Band of Investment Models for Estimating Cap Rates

I. Estimation of the overall cap rate (R_O)
   A. The cap rate is preferably extracted directly from comparable sales data (and thus supported by direct market evidence), if possible.
      1. However, it is not always possible to extract overall capitalization rates (R_O) directly from comparable sales because of the absence of adequate comps or reliable market data.
      2. In the absence of data that allows cap rates to be extracted from market transactions, appraisers must rely on algebraic approaches and elements of finance theory.
   B. Mortgage-equity valuation techniques
      1. In the absence of adequate comps, one approach is to estimate an overall cap rate from mortgage and equity data.
      2. Techniques that use mortgage and equity data to estimate the value of income property or to estimate parameters of valuation models, such as the cap rate, are referred to as mortgage-equity techniques. These techniques are used in a variety of income-property valuation situations.
      3. There are a variety of mortgage-equity techniques. These techniques break property value or the return on a property investment into their mortgage (debt) and equity components, and then estimate the property value as the sum of the values of the mortgage and equity components or estimate the return on a property investment as the weighted average of returns to the mortgage and equity components.
      4. Later on (Chapter 18) we will look at valuing a property as the sum of the values of the loans and equity contributions used to finance the property. This is based on the finance principle that
      5. In chapter 15 we look at how the overall cap rate, the annual cash return to the property (NOI/V_P), can be estimated as the weighted average of the annual cash return to the lender (ADS/V_M) and the annual cash return to the equity investor ($BTCF/V_E$), that is, the overall cap rate is estimated as the weighted average of the mortgage and equity components of the cap rate (analogous to the WACC).

II. Chapter 15 explains a best method for estimating cap rates – The mortgage-equity band of investment technique, simply called the band of investment technique
   A. The band of investment technique says that since the overall cap rate expresses the relationship between one year's NOI (the NOI expected in the first year of new ownership) and the property value (which is a one year cash return to the property), the mortgage-equity components used to estimate an overall cap rate must be the one year cash returns paid to the lender and to the equity investor out of the NOI.
   B. The key variables used in the band of investment model to estimate the overall rate (R_O) are an equity capitalization rate (R_E), which is the ratio of one-year BTCF to the equity contribution, and a mortgage capitalization rate (R_M), which is the ratio of the annual debt service payment to the loan amount.

C. The model calculates the overall cap rate (R_O) as a weighted average of the mortgage capitalization rate (R_M), also called the mortgage constant, and the equity capitalization rate (R_E), also called the equity dividend, with the weights being the loan-to value ratio (m) and the equity to value ratio (1-m).
   1. The model is: $R_O = (m)(R_M) + (1\text{-}m)(R_E)$, where
      a. R_M is the mortgage capitalization rate defined as $R_M = DS/M$, where DS is the annual debt service payment (based on typical lending terms in the market), and M is the face amount of the loan.
      b. R_E is the ratio of before tax cash flow to the initial equity investment, R_E = BTCF/Equity
      c. m is the market loan-to-value ratio, which represents the proportion of mortgage funds provided by the typical lender in the market to finance the property investment
      d. (1-m) is the market equity to value ratio, expressed as the complement of the loan-to-value ratio; it represents the proportion of equity funds used by the typical investor to finance a property investment
   2. Thus, the band of investment model disaggregates R_O into the property's debt and equity components expressed as one-year cash flow ratios – the overall one-year cash return to the property, R_O, is a weighted average of the one-year cash return to the lender R_M and the one-year cash return to the equity investor R_E. Note the following relationships:
      a. The NOI (the net operating income) expected from a property can be estimated as the sum the annual payments to the providers of capital used to finance the property. NOI = payments to lender + payments to equity investor, or NOI = BTCF + DS.
      b. The value of an asset is equal to the sum of the values of the debt and equity components use to finance the asset. V = D + E , or $V_P = V_M + V_E$.
      c. The cap rate is a weighted average of the current return to the lender and the current return to the equity investor.

$$\frac{NOI}{V_P} = w_M \frac{DS}{V_M} + w_E \frac{BTCF}{V_E}$$

   3. See the model and an example of the application of the model on pp. 278-279

D. This model assumes that the loan amount is constrained by a lender-imposed loan-to-value ratio (m); i.e., the loan amount is restricted by the lender's loan-to-value requirement.

E. Like the overall cap rate, neither of the two ratios that are the components of this model (R_M and R_E) explicitly address expected investment profitability; instead, they are measures of current cash return per dollar of investment.

F. To estimate market value, typical financing terms available in the market must be used.

1. If financing terms from nonmarket financing available to an individual property were used in the model, investment value not market value would be estimated.

III. Mortgage and equity capitalization rates

A. The mortgage capitalization rate (mortgage constant), R_M

1. As mentioned, the mortgage capitalization rate is also called the loan constant. Mathematically, the mortgage constant is the reciprocal of the present value of an annuity factor, i.e., $1/PVIFA_{Y_M,n}$ (see pp. 280-281).
2. Definition – Ratio of mortgage payment to loan amount; it expresses the loan (debt service) payment as a percentage of the loan amount.
3. It is the one year cash return to the lender
4. R_M is also called the loan constant, which is an interest factor of $1, the payment to amortize $1 of debt.
5. R_M can also be calculated as the reciprocal of the present value of an annuity interest factor, $1/PVIFA_{Y_M,n}$ (see pp. 280-281).
6. R_M consists of the return <u>on</u> capital (the interest rate) and return <u>of</u> capital (sinking fund factor) in order for the loan to be fully amortized over the loan term.

B. The equity capitalization rate, R_E

1. Definition – Ratio of first year before-tax cash flow (BTCF) to the equity investment, $BTCF_1/Equity = BTCF_1/ (1\text{-}m)V_P$
2. The equity capitalization rate is also known as the equity dividend rate
3. R_E is a more problematic estimate than R_M because mortgage information is generally more widely available than equity information.
4. R_E is estimated from comparable sales (see Table 15-1, p. 283), or from surveys of investors and other market participants (brokers, appraisers, lenders, etc.)
5. Used as a benchmark ratio to compare cash-on-cash returns of similar income properties
6. Equity capitalization rates should reflect the market's expectations about the growth potential of future cash flows and property value
    a. Equity capitalization rates for properties with income and value growth expectations will usually be lower than mortgage capitalization rates even though equity is riskier
    b. In general, there is an inverse relationship between equity capitalization rates and expected growth in income and property value
7. Holding NOI constant, factors that affect loan payments (the loan terms) could cause equity capitalization rates to differ among comparable sales
    a. BTCF = NOI – DS
        1) Holding NOI constant, the BTCF depends on the DS, and
        2) The size of DS is affected by the loan terms
    b. EQUITY = Property value – loan amount, and thus equity varies inversely with loan amount.

c. It is apparent from a. and b. that the BTCF-to-EQUITY relationship varies with the loan amount and the debt service payment, and the latter are affected by the terms of financing.
d. Therefore, comparable properties used to extract a R_E should have similar financing terms.

8. As a one-year cash return, R_E does not explicitly address the equity investor's required profitability, and hence the required rate of return, of an investment; as is the case of all capitalization rates, it is not a discount rate

C. Use of the mortgage capitalization rate and the equity capitalization rate to estimate the value of the loan and the equity, respectively.
1. The value of the mortgage loan can be estimated by mortgage capitalization as follows: V_M, = DS/R_M, where DS = annual debt service (mortgage) payment.
2. The value of investor equity can be estimated by equity capitalization as follows: V_E, = BTCF/R_E

IV. Another variety of the band of investment technique is the debt coverage ratio band of investment technique. It is discussed in the appendix to chapter 15.
A. In this band of investment model, the loan amount is determined by a debt coverage constraint (the DSCR, or simply DCR) rather than a loan-to-value ratio.
1. With this model, the amount of the loan is a function of the DSCR
2. The loan-to-value ratio is a result (outcome) of the debt coverage constraint rather than a determinant of the loan amount.
B. DSCR = NOI/DS $\Rightarrow$ DS = NOI/DSCR (whereas in the traditional band of investment model DS = (m) (V) (R_M).).
C. A DSCR constraint focuses on the borrower's ability to make loan payments out of property cash flow, whereas a L/V constraint focuses on the amount (value) of the loan relative to the value of the lender's collateral (the property).
1. The L/V constraint is based on the idea is that the loan amount should not exceed a certain proportion of property value.
2. The DSCR constraint is based on the ideal that the DS payment should not exceed a certain proportion of the NOI generated by the property out of which the DS is paid.
D. The debt coverage ratio band of investment model is used in property markets where the equity investor makes the loan payment out of the NOI and where expectations of future property appreciation result in a high current property value which, based on a loan to value ratio, would produce a loan amount that is higher than the ability of the current NOI to service. In these circumstances, the debt coverage constraint is more important than the loan-to-value constraint as a lender loan decision tool.
E. This model uses the basic mortgage-equity valuation model: V = V_M + V_E,
1. The maximum value of the debt (mortgage), V_M, can be estimated from a DSCR constraint as follows,
a. V_M = NOI/(DSCR)(R_M),

b. Alternatively, V_M can be calculated as $V_M = DS/R_M$. Since DS = NOI/DSCR, b. is easily transformed to a.

2. Value of equity, V_E, is calculated from the residual BTCF and a given R_E, as follows:
   a. BTCF = NOI – DS
   b. $V_E = BTCF/R_E$

F. Read and work through the extended example on pp. 289-290