A SIMPLIFIED APPROACH TO UNDERSTANDING CAPITALIZATION RATES

by Young W. Chai

The criticism that today's properties are valued based on yesterday's prices reflects a traditional process which estimates the market value of an asset by analyzing prior and current comparable sales. While the approach inherently produces a time lag and smoothing, this article argues that these may be the result of insensitivity to real estate market conditions which, in turn, affect expectations for future income growth.

Valuation Of Real Estate Investments

There are two generally accepted approaches to value commercial real estate. The first approach is the present value of expected future income from an investment, or the discounted cash flow (DCF) approach. This method involves two steps: (1) estimating the future net operating income and residual value, and (2) calculating the present value of the cash flow by discounting the income stream at a risk-adjusted, required rate of return. The second approach is the market extract method in which capitalization rates from prior or current sales transactions are applied. A capitalization rate, analogous to a price/earning ratio used in securities markets, is simply a ratio of net operating income over price.

In theory, the DCF and market extract approaches should result in the same valuation of an asset, because a capitalization rate reduces all the assumptions used in the DCF approach into a single number. Let's assume a simple world in which investors do not pay taxes, the cost of debt and equity is the same and buildings are purchased and held until they become obsolete. In this world, the capitalization rate equals: the risk-adjusted required rate of return – the expected NOI growth rate + the economic depreciation rate for the building.[1]

Data On Capitalization Rates

Although capitalization rates are probably the most important performance/valuation measure for commercial real estate assets because of their prevalent use, they are probably the most difficult pieces of information to obtain. In the public REIT market, the proxy for capitalization rates is the ratio of funds from operation (FFO) over the market value of debt and equity. However, at least two factors make the use of this ratio difficult. First, the market value of debt is difficult to assess unless it is publicly-traded. Second, the market value of equity incorporates intangible franchise value which cannot be easily valued as distinct from the total value of the enterprise.

Young W. Chai, Ph.D. is a vice president of research at Copley Real Estate Advisors, a real estate investment management firm with approximately $6.2 billion of assets under management on behalf of institutional and individiual investors. He received a Ph.D. from Massachusetts Institute of Technology and an MBA from the University of California, Los Angeles.

FIGURE 1

Capitalization Rate for Industrial Properties–ACLI

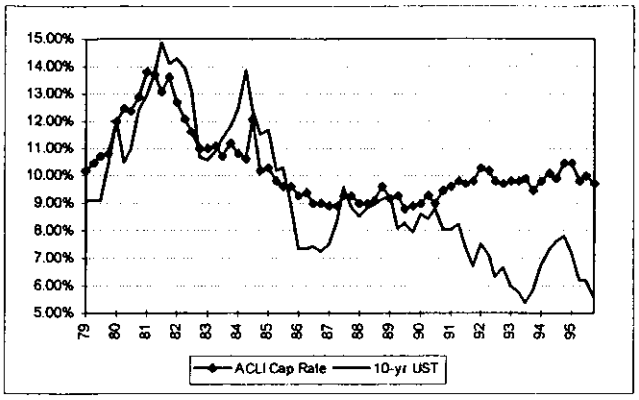
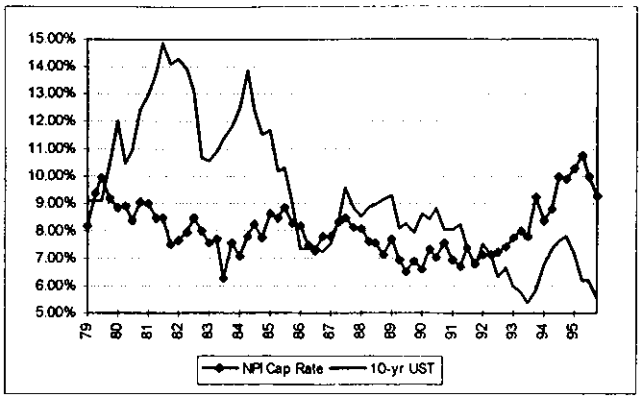


FIGURE 2

Implicit Capitalization Ratesbased on NPI Warehouse Data



In the private market, capitalization rates are difficult to obtain due to infrequent sales transactions and the proprietary nature of private property operating information. In the absence of a reasonably reliable method of valuing commercial real estate, institutional investors primarily rely on appraisals to monitor the value of their assets. Two appraisal-based capitalization rate series provide the sufficiently long history as well as broad sampling necessary for time-series analyses. They consist of commercial mortgage commitment data from the American Council of Life Insurance (ACLI) and the Property Index (NPI) from the National Council of Real Estate Investment Fiduciaries. Throughout this article, data for the industrial/warehouse property type at the national level will be used as an example. This property type was chosen because it is least affected by diverging definitions of NOI. However, the methodology of the analysis for other property types should be the same. The ACLI data is provided by large life insurance companies which underwrite commercial mortgages. The data, published quarterly, include summary information for mortgages including capitalization rates, loan-to-value ratios, interest rates and amortization terms.

Figure 1 illustrates historic capitalization rates for industrial properties taken from the ACLI series between 1979 and 1995. The series has an average of 10.32 percent with a standard deviation of 1.29 percent. Until the 1990s, the series is highly correlated with the 10-year U.S. Treasury interest rate series. Between 1979 and 1995, approximately 56 percent of variance in capitalization rates can be explained by the movement in interest rates.

The NPI is compiled quarterly from data provided by investment advisors who own commercial real estate on behalf of pension funds and other institutions. The NPI data provide a time series for net operating income and price on a quarterly basis. Since the capitalization rate is the ratio of the expected net operating income for the next year divided by this year's price, one can calculate the implicit capitalization rate for the properties included in the NPI. To estimate the expected net operating income for the next year, the current year's change in net operating income was extrapolated. As shown in Figure 2, implicit capitalization rates averaged 8.08 percent with a standard deviation of 0.97 percent between 1979 and 1995. The income return series, as reported by NPI, has a slightly lower average (i.e., 7.81 percent) and lower volatility (i.e., a standard deviation of 0.74 percent) during the same time frame. Unlike the ACLI data, the implicit capitalization rate series is not even modestly correlated with the interest rate series, as shown in Figure 2.

Each of the series contains problems associated with how capitalization rates are estimated. Specifically, ACLI's series is based on artificial net operating income which is arrived at by assuming that a building is operating under full occupancy, defined typically as 95 percent. In a market environment characterized by much lower occupancy rates, this assumption would lead to unrealistically high capitalization rates. Also, most investment advisors who supply the NPI data are required to have their properties appraised by independent appraisers only once a year. During the year's other three quarters, these advisors use internally generated appraisals.

Notwithstanding the problems associated with the capitalization rates derived from these series, it is important to understand them. To value assets

FIGURE 3

Expected NOI Growth and CPI Inflation Rates

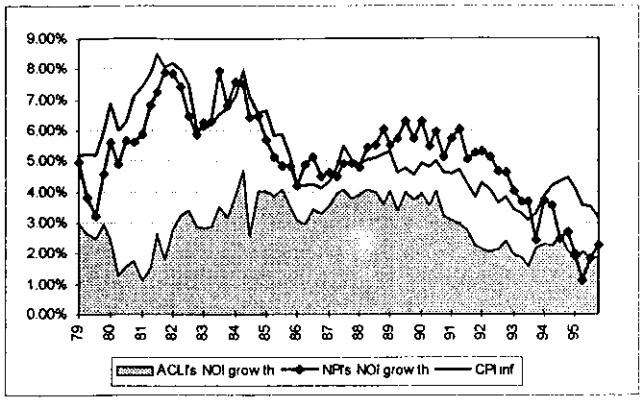
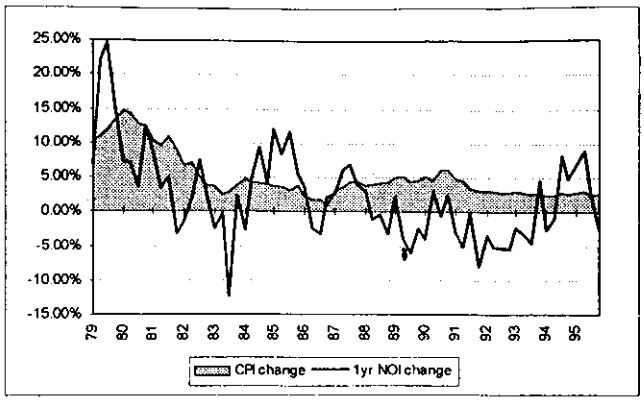


FIGURE 4

Actual Annual Changes in NOI and CPI



properly, one must understand what is determining market capitalization rates. A careful analysis of capitalization rates can help investors determine whether an investment opportunity is over-priced or under-priced based on market fundamentals.

Analysis Of Expected NOI Growth Rates

Since a capitalization rate series can be derived from the ACLI and NPI data, and assuming that the economic depreciation rate is 2.47 percent per year, one can estimate expected NOI growth rates between 1979 and 1995 as shown in Figure 3. The series, based on the ACLI data, has an average of 2.92 percent with a standard deviation of 0.86 percent. Therefore, the series suggests that expected NOI growth rates fell within the range of 2 percent to 4 percent during most of the observed time frame.

The series based on the NPI data indicates an optimistic set of expectations. The expected NOI growth rates averaged 5.16 percent with a standard deviation of 1.50 percent. One might argue that the spread between these two expected NOI growth rate series may be explained partly because the properties included in the NPI data consist of institutional quality buildings, whereas those included in the ACLI data are typically a mix of Class A, B and C buildings. However, the magnitude of the spread has not been consistent over time, making this explanation difficult to accept.

A comparison of these expected NOI growth rates against 10-year CPI inflation expectations reveals interesting results as shown in Figure 3.[2] The expected 10-year CPI inflation rate series averaged 5.29 percent with a standard deviation of 1.41 percent. This suggests that the series mirrors the expected NOI growth rate series based on the NPI data.

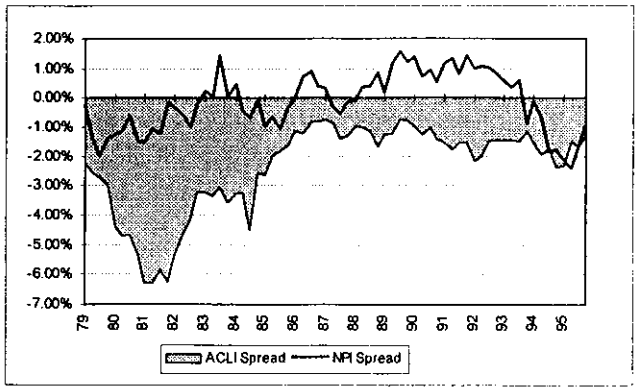
Figure 4 illustrates actual annual changes in the NOI index from the NPI data and CPI between 1979 and 1995. Although the CPI series averaged 5.14 percent with a standard deviation of 3.35 percent, actual annual changes in NOI averaged only 2.34 percent with a standard deviation of 6.59 percent. During this time frame, actual changes in NOI have not only been low compared to CPI, but also far more volatile. Therefore, one can conclude that investments in warehouse properties have provided only modest protection against inflation. More importantly, actual changes in NOI are not correlated with expected NOI growth rates. This is clear evidence that prior real estate market performance is not incorporated into the valuation process.

Figure 5 illustrates the spread between expected NOI growth rates and 10-year CPI inflation expections. It is quite evident that investment advisors' expectations of NOI growth, based on the NPI data, are highly correlated with CPI inflation expectations. In fact, the average spread between these two series was negligible at 0.13 percent.

The expected NOI growth rate series based on the ACLI data is insensitive to expected inflation rates between 1979 and 1995. However, a remarkably close relationship existed between these two series during the period of 1987-1995 with an average spread of negative 1.41 percent. This negative spread probably existed because industrial vacancy rates during this period were above the equilibrium level. If market conditions were to approach equilibrium, the spread should tighten because rents are likely to increase at a faster pace. Prior to 1987, the spread between the ACLI-based expected NOI growth rates and general inflation rates was significantly lower, averaging negative 3.45 percent. In hindsight, since rents have not kept up with inflation through most of the 1980s, one can conclude

FIGURE 5

Spread Between Expected NOI Growth and 10-Year CPI Inflation Rates



that the ACLI-based expected NOI growth rates were closer to the actual changes in the NOI index. More specifically, such a large spread may be explained by industrial vacancy rates, which increased from 2.7 percent in 1978 to 5.8 percent in 1986. Obviously, if vacancy rates rise significantly beyond the equilibrium level, one would not expect rents to keep up with inflation rates.

Conclusion

Based on analysis of capitalization rates derived from the NPI data, one can conclude that they are highly correlated with inflation expectations reflected in the Treasury market. The lack of correlation between past performance and expected NOI growth rates suggests that real estate market conditions have been delinked in the valuation process. If real estate market conditions had been in equilibrium throughout the observed time frame, this would not have been a source of concern. However, history has shown that real estate markets are usually in disequilibrium.

Given that an increasing number of institutional investors are focusing on opportunistic investments, the finding that disequilibrium in real estate market conditions is not fully priced in the valuation process indicates that the analysis of capitalization rates can be a useful tool for identifying investment opportunities. For example, investors can use the NPI data in Figure 5 to support their acquisition or disposition decisions. When the spread is persistently positive (e.g., between 1988 and 1993), market sentiment is probably overly bullish. Therefore, investors should monitor market conditions carefully to consider selling their investments. Conversely, if the spread is abnormally negative, the market may be overly bearish. The second half of 1994 and the first half of 1995, when the spread was around −2.0 percent, appears to have been an opportunistic period to acquire warehouse buildings. Since the series has a mean of 0.13 percent, the spread is very likely to approach or exceed zero in the near future.

NOTES

1. The **risk adjusted required return** can be estimated using the capital asset pricing model (CAPM) and data provided by industrial public REITs. The risk adjusted rate of return would be 9.75% assuming a 7% yield on the 10-year U.S. Treasury, a market rate of return of 12% (the historic average for the S&P 500) and a weighted average beta for industrial REITs of 0.55. The **economic depreciation rate** can be assumed to be 2.47% based on a study by Charles Hulten and Frank Wykoff, "The Measurement of Economic Depreciation." in Charles R. Hulten, ed., *Depreciation, Inflation, and the Taxation of Income from Capital.* The **expected NOI growth rate** is the most difficult to calculate so it is often assumed to grow at the rate of inflation. However, NOI is unlikely to grow at the rate of inflation unless real estate market conditions are at or near equilibrium.
2. To arrive at 10-year CPI inflation expectations reflected in Treasury rates, the historic average real interest rate of 3.0% is assumed when 10-year U.S. Treasury averaged 7.0%. When the Treasury is above or below 7.0%, real interest rates should also be higher or lower than 3.0%. Accordingly, the expected 10-year CPI inflation rate is defined as 10-year U.S. Treasury yield*0.57. The resulting expected 10-year CPI inflation series mirrors very closely with survey data in "Survey of Professional Forecasters" by the Federal Reserve Bank and "Decision-Makers Poll" by Dick Hoey.