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Research note

A quantile regression analysis of tourism market growth effect on the hotel industry

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ABSTRACT

This study used the quantile regression method to investigate how inbound tourism market growth proxied by the growth rate of total foreign tourist arrivals (GTA) affects the growth rate of sales (GS) and financial performance of hotel firms in Taiwan. The ordinary least squares estimation results of panel regression test revealed that GTA significantly affects GS, but has no significant effect on financial performance (proxied by hotel equity return). However, quantile regression tests revealed new and interesting results. GTA has a significant effect on GS at the different quantiles of GS. In comparison, although hotel equity return was not significantly related to GTA at the median and high quantiles, the effect of GTA on hotel equity return was statistically significant at the low quantiles. These results suggest that the effect of GTA on hotel equity return is asymmetric and state-dependent, conditional on the distributions of hotel equity return. The study further identified that GTA has a significant influence only on equity returns of hotels with a small size.

1. Introduction

The growth of the inbound tourism market (tourism growth hereafter) is expected to have a strong effect on the hotel industry. On the one hand, tourism growth can directly enhance the development of hotel industry by increasing the hotel occupancy rate and hence sales revenue. Chen (2010) and Chen and Kim (2010) found that tourism growth proxied by the growth rate of total foreign tourist arrivals (GTA) in Taiwan has a significant influence on hotel sales and profitability.

Kim et al. (2006) revealed that tourism growth can cause significant economic growth in Taiwan. Chen (2007b) further showed that improved economic/business conditions caused by tourism growth can increase sales and strengthen the financial performance of hospitality-related companies in Taiwan. Accordingly, tourism growth, on the other hand, can significantly promote economic growth and improve business conditions, which in turn can have an indirect effect on the hotel industry.

As hotel sales/profitability increase due to tourism growth in Taiwan, one interesting question arises: How well do hotel firms perform? Indeed, financial performance of hotel firms is expected to benefit from tourism growth because of better economic condition and hence more sales earnings. Moreover, according to equity valuation model, equity prices reflect investors' expectations about future corporate earnings. Hence, given an improved hotel earnings due to tourism growth, a better equity performance of hotel companies is anticipated.

While the financial performance of hotel firms is expected to be closely related to tourism growth, previous hospitality studies found no significant link between tourism growth and hotel equity return (HER). Chen (2007a) investigated the effect of some selected economic variables and GTA on HER in Taiwan. The monthly tourism growth had a positive effect on the monthly HER, but the influence was not statistically significant. Similarly, Chen (2010) found that the quarterly tourism growth rate could not significantly explain the quarterly HER.

Chen (2011) offered an explanation for the absence of a significant relationship between tourism growth and HER. As mentioned, based on equity valuation model, variations in equity price reflect not only the future earnings stream, but also the perceived riskiness of equity cash flows. In other words, both changes in sales earnings and the perceived riskiness of equity cash flows could cause fluctuations in equity price. He detected that tourism growth has a strong effect on growth rate of hotel sales (GS), but not on the perceived riskiness of equity cash flows.

Chen (2011) also investigated whether the effect of tourism growth on HER depends on the state of economy. He concluded that the effect of tourism growth on HER in business cycle

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Table 1
Summary statistics.

Variable	GTA	GS	HER	MR
Mean (%)	.56	.13	−.07	−.79
Median (%)	1.00	1.37	−.346	−.69
Minimum (%)	−101.00	−122.91	−97.62	−40.64
Maximum (%)	99.00	19.92	128.66	49.34
Standard deviation (%)	13.31	68.12	14.14	10.20
Skewness	−.75	−.85	.53	.31
Kurtosis	23.05	7.57	11.18	6.79
LM statistic	43763.57	982.71	4816.47	1595.52
Probability	.00	.00	.00	.00

Note: The number of available observations is 2513. The standard errors for skewness and kurtosis are $(6/T)^{1/2}$ and $(24/T)^{1/2}$, respectively. T is the number of sample observations. LM statistic is the Lagrange Multiplier normality test statistic, which is defined as $[(T/6)b_1^2 + (T/24)(b_2 - 3)^2] \sim x_2^2$, where b_1 is the coefficient of skewness, and b_2 is the coefficient of kurtosis (Jarque and Bera, 1980). The critical value at the 1% significance level is 9.21.

contraction is statistically different from that in business cycle expansion. Moreover, while the influence of GTA on HER is still irrelevant during expansion periods, tourism growth can significantly enhance HER during contraction periods.

This study, motivated by abovementioned previous studies, used the quantile regression method to examine the effect of GTA on different quantiles of sales growth and financial performance of hotel firms. Chiang et al. (2010) and Chiang and Li (2012) stated that the ordinary least squares (OLS) method may be inconsistent because it fails to address the information about the tails of a data distribution given that the OLS estimators concentrate on the mean as a measure of location and thus the information about the tails of a distribution is lost. Consequently, the OLS regression test results can be distorted since events or news in the form of extreme outliers in financial markets can significantly influence tail values of a data distribution.

In particular, the earthquake of September 21, 1999, the terrorist attacks of September 11, 2001, in the US, and the outbreak of Severe Acute Respiratory Syndrome on April 22, 2003, significantly harmed GS and HER in Taiwan, causing a large negative fluctuation in hotel sales and equity prices during the period from 1983 to 2013 (Chen, 2010, 2011). In fact, the summary statistics of GS and HER presented in the next section show that HER has fat tails during the sample period.

Thus, by using the quantile regression approach, the study not only addresses the tail information of GS and HER, but also illustrates how tourism growth affects different quantiles of GS and HER. Test results contribute to the hospitality literature by showing a new and interesting finding regarding the relationship between tourism growth and HER. Specifically, the effect of tourism growth on GS and HER is asymmetric and state-dependent, i.e. the influences of tourism growth on GS and HER vary in different quantiles.

The rest of the paper is organized as follows. Section 2 presents the tourism and hotel equity data. Section 3 describes the quantile regression method. Quantile regression test results are reported in Section 4. Section 5 concludes the paper with a discussion of major findings.

2. Tourism growth and hotel data

The growth rate of the number of total foreign tourist arrivals (GTA) was used as a proxy for tourism growth (Chen, 2010; Kim et al., 2006):

$$\mathrm{GTA}_t = \ln\left(\frac{\mathrm{TA}_t}{\mathrm{TA}_{t-1}}\right), \quad (1)$$

where TA is the number of total foreign tourist arrivals during the month t. The TA data were taken from the database of the Taiwan Economic Journal (TEJ). The sample period is from January 1983 to December 2012. The growth rate of hotel sales is calculated as:

$$\mathrm{GS}_t = \ln\left(\frac{S_t}{S_{t-1}}\right), \quad (2)$$

where S is the sales of each hotel firm at the end of the month t.

The study included equities of seven publicly traded hotel companies—Ambassador Hotel, First Hotel, Grand Formosa Regent Taipei, Hotel Holiday Garden, Leofoo Hotel, Landis Taipei, and Chihpen Royal. Hotel equity return is computed as

$$\mathrm{HER}_t = \ln\left(\frac{P_t}{P_{t-1}}\right), \quad (3)$$

where P_t is the closing price of each hotel equity at the end of month t.

To capture the effect of the broad equity market movements on hotel sales growth and equity returns, the variable of the overall equity market return was incorporated into regression tests. Note that the stock market reflects expectations about future economic conditions because stock market investors bid up prices when they expect companies to be profitable. An increase in stock prices, indicating that investors expect the economy to grow rapidly, is hence expected to affect hotel equity returns and sales growth. The equity market return (MR) was computed as: $\mathrm{MR}_t = \ln\left(\mathrm{TWI}_t/\mathrm{TWI}_{t-1}\right)$, where TWI_t is the Taiwan weighted index at the end of the month t. All equity data were also taken from the TEJ database.

Table 1 presents the summary statistics of GTA, GS, HER, and MR over the entire sample period. The results of statistical tests of the null hypothesis of normality (the Lagrange Multiplier test) are also reported in Table 1. The skewness test measures the asymmetry of the data distribution about the mean, while kurtosis in excess of

Table 2
Regression test results: tourism growth on hotel sales growth.

GS	Constant	GTA	MR	R^2
OLS	.01 (.90)	.23 (.00)***	.18 (.03)**	.05
Low quantile $\tau = .10$	−20.58 (.00)***	.24 (.00)***	.36 (.16)	.03
Low quantile $\tau = .20$	−9.48 (.00)***	.25 (.00)***	.15 (.21)	.04
Low quantile $\tau = .30$	−4.88 (.00)***	.25 (.00)***	.13 (.06)*	.04
Median quantile $\tau = .40$	−1.54 (.00)***	.25 (.00)***	.12 (.02)**	.04
Median quantile $\tau = .50$	.93 (.01)***	.24 (.00)***	.10 (.07)*	.05
Median quantile $\tau = .60$	3.67 (.00)***	.23 (.00)***	.12 (.09)*	.04
High quantile $\tau = .70$	6.52 (.00)***	.22 (.00)***	.13 (.17)	.04
High quantile $\tau = .80$	10.92 (.00)***	.19 (.00)***	.20 (.03)**	.04
High quantile $\tau = .90$	19.19 (.00)***	.24 (.00)***	−.04 (.72)	.03

Note: Figures in parentheses are p-values. The R^2 values for the quantile regression results are pseudo-R^2 (Koenker and Machado, 1999).
* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.