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The impact of macroeconomic and non-macroeconomic forces on hotel stock returns

Ming-Hsiang Chen^a, Woo Gon Kim^b, Hyun Jeong Kim^{c,*}

^a*Department of Finance, National Chung Cheng University, Chia-Yi, Taiwan, ROC*

^b*School of Hotel and Restaurant Administration, Oklahoma State University, Stillwater, OK 74078-6173, USA*

^c*School of Hospitality Business Management, Washington State University, Pullman, WA 99164-4742, USA*

Abstract

This study aimed to examine the relationship between macroeconomic and non-macroeconomic variables and hotel stock returns using hotel companies listed on the Taiwan Stock Exchange. The regression analysis indicated that among the macroeconomic variables (i.e., money supply, the growth rate of industrial production, expected inflation, the change of unemployment rate, and the yield spread), only money supply and the unemployment rate significantly explained the movement of hotel stock returns. On the other hand, all non-macroeconomic forces selected (i.e., presidential elections, the 921 earthquake, the 2003 Iraqi war, the outbreak of SARS, sports mega-events, the Asian financial crisis, and the 911 terrorist attacks) had significant influences on the hotel stock returns. The empirical results of this study may be used as valuable information for local and global stock investors who seek an investment opportunity in the hospitality industry.

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Keywords: Macroeconomic forces; Non-macroeconomic forces; Taiwan stock market; Hotel stock returns; Regression analysis

*Corresponding author. Tel.: +1-509-335-4706; fax: +1-509-335-3857.

E-mail addresses: finmhc@ccu.edu.tw (M.-H. Chen), kwoo@okstate.edu (W.G. Kim), jennykim@cbe.wsu.edu (H.J. Kim).

1. Introduction

According to the financial theory, stock prices reflect investors' expectations about future corporate earnings (Choi et al. 1999). Stock prices are commonly known to react to economic news. A vast amount of research has focused on the impact of macroeconomic variables on stock returns (Fama, 1981; Chen et al. 1986; Fama and French, 1988; Wasserfallen, 1989; Asprem, 1989; Bulmash and Trivoli, 1991; Abdullah and Hayworth, 1993). However, studies regarding the exploratory power of non-macroeconomic variables in predicting stock returns are rare and a recent trend. Chen et al. (1986) asserted that stock prices are affected by a variety of national and international events and some, such as political and sports events, have an even more dramatic impact on stock prices than others do.

It is not surprising to encounter only a handful of studies conducted on this topic in the hospitality arena. Barrows and Naka (1994) were precursors who explored the relationship between macroeconomic variables and the movement of hospitality stocks in the US market. Although some studies attempted to discover the relationship between non-macroeconomic variables, in particular sports mega-events (e.g., the Super Bowl in the US and the Olympics) and stock returns, the scope of these studies included all industry portfolios rather than the hospitality industry (Krueger and Kennedy, 1990; Berman et al. 2000). Recent events such as the SARS outbreak, the 911 terrorist attacks, and the Asian financial crisis are possible influencers on hospitality stock returns, yet no research has been conducted using these non-macroeconomic variables in the hospitality academia.

According to the annual report of the Taiwan Tourism Bureau (2003), as of December 2002, Taiwan had 3309 hotels including 3222 general hotels and 87 tourist hotels. The 87 tourist hotels are divided into two groups: 25 are categorized as general tourist hotels and 62 are grouped as international tourist hotels. In general, international tourist hotels are much more upscale than general tourist hotels and general hotels, providing high-quality service. The first hotel company that made an appearance in the Taiwan stock market was Hotel Holiday Garden (international tourist hotel) in the year 1965. Since then, more numbers of hotel companies have been publicly held and their stocks have been traded in the market.

This study aimed to extend the existing research, which has almost exclusively been conducted for the developed stock market of the US, to the Asian stock market, specifically the emerging Taiwan stock market. The purposes of this study were to test the financial theory regarding the effects of macroeconomic and non-macroeconomic forces using hotel stocks in the context of the Taiwan stock market and compare the significance of the two forces.

The remainder of the paper is organized as follows: Section 2 reviews the theoretical literature and primary empirical research efforts; Section 3 describes the data set; the regression models and results are shown in Section 4; Section 5 discusses findings with implications for hospitality investors and the last section concludes the paper with future research.

2. Literature review

A growing body of research has demonstrated that changes in stock prices systematically react to changes in macroeconomic variables (Keim and Stambaugh, 1986; Chen et al., 1986; Fama and French, 1988; Jensen et al. 1996; Schwert, 1990). Asprem (1989) agreed that stock returns have a complex association with macroeconomic variables in addition to portfolios of other assets. Previous research is consistent with the belief that the identification of predictable patterns in stock prices conforms to an efficient market; theoretically, in the efficient market, stock prices fully reflect all available information (Jensen et al., 1996).

Numerous studies have been conducted to identify the determinants of stock price movements. According to the study of Chen et al. (1986), three macroeconomic variables, interest rates, inflation, and industrial production, should be systematic predictors of stock market returns. Wasserfallen (1989) investigated the effects of macroeconomic variables on stock price indices for the UK, Germany, and Switzerland. Evidence was found that stock returns were positively related to real activity. A higher economic activity increases the expected profits of firms, thereby boosting stock price movements positively. Gross national product, industrial production, real consumption, real investment, the unemployment rate, and real wages are widely used to measure economic activity. On the other hand, inflation was inversely related to stock returns. Consumer price index and nominal wage index are generally used to measure inflation. The negative effect of interest rates on stock returns was expected and his regression result confirmed the inverse relationship. Although he found the significant effects of inflation and interest rates on stock returns, the overall explanatory power of these macroeconomic variables in the model was small.

Asprem (1989) also examined the relationship between macroeconomic variables and stock prices in European countries. Real economic activity (industrial production and exports), money, and the US yield curve were positively correlated to stock prices, whereas employment, imports, inflation, and interest rates had a negative relationship with changes in stock prices. The relationships between stock returns and real activity, inflation, and the money supply are well documented by Fama (1981). He asserted that a negative association between stock returns and inflation and a positive association between stocks and real activity are natural consequences of an inverse relationship between inflation and real economic activity. He added that an increase in real activity, which drives stock returns, stimulates the demand for money through the simple quantity theory model; this creates a positive relationship between money supply and stock returns.

Bulmash and Trivoli (1991) developed a business cycle model to explain the linkage between key economic variables and stock prices. They identified the aggregate variables that were related to stock prices: gross national product, inflation (consumer price index), money supply (M1 and M2), interest rates (T-bill and T-bond rates), and the unemployment rate. They found that interest rates influenced

stock prices negatively because higher interest rates attracted another investment option, causing stock prices to decrease. When interest rates fall, investors tend to switch from long-term bonds to stocks. Thus, decreases in interest rates cause increases in stock prices from the perspective of asset portfolio allocation (Abdullah and Hayworth, 1993).

Abdullah and Hayworth (1993) are another team of scholars that examined the influence of macroeconomic variables on stock price fluctuations. The variables selected were money growth, inflation rate, short-term and long-term interest rates, budget deficits, trade deficits, and industrial production growth. They found that stock returns have positive relationships with money growth and inflation rate, and negative relationships with budget deficits, trade deficits, and both long-term and short-term interest rates.

Booth and Booth (1997) investigated the influence of monetary policy on security returns. The authors expected monetary policy to influence economic activity and security returns because a number of previous studies suggested a positive relationship between monetary policy and stock returns (Rozeff, 1984; Campbell, 1987; Kaul, 1987). They confirmed the theory that an expansionary monetary policy increases returns of stocks and bonds.

In the hospitality arena, very little research has been conducted regarding the relationship between macroeconomic factors and hospitality stock returns. Zheng (1993) study is the first study that discussed investment risk specifically using the hospitality industry, i.e., casino, lodging, and restaurant segments across a 10-year period (1982–1992). The restaurant segment's investment performance was superior to hotels but lower than that of the casino segment. Although his study showed the performance of the three segments between pre- and post-recession, no explanations were provided in relation to key economic variables.

In the following year, Barrows and Naka (1994) investigated the impact of selected macroeconomic variables on stock returns of US hospitality firms from 1965 to 1991. The results indicated that macroeconomic variables had a better explanatory power in predicting stock returns of restaurant firms than did lodging sectors. Five macroeconomic variables were hypothesized to have relationships with stock returns: expected inflation rate, money supply, domestic consumption, term structure of the interest rate, and industrial production. Three of the five variables were significant: inflation, money supply, and domestic consumption. Stock returns had a negative relationship with inflation rate, but a positive relationship with money supply and domestic consumption.

Several studies have highlighted the relationship between non-macroeconomic forces and stock returns. Sports mega-events have been of particular interest to researchers. Krueger and Kennedy (1990) identified the Super Bowl as a determinant of US stock market movements by studying its reaction to Super Bowl results between 1967 and 1988. Berman et al. (2000) examined the impact of the announcement of the 2000 Sydney Olympic Games on the Australian stock market and found that the announcement of the Olympics did not have a significant influence on the overall stock market. However, the announcement had a significant impact on a limited number of industry portfolios.

Stocks of certain hospitality firms appear to be sensitive to legislation changes. Chen and Bin (2001) investigated the relationship between US gaming stock returns and federal and state legislation events concerning casino regulation and deregulation. The results revealed that different types of casino companies showed different reactions to gaming legislation announcements: On average, small gaming firms and gaming equipment suppliers reacted to both federal and state legislation events more significantly; large firms were predominantly responsive to the federal legislative changes. The only state legislation event that negatively affected the stock value of the large gaming firms was the November 8, 1994 voting event where Florida residents overwhelmingly refused to legalize casino gaming. This negative reaction was attributed to confounding events because some other states such as Colorado, Rhode Island, and Wyoming also voted against their gambling projects on the same election day.

3. Data and variables

3.1. Data

Five hotel stocks are currently traded in the Taiwan Stock Exchange, including Ambassador Hotel, First Hotel, Grant Formosa Regent Taipei, Hotel Holiday Garden, and Leofoo Corporation. Although these companies are known as large hotel corporations to the public, their sources of income vary: lodging, restaurants, and theme parks are three major income generators. More detailed financial information on these hotels is presented in Table 1.

The hotel stocks under consideration here excluded the stock of Grant Formosa Regent Taipei because of its relatively short period of trading beginning from March 1998. Monthly hotel stock prices over a 14-year period (from January 1989 to August 2003) with 175 observations were obtained from the financial database of the Taiwan Economic Journal. The value-weighted hotel stock price index (*HPI*) using four hotel stock prices was computed. Fig. 1 shows the time trend of the *HPI* and event dates of some non-macroeconomic forces. Monthly hotel stock returns (R_t) were then calculated from changes in *HPI*, i.e., *HPI* appreciation or depreciation given continuous compounding:

$$R_t = \ln(HPI_t / HPI_{t-1}) \times 100. \quad (1)$$

3.2. Variables

The monthly macroeconomic data covered in this study included industrial production (*IP*), consumer price index (*CPI*), unemployment rate (*UEP*), money supply (*M2*), 10-year Government bond yield (*LGB*), and 3-month Treasury bill rate (*TB*). Later, *CPI* was used to estimate expected inflation (*EINF*) and *LGB* and *TB* were used for the calculation of the yield spread (*SPD*). All data were

Table 1
Descriptive statistics of hotel companies

Company	Type of hotel	Major business income	Date of stock issued	Shares outstanding (in billion)	Market capitalization (in million)
Ambassador Hotel	International tourist hotel	Restaurant (60%) Lodging (32%)	Nov. 10, 1982	358	2938
First Hotel	General tourist hotel	Entertainment rental capital (81%) Lodging (15%)	June 25, 1991	142	2358
Grant Formosa Regent Taipei	International tourist hotel	Restaurant (52%) Lodging (30%)	March 9, 1998	216	6663
Hotel Holiday Garden	International tourist hotel	Lodging (51%) Restaurant (30%)	June 1, 1965	64	529
Leofoo Hotel	General tourist hotel	Restaurant (38%) Theme Park (32%) Lodging (21%)	Dec. 24, 1988	265	2236

Note: The percentage in parentheses denotes the proportion of income from the business under consideration accounted for the total income of the company. Date of stock issued is the beginning date of company's stock traded on the Taiwan Stock Exchange. Market capitalization is denominated in New Taiwan dollar. All numbers are figures as at the end of August 2003.

Fig. 1. The value-weighted hotel stock price index and the non-macroeconomic forces. *Note:* Line 1 = The 1st Presidential Election (3/1997); Line 2 = The Asian Financial Crisis (7/1997); Line 3 = The 921 Earthquake (9/1999); Line 4 = The 2000 Sydney Olympics (7/2000); Line 5 = The 2nd Presidential Election (3/2001); Line 6 = The 911 Terrorist Attacks (9/2001); Line 7 = The 2002 World Cup (6/2002); Line 8 = The Iraqi War (3/2003); & The SARS Outbreak (4/2003).

again taken from the financial database of the Taiwan Economic Journal. Based on these six time series data, the five selected macroeconomic variables (i.e., ΔIP , $EINF$, ΔUEP , $\Delta M2$, and SPD), most commonly used in the literature, were derived.

First, the growth rate of industrial production (ΔIP) is defined as

$$\Delta IP_t = \ln(IP_t / IP_{t-1}) \times 100. \quad (2)$$

Economists usually use data on gross domestic product (GDP) to measure the value of economic growth. GDP , however, is available on a quarterly basis. The monthly IP is often utilized as a proxy for income. Rapidly growing IP indicates an expanding economy with ample opportunity for a firm to increase sales. Second, in a similar manner, the growth rate of money supply ($\Delta M2$) was calculated in terms of the difference in natural log using $M2$. $\Delta M2$ represents the monetary policy. Expansionary monetary policy or increases in $M2$ stimulates the economy.

Third, the growth of CPI is the rate at which the general level of prices is rising. High inflation rates are frequently associated with overheated economies (i.e., where the demand for goods and services is surpassing productive capacity) and consequently lead to an upward pressure on price. Following Barrows and Naka (1994), we estimated the expected inflation ($EINF$) based on the moving averages as in Chen et al. (1986) and Chen (1991). Fourth, the change in the unemployment rate (ΔUEP) was derived as the difference of UEP . The unemployment rate measures the extent to which the economy is operating at full capacity and provides an insight into the strength of the economy.

Lastly, the term structure of the interest rate or the yield spread (SPD) is simply the difference between LGB and TB , which can be given as

$$SPD_t = LGB_t - TB_t. \quad (3)$$

The interest rate determines the present value of firms' future earnings or cash flows. A high interest rate reduces the present value of future cash flows, thereby reducing the attractiveness of investment opportunities. SPD is related to the expected growth rates of GDP and consumption. Chen (1991) stated that, "If future output is expected to be high, individuals desire to smooth consumption by attempting to borrow against the expected future production, thereby bidding up interest rates" (p. 532). This theoretical relation is implied by the first-order condition of the consumption-based asset pricing model (Lucas, 1978; Breeden, 1979).

In addition to macroeconomic variables, some of the recent non-macroeconomic forces were selected. The non-macroeconomic forces under consideration here included political events (the first and second democratic presidential elections in Taiwan), natural disasters (the earthquake of September 21, 1999 and the outbreak of Severe Acute Respiratory Syndrome (SARS) on April 22, 2003), sports mega-events (the 2000 Sydney Olympics and the 2002 Japan/Korea World Cup), the 1997–1998 Asian financial crisis, the Iraqi war in 2003 and the terrorist attacks of September 11, 2001 in the US.

4. Model formation and findings

4.1. Step 1: regression model with macroeconomic forces

Table 2 demonstrates the summary statistics of the hotel stock return and the five macroeconomic variables along with the correlation coefficient values between the return and the five variables over the entire sample period. The mean of monthly hotel stock return was -0.92% . Hotel stocks appeared to be more strongly correlated with two variables, $\Delta M2$ (0.25) and ΔUEP (-0.12), than others. Prior to the formation of a regression model, it is critical to review correlations among exploratory variables. Correlations among exploratory variables (macroeconomic variables) were low except for ΔIP , of which correlations with $EINF$ (-0.34) and ΔUEP (-0.25) were relatively high. Therefore, two separate multiple regressions (with and without the ΔIP variable) were deemed appropriate to detect the possible presence of multicollinearity.

Next, the Augmented Dickey–Fuller (Dickey and Fuller, 1981) and Phillips–Perron (Phillips and Perron, 1988) unit root tests were carried out to examine the stationarity of all variables. Results of both tests indicated that the return and all macro variables are stationary (see Table 3). We, therefore, proceeded with the model formation.

To investigate whether macroeconomic factors can explain hotel stocks, the following regression is formed:

$$R_t = \beta_0 + \beta_1 \Delta IP_t + \beta_2 EINF_t + \beta_3 \Delta M2_t + \beta_4 \Delta UEP_t + \beta_5 SPD_t + e_t. \tag{4}$$

The matrix notation of the general stochastic linear regression above can be given by

$$\mathbf{R} = \mathbf{V}\boldsymbol{\beta} + \mathbf{e}, \tag{5}$$

where $\mathbf{R}$ is an $N \times 1$ vector of observed hotel stock returns, the $N \times 6$ regressor matrix $\mathbf{V}$ contains the macroeconomic variables, $\boldsymbol{\beta}$ is a 6×1 vector of unknown

Table 2
Summary statistics of the hotel stock returns and macroeconomic variables

	<i>Return</i>	ΔIP	<i>EINF</i>	$\Delta M2$	ΔUEP	<i>SPD</i>
Mean	−0.92	0.27	0.19	0.85	0.02	0.00
Maximum	47.70	28.52	3.73	3.64	0.53	2.00
Minimum	−47.69	−25.48	−2.60	−0.85	−0.42	−1.50
Standard deviation	14.53	9.40	1.01	0.94	0.17	0.31
<i>Correlation coefficient matrix</i>						
<i>Return</i>	1.00	−0.03	−0.05	0.25	−0.12	0.04
ΔIP		1.00	−0.34	−0.13	0.25	−0.02
<i>EINF</i>			1.00	0.01	0.09	0.01
$\Delta M2$				1.00	−0.19	0.10
ΔUEP					1.00	−0.17
<i>SPD</i>						1.00

Table 3
Unit root tests

Variable	<i>Return</i>	<i>ΔIP</i>	<i>EINF</i>	<i>ΔM2</i>	<i>ΔUEP</i>	<i>SPD</i>
ADF	−6.74	−9.02	−7.24	−5.22	−6.31	−9.31
PP	−12.64	−30.19	−16.89	−11.25	−10.57	−13.86

Note: The Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) test equations with four lags include an intercept but no trend, since the inclusion of a time trend does not generate significantly various coefficients. MacKinnon (1991) critical values for rejection of hypothesis of a unit root for both tests at the 1% and 5% levels are −2.89 and −3.47, respectively. Both ADF and PP tests indicate no unit root in all variables.

parameters, e is an $N \times 1$ vector of random errors with zero mean and constant variance σ^2 , i.e. $e \sim (0, \sigma^2 I_N)$, and N is the number of observations. The ordinary least-squares (OLS) estimator β , $(V'V)^{-1}V'R$, is unbiased and efficient, and its covariance matrix equals $\sigma^2(V'V)^{-1}$. However, when heteroskedasticity and/or autocorrelation exist in the errors e , the covariance matrix for β is no longer equal to $\sigma^2(V'V)^{-1}$. The OLS estimator β is no longer efficient and the standard errors computed for β are not appropriate, either. Consequently, the confidence intervals and hypothesis tests based on inappropriate standard errors could be misleading.

To account for the presence of both heteroskedasticity and autocorrelation, Newey and West (1987) proposed an alternative that can yield consistent estimates of the covariance matrix $(V'V)^{-1}\Omega(V'V)^{-1}$, where

$$\Omega = \frac{N}{N-k} \left\{ \sum_{t=1}^N e_t^2 v_t v_t' + \sum_{i=1}^q \left(1 - \frac{i}{q+1} \right) \sum_{t=i+1}^N (v_t e_t e_{t-i} v_{t-i}' + v_{t-i} e_{t-i} e_t v_t') \right\}. \quad (6)$$

e_t is the least-squares residual, k is the number of regressors, and the truncation lag q is the number of autocorrelations used to approximate the dynamics of the residuals e_t . Based on the suggestion of Newey and West (1987), the truncation lag q is equal to $4(N/100)^{2/9}$.

Multiple regression results of hotel stock returns on macroeconomic forces are reported in Table 4. Note that empirical results were not much different whether the regression included or excluded the variable of ΔIP . Of all five macroeconomic variables, ΔIP and $\Delta M2$ affected hotel returns positively while $EINF$, Δ and SPD impacted hotel returns negatively. Among variables, only $\Delta M2$ ($p < 0.01$) and Δ ($p < 0.1$) significantly explained the hotel returns. This is consistent with the results of the correlation matrix, which showed relatively higher correlations between the hotel stock return and the two variables (see Table 2). The overall explanatory power (adjusted R^2 value) of macroeconomic forces on the hotel return was 8%. This result is very similar to the study of Barrows and Naka (1994), who reported that the explanatory power of macroeconomic variables on restaurant and lodging returns was 12% and 8%, respectively.

Table 4

Multiple regression results of the hotel stock returns on macroeconomic variables

Variable	Constant	ΔIP	$EINF$	$\Delta M2$	ΔUEP	SPD
Coefficient	−3.32	0.05	−0.43	3.60	−12.51	−0.32
<i>t</i> -statistic	−1.75	0.44	−0.28	2.70	−1.81	−0.29
<i>p</i> -value	0.08	0.66	0.78	0.01	0.07	0.77
$\bar{R}^2 = 0.08$	<i>F</i> -statistic = 2.94		Prob.(<i>F</i> -statistic) = 0.01		<i>DW</i> = 2.01	
Coefficient	−3.30	—	−0.60	3.55	−11.75	−0.28
<i>t</i> -statistic	−1.56	—	−0.55	2.73	−1.75	−0.21
<i>p</i> -value	0.12	—	0.58	0.01	0.08	0.83
$\bar{R}^2 = 0.08$	<i>F</i> -statistic = 3.66		Prob.(<i>F</i> -statistic) = 0.01		<i>DW</i> = 2.02	

Note: The value of *t*-statistic and *F*-statistic are corrected for residual heteroskedasticity and autocorrelation. $\bar{R}^2$ is the adjusted R^2 , which is equal to $1 - (N - 1/N - i - 1)[sd(e)/sd(R)]^2$, where *N* is the sample size, *R* is the hotel stock return and *sd*(*e*) and *sd*(*R*) are the sample standard deviations of *e* and *R*, respectively. *DW* is the Durbin–Watson (1950) statistic, $DW = \sum_{t=2}^N (\hat{e}_t - \hat{e}_{t-1})^2 / \sum_{t=1}^N \hat{e}_t^2$. Based on the Durbin–Watson bounds test, there is no residual autocorrelation if *DW* is greater than the upper critical value bound, which approximately equals 1.75 when *T* = 171.

Note that the estimator β is efficient only under normality assumption. The diagnostic checks on regression residuals were performed. The Jarque and Bera (1980) normality test indicated that residuals are normally distributed (see Fig. 2). The Ljung–Box *Q*-statistics for residuals showed no significant sample autocorrelations (see Fig. 2), which was also evidenced by the Durbin–Watson (*DW*) statistics in Table 4. *Q*-statistics for the square residuals showed no presence of autoregressive conditional heteroscedasticity (see Fig. 2). Hence, the estimated β coefficients are efficient in general.

4.2. Step 2: regression model with the addition of non-macroeconomic forces

In this stage, non-macroeconomic forces were incorporated into the model along with significant macroeconomic variables ($\Delta M2$ and ΔUEP) shown in step 1. The following multiple regression is executed to test the exploratory power of the whole model with non-macroeconomic variables:

$$R_t = \alpha_0 + \sum_{i=1}^n \alpha_i V_{it} + \sum_{j=1}^8 \lambda_j NV_{jt} + v_t, \quad (7)$$

where *V* denotes macroeconomic variables that significantly explained hotel returns and *NV* denotes dummy non-macroeconomic variables which take the value of 1 during the corresponding month on the event date and 0 otherwise. The non-macroeconomic forces were the presidential elections in Taiwan, the 1999 earthquake, the outbreak of the SARS epidemic, the 2000 Sydney Olympics, the 2002 Japan/Korea World Cup Tournament, the Asian economic crisis of 1997–1998, the Iraqi war in 2003 and the terrorist attacks upon the United States in 2001.

Fig. 2. Diagnostic checks of the regression residuals. Note: Jarque-Bera is the Jarque and Bera normality test and is defined as $[(T/6)b_1^2 + (T/24)(b_2 - 3)^2] \sim \chi^2_2$, where T is the sample size ($T = 175$), b_1 is the coefficient of skewness and b_2 is the coefficient of kurtosis (Jarque and Bera, 1980). $Q(n)$ and $Q^2(n)$ are the Ljung-Box (1978) Q -statistic with a lag of n for the series of stock return and squared stock return, respectively, and distributed as χ^2_n .

Table 5 presents regression results of the hotel stock returns on non-macroeconomic variables controlling macroeconomic risks. All nine events had a significant impact upon the hotel returns. Only two democratic presidential elections affected the hotel returns positively and all others negatively. It is an interesting result that neither of the sports mega-events (the 2000 Sydney Olympics and the 2002 Japan/Korea World Cup) boosted the hotel returns in Taiwan. Returns were most seriously hurt by the SARS outbreak followed by the earthquake and the 911 terrorist attacks. In particular, the estimated impact of the SARS outbreak on the hotel returns was about -25.93% , which is very close to its real Fig. -27.99% (see Fig. 1). Diagnostic checks on regression residuals are necessary to determine the efficiency of estimators. The results (not reported here) indicated that all of the estimators are efficient.

Table 5
Regression results of the hotel stock returns on macroeconomic and non-macroeconomic variables

Variable	Constant	$\Delta M2$	ΔUEP	The 1 st presidential election	The Asian financial crisis	The 2000 Sydney olympics
Coefficient	−2.90	2.98	−12.21	7.50	−3.70	−7.31
<i>t</i> -statistic	−1.88	2.39	−1.68	3.06	−2.30	−4.20
<i>p</i> -value	0.06	0.02	0.09	0.00	0.02	0.00
Variable	The 921 earthquake	The 911 terrorist attacks	The 2002 World Cup	The 2 nd presidential election	The Iraqi war	The SARS outbreak
Coefficient	−22.29	−12.50	−4.34	5.72	−6.19	−25.93
<i>t</i> -statistic	−14.90	−6.03	−1.79	2.02	−3.05	−13.72
<i>p</i> -value	0.00	0.00	0.08	0.04	0.00	0.00
$\bar{R}^2 = 0.12$	<i>F</i> -statistic = 2.02		Prob.(<i>F</i> -statistic) = 0.03		<i>DW</i> = 2.08	

Note: Same as in Table 4.

5. Discussion

This study investigated selected macroeconomic and non-macroeconomic variables as determinants of the hotel stock returns in the emerging Taiwan stock market. Two macroeconomic variables, i.e., changes in the unemployment rate (ΔUEP) and increases in money growth ($\Delta M2$), were significant influencers on the hotel stock returns in Taiwan. The changes in the unemployment rate imply the strength of the economy. An increase in the unemployment rate is symptomatic of slow economic activity and accompanies a decrease in stock returns. The Taiwan hotel stocks were no exception, resulting in the negative returns.

Changes in the money supply are an important macro-economic variable affecting stock returns. Originated from the expansionary monetary policy, which is designed to stimulate the economy, an increase in money growth ($\Delta M2$) causes an unexpected boost in the public's cash balance, which results in the wealth effect. The wealth effect tends to stimulate consumption and production and increase investment. A significant share of increased wealth would shift to stocks and bonds and increase investment in securities, thereby resulting in higher securities prices. An increase in the money supply would also reduce interest rates and encourage investment, consumption, and production. The result of this study regarding the positive effect of increase in the money supply is consistent with the findings of Bulmash and Trivoli (1991) and Barrows and Naka (1994). The hotel stocks in the Taiwan stock market did not behave much differently from its counterpart in the United States (Barrows and Naka, 1994).

This study also confirmed that non-macroeconomic forces are significantly important determinants of stock returns. In fact, the majority of them were much stronger influencers than macroeconomic variables. In the Taiwan stock market,

political events (two presidential elections) influenced the hotel stock returns positively. In Taiwan, the third presidential election is scheduled for March 20, 2004. Future stock investors may want to take advantage of the event by purchasing hotel stocks prior to the election, holding them, and selling them shortly after the election; the large investors may realize considerable returns in the end. It is worth observing whether hotel stocks are systematically responsive to the presidential election.

International sports mega-events, such as the 2000 Sydney Olympics and the 2002 Japan/Korea World Cup, had a negative impact on the Taiwan hotel stock returns. This result may be justified by the fact that Taiwan did not host the games and the public may have lowered the expectation of the number of visitors to Taiwan during the game period because they thought sports fans from other continents would most likely visit Australia, Japan, and Korea, not Taiwan.

The negative impact of the Sydney Olympics is understandable, considering the geographical distance between the two nations. However, Taiwan could have benefited from the 2002 Japan/Korea World Cup because of its proximity to Japan and Korea. The negative result may be attributed to no sufficient efforts made to attract visitors (e.g., promotions or advertisements on Taiwan travel) before the games. Tourism organizations and marketers in Taiwan should put heads together to take advantage of the 2008 Beijing Olympics in China. Taiwan can be appealed as an excellent stopover destination because it shares the same Chinese culture and offers a variety of lodgings, restaurants, and shopping opportunities. The hotel stocks may react positively if investors feel confident in international tourists' arrivals to Taiwan during the 2008 Olympics.

Returns were also negatively affected by natural disasters (the SARS outbreak, and the 921 earthquake), the 911 terrorist attacks, the Iraqi war and the Asian financial crisis. The Asian financial crisis had a minimum negative impact on the Taiwan hotel stock returns compared to other non-macroeconomic variables (see Table 5). Our speculation is Taiwan was not one of the major Asian countries that initiated and seriously experienced the financial crisis. Goldstein (1998) pointed out that the overall economy and the stock market in Taiwan were least hit by the financial crisis among five Asian countries, including Hong Kong, Korea, Malaysia, Thailand, and Taiwan. Secondly, although the economic downturn discourages public travel in general, business travelers would still travel around within a limited budget and some of the leisure travelers could take it as an opportunity to travel domestically or internationally at a lower price. The above grounds may explain the reason why the negative effect of the Asian financial crisis was relatively weaker than other factors.

The common thread of the SARS outbreak, the earthquake, the Iraqi war and the terrorist attacks, is traveler's safety. Safety is considered as the most fundamental condition for international travels. The impacts of natural disasters and the terrorist attacks on the tourism industry have been well documented (Barton, 1994; Durocher, 1994; Sonmez et al. 1999; Stafford et al. 2002). This study evidenced the powerful relationship between stock returns and non-macroeconomic forces, which, in particular, threaten traveler's safety. Investors who are interested in

hospitality stocks should be alert to these forces prior to making any purchase decisions.

6. Conclusions and future research

This study enriches the hospitality finance literature where very limited research exists in light of the relationship between the macroeconomic variables and movements of hospitality stocks. This study also brings particular attention to non-macroeconomic variables such as political events, sports mega-events, financial crises, natural disasters, wars and terrorist attacks by showing that many of these factors could be as powerful as or even more powerful than macroeconomic forces. It is recommended to validate the results using stock markets of other Asian countries or countries in different continents such as South America, Europe, and Africa.

Among non-macroeconomic variables used in this study, more vigorous research is recommended regarding political events and sports mega-events because they are scheduled in advance and therefore, predictable. US Gaming stocks were sensitive to federal and state legislation voting events (Chen and Bin, 2001) and Taiwan lodging stocks were responsive to presidential elections according to this study. Future research should be extended into other hospitality segments such as airlines or foodservice companies to draw a more concrete conclusion on the relationship between political events and hospitality stocks.

The relationship between sports mega-events and hospitality stocks is also inconclusive. Berman et al. (2000) reported that the announcement of the 2000 Sydney Olympics affected a limited number of industry portfolios in the Australian stock market: building materials, developers and contractors, engineering and miscellaneous services. Oddly enough, the tourism industry portfolio was not one of the beneficiaries. During the actual game period, tourism stocks did not gain any positive returns either (Chen, 2002). Hospitality finance researchers should utilize upcoming international sports events such as the 2008 Beijing Summer Olympics and the 2010 Vancouver Winter Olympics to answer the following possible research questions: (1) the host country's hospitality stock reactions to the games, (2) the effects on the neighboring country's hospitality stocks, and (3) comparison studies on hospitality stock reactions based on the economic development of host countries—For example, it may be hypothesized that China's hospitality stocks will react more significantly than Canada's hospitality stocks.

Some efforts also should be made to find what other non-macroeconomic variables can be significant determinants for hospitality and tourism stock returns and how these variables influence the returns—negatively or positively. Lastly, the empirical findings of this study should be generalized with some care because the sample was based on only one country and the number of lodging companies included in the analysis was small although the total number of time series observations (175) satisfied the Law of Large Numbers.

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