PERFORMANCE CHARACTERISTICS OF THE HOTEL INDUSTRY

by

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Submitted to the Department of Urban Studies and Planning in Partial Fulfillment of the Requirement for the Degree of MASTER IN CITY PLANNING

at the

Massachusetts Institute of Technology

June, 1990

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ABSTRACT

This thesis examines the performance characteristics of hotels as income-producing property. The influence of business cycles and inflation on the net operating income (NOI) is examined by analyzing a national hotel operating data base during the period 1974 and 1987. The holding period return (HPR) and the capitalization rate are examined during the period 1978-1988. The NOI is compared among location types (urban, suburban, highway, airport and resort hotels). In addition, the NOI of hotels is compared with those of offices and apartments. A case study of a downtown hotel in Boston's hotel market is presented.

The results suggested that the NOI of hotels was significantly affected by business cycles and showed a substantial hedge against inflation until the early 1980s; however, since then, the NOI did not reflect business cycles directly and offered a weak hedge against inflation. This change was primarily caused by the rapid increase in payroll costs due to the decline in the younger work force in the U.S. The performance of urban hotels appeared to be most stable among the location types. The NOI of hotels was more stable than that of offices but more volatile than that of apartments.

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ACKNOWLEDGEMENTS

I thank my thesis committee: Dr. Marc Louargand as my thesis advisor and Mr. Ara Aftandilian as my thesis reader. I am particularly appreciate Dr. Louargand who guided the development of my thesis with his acute insights.

I also wish to thank many firms and agencies which allowed me to use their valuable data for this thesis. In particular, I would like to thank Laventhol & Horwath, Pannell Kerr Foster, and Hospitality Valuation, Inc. In addition, I would like to thank professionals in the hotel industry who provided my thesis with insightful information through interviews.

I appreciate Professor Christopher Sawyer-Laucanno for his instructions in professional writing. His lectures and comments enhanced the quality of my thesis very much. I also thank all the members of the Writing Center at MIT for improving my English writing.

My studies at MIT were made possible by the financial support by TAISEI CORPORATION. I would like to thank TAISEI for giving me an excellent opportunity for studies and experiences.

I close with a special thank to my wife, Mari, who, suspending her job career in Tokyo, supported my studies constantly.
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INTRODUCTION

Real estate investors are concerned about the relationship between risk and return. Project level risk includes operating and financial risk. Operating risk can be measured by the variation of a property's return over a holding period. The causes of this variation include general business cycles, inflation, changes in tax policies and local market forces. In addition, institutional investors pay attention to portfolio diversification. Some empirical studies have suggested that the diversification within real estate investments can be achieved across product types and geographical regions, based on low correlations of historical returns.

Major income-producing property types, including offices, apartments, industrial, retail and hotel properties, share some common performance characteristics. However, the performance of each product type has particular characteristics since each type has a unique supply and demand structure. Changes in general economic conditions may impact the demand for each type of real estate product differently since each product is supported by different economic activities. Generally, a longer lease term stabilizes income from operation, and some provisions for inflation such as "pass-through" and "triple net" clauses largely protect owners' incomes from inflation.

Some analysts have implied that hotels have higher operating risk. [3] In contrast to other real estate products, hotels do not have tenants on a long-term lease. Because a hotel's major revenue comes from the selling of rooms on a daily basis, the revenues for a
hotel are assumed to be volatile. Market forces outside management control may quickly affect a hotel's operation. They can cause a significant decrease in demand or a rapid increase in expenses such as labor and energy. Furthermore, the number of rooms rented often varies from weekdays to weekends and from season to season. These are the main reasons why many real estate investors regard hotels as a risky product. By contract, hotels have been viewed as real estate that provides an effective hedge against inflation. Because of the daily revenues, hotels may quickly adjust their prices upward in a strong market or during inflationary periods.

Although these issues have been discussed by some researchers, e.g., Shulman and Giles [3], Lee [5], Arbel and Strebel [8], most of the studies have relied on qualitative analyses or have not been focused on incomes, but on prices. In addition, it is insufficient to study hotels as a whole since the hotel industry itself includes diverse product types such as old urban "grand hotels", economy highway motels, and luxury resort hotels. Each property type may perform differently over a long period because the primary market segment (the main supporting consumers) for each type differs.

The purpose of this study is to examine the performance characteristics of hotels as income-producing properties, by analyzing their historical operation and transaction data for 1974-1988. The influence of business cycles and inflation on their performance is examined, paying attention to supply and demand conditions. In addition to the analyses of hotels as a whole, the attributes of returns from each location type (urban, suburban,
highway, airport, resort hotels) are discussed. The returns from hotels are also compared with those of other real estate products. Generally, the returns from real estate consist of three components: income from operation, property value appreciation, and tax benefits. In this thesis, performance is discussed primarily in terms of the income from operation. In addition, the holding period returns (HPR), which include income from operation and appreciation components, are also analyzed. The component of tax benefits is not in the scope of this thesis, as all returns are studied on a pre-tax basis.

The first chapter includes an overview of the hotel industry's history and trends, market segments, classification, income and expense components, and performance measures. Chapter 2 contains an exploration of the hotel industry's supply and demand forces, including a survey of the trends for the last two decades. This chapter also contains a review of the literature on supply and demand as well as other performance issues. Chapter 3 explains this study's methodology and data which are used for the analysis presented in chapters 4 and 5. In chapter 4, the historical operation and transaction data in the U.S. are analyzed, focusing on the influence of business cycles and inflation. A comparison in returns across location type is conducted; the performance of hotels is also compared with those of offices and apartments in this chapter. In chapter 5, Boston's hotel market and a hotel's historical performance are analyzed as a case study, focusing on the influence of the local economy. Finally, conclusions are presented.
Chapter 1: Hotel Industry Overview

Section 1: History and Trends

The U.S hotel industry began to expand in the 1920s. This expansion was interrupted by WWII, but since the 1950s, the stock of hotel rooms has increased rapidly. Between 1948 and 1988, they increased from 1.85 million to 2.9 million; that is, at an average rate of 1.1 percent per year. During the same period, however, the number of hotel properties decreased from 55,569 to 44,100, as smaller hotel properties were demolished or replaced by larger new hotels. In 1948, hotels with fewer than 50 rooms dominated the hotel industry. They represented 84 percent of all hotel establishments and 43 percent of the number of rooms available. By 1988, however, the property size (the average number of rooms per property) had almost doubled - from 33.4 in 1948 to 65.8 in 1988. ([1], Smith Travel Research)

During the 1940s and 1950s, the typical hotel location was in the downtown business district and usually near a railroad station. Downtown areas, as retail, finance and general business centers, were still attracting many people. At that time, hotels were supported mainly by business travelers. There was a limited number of resort hotels that served wealthy individuals. Few hotels/motels existed on highways. Suburban and airport properties did not exist at all. Although the Hilton and the Sheraton emerged in the late 1940s, most of the hotel properties were independently owned and operated. Hotel rooms tended to be small and facilities and amenities were very limited. At that time, hotels were used by a
limited group of people such as business travelers and wealthy leisure travelers. [1]

During the 1950s, 1960s and 1970s, the hotel industry experienced dramatic growth and changes. Hotel properties became more diverse in regard to facility types, location and services. Changes in demographics and life styles caused a diversified and intensified demand. Not only the population but also the number of households grew rapidly during and after the 1950s. The shift of population and firms toward the Sunbelt, spreading out family members, boosted people's travel needs. As two-income families increased and the family size shrank, the increase in real disposable household income spurred leisure travel. Reduced airline fares also boosted pleasure travel. [5]

During the 1960s and 1970s, the expanding interstate highway system contributed to travel by automobile and created new locations for the hotel industry. New properties included motels and motor hotels as new product types.

The construction of highways also enhanced the accessibility within metropolitan areas. As a consequence, a large number of people moved to the suburbs. Eventually a new suburban location was established, not only for shopping centers and industrial parks but also for hotels. Then, as air travel became popular, locations near airports were added to the list of major hotel locations. Many hotels were also constructed in downtown areas as a component of redevelopment projects; some of these were funded by Urban Development Action Grants (UDAG). During the 1960s and 1970s, many cities, regarding convention centers and auditoriums as
catalysts for regional economic growth, constructed convention centers. These convention centers also strongly impelled the demand for accommodations from the group/convention segment. [1]

In the 1950s, many hotel chains such as Holiday Inns, Ramada Inns, Howard Johnson's, and Travelodge emerged. Most of their properties were located in suburbs and near interstate highways. To cope with competition with the newer chains, the Sheraton and Hilton also diversified their locations. Through the expansion of these hotel chains, diversification and specialization were intensified. Luxury hotels raised their grade by adding new facilities such as swimming pools, meeting and banquet rooms, whirlpools, and saunas. On the other hand, the low-priced "budget" or "economy" hotels, whose amenities were limited, emerged in the 1960s. [1]

Even in the 1980s, a number of major national hotel chains had diversified their products to appeal to a wider range of travelers. Some of them created a full spectrum of service by aggressive expansion plans or by mergers and acquisitions of smaller chains. As the population ages, the elderly market is the fastest growing market segment. Nothing seems to slow down the growth the hotel market has experienced. Even progress in telecommunication technology has not so far curtailed hotel demand significantly, and the necessity of face-to-face business meetings appeared to remain stable. [1]
Section 2: Definition, Market Segments and Classification

**Definition**

There is no specific definition of lodging facilities. However, they generally include those properties that provide away-from-home sleeping and living accommodations to travelers for a daily remuneration. Although weekly-basis hotels/motels, condominium/apartment hotels, and time-sharing resort facilities are sometimes classified as hotel/motel facilities, in this thesis, "hotels" refers to all daily-basis lodging facilities that include hotels, motels, and motor hotels.

**Market Segments**

It is important to pay attention to the characteristics of market segments in order to analyze fluctuations in the demand for hotels. The demand in each segment may respond differently to general economic conditions. Generally, market segments can be classified according to the purpose of the travel (business or pleasure/personal), the travel mode (independent or group) and the general attributes of travelers (gender, age, or family with/without children). Although travelers are classified into many small market segments by different combinations of the above items, it is common to classify the market segments into the following three major divisions: (1) Business/Individual, (2) Tourist (Pleasure/Personal) and (3) Convention (Commercial/Group).
(1) Business/Individual

This segment includes independent business travelers except for convention participants. Government and military employees, and airline crews are also included in this category. Travelers who belong to this segment typically make trips to attend corporate meetings and to make commercial sales.

Their price sensitivity varies depending on a traveler's position. Corporate executives tend to be able to afford higher rates and want high quality amenities such as restaurant, bars, and health clubs. Traveling sales persons are more price sensitive and want convenience and reasonably affordable restaurants.

Many hoteliers regard business travelers as most important to the lodging industry because they show a high repeat ratio and a low double occupancy ratio. The hotel room demand by this segment is influenced by the amount of office, industrial, and retail businesses within the market area. The closing of major firms or of military bases sometimes lowers the local hotel demand significantly. The monthly fluctuations in demand are relatively small (somewhat low demand in summer and around holidays). However, the demand is concentrated from Monday through Thursday. [5]

Compared with pleasure travelers, the demand by this segment has been considered less volatile since some business travel is necessary regardless of economic conditions. In addition, business travelers are perceived as generally less price-sensitive than pleasure travelers. [5]
(2) Tourist (Pleasure/Personal)

This segment consists of pleasure travelers and personal travelers. Pleasure travel is typically comprised of one to two week vacation travel and shorter weekend trips. Personal travel includes job-seeking-trips, funeral attendance, and other non-business traveling. Since the main purpose of travel by this segment is vacation and pleasure oriented, the seasonal fluctuation is large. Pleasure travel peaks in the summer quarter, as many families take vacations while children are out of school. This segment includes both price sensitive lower-income people and relatively non price-sensitive wealthy people. The demand by this segment is considered very sensitive to business cycles. [5]

(3) Convention (Commercial/Group)

This segment includes participants for local companies' meetings, large state or regional events, national association conferences, and corporate incentive tours. Most of the rooms for this segment are sold at discounted group rates. The average length of stay by this segment is longer than the Business/Individual travelers. Spring and fall months are most popular for the segment demand.

Classification of hotels

Hotels can be classified according to their diverse attributes: the price range, the location of the property, the market orientation, the size of the property (the number of rooms), the age of the
property, the types of facilities and amenities offered. These attributes can be illustrated as follows:

<table>
<thead>
<tr>
<th>Price</th>
<th>Specific Markets Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget/Economy Hotels</td>
<td>Executive Conference Centers</td>
</tr>
<tr>
<td>Middle-Market Hotels</td>
<td>Health Spas</td>
</tr>
<tr>
<td>Luxury Hotels</td>
<td>Resort Hotels</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amenities</th>
<th>Style or Offerings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convention Hotels</td>
<td>All-Suite Hotels</td>
</tr>
<tr>
<td>Commercial Hotels</td>
<td>Renovated/Converted Hotels</td>
</tr>
<tr>
<td></td>
<td>Mixed-Use Hotels</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Locations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Downtown Hotels</td>
<td></td>
</tr>
<tr>
<td>Suburban Hotels</td>
<td></td>
</tr>
<tr>
<td>Highway/interstate Hotels</td>
<td></td>
</tr>
<tr>
<td>Resort Hotels</td>
<td></td>
</tr>
<tr>
<td>Airport Hotels</td>
<td></td>
</tr>
</tbody>
</table>

Source: Hotel/Motel Development, ULI, Laventhol Horwath

Although hotels can be classified in many different ways, the classification based on location is meaningful. Some data on the hotel industry are also available based on this classification. According to this, hotels consist of five categories: Urban, Suburban, Highway, Airport and Resort hotels. Urban hotels can be subdivided into three types by the market segments: Downtown Convention, Downtown Business, and Downtown Luxury.

As Table 1-1 shows, in 1988, Urban hotels accounted for 8.6% in property numbers and 16.8% in rooms of the total U.S. hotels. Suburban and Highway properties accounted for more than 30% respectively of the total rooms. However, the average property size in these categories was relatively small. Resort hotels and airport
hotels accounted for 11.7% and 7.5% respectively of the total rooms. Resort hotels had the highest average daily room rate (ADR), followed by urban, suburban, airport, highway hotels.

Table 1-1 Hotel Properties and Rooms Breakdown (1988)

<table>
<thead>
<tr>
<th>Property</th>
<th>Number of Property (,000)</th>
<th>Rooms (,000)</th>
<th>Rooms per property (%)</th>
<th>ADR ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>URBAN</td>
<td>3,793 (8.6%)</td>
<td>482 (16.8%)</td>
<td>127</td>
<td>63.6</td>
</tr>
<tr>
<td>SUBURBAN</td>
<td>13,230 (30.0%)</td>
<td>904 (31.5%)</td>
<td>68</td>
<td>52.8</td>
</tr>
<tr>
<td>HIGHWAY</td>
<td>22,403 (50.8%)</td>
<td>933 (32.5%)</td>
<td>42</td>
<td>36.3</td>
</tr>
<tr>
<td>AIRPORT</td>
<td>1,808 (4.1%)</td>
<td>215 (7.5%)</td>
<td>119</td>
<td>47.2</td>
</tr>
<tr>
<td>RESORT</td>
<td>2,867 (6.5%)</td>
<td>336 (11.7%)</td>
<td>117</td>
<td>72.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>44,100 (100%)</td>
<td>2,870 (100%)</td>
<td>65</td>
<td>51.1</td>
</tr>
</tbody>
</table>

Source: American Hotel & Motel Association (property and room numbers), Laventhol & Horwath (ADR)
ADR: Average daily room rate

Table 1-2 illustrates the market segments for each location type. The mixture of market segments for urban hotels, which is a diverse category, is fairly well distributed among business travelers, tourists and conference participants. The guests at airport hotels are also fairly evenly distributed, but the ratio of conference participants is lower than that of urban hotels. The segments for suburban and highway hotels concentrate on business travelers. Highway hotels show the lowest conference participants ratio. Not surprisingly, the guests at resort hotels are concentrated highly in tourists. Urban hotels and resort hotels depend substantially on conference participants.
Table 1-2  Source of Demand for Each Location Type (1982)

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Business/Individual</th>
<th>Tourist</th>
<th>Conference participants</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>URBAN</td>
<td>37%</td>
<td>29%</td>
<td>28%</td>
<td>6%</td>
</tr>
<tr>
<td>SUBURBAN</td>
<td>57%</td>
<td>22%</td>
<td>18%</td>
<td>3%</td>
</tr>
<tr>
<td>HIGHWAY</td>
<td>55%</td>
<td>26%</td>
<td>11%</td>
<td>8%</td>
</tr>
<tr>
<td>AIRPORT</td>
<td>47%</td>
<td>33%</td>
<td>17%</td>
<td>3%</td>
</tr>
<tr>
<td>RESORT</td>
<td>13%</td>
<td>57%</td>
<td>27%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Source: Laventhol Horwath, U.S.Lodging Industry

According to The Urban Land Institute's Hotel/ Motel Development [1], profiles of each type of location are as follows:

1. Urban hotels
   a) Downtown Convention Hotels
      Downtown convention hotels generally contain 500 or more hotel rooms. They have large banquet rooms and spaces for meetings. In addition to these facilities, some amenities such as an indoor swimming pool and substantial retail space are usually included. Such hotels sometimes are located near large convention centers and provide convenient access to them. The primary market segment for this type of hotel is the business/commercial oriented group guest. Examples: The Bonaventure in Los Angeles, The New York Hilton at Rockefeller Center, The Franklin Plaza in Philadelphia, The Memphis Hyatt

   b) Downtown Commercial Hotels
      Downtown commercial hotels generally have 300 to 500 rooms. These hotels also expect to attract the convention and meeting
segment; however, their groups are smaller. Specialized small meeting space are usually offered. Typically, this type of hotel is supported by the segments comprised of individual business travelers and tourists. Examples: Park Plaza Hotel in Boston, The Sheraton Plaza in Chicago, The Meridien Houston Hotel

c) Downtown Luxury Hotels

Downtown luxury hotels are typically located in the center of large metropolitan areas. These hotels include both old "grand hotels" and new hotels, some of which are parts of mixed-use developments. The major market segment for these hotels is both business/individual and pleasure/personal persons who are willing and able to pay the high room rate. The luxury hotels also may accommodate meetings and offer banquet space. However, they focus on small groups. All luxury hotels provide high quality furnishings, superior restaurants, and a variety of guest amenities and services. Examples: Ritz-Carlton in Boston, The Whitehall in Chicago, The Four Seasons Hotel in Washington, D.C.

2. Suburban Hotels

A typical suburban hotel contains 200 to 500 rooms with public space which serves the demand for commercial meetings and for local food and beverages. Although business travelers account for more than half of the total guests, tourists and conference participants are also important as secondary markets. Generally, the average room rate for suburban hotels is higher than that of highway facilities but lower than that of downtown facilities.
Examples: The Marriott Hotel in Perimeter Center, Atlanta, The Hilton Inn Naperville, Illinois, The Holiday Inn in Westlake, Ohio

3. Highway Hotels

A typical highway hotel consists of a two-story, out-corridor structure and a separate restaurant and administration building with surface parking. The primary market is business repeaters and the secondary market is pleasure/personal families. The guests for highway hotels tend to stay for short periods.

Economy/budget properties emerged near highways in the 1960s and 1970s, in response to the rapid expansion of price-sensitive pleasure travelers. These properties, which later spread over urban, suburban, and resort areas, still occupy the majority of highway hotel locations. Examples: The Ramada Inn in Davenport, Iowa, The Quality Inn in Madison, Wisconsin

4. Airport Hotels

The facilities at airport hotels are similar to those of suburban hotels. However, airport hotels differ from suburban hotels in that airport hotels cater to a greater diversity of guests. The primary market for airport hotels include guests associated with airports; passengers who have to stay overnight for connections, passengers who are stranded by weather conditions, and airline crews. In addition, the conference/convention market is also important for airport hotels since they offer a convenient site for participants coming from many cities. Examples: Logan Airport
Hilton in Boston, The Marriott Hotel, Kansas City International Airport.

5. Resort Hotels

Resort hotels were originally located near water or mountain areas and their guests were limited to wealthy or upper-middle class people. However, diverse types of resort hotels have been developed during the past few decades. They include hotels that attract guests with sports facilities such as golf courses and tennis courts. Casino hotels are a relatively new type of resort hotels. Resort hotels also have been developed in alliance with theme parks such as Disney World. Tourists (pleasure) is the primary market, although the convention market is also important as the secondary source. Not only individuals, but also groups, including corporate incentive travelers, are sources for resort hotels.
Section 3: Income and Expense Components, and Performance Measures

In contrast with other real estate products such as offices, industrial properties, and apartments, hotels don't have tenants on a long-term lease. Because a hotel's major revenue comes from the selling of rooms on a daily basis, the revenues for a hotel tend to be volatile. Hotels may experience, without warning, the impact of market forces outside management's control. Sometimes market forces can cause a significant decrease in demand or a rapid increase in expenses such as labor, energy and reinvestment in furniture, fixtures and equipment (FF&E). Furthermore, the number of rooms rented varies often from weekdays to weekends and from season to season. These are the main reasons why many real estate investors, who define operating risk as performance variation over a holding period, regard hotels as a risky product. But it should be noted that because of the daily basis revenue, hotels may quickly adjust their prices upward against inflation and in strong market conditions.

According to a survey by Pannell Kerr Foster in 1988 [2], revenues of hotels came from room sales (61.6%), food and beverage sales (31.2%), and other sources (7.2%). Resort hotels tend to rely more on food and beverage sales while motels (highway properties) rely more on room sales. Total expenses consist of payroll and related costs (33.3%), operating costs (34.3%), cost of sales (10.1%), energy costs (4.5%), other (17.8%). The operating costs include administrative and general costs, management, marketing, and
property maintenance fees. The "other" includes insurance, rent, interest, depreciation, amortization and taxes. The hotel industry is still a labor-intensive industry.

Similar to other real estate products, the level of rent, utilization and profitability are three important factors which are used to measure a hotel's performance. In the hotel industry, they are referred to as "average daily room rate (ADR)", "occupancy" and "income before fixed charges per room" (or "gross operating profit (GOP) per room"). The ADR can be determined by the total room sales divided by the total number of rooms occupied during a certain period. Occupancy rate is calculated by "the room nights occupied" divided by "the room nights available" during a certain period. The GOP is often used as a measure of profitability. It is the income from all hotel operations before deduction of property tax, insurance, rent, interest, depreciation, amortization and income taxes.

For other real estate products such as offices and industrial properties, the net operating income (NOI) is commonly used as a measure of income from operation. The GOP differs slightly from the NOI. The former is an income before property tax and insurance, while the latter is an income after the deduction of them. In this study, the NOI is used as a measure of hotels' income from operation in order to discuss their performance as a real estate product and to compare it with those of other real estate products. As discussed in the next paragraph, hotels' operating and ownership structure is often more complex than those of other real estate products. The comparison among real estate products on the basis of NOI is
possible if we assume that the property owner and hotel operating company are the same entity.

Generally, to run a hotel business, there are three players: a property owner, a hotel operating company and a hotel management company. A player may take one, two, or three of the roles depending on a situation. Hotel management companies, e.g., the Sheraton, or the Hilton, manage hotel businesses and receive management fees, which typically, consist of fixed fees and a certain percentage of the GOP or the gross revenues. Hotel operating companies take the business risk and pay rent to property owners, if the owners are different entities. Property owners, including risk-averse institutional investors, receive rent from operators.

While hotel operating income has a greater operating risk component than income from other property types, the income flows are roughly comparable across property types. Volatility in hotel income streams is generally recognized to be greater than the income of other property types, so we would expect that the increased volatility would be reflected in the structure of the rental agreement. Therefore, we can consider the NOI of the hotel owning entity to be a reasonable proxy for the earning stream of the hotel real estate.
Chapter 2: Supply and Demand Structure

and Literature Review

Section 1: Long-Term Supply and Demand Trends

Figure 2-1 illustrates the stock of hotel rooms, the average occupied rooms, and the occupancy rate in the U.S. between 1957 and 1988. The average occupied rooms, which are calculated by the number of rooms in stock multiplied by the occupancy rate, indicates the demand for hotel rooms.

Between 1960 and 1988, the hotel rooms in stock increased from 2.0 million to 2.9 million at an average annual rate of 1.35%. During that period, the average occupied rooms increased from 1.3 million to 1.9 million at an average annual rate of 1.43%. These rates outpaced the U.S. population growth rate, which was 1.13% during the same period. This difference means that people became more likely to travel and to stay at hotels during the period. While the number of hotel rooms in stock increased consistently except for the period 1974-1977, the number of the occupied rooms fluctuated substantially in an upward trend.

As Table 2-1 shows, the supply and demand didn't expand evenly or in parallel during the three decades. The number of hotel rooms expanded rapidly in the 1980s, whereas that of the occupied rooms increased substantially in the 1970s. The increase in the demand reflected the growth in population in the 20 to 54 age bracket, the main supporters of the hotel demand, as the baby boomers aged and entered the labor force.
As Figure 2-1 shows, the occupancy rate declined between 1957 and 1971, and then increased until 1978. In this year, the occupancy showed the highest percentage (72.1%) during the three decades. Between 1978 and 1981, the occupancy stayed above 70%. In 1982, the occupancy sharply dropped to 66%. Since then the occupancy rate fluctuated in the range between 65% and 68%. During the period 1957-1988, the average occupancy rate was 64.5%.

Source: Smith Travel Research (hotel rooms in stock), Laventhol & Horwath (Occupancy)
Table 2-1 Change in Rooms, Occupied Rooms, Population
(average annual percentage change)

<table>
<thead>
<tr>
<th>Years</th>
<th>Rooms in Stock</th>
<th>Occupied Room</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-70</td>
<td>1.37%</td>
<td>-0.31%</td>
<td>1.26%</td>
</tr>
<tr>
<td>70-80</td>
<td>0.56%</td>
<td>3.86%</td>
<td>1.36%</td>
</tr>
<tr>
<td>80-88</td>
<td>2.33%</td>
<td>0.44%</td>
<td>0.29%</td>
</tr>
<tr>
<td>60-88</td>
<td>1.35%</td>
<td>1.43%</td>
<td>1.13%</td>
</tr>
</tbody>
</table>

Source: Smith Travel Research, Laventhol & Horwath, U.S. Census
Section 2: Supply Trend and Factors

Between 1970 and 1988, the number of hotel rooms increased from 2.286 million to 2.906 million, by an average of 33,000 rooms per year, or at an average rate of 1.3% per year. However, as Fig.2-2 shows, the supply of hotel rooms, like those of other real estate products, followed a cyclical pattern. During these 19 years, the U.S. hotel industry experienced massive construction periods in the early 1970s, and in the second half of the 1980s. By contrast, the number of rooms in stock declined between 1974 and 1977. Since 1987, the construction boom has been slowing down.

Table 2-2 illustrates the breakdown of the increase in the hotel rooms by location type between 1985 and 1988. During the same period, suburban hotels showed the highest rate of increase, followed by highway, Airport, resort, and urban hotels. These data indicate that the massive hotel room addition during the 1980s was concentrated on suburb, highway and airport locations.

<table>
<thead>
<tr>
<th>Location</th>
<th>1985</th>
<th>1988</th>
<th>Change(85-88)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>465,400</td>
<td>482,160</td>
<td>3.60%</td>
</tr>
<tr>
<td>Suburban</td>
<td>793,000</td>
<td>904,050</td>
<td>14.00%</td>
</tr>
<tr>
<td>Highway</td>
<td>829,400</td>
<td>932,750</td>
<td>12.46%</td>
</tr>
<tr>
<td>Airport</td>
<td>195,000</td>
<td>215,250</td>
<td>10.38%</td>
</tr>
<tr>
<td>Resort</td>
<td>317,200</td>
<td>335,790</td>
<td>5.86%</td>
</tr>
<tr>
<td>Total</td>
<td>2,600,000</td>
<td>2,870,000</td>
<td>10.38%</td>
</tr>
</tbody>
</table>

Source: American Hotel and Motel Association
Figure 2-3 illustrates the constant dollar values which were invested in each real estate type between 1974 and 1988. Each value in 1974 is indexed as 100 for comparative purposes. Between 1976 and 1978, the investment in new hotel constructions plunged to half the level of that in 1974. In addition, the sharp drop in occupancy in 1974 and 1975 spurred the demolition of uncompetitive properties. As Daniel R. Lee [5] estimated, assuming that the average life of hotels is 20 to 30 years, generally 3 to 5 percent of all hotel rooms becomes obsolete and uncompetitive, either functionally or physically, each year.
Shulman and Giles [3] illustrated the factors for the construction boom in the early 1970s: (1) the good economic climate prior to 1973, (2) the influx of funds from real estate investment trusts (REITs), and (3) newly created hotel locations due to the completion of highway systems. According to them, the decline in the supply in the second half of the 1970s and the early 1980s was caused by the oil crunches between 1975 and 1978, and by high interest rates between 1980 and 1981. They also suggested the factors for the second construction boom in the 1980s as follows: (1) the favorable operating results in the late 1970s and the early 1980s, (2) the increased tax benefits due to The Economic Recovery
Tax Act of 1981, (3) the abundant funds available in both equity and debt, including the Urban Development Action Grants (UDAG), the influx of capital by limited partners, and the money from deregulated thrifts, and (4) the major hotel chains' aggressive expansion activities.

Generally, the following four factors influence the supply of hotel rooms.
- Previous years' operating performance,
- Availability and affordability of financing,
- Tax policy, and
- Availability of sites for developments.

Although these factors are common for almost every real estate product type (office, residential, industrial, retail, hotel, etc.), they influence each of the real estate products differently. As Figure 2-3 shows, the cyclical pattern of investment in hotel construction is very similar to that of offices. In contrast, the investments in industrial and multi-housing facilities show different patterns.

Generally, hotel developments, like office developments, are driven by developers' speculative expectations. Developers are motivated to plan new hotel developments in response to a strong market. When these developments are completed a few years later, the supply tends to exceed the demand and the performance of properties deteriorates. Then, construction slows down until performance recovers.
For the last two decades, the hotel industry has experienced a sharp increase in occupancy rate during two periods: 1971-1973, and 1975-1978 (See Fig.2-1). These trends in occupancy rate coincided with the first construction boom in the early 1970s, but not with the second boom, which continued until the late 1980s. In 1982, the hotel market became soft; the occupancy rate declined from 70.1% in 1981 to 66% in 1982. Since then, the occupancy rate has stayed between 65% and 67%. As many practitioners have suggested, the second boom was caused largely by tax-driven investments. Around 1980, the occupancy rate was in a downward trend; in addition, debt financing was very tight and interest rates were very high.

Hotel developments have been significantly impacted by changes in tax policies because hotels are one of the most capital-intensive real estate products. According to Hospitality Valuation Service, Inc.[9], in 1988, construction of a standard hotel cost $50,000 to $80,000 per room, excluding land cost, pre-opening cost and other required working capital. Furniture, fixture and equipment (FF&E) account for approximately 20% of the total construction cost. In addition to new construction, hotels regularly need to replace FF&E as these become worn out, or in order to remain competitive in markets. The Tax Act of 1981 greatly stimulated hotel construction by reducing hotels' depreciable life from 30 to 15 years. Furthermore, the average depreciable life for FF&E was reduced from 7 to 5 years. The change in tax policy probably most strongly impacted hotels and offices among real estate products (See Fig.2-3).
Since hotels are very location-sensitive products, the availability of development sites sometimes determines the level of supply. Hotels cannot exist independently from demand generators such as offices, industrial facilities, and academic institutions. Available development sites are particularly limited in central business districts. In the 1970s and 1980s, downtown redevelopments, some of which were funded by public grants, created new sites for hotels and spurred hotel development. As discussed in chapter 1, highway and suburban areas also became popular new hotel locations in the 1960s and 1970s.
Section 3: Demand Trends and Factors

As can be seen in Figure 2-1, the demand for hotel rooms has fluctuated significantly during the past three decades. Fig.2-4 illustrates the percentage changes in the occupied rooms (demand) and in the net addition of rooms (supply). The demand showed a much greater fluctuation than the supply; each year's change in the supply was less than 4% during the period 1974-1988, while the demand showed more than 5% changes in 9 out of the 19 years.

Some factors affect the levels of demand for hotel rooms. In the long-term, the main factors include the changes in demographics and life styles. In particular, the baby boomers expanded the demand for hotel rooms in the 1970s; people aged 25-54 are regarded as the most frequent travelers. As the real disposable income increased and the size of families shrank, the demand for travel, especially for pleasure travel, was intensified.

In the short-term, general economic conditions are the main factors which determine the level of demand for hotel rooms. Social/political movements, natural disasters and weather conditions may also influence the demand for hotel rooms. For instance, terrorism or upheavals in Europe or Latin American countries sometimes discouraged Americans from traveling abroad and boosted domestic demand. Hurricane damage at a beach resort or a shortage of snow in a ski resort sometimes curtails the demand at resort hotels.
According to Salomon Brothers, Inc. [4], the demand for hotel rooms is influenced by overall economic conditions, the cost of travel and the value of the U.S. dollar. Their regression equation below, whose variables are "GNP", "Gasoline Price", and "Foreign Exchange Rate", shows a high R-squared value. This equation says that 97% of the variation in the log of the room demand is explained by the log of the percentage change in the real GNP, log of the percentage of change in real gas price, and log of the percentage change in the trade-weighted value of the dollar. The equation is expressed in log form, indicating a near-unitary elasticity of demand for hotel services at any level of economic activity. For instance, if the GNP increased by 10%, the hotel room demand increases 8.5%. The room demand is explained mostly by "GNP". "Gas
"Salomon Brothers Demand Forecasting Model"

\[ \log(\text{RmD}) = 7.978 + 0.846 \log(\text{GNP}) - 0.059 \log(\text{GasPr}_{t-1}) - 0.124 \log(\text{TrDoIt}_{t-1}) \]

\[ (22.6) (17.9) (-1.9) (-2.3) \]

\( R^2 = 0.97 \)

RmD: Hotel Room Nights Demand
GNP: Gross National Product in 1982 dollars
GasPr: Real Motor Fuel Price (lagged 1 year)
TrDol: Effective Exchange Rate of the U.S. dollar (lagged 1 year)

During recessionary periods, both business and pleasure travelers tend to restrain their spending on travel. Business travel is one of the first items to be reduced by cost-conscious companies. Companies attempt to reduce the amount of business travel itself, and/or shorten the length of trips, and/or lower the grade/price of accommodations. The pleasure/leisure market segment responds similarly to economic downturns. During these periods, people tend to spend holidays close to their homes.

Laventhol & Horwath [1] suggested that resort and budget hotels are most susceptible to recessions. However, Lesure and Smith [6] indicated that business travel shrinks during recessions, but pleasure travel is not always affected. According to them, the reduced demand by pleasure travelers around 1980 was caused not
by overall economic conditions but by high gasoline prices. Although there is no sufficient data to compare each market segment's sensitivity to economic downturns, both segments may include recession-sensitive and price-sensitive consumers.

Daniel R. Lee [5] indicated that the impact of energy prices was very mild; what did have an impact was "the availability" of fuel and air service. The spot gasoline shortages of the 1970s and the air-traffic controllers' strike in 1981 had an immediate negative impact on travel and hotel demand. As the regression equation by Salomon Brothers showed a small t-value for gas prices, gasoline prices have little impact on the demand for hotel rooms in the long run. Their impact is probably limited to extraordinary events such as the two oil embargoes.

The change in foreign currency exchange rates to the U.S. dollar generally has a double effect on the U.S. hotel industry. A relatively weak dollar boosts the demand for the U.S. hotel markets by foreign travelers. In addition, the demand by Americans in the domestic markets is also intensified, as they are discouraged from traveling abroad. In contrast, a stronger dollar discourages foreign travelers from coming to the U.S. and encourages Americans to travel abroad. Since foreign travelers account for only about 10% of the total U.S. hotel room demand; the impact of the change in currency exchange rates on the U.S. hotel industry as a whole is relatively small. However, some local markets which rely on highly international travelers tend to be influenced significantly (e.g., Hawaii, Los Angeles, New York). But, at the same time, these markets can reduce their operating risk by diversifying their demand sources. Even
when their local economies are not good, the impact on their performance can still be moderate.
Section 4: Literature Review

Sagalyn and Louargand [7] discussed the performance characteristics of office buildings, industrial properties, apartments and shopping centers, focusing on the influence of business cycles and inflation. They concluded that industrial property offers the lowest volatility, the greatest hedge against inflation, and is least sensitive to the business cycles. Industrial is followed by apartments, retail and office. They described each product's performance characteristics as follows:

Office rents are determined less by inflation and business cycles than by the office construction cycles which are mainly driven by developers' accessibility to capital. However, office buildings are the only product they studied for which there is a notable difference in income returns between periods of high and low growth in real GNP. The NOI is not protected from inflation in real terms.

Industrial properties are a stable, low-risk income producers. Industrial properties offer a great inflation hedging capacity which comes from their net lease basis. The development of Industrial properties has been less driven by tax-shelter benefits than offices or apartments. Unlike offices, the supply cycles are less driven by developers' speculative expectations. Land appreciation plays a greater role in returns to industrial properties than to other product types.

Shopping centers have been reasonably good at keeping pace with inflation over the long-term, but performance has suffered
from oversupply. However, market imbalances have been less severe than in office markets because construction of shopping centers cannot be financed without credit anchor tenants.

Apartments are less sensitive to changes in the national business cycle than to local economic conditions and local supply constraints on the development of new units. Their rents are a relatively good hedge against inflation.

Arbel and Strebel [8] surveyed hotels' inflation hedge capacity by analyzing operation data base during the 20-year period 1958-1977. They examined the influence of general inflation rate (CPI) on average room rate, occupancy, and NOI per available room. They concluded that the hotel industry was to a large extent successful in hedging against inflation, and real demand for hotels and profitability of hotels were highly stable over the long run. According to them, the slight decline in real income occurred during economic slowdown periods, and the changes in general price per se did not significantly affect real earnings.
Chapter 3: Methodology and Data

Methodology

The performance characteristics of hotels are examined by analyzing secondary time-series' data, in conjunction with several interviews of professionals within the industry. The performances are measured mainly by Net Operating Income (NOI), in addition to Holding Period Returns (HPR). NOI is the profit after operating expenses, property tax and insurance, but before depreciation, amortization, interests and income taxes. HPR is calculated by NOI and property transaction data, based on the following formula:

\[ HPR (t) = \left\{ NOI (t) + \left[ TrPr (t) - TrPr (t-1) \right] \right\} / TrPr (t-1) \]

TrPr: Transaction Price

Data

The main data sources regarding hotels' operating results and property transactions are as follows: "The U.S. Lodging Industry" from Laventhol & Horwath for the years 1974 to 1988, and "The Hotel/Motel Sales Data" from Hospitality Valuation Service, Inc. for the years 1977 to 1988. For the analyses of Boston's hotel market, "Hotel Development Study" from Boston Redevelopment Authority, and "Trends in The Hotel Industry" from Pannell Kerr Foster for the years 1974 to 1988 are used.

"The Experience Exchange Reports" and "The Income/Expense Analysis (Apartments)" are used to compare the performance characteristics of hotels with those of offices and apartments.
Additional data sources include "the Hotel Rooms in Stock" from Smith Travel Research, and "the Value of New Construction Put in Place" from the U.S. Department of Commerce. Gross National Product (GNP), Gross State Product (GSP), Consumer Price Index (CPI), and "Personal Income" are also used as general economic indicators.

"The U.S. Lodging Industry," Laventhol & Horwath, Philadelphia, PA

Since 1932, Laventhol & Horwath (L&H), a major accounting firm, has surveyed the financial and operational performance of hotels in the U.S. "The U.S. Lodging Industry," its annual publication on the survey results, includes operating income and expense data by hotels' attributes such as location type and age. In this thesis, NOI is calculated by subtracting property tax and insurance from income before fixed charges, although these numbers are medians. This report also includes other major industry indices such as occupancy rates and average daily room rate.

Every year, L&H distributes more than 10,000 questionnaires in addition to direct contact with several major hotel chains. In 1988, 778 questionnaires were used to compile data for the annual report. The sample size has been between 600 to 800 since 1974. Although the compiled samples are not based on a statistic sampling but on voluntary contributors, the samples are fairly well distributed across the hotel properties in the U.S. The profile of the respondents in 1988 was as follows:
<table>
<thead>
<tr>
<th>Region</th>
<th>Location</th>
<th>1989 Edition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast</td>
<td>Urban</td>
<td>26.5%</td>
</tr>
<tr>
<td>South</td>
<td>Suburban</td>
<td>20.7%</td>
</tr>
<tr>
<td>North Central</td>
<td>Airport</td>
<td>6.6%</td>
</tr>
<tr>
<td>West</td>
<td>Highway</td>
<td>17.9%</td>
</tr>
<tr>
<td></td>
<td>Resort</td>
<td>28.3%</td>
</tr>
</tbody>
</table>

"Trends in The Hotel Industry." Pannell Kerr Foster, Houston, TX

Pannell Kerr Foster, a major accounting firm, publishes their annual report on the operating results of the nationwide hotels. In addition, this report includes major cities' occupancy rates and average room rates. The 1989 edition includes data on 1,000 properties from voluntary contributors.

"Hotel/Motel Sales Data," Hospitality Valuation Service, Inc., Mineola, NY

"Hotel/Motel Sales Data" includes the transaction data that have been submitted by participants in the "Hospitality Data Exchange". Hospitality Valuation Service, Inc., an appraisal firm specializing in hotel/motel valuation, as a conduit for the non-profit data exchange group, publishes a cumulative report every six months. The winter, 1990 edition includes more than 3,000 transaction data throughout the U.S. between 1968 and 1989. However, the period of analysis here is limited to 1978 through 1988. Each transaction observation includes the property name, location (city and state), transaction date, sales price, number of rooms, and price per room.
"Experience Exchange Report," The Building Owners and Managers Association (BOMA)

The report provides operating income and expense data for office buildings throughout North America. The data is based on a voluntary survey of building owners and managers whose buildings represent a varied office space in terms of age, location, and geographical region. The 1989 edition represents 3,055 office buildings.

"Income /Expense Analysis-Conventional Apartments," Institute of Real Estate Management (IREM)

This report provides median income, operating costs, and NOI for apartments throughout the U.S. and Canada. The data are collected from voluntary contributors whose apartment buildings include varied types: high-rise, low-rise and garden apartments. The 1989 edition represents 5,196 apartment buildings. In particular, since 1974, the procedure of data compiling has been stable.
Since each data base for the NOI of hotels, offices and apartments is not based on a statistical sampling but on voluntary contributions, these data may not fully represent each population. The data bases for offices and apartments contain a relatively large number of observations. However, the data base for hotels has a relatively small absolute number of observations (788 in 1988), although they represent 1.8% of the population. As discussed in Chapter 1, Section 3, the NOI of hotels has a meaning, assuming that the property owner and the hotel operator is the same entity. In this case, the NOI of hotels is somewhat comparable to those of offices and apartments.
Chapter 4: Historical Performance of Hotels in the U.S.

In this chapter, hotels' performance characteristics are examined, analyzing national data between 1974 and 1987. Section 1 overviews the U.S. economic trends. Section 2 and 3 analyze inflation hedge ability and the influence of business cycles, respectively. In section 4, performance characteristics are discussed by location type. Section 5 compares the NOI of hotels to those of offices and apartments. In section 6, hotel holding period return and capitalization rate are analyzed.

Section 1: The U.S. Business Cycles Between 1974 and 1988

As can be seen in figure 4-1, the real U.S. gross national product (GNP) growth rate showed a cyclical pattern during the period 1974-1988. The annual average growth rate for this period was 2.6%. For the fifteen years, there were two high growth periods and two low or negative growth periods.

The U.S. economy expanded substantially between 1976 and 1978 at annual rates of around 5%. Between 1983 and 1988, the annual growth rates also exceeded the average for the fifteen years. Particularly, in 1984, the GNP expanded by 6.8 percentage points.

The U.S. economy experienced two recessionary periods 1974-1975 and 1980-1982. Especially, the real GNP growth rate was negative within 1974, 1975, 1980 and 1982. Excluding 1982, these years also suffered from high inflation: The rises in the consumer price index (CPI) were 11.0% in 1974 and 9.1% in 1975. In 1980 and
1981, the CPI rose by 13.5% and 10.3% respectively. In 1982, the growth rate plunged to -2.5% with a relatively modest inflation rate of 4.3%. In 1975 and 1979-1980; gasoline prices also soared substantially.
Fig. 4-1 Real GNP Growth Rate (1974-1988)

source: Department of Commerce

Fig. 4-2 CPI Annual Percent Change

Source: U.S. Labor Department
Section 2: Inflation Hedge Characteristics

A nominal price (revenue) and a profit are affected by both inflation and market condition resulting from the balance between supply and demand. When a market is soft (resulting both or either from oversupply and/or from sluggish demand), it is generally difficult to raise prices. Sometimes prices cannot keep up with inflation rates. In contrast, when a market is strong, prices may be raised at rates exceeding inflation. In addition, the average room rate and operating expenses per hotel room tend to rise year by year because the hotel stock is being upgraded by replacements of old hotels by new hotels. Newer properties tend to be of better quality with more amenities than the older hotels.

Although it is difficult to separate the influence of inflation from other market factors, "sales per occupied room" and "operating expenses per occupied room" indicate the influence of inflation better than "per available basis". "Sales per occupied room", which can be determined by "total sales per available room" divided by occupancy rate and 365 days, means the unit price of a room sold. On the other hand, "sales per available room", total sales divided by the number of available rooms, is determined both by the unit price and by the occupancy rate resulting from the market balance.

Between 1974 and 1987, the average room rate rose from $19.66 to $57.84 at an average annual rate of 8.7%. Similarly, during the same period, the total sales per occupied room increased from $33.18 to $95.18 at an average annual rate of 8.4%. The operating expenses per occupied room also increased from $26.58 in 1974 to
$79.27 in 1987 at an average annual rate of 8.8%. Both the sales and the operating expenses outpaced the increase in the CPI whose annual increase rate was 6.5% for this period. This may be partly or wholly due to the increase in quality described above.

As figure 4-3 shows, the sales and the operating expenses per occupied room in constant dollar were almost stable between 1974 and 1979, but since 1982, both the sales and the expenses increased in real terms. The real NOI per occupied room increased gradually until 1980, since then, it has declined gradually.

Fig. 4-3 Sales, Expenses, NOI per Occupied Room
(Adjusted for Inflation)

Source: Laventhol & Horwath
Figure 4-4 illustrates the changes in the sales and the expenses per occupied room and the CPI between 1975 and 1987. Until 1979, both the sales and expenses fared similarly to the change in the CPI. Since 1980, the sales and expenses varied greatly from the trend of the CPI. In 1980, prices (sales amount) were aggressively raised at the rate of 19.6%, which was much higher than the year's high inflation rate (13.5%). In this year, the expenses also soared by 17.9 percentage points. In 1981, in contrast to 1980, the increase in the sales was far below the CPI change, yet still covered the increase in the expense.

Between 1982 and 1987, both the sales and the expenses per occupied room outpaced the change in the CPI. The faster increase in the operating expenses was caused primarily by the increase in payroll and related costs, which accounted for about one third of the total operating expenses in 1988. This increase reflected both cyclical and structural changes. First, since the early 1980s, payroll per occupied room increased as the occupancy rate declined because a large part of payroll is fixed costs in this industry. The second reason reflected a more serious structural change. Since the early 1980s, wages and salaries increased rapidly as the 18-24 age bracket, a major work force for the hotel industry, began to decrease. This led to increased competition for the available pool of younger workers as well as reliance on more costly members of the labor pool. Compensations and insurance for workers are still a single rapid increasing item in operating expenses.

During the period 1974-1981, hotels, whose revenues are primarily based on a daily basis, showed a strong ability for price-
adjustment against inflation even at a high inflation period. However, between 1984 and 1987, the real NOI of hotels declined gradually under a soft market, which was caused by the oversupply of hotel rooms. Hotels could raise their prices at rates exceeding general inflation rates (CPI), but the increase in prices was not large enough to cover the soaring operating expenses. Since a continuous decline in the younger work force is anticipated, payroll and related costs will continue to increase substantially. It seems unlikely that the NOI of hotels will keep up with inflation. Hotels are no longer a product with a substantial hedge against inflation.

Fig. 4-4  Changes in Sales and Expenses per Occupied Room, and CPI

Source: Laventhol & Horwath
Section 3: Influence of Business Cycles

As Figure 4-5 shows, after slight declines in 1975, both sales and expenses per available room (adjusted for inflation) increased between 1976 and 1980, dropped in 1981, and then again increased until 1987. These trends were almost the same as the change in the GNP. However, the real NOI per available room gradually increased between 1974 and 1980, and then headed into a downward trend. Even during the stable GNP growth period, 1984-1987, the NOI declined.

![Fig. 4-5 Sales, Expenses, NOI per Available Room
(Adjusted for Inflation)](image)

Source: Laventhol & Horwath
As Figure 4-6 also illustrates, between 1974 and 1983, the change in NOI largely corresponded with the GNP growth rate. However, since 1984, the NOI declined substantially despite a relatively high GNP growth period.

Fig. 4-6 Changes in NOI and GNP (Adjusted for Inflation)

![Graph showing changes in NOI and GNP](image)

Source: Laventhol & Horwath, Department of Commerce

As discussed in chapter 2, section 3, the demand for hotel rooms is generally correlated with the real GNP. The following two regression equations demonstrate the relationship between the sales and the GNP, and between the NOI and the GNP. As Equation-1 shows, during the period 1974-1987, the sales were highly correlated with the GNP. The NOI was also correlated with the GNP until 1983, but since 1984, it became almost independent of the GNP (see Equation-2 and 3).
Equation-1 (1974-1987)
\[
\text{Sales} = 3,060 + 1.79 \times \text{GNP}
\]
\[
\text{R-squared} = 0.880 \\
(9.37) \\
\text{(critical value at 5% = 2.18)}
\]

\[
\text{NOI} = 1,898 + 0.026 \times \text{GNP}
\]
\[
\text{R-squared} = 0.001 \\
(0.12) \\
\text{(critical value at 5% = 2.18)}
\]

Equation-3 (1974-1983)
\[
\text{NOI} = -1,543 + 1.180 \times \text{GNP}
\]
\[
\text{R-squared} = 0.844 \\
(6.57) \\
\text{(critical value at 5% = 2.31)}
\]

NOI: adjusted for inflation,  
GNP: in '82 billion dollars

The data revealed that hotels' revenues were significantly correlated with business cycles throughout the whole period. However, as discussed in section 2, the increase in revenues could not keep pace with the increase in capacity of fixed expenses since the early 1980s. As a result, the NOI of hotels did not reflect the growth of revenue since the mid-1980s.
Section 4: NOI by Location Type

In this section, hotels' performance characteristics are discussed by each location type. Performance is compared by NOI per available room. As can be seen in Table 4-1, in 1987, resort hotels showed the highest average room rate, followed by urban, suburban, airport, and highway hotels. NOI per available room also showed the same order. Urban hotels had the lowest profit margin (NOI to revenue ratio), while highway hotels showed the highest profitability.

Table 4-1 Operating Results by Location Type (1987)

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Average Room Rate</th>
<th>Occupancy Rate</th>
<th>Revenue per Room</th>
<th>NOI per Room</th>
<th>NOI to Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>$70.69</td>
<td>65.8%</td>
<td>$28,399</td>
<td>$3,907</td>
<td>13.8%</td>
</tr>
<tr>
<td>Suburban</td>
<td>53.53</td>
<td>64.3%</td>
<td>19,334</td>
<td>3,858</td>
<td>20.0%</td>
</tr>
<tr>
<td>Airport</td>
<td>60.30</td>
<td>66.8%</td>
<td>21,511</td>
<td>3,758</td>
<td>17.5%</td>
</tr>
<tr>
<td>Highway</td>
<td>41.10</td>
<td>63.7%</td>
<td>13,405</td>
<td>3,080</td>
<td>23.0%</td>
</tr>
<tr>
<td>Resort</td>
<td>75.40</td>
<td>67.1%</td>
<td>33,975</td>
<td>5,688</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

Source: Laventhol & Horwath

The stability or volatility of performances derives both from supply and demand factors. The massive additions to the supply of hotel rooms may affect the markets. The sensitivity of demand to business cycles and inflation may also impact the stability of performances.
Although the occupancy rate is a result of a balance of supply and demand, the change in occupancy in the short-run can be regarded as the change in demand. As Figure 2-4 shows, the occupied hotel rooms (demand) may change by 5 percentage points a year, while the annual change in supply is between 3 to 4 percent. Figure 4-7 illustrates the occupancy rates by location type. The rate of each location type increased in the second half of the 1970s and declined in the early 1980s. The rate of airport hotels showed the largest variation during these years. In the mid-1980s, urban hotels were an upward trend while suburban hotels declined substantially. Highway hotels moved up and down rapidly. Resort hotels also moved up and down year by year throughout the whole period.
Fig. 4-7 Occupancy Rates by Location Type

- Urban
- Suburb
- Highway
- Airport
- Resort

Source: Laventhol & Horwath
As Table 4-2 shows, during the period 1974-1987, the NOI of airport and highway hotels showed the highest coefficient of variation, followed by resort, urban, and suburban hotels. The coefficient of variation, standard deviation divided by the mean, demonstrates the relative magnitude of variation in NOI. These results indicate that during this period, the NOI of airport and highway hotels were most volatile while suburban hotels' NOI was most stable. The NOI of urban hotels was also stable next to suburban hotels.

Table 4-2  NOI per Available Room by Location Type  
(Adjusted for Inflation, 1974-1987)

<table>
<thead>
<tr>
<th></th>
<th>ALL</th>
<th>Urban</th>
<th>Suburban</th>
<th>Airport</th>
<th>Highway</th>
<th>Resort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>$1,983</td>
<td>$1,874</td>
<td>$2,108</td>
<td>$2,181</td>
<td>$1,745</td>
<td>$2,351</td>
</tr>
<tr>
<td>STD</td>
<td>$264.49</td>
<td>$292.74</td>
<td>$290.50</td>
<td>$395.60</td>
<td>$315.04</td>
<td>$375.86</td>
</tr>
<tr>
<td>Coefficient of Variation</td>
<td>0.133</td>
<td>0.156</td>
<td>0.138</td>
<td>0.181</td>
<td>0.181</td>
<td>0.160</td>
</tr>
</tbody>
</table>

Source: Laventhol & Horwath
Figure 4-8 illustrates the trends of the NOI (adjusted for inflation) by location type between 1974 and 1987. The NOI of each location type fluctuated differently for this period. The spread among the NOIs shrank once in 1981 and again expanded in the latter years.

The NOI of each location type, except for highway hotels, increased substantially between 1975 and 1979, and then declined until 1982. These trends reflected the change in GNP. Among the location types, airport and resort hotels showed the sharpest changes. On the other hand, particularly in 1980 and 1981, highway hotels fared uniquely. The occupancy rate of highway hotels rose from 67.6% in 1979 to 71.6% in 1980 though those of other locations, excluding resort hotels, declined (see Figure 4-8). Two explanations are possible for this phenomenon. During recessionary and high inflation years, some price sensitive consumers shifted from urban and suburban hotels to highway hotels; and/or the demand for highway hotels was expanded by the increase in travelers who shifted from airlines to automobiles to save money.

During the period 1983-1988, years of stable economic growth with moderate inflation, urban hotels were relatively stable while others varied greatly. In particular, highway and suburban hotels declined sharply. As discussed in section 2 and 3, the oversupply of hotel rooms and the rapid increase in payroll costs were the reasons for the downward trend in 1980s. The declines in the above location types were caused primarily by the oversupply of hotel rooms. Hotel construction was concentrated in highway and suburban locations (see Table 2-2). In addition, the impact of increase in payroll for
highway hotels should have been moderate because payroll accounts for a relatively low percentage of the total expenses.
Fig. 4-8 NOI per Available Room, by Location Type

Source: Laventhol & Horwath
Urban hotels appeared to be most independent of both supply and demand factors. The available sites for new development in urban areas are much more limited than in other locations. In other words, the existing urban hotels are protected from massive new supplies. In addition, the demand for urban hotels appeared to be relatively insensitive to business cycles.

Suburban hotels showed the lowest coefficient of variation during the fourteen-year period. However, their NOI declined sharply since the mid-1980s due to the oversupply of hotel rooms.

Airport hotels, being very sensitive to business cycles, showed the highest volatility. The reasons for the volatility may include some specific factors such as airline strikes. In addition, airport hotels' sales may plunge due to the airlines' sharp cut back on crew accommodation budgets.

Resort hotels also respond to the business cycles. The up and down movements of the NOI may also reflect some specific factors such as weather conditions and natural disasters.

Highway hotels' NOI showed an almost counter-cyclical pattern to business cycles; the NOI increased in high inflation and recession years and did not increase even during high economic growth periods. Highway hotels are also susceptible to massive additions to the hotel rooms.
Section 5: NOI of Hotels, Comparison to Those of Offices and Apartments

Figure 4-9 illustrates the NOI of hotels, offices, and apartments (adjusted for inflation) between 1974 and 1988. The available data are based on "per available room basis" for hotels and on "per square foot basis" for offices and apartments. For comparative purposes, each value of NOI in 1974 was indexed as 100 respectively. In 1974, the NOI of hotels was $1,589 per available room. In the same year, the NOIs of offices and apartments were $2.17 per square foot and $1.27 per square foot.

Fig. 4-9 Comparison in NOI; Hotels, Offices and Apartments (Adjusted for Inflation, values in 1974 = 100)
As Figure 4-9 shows, each of the product types fared differently. The NOI of apartments had been much more stable than those of hotels and offices. Office NOI showed a cyclical pattern with a large variation. Hotels and offices showed almost the opposite trends. Since their NOIs were negatively correlated, combinations of offices and hotels may create an effective portfolio diversification.

The NOI of apartments was almost independent of business cycles and inflation. The NOI of offices also did not appear to be correlated with the trend of the GNP. Even during a recession period 1981-1982, the NOI was not impacted by business cycles. The 1980s' office boom coincided with the entry of the largest part of the baby boom generation into the labor force. This effect tended to over-ride any business cycle impact on office building earnings. [7] Although the NOI of hotels also has not reflected business cycles directly since 1984, their revenues are still highly correlated with the trend of the GNP (see section 3). In this sense, hotels are a product whose performance is more affected by business cycles, compared with offices and apartments.

As Table 4-3 shows, the coefficient of variation of hotels is larger than that of apartments but smaller than that of offices during the period 1974-1988. These results suggest that the NOI of hotels was more stable than that of offices, but more volatile than that of apartments. The values of coefficients of variation for each location type also fell between the values of apartments and offices.
Table 4-3  Comparison in NOI; Hotels, Offices and Apartments  
(Adjusted for Inflation, 1974-1988)  

<table>
<thead>
<tr>
<th></th>
<th>MEAN</th>
<th>Standard Deviation</th>
<th>Coefficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Hotels</td>
<td>$1,965.93</td>
<td>$271.33</td>
<td>0.138</td>
</tr>
<tr>
<td>Offices</td>
<td>$2.36</td>
<td>$0.60</td>
<td>0.255</td>
</tr>
<tr>
<td>Apartments</td>
<td>$1.26</td>
<td>$0.08</td>
<td>0.061</td>
</tr>
</tbody>
</table>

Hotels: $/Room, Offices and Apartments: $/sqft  
Source: L&H (Hotels), BOMA (Offices), IREM (Apartments)
Section 6: Holding Period Returns and Capitalization Rate

As Figure 4-10 shows, the median transaction price in the U.S. increased from $15,962 per room in 1978 to $36,341 in 1986 at an average annual rate of 10.7%. In 1987, the price declined by 12% from 1986, and rebounded to $36.341 in 1988.

The holding period return (HPR) at time-t, which consists of the components of income from operation and property appreciation, can be calculated by the following equation. In this analysis, the HPR is determined by substituting "the NOI per available room" for the income from the operation component and "the transaction price per room" for "Price".

\[
HPR \ (t) = \frac{\text{Income from Operation} \ (t) + [\text{Price} \ (t) - \text{Price} \ (t-1)]]}{\text{Price} \ (t-1)}
\]

Fig. 4-10 Hotel Transaction Price ($/room, Median)

Source: Hospitality Valuation Service
Figure 4-11 illustrates the HPR during the period 1979-1988, and capitalization rates during the period 1978-1988. The nominal HPR showed a volatility with a high of 47.6% in 1980, a low of -1.6% in 1987, and an average of 26.3%. Similarly, the HPR (adjusted for inflation) had a high of 34.1% in 1980, a low of -5.2% in 1977, and an average of 20.1%.

The average NOI component for the ten-year period was $4,038, while the average appreciation component was $2,038. The NOI component accounted for 66% of the total return. The HPR of hotels, unlike other real estate products such as industrial properties, substantially depends on the component of income from operation (NOI). Both NOI and appreciation components contributed evenly to the sharp increase in HPR in 1980. However, the sharp decline in HPR in 1987 was caused by the appreciation component.

The capitalization rate (cap rate) had a high of 19.4% in 1982 and a low of 10.4% in 1988, and an average of 15.1%. The cap rate was in an upward trend between 1978 and 1982. After the peak in 1982, it declined gradually until 1988. This trend was almost the same as that of real NOI (see Figure 4-3). In general, the cap rate reflects a property’s expected future income stream, as well as the cost of capital. As a table in the next page shows, g (growth in NOI) increased between 1978 and 1980, and then fluctuated in a downward trend. The declining cap rate reflects investors’ lowered expectations of growth in income. In addition, the declining cap rate was consistent with the lowered cost of capital; the prime interest rates sharply declined from 18.9% in 1981 to 8.2% in 1987. Long-term treasury and corporate bond yields also showed the same

68
downward trend. The increased investment by foreign investors also lowered the cap rate. Their expecting rate of return tends to be lower than domestic investors.

Table 4-4 illustrates the capitalization rates by location type in 1988. Its cap rate of urban hotels was by far lower than others. The value was followed by those of highway, suburban, and resort hotels. A cap rate reflects a property's future income and risk premium. As discussed in section 4, the NOI of urban hotels is relatively stable compared with other location types. This attribute is consistent with urban hotels' lower cap rate.

"Trophy hotel transactions" were excluded from the transaction data to calculate the cap rates. In general, these transactions skew the median price higher and lower the cap rate. This type of investment is not necessarily based on a property's future income stream, but on its redevelopment potential or on the hotel's name recognition value for further hotel chain expansion.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>$3,907</td>
<td>$74,088</td>
<td>5.3%</td>
</tr>
<tr>
<td>Suburban</td>
<td>$3,750</td>
<td>$36,340</td>
<td>13.0%</td>
</tr>
<tr>
<td>Highway</td>
<td>$3,080</td>
<td>$21,406</td>
<td>10.3%</td>
</tr>
<tr>
<td>Resort</td>
<td>$5,688</td>
<td>$40,186</td>
<td>14.2%</td>
</tr>
</tbody>
</table>
Fig 4-11  HPR, Cap Rate  (1978-1988)

<table>
<thead>
<tr>
<th>Year</th>
<th>Transaction Price/Room</th>
<th>NOI/Room (nominal)</th>
<th>HPR (nominal)</th>
<th>HPR (real)</th>
<th>Cap Rate</th>
<th>g</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>$15,962</td>
<td>$2,796</td>
<td>27.0%</td>
<td>15.7%</td>
<td>15.2%</td>
<td>15.0%</td>
</tr>
<tr>
<td>79</td>
<td>$16,951</td>
<td>$3,326</td>
<td>25.7%</td>
<td>18.6%</td>
<td>16.5%</td>
<td>19.0%</td>
</tr>
<tr>
<td>80</td>
<td>$20,926</td>
<td>$4,089</td>
<td>47.6%</td>
<td>19.4%</td>
<td>15.9%</td>
<td>22.9%</td>
</tr>
<tr>
<td>81</td>
<td>$22,000</td>
<td>$4,304</td>
<td>25.7%</td>
<td>19.4%</td>
<td>15.4%</td>
<td>5.3%</td>
</tr>
<tr>
<td>82</td>
<td>$22,232</td>
<td>$3,991</td>
<td>19.2%</td>
<td>19.4%</td>
<td>13.0%</td>
<td>-7.3%</td>
</tr>
<tr>
<td>83</td>
<td>$24,454</td>
<td>$4,399</td>
<td>29.8%</td>
<td>16.3%</td>
<td>26.6%</td>
<td>10.2%</td>
</tr>
<tr>
<td>84</td>
<td>$26,686</td>
<td>$4,437</td>
<td>27.3%</td>
<td>16.5%</td>
<td>23.0%</td>
<td>0.9%</td>
</tr>
<tr>
<td>85</td>
<td>$32,006</td>
<td>$4,097</td>
<td>35.3%</td>
<td>13.9%</td>
<td>31.7%</td>
<td>-7.7%</td>
</tr>
<tr>
<td>86</td>
<td>$36,061</td>
<td>$3,773</td>
<td>24.5%</td>
<td>11.4%</td>
<td>22.6%</td>
<td>-7.9%</td>
</tr>
<tr>
<td>87</td>
<td>$31,708</td>
<td>$3,792</td>
<td>-1.6%</td>
<td>11.9%</td>
<td>-5.2%</td>
<td>0.5%</td>
</tr>
<tr>
<td>88</td>
<td>$36,341</td>
<td>$4,171</td>
<td>27.8%</td>
<td>10.4%</td>
<td>23.7%</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

Source: Hospitality Valuation Service (transaction data), L & H (NOI)
HPR: Holding Period Return
Cap Rate $t = NOI_{t-1}/Price_t$

Transaction prices and NOIs are medians
Chapter 5: Boston's Hotel Market and A Case Study

In this chapter, the city of Boston's hotel market and a hotel's historical performance are examined. Section 1 is an overview of the economic structure and trends as well as the hotel market in Boston. Section 2 surveys the supply trends and structure. Section 3 examines the demand trends and structure. In section 4, a hotel's historic performance, as a case study, is analyzed.

Section 1: General Economic Trends and Hotel Market

Economic Trends and Structure in Boston

Boston is the economic, cultural and political center of both the Commonwealth of Massachusetts and New England. The city of Boston is located in the center of Greater Boston which covers the areas along and inside the circular outer belt, Route 495. After a recession in the 1970s, Boston's economic base shifted from manufacturing and trade to high-technology research and development, finance, insurance, investment, consulting and medical services. Corresponding to the structural change in the economy, the city's work force also shifted toward professional, managerial, and technical occupations. As Table 5-1 shows, employment in Boston in 1987 was concentrated in service, government, finance, insurance and real estate sectors.

During the 1980s, the economy of Massachusetts was very healthy, compared to the national economy. As Figure 5-1 shows, although in the 1970s, the economic growth rate of Massachusetts was lower than that of the U.S., in the 1980s, the Massachusetts
economy expanded faster than the national economy. For the past ten years, the unemployment rate in Massachusetts has been lower than the national rate. In 1988, the rate in Massachusetts was 3.3% while it was 5.5% in the U.S. Particularly in Boston, the healthy economy resulted in a very tight job market with high average salaries and wages. However, since 1988, the Massachusetts economy began to soften, especially in the high-tech industries and real estate businesses. The unemployment rate in Massachusetts rose from 3.3% in 1988 to 4.5% in the fourth quarter of 1989. Although the rate in Massachusetts remained lower than the U.S. average, in the fourth quarter of 1989, the gap between the state and the nation fell to 1.2 percentage points from 2.2 in the third quarter of 1988.

Table 5-1  City of Boston: Employment (1976 and 1987)

<table>
<thead>
<tr>
<th></th>
<th>1976</th>
<th>1987</th>
<th>% Change (76-87)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing, Mining</td>
<td>1,045</td>
<td>1,450</td>
<td>0.2% 38.8%</td>
</tr>
<tr>
<td>Construction</td>
<td>14,618</td>
<td>15,828</td>
<td>2.6% 8.3%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>53,507</td>
<td>37,295</td>
<td>6.0% -30.3%</td>
</tr>
<tr>
<td>Transportation/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication/Utilities</td>
<td>34,802</td>
<td>35,648</td>
<td>5.7% 2.4%</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>31,669</td>
<td>26,077</td>
<td>4.2% -17.7%</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>57,827</td>
<td>63,231</td>
<td>10.2% 9.3%</td>
</tr>
<tr>
<td>FIRE</td>
<td>65,129</td>
<td>94,036</td>
<td>15.2% 44.4%</td>
</tr>
<tr>
<td>Services</td>
<td>167,437</td>
<td>243,728</td>
<td>39.3% 45.6%</td>
</tr>
<tr>
<td>Government</td>
<td>84,865</td>
<td>103,045</td>
<td>16.6% 21.4%</td>
</tr>
<tr>
<td>Total</td>
<td>510,899</td>
<td>620,338</td>
<td>100.0% 21.4%</td>
</tr>
</tbody>
</table>

Source: U.S. Bureau of Economic Analysis Series for Suffolk County, BRA
Fig. 5-1 Real Growth Rates of GNP and GSP of Massachusetts

Source: Federal Reserve Bank of Boston

*Boston's Hotel Market Overview*

The cities and towns located along and inside Route 128 constitute the hotel market for Boston. While the hotel stock in the city of Boston is heavily concentrated in luxury and first class "urban hotels", the surrounding cities and towns' hotel stock mainly consists of lower rate suburban and highway hotels. A part of the hotel demand which is generated inside the city spills over to the surrounding municipalities. In particular, some price-sensitive tourists and business travelers who have destinations within the city stay outside the city. On the other hand, some executive business travelers whose destinations are located outside the city, for instance, high-tech firms along Route 128, may stay at hotels in the city of Boston. The city of Boston's hotel market, as an upper-
end sub-market, attracts mainly people who are willing and able to pay high room rates.

Boston has been one of the best cities from the perspective of hoteliers. Because of its abundant historic and cultural attractions, many tourists visit Boston annually. Its healthy service-oriented industries generate a substantial number of trips by executive and managerial class business travelers. Convention facilities attract a lot of convention/conference participants though the facilities are relatively small compared to those of other major convention cities.

Boston's hotel market has been very strong during the past fifteen years. As can be seen in Figure 5-2, Boston's occupancy rate has been above the nation's average. In particular, between 1986 and 1988, Boston ranked first in occupancy rate among major metropolitan cities. During the same period, Boston's average daily room rate was second only to that of New York. However, in 1988, Boston's hotel market headed into a downward trend, responding to a slow down of the regional economy. This tendency is more serious in the outskirts of Greater Boston. The occupancy rate in the area surrounding Route 128 and interstate 495 dropped by about 10 percentage points from 1988 to 1989, while the city of Boston's rate dropped by about 3 percentage points during the same period.

One of the difficulties for Boston's hotel market is its seasonality due to severe winters. During December, January and February, Boston's occupancy rate typically plunges to 50 to 60 percent. Although business-individual travelers are relatively stable, most of the convention groups, concerned about airport closure by snow storms, are hesitant to book Boston's hotels during
The number of tourists also declines in winter months.

**Fig. 5-2 Occupancy Rates in Boston and the U.S.**

Source: Pannell Kerr Foster
Section 2: Supply Trends and Current Hotel Stock

According to a report by the Boston Redevelopment Authority [10], at the beginning of the twentieth century, Boston's thriving economy, based on trade and manufacturing, supported about 100 hotels. In 1930, Boston had 11,863 hotel rooms, approximately the same as the stock in 1988. Between 1930 and 1960, the number of hotel rooms declined from 11,863 to 6,923 due to a long-term economic hardship which plagued Boston. However, some hotels that were built before 1930 are still in operation as luxury or first class grand hotels. These hotels, including Ritz-Carlton, Park Plaza Hotel, Omni-Parker House and Copley Plaza Hotel, currently account for 26 percent of the total hotel rooms in Boston.

During the period 1978-1987, Boston's hotel stock expanded from 25 hotels with 7,373 rooms to 35 hotels with 11,792 (see Fig. 5-3). Hotel rooms increased by 4,940 rooms, or at an annual average rate of 5.4 percent. Of the current stock of 11,792 rooms, 42 percent has been added to the stock since 1978.

Hotel rooms increased by 1,298 between 1979 and 1982 with the construction of the Hotel Meridian, Bostonian Hotel, Marriott Hotel at Long Wharf, and the Back Bay Hilton Hotel. Except for the Hilton, these hotels were built in the financial district and the waterfront area. These four hotels have been operated as urban luxury or urban commercial hotels, whose primary market segment is business-individual travelers or smaller conference participants.

Furthermore, between 1983 and 1985, 3,048 rooms were added to the hotel stock. These new developments included the Marriott
Hotel-Copley, Westin Hotel, Lafayette Hotel, Four Seasons Hotel, and Embassy Suites Hotel (currently operated as Guest Quarters Suite Hotel). The first two hotels were developed as parts of Copley Place, a mixed-use development. These developments during the mid-1980s occurred mainly within walking distance of the Hynes Convention Center in the Back Bay area.

Between 1986 to 1988, two projects: the Susse Chalet and Boston Harbor Hotel as well as an addition to the Inn at Children's Hospital added 573 rooms to the total stock. Since 1988, almost no hotel rooms have been added to the hotel stock.

Fig. 5-3 Hotel rooms in Boston

As discussed in Chapter 2, the supply of hotel rooms is generally affected by four factors: (1) previous years' operating
performance, (2) availability and affordability of financing, (3) tax policy, and (4) availability of sites for developments. The massive hotel development in Boston in the first half of the 1980s was consistent with the above factors. Between 1978 and 1980, the occupancy rate recorded 77.2%, 77.6%, 75.8% respectively. Considering the seasonality of Boston's market, these rates meant almost maximum utilization. In 1981, the prime interest rate reached almost 19%. After this peak, interest rates sharply declined to a moderate level in 1983. The Economic Recovery Tax Act of 1981 also boosted construction. In addition, in the early 1980s, some redevelopment projects created new hotel sites. These projects included Copley Place, a large-scale mixed-use development, and a few redevelopments in the waterfront area. The massive additions to the supply of hotel rooms in the first half of the 1980s gradually lowered the occupancy rate in Boston, but the rate still remained at a healthy level. Although all the above factors affected the supply of hotel rooms in Boston, the availability of sites for developments has been the primary factor. Boston's high land price, rigorous development approval process including linkage fees and design reviews have prevented hotel developers/owners from easily entering Boston's market.

Boston's hotel stock includes 22 urban hotels, 2 airport hotels, and 11 suburban or highway hotels in 1987 [10]. Most of the urban hotels are located in two major sub-areas: the financial district and the Back Bay area. The financial district has 4 hotels with 1,523 rooms. These hotels, as urban commercial or urban luxury hotels, mainly attract business-individual travelers and pleasure/personal
visitors. The hotel stock in the Back Bay area consists of 15 hotels with 7,062 rooms. Of these hotels, five convention hotels have 3,939 rooms with small or middle size meeting rooms and banquet spaces. Other hotels in the Back Bay area are urban luxury or commercial hotels.

Most of the hotels developed in the 1980s were luxury or first class hotels. These developments shifted Boston's hotel stock toward luxury and first class concentration. In 1987, luxury and first class hotels account for 70 percent of the total hotel rooms in Boston.
Section 3: Demand Trends and Structures

Boston's hotel market, like other markets, has three major demand sources: business-individual travelers, convention/conference groups and pleasure/personal travelers. In 1987, business-individual travelers accounted for 47 percent of the total occupied hotel rooms in Boston. Convention group visitors and pleasure/personal travelers made up 33% and 20% of the total occupied rooms respectively [10]. The percentage of each segment was almost stable during the period 1976-1987 though the convention group segment increased at a slightly higher rate of 6.9% per year than pleasure/personal travelers (6.3%) and business-individuals (5.9%).

As Figure 5-4 shows, the occupied room nights by each market segment in Boston expanded rapidly in the late 1970s, corresponding to a substantial growth in both the national and local economies. During an economic downturn in the early 1980s, business-individual and convention group segments declined, while pleasure and personal travelers were almost stable.

During the period 1976-1987, the demand by convention group segment showed the largest fluctuations, followed by business-individual and pleasure/personal segments. "Coefficients of variation" of each segment were 0.254, 0.225 and 0.206, respectively. These results in Boston imply that in upper-end markets, the hotel demand by convention group segment is most susceptible to business cycles, and the demand by pleasure/personal travelers is most stable. Some people have suggested that the
demand by pleasure travelers is more volatile than business travelers'. However, these results suggest that the demand by pleasure travelers is not necessarily more volatile than the demand by business-individuals and convention groups.

Fig. 5-4 Occupied Hotel Room Nights in Boston by Market Segment

<table>
<thead>
<tr>
<th></th>
<th>Business individual</th>
<th>Convention Group</th>
<th>Pleasure/Personal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>1,092,774</td>
<td>722,467</td>
<td>453,810</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>224,596</td>
<td>183,539</td>
<td>101,962</td>
</tr>
<tr>
<td>Coefficient of Variation</td>
<td>0.2055</td>
<td>0.2540</td>
<td>0.2247</td>
</tr>
</tbody>
</table>

Source: Boston Redevelopment Authority, Pannell Kerr Foster
Demand structures by each market segment

(1) Business-individual travelers:

Typically, business-individual travelers visit Boston to attend corporate meetings or to make commercial sales. The main demand generators include the high-tech industries, banking, insurance, investment, and other professional services. Medical and academic institutions, government offices and airlines (crews) also generate business-individual trips.

As Fig. 5-4 shows, "occupied hotel room nights by business-individual travelers" increased rapidly in 1977 and 1978, then declined slightly in 1979 and 1980, and again increased substantially between 1982 and 1986. The demand for hotel rooms by this segment is generally more tied to a local economy than the national economy. The number of employment is an indicator of local economic activities. Table 5-2 shows, "occupied hotel room nights by business-individual travelers", employed in the city of Boston, and the ratio of the room nights per an employee. Between 1976 and 1987, the occupied hotel room nights from this segment increased consistently faster than Boston's employment.

Table 5-2  the City of Boston: Occupied Hotel Room Nights by Business-individuals and Employment, (,000)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel room nights</td>
<td>790</td>
<td>936</td>
<td>999</td>
<td>1,236</td>
<td>1,330</td>
<td>1,429</td>
<td>1,485</td>
<td>5.9%</td>
</tr>
<tr>
<td>Employment</td>
<td>511</td>
<td>561</td>
<td>558</td>
<td>590</td>
<td>592</td>
<td>606</td>
<td>620</td>
<td>1.8%</td>
</tr>
<tr>
<td>Ratio</td>
<td>1.55</td>
<td>1.67</td>
<td>1.79</td>
<td>2.09</td>
<td>2.25</td>
<td>2.36</td>
<td>2.39</td>
<td></td>
</tr>
</tbody>
</table>

Source: Boston Redevelopment Authority, Pannell Kerr Foster
Although the employment data are limited to seven years, they indicate that some industry sectors generate the demand for hotel rooms more than others. As Table 5-1 and Fig. 5-5 show, the employment in service and FIRE sectors increased more rapidly than other sectors in Boston. Table 5-3 displays the correlation coefficients between "the occupied hotel room nights" and employment in each sector. Among the industries, manufacturing, FIRE and service sectors show high correlation coefficients. These results suggest that in Boston, the hotel demand by business-individual travelers is more associated with the economic activities in manufacturing, service and FIRE sectors.

Fig. 5-5  City of Boston: Employment by Sectors

Source: U.S. Bureau of Economic Analysis Series for Suffolk County, BRA

<table>
<thead>
<tr>
<th>Sector</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing,Mining</td>
<td>0.917</td>
</tr>
<tr>
<td>Construction</td>
<td>0.513</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.974</td>
</tr>
<tr>
<td>Transp./Commun ic./Utilities</td>
<td>0.000</td>
</tr>
<tr>
<td>Wholesale</td>
<td>0.723</td>
</tr>
<tr>
<td>Retail</td>
<td>0.797</td>
</tr>
<tr>
<td>FIRE</td>
<td>0.973</td>
</tr>
<tr>
<td>Services</td>
<td>0.965</td>
</tr>
<tr>
<td>Government</td>
<td>0.820</td>
</tr>
<tr>
<td>Total</td>
<td>0.964</td>
</tr>
</tbody>
</table>

(2) Convention/conference group travelers

Conventions and conferences are generated by both national and regional associations and corporations. The purposes of these meetings include annual assemblies, seminars, trade shows, and receptions. Associations include diverse categories: academic, industries', religious, social, and political groups. Boston has three major convention facilities: Hynes Convention Center (434,868 sqft), Bayside Expo Center (183,622 sqft), and World Trade Center (142,200 sqft), in addition to smaller meeting rooms and banquet spaces in some major hotels. According to the Greater Boston Convention and Visitors Bureau, more than 1 million people visited Boston to attend conventions and conferences in 1989.

The hotel demand by this segment tends to fluctuate year to year. According to interviews of local hotel managers, large
national groups, rotating major convention cities every year, visit Boston on average every ten-years. Some regional groups have assemblies every other year in Boston. If many national conventions concentrate in Boston coincidentally in a year, Boston's hotels record high sales.

A typical large national convention generates 5,000 to 6,000 rooms for three nights. Regional firms and associations' meetings are more numerous, but tend to be have fewer participants. Typically, a regional meeting creates a 2,000 to 3,000 room demand for three nights. Although national associations' meetings in Boston attract participants from all over the nation, they are heavily weighted in New England residents. One of the reasons for national associations' meetings to rotate some cities is that their meetings attract primarily regional residents. In addition, because most conventions have evening programs, large number of local residents tends to stay at hotels even though they can commute. Thus, the hotel demand by this segment is more tied to a regional economy than the national economy.

The following regression equations demonstrate the relationship between the hotel room demand by convention groups and the GNP, and between the demand and New England Gross State Product (GSP). Equation-1, whose explaining variable is New England GSP, shows higher R-squared than Equation-2 (GNP). Equation-3 (two variables: GSP and GNP) also shows that the GNP does not contribute to enhance the value of R-squared. These results verify that the hotel demand by convention group segment is more tied to a regional economy than to the national economy.
Equation-1  (1976-1986)

\[ CGHD = -485,500 + 6,542 \times NE-GSP \]
\[ R\text{-squared} = 0.966 \]
\[ (15.97) \]

(Critical Value at 5% = 2.26)

Equation-2  (1976-1987)

\[ CGHD = -1,197,673 + 580 \times US-GNP \]
\[ R\text{-squared} = 0.946 \]
\[ (13.21) \]

(Critical Value at 5% = 2.23)

Equation-3  (1976-1986)

\[ CGHD = -441,187 - 33.3 \times US-GNP + 6,904 \times NE-GSP \]
\[ R\text{-squared} = 0.966 \]
\[ (-0.17) \]

(Critical Value at 5% = 2.31)

CGHD: Convention Group Hotel Demand
US-GNP: the U.S. Gross National Product (real)
NE-GSP: New England Gross Sates Product (real)

(3) Pleasure/personal travelers

The majority of travel by pleasure/personal segment in Boston is comprised of tourists who visit or attend historic sites, sport events or cultural and recreational attractions. This segment also includes personal travelers such as job-applicants, patients and their families who visit hospitals, and students' families, particularly in the fall and at graduation season.

Generally, personal travelers tend to be independent of economic conditions, while pleasure travelers may be affected by a level of income. Boston attracts tourists both from the New England
region and from outside the region including foreign countries. Although New England residents account for a large part of the total tourists, the majority of hotel demand is supported by the residents from outside the region. According to a major hotel in Boston, residents from outside the region account for 85 percent of its pleasure/personal segment.

The following three regression equations show the relationship between the demand by pleasure/personal travelers and the national disposable income, and between the demand and the regional personal income. The national personal income includes the New England personal income, so the two variables are not mutually exclusive. Although both the regional and national personal income well explain the demand, these equations suggest that pleasure/personal segment is slightly more tied to the national personal income than the regional personal income.

Although "Personal Income" is used for the region and "Disposable Personal Income" is used for the nation, this difference may not affect this analysis significantly. "Disposable personal income" differs from "personal income" in that the former is an income after the deduction of income taxes and social insurance.

Equation-1 (1976-1987)

\[
PPHD = -551,370 + 737.44 \times RDPI-US
\]

\[
R^2 = 0.987
\]

(28.0) (critical value at 5% = 2.23)
Equation-2  (1976-1986)

\[ \text{PPHD} = -257,091 + 4,449 \times \text{RPI-NE} \quad \text{R-squared} = 0.937 \]
\[ (12.20) \quad \text{(critical value at 5\% = 2.23)} \]

Equation-3  (1976-1986)

\[ \text{PPHD} = -558,122 + 756.8 \times \text{PDPI-US} - 123.0 \times \text{RPI-NE} \]
\[ (6.02) \quad (-0.16) \]
\[ \text{R-squared} = 0.987 \]
\[ \text{(Critical value at 5\% = 2.26)} \]

PPHD: Pleasure/Personal Segment's Hotel Room Demand
RDPI-US: Real Disposable Personal Income in the U.S.
RPI-NE: Real Personal Income in New England
Section 4: Performance of A Hotel

In this section, a hotel's historical performance between 1976 and 1989 is examined as a case study. This hotel is a typical urban convention hotel that is operated by a major hotel chain. The hotel is located within walking distance of a convention center in downtown Boston. Its market segments consist of convention/conference groups (70%), business-individuals (15%) and pleasure/personal (15%) in 1989.

As Figure 5-6 shows, this hotel's occupancy rate was similar to that in Boston in general (see Figure 5-2). Between 1979 and 1985, this hotel's occupancy rate gradually declined in response to the rapid increase in the supply of hotel rooms. The drop in the occupancy rate in 1985 was particularly caused by the Hynes Convention Center's temporary closure for renovation. In 1988, the convention center's reopening year, the occupancy rate was over 70%. The average daily room rate (ADR) has been successful in keeping up with inflation. Even in high inflation years (1980, 1981, 1982), the real ADR increased.
Figure 5-6  A Hotel's Average Daily Room Rate and Occupancy Rate

Figure 5-7 displays the hotel's gross operating profit (GOP) per available room both in nominal and real terms. Gross operating profit is a profit after operating costs but before property tax, insurance, depreciation, interest, and income taxes. Between 1977 and 1981, the real GOP increased, reflecting a strong market in the late 1970s. After a peak in 1981, the real GOP declined until 1985, in response to the gradual decline in the occupancy rate which was caused both by a massive hotel supply in the early 1980s and the convention center's temporary closure. Since 1985, the real GOP moved up and down year by year. In 1989, the GOP declined, reflecting the softening regional economy.
The fluctuations in this hotel's GOP primarily came from convention group segment. The demand by business-individuals and pleasure/personal travelers was relatively stable. The volatility of the demand by convention group segment derives from the market specific factors that were discussed in section 3, in addition to general economic conditions. This hotel's operating results suggest that convention hotels may have more volatile performances than urban luxury and commercial hotels.
CONCLUSION

In the 1980s, the U.S. hotel industry was significantly impacted by two phenomena: massive additions to the supply of hotel rooms, and a rapid increase in operating costs. The additions to the supply, which were primarily driven by the Economic Recovery Tax Law in 1981, softened hotel markets. As a result, the occupancy rates, which peaked in 1979, gradually declined throughout the 1980s. In addition, payroll and related costs, which account for approximately one third of the total operating expenses, have soared during the 1980s. The rapid increase in payroll was caused by a structural change in the U.S. population; the younger work force began to decrease in 1982, forcing operators to hire more costly older workers.

The operating result data during the period 1974-1987 revealed that hotel revenues, primarily based on a daily basis, were significantly affected by business cycles, showing a high correlation with the GNP. The increase in revenues kept up with inflation during the whole period. Generally, hotels' prices tend to be easily raised at a rate of CPI change. Until the early 1980s, the NOI of hotels kept up with inflation even at a high inflation period. In addition, the NOI adjusted for inflation accurately reflected business cycles. However, since the early 1980s, the real NOI gradually declined despite the stable economic growth period. Although hotels could raise their prices at rates exceeding the CPI changes, their revenues could not cover the
increase in the operating expenses. Additionally, the increase in the stock of hotel rooms forced the occupancy rate down. As a consequence, the real NOI of hotels declined throughout the 1980s.

The demand for hotel rooms is catching up with the oversupply of the mid-1980s. However, the change in the U.S. population structure is not a short-term phenomenon. Since the continuous decline in the younger work force is projected, the increase in "payrolls and related costs" is also anticipated to continue. Only strong hotel markets will absorb the increase in payroll. Hotels may no longer offer a significant hedge against inflation.

Although the NOI of hotels did not directly reflect business cycles after 1983, their revenues are still highly correlated to the change in the GNP. In this sense, hotels are a product whose performance is affected by business cycles.

The operating result data between 1974 and 1988 suggested that hotels are not necessarily a riskier product than offices. The NOI of hotels was more stable than offices, but more volatile than apartments during the period. Since the NOIs of hotels and offices varied in opposite fashion, a combination of offices and hotels should be investigated as a potential for portfolio diversification.

Compared with other real estate products, hotels are a product whose returns depend highly on the "income from operation" component. The NOI of hotels accounts for more than 60 percent of the holding period returns which consist of NOI and appreciation components.
Among location types, the returns for urban hotels appeared to be most stable. This attribute was consistent with their lower capitalization rate. The existing urban hotels are protected from massive new supplies. In addition, the demand for urban hotels appeared to be relatively insensitive to business cycles. The NOI of suburban hotels also showed a stability; however, their locations are susceptible to oversupply of hotel rooms. Airport hotels, being very sensitive to business cycles, showed the highest volatility in their NOI. The demand for airport hotels is significantly affected by business cycles. Resort hotels also respond to the business cycle. Their NOI also tends to be affected by some specific factors such as weather conditions and natural disasters. The NOI of highway hotels showed a counter-cyclical pattern to business cycles; the NOI increased in high inflation and recessionary years and did not increase significantly during high economic growth periods. Highway hotels are another category which deserves to be investigated for its diversification potential. Highway hotels are also susceptible to massive hotel room supplies.

Boston's market data during the period 1976-1987 revealed the characteristics of hotel demand by each market segment: business-individual, convention, and pleasure/personal segments. During this period, the occupied hotel room nights by convention group segment showed the largest variation, while the demand by pleasure/personal travelers was most stable. It has been generally regarded that the demand by pleasure travelers is most volatile among the three market segments. However, Boston's market data
suggested that the demand by tourists who belong to the upper or upper-middle income class is not necessarily more volatile than those of other market segments. In addition, Boston's recent economic downturn impacted hotels in the suburbs more seriously than downtown. These results suggest that the degree of sensitivity to business cycles is more associated with hotels' price ranges rather than market segments: pleasure or business.

The analyses of Boston's hotel market revealed the details regarding the hotel demand structures. The hotel demand by business-individual segment is more associated with the local economic activities in particular industries. In Boston's market, they are manufacturing, service and FIRE sectors. The hotel demand by convention group segment is more correlated to a regional economy than the national economic conditions. In Boston, the hotel demand by pleasure/personal segment is more tied to the national personal income than the regional personal income. However, this characteristic differs in each hotel market.

This study focused on systematic risk, analyzing the national hotel market as well as Boston's market. The results of this study are not necessarily applicable to every hotel market. Since hotels are a market specific product, the investment in hotels should be based on scrutiny of local market conditions. In addition, the returns for a property may vary more than those for a hotel market as a whole. A property's attributes such as age, size, and management contract may significantly affect the profits for the
operating entity and the investor. Since the performance of hotels is sensitive to market forces, the portfolio diversification with other real estate products or with other location type hotels is worth considering.
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[1] The Urban Land Institute, *Hotel/Motel Development*, 1985


