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Advanced Topics in Real Estate Finance

Cross-Sectional Analysis of Real Estate Cap Rates: Market pricing of expected income growth

Abstract:

Empirical data and previous research have shown that capitalization rates vary across different MSA markets as well as between different product types. The cause of these variations is not fully understood however. Theory would suggest that the cause of variation should be income growth expectations, or risk variation. Surprisingly, ex-post data comparing income growth and cap rates shows almost no correlation between cap rates and ex-post income growth. This data suggests that the market is somehow inefficient, or that the market has historically done a poor job of anticipating future income changes. This paper will further explore capitalization differences across markets by exploring several different proxies for future income growth including historic rental growth, anticipated rental growth based on Torto Wheaton data, and ex-post actual rental growth. The intent of this research is to develop a better understanding of how the market prices risk and future rent growth expectations. A better understanding of these factors will hopefully lead to the development of an investment strategy that will capitalize on the market inefficiencies and poor ability to predict future income growth.

Introduction:

The objective of this paper is to better understand real estate market pricing and to develop an investment strategy to take advantage of apparent market pricing inefficiencies. One measure of pricing comparison that is frequently used in real estate is the capitalization rate or cap rate. Cap rates represent the ratio of NOI to price for real estate assets. Amongst other factors, cap rates are influenced by required rates of return, income growth expectations, and market risk perceptions.

Both income growth and investment risk are significantly impacted by local market factors such as supply and demand market dynamics, economic factors, and future supply considerations. Due to the local nature of real estate markets, future cash flow forecasts for a property are significantly influenced by these local market factors. While many markets can be affected by general or national market factors such as economic conditions or interest rates, the cash flow of a property are nevertheless the results of the impact of both national and local factors on the local space market.

This paper will employ a cross-sectional geographic anslydid. The paper will include a comparative analysis of the twenty largest markets for apartments as well as the twenty largest markets for office buildings. The paper will review data at two points in time, 1996 and 2001 for comparison purposes to asses any differences across time. For each market, several proxies will be tested as potential dependent variables that affect cap rates. The focus of this paper is on projected income growth. However, in order to isolate the market's pricing of future income growth, we must attempt to control for risk which can

affect the market's required rate of return, and hence cap rate. Therefore, a multi-variable regression analysis will be performed including several proxies for market risk.

Finance theory suggests that the market price and hence cap rate should be significantly impacted by expected future income growth. Some empirical evidence suggests that the market does a poor job of pricing future income growth, but that does not mean that the market does not attempt to do this. In an attempt to determine what factors the market does consider in predicting future income growth, this paper will test several potential factors.

One of the three main income growth proxies that will be tested is the annualized income growth over the past five years. This factor is meant to test if the market appears to be myopic and whether or not it expects recent history to repeat itself in the near future. A second income growth proxy that will be tested is the Torto-Wheaton rental growth prediction. This factor will be testing whether or not the market is pricing future expectations of the market analysts who analyze local market factors and predict future income growth. The third factor that will be tested is ex-post actual income growth. This is intended to assess whether or not the market somehow prices future income growth better than market analysts.

In addition to the three main growth proxies, the paper will also test several other factors which the market is anecdotally known to consider. These factors include absorption, vacancy rate, supply constraint factors, projected employment growth and potentially

several others. In theory, all of these factors should be considered by the market and the combined effect of these should result in the projected or expected income growth. While this is theoretically how the market should develop expectations, it is possible that this is not the case and that the market is somehow overly simplistic or unsophisticated in its understanding of future income projections. The intent of this paper is to better understand how the market actually prices assets and projects future income growth.

<u>Literature Review:</u>

There has been a small amount of cross-sectional cap rate research relative to some other areas of the real estate research field. Despite this, there have been several important papers whose research is relevant to this topic and whose findings have influenced this paper. While these papers don't have the exact same focus as this paper, they are nevertheless important to understand on a basic level.

One of the more important papers to explore differences in cap rates across markets was (Sivitanidou and Sivitanides 1999). This study compared differences in office market cap rates between markets from 1985 to 1995 in an attempt to assess what factors go into determining cap rates. This paper drew two important conclusions that are relevant for this paper: 1) it confirmed that markets are indeed priced differently and that changes in cap rates in individual markets are idiosyncratic, implying that local space market factors influence cap rates and pricing. The graph below from this paper illustrates the cap rate changes over time for several markets.

Intertemporal movements in office capitalization rates, 1985-1995.
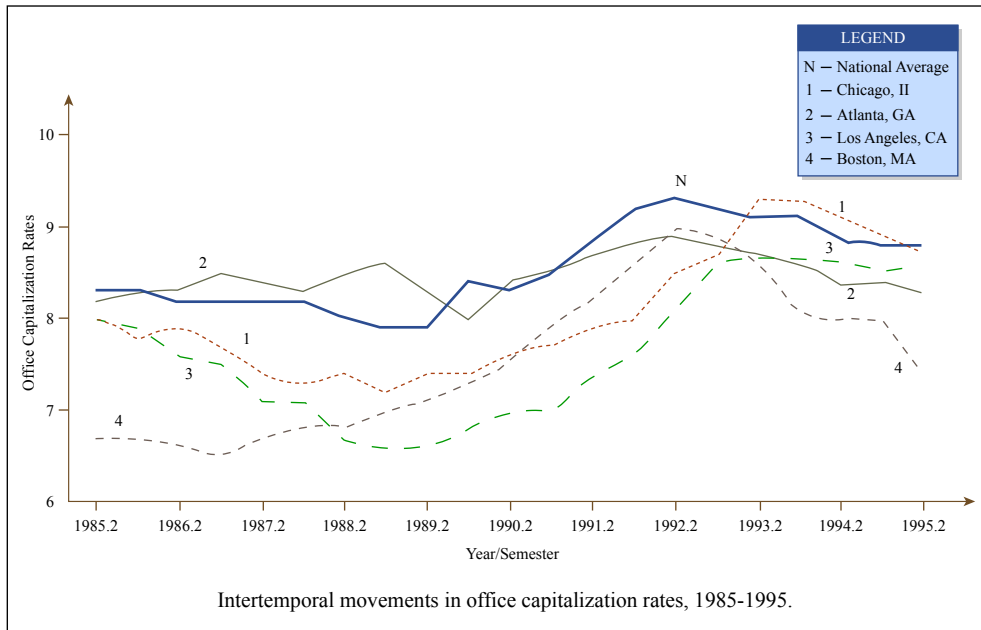
Figure by MIT OCW.

2) the second important conclusion from this paper is that local markets appear to have time variant and time invariant factors that affect local cap rates. Examples of time invariant factors include employment concentration in a single sector, or percentage of government jobs. These factors may be important in assessing the perceived riskiness of a market which must be understood due to the likely impact of required rates of return in that market. This concept is important in terms of separating short term expectations of income growth from long term market specific risk factors that affect risk and return requirements and differences across markets.

Another important paper (Yisheng Yu 2004) explored the variation in cap rates across sub-markets within the Atlanta office MSA. The findings of this study included the fact that the market does care about individual space market factors as well as property specific attributes such as age and construction type. "Movements of market-specific

capitalization rates are shaped by local office market features, including space stock level, absorption rate, and past rate of rental income growth. These features result persistent different capitalization rates across submarkets in this case." This finding confirms that differences in local market factors affect cap rates, even at a sub-market level. Interestingly, in contrast to the graph shown above, movements in capitalization rates at a sub-market level appear to have an extremely high correlation and move simultaneously.
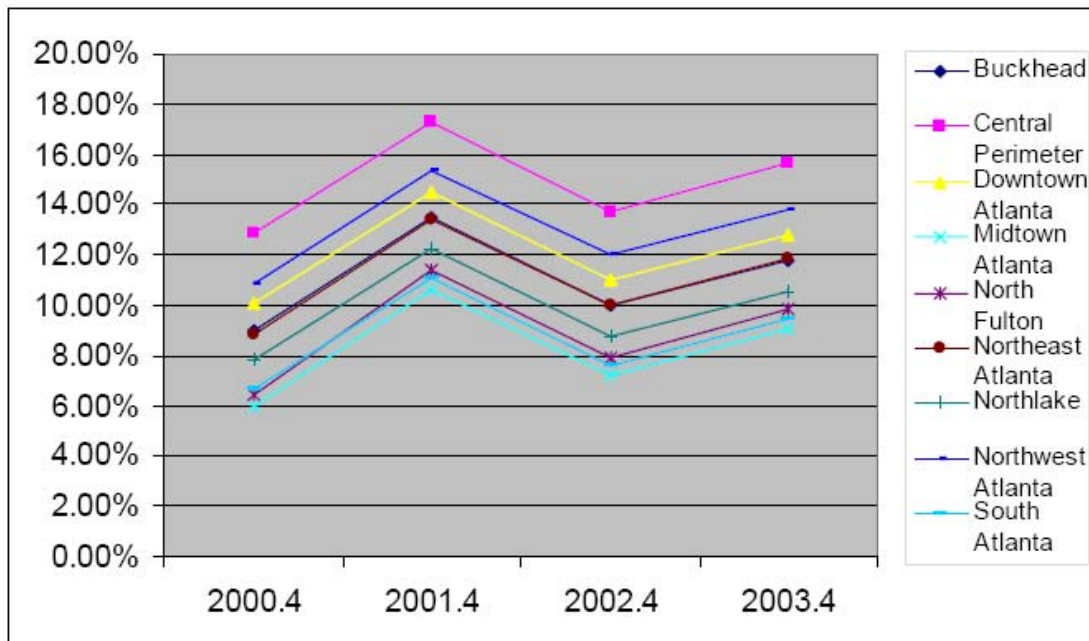
Another interesting finding of this paper was that past rental growth was found to have a negative impact in unity on cap rates. This would suggest that the market is likely not 'backward looking' and that further exploration is warranted to test this possibility.

(Pai 2006) is an MIT thesis that attempted to develop an equilibrium pricing model that would accurately predict real estate prices. The papers' findings showed significant impact on pricing from several factors including market size, property price, and property type. In addition to determining that these specific factors are relevant to market pricing,

it also discovered that many of the relationships apparent in the way the market prices assets are surprisingly the opposite of commonly accepted principals of both investment and property markets. The factor that was found to be most important in determining real estate asset prices was the property type. The graph below shows the grouping by type, as well as the curious result of apartments having smaller Betas and yet earning higher returns historically.

Property Type Size Analysis - Risk (Beta) vs Return
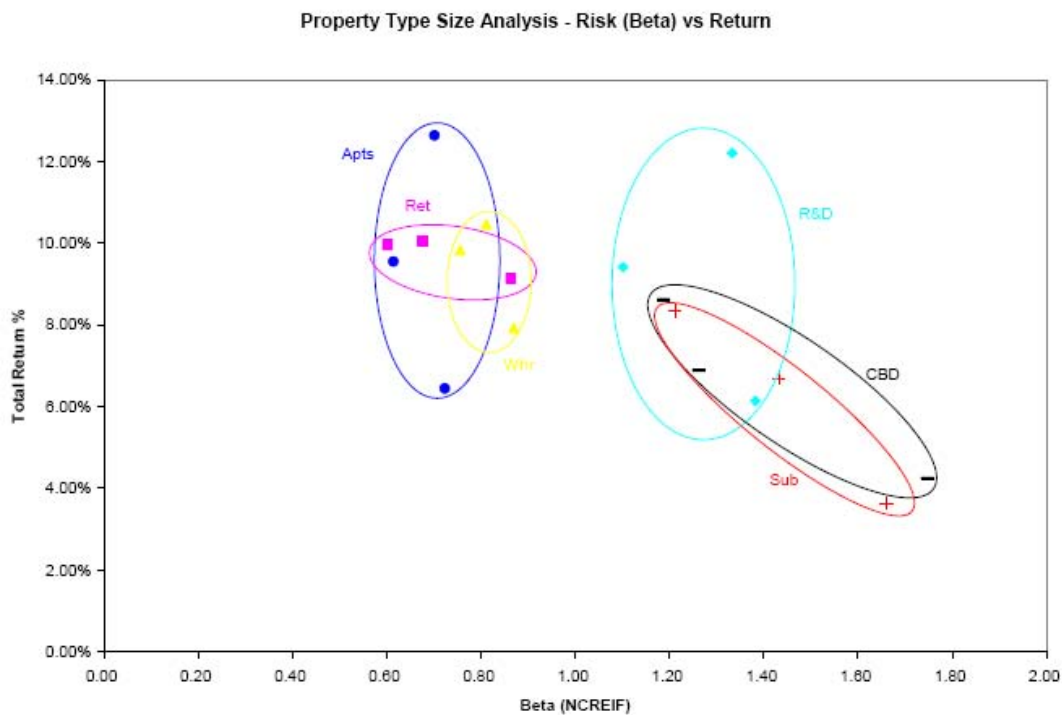
 While this paper did not explicitly perform a cross-sectional analysis, it still provides important insights into how the market appears to price real estate and what factors should be considered in this cross-sectional analysis.

The most recent study was that done by (Chichernea, Miller, Fisher, Sklarz, White 2007). This study is also the most similar to the topic of this paper as it specifically addresses the causes of cap rate differences across markets. This paper studied cap rate variations

across markets for apartments using transactional data from RCA. One of the important findings of this paper was that supply side factors have a significantly larger impact on cap rates than demand side growth forecasts. This implies that the market places a significant premium on supply constrained markets. The other related finding of this study that is important is that there doesn't appear to be a demand side impact on pricing. This means that increases in expected future demand for apartment in the space market doesn't appear to be being priced into apartment prices significantly. This is a surprising and important result. A third finding of this study is that market size or liquidity has a significant impact on pricing. This finding supports findings of (Sivitanidou and Sivitanides 1999) related to office prices.

Progress- Market evolution and sophistication

One of the important aspects of this research that makes it particularly relevant is the continued evolution of the real estate industry. The market appears to be evolving in two important and distinct ways that are having significant impacts on real estate prices and markets. One important evolution is the continued refinement and understanding of how the space market works. Through increased scrutiny as well as additional data, the market has developed a much better understanding of the space market dynamics.

It has been argued that the increased understanding of the space market has resulted in more prudent and restrained lending practices, specifically related to development. Historically, excess development or over-production of supply is the primary factor that has lead to the historic cyclicality and volatility of rents in the space market. Recent

increases in valuation have not resulted in the significant building boom that has

previously been seen in previous cycles. This is potentially an indication of a more

sophisticated development market. It remains to be seen whether or not the cyclicality of

rents will potentially diminish.

In addition to the space market's evolution, the financial market also appears to have

developed an increased understanding of real estate as an investment asset class. The

increased attention from the financial markets on real estate has had important impacts on

property values. This has included significant reductions in cap rates over the past

several years, as well as an improved understanding of the value of real estate in a well-

diversified portfolio. This trend can be conceptualized as the slow merger of real estate

and Wall Street. With this trend, Wall Street is bringing increased scrutiny and

sophistication as well as brainpower and capital to the pricing of real estate.

In my opinion, the upshot of the evolution of both the space and financial markets will be

an increasingly efficient asset pricing market for real estate. The real estate market is

going through a transition period where it is changing from a somewhat inefficient to an

increasingly efficient market. One of the important aspects of this evolution is the ability

of the market to understand and predict future income growth changes due to the local

market dynamics.

This paper is an attempt to employ sound strategies and analytical tools to increase the

understanding of real estate prices. This sort of methodology is meant to be important

both for academics understanding of real estate markets as well as being relevant to active market practitioners. For market practitioners, the current real estate market prices still appear to demonstrate characteristics of inefficiencies that can be interpreted as opportunities for superior risk-adjusted returns.

The goal of this research will be to first understand the differences between theoretical models and actual pricing models used by the market. The paper's other main objective is to analyze the potential opportunities presented by the current pricing practices of real estate. If the inefficiencies in pricing are consistent and can be better understood, an investment strategy can be developed to capitalize on the inefficiencies. By analyzing the data from 1996 and 2001, I will attempt to extrapolate to the current market and attempt to identify undervalued markets. The development of an investment strategy based on this research will hopefully be an impetus for furthering the market's understanding of accurate real estate pricing models and a way to increase the sophistication and accuracy with which real estate should be priced based on the space market fundamentals.