

The Relationship Between Cap Rates Inflation, Deflation, and GDP Growth Rates

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1 Abstract

The inability to accurately and consistently predict changes in asset values plagues all sectors of finance. In commercial real estate the capitalization rate, cap rate, is a good metric to measure the value of a commercial real estate asset. The current literature tends to argue that capitalization rates are determined by previous cap rates and macroeconomic variables. This paper aims to show that stagflation, a slowing GDP growth rate and a rising inflation rate, is a good predictor of ensuing changes in cap rates. This analysis will use cap rate data from Green Street Advisors and macroeconomic data from the Federal Reserve. Examining groups of six quarters from January 1, 1987 to January 1, 2021 for the presence of stagflation predicted the rise of cap rates 49 percent of the time and of the 27 forecasts this system made 85 percent were correct. Decreasing the period of examination to four quarters, the system correctly forecast a rise in cap rates 56 percent of the time and when the system did make a prediction it was correct 79 percent of the time. A predictive system like this will make the

commercial real estate market more efficient and allow those within the market to maximize their returns.

2 Literature Review

Capitalization rate are a crucial part of underwriting commercial real estate assets and the conduct of the commercial real estate business. There is significant value in being able to predict the movement of cap rates. Many scholars and finance professionals who examine the real estate market have tried to establish a substantive connection between macroeconomic variables and cap rates. This work has yielded mixed results. Specifically inflation, deflation, and changes in GDP are macroeconomic variables which may be good predictors of changes in cap rates.

The relationship between inflation and cap rates has been explored in the literature as a predictive relationship (Costello et al., 2001; Sivitanides et al., 2001; Chandrashekar and Young, 2000). In general, the research has reached mixed conclusions on the ability of changes in inflation rates to determine future changes in cap rates. Conclusions range from an implied correlation between inflation and cap rates to emphatic empirical support of the inflation rates' predictive ability to dismissal of the relationship between inflation rates and cap rates entirely. These different conclusions can be attributed to differences in data and methodology. Research which finds that inflation is a good predictor of future cap rates typically use time series data for both macroeconomic variables and cap rates while research which dismisses the value of inflation rates, generally, use cross sectional econometric methods.

Costello et al. in "Real Estate Risk: A Forward Looking Approach Real Estate Risk: A Forward Looking Approach" provide an example of re-

searchers reaching a conclusion that inflation has a serious effect on cap rates. To do this Costello et al. measure future risk of real estate assets using a variance auto regression (VAR) method and conclude that the risk of the given asset is the standard error of each variable. (Costello et al., 2001) Their approach shows that the cap rate can be predicted using local market rent forecasts as well as national interest rate and inflation forecasts. Costello et al. make two very important conclusions. First, cap rates reflect changes in the opportunity cost of riskless capital relative to inflation. Second, cap rates are related to recent market rent growth instead of forecasted rent growth. (Costello et al., 2001) In other words macroeconomic variables such as inflation have a definite effect on cap rates.

Sivitanides et al. use the average cap rates over the past 16 years of four property types across 14 metropolitan markets to examine how cap rates behave. This data is extracted from the National Council of Real Estate Investment Fiduciaries (NCREIF). Sivitanides et al.'s methodology takes great advantage of their data. A log-linear model yielded the best results due to the non-linear nature of the data. (Sivitanides et al., 2001) This statistical specification was estimated using a dual Time-Series Cross-Section method which corrects for cross section correlations and group-wise heteroskedasticity. Inflation was found to be a major driver of cap rates. In fact, Sivitanides et al. found that an expected increase in economy wide inflation of one percent annually lowers office cap rates by 46 basis points, multi-family cap rates by 40 basis points, retail cap rates by 54 basis points, and by 20 basis points in industrial cap rates.

In contrast to Costello et al. and Sivitanides et al., Chandrashekar and Young find that there is little to no relationship between inflation and cap rates. To reach this conclusion Chandrashekar and Young use two regression models: one with macroeconomic variables and one with lagged cap rates. The model with lagged cap rates uniformly performed better. (Chandrashekar

and Young, 2000) The duo concluded that their attempt to predict cap rates using macroeconomic variables, such as inflation, were unsuccessful. Gimpelevich supports Chandrashekar and Young using Monte Carlo simulations of real estate returns called the Simulation-Based Excess Return Model (SERM). The simulation results in poor correlation between inflation rates and cap rates (Gimpelevich, 2011).

GDP, unlike inflation, is a fairly obvious driver of property values and consequently cap rates (Quan and Titman, 2003). As the GDP or wealth of a nation, or even a region, rises the value of property in that nation or region would presumably rise. The primary question in the literature concerning GDP and cap rates is how GDP effects property values and cap rates. If GDP is a primary driver of property values and cap rates, does where GDP growth occur matter in real estate pricing? If GDP is growing locally will that have a stronger effect on local real estate values than global GDP growth?

Since, GDP, presumably, does have a significant effect on property values and cap rates, does worldwide GDP growth or local GDP growth have a larger effect on property values and cap rates? Goetzmann and Rouwenshorst explore whether or not correlations across global real estate markets are due to world changes in GDP, and estimate the value of local economic performance in real estate markets. This is an important question in real estate because all real estate is essentially local and if local growth has a stronger effect on property values than national or global growth investors can better leverage local growth patterns to maximize return. It is difficult to obtain international property return data, but Goetzmann and Rouwenshorst collected data from a now defunct real estate association the International Commercial Property Associates (ICPA). This organization published yield and rent estimates in ICPA's "International Property Bulletin". Unfortunately, this source among other dated real estate reporting firms do not provide the most useful data. For example

Goetzmann and Rouwenshorst estimate income and capital appreciation with yields and cap rates.

International real estate markets are found to be correlated through changes in world GDP. Some markets, such as Asia, are more effected by local changes rather than world changes in GDP (Goetzmann and Rouwenhorst, 2000). In other words, even though real estate is fundamentally local changes in the global economy carry enough weight to have significant effects in local real estate markets.

Quan and Titman utilize time series regressions to examine the effects of changes in macroeconomic variables on real estate values and rents. To begin Quan and Titman explore the connection between stock and real estate market returns, and after establishing their connection the duo explore factors and develop regressions to explain this connection. The first theory they explore is that real estate and stock prices are both guided by future macroeconomic expectations such as GDP growth. The second is that commercial real estate prices rise and fall because of changing political and economic fundamentals, under this theory the relationship between the stock and real estate market will be much weaker. After controlling for macroeconomic variance Quan and Titman find that the correlation between real estate and stock prices are primarily because of economic fundamentals, and that rental rates are strongly correlated with GDP growth.

To reach these conclusions the duo used an international data set including 17 countries with data spread over 14 years. All of the real estate data was obtained from JLL (previously JLL). This data includes estimates of capital and rental values arising from public opinion. In general, international macroeconomic variables (GDP, exchange rates, inflation, etc...) were all provided by the IMF International Financial Statistics Yearbook. Quan and Titman's first

table lays out the mean commercial real estate capital values, commercial rents and the stock index, and the first order serial correlation of the capital appreciation series (Quan and Titman, 2003). This chart shows that Asian markets, Hong Kong and Taiwan, experienced large increases in real estate price between 1984 and 1996 while the rest of the world experienced only moderate growth.

In empirical testing the duo utilize both cross sectional and time series econometric methods. Indonesia, Taiwan, and Thailand were excluded from cross-sectional regressions because of a lack of data in the early to mid 1980s. For the remaining countries Quan and Titman calculated the change in the value of stock indices, real estate indices, and macroeconomic variables. Their regression examines the factors of long term appreciation and changes in rental rates of commercial real estate. This cross sectional analysis shows that changes in GDP are very strongly related to movements in real estate values. Despite the significance of GDP inflation and interest rates had relatively little effect on real estate values.

Time series regressions yielded the same results as cross sectional analysis. Real estate values and rents were still significantly affected by changes in GDP. Inflation, again, appears to be unimportant. Concerning inflation, the duo finds that real year-to-year rental rate is negatively effected by inflation (Quan and Titman, 2003). Therefore, real estate may not be a good short term hedge against inflation.

There is a clear desire in academic and professional circles to find a good predictor of cap rates to be able maximize potential returns. Despite the plethora of research attempting to establish the determinants of cap rates there exists a persistent degree of uncertainty in predicting cap rates. In fact, Liang Peng in "Finding Cap Rates: A Property Level Analysis of Commercial Real Estate Pricing" found a strong positive relationship between pricing and risk for

all property types. In other words the higher the cap rate the more uncertainty (Peng, 2013). Keeping in mind Peng's findings macroeconomic variables may also contribute to uncertainty in the value of real estate assets. Fundamental macroeconomic variables such as inflation, deflation, and GDP growth despite their potential influence on uncertainty still appear to be the most promising variables for predicting future cap rates.