narrow and expected rental growth strengthens.

Cap rates are a function of many variables, not just interest rates. Even though in theory rising interest rates should increase cap rates, holding other factors constant, credit spreads, expected rates of growth of NOI, market liquidity, and other factors are always changing. The combined effect of these factors on cap rates has the potential of offsetting or completely swamping the impact of rising Treasury yields, thus confounding the relationship between cap rates and interest rates. ■

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