Estimating Future Room Occupancy Fluctuations to Optimise Hotel Revenues

Abstract

The present study proposes a mechanism that estimates future hotel demand and assesses the likelihood of forthcoming occupancy peaks and troughs. In anticipating rate fluctuations, the approach depends less on short term seasonal related factors than many prevailing hotel forecasts. Scholars and practitioners are in broad agreement that accurate assumptions about room occupancies produce better informed strategic planning for staffing, purchasing and budgeting related decisions. The literature has confirmed the difficulty of providing accurate mid to long run hotel industry estimates without a comprehensive revenue management system that considers factors beyond seasonal movements. Hotel managers need advance and accurate notifications about the up and down turns of the occupancies if they would like to maximise revenues. The proposed approach facilitates efficient resource management by reducing the medium to long term financial risks that are associated with volatile occupancy rates. Drawing upon Hong Kong data, the study found that the average contraction period for hotel occupancies from one peak point to the next trough exceeds the duration of the expansion period (defined as the period from one trough point to the next peak). This may be partly attributable to Hong Kong's dynamic image and appeal which has been fostered by destination tourism marketing efforts. The study contributes to industry practice by providing estimations that are applicable to different levels of hotel classification.

Keywords

Occupancy rate, hotel industry, revenue management, peak and trough periods

Introduction

Since tourism involves the consumption and purchase of goods and services, it impacts on many sectors of the economy (Chan, Lim, and McAleer 2005). Within this wider tourism context, it is important for hotel developers and operators to adopt a longer term planning outlook. The hotel planning process is prolonged and is characterized by high-risk, high-capital investments and by heavy fixed costs in property, facilities, staff, and equipment (Buttle, 1986; Jeffrey and Barden, 2000). One noteworthy indicator of supply and availability is room occupancy rates which report the proportion of occupied rooms relative to available rooms. Though hotel managers are well advised to make advanced and accurate predictions of occupancies when they are planning, this is difficult in practice because the hotel industry is both increasingly competitive and highly susceptible to volatile economic and political circumstances locally and internationally. Middleton (1994) noted that when hotels are confronted by low room occupancies, the high fixed costs of operation are quickly manifest in performance indicators. The established revenue management models that have been used by hotel operators to manage room prices, allocate demand and develop marketing strategies have relied heavily on seasonal factors. However the reliance on seasonality and related factors in widely used forecasting and/or estimation models may not be appropriate, particularly in the case of longer term planning horizons. It is evident that hotel managers and government tourism officials who are managing the risks associated with mid-term and long term volatility and uncertainty, should examine factors beyond seasonality when explaining room occupancy upturns and downturns. The findings of

the present study offer the prospect of assisting hoteliers to allocate resources more effectively in the mid to long term. Accurate estimations of hotel occupancy peaks and trough may inform the development of more precise operational plans that minimize costs and maximize returns, thereby yielding potential savings. Information about future hotel occupancies can assist the hotel industry with longer term investments and strategic plans and improve the deployment of resources. The present study findings should assist hotel managers to enhance both efficiency and returns and encourage innovative management of hotel resources in response to changing demand conditions. In addressing such challenges, the authors have drawn upon the Hong Kong Tourism Board (HKTB)'s well-structured and maintained historical data set of hotel occupancy rates for each category of hotel based on tariffs. The study draws upon occupancy rates have been obtained for each hotel tariff level over the period 1972 to 2012.

Revenue Management

Revenue management involves allocating the right type of capacity to identified groups of customers at the right price with a view to maximizing revenue or yield (Brotherton and Mooney, 1992). The concept relates closely to hotel revenue management and to charging applicable prices that "select the right customer in filling each available room, with the aim of achieving the highest possible revenue" (Capiez and Kaya, 2004, p22). According to Capiez and Kaya (2004) revenue management involves offering several levels of service and price. This approach takes account of both customer satisfaction and financial performance and can "satisfy a wider range of customers and consequently increases the revenue of the service firm" (p21). According to Wirtz and Kimes (2007) revenue management is applicable to businesses with a "relatively fixed capacity of perishable inventory" (p229). The authors note that effective revenue management

pricing prevents consumers who are willing to pay more from “taking advantage of lower prices targeted at more price-sensitive segments” (p229).

Balancing supply and demand to maximize profits is a major challenge for management. Hoteliers and tour operators can benefit from studying room occupancy rate trends in order to acquire background information and form a clearer picture when preparing to shift demand. Such approaches offer the prospect of optimal resource utilisation to achieve best practice in hotel revenue management. Upchurch, Ellis and Seo (2008) have noted that the implementation of revenue management practices is well established in the hotel and airline industries. An effective revenue management system can assist hotels to maximize profit over a defined period.

The most established approaches to revenue management have focused on seasonality and related factors when identifying the optimal service mix. The identification of an applicable time frame is critical for revenue managers. In their reliance on seasonality as a determinant for decision making, prevailing approaches have neglected other factors. According to Noone, Canina and Enz (2012) the revenue management literature has focused primarily on the application of "competitor price information to support tactical pricing decisions” and provides “little insight into the effectiveness of long-term price positioning strategies” (p208). Canina and Enz (2008) undertook a study which has particular applicability to the Hong Kong and wider Asian context. They concluded that Asia-Pacific hotels charging higher prices than their competitive sets generally enjoy higher RevPAR than hotels which charge below average. They also sacrifice little in terms of occupancy rates. The more modestly priced hotels exhibit both lower RevPAR and occupancies. The Canina and Enz study is important for the current investigation because it shows a relationship between strategic hotel positioning as manifest though pricing, occupancies and revenues (RevPAR). The present paper stresses strategic

considerations by eliminating short term seasonal considerations and focusing on medium to long term estimates. The existing revenue management systems have tended to emphasize competitor pricing information. The present study provides managers with a better approach by examining peaks and troughs on the basis of historic revenue management data, thereby offering an additional channel and a more comprehensive overall picture.

According to Weatherford, Kimes and Scott (2001) revenue management techniques have widespread applicability to hotels because managers can "make a reasonable prediction regarding duration of use" (p54). The authors note that "accurate forecasting is one of the ways to increase the predictability of duration of use" (p54). According to Weatherford and Kimes (2003), revenue management helps hotel managers to determine the "most profitable mix of transient business" (p401). They stress the importance of incorporating accurate forecasts into the rate and availability systems emerging from the revenue management system (p401). Zakhary et al (2011) stated that forecasting hotel arrivals and occupancies is "an important component in hotel revenue management systems" (p344). Zakhary et al (2011) have noted that effective revenue management is particularly important in low margin sectors such as hotel and airline industries.

The Hotel Industry in Hong Kong

Room occupancy rates are the most commonly used business indicator in the hotel industry (Moutinho and Peel, 1994; Law, 1998; Gonzalez, Morini, and Calatayud, 1999; Law, 2004; Schwartz and Cohen, 2004). Occupancy rates relate directly to hotel revenues because the bottom line is generally strengthened when more guests are occupying rooms and frequenting food and beverage outlets. The high occupancy and average room rates which are prevalent in Hong Kong reflect the city's global and

cosmopolitan status. The prevailing occupancy rate was 86% for High Tariff A Hotels in April 2013 and the equivalents for High Tariff B and for Medium Tariff Hotels were 89% and 93% respectively. The average achieved room rate for High Tariff A Hotels in April 2013 was HK$2,477, for High Tariff B Hotels HK$1,290, and for Medium Tariff Hotels HK$804.

Using Hong Kong hotel occupancy rate data to study forthcoming upturns and downturns should provide insights that are applicable to comparable major destination cites. When justifying the choice of Hong Kong as a setting for their study, Go, Pine, and Yu (1994) stated that the city's strategic location provides international hoteliers with a base to acquire expertise for subsequent investments and management assignments. Liu, Guillet, Xiao and Law (2014) also noted the merits of Hong Kong as for undertaking tourism related investigations. Law (1998) has stated that hotels with average room occupancy rates exceeding 60% will generally be profitable. The average substantially exceeds this level in the case of Hong Kong.

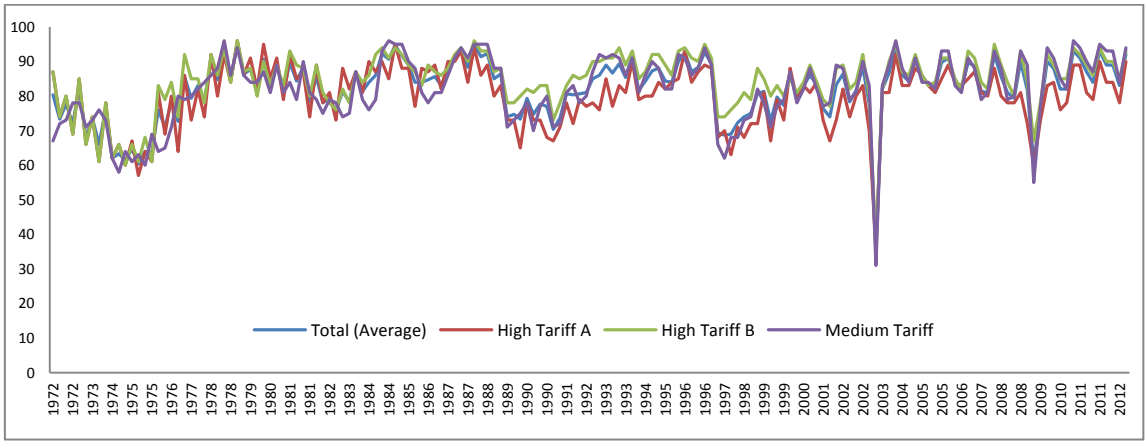
Hong Kong Special Administrative Region (SAR) is a leading global tourism destination and a major gateway to and from mainland China with an extensive and varied accommodation sector. The destination catered to 23.77 million overnight tourists in 2012, an increase of 6.5% over 2011 (HKTB, 2013). Hong Kong hosts the Asian regional headquarters for many international hotel chains and the head offices of local hotel brands. Despite Hong Kong's advantaged position, hotel occupancy rates are volatile because of the dynamic nature of tourist-source markets and the intense competition from nearby tourist destinations such as Macau SAR and China's Guangdong Province (Tsai and Gu, 2012). Volatile occupancy rates have led to uncertain hotel revenues. This prompted the authors' interest in applying the latest

estimation techniques to provide a comprehensive decision making environment that will allow managers to minimise risk and manage their resources.

The comprehensiveness of the hotel classification system provides another reason for selecting Hong Kong as a study setting. The Hong Kong Tourism Board (HKTB) classifies hotels according to price, leading to the following groupings: high tariff A, high tariff B, and medium tariff hotels (HKTB, 2010). HKTB's unique classification system includes five key indicators, namely: facilities, location, staff-to-room ratio, achieved room rate, and business mix, as a basis for distinguishing the quality and service of Hong Kong hotels. O'Neil and Mattila (2007) have confirmed that hoteliers and developers have an interest in the trends that are prevalent across different levels of hotel. The classification of Hong Kong hotels is particularly useful because of the prospect to using such information to adopt more customised implementation that increases return on investment. The authors determined that Hong Kong would be a suitable setting for a comprehensive study of revenue management because of the city's dynamic image and competitiveness with equivalent destinations under the close monitoring of HKTB.

The present study also includes another category – Total – which refers to the average over three categories of hotel. By providing Hong Kong's overall hotel occupancy performance, the Total provides an explanation of the complete hotel industry. The present study uses data covering the years from 1972 to 2012 and Figure 1 shows the Hong Kong Hotel Occupancy Rate over this period for all categories. In the following section, the authors outline an effective method of predicting upturns and downturns.

Figure 1 Monthly occupancy rates for Hong Kong hotels (1972 – 2012)



Methodology

Smoothing the Data

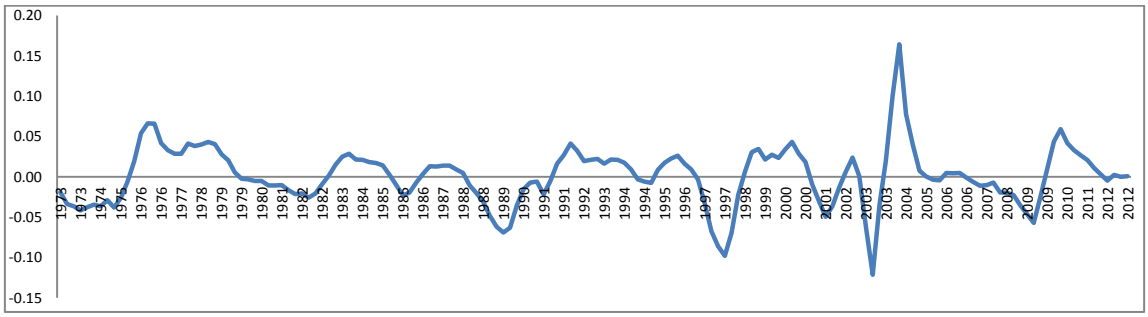
Since tourists travel most frequently during their preferred periods, the tourism sector is characterized by seasonality. This affects the capacity of data series to provide estimations. Selecting the best technique involves removing seasonality and random factors to arrive at the essentials for estimating turning points in the time series. A preparatory step in the present study involved extracting the trend component for the purpose of smoothing the relevant data. Niemira and Klein (1994) identified the most important considerations when choosing the most appropriate method from amongst the several available options. These were respectively: that the original configuration pattern should not be altered and should not be adversely affected by outliers.

In preparing the present investigation the authors considered three alternative smoothing methods, namely: SMSAR/TQSAR, the HP Filter Approach and the Basic Structure method (BSM). Considering the disadvantages associated with other smoothing methods and the findings of a preliminary trial, the authors opted for the BSM approach to extract smooth growth from the Hong Kong quarterly hotel occupancy rates. Recent

studies have shown that BSM outperforms other models and is readily applicable to tourism data (Turner, Kulendran, and Fernando, 1995; Greenidge, 2001; Turner and Witt, 2001; Kulendran and Wong, 2009; Fernando, 2010). Moreover, Fernando's (2010) study on Australian tourism demand also identified BSM as the most suitable means of handling tourism industry time-series data. The volatility of the smoothed data makes it difficult to locate the turning points in the case of TQSAR (Niemira and Klein, 1994). The series that uses the HP filter approach is however too smooth, making it difficult to identify significant peaks and troughs. All three methods were applied in the present study, generating results that resembled Fernando's findings (2010).

Basic structural time-series models such as BSM (Engle, 1978; Kitagawa, 1981; Harvey, 1989) are formulated directly from trends, seasonality, and cycles. Structural time-series models offer clear interpretations through decomposition into components (Kendall and Ord, 1990). The capacity for decomposition is one of the major attractions of structural models that estimate and forecast on the basis of time-series. Introduced by Harvey and Todd (1983), BSM enabled direct handling of non-stationary data without the need for explicit differencing operations. BSM is commonly used as a smoothing method in finance and economics. When smoothing the relevant data it is helpful to use the structural time series analyser, modeller and predictor (STAMP) a computer program developed for BSM. Figure 2 is an example of using BSM for Hong Kong High Tariff A hotel occupancy rates (1972 to 2012).

Figure 2 Smoothed occupancy growth rates for Hong Kong High Tariff A hotels using BSM



Cyclical patterns

Having smoothed the data, the authors next identified a suitable cyclical pattern to feature the turning points. The business world commonly opts for one of the two available cyclical patterns, namely the classic business cycle or the growth cycle. Used widely in research, the classic business cycle was originally defined as a cyclical pattern consisting of expansions, recessions, contractions, and revivals that relate to a variety of economic activities over a defined period (Burns and Mitchell, 1946). The business cycle uses absolute data to present the declines and rebounds (Niemira and Klein, 1994). García–Ferrer and Bujosa–Brun (2000) cited the long tradition of business cycle-based forecasting that focuses on turning points. García–Ferrer, Queralt and Blazquez (2001) noted that most researchers have relied on the classic cycle for the measurement, modelling, and estimation of economic situations.

With the advent of subdued economic conditions in the industrialized world during the 1960s, and the absence of applicable downturns, more researchers became aware of the limitations of relying on the business cycle (Diebold and Rudebusch, 1989; Rosselo–Nadal, 2001). This prompted some researchers to opt for the growth cycle when reviewing economic movements (Mintz, 1969). In contrast to the classical business cycle, the growth cycle represents alternating periods of above and below trend growth

rates, and may be viewed as short-term fluctuation around previous peaks and troughs (García–Ferrer, Queralt and Blazquez, 2001). Growth cycles have subsequently become popular for developing economic indicators in projects conducted by organizations including the American National Bureau of Economic Review (NBER) and the Organisation for Economic Co-operation and Development (OECD). The growth cycle has also been applied by some tourism scholars (Kulendran and Wong, 2009; Fernando, 2010; Tang and Kulendran, 2011). The present study identifies the peaks and troughs of Hotel Kong hotel room occupancies. On this basis, the growth cycle will be used as the cyclical pattern to identify the turning point of the time-series data.

BSM Equation

The Basic Structural Model (BSM) is a trend derivative approach that smooths original data with a view to capturing the turning points for each hotel category time series. The BSM method can be used to smooth both monthly and quarterly data. After a visual examination of the outputs, the researchers opted for quarterly data to generate the smoothed hotel occupancy growth rates that were chosen for the present study. The reason is straightforward. The excessive volatility of monthly data makes it impractical to identify significant turning points. On the other hand, the smoothness of the quarterly data allows easy identification of the peaks and troughs in each series. The quarterly hotel occupancy data are determined using figures for the last month of each quarter. On this basis, the quarterly occupancy rate applies to the period from the first quarter (Q1) of 1972 until the last quarter (Q4) of 2012. The BSM has been used to smooth the growth cycle pattern. The unobserved components model can be written as follows: $Y_t = T_t + S_t + \mathcal{E}_t$

where Y_t is the Hong Kong quarterly hotel occupancy rate; T_t is the series exhibit trend component; S_t is the seasonal component; and $\mathcal{E}_t$ is the irregular component. The irregular component is normally distributed with $(0,\sigma_\varepsilon^2)$.

The trend component, T_t, has been developed further as:

a) $T_t = T_{t-1} + \beta_{t-1} + \xi_t$

$\beta_t = \beta_{t-1} + \lambda_t$

where ξ_t is normally distributed with $(0, \sigma_\xi^2)$ and λ_t is normally distributed with $(0, \sigma_\lambda^2)$. $\beta$is the slope or derivative of the trend.

The equation is the seasonal component:

b) $S_t = \sum_{j=1}^{s-1} (S_{t-j} + \psi_t)$, *t = 1, ..., N*

Where ψ_t is normally distributed with $(0, \sigma_\psi^2)$.

Developed by Harvey (1989), the BSM may be illustrated using equations (a), (b), and (c). Further restricting the σ_ξ^2 = 0, the equation can develop the smooth trend which suits estimations of the growth cycle. A smooth annual growth cycle can be obtained from the fourth difference of the smooth trend. The STAMP program was used to estimate this trend.

Dating the turning points

After determining the applicable smoothing method and the cyclical pattern for the series, the next step is to identify significant turning points. For the purposes of the present study, it is important to provide a thorough definition of the turning point before commencing the dating process. A "turning point" in the growth of hotel occupancy

rates for all categories is a particular peak (trough) of the time series where the occupancy changes from high growth to slow growth (contraction) or from slow growth to high growth (expansion). Within the wider literature scholars have tended to use the method that appears most appropriate for their study because official tourism organizations have provided no guidelines for the dating process. Fernando (2010) stated that any process used to identify turning points should perform at least two functions: first, the algorithm should provide a possible set and sufficient turning points. Second, the method should establish clear procedures to determine turning points for the whole time series.

Hardings and Pagan (2003) outlined two alternative dating methods, namely parametric and nonparametric. The parametric approach is mainly driven by the so-called Markov switching model, which was developed by Hamilton in 1989. The non-parametric approach has been dominated by Bry and Boschan's method (1971) and is simpler, more rigorous, replicable and clearer for readers (Hardings and Pagan 2003). Hardings and Pagan (2003) commented that the process of the Markov switching model is "not very transparent", compared to the simple and flexible nonparametric method. Fernando (2010) contributed to the debate by choosing the dating method for tourism data. He used both the Markov switching model (parametric) and Bry and Boschan's (nonparametric) approach to examine the most suitable method for tourism time series. The results showed that the nonparametric approach is the most applicable method for tourism time series data. Many other researchers have used nonparametric methods to identify the turning points in different time series, some of them in the tourism context (Witt and Witt, 1989; Oller and Tallbom, 1996; Rosselo–Nadal, 2001; Kulendran and Wong, 2009; Tang and Kulendran, 2011).

According to Bry and Boschan (1971), if Y_t represents the peak in the growth cycle, the value of Y_s will be such that $s<t$ or $s>t$. The limitation of the window in time over the domain ($t-k$, $t+k$) should be set according to different circumstances. To set the k value, Bry and Boschan (1971) set $k=5$ in their monthly data study. Hardings and Pagan (2002) chose $k=2$ to analyse the quarterly data of the US GDP time series. Following considerable trial and error the present study has adopted $k=3$ because of the volatility of the hotel occupancy rate growth cycle data. The downturn (DT) and upturn (UT) are defined below:

DT (Peak) at t is equal to: $\{ (Y_{t-3} , Y_{t-2} , Y_{t-1} < Y_t > Y_{t+1} , Y_{t+2} , Y_{t+3}) \}$

UT (Trough) at t is equal to: $\{ (Y_{t-3} , Y_{t-2} , Y_{t-1} > Y_t < Y_{t+1} , Y_{t+2} , Y_{t+3}) \}$

Note that Y_{t-3}, Y_{t-2} and Y_{t-1} are the past values of the growth occupancy rate, and Y_{t+1}, Y_{t+2} and Y_{t+3} are the equivalent future values. The following figures show the smoothed growth occupancy rates for each hotel category with the identified peaks (P) and troughs (T). From the results, it can be seen that there are 20 turning points for the Total category, namely 9 peak and 11 trough turning points. There were only 13 turning points in the case of High Tariff A hotels (6 peak points and 7 trough points). Compared to the other two categories, High Tariff B hotels experienced 22 turns (10 peak points and 12 trough points) and the Medium Tariff hotel group had 19 points (10 peak points and 9 trough points). This indicates that tourist demand for different categories of accommodation in Hong Kong is variable.

Figure 3 Smoothed quarterly occupancy rates growth cycle for Hong Kong (Total) hotels with peaks (P) and troughs (T)

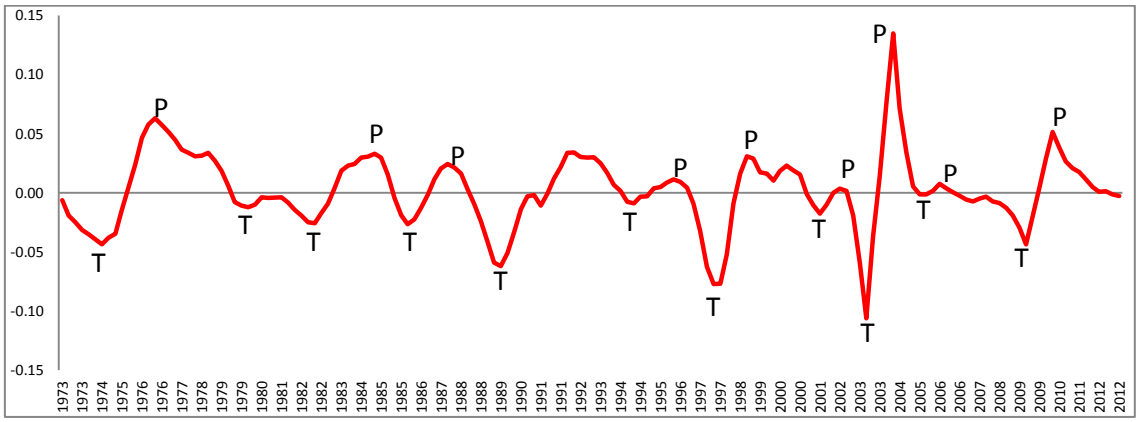


Figure 4 Smoothed quarterly occupancy rates growth cycle for Hong Kong High Tariff A hotels with peaks (P) and troughs (T)

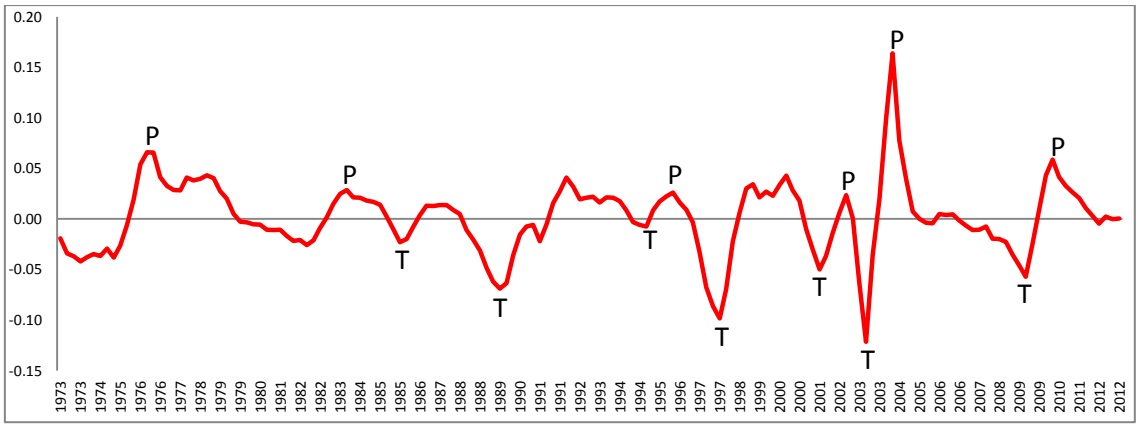


Figure 5 Smoothed Hong Kong High Tariff B hotel quarterly occupancy rates growth cycle with peaks (P) and troughs (T)

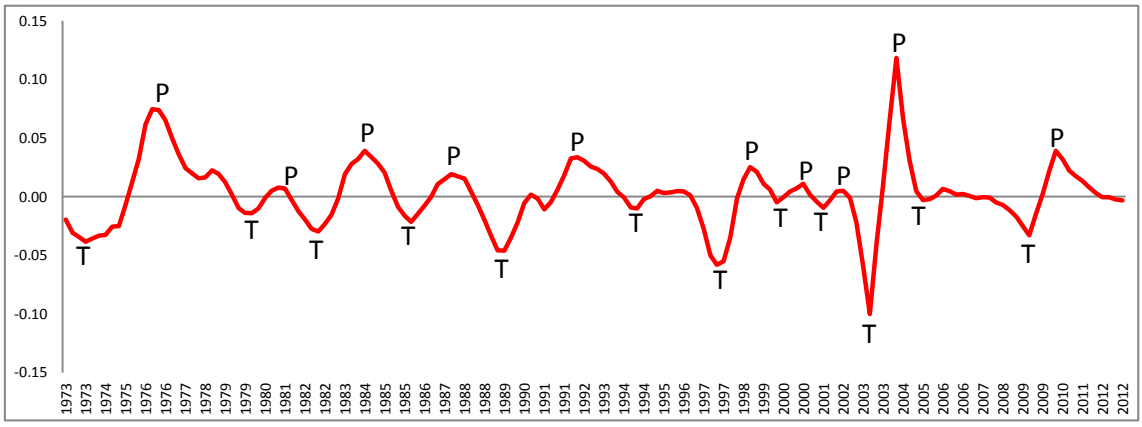
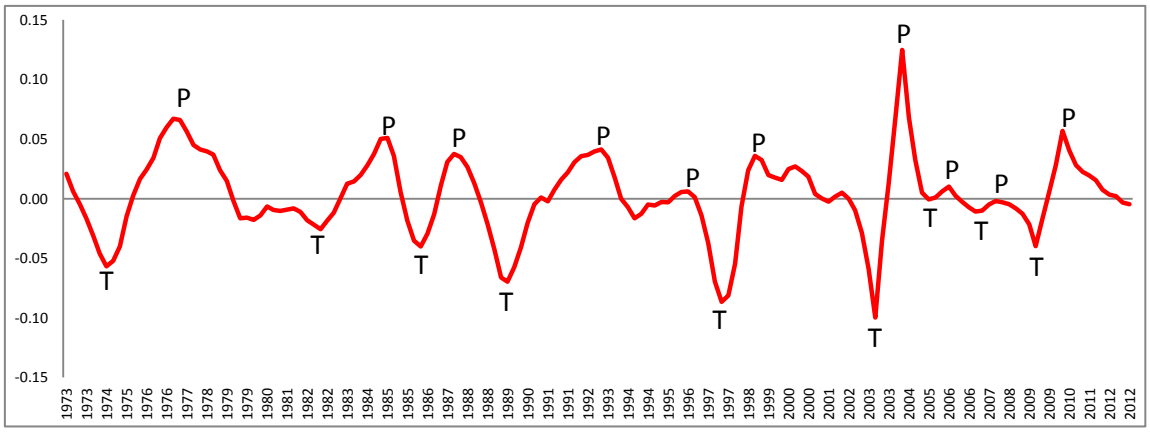


Figure 6 Smoothed Hong Kong Medium Tariff hotel quarterly occupancy rates cycle growth with peaks (P) and troughs (T)



Findings

Common peaks and troughs were identified for all levels of hotel and are attributable to the factors shaping tourism demand. The trough experienced during the third quarter of 1989 reflected the political events which occurred in Beijing on June 4, 1989. The trough in the second quarter of 2003 coincided with the outbreak of SARS (severe acute respiratory syndrome). The only peak across all levels occurred during the second quarter of 2004, reflecting a return of tourist confidence levels following the 2003 fall. This was also attributable to Hong Kong's massive post-SARS destination promotional campaign. The trough prevalent in all categories during the second quarter of 2009 reflected the impact of the global financial crisis on travel.

The results show that the average contraction period (from one peak to the next trough) is longer than the expansion period (from one trough to the next peak) for occupancies across all categories of hotel. This suggests that the “pick-up” speed of Hong Kong’s hotel industry is faster than its “slow-down” counterpart. A further explanation could be that Hong Kong’s dynamic and international image improves as soon as the tourist mood revives. Another reason may be the intensive promotions undertaken by HKTB to

highlight Hong Kong's month by month festivities with a view to increasing visitor arrivals. Such initiatives indicate increased awareness by the Hong Kong government of the economic contribution of tourism.

The average lengths of the peak-to-peak and trough-to-trough periods are the total difference patterns that are evident across different hotel categories. A peak-to-peak period may be defined as the recession cycle because one or more contraction period is evident for every period of expansion. A trough-to-trough period may be described as a boom cycle and the study has found that there is one or more expansion period for every contraction period. Such cycles can give policy makers or hoteliers a clearer idea or bigger picture of longer-term occupancy rate movements. Table 1 shows the number of peaks and troughs as well as the average expansion and contraction periods for all categories of hotel.

Table 1 The average duration and turns of occupancy expansion and contraction periods for Hong Kong hotels by category

Hotel Category	Numbers of Peak Turns	Numbers of Trough turns	Average			
			Expansion Period (Trough to Peak)	Contraction Period (Peak to Trough)	Peak to Peak Periods (Recess)	Trough to Trough Periods (Boom)
HK Total	**9**	**11**	**5.78**	**7.38**	**17.00**	**13.90**
HK High Tariff A	**6**	**7**	**7.00**	**9.50**	**23.00**	**15.57**
HK High Tariff B	**10**	**12**	**6.60**	**6.67**	**15.11**	**12.91**
HK Medium	**10**	**9**	**7.33**	**9.00**	**15.67**	**17.38**

HK TOTAL is the Hong Kong (total) hotel category.
HK HIGH A is the Hong Kong High Tariff A hotel category.
HK HIGH B is the Hong Kong High Tariff B hotel category.
HK MEDIUM is the Hong Kong Medium Tariff hotel category.

Suggestions for Total (average) category hotel occupancies

The Total category provides a benchmark for the standards of individual hotel performance in the wider industry context. The trends for Hong Kong (Total) hotel occupancies indicated an average expansion period of 5.8 quarters and a comparable

contraction period of 7.4 quarters. The data may provide hoteliers and policy makers with an improved understanding of occupancy growth patterns. The longer expansion period may be a positive business indicator because it provides an opportunity for increasing revenues or for maintaining stability. Where the contraction period exceeds expectations, hotel managers cannot raise their prices because the demand for hotel rooms slows until the recession period ends and the trough appears.

Such indications can serve as benchmarks for hotels to compare their performance with others. A hotel operator may for example discover that the number of turning points and their timing differs from those of all Hong Kong hotels on average, based on hotel occupancies. The hotel operator could thus explore possible reasons for differences such as misconceived or directed pricing strategies or marketing campaigns. Moreover, the difference in the lengths of the contraction and expansion periods may show a recovery or the need for hotels to deploy a better catch-up strategy.

Hoteliers can estimate the duration of the whole recession cycle drawing upon the average of the peak-to-peak period. Such indications may provide ideas that may be implemented by the hotel industry during the typical four-and-a-half years from the peak occupancy rate to the next peak occupancy rate. Drawing upon such insights, senior management may commit more strongly to strategic planning between these years and prepare for the next peak. The boom cycle has been shown to be shorter than its recessionary equivalent, which takes about three-and-a-half years from the point of the lowest occupancies to the subsequent lowest point. The same theory applies here, since policy makers could plan better to address tourist needs over the course of the cycle.

Table 2 Summary of the turns and time periods for Hong Kong (total) hotel occupancy rates

Hotel Occupancy	Peak	Trough	Expansion Period (Trough to Peak)	Contraction Period (Peak to Trough)	Peak to Peak Periods (Recess)	Trough to Trough Periods (Boom)
HK Total		**1974-3**				
	1976-3	**1979-4**	8	13		21
		1982-3				11
	1984-4	**1986-1**	9	5	33	14
	1987-3	**1989-3**	4	8	12	14
		1994-3				20
	1996-1	**1997-3**	6	4	34	12
	1998-4	**2001-2**	5	10	11	16
	2002-2	**2003-2**	3	4	14	7
	2004-2	**2005-2**	4	4	8	8
	2006-3	**2009-2**	5	11	9	16
	2010-2		8		15	
Average			**5.78**	**7.38**	**17.00**	**13.90**

Suggestions for the High Tariff A Hotel category

The most luxurious hotels – those in the High Tariff A category - achieved average room rates per night of HK$2,477 in April 2013. High Tariff B hotels may be described as transit business hotels. The average equivalent per night rate for April 2013 was just HK$1,290; half of the rate achieved by High Tariff A hotels. The smaller number of turning points in the case of High Tariff A hotels indicated less volatile occupancy rates. Such findings show that the occupancy rate for High Tariff A hotels may be less affected by social, political, or economic factors. Travellers who opt for High Tariff A hotels when travelling to Hong Kong may be wealthier and less price sensitive. Those who stay in High Tariff A hotels are probably less sensitive to the cost of travel. On the basis of historical data about High Tariff A hotel occupancies, the small number of turning points in the time-series data meant that travellers staying in such hotels are less price sensitive, and that price elasticity is lower. Such travellers appear to be less susceptible to social, political, or economic factors than travellers who stay in the other hotel categories.

It is suggested that marketers in High Tariff A hotels should focus on upgrading services and facilities rather than reducing prices. Travellers who stay in such hotels are mainly attracted by the personal services and luxury facilities; on this basis, the feedback and changing demands or trends for this group of customers is particularly important. Regular customer surveys or loyalty programs may be worthwhile investments for this grouping of hotels. The contraction period in High tariff A hotels is 9.5 quarters, whereas the expansion period is 7 quarters. Compared to other categories, the longer contraction period for High Tariff A hotels indicates that hoteliers should undertake well-organized strategic planning during such periods. When it is accepted that the duration of a recession may exceed two years, it may be advisable to freeze hotel prices and maintain services and facilities, thereby implying higher operating costs. The hotel may consider releasing some long-term staff during this time and hiring some part-timers with a view to reducing costs; undertaking lobby or room renovations; redesigning or changing restaurant concepts and menus; and providing staff cross-training. In order to accelerate recovery, it may be appropriate to implement marketing schemes such as joint airline promotions, package offers to convention organizers, or special treats for loyal customers.

Relative to their counterparts in other categories, operators of High Tariff A hotels should pay greater attention to the longest peak-to-peak period. This is a reminder of the need for a well-considered and longer-term operational plan. Evidence from this study has suggested that the average recession cycle for High Tariff A hotels may exceed seven-and-a-half years. This valley period suggests that following an occupancy peak, it will take longer than seven years to regain another high-peak point. As a long-term goal hoteliers should be reducing the duration of such a valley period. Hotel managers may encounter frustration when it takes many years to reach another peak. Such indications provide an early signal that allow for improved advance preparations.

Table 3 Summary of the turns and time periods for Hong Kong High Tariff A hotel occupancy rates

Hotel Occupancy	Peak	Trough	Expansion Period (Trough to Peak)	Contraction Period (Peak to Trough)	Peak to Peak Periods (Recess)	Trough to Trough Periods (Boom)
HK High Tariff A	**1976-3**					
	1983-4	**1985-4**		8	31	
		1989-3				15
		1995-1	15		23	22
	1996-1	**1997-4**	4	7	26	11
		2001-3				15
	2002-3	**2003-2**	4	3	26	7
	2004-2	**2009-2**	4	20	7	24
	2010-2		8		24	
Average			**7.00**	**9.50**	**23.00**	**15.57**

Suggestions for of the High Tariff B Hotels category

High Tariff B hotels face some difficult price related challenges. More than 20 turning points are evident for this category which suggests that social, political, or economic factors have a major impact on occupancy rates. Moreover, customer price sensitivity is higher in the case of High Tariff B than for High Tariff A hotels, based on the number of turns that are evident over comparable periods. The managers of High Tariff B hotels evidently need to exercise care when they are formulating their pricing strategies. Demand for this category of property lends itself to stimulus during special events such as holidays, business promotional events, meetings and conventions. One means of to maintaining average occupancy rates may be to boost the number of corporate clients. Occupancy rates for such hotels may also be enhanced by updating convention facilities and enhancing guest room features.

The average expansion period for High Tariff B hotels is 6.6 quarters and the equivalent contraction period is 6.7 quarters. Such figures show that hotel operators have approximately 20 months to prepare for the trough or to climb for the peak. A well-organized strategy should be applied regularly during such periods.

Table 4 Summary of the turns and time periods for Hong Kong High Tariff B hotel occupancy rates

Hotel Occupancy	Peak	Trough	Expansion Period (Trough to Peak)	Contraction Period (Peak to Trough)	Peak to Peak Periods (Recess)	Trough to Trough Periods (Boom)
HK High Tariff B		**1973-4**				
	1976-2	**1980-1**	10	15		25
	1981-1	**1982-3**	4	6	19	10
	1984-2	**1986-1**	7	7	13	14
	1987-3	**1989-3**	6	8	13	14
	1992-2	**1994-3**	11	9	19	20
		1997-3				12
	1998-4	**1999-4**	5	4	26	9
	2000-4	**2001-3**	4	3	8	7
	2002-2	**2003-2**	3	4	6	7
	2004-2	**2005-2**	4	4	8	8
		2009-2				16
	2010-2		8		24	
Average			**6.60**	**6.67**	**15.11**	**12.91**

Suggestions for the Medium Tariff Hotels category

The average achieved room rate for Medium Tariff hotels in April 2013 was HK$804. Compared with the other two categories, Medium Tariff hotels are associated with lower profit margins due to their lower prices and fixed operating costs. Their lower prices tend to attract tour groups and budget travellers. The total of 19 turning points suggests that Medium Tariff hotels are less affected by social, political or economic factors than in the case of High Tariff B hotels. Medium Tariff Hotel customers are also price sensitive.

Managers commonly keep prices low in such hotels to attract a greater volume of customers. However, a minimum quality threshold should be maintained for services and facilities within this category if rankings are to be maintained. Joint promotions with travel agents or airlines may provide a means of securing revenues. The average contraction period for this category is 9 quarters, whereas the expansion period is 7.3 quarters. More importantly, the low profit margins prevalent across this category require

the use of alternative tactics to increase revenues during an expansion period, as well as creative strategies to survive the contractions. Another interesting finding for this category is that the duration of the average trough-to-trough period exceeds the average peak-to-peak period. This is the only category of hotel displaying such a pattern. It may be helpful to conduct further research in order to explore the reasons for this phenomenon.

Table 5 Summary of the turns and time periods for Hong Kong Medium Tariff hotel occupancy rates

Hotel Occupancy	Peak	Trough	Expansion Period (Trough to Peak)	Contraction Period (Peak to Trough)	Peak to Peak Periods (Recess)	Trough to Trough Periods (Boom)
HK Medium		**1974-3**				
	1977-1	**1982-3**	10	22		32
	1985-1	**1986-2**	10	5	32	15
	1987-3	**1989-3**	5	8	10	13
	1993-1		14		22	
	1996-2	**1997-3**		5	13	32
	1998-4	**2003-2**	5	18	10	23
	2004-2	**2005-2**	8	4	22	8
	2006-1	**2007-1**	3	4	7	7
	2007-4	**2009-2**	3	6	7	9
	2010-2		8		18	
Average			**7.33**	**9.00**	**15.67**	**17.38**

Conclusions and recommendations for further research

The present study has addressed the previous failure of tourism scholars to consider factors other than seasonality when studying hotel revenue management. The authors have shown the urgent need for reliable and accurate models for estimating tourism that can provide hotels with information for planning investments and undertaking strategic marketing. Tourism-related firms need to understand changes in demand and the timing of directional changes for tourism growth (Song and Li, 2008). Tourism demand expands and contracts because of changes in economic, social, and political circumstances and because of unexpected crises in both source and destination countries

such as terrorism and natural disasters. Positive and negative growth rates are associated with upturns and downturns respectively. Turning points in tourism demand occur when growth rates move from an upturn to a downturn period, or vice versa. It has been shown that there is high demand for tourism resources during periods of positive growth, whereas resources are in low or even no demand during periods of negative growth. It is evident that destinations should develop appropriate operational management planning tools to accommodate changes in the demand for various resources. For these reasons, the public and private sectors need early signals of the start and end of the turns. On-going research is needed to identify means of increasing the scope of factors affecting revenue management systems for different categories of hotel. Ideally the model could be applied in a variety of tourism destinations.

If they are to maximize revenues, hotel managers should analyse time-series data to understand prior, current and future occupancy rates. Within the category of time-series analyses, the present study is the first to identify peak and trough occupancy rates and to estimate the respective expansion and contraction periods, thereby addressing a longer-term revenue management challenge. Understanding the direction of changes and the length of forthcoming occupancy rate peaks and troughs has high practical value for hoteliers because they must be aware of the trends and timing of mid- and long-run occupancies. A reliable and accurate revenue management approach is needed to inform investment planning and industry marketing strategies. This applies to both government policy-makers and to significant private sector industry operators.

The study has identified fewer turning points for High Tariff A hotel occupancy rates, which suggests lesser susceptibility to social, political and economic changes. The contraction period for High Tariff A hotels extends to 9.5 quarters, whereas the expansion period is 7 quarters. Longer contraction periods are likely to produce

financial constraints. With more than 20 turning points it is suggested that High Tariff B hotels are more impacted than High Tariff A equivalents by social, political and economic factors. The expansion and contraction periods for High Tariff B hotels are 6.6 and 6.7 quarters respectively, less than for High Tariff A hotels. Medium Tariff hotels which have nineteen turning points appear to be less affected by social, political and economic changes. The average expansion and contraction periods for medium tariff hotels are 7.3 and 9 quarters respectively.

Overall the average contraction period exceeds the equivalent expansion period. This suggests that the Hong Kong Hotels Association as the industry peak body could play a role in informing strategies to maintain hotel revenues. To maximize such revenues at the level of chains or individual properties, hotel managers should maximise profitability by identifying the optimum service mix during expansion and contraction periods. Meanwhile further research is needed to extend the scope of factors and identify those which have the greatest impact on revenue management systems for different levels of hotel. Applications in other tourism destinations may also provide confirmatory tests of the proposed model. Finally, the authors support Kimes' view (2008) that the application of revenue management should be extended beyond the rooms division to function areas, food and beverage and spas/health clubs (p14).

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