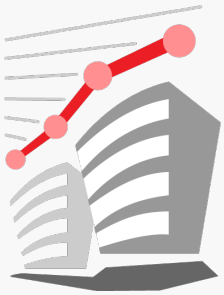


# SHA563: Valuing Hotel Investments Through Effective Forecasting

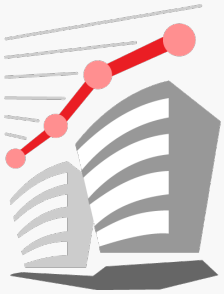
## This course includes

- Two self-check quizzes
- Two discussions
- Four tools to download and use on the job
- One scored project
- One video transcript file

Completing all of the coursework should take about five to seven hours.

## What you'll learn

- Perform a market study for a particular property
- Forecast occupancy and average daily rates
- Produce accurate forecasts of income and expenses
- Use the income approach to produce an estimate of market value
- Produce defensible and supportable estimates using the tools developed in this course



## Course Description

This course, produced in partnership with the Cornell School of Hotel Administration, builds expertise in producing accurate values of the real estate needed to support hotel operations. You learn to accurately forecast hotel occupancies

both for new properties and for existing properties facing significant new competition. You forecast daily rates using a variety of contemporary techniques. You forecast hotel cash flows, respecting the fixed and variable revenue and cost structure of a hotel. You estimate the value of individual hotels, recognizing the impact of new properties on existing properties. Given that forecasts are only as accurate as the starting assumptions, you learn how to develop data to support all of these forecasts.

This course is based on the *Hotel Valuation Software* developed by Jan A. deRoos of Cornell University's School of Hotel Administration and Stephen Rushmore, founder and President of HVS International.

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Jan deRoos
Associate Professor and HVS Professor of Hotel Finance and Real Estate, School of Hotel Administration, Cornell University

Professor Jan A. deRoos, on the faculty of the Hotel School since 1988, has devoted his career to hospitality real estate, with a focus on the valuation, financing, development, and operation of lodging, timeshare, and restaurant assets. He holds B.S., M.S., and Ph.D. degrees from Cornell University, all with majors in Hotel Administration. Areas of teaching expertise span the entire range of hospitality real estate topics: real estate finance; real estate principles; hotel asset management; real estate portfolio management; hotel and restaurant valuation; lodging market and feasibility analysis; hotel/resort planning and design; hotel/resort development and construction, and the analysis of timeshare/vacation ownership projects. He teaches courses in the Hotel School's undergraduate and graduate degree programs, teaches extensively in the Hotel School's executive education programs, and has developed an on-line professional Certificate in Hotel Real Estate Investments and Asset Management.

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Start Your Course

# Module Introduction: Forecasting Hotel Occupancy

In this module, you will examine the first step in performing a valuation: conducting a market study. The market study provides the basis for estimating hotel occupancy, an essential first step in forecasting revenue and expenses. In making these calculations, we use a Room Night Analysis Program.

After completing this module, you will be able to:

- Define the competitive set for a market by specifying the primary and secondary competitors
- Perform an analysis of lodging activity to estimate the existing marketwide demand, occupancy, and market segmentation
- Estimate the relative competitiveness of the competitive set by calculating the overall occupancy penetration percentages for each hotel and occupancy penetration within each market segment
- Estimate latent demand within a market by specifying unaccommodated demand and induced demand
- Extend the analysis beyond the present to estimate future market demand and future market supply
- Adjust the relative competitiveness of the competitive set to reflect changes in the market or changes in individual hotels
- Complete the market analysis by fitting the subject property into the market and forecasting its occupancy over the forecast period
- Forecast the occupancy for all hotels in the competitive set over the analysis period

## Listen: The Market Study

The first step in a market analysis is to specify the subject property's primary and secondary competition, known as the competitive set. Once you have specified the competitive set, you can begin to use the built-up approach to estimate existing marketwide demand, occupancy, and market segmentation. This involves calculating the fair share and occupancy penetration percentages for each hotel in the competitive set. We use the Room Night Analysis Program to facilitate your analysis.

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Click the image below to hear Prof. deRoos discuss the importance of producing a defensible estimate of value.

This module focuses on the market study, the study of demand and supply. Starting with the existing demand in the market, you adjust for *unaccommodated demand* to determine current potential demand. Unaccommodated demand is demand that cannot currently stay in the market because hotels are all full. If you just studied the occupancies of existing hotels, you would miss this unaccommodated demand.

Using data summarizing economic growth, you extend the demand forecast for a ten-year period and then tabulate the current supply. Current supply is simply an inventory of the existing hotels that are competitive with the subject in the market. You then adjust that total over a ten-year period for expected changes, including new hotels, new additions to existing hotels, or removals of hotels.

With these data on demand and supply, you can estimate overall marketwide occupancy. But you are not finished, because you want to know the occupancy for each hotel in the market. You estimate this by specifying the relative competitiveness for each hotel over the projection period and allocating demand accordingly.

To collect data for this study and implement it, you will use an Excel program called the Room Night Analysis Program. In this module we introduce the program and provide an opportunity to download it.

## Tool: Room Night Analysis Program

Download the Tool

RNA Spreadsheet

Much of this section of the course makes use of an Excel spreadsheet called the Room Night Analysis Program. This program performs several functions:

- It enables you to evaluate the various competitive factors, such as occupancy, average room rate, and market segmentation, of all hotels in a local market.
- It calculates the area-wide occupancy and average room rate, as well as the competitive market mix.
- It produces a forecast of occupancy for each existing hotel or proposed hotel in a local market. The program incorporates such factors as competitive occupancies, market segmentation, unaccommodated demand, latent demand, growth of demand, and the relative competitiveness of each property in the local market. The program output is a ten-year projection of occupancy.

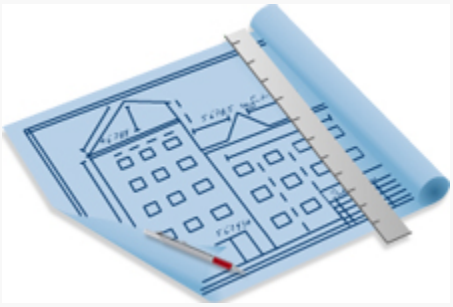
Download the RNA spreadsheet above. You should keep the RNA program open throughout this section of the course and take the opportunity to replicate the case study as you proceed by entering the values you see in the program.

## Read: The Case Study Hotel

Throughout this course, we use a case study to illustrate concepts. The case studies and practice scenarios presented in this course are entirely fictitious. In some instances, actual brand names and markets are used to help students master the learning objectives, but the hotels themselves and the data associated with them do not represent real situations.

The subject property is a proposed 250-room Sheraton Hotel that will be entering the market two years from the date of the study. For convenience, we will assume the appraiser is at January 1, Year 1, looking back at the market's actual operating performance for the base year, Year 0. The Sheraton is scheduled to open in January 1, Year 3. For clarity, think of the time line as follows:

| |
|---|
| Year 0-Base Year |
| Year 1-Date of Study |
| Year 3-Date of Sheraton Opening |



The proposed Sheraton Hotel will be located at the intersection of a major interstate and a county road on Long Island, New York. The area is a suburb of New York City (which is 35 miles to the west), and the surrounding neighborhood is a mixture of office, light industrial, and retail property. The site has good access and visibility from nearby highways and is considered a desirable hotel location.

Construction on the proposed Sheraton is expected to commence during the spring of Year 1 with an opening scheduled for January 1, Year 3. The parcel on which the hotel is to be built consists of seven acres of land and has all the necessary utilities.

The improvements will be designed with an orientation toward the commercial and meeting-and-convention segments of the market and will target travelers looking for a first-class quality level. The following table summarizes the facilities and amenities planned for the Sheraton:

| |
|---|
| 250 guestrooms |
| 175-seat restaurant |
| 150-seat lounge |
| 40-seat lobby bar |
| 12,500 square feet (approx. 1200 $m^2$) of meeting space |
| Indoor-outdoor swimming pool |

The owner of the property will utilize this study to determine initial project feasibility and to help obtain debt and equity financing. The appraisal will estimate the market value of the hotel on the day it is fully complete and operational, which is assumed to be January 1 of Year 3. The financial projections will commence as of this date, utilizing inflated dollars for each projection year.

## Read: Preliminary Steps

To make a recommendation about the proposed Sheraton Hotel, you need to forecast the occupancy of the hotel. To do this, begin with a study of the hotel market. We generally formulate occupancy and average rate projections from the market study.

The basis of a hotel's occupancy forecast is the amount of demand captured over a given period of time (usually one year) divided by the number of rooms available over the same period. A room night is the unit used by the hotel industry to quantify this demand. A room night is a unit of lodging demand representing one room occupied by one or more people for one night.

The process of forecasting occupancy for both existing and proposed hotels involves nine steps:

| The Nine Steps of the Forecasting Process | Description |
|---|---|
| Step 1 | Define the primary market area |
| Step 2 | Define the market area's primary segments |
| Step 3 | Quantify the existing room night demand |
| Step 4 | Forecast the room night demand into the future |
| Step 5 | Quantify the market area's total guestroom supply, the total room nights available, the latent demand that can be accommodated, and the total usable demand |
| Step 6 | Calculate the area-wide occupancy |
| Step 7 | Evaluate the relative competitiveness of all hotels in the market area |
| Step 8 | Fit each new hotel into the market based on its expected competitiveness |
| Step 9 | Calculate the subject property's market share, room nights captured, and occupancy percentage |

We begin with the first three steps:

### Step 1: Define the Primary Market Area

The first step in performing a lodging market study is to define the subject property's market area in geographic terms. A market area can be described as a perimeter surrounding the subject property. Within this area are various generators of transient demand, whose visitors are likely to utilize the accommodations offered by the subject property.

### Step 2: Define the Market Area's Primary Market Segments

Once the market area has been outlined, the appraiser should determine the primary segments of transient demand presently using local hotels. The three market segments generally found in most market areas are transient commercial travelers, meeting and convention visitors (also known as group business), and pleasure and leisure travelers. Other segments often present include government employees, airline crews, extended stay or relocation guests (generally staying over one week at a time), sports teams, members of the military, truck drivers, hospital visitors and outpatients, cruise ship passengers or staff, and similar groups.

### Step 3: Quantify the Existing Room Night Demand

To forecast hotel room night demand into the future, you need to quantify current demand. From this base level, the appraiser makes projections of future demand changes (growth, stability, or decline) for each market segment.

We generally quantify existing room night demand using the built-up approach based on an analysis of lodging activity. We examine this built-up approach next.

## Watch: The Built-Up Approach to Estimating Demand

An illustrated presentation appears below. Use this resource to estimate market demand using the Room Night Analysis spreadsheet you downloaded earlier. You should open the spreadsheet and duplicate the data entries discussed in this presentation.

## Read: Accommodated Demand, Fair Share, and Market Penetration

Once we have the primary and secondary market data in place, we can calculate the current accommodated room demand for each market segment, using the following equation:

Historic average room count

x Occupancy

x Market segmentation percentage

x 365

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= Room nights sold in the market segment

The RNA program performs this step of the analysis of lodging activity automatically. We repeat this process for each of the competitive hotels in the market area. We then combine the number of room nights sold for each market segment at each hotel to give the market area's current accommodated room night demand. The result looks like this:

| | A | B | C | D | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|
| 1 | **Base Year Demand** | | | | | | | | |
| 2 | | **Room Nights Sold by Mkt Segment** | | | **Fair** | **Overall** | **Market Segment Penetration** | | |
| 3 | **Competitors** | Seg 1 | Seg 2 | Seg 3 | **Share** | **Penetration** | Seg 1 | Seg 2 | Seg 3 |
| 4 | Secondary | 65,045 | 18,127 | 23,459 | 20.1% | 104.2% | 110% | 77% | 120% |
| 5 | Embassy Suites | 45,552 | 2,847 | 8,541 | 10.4% | 108.2% | 150% | 23% | 85% |
| 6 | Hilton Inn | 28,908 | 36,135 | 7,227 | 14.2% | 99.9% | 69% | 216% | 52% |
| 7 | Radisson Hotel | 27,923 | 24,820 | 9,308 | 12.9% | 94.3% | 73% | 163% | 74% |
| 8 | Holiday Inn | 25,646 | 11,657 | 9,326 | 9.1% | 101.3% | 96% | 110% | 106% |
| 9 | Courtyard | 11,032 | 735 | 2,942 | 3.2% | 90.2% | 117% | 20% | 94% |
| 10 | Ramada Inn | 23,488 | 7,227 | 5,420 | 7.8% | 91.5% | 103% | 79% | 72% |
| 11 | Island Inn | 18,330 | 9,165 | 3,055 | 7.0% | 86.0% | 89% | 112% | 45% |
| 12 | Quality Inn | 24,911 | 4,982 | 19,929 | 9.1% | 108.2% | 94% | 47% | 226% |
| 13 | Days Hotel | 22,688 | 1,621 | 8,103 | 6.2% | 102.6% | 124% | 22% | 134% |

| **Total Accommodated Demand Output** | | | |
|---|---|---|---|
| | **Segment** | **Base Year Rm Nights** | **Segment Percent** |
| 1 | **Commercial** | 293,523 | 57.76% |
| 2 | **Meeting & Conventi** | 117,317 | 23.09% |
| 3 | **Leisure** | 97,309 | 19.15% |
| 4 | **N/A** | 0 | 0.00% |
| 5 | **N/A** | 0 | 0.00% |
| | **TOTAL** | 508,149 | 100.00% |
| | | | |
| | **Market Occupancy** | 72.10% | |

Here we have the room nights sold by each market segment: commercial, meeting and convention, and leisure. We also have the *fair share* for each hotel, presented in column G. The fair share for a given property is that property's room count as a percentage of the total room count in the competitive set.

Next we have *market penetrations* in columns H through M. We use the market penetration to assess the relative competitiveness of each hotel, as a whole and within each market segment. The "Overall Penetration" figures in column H represent the amount of business captured by a particular hotel compared to that hotel's fair share. The "Market Segment Penetration" figures in columns I through M represent the within-segment competitiveness of each hotel. For example, the

Embassy Suites has an overall penetration rate of 108.2%, meaning that the hotel captures 108.2% of its fair share. The market segment penetration shows that the Embassy Suites captures 150% of its fair share of commercial demand, only 23% of its fair share of meeting and convention demand, and 85% of its fair share of leisure demand.

## Watch: Continuing the Built-Up Approach

An illustrated presentation appears below. Use this resource to continue our estimate of market demand using the Room Night Analysis Program. You should open the program and duplicate the data entries discussed.

## Read: Forecast Room Night Demand into the Future

We've now reached the fourth step in our analysis of lodging activity, forecasting room night demand into the future.

Because a market study and valuation require the appraiser to look into the future, the existing room night demand must now be forecast over the projection period. The direction and rate of change are estimated through an analysis of various economic and demographic indicators, as well as an examination of historic supply and demand changes.

The estimated change in hotel demand is generally projected by market segment for periods ranging from three to ten years. The annual compounded percentage change should reflect the most probable trend in hotel room night demand.

Historical data on market supply and demand are available for most markets throughout the world in the form of a "Trend Report," obtainable from Smith Travel Research. The table below contains a summary of supply, demand, and occupancy data from a Trend Report for the Central Long Island market area. Note that the supply and demand figures do not align with the data in the *Demand-Base Year* sheet, because the Trend Report covers a larger area than the more tightly defined competitive set for the subject Sheraton Hotel.

Trend Report
for Central Long Island

| Year | Room Night Demand | Room Night Supply | Occupancy (%) |
|---|---|---|---|
| Year -10 | 691,075 | 990,083 | 69.8% |
| Year -9 | 685,125 | 1,018,286 | 67.3% |
| Year -8 | 663,639 | 1,028,256 | 64.5% |
| Year -7 | 671,023 | 1,036,876 | 64.7% |
| Year -6 | 707,644 | 1,058,952 | 66.8% |
| Year -5 | 740,023 | 1,109,618 | 66.7% |
| Year -4 | 783,857 | 1,165,655 | 67.3% |
| Year -3 | 837,987 | 1,205,831 | 69.5% |
| Year -2 | 880,664 | 1,238,459 | 71.1% |
| Year -1 | 916,270 | 1,283,078 | 71.4% |

The historic supply and demand data obtained from Smith Travel are entered on the *Demand Inputs* sheet of the RNA spreadsheet. As illustrated below, this portion of the spreadsheet not only calculates historical occupancies, it calculates annual and compound supply and demand growth rates.

| | A | B | C | D | E | J | K | L |
|---|---|---|---|---|---|---|---|---|
| 19 | **Historical Market Growth Rate** | | | | | | | |
| 20 | | Year -10 | Year -9 | Year -8 | Year -7 | Year -2 | Year -1 | Avg |
| 21 | **Room Demand** | 691,075 | 685,125 | 663,639 | 671,023 | 880,664 | 916,270 | |
| 22 | Room Supply | 990,083 | 1,018,286 | 1,028,256 | 1,036,876 | 1,238,459 | 1,283,078 | |
| 23 | Occupancy | 69.80% | 67.28% | 64.54% | 64.72% | 71.11% | 71.41% | |
| 24 | | | | | | | | |
| 25 | Yearly Change in Demand | | -0.86% | -3.14% | 1.11% | 5.09% | 4.04% | 3.23% |
| 26 | Yearly Change in Supply | | 2.85% | 0.98% | 0.84% | 2.71% | 3.60% | 2.93% |
| 27 | | | | | | | | |
| 28 | | | 9 Years | 8 Years | 7 Years | 2 Years | 1 Year | |
| 29 | Compound Growth in Demand | | 3.18% | 3.70% | 4.72% | 4.57% | 4.04% | |
| 30 | Compound Growth in Supply | | 2.92% | 2.93% | 3.21% | 3.15% | 3.60% | |
| 31 | | | | | | | | |
| 32 | Assumed Compound Supply | | 2.92% | | | | | |
| 33 | Growth for *Supply Addn* sheet | | | | | | | |

Once you have entered the room night demand and room night supply into the Demand Inputs sheet, the program automatically calculates occupancy, annual change in demand and supply, and the compound growth rate, for each year data are entered. For the Central Long Island market, recent demand growth has been very strong, reflecting the vigor of the local economy. Supply growth has been moderate, although it has increased quickly in the past few years.

The program uses the "oldest" compound growth rate as the assumed supply growth rate in the future. If future supply growth is not expected to mirror the entry in cell C32 (2.92% in our case study), you should enter the expected growth rate in cell C32 as a manual "override" to the calculated figure.

# Read: Growth Rates of Accommodated and Unaccommodated Demand

## Key Points

Use growth rates to project hotel room night demand

Forecast change in room night demand over a projection period

Rely on economic and demographic information

We generally apply the forecasted direction and rate of change in room night demand separately to the accommodated and unaccommodated demand components. Although these components tend to move together in synchronization, there may be specific reasons to estimate each component separately. For instance, if it is difficult for price-sensitive leisure travelers to find accommodations during midweek, a period typically dominated by price-insensitive commercial travelers, accommodated leisure demand may grow at a slower rate than unaccommodated leisure demand.

Projected changes in the accommodated and unaccommodated components usually do not affect induced demand. Rather, induced demand depends on the demand characteristics exhibited by the specific demand generator.

We forecast the change in room night demand for the Sheraton's market area over the projection period using local economic and demographic trends as a basis, as well as incorporating historical patterns of supply and demand growth.

Based on this analysis, we use the following growth rates to project hotel room night demand for the subject's market area:

**Forecast Demand Growth Rates for Both Accommodated and Unaccommodated Demand**

| Segment | Year 1 | Year 2 | Year 3 | Stabilized |
|---|---|---|---|---|
| Commercial | 5.0% | 4.0% | 3.0% | 3.0% |
| Meeting & Convention | 2.0% | 2.5% | 2.75% | 2.75% |
| Leisure | 1.5% | 1.5% | 1.5% | 1.5% |

Entering this data into the Demand Inputs sheet in the RNA program yields the following:

| | A | B | C | D | E | I | J | K |
|---|---|---|---|---|---|---|---|---|
| 1 | Demand Inputs | | | | | | | |
| 2 | Accommodated Demand Growth Rates | | | | | | | |
| 3 | Segment | Year 1 | Year 2 | Year 3 | Year 4 | Year 8 | Year 9 | Year 10 |
| 4 | Commercial | 5.00% | 4.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% |
| 5 | Meeting & Convention | 2.00% | 2.50% | 2.75% | 2.75% | 2.75% | 2.75% | 2.75% |
| 6 | Leisure | 1.50% | 1.50% | 1.50% | 1.50% | 1.50% | 1.50% | 1.50% |
| 7 | N/A | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 8 | N/A | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 9 | Weighted Average | 3.69% | 3.22% | 2.68% | 2.68% | 2.70% | 2.70% | 2.70% |
| 10 | | | | | | | | |
| 11 | Unaccommodated Demand Growth Rates | | | | | | | |
| 12 | Segment | Year 1 | Year 2 | Year 3 | Year 4 | Year 8 | Year 9 | Year 10 |
| 13 | Commercial | 5.00% | 4.00% | 3.00% | 3.00% | 3.00% | 3.00% | 3.00% |
| 14 | Meeting & Convention | 2.00% | 2.50% | 2.75% | 2.75% | 2.75% | 2.75% | 2.75% |
| 15 | Leisure | 1.50% | 1.50% | 1.50% | 1.50% | 1.50% | 1.50% | 1.50% |
| 16 | N/A | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| 17 | N/A | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |

The top portion (rows 2 to 9) shows the growth factors for accommodated demand. We enter the growth rates from the table above in the appropriate cell. For example, we expect commercial demand to grow by 5% from the end of the base year to the end of Year 1, so we enter the 5% growth factor in cell B4. We enter the Year 2 commercial growth rate of 4% in cell C4, and the stabilized growth rate of 3% in cell D4. No additional entries are required for that particular market segment, because each subsequent cell refers to the rate used in the previous year. For example, cells E4 through K4 automatically pick up the 3% growth rate entered in cell D4.

We enter the meeting and convention growth rates in row 5 and the leisure growth rates in row 6.

Note the weighted average growth rate for accommodated demand in row 9. This gives the analyst a good overall view of projected market demand growth.

The bottom portion (rows 11 to 17) shows the growth factors for unaccommodated demand. The program enters these figures automatically, under the assumption that they have the same values as the accommodated demand growth factors. In the event that you expect unaccommodated growth to differ from accommodated growth, you should enter the proper growth factors manually in rows 13 through 17.

Once the growth rates have been entered, the program calculates the accommodated demand for each year of the ten-year projection period, adds unaccommodated and induced demand, and computes to appropriate totals. Here, a portion of the *Demand Calcs* sheet illustrates the process.

| | A | B | C | D | E | F | L |
|---|---|---|---|---|---|---|---|
| 1 | **Demand Calcs** | | | | | | |
| 2 | **Accomodated Demand** | | | | | | |
| 3 | **Segment** | **Year 0** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 10** |
| 4 | **Commercial** | 293,523 | 308,199 | 320,527 | 330,143 | 340,047 | 406,033 |
| 5 | **Meeting & Convention** | 117,317 | 119,663 | 122,655 | 126,028 | 129,494 | 152,384 |
| 6 | **Leisure** | 97,309 | 98,769 | 100,251 | 101,755 | 103,281 | 112,931 |
| 9 | **Total** | 508,149 | 526,631 | 543,433 | 557,926 | 572,822 | 671,348 |
| 10 | | | | | | | |
| 11 | **Unaccomodated Demand** | | | | | | |
| 12 | **Segment** | **Year 0** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 10** |
| 13 | **Commercial** | 23,482 | 24,656 | 25,642 | 26,411 | 27,203 | 32,483 |
| 14 | **Meeting & Convention** | 5,866 | 5,983 | 6,133 | 6,302 | 6,475 | 7,619 |
| 15 | **Leisure** | 2,919 | 2,963 | 3,007 | 3,052 | 3,098 | 3,387 |
| 18 | **Total** | 32,267 | 33,602 | 34,782 | 35,765 | 36,776 | 43,489 |
| 19 | | | | | | | |
| 20 | **Induced Demand** | | | | | | |
| 21 | **Segment** | **Year 0** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 10** |
| 22 | **Commercial** | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | **Meeting & Convention** | 0 | 0 | 0 | 3,000 | 9,000 | 15,000 |
| 24 | **Leisure** | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 | **Total** | 0 | 0 | 0 | 3,000 | 9,000 | 15,000 |
| 28 | | | | | | | |
| 29 | **Total Market Demand - Unadjusted for Unaccommodatable Demand** | | | | | | |
| 30 | **Segment** | **Year 0** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 10** |
| 31 | **Commercial** | 317,005 | 332,855 | 346,169 | 356,554 | 367,250 | 438,516 |
| 32 | **Meeting & Convention** | 123,183 | 125,646 | 128,788 | 135,330 | 144,969 | 175,003 |
| 33 | **Leisure** | 100,228 | 101,732 | 103,258 | 104,807 | 106,379 | 116,318 |
| 36 | **Total RN Demand** | 540,416 | 560,233 | 578,215 | 596,691 | 618,598 | 729,837 |

However, since latent demand can only be captured with the addition of new supply, we must adjust these figures to reflect that portion of latent demand that is accommodatable. This work is performed as part of the next step of the market study process.

## Watch: Quantifying Total Usable Demand

An illustrated presentation appears below. Use this resource to quantify total usable demand using the Room Night Analysis Program. You should open the program and duplicate the data entries discussed.

## Watch: Evaluating Competitors

An illustrated presentation appears below. Use this resource to evaluate the relative competitiveness of area hotels using the Room Night Analysis Program.

## Watch: Fit Each Hotel into the Market Analysis

An illustrated presentation appears below. Use this resource to fit each hotel into the market analysis using the Room Night Analysis Program. You should open the program and duplicate the data entries discussed.

## Watch: Final Calculations

An illustrated presentation appears below. Use this resource to complete our market analysis and to estimate stabilized occupancy. You should open the program and follow the data entries discussed.

# Read: Challenging Your Assumptions

## Key Points

- Room night analysis is an art that requires judgment
- The RNA program is only as accurate as the input data

The RNA spreadsheet program you have just completed embodies the science of room night analysis. The spreadsheet can produce remarkably accurate estimates of occupancy and project them into the future. The art of the room night analysis is in creating an appropriate set of inputs to support the spreadsheet. Every piece of the nine-step process we've been outlining requires some judgment. Let's take a look at some places where such judgment is needed.

### Step 2. Define the market area's primary market segments

For example, in step 2, defining the primary market segments, consider the meeting and convention segment. This could be two segments, if together meetings and conventions comprise a significant portion of the market and the two segments are evolving in different ways. Of the two segments, one could be for small corporate meetings and the other for conventions, the large meetings held from time to time throughout the year. If different hotels in the competitive set are competing for different pieces of the group segment, that would be another argument for splitting the group segment like this.

Another area where we might have more than one market segment is leisure. This could be split into two market segments. One would include discount channels, such as Priceline and Expedia, where you have some hotels competing for price-sensitive customers. The other would include vacationers and transient leisure guests, who use the Web site and the loyalty program to stay at the hotel on the weekends or for leisure travel. This is a very different segment than the price-sensitive customers.

### Step 3. Quantify the existing room night demand

In step 3, quantifying existing demand, you will recall that the last part of the step was to quantify latent demand. Latent demand consists of unaccommodated demand and induced demand. Unaccommodated demand can be calibrated by a close analysis of turn-away reports (the number of guests who are turned away after requesting accommodation) generated by each hotel in the market combined with an analysis of the number of days annually that the hotel was sold out. Suppose, for example, that turn-away reports show that a 100-room hotel consistently turns away 15 guests when sold out (a 15% turn-away), and there are 100 sold-out nights a year. You now have a very good indication of unaccommodated demand in the market.

Induced demand, on the other hand, must be quantified via a defensible analysis of how demand will be driven to a given hotel or how new demand will be generated in the market by the existence of a new demand generator. In the absence of this information, it is very difficult to justify allowances for induced demand.

### Step 8. Fit each new hotel into the market based on its expected competitiveness

In step 8, fitting each hotel into the market based on its expected competitiveness, we look at the market penetrations for each hotel by market segment. For new hotels, we must specify relative competitiveness. The default assumption is very easy: each hotel is 100% competitive in each market segment. The analyst then looks for a defensible story to justify

deviations from the 100% default assumption. For example, select service hotels such as the Hampton Inn, Holiday Inn Express, or Courtyard traditionally penetrate above 100% in commercial demand and below 100% in group demand, because they do not have significant meeting facilities. On the other hand, group-oriented hotels would have significantly more than 100% group segment penetration.

For existing hotels, penetrations change over time, especially if new hotels coming into the market target the existing hotels. For example, select service hotels may take business away from the traditional transient and group hotels. The location of the existing hotel could become unattractive, or if travelers no longer use a set of services that the existing hotel provides, it could become functionally obsolete. Here the analyst must be careful to tell a story about how the relative competitiveness of the hotel changes over time.

In the end, although the RNA program is a very powerful tool capable of producing very accurate projections of occupancy, the projections are only as accurate as the input data. Good analysts understand that analysis is an art, one that requires that the analyst conduct the preliminary field work and the actual field work in a professional manner.

# Module Introduction: Forecasting Revenues and Expenses

In this module, you will use the occupancy forecast derived from the market study to forecast revenues and expenses for the subject hotel. You will use the fixed and variable methodology to adjust for varying levels of occupancy over the forecast period. You will also utilize the Fixed and Variable Income and Expense Forecasting Model Program to arrive at accurate forecasts. This is the second part of the hotel valuation software used throughout the course, and aids in producing defensible estimates of revenues and expenses. After considering an overview of the process, download the FixVar program and produce a forecast of average daily rate.

After completing this module, you will be able to:

- Forecast average daily rates for both existing and new hotels
- Explain the implications of variable revenues and fixed costs on hotel profitability
- Produce accurate forecasts of revenues, expenses, and cash flows

## Listen: Overview of Forecast Production

Now that we have our market study, we are ready to forecast revenues and expenses. The market study is important because it reflects the specific circumstances in the local market for occupancy and average room rates, the foundation for forecasting room revenues. Once room revenues have been established, we can begin to forecast other revenues and expenses. The other foundation for forecasts of revenues and expenses is appropriate benchmark data for other comparable hotels.

Click to listen to Professor deRoos describe the steps necessary to produce our forecasts of revenues, expenses, and cash flows.

## Tool: The FixVar Program

Download the Tool

FixVar Program

The key to any market study and valuation is a supportable forecast of revenues and expenses. Hotel revenues and expenses are comprised of many different components, which display certain fixed and variable relationships to each other. Throughout this module we will use an Excel program, the fixed and variable income and expense forecasting model (FixVar). This program enables the appraiser to input comparable financial operating data and forecast a complete 11-year revenue and expense statement by defining a small set of inputs:

- The expected future occupancy levels for the subject hotel
- Base year operating data for the subject hotel
- Expected inflation rates for revenues and expenses

Download the program from the link above. You should keep the FixVar program open throughout this module and replicate the case study as you proceed by entering the values you see into the program.

## Read: Forecasting ADR for Existing Hotels

The two major forecasting inputs for hotels are occupancy and the average daily rate (ADR), or more precisely, the average rate per occupied room. The Uniform System of Accounts for the Lodging Industry defines the ADR as the net rooms revenue divided by the number of paid rooms occupied:


The net rooms revenue is the sum of all guestroom revenues less allowances due to a service problem. The paid rooms occupied includes any room occupied by hotel guests on a paid basis. The overall average rate per occupied room does not include any occupancy derived from complimentary rooms. This definition accurately describes the fundamental revenue metric for a hotel, the average funds collected from each occupied room. The ADR is thus the most desirable metric to forecast hotel revenues into the future. Note that the average rate per occupied room is NOT the same as other terms for room rates in the hotel industry, such as the rack rate, published rate, commercial rate, or contract rate.

We use separate procedures to forecast the average rate for existing hotels and proposed hotels. To forecast ADR for an existing hotel, follow these steps:

1. Compile historical data for the existing property.

   Monthly data are the industry standard, though daily and weekly data are becoming more common. A three- to five-year history is usually sufficient to determine patterns. The data should be broken down into average rate per occupied room by market segment, if possible. With this data in hand, analyze year-to-year changes in rate and the compound growth rate. Examine seasonality and the effects of occupancy on average rate over the season and over time. Finally, place the rate movements of the historical data within the overall context of the area-wide market cycle.

2. Compile historical data for competitors.

   This ensures that the data conform to the definition of average rate per occupied room. Here, as in our determination of occupancy, we divide the competition into primary and secondary sets. One year of data is sufficient if available on a monthly basis, though two to three years of data enable you to examine rate growth or decline. Look for patterns for individual properties and within the aggregate competitive set. Smith Travel Research publishes a Trend Report that provides a five-year history of occupancy and ADR for most markets throughout the world. If you wish, you can customize it to limit the analysis to the competitive set for the subject hotel.

3. Compare the existing property to the competitive set.

   You need to determine why differences in average rates exist. Possible answers include location and access, the physical characteristics and quality of the facilities, the management philosophy regarding rates, the hotel image, and the market served. In addition to being able to account for differences in rate across the competition, you need to search for patterns or trends in the market.

4. Review macroeconomic factors.

   You should examine market supply and demand factors, including historical data plus growth factors. You must also account for inflationary trends.

5. Prepare an average rate projection for the subject property.

   You're now ready to project an average rate for the hotel. Typically, you base this on growth of rates within market segments, by season.

## Read: Forecasting ADR for Proposed Hotels

Given the lack of historical data, the process of forecasting average rates for proposed properties obviously differs from that for existing properties. The analysis typically uses data from the competitive supply. It is important to break down these data by market segment to expose rate differentials among properties that the proposed hotel can exploit.

There are four methods to project average rates for a proposed hotel. (Note that you can also use them to supplement the analysis of an existing hotel.)

1. Competitive Positioning Method

   This method assumes that rates for the competitive supply define the boundary for rates that can be achieved by the proposed hotel. You set these rates by associating them with the competitive hotel or hotels that most closely resemble the proposed hotel in terms of quality, size, market orientation, and location. You then adjust the rates for age, relative market position, relative location, and access. This is a solid method.

2. Market Segment Model

   This method is an extension of the competitive position method outlined above. You use the forecasted market segment breakdown to determine a weighted average room rate. You perform research to estimate the ADR for the competitive set, by market segment. Using the competitive positioning methodology outlined above, set the rate for the new hotel by association with the competitive hotels within each market segment. You then multiply the average room rate for each market segment by the number of room nights in that segment to determine room revenue by segment. Next, sum room revenue for all of the market segments. Finally, divide the total by the total room nights to determine the weighted average room rate. Perform this work for each year of the analysis period.

   Although this is the preferred method, it demands a lot of analysis. In addition, the method is highly dependent on the quality of the segment ADR data. If these data are not reliable, the integrity of the forecast is in question.

3. Bottom-Up Method (also known as the Hubbart Formula)

   This method assumes that rates should be set by covering all the costs of operation. You determine a minimum level of net income, and use that level to determine the necessary rate and occupancy. Using a proper forecasting model, it is relatively easy to solve for the rate that produces a given cash flow from operations. This is generally not a recommended method because it is based on covering costs, not on market factors. It is useful, however, to determine a minimum ADR.

4. Rule-of-Thumb Method

   This method uses the rule of thumb that each $1000 in development costs should equate to $1.00 in average rate. We do not recommend this method as a forecasting model because the relationship is based on observed phenomenon. It is descriptive, not prescriptive.

## Watch: Forecasting ADR for the Emphatic Hotel

An illustrated presentation appears below. Use this resource to forecast average rate for an existing property, the Emphatic Hotel.

Note: This material is adapted from Rushmore, Tarras, and Ciraldo, *Hotel Investments Handbook* (1999 Edition). Boston, MA: Warren, Gorham & Lamont.

## Read: Project Rooms Revenue

Once you've projected occupancy and average rate, you have the tools to forecast room revenues. From there, you can forecast all hotel revenues and expenses. We will begin by looking at this within the context of the case study.

---

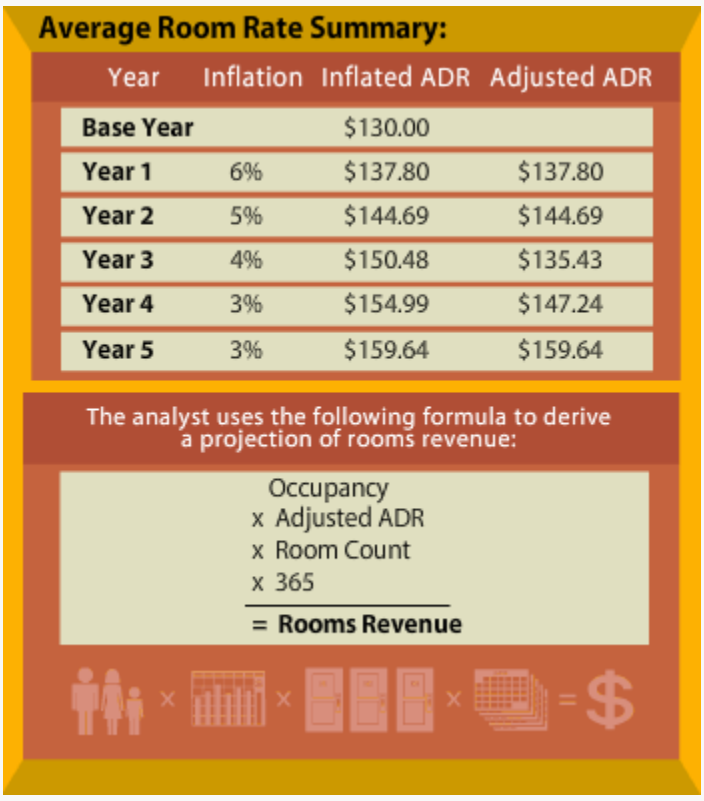
| | |
|---|---|
| Year 3 (opening) | 54.17% |
| Year 4 | 62.53% |
| Year 5 | 68.92% |

From the room night analysis, we estimated the proposed Sheraton's occupancy in its first three years of operation to be:

---

| | |
|---|---|
| Year 3 | 53% |
| Year 4 | 62% |
| Year 5 | 67% |

Let us take a conservative approach to the development of the projection and make the following minor adjustments to forecast the following occupancies in the FixVar analysis:




The average rate projection proceeds as follows: Most significant is the assumption that the Year 5 (stabilized) occupancy will be 67%, almost 2% less than the room night analysis forecast. The reason is the assumption that new supply will enter

the market over time, thus dampening overall market occupancy.

Given what we know of the proposed Sheraton, the market, and the competitive set, we propose a base year ADR of $130. We then use inflation estimates to calculate an inflated ADR for each year of the projection period. We expect the general inflation rate to be 3%. Lodging demand has been growing faster than lodging supply, however, so market ADRs increased at a rate greater than inflation over the past few years. We expect this to continue for the next three years, but at a decreasing rate. Accordingly, we can project a 6% rate of inflation for Year 1, 5% for Year 2, and 4% for Year 3. Thereafter, we can assume that rate increases will mirror the expected inflation rate of 3%.

In addition, we know that hotels generally discount their rates during the stabilization period to build occupancy quickly. For the Sheraton, we discount the Year 3 (opening) rate by 10% from $150.48 to $135.43, and the Year 4 by 5% from $154.99 to $147.24. We do not project discounts beyond Year 4.

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**Proposed Sheraton Hotel**

| Projection Year | 3 | 4 | 5 |
|---|---|---|---|
| Actual Year | Year 3 | Year 4 | Year 5 |
| Occupancy | 53% | 62% | 67% |
| Average Rate | $135.43 | $147.24 | $159.64 |
| Number of Rooms | 250 | 250 | 250 |
| Days per Year | 365 | 365 | 365 |
| Rooms Rev ($000) | $6,550 | $8,330 | $9,760 |

The following table demonstrates this calculation for the proposed Sheraton.

So we project rooms revenues of $6,550,000 for Year 3, $8,330,000 for Year 4, and $9,760,000 for Year 5. We can now turn to developing forecasts of other revenues from items such as food, beverage, telephone, and other income, as well as normal hotel operating expenses.

# Read: Fixed and Variable Component Approach

The fixed and variable component approach to forecasting is one of the most accurate ways to model hotel financial performance. It forms the basis for the computerized hotel forecasting programs used by hotel appraisal firms, hotel companies, investors, lenders, and developers.

The fixed and variable component approach is based on the premise that hotel revenues and expenses have one component that is fixed and another component that varies directly with occupancy or other measures of facility utilization. Because only a portion of the revenues and expenses varies with business volume, cash flow margins and profitability grow as occupancy increases. Analysts need to model this behavior to forecast expected performance accurately.

The fixed and variable approach starts by establishing a known base level, or base year, of revenues and expenses for a given property. We establish future projections as follows:

1. Adjust the base year revenue or expense item for inflation.
2. Establish which portion of the inflation-adjusted revenue or expense item is fixed.
3. Establish which portion of the inflation-adjusted revenue or expense item is variable.
4. Adjust the variable component for the percentage change between the projected occupancy or facility use and the base level of occupancy or facility use.
5. Add the fixed and variable components together to obtain the total projected revenue or expense item.

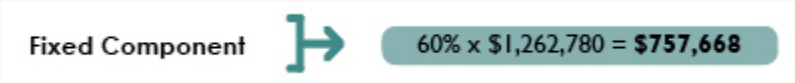
Let's look at an example.

## Fixed and Variable Revenue and Expense Calculations

A 200-room commercial hotel operated in the base year with an occupancy of 70%, an average room rate of $104.33, and a rooms department expense of $1,226,000, or 23% of rooms revenue. A forecast of the following year's occupancy indicates that, due to a significant increase in the competitive supply, we can expect the subject's occupancy to fall to 61%. We calculate the rooms department expense for the following year as follows:

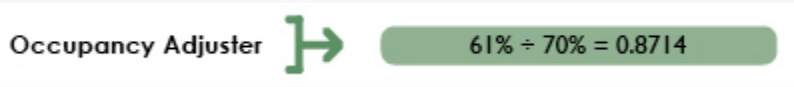
1. Adjust the base-year rooms department expense for inflation to express the base-year figure in Year 1 dollars. Assume the inflation rate is 3%. Thus, the inflation adjustment calculation is:


2. For rooms department expenses, the fixed component is typically 60% of the total, with the remaining 40% varying in proportion to occupancy. Calculate the fixed component as 60% of the inflation-adjusted expense:

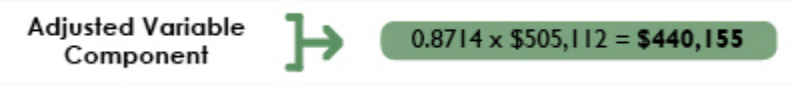



3. We calculate the variable component in a two-step process. First, estimate the unadjusted variable component as 40% of the inflation-adjusted expense:

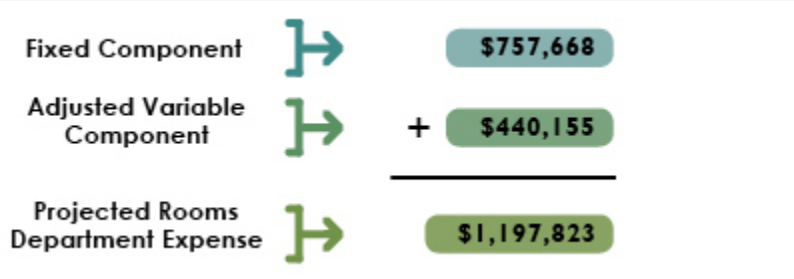

Then adjust the unadjusted component for the decline in occupancy from 70% to 61%. Calculate the percentage decline in occupancy (occupancy adjustment) by dividing the projected occupancy by the base occupancy:




Multiply the adjusted occupancy by the variable component to yield the adjusted variable component.




4. Combine the fixed component and the adjusted variable component to calculate the estimated Year 1 rooms department expense at an occupancy of 61%:



## Read: Applying the Fixed and Variable Approach

Follow these steps to implement the fixed and variable component approach to forecasting hotel revenue and expenses:

1. The basis for forecasting all items of revenue and expense comes from financial statements representing comparable hotels. If the subject property is an existing hotel, you can use its past operating performance. For proposed hotels, you must rely on the operating results from hotels comparable to the subject property.

2. Adjust or modify the comparable financial statement to reflect the unique characteristics of the subject property. The objectives? The first is to establish a one-year, or base year, financial statement based on the average room rate you would expect the subject to achieve in the current year. The second is to establish income and expense ratios representing the level of occupancy and operational efficiency actually expected by the subject. The resulting profit and loss statement, called the base year, forms the basis for calculating the fixed and variable component relationships.

3. Inflate (or deflate) the revenue and expense numbers that constitute the base year to a level reflecting nominal dollars for each forecast year. The rate of inflation reflects the anticipated price change for individual line items in the income and expense statement. This puts the comparable financial data for the base year in the inflated dollars anticipated for that year.

4. Estimate the fixed and variable percentages for each revenue and expense category. The table below illustrates typical ranges of fixed or variable percentages, along with the index used to measure variable change.

**Typical Fixed and Variable Expense Percentages**

| | Revenue and Expense Category | Percent Fixed | Percent Variable | Index of Variability |
|---|---|---|---|---|
| Revenues | Rooms | N/A | N/A | N/A |
| | Food | 10-50 | 50-90 | Occupancy |
| | Beverage | 0-30 | 70-100 | Food Revenue |
| | Telephone | 10-40 | 60-90 | Occupancy |
| | Other Income | 30-60 | 40-70 | Occupancy |
| Departmental Expenses | Rooms | 50-70 | 30-50 | Occupancy |
| | Food and Beverage | 35-60 | 40-65 | F&B Revenue |
| | Telephone | 55-75 | 25-45 | Telephone Revenue |
| | Other Income | 40-60 | 40-60 | Other Income |
| Undistributed Operating Expenses | Administrative and General | 65-85 | 15-35 | Total Revenue |
| | Transportation | 65-90 | 10-35 | Occupancy |
| | Human Resources | 80-95 | 5-20 | Total Revenue |
| | Information Systems | 80-100 | 0-20 | Total Revenue |
| | Security | 65-90 | 10-35 | Occupancy |
| | Marketing | 65-85 | 15-35 | Total Revenue |
| | Franchise Fees | 0 | 100 | Rooms Revenue |
| | Prop. Operations and Maintenance | 55-75 | 25-45 | Total Revenue |
| | Energy (Utility) Costs | 80-95 | 5-20 | Total Revenue |
| Fixed Expenses | Management Fee | 0 | 100 | Total Revenue |
| | Property Taxes | 100 | 0 | Total Revenue |
| | Insurance | 100 | 0 | Total Revenue |
| | Reserve for Replacement | 0 | 100 | Total Revenue |

These fixed and variable percentages were developed from a regression analysis that evaluated hundreds of financial statements to determine what portion of each revenue and expense category was fixed and what portion was variable.

The index of variability refers to a factor that controls the movement of the variable component. For example, the variable component of food revenue moves in accordance with changes in occupancy. Beverage revenue seems to be tied directly to food revenue. Food and beverage expense depends largely on changes in food and beverage revenue. The variable component of undistributed operating expenses moves in line with total revenue, as do all fixed expenses.

For the remaining steps, input data into the FixVar program and let it produce the forecasts.

1. Project each individual line item in a hotel's financial statement separately. Estimate the fixed component by multiplying the appropriate fixed percentage by the base revenue or expense line item for the corresponding projected year.

2. Assume the variable components will vary directly with the index of variability set forth in step 4. Quantify the amount of variable change by dividing the appropriate projected index of variability by the index of variability for the base.

3. Calculate the unadjusted variable component by multiplying the appropriate base revenue or expense category

for the projected year by the percentage variable estimated in step 4.

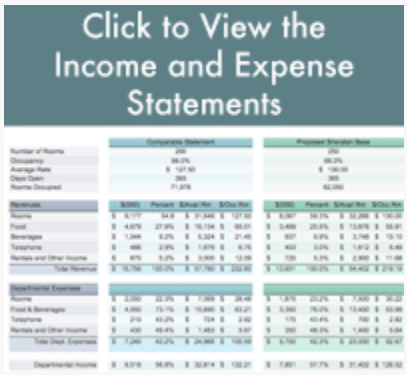
4. Multiply the results of step 7 by the variable percentage change calculated in step 6 to adjust the variable component for variability. The resulting product is called the adjusted variable component.

5. The forecasted revenue or expense category is the total of the fixed component calculated in step 5 and the adjusted variable component calculated in step 8.

# Read: Fixed and Variable Revenue and Expense Calculations for the Sheraton

Let's see what it's like to use the fixed and variable component approach to forecast income and expenses for the proposed Sheraton Hotel. Here we outline the first four steps in the process; you accomplish the remaining five by inputting data into the FixVar program and letting it produce the forecasts.

## Step 1: Obtain financial operating statements from comparable hotels.




The proposed Sheraton has no financial operating history, so you will need to use income and expense statements from comparable hotels to develop the projection. Click the image on the right to pop up the needed statements.

The first statement of income and expense, labeled "Comparable Statement," originates from a hotel considered closely comparable to the proposed Sheraton. Although we use only one statement here, analysts commonly use comparable statements from several hotels to produce one overall "stylized" comparable hotel for their analysis.

## Step 2: Adjust comparable financial statements to reflect any physical, operational, or location differences between the comparable and the subject property.

The second statement, "Proposed Sheraton Base," represents the comparable statement after adjustment for physical, operational, or location differences. This base financial statement uses the subject's first-year average room rate expressed in current dollars, undiscounted for any start-up or first-year promotional pricing.

The comparable statement has also been adjusted to reflect the income and expense ratios we expect the subject to achieve, at the comparable property's occupancy level. Note, for example, that franchise fees are 6% of rooms revenue for the comparable property ($551 ÷ $9,117), but are 5% of rooms revenue ($403 ÷ $8,067) for the proposed Sheraton. The resulting adjusted profit-and-loss statement forms the basis for calculating the fixed and variable component relationships developed in the next steps.

## Step 3: Inflate the base revenue and expense categories to reflect expected nominal dollars in each forecast year.

This expresses the financial data on the subject property's base in the inflated dollars anticipated for any particular year. To compute the fixed and variable relationships for each projection year, we must inflate (or, in rare cases, deflate) the base year to reflect an assumed rate of inflation.

Each category of revenue and expense can be affected by different types of inflation. For example, future changes in the average room rate are influenced more by local supply and demand conditions than by expected changes in the national inflation rate. On the other hand, energy costs are usually tied to the price of fuels, which frequently change in response to

national and world events. Property taxes are often correlated with changes in the local tax base.

We should look at each category of revenue and expense and establish unique inflation assumptions reflecting how the market currently views this type of price change. In many instances, however, it is appropriate to use a single inflation factor for all categories of revenue and expense, particularly for projection years after the property reaches a stabilized level of occupancy.

Looking at the local market for both subject properties, we develop the following inflation assumptions:

- Average Room Rate - We estimate the rate of growth for the area's hotel room rates as follows:

| | Change from Previous Year |
|---|---|
| Year 1 | +6% |
| Year 2 | +5% |
| Year 3 | +4% |
| Year 4 and beyond | +3% |

- All Other Categories - We assume an overall inflation rate of 3% per year for all other categories of revenues and expenses.

## Step 4: Estimate the fixed and variable percentages for each revenue and expense category.

Each category of revenue and expense has a component that is fixed and one that varies directly with occupancy and facility utilization. To use the fixed and variable component approach to forecasting, we must assign a fixed and variable percentage to each revenue and expense category.

The following table shows the fixed and variable percentages we've selected for the proposed Sheraton.

Proposed Sheraton
Fixed and Variable Percentages

| Category | Fixed | Variable |
|---|---|---|
| Food Revenue | 40% | 60% |
| Beverage Revenue | 0% | 100% |
| Telephone Revenue | 10% | 90% |
| Other Revenue | 50% | 50% |
| Rooms Expense | 60% | 40% |
| Food & Beverage Expense | 55% | 45% |
| Telephone Expense | 60% | 40% |
| Other Expense | 50% | 50% |
| Administration & General | 70% | 30% |
| Management Fee | 0% | 100% |
| Marketing | 70% | 30% |
| Franchise Fees | 0% | 100% |
| Property Operation & Maintenance | 70% | 30% |
| Energy Costs | 90% | 10% |
| Property Taxes | 100% | 0% |
| Insurance | 100% | 0% |
| Reserve for Replacement | 0% | 100% |

We have now developed all the data necessary to use the FixVar program.

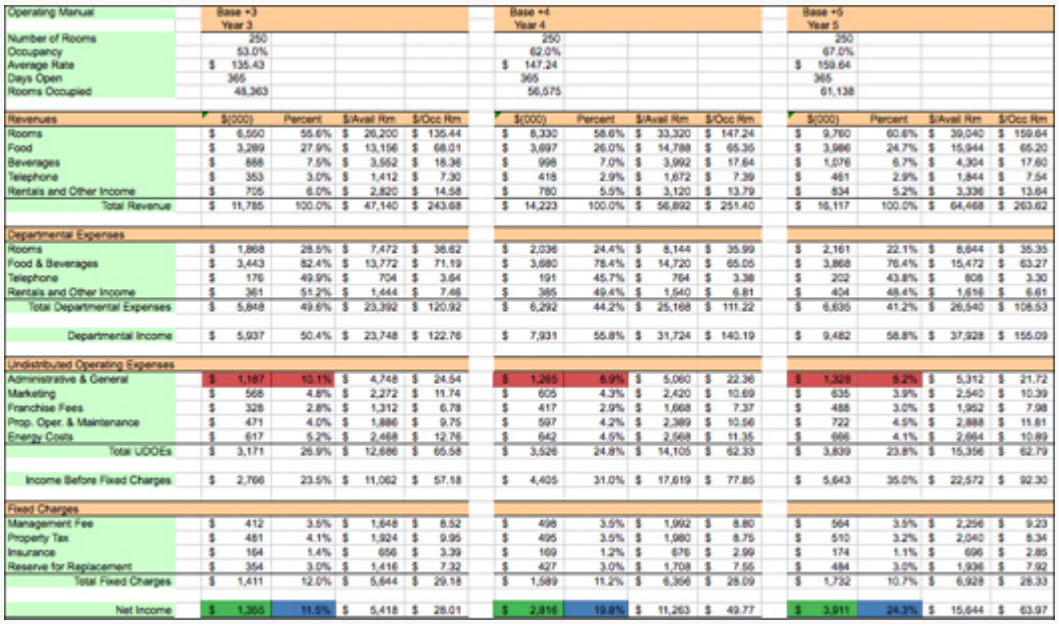
## Watch: Implementation

An illustrated presentation appears below. Use this resource to enter data into the FixVar spreadsheet and forecast revenues and expenses. You should open the FixVar spreadsheet and duplicate the entries. If you did not download the FixVar spreadsheet previously, "Forecasting the Average Daily Rate", you can do so here. Also, always verify that the data appear correctly. If you enter 68 for the occupancy, verify that it appears as 68% in the spreadsheet.

## Read: Interpreting the Data

Let's look at the output of the FixVar program. If we have done our job well in specifying the inputs (occupancy, average rate, inflation, percentage fixed, and selection of comparables for each line item), we have a very accurate picture of revenues, expenses, and cash flows expected over the projection period. For the Sheraton, it looks like this:

(Click the chart to open a larger version)



| Operating Manual | Base +3 Year 3 | | | | Base +4 Year 4 | | | | Base +5 Year 5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Rooms | 250 | | | | 250 | | | | 250 | | | |
| Occupancy | 53.0% | | | | 62.0% | | | | 67.0% | | | |
| Average Rate | $ 135.43 | | | | $ 147.24 | | | | $ 159.64 | | | |
| Days Open | 365 | | | | 365 | | | | 365 | | | |
| Rooms Occupied | 48,363 | | | | 56,575 | | | | 61,138 | | | |
| **Revenues** | **$(000)** | **Percent** | **$/Avail Rm** | **$/Occ Rm** | **$(000)** | **Percent** | **$/Avail Rm** | **$/Occ Rm** | **$(000)** | **Percent** | **$/Avail Rm** | **$/Occ Rm** |
| Rooms | $ 6,550 | 55.6% | $ 26,200 | $ 135.44 | $ 8,330 | 58.6% | $ 33,320 | $ 147.24 | $ 9,760 | 60.6% | $ 39,040 | $ 159.64 |
| Food | $ 3,289 | 27.9% | $ 13,156 | $ 68.01 | $ 3,697 | 26.0% | $ 14,788 | $ 65.35 | $ 3,986 | 24.7% | $ 15,944 | $ 65.20 |
| Beverages | $ 888 | 7.5% | $ 3,552 | $ 18.36 | $ 998 | 7.0% | $ 3,992 | $ 17.64 | $ 1,076 | 6.7% | $ 4,304 | $ 17.60 |
| Telephone | $ 353 | 3.0% | $ 1,412 | $ 7.30 | $ 418 | 2.9% | $ 1,672 | $ 7.39 | $ 461 | 2.9% | $ 1,844 | $ 7.54 |
| Rentals and Other Income | $ 705 | 6.0% | $ 2,820 | $ 14.58 | $ 780 | 5.5% | $ 3,120 | $ 13.79 | $ 834 | 5.2% | $ 3,336 | $ 13.64 |
| Total Revenue | $ 11,785 | 100.0% | $ 47,140 | $ 243.68 | $ 14,223 | 100.0% | $ 56,892 | $ 251.40 | $ 16,117 | 100.0% | $ 64,468 | $ 263.62 |
| **Departmental Expenses** | | | | | | | | | | | | |
| Rooms | $ 1,868 | 28.5% | $ 7,472 | $ 38.62 | $ 2,036 | 24.4% | $ 8,144 | $ 35.99 | $ 2,161 | 22.1% | $ 8,644 | $ 35.35 |
| Food & Beverages | $ 3,443 | 82.4% | $ 13,772 | $ 71.19 | $ 3,680 | 78.4% | $ 14,720 | $ 65.05 | $ 3,868 | 76.4% | $ 15,472 | $ 63.27 |
| Telephone | $ 176 | 49.9% | $ 704 | $ 3.64 | $ 191 | 45.7% | $ 764 | $ 3.38 | $ 202 | 43.8% | $ 808 | $ 3.30 |
| Rentals and Other Income | $ 361 | 51.2% | $ 1,444 | $ 7.46 | $ 385 | 49.4% | $ 1,540 | $ 6.81 | $ 404 | 48.4% | $ 1,616 | $ 6.61 |
| Total Departmental Expenses | $ 5,848 | 49.6% | $ 23,392 | $ 120.92 | $ 6,292 | 44.2% | $ 25,168 | $ 111.22 | $ 6,635 | 41.2% | $ 26,540 | $ 108.53 |
| Departmental Income | $ 5,937 | 50.4% | $ 23,748 | $ 122.76 | $ 7,931 | 55.8% | $ 31,724 | $ 140.19 | $ 9,482 | 58.8% | $ 37,928 | $ 155.09 |
| **Undistributed Operating Expenses** | | | | | | | | | | | | |
| Administrative & General | $ 1,187 | 10.1% | $ 4,748 | $ 24.54 | $ 1,265 | 8.9% | $ 5,060 | $ 22.36 | $ 1,328 | 8.2% | $ 5,312 | $ 21.72 |
| Marketing | $ 568 | 4.8% | $ 2,272 | $ 11.74 | $ 605 | 4.3% | $ 2,420 | $ 10.69 | $ 635 | 3.9% | $ 2,540 | $ 10.39 |
| Franchise Fees | $ 328 | 2.8% | $ 1,312 | $ 6.78 | $ 417 | 2.9% | $ 1,668 | $ 7.37 | $ 488 | 3.0% | $ 1,952 | $ 7.98 |
| Prop. Oper. & Maintenance | $ 471 | 4.0% | $ 1,886 | $ 9.75 | $ 597 | 4.2% | $ 2,389 | $ 10.56 | $ 722 | 4.5% | $ 2,888 | $ 11.81 |
| Energy Costs | $ 617 | 5.2% | $ 2,468 | $ 12.76 | $ 642 | 4.5% | $ 2,568 | $ 11.35 | $ 666 | 4.1% | $ 2,664 | $ 10.89 |
| Total UDOEs | $ 3,171 | 26.9% | $ 12,686 | $ 65.58 | $ 3,526 | 24.8% | $ 14,105 | $ 62.33 | $ 3,839 | 23.8% | $ 15,356 | $ 62.79 |
| Income Before Fixed Charges | $ 2,766 | 23.5% | $ 11,062 | $ 57.18 | $ 4,405 | 31.0% | $ 17,619 | $ 77.85 | $ 5,643 | 35.0% | $ 22,572 | $ 92.30 |
| **Fixed Charges** | | | | | | | | | | | | |
| Management Fee | $ 412 | 3.5% | $ 1,648 | $ 8.52 | $ 498 | 3.5% | $ 1,992 | $ 8.80 | $ 564 | 3.5% | $ 2,256 | $ 9.23 |
| Property Tax | $ 481 | 4.1% | $ 1,924 | $ 9.95 | $ 495 | 3.5% | $ 1,980 | $ 8.75 | $ 510 | 3.2% | $ 2,040 | $ 8.34 |
| Insurance | $ 164 | 1.4% | $ 656 | $ 3.39 | $ 169 | 1.2% | $ 676 | $ 2.99 | $ 174 | 1.1% | $ 696 | $ 2.85 |
| Reserve for Replacement | $ 354 | 3.0% | $ 1,416 | $ 7.32 | $ 427 | 3.0% | $ 1,708 | $ 7.55 | $ 484 | 3.0% | $ 1,936 | $ 7.92 |
| Total Fixed Charges | $ 1,411 | 12.0% | $ 5,644 | $ 29.18 | $ 1,589 | 11.2% | $ 6,356 | $ 28.09 | $ 1,732 | 10.7% | $ 6,928 | $ 28.33 |
| Net Income | $ 1,365 | 11.5% | $ 5,418 | $ 28.01 | $ 2,816 | 19.8% | $ 11,263 | $ 49.77 | $ 3,911 | 24.3% | $ 15,644 | $ 63.97 |

To understand why FixVar is so powerful, let's interpret the data. Note that the operating margin (the cash flow as a percentage of revenues) grows from 11.5% in the opening Year 3 to 24.3% in Year 5. This is due to three factors: the rapid growth of occupancy (found in line 5), the rapid growth of ADR (line 6), and the fixed nature of many expenses.

The result? The cash flows "explode" from $1.4 million in the opening year to $3.9 million in the third year of operations.

The Administrative and General (A&G) expense nicely illustrates the power of FixVar. It increases every year, from $1.19 million to $1.33 million in the third year. However, this expense decreases from 10.1% of revenues to 8.3% of revenues over the same time period due to the fixed nature of most A&G expenses. Recall that we specified A&G as 70% fixed.

Next, it is important to review the output carefully, to make sure that it is reasonable and error free. Ask questions such as:

- Are the overall margins reasonable, based on the comparables?
- Are individual line items reasonable, especially the revenue lines, the rooms department expense, and the food and beverage department expense?

If you suspect that any figures are incorrect, it is easy to go back to the Input sheet and make the changes you feel appropriate. The Output sheet will then reflect these changes.

Now that we have completed the preparation of the forecast of revenues, expenses, and cash flows, we're ready to move to the final task - producing an estimate of the value of the hotel. With the care that has gone into the market study and the forecast of cash flows, we have every reason to believe that our estimate of market value will be accurate and defensible.

# Module Introduction: Valuation

Using the Room Night Analysis Program to estimate projected occupancy and the FixVar program to project revenues and expenses accomplishes much of the "heavy lifting" necessary to estimate the value of a hotel property. In the context of the proposed Sheraton Hotel, this module introduces Hotel Capitalization Software (HCS) as a means of estimating a hotel's market value. You then have the opportunity to use all three programs-Room Night Analysis Program, FixVar, and Hotel Capitalization Software-to examine the valuation of a second hotel, the Wellington Hotel in Newtown, UK.

After completing this module, you will be able to:

- Use the income approach to estimate the market value of a hotel
- Explain how different valuation parameters influence the market value of a hotel
- Produce defensible and supportable estimates using the tools developed in this course
- Analyze hotel valuation reports

# Read: Approaches to Valuation: Income Capitalization

## Key Points

Income capitalization is:

- the dominant way of estimating hotel value
- based on "present worth of future benefits"

Hotel appraisers use three approaches to inform the estimate of value: the income capitalization approach, the sales comparison approach, and the cost approach. The appraiser generally considers all three approaches, evaluating the strengths of each approach and the nature of the subject property to determine which will provide supportable estimates of market value. The first course in this series, Financial Analysis of Hotel Investments, considers all three approaches. Here we use the income capitalization approach, the dominant approach for income property and one that is particularly suited to computer applications.


Recall that an estimate of market value is not the same as an estimate of investment value. *Market value* refers to the most probable selling price of the property in an open and competitive market, where the purchaser, whose identity is unknown, is assumed to be rational and fully informed. The appraiser uses information about typical "market" data related to financing arrangements, holding periods, and return requirements to inform the valuation. *Investment value* refers to the value of the property to a particular firm or person, using the investor's specific financing arrangements, holding periods, and return requirements.

In the real world, the final market value is estimated only after considering all three approaches. The appraiser should take the cost and sales comparison approaches into account before completing any appraisal assignment.

The income capitalization approach is based on the principle that the market value of a property is indicated by the net return to the going concern, or what is also known as *the present worth of future benefits*. The future benefits from income-producing properties such as hotels are the annual cash flows and the net receipts from selling the property in the future. We can convert these future benefits into an estimate of the market value through a capitalization process and discounted cash flow analysis.

To convert the forecasted cash flow stream into an estimate of market value, the appraiser allocates the anticipated cash flow to the mortgage and equity components based on market rates of return and lending parameters. The market value of

the property equals the sum of the mortgage component plus the equity component.

The following steps summarize the process of estimating the market value of the mortgage and equity components. To produce this estimate, we use the Hotel Capitalization Software program to perform the calculations.

1. Determine the provisions of typical hotel financing currently available in the market.
   These include the interest rate, amortization term, loan-to-value ratio, and the debt coverage ratio.

2. Establish a before-tax equity yield for a typical market participant.
   The equity yield takes into account the benefits of ownership. It is typical for buyers to base their equity yield on a ten-year holding period. The yield *explicitly* includes annual cash flow distributions and the equity residual. It *implicitly* includes refinancing distributions that return any property appreciation and mortgage amortization, income tax benefits, and nonfinancial considerations such as status and prestige.

3. Calculate the value of the equity component.
   This entails a series of steps. First, deduct the yearly debt service from the forecasted cash flow before debt service (called "Net Income" in FixVar), leaving the cash flow to equity for each forecasted year. Next, discount the cash flow to equity for each of the ten projection years back to the date of value at the equity yield rate (multiply each year's cash flow by the equity yield rate and sum). Then capitalize the cash flow in the 11th year into a reversionary value, or the estimated sale price of the hotel at the end of the analysis period. From the estimated sale price, we deduct the mortgage balance as of the end of the 10th year, along with normal legal and selling costs, to obtain the value of the equity residual. This equity residual is discounted back to the date of value at the equity yield rate. The sum of the discounted equity cash flows and the discounted equity residual is the value of the equity component. Adding the value of the equity component to the initial mortgage balance produces an estimate of the overall property value.

4. Compute total property value.
   The amount of the mortgage, the amount of the annual debt service, and the remaining mortgage balance all depend on the value to be calculated - the classic simultaneous valuation problem. Thus, the preceding calculation of the value of the equity component must be solved either by an iterative process on a computer or through an algebraic equation that computes the total property value. The Hotel Capitalization Software we employ for this uses the algebraic solution first developed by Suzanne Mellen in "Simultaneous Valuation: A New Technique," *Appraisal Journal*, April 1983.

5. Calculate value using a debt coverage ratio.
   In addition to calculating value using a specified loan-to-value ratio, the software calculates value using a debt coverage ratio. Lenders are increasingly using debt coverage ratio to size their loans, and are placing less emphasis on the loan-to-value ratio.

6. Perform proof of value.
   The program does this by allocating the total property value between mortgage and equity components and verifying that the rates of return set forth in steps 1 and 2 can be precisely met from the forecasted net income.

# Tool: Hotel Capitalization Software

Download the Tool

HCS Spreadsheet

To produce a valuation of the proposed Sheraton Hotel, we use Hotel Capitalization Software (HCS). Developed from the simultaneous valuation formula, [1] this is a discounted cash flow valuation model utilizing the mortgage-equity technique.

The HCS produces market value estimates under two different binding constraints:

- A loan-to-value ratio, in which the size of the mortgage is based on property value
- A debt-coverage ratio (also known as a debt-service coverage ratio), in which the size of the mortgage is based on property-level cash flow

By inputting the terms of typical lodging financing, along with the ten-year forecast of cash flows, the program determines the market value that provides the stated returns to the mortgage and equity components.

Click the link above to download the HCS spreadsheet. You should open the spreadsheet and seek to duplicate the calculations as you proceed through the remainder of this section.

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[1]The Simultaneous Valuation Formula was developed to solve a classic valuation problem that occurs when the loan-to-value ratio is used to size the mortgage component of value. For example, if the loan is 75% of the value of the property, we can't know the loan size until we know the value. But, since we're estimating the value of the property, we have a problem estimating the value of the mortgage component. Algebraic methods were used to find the "closed form" solution to the problem in the Simultaneous Valuation Formula, a breakthrough in appraisal practice. The HCS uses this closed form solution in its calculation engine. See Suzanne Mellen in "Simultaneous Valuation: A New Technique" *Appraisal Journal*, April 1983 for more information about the technique.

## Read: Establish Terms, Equity Yield Rate and Terminal Capitalization Rate

We can now begin to work through our step-by-step process to estimate a market value for the proposed Sheraton Hotel. Open the Hotel Capitalization Software (HCS) spreadsheet, and use the HCS to follow the example and practice entering data as you go. Let's begin.

### Step 1: Estimate appropriate terms under which the subject property could be financed with mortgage debt capital.

The proposed Sheraton Hotel will have new facilities, good management, and a recognized affiliation. Based on this analysis, the appraiser determines that the following mortgage terms for the proposed Sheraton would be available in the capital markets:


### Step 2: Establish an appropriate equity yield rate and a terminal capitalization rate.

The remaining portion of the capital required for a hotel investment generally comes from the equity investors. The rate of return an equity investor expects over a ten-year holding period is called an *equity yield*. The equity yield specifically considers a long-term holding period (typically ten years), annual cash flows adjusted for inflation, property appreciation, mortgage amortization, and proceeds from a sale at the end of the holding period. In concept, the equity yield is the internal rate of return to equity capital. It is very important to note that equity yield is not the same as the *equity dividend rate*, which is a short-term rate of return.

A survey of hotel investors determined that equity yield requirements in the market for a property similar to the proposed Sheraton would be between 17% and 20%. Using the same investment criteria that was employed for the mortgage interest rate, the range was narrowed to an 18% equity yield. Based on a survey of terminal capitalization rates, a 12.0% rate was considered to be the appropriate market "terminal cap rate" for the proposed Sheraton hotel.

### Step 3: Use a mortgage-equity technique to estimate the overall market value by first valuing the equity component and then adding the initial mortgage balance to that value.

Before we can separately calculate the value of the equity and the value of the mortgage, we need to establish the cash flow (known as net income in FixVar) over the projection period. In most instances, we project the cash flows that occur after the stabilized year at an assumed rate of inflation. This way, the cash flow expressed as a percentage of total revenue remains constant and the dollar amount of cash flow will escalate each year at the inflation rate.

When you expect a category of revenue or expense to increase at a rate other than inflation, the forecast of income and expenses for that year should reflect this peculiarity. For example, contractual changes in a ground rent expense, an escalating reserve for replacement percentage, or an expected change in property tax assessment might all require adjustments.

The Hotel Capitalization Software is designed to give the user a choice of using cash flows developed in a projection of revenue and expense or calculating cash flows after the stabilized year, based on an inflation assumption.

Cash Flows from the FixVar Program for the Proposed Sheraton:


Note that the cash flows are available only through Year 9. Because the Hotel Capitalization Software assumes a 10-year holding period, we need two years of projection beyond Year 9 - Year 10 for the discounted cash flow analysis and Year 11 to determine the residual value of the property. As you will see, we estimate these by assuming that the property stabilizes in Year 3 and that the cash flow grows at 3.0% per year for the remainder of the projection period.

## Watch: Estimate Overall Property Value

An illustrated presentation appears below. Use this resource to estimate overall property value using the Hotel Capitalization Software spreadsheet you downloaded earlier in this section. You should open the spreadsheet and duplicate the data entries discussed in this presentation.

# Read: Valuing the Wellington Hotel

Projecting hotel occupancy, average rate, revenues and expense forecasts, and hotel value is all part of the analyst's job. These numerical projections, however, need to be presented in a larger analytic framework. This page considers a valuation report for the Wellington Hotel, following the projections and analyzing the report.

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Let's review what we have produced for the proposed Sheraton Hotel. Using the Room Night Analysis Program, we produced a market study and projected both market occupancy and the expected occupancy. Using the FixVar program, we produced accurate projections of both revenues and expenses. Finally, using the Hotel Capitalization Software, we produced a market valuation.

Now we look at another fictitious hotel, the Wellington Hotel in Newtown, U.K. The Wellington is a four-star, full-service hotel with 250 rooms. For this hotel, we present a full-scale economic study and valuation report in the form of a "demonstration appraisal" [1]. Here we see the projections we have derived throughout this course embedded in a sustained work of analysis and appraisal. This is what the projections look like in the real world.

Using the three spreadsheets that make up the Hotel Valuation Software and the data in the report, we have produced our own valuation of the property. In reading through the report, and comparing the report with the data in the three spreadsheets, you will see how accurately the Hotel Valuation Software's output mirrors that of the report. If you read closely, you may also find mistakes made in the preparation of the report.

Click the links below to download the following files. You will use them when you complete the evaluation on the next page:

- An economic study and valuation report
- The room night analysis for the Wellington Hotel
- The FixVar analysis for the Wellington Hotel
- The HCS analysis for the Wellington Hotel

The economic study and valuation report is a lengthy document. It is worth reading carefully, and you may want to spend more time with the document than is required for this course. To complete the course assignment, however, you should:

- Read the Executive Summary, pp. 1-2
- Skim quickly the Market Analysis, pp. 6-11

- Skim quickly the Description of the Hotel, pp. 12-15
- Skim the Market for Transient Accommodation, pp. 16-19
- Skim the Competition section, pp. 20-26
- Skim the Projection of Hotel Demand, pp. 27-34
- Read closely the Projection of Occupancy and Rate, pp. 35-38
- Read the Projection of Income and Expense, pp. 39-40
- Skim quickly the rest of the Projection of Income and Expense, pp. 41-46
- Read the Valuation, pp. 47-51 (end at "Proof of Value")
- Browse the rest of the report

While you read the report, open the accompanying spreadsheets and compare the data. Then proceed to the evaluation on the next page of this course.

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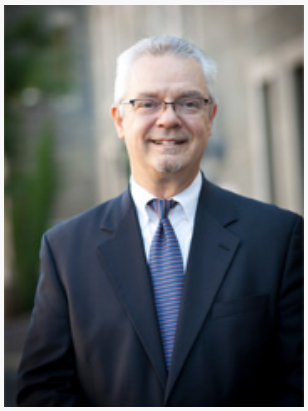
[1] The author is indebted to HVS for permission to use the Wellington demonstration appraisal in this course, and especially for the help of Mr. Russell Kett, managing director of the HVS office in London, U.K.



Click Play to Listen

Jan deRoos
HVS Professor of Hotel Finance and Real Estate
School of Hotel Administration, Cornell University

## Listen: Thank You and Farewell

Hi, this is Jan deRoos again. We now have the tools necessary to perform a market study and produce highly accurate estimates of hotel occupancy. We can likewise produce accurate estimates of average daily rate, and of cash flows. And finally, we can put it all together to produce an overall valuation for a prospective hotel. These are essential tools for hotel appraisal work and the starting point for the thorough and defensible analysis of hotel investments. I trust they will serve you well.

# Stay Connected

## Additional Resources

The Center for Hospitality Research provides focused whitepapers and reports based on cutting-edge research.