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Revisiting the hotel capitalization rate

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ABSTRACT

Based on empirical analyses of US hotels, this study finds that hotel capitalization rate is a complex combination of macroeconomic and asset-class specific variables beyond the cost of capital, capital structure and growth rate. In particular, investors in hotel real estate base their cap rate measures on the performance of corresponding REITs. Incorporating asset specific trends improves the explanatory power of the capitalization rate model. A significantly persistent cap rate across consecutive-periods experiences an offsetting autoregressive effect in a year. Unusual increases in rents lead to investor scrutiny. Regulatory environment significantly impacts the capitalization rate after controlling for the overall economic activity in a market.

1. Introduction

Valuation of an asset is a precursor of investment in it. Income producing assets such as hotels are primarily valued based on their income generating abilities over time. Such methods heavily depend on capitalization ("cap") rate assumptions. Cap rate is the ratio of expected income from an asset to its intrinsic value. This ratio determines the value investors would assign to it given the income produced by the asset. Conversely, the cap rate reflects income yield expectations given the value of an asset.

Since real estate assets are funded by debt and equity their yield expectations should be a weighted mean of individual yield expectations from these sources. Unless the cap rate is already specified, an analyst has to determine it by deducting cash flow growth expectations from the discount rate. Although such a derivation of the cap rate is mathematically intuitive, it is faced with some practical challenges. For example, the prevalent capital structure is unknown in a short run. Moreover, the exact costs of equity and debt capital for a particular asset are difficult to estimate. Therefore, several studies have offered alternate explanations for the determination of the cap rate (Sivitanidou and Sivitanides, 1999; Chen et al., 2004; Hendershott and MacGregor, 2005a,b; Ghysels et al., 2007; Clayton et al., 2009).

The purpose of this study is to reconcile the explanations of earlier studies specifically in the context of hotel real estate. By comparing various generic studies on cap rates, the study aims at introducing some novel determinants that improve our understanding of hotel cap rates. In particular, this study intends to develop effective empirical models for cap rate based on widely accessible economic information.

Hotel industry offers an effective laboratory to examine the empirical models due to a higher degree of information efficiency in its consumer market. Unlike several other commercial real estate classes such as office, apartment or retail, lease contracts in hotels are substantially short such that the occupancy rates, rents and, hence, the income should respond more frequently to the changing macroeconomic trends. Since lease contracts in other commercial real estate markets are often proprietary information, it is challenging to collect the rental information in several commercial real estate assets. Also, although indirectly, measures such as Revenue Per Average Room (RevPAR) and Average Daily Rate (ADR) offer a highly frequent and recent means of documenting real estate income in hotels.

This study finds that the hotel cap rate is persistent in a short run; but exhibits mean-reversion about a local mean within a year. As expected, higher leverage leads the cap rate to decline. Relatively "free" MSAs experience higher cap rates and local regulatory environments (freedom index) is a significant determinant of the cap rate. Findings suggest that the fundamental components such as capital structure and cost of capital constitute necessary determinants of cap rate, but not sufficient. When determining cap rates for a financial analysis exercise, analysts must also incorporate recent trends in asset-specific key indicators and local regulatory factors.

The remaining part of this paper is organized as follows. The section below provides relevant background literature. Some studies in this section provide the initial basis for the empirical models examined in this study. The next section presents the classical model of the cap rate and builds a case for empirical models. This

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section is followed by a discussion on data and models. Next, results of the empirical models are presented and discussed. The final section provides conclusions, discusses limitations of the current study and suggests future research.

2. Background and literature

Determination of the cap rate has been a question of inquiry in several scientific studies in the domain of finance and real estate. Examining office cap rate, Sivitanidou and Sivitanides (1999) stress on the importance of local fixed-effects, time-variant components and persistence in cap rate. They report that cap rate is not solely determined by the local market; but also by national capital markets. The influence of macroeconomic trends such as real GDP, stock returns and inflation have been documented in Chen et al. (2004). Ghysels et al. (2007) note that economic variables and growth in rents are among the prime determinants of the cap rate. They also point out that beyond market fundamentals, cap rate is more influenced by factors orthogonalized by fundamentals. In other words, cap rate is heavily dependent on heuristics which are not necessarily associated with economic fundamentals. Similarly, Clayton et al. (2009) report while market fundamentals are the key driver of cap rate, the investor sentiment plays a significant role.

Cap rates are sticky in a short run and are primarily determined by different factors across different property types (Chen et al., 2004). Clayton et al. (2009) point out that heterogeneity across property types differentiates price movements across their markets.

Several papers examine the role of market cycle in the cap rate determination. However, the exact role of rent cycles is a conundrum. Sivitanides et al. (2003) argue that in an efficient market if the space (commercial rental) market is mean-reverting cap rates should decline with temporarily deteriorating real estate fundamentals. Such a decline in the cap rate would reflect an investor perception that the market will eventually recover. Similarly, if the space market is strong, cap rates may fall in an anticipation of upcoming market decline. However, their empirical evidence based on office market data suggests the opposite: cap rates further rise in a downturn. They note that cap rates are not forward looking and do not forecast the market. However, Ghysels et al. (2007) argue the contrary that cap rates forecast commercial real estate. According to Hendershott and MacGregor (2005a,b), "cap rates reflect rational expectations of mean reversion in future real cash flows." The study acknowledges a contrasting finding in earlier studies that investors fail to raise the cap rates during market peaks. However, such a mean-reverting nature in cap rates is noted in another study by Hendershott and MacGregor (2005a,b) and Chen et al. (2004).

A separate stream of studies documents the influences of macroeconomic policy on capital markets (e.g. Bekaert et al., 2010, Kurov, 2010 and Daniel et al., 2002). For example, in stock markets, asset pricing models incorporate the risk-free rate which is governed by monetary policy. Hendershott and MacGregor (2005a,b) argue that dividend/price ratio and real expected dividend growth rate in stocks are associated with cap rates. Analogous to PE ratio in the relatively efficient stock markets, the cap rate is a critical measure of investor sentiments in real estate asset markets. By inference, empirical models for the cap rate capture such policy-related influences if they control for movements in stock markets. However, while PE ratios are widely-ranged measures, cap rates are localized. Therefore, beyond the national-level policies, local regulatory environments must play a significant role in the cap rate determination. Some studies include local regulatory variables such as development process regulatory index (Xing et al., 2006) and Wharton regulatory index (Gyourko et al., 2008). However, these studies focus primarily on the supply side of residential real estate.

In this paper, it is argued that beyond the supply side, the demand side should also have a significant influence on the cap rate. The freedom index measured for various states by the Mercatus Center at George Mason University offers a broader measure for the regulatory environment. Among others, this index quantifies regulatory freedom on personal (e.g. sexual orientation, gaming, drugs, guns), fiscal (e.g. local tax, debt), policy (e.g. insurance, telecom) and other such fronts to which consumers of hotel real estate are sensitive. Arguably, this index influences both the supply and demand sides of real estate; yet it has been ignored in existing studies. To the best of the author's knowledge, this is the first study to examine the impact of regulatory freedom on cap rate. Besides, the study reconciles diverse perspectives from earlier findings in a single study and makes a comparative analysis of various empirical approaches in the context of hotel real estate. In line with the argument made by Chen et al. (2004) and Clayton et al. (2009), cap rates behave distinctly for different asset classes. Therefore, this study narrows down the focus on a single asset class to offer in-depth analysis of the cap rate. Besides, the study explores the role of regulatory freedom in determining cap rates.

3. The mathematics of cap rate

A newly built (or acquired) hotel experiences unstable cash flows during initial years. It is customary to assume a stabilization period (say τ) after which the income (NOI) grows at a constant rate (say g). If the discount rate is assumed to be $=\omega$, then total present value of all incomes following time τ, based on the sum of an infinite geometric series can be derived as:

$$P = \frac{\mathrm{NOI}_{\tau+}}{\omega - g} \tag{1}$$

This is the intrinsic value of the hotel at time τ. Here, subscript $\tau+$ signifies the cash flow immediately after time τ. The above equation is also the classical definition of the cap rate (ρ) where, $\rho = \omega - g$.

Or,

$$P = \frac{\mathrm{NOI}_0}{\rho} \tag{2}$$

Eq. (1), however, is based on a premise that g is a constant and the asset generates income virtually until infinity. In reality, NOI follows an irregular path in the long run adding to the risk in cash flows. In other words, $\rho = f(\omega, g, X)$, where X is a set of exogenous factors that determine investors' collective perception about the riskiness in an asset class. Therefore, coefficients of ω and g may be unequal, different from unity and adjusted by X. The exact measures of these determinants need to be established empirically.

By definition, ω reflects the weighted average cost of capital (WACC). For leveraged investments, if λ, D and E reflect loan-to-value ratio, cost of debt and cost of equity capital respectively, then $\omega = \lambda D + (1-\lambda)E$. However, often D and E for a specific investment are not overtly known and are derived by adding commensurate risk-premiums (say, x and y) to yields (say D_o and E_o) on standard, less-risky securities. D_o and E_o may often be determined easily (for example, Moody's BAA index yield may proxy for D_o and S&P500 return for E_o). Expected inflation offers a proxy for g. Thus,

$$\begin{aligned} &\rho = \lambda(D_0 + x) + (1-\lambda)(E_o + y) - g \\ &\text{Or,} \quad \rho = \lambda * D_o + x\lambda + E_o + y - \lambda * E_o - y\lambda - g \end{aligned} \tag{3}$$

Rearranging Eq. (5):

$$\rho = y + \lambda * D_o + (1-\lambda) * E_o + (x-y) * \lambda - g \tag{4}$$