The Relationship between Stock Returns and the Past Performance of Hotel Real Estate Industry in the U.S.: Is Hotel Real Estate prone to overinvestment?

July 09, 2008

Minye Zhang[1]
2727 Ellendale Pl, Apt 126
Los Angeles, CA 90007, USA
Tel: 1-323-733-6306
Email: minyezha@usc.edu

Yongheng Deng[2]
School of Policy Planning, and Development
University of Southern California
650 Childs Way, RGL 201A
Los Angeles, CA 90089-0626
Tel: (213) 821-1030
Email: ydeng@usc.edu

All errors are our own. Address correspondence to:Minye Zhang, 2727 Ellendale Pl, Apt 126, Los Angeles, CA 90007, USA. Email: minyezha@usc.edu. Tel /Fax: 1-323-733-6306.

[1] Minye Zhang is a Ph.D. student of planning and real estate at School of Policy, Planning, and Development, USC, and research assistant in Lusk Center for Real Estate.
[2] Yongheng Deng is Associate Professor in Real Estate and Financial Economics, and Director, Doctoral Program, School of Policy Planning, and Development and Marshall School of Business, University of Southern California

Abstract

Hotel real estate industry is an important economy in the U.S. This study examines the return patterns of hotel real estate stocks in the U.S. from 1990 to 2007. This study utilizes an integrated framework which includes the most critical explanatory variables to investigate the determinants of the contrarian or momentum profits of the hotel real estate industry. The study finds that the magnitude and persistence of future returns of hotel real estate stocks can be predicted based on past returns, past earning surprises, trading volume, firm size, and holding period.

The evidence of this paper strongly confirms that short-horizon contrarian profits are partially due to lead-lag effects, while in the intermediate-term price momentum profits and long-term contrarian profits are partially due to the firms' overreaction to past price. My result tends to support the price overreaction hypothesis, and is clearly inconsistent with the risk-based hypothesis and the underreaction hypothesis. The study also confirms the earning underreaction hypothesis and finds the high volume stocks tend to earn high momentum profits in the intermediate-term.

The study finds that the earning momentum effect for hotel stocks is more short-lived in persistence and smaller in magnitude than for the whole market on average. Possible explanation is that products and services of hotel industry are highly perishable. Near term earnings information of hotel stocks could be more easily and precisely estimated and therefore reflected into the prices than what could be done for other industries.

The key finding of this study is that price momentum portfolios (or contrarian portfolios) of big hotel firms underperform that of small hotel firms and the hotel price momentum portfolio (or contrarian portfolios) significantly underperform that of the overall market over the intermediate-term (or the long-term). It implies the hotel industry, particularly big hotel firms, have executed more conservative growth strategy after the 1980s' hotel oversupply and financial problem. It could be also possibly caused by big hotel REITs which are less likely to overinvest compared with the overall stock market. The study suggests that a conservative hotel growth strategy accompanied by an internal-oriented financing policy is appropriate in a period of prosperity.

1. Introduction

According to the 2007 Lodging Industry Profile (American Hotel & Lodging Association, 2007), the U.S. lodging (hotel) industry revenue increased in 2006 to $133.4 billion, from $122.7 billion in 2005, representing about 1% of the country's GNP, and generated $26.6 billion in pretax profits. According to IBIS World Inc., the hotel industry provides 1.87 million[3] employment opportunities in 2006, accounting for 1.2% of the aggregated U.S. employment.

The historical data of the hotel industry indicates a cyclical pattern. Choi et al (1999) find that the mean duration for contraction is 1.7 years and 5.7 years for expansion, which implies that investors and developers tend to be over-optimistic. Many studies, for example, Vogel (2001), and Powers and Barrows (2002), report that the hotel industry is more sensitive to the fluctuating market demand than other sectors. Lundberg et al. (1995) point out that the hotel industry, similar to other heavily capitalized industries such as residential real estate and finance, tends to oversupply in prosperity or when there is other positive information, and encounters heavy losses during the subsequent economic recession because of "too many rooms in the inn". The problem has been exaggerated when hotel companies were over-leveraged. For example, lodging companies expanded dramatically in the 1980s, and their financial problems were serious from the middle of the 1980s to the beginning of 1990s (Vogel, 2001).

Since the stock market serves as the source of capital and stock price reflects the market expectation, if the hotel industry is prone to overinvestment and its stock IPOs are demand-driven by the underling, a logical deduction is the hotel stock return will overreact to its pervious price information and demonstrate intermediate-term momentum and long-term reversal patterns. Is it still real from 1990 to 2007?

Two important issues might change the relationship between stock returns and their past performance of hotel industry. One is the ownership interest of both direct equity investment and REITs (real estate investment trusts) in hotel real estate had been growing fast from the 1990s, particularly the REITs. The market capitalization of America's hotel REITs rose to $19.4 billion in the first quarter of 1998 from just $142.4 million in 1993 when the first hotel REIT was introduced, according to Real Estate

[3] The employment data are the summation of industry of Hotels & Motels (IBISWorld Industry Report No. 72111), Casino Hotels (72112), and Bed and Breakfast & Hostel Accommodations (72119). The employment data are 1,411,238, 402,290, and 54,502 respectively.

Weeks[4]. This amount accounts for 42.6% of all hotel stocks' market capitalization. By the end of 1998, there are 16 hotel REITs and 51 non-REITs hotel corporations traded in the capital market (Mooradian and Yang, 2001). All the hotel REITs are powerful industry players. According to Legg Mason Wood Walker, Inc. (1999), five percent of hotel properties are now owned by REITs by the end of 1999. Although the hotel REITs IPO wave cools down recently, the REITs still plays an important role as a source of capital for underlying hotel real estate.

Another important issue is that, from the end of twentieth century to the beginning of the twenty-first century, mergers, acquisition, and joint ventures changed the competitive environment of the lodging sector in the U.S. Almost all the milestone events were significant transactions: such as Starwood acquired Westin for US$ 1.6 billion in 1997, Starwood bought ITT Sheraton for US$ 13.7 billion in 1998, and Hilton acquired Promus group for US$ 41 billion in 1999 (Vogel, 2001). Hotel chains account for a large percentage of the U.S.'s hotel room inventory. In 1999, the number of the rooms of largest 25 hotel chains, such as Bass, Marriott International, Hilton Hotel Corporation, and Starwood Hotels & Resorts, was 2.4 million, or about 70% of the U.S. market (Angelo and Vladimir, 2001).

Given the REITs IPO boom together with the property of hotel real estate industry concentration, it is interesting to understand the underlying hotel real estate industry market characteristics through investigating its stock price behaviors. In particularly, are hotel real estate firms, especially big firms, still relatively more prone to overinvestment than the overall stock market?

This study try to provide insights into the relationship between stock returns and past firm performance for the hotel real estate industry in the U.S. based on the Lehmann (1990) and Jegadeesh and Titman (1993, 2001)'s frameworks, this study utilizes an integrated framework which includes the most critical explanatory variables to investigate the determinants of the contrarian or momentum profits of the hotel real estate industry. The study finds that the magnitude and persistence of future returns of hotel real estate stocks can be predicted based on past returns, past earning surprises, trading volume, firm size, and holding period. The evidence of this paper strongly confirms that short-horizon contrarian profits are partially due to lead-lag effects, while in the intermediate-term price momentum profits and long-term contrarian profits are partially due to the firms' overreaction to past price. The study also confirms the

[4] Real Estate Weekly, Sept 23, 1998, Hotel REITs' Market Cap Rate Reaches $19.4 Billion - Real

earning underreaction hypothesis and finds the high volume stocks tend to earn high momentum profits in the intermediate-term.

As expected, the study finds that the earning momentum effect for hotel stocks is more short-lived in persistence and smaller in magnitude than for the whole market on average. Possible explanation is that products and services of hotel industry are highly perishable and intangible. Near term financial performance information such as earnings of hotel stocks could be more easily and precisely estimated by analysts and investors, and therefore be more quickly reflected into the prices than what could be done for other industries.

Unexpectedly, this empirical study find that price momentum portfolios (or contrarian portfolios) of big hotel firms underperform that of small hotel firms and the hotel price momentum portfolio (or contrarian portfolios) significantly underperform that of the overall market over the intermediate-term (or the long-term). It could be possibly caused by big hotel REITs which are less likely to overinvest because the dividend policy of REITs together with their more limited free cash flow, mitigate the oversupply of the hotel industry, particularly big firms, compared with the overall stock market. Another possible reason is that learning from lesson of the 1980's hotel oversupply and financial problem, the capital market might more strictly check than before on the management of hotel firms who has the incentive to overbuild or overpay for assets, then reduce the risks of overinvestment.

Furthermore, the evidence of the segmentation in terms of contrarian or momentum profits between hotel real estate industry and overall market is found in this study. The study implies that a conservative hotel growth strategy accompanied by an internal-oriented financing policy is appropriate in a period of prosperity.

2. Literature Review

Numerous studies indicate there are many average stock return patterns which can not be explained by the CAPM and APT. Particularly, many recent studies document patterns of the predictability of average stock returns after the findings of long-term reversal (DeBondt and Thaler, 1985 and 1987), short-term reversal (Jegadeesh, 1990; Lehmann, 1990), and intermediate-term momentum (Jegadeesh and Titman, 1993) in average stock returns. These approaches find that the magnitude and persistence of

---

Estate Investment Trusts.

future excess returns can be predicted based on past performance (returns, earnings, trading volume, analyst coverage, etc.) and firm characteristics (firm size, book-to-market ratio, etc).

For instance, Lehmann (1990) suggests the "contrarian trading strategy" of individual securities -- selling the securities that have performed well and buying the securities that have performed poorly will earn positive profits. Campbell et al (1993), Blume et al (1994), and Conrad et al (1994) also report that there is strong evidence of short-term price reversals, particularly for high-transaction securities. Working on the long-horizon economic data, DeBondt and Thaler (1985, 1987) find stocks with low long-term past returns tend to outperform long-term winners over the subsequent three to five years. Poterba and Summers (1988) and Fama and French (1988) also find mean reversion in the stock returns in long horizon. In the intermediate time horizon, the empirical puzzle is not return reversal but return continuation. Jegadeesh and Titman (1993) document an intermediate-horizon with three to twelve months of "momentum" in stock prices, that is, past winners on average continues to outperform past losers. The result is supported by the tests of Rouwenhorst (1998) and Jegadeesh and Titman (2001). Chan et al (1996) propose the concept of an "earning momentum" strategy to refer to the investment strategy based on past earnings-related information.

Many explanations have been proposed to account for these patterns. As for short-horizon predictability, Lo and Mackinlay (1990) Conrad and Kaul (1998), and Moskowitz and Grinblatt (1999) find lead-lag effects (returns of large stocks lead those of smaller stocks) can explain short-term reversals. Kaul and Nimalendran (1990) and Jegadeesh and Titman (1993) document that short-horizon excess profits may also be caused by bid-ask spread. The source of the intermediate-term momentum strategy excess profits and the interpretation of the evidence are widely debated. These theories can be classified into two categories-- behavior models and risk-based models. Behavior models imply that the holding period momentum profits arise because of an overreaction (or underreaction) to information that pushes the prices of winners (losers) above (below) their fundamental values in the subsequent intermediate-term, say three to twelve months. The "overconfidence bias" hypothesis of Daniel et al. (1998), and the "positive feedback trader" model of DeLong et al. (1990) can be listed in this subset. These overreaction models also predict long-term price reversals as a price error correction to a previous intermediate-term price overreaction. In the subset of the underreaction hypotheses, some studies, such as Brown et al. (1988), Bernard and Thomas (1990), and Chan et al. (1996), suggest that investors may underreact to past

earnings or price and that a momentum strategy may produce excess profits. The "conservatism bias" hypothesis of Barberis et al. (1998), the "gradual-information-diffusion" model of Hong and Stein (1999) and Hong, Lim and Stein (2000) can be listed in this subset. One important implication of the underreaction hypotheses is that the post-holding period returns will be zero whenever the information is fully reflected on the prices. Others (e.g., Conrad and Kaul (1998), Fama and French (1993, 1996)) have suggested a risk-based interpretation of momentum. Risk-based models suggest that the profitability of momentum strategies may simply be the compensation for risks. For example, Fama and French (1996) argue that if the risk premium of the three stock-market factors is considered, the price reversal in the short and long-horizon largely "disappears" in the regression residuals of the Fama-French three-factor model which was proposed in 1993. Although risk-based models are certainly a logical possibility, there is little evidence in favor of such a risk theory. For example, Jegadeesh and Titman (2001) examine the risk-adjusted returns and still find a negative long-term reversal profit.

As for the explanations of long-horizon reversals, many studies, including those of De Bondt et al. (1985, 1987), Chopar et al. (1992), and Jegadeesh and Titman (2001), support the concept of market overreaction. Other competing explanations include "microstructure biases" hypothesis of Ball et al. (1995), "upward bias in cumulating single-period returns" hypothesis of Conrad and Kaul (1993), "book-to-market equity effect" hypothesis by Chan et al. (1991) Lakoniskhok et al. (1994), and Fama and French (1992, 1995).

3. Data and Methodology

3.1 Research Questions

First, this research examines the predictability (contrarian or momentum effect) of hotel stock returns in different horizons -- short horizon (one week to one month), intermediate horizon (three months to twelve months), and long horizon (thirteen months to sixty months) -- based on past return and past trading volume. The paper also tests the relationship between firm size and return predictability. None of the previous studies have examined the price behaviors of stocks with all of the explanation variables. The "triangulation" methodology can control the potential extraneous variables and reduce the errors arising from them, and thus enhance the predictability power of these determinant variables.

Second, using the "earning momentum/contrarian" strategy could provide more evidence to evaluate market efficiency and to explain stock return predictability in a special way. As reported by many studies (Bernard and Thomas (1990), and Chan, Jegadeesh and Lakonishok (1996)), it is natural to look at earnings to try to understand movements in stock prices because the predictability of stock average return is largely due to the component of returns that is related to this earnings-related information. Thus, earnings are normally believed to be one of the driving forces for return momentum behavior in these studies.

Third, whether the hotel stocks and the whole stock market has overreaction (own-autocovariance or/and cross-autocovariance), underreaction to past information, behave as those in Conrad and Kaul (1998) risk-based hypothesis, or can be explained by Fama-French model, is still not resolved. The paper finds that oversupply of the hotel industry in prosperity has a significant impact on the mean rate of return of hotel stocks. The study tests various theories, which have been proposed by previous studies to explain predictability in stock returns.

Furthermore, the study studies the impacts of some characteristics of the hotel industry on hotel stock performance. Historical data indicates that big firms tended to take more aggressive overreaction than small firms. It would be interesting to examine how big hotel firms' overreaction affects the momentum profits of big hotel stocks -- whether intermediate-term price momentum strategies for big capitalization stocks are more profitable than those of small stocks. Another characteristic of the hotel industry is that its products and services are highly perishable and intangible; production, delivery, and consumption take place simultaneously. Thus, hotel firms' near-term earnings could be more precisely expected by analysts and investors and thus be partially reflected in hotel firm stock prices before the date of earning disclosure. Whereas in the manufacturing industry, products could be sold at a later date if the market condition is not good, so manufacturing firms' next quarter earnings could not be expected as easily as hotel firms. This property of the hotel industry implies that the persistence and magnitude of the hotel earning momentum strategies and market earning momentum strategies will be different on average.

3.2 Data

Hotel real estate stocks in the U.S. comprise all hotel industry firms listed on the NYSE, AMEX, and NASDAQ during the period of January 1990 through December

2007. The sample of market portfolio is constructed from all stocks traded on the NYSE, AMEX, and NASDAQ during the same period.

The selection of hotel real estate firms is based on the U.S. Census Bureau's 1987 Standard Industrial Classifications (SIC) code system with SIC major industry group code 70 (Hotels, rooming houses, camps, and other lodging places). Return data, number of transactions, and firm sizes (market capitalization) for individual securities are obtained from the Center for Research in Security Prices (CRSP). The study uses net income as the proxy of earnings data. Net income data are come from COMPUSTAT files.

To lay the groundwork, Table 3.1 and Table 3.2 report the average daily returns, maximum daily returns, minimum daily returns, and stock number from 1990 to 2007 for the full samples of price strategies and earning strategies. Since the Compustat file has a different stock coverage, the stock number for earning data is less than that for average daily returns. The tables illustrates that the mean rate of returns and mean earnings for market portfolio and hotel portfolio are closely related to the macro economic climate. For example, economic recession in the early 1990s, the 1994 slowdown, the Asia Financial Crisis in 1998, and the 2001 9-11 terrorism attack stunted growth of the returns of the overall stock market and hotel stocks for a while.

Table 3.3 reports Fama-French Three-Factor regression statistics and Ljung-Box-Q statistics based on monthly return for an equal-weighted hotel stock portfolio. Risk-adjusted abnormal return (Alpha) is estimated by the intercept in the Fama-French three-factor regression model:

$$\hat{\alpha}_i = \mathrm{E}(R_i) - R_f - \hat{\beta}_i[\mathrm{E}(R_M) - R_f] - \hat{s}_i \mathrm{E}(\mathrm{SMB}) - \hat{h}_i \mathrm{E}(\mathrm{HML})$$

Panel A of Table 3.3 reports that monthly risk-adjusted abnormal return (Alpha) is positive but not significantly at the 10% level. Thus we cannot reject the null hypothesis that the risk-adjusted return of a hotel stock portfolio equals zero. The loadings of the SMB and HML are highly significantly different from zero. Market factor loading (systematic risk, Beta) is significantly higher than 1. It implies that the hotel stock portfolio is more sensitive than the whole market portfolio on a monthly return basis.

Ljung-Box-Q (or Q) statistics can be used to test whether a group of autocorrelations or cross-autocorrelations is significantly different from zero. In Panel B, the study uses the

Ljung-Box-Q tests for up to fourth, eighth, twelfth, sixteenth, and twentieth month order autocorrelation in the three factors and the residual term. The test Q statistics for the residuals falls above the upper boundary at 10% significance level for the fourth and eighth month order but within the 10% significance level for twelfth, sixteenth, and twentieth month order. It can be concluded that residuals were not positively or negatively auto-correlated in the short horizon but were positively auto-correlated in the intermediate and long horizon.

Table 3.1

Summary Statistics of Daily Returns Data

Table 3.1 reports the average daily returns, maximum daily returns, minimum daily returns, and stock number listed in the sample from 1990 to 2007. The sample of hotel stocks includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ with SIC major industry group code 70 (Hotels, rooming houses, camps, and other lodging places). The sample of market stocks includes all stocks traded on the NYSE, AMEX, and NASDAQ. "Mean" is the average daily returns. "Maximum" is the maximum daily returns, and "Minimum" is the minimum daily returns.

Panel A: Hotel Stock Portfolio

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Number of Stocks	44	41	42	48	56	61	73	72	67	58	46	42	39	35	35	34	32	30
Mean	-0.0006	0.0026	0.0030	0.0027	0.0005	0.0014	0.0009	0.0012	-0.0005	0.0009	0.0009	0.0002	0.0003	0.0014	0.0014	0.0002	0.0011	-0.0005
Standard Derivation	0.0685	0.0691	0.0905	0.0531	0.0456	0.0489	0.0469	0.0424	0.0480	0.0461	0.0474	0.0465	0.0411	0.0324	0.0243	0.0303	0.0239	0.0279
Maximum	2.0000	1.2500	3.0000	0.8333	0.8182	1.3333	0.9394	1.0000	1.3846	0.7297	1.1299	1.4615	0.6216	0.6190	0.3859	1.3125	0.2917	0.4569
Minimum	-0.6923	-0.5000	-0.6667	-0.4000	-0.4167	-0.4048	-0.7273	-0.5000	-0.4649	-0.4259	-0.4242	-0.5873	-0.6200	-0.2432	-0.3075	-0.3231	-0.2745	-0.1922

Panel B: Market Portfolio

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Number of Stocks	7292	7325	7620	8130	8705	9093	9693	9933	9800	9468	9174	8450	7750	7316	7185	7246	7321	7609
Mean	-0.0003	0.0024	0.0020	0.0018	0.0006	0.0017	0.0012	0.0012	0.0005	0.0016	0.00004	0.0013	0.0000	0.0024	0.0009	0.0003	0.0008	0.0000
Standard Derivation	0.0552	0.0591	0.0627	0.0551	0.0521	0.0512	0.0480	0.0491	0.0584	0.0559	0.0613	0.0583	0.0552	0.0427	0.0322	0.0295	0.0282	0.0307
Maximum	6.0000	8.0000	11.0000	5.0000	7.5000	5.0000	7.5000	9.0000	12.7778	12.6923	4.0455	4.5556	15.9550	12.9028	3.0972	3.6000	3.0397	4.9633
Minimum	-0.8833	-0.9375	-0.9167	-0.9000	-0.9412	-0.9717	-0.9444	-0.9167	-0.8667	-0.8000	-0.8947	-0.8710	-0.9565	-0.9540	-0.8000	-0.8440	-0.8312	-0.8888

Table 3.2

Summary Statistics of Quarterly Earning Data

Table 3.2 reports the average net income (measure of earnings), maximum net income, minimum net income, and stock number listed in the sample for the price strategies from 1990 to 2007. "Mean" is the average net income (in Million US$) disclosed every quarter, "Maximum" is the maximum net income, and "Minimum" is the minimum net income.

Panel A: Hotel Stock Portfolio

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stock Numbers	40	41	41	46	49	55	60	57	52	50	48	47	45	37	33	29	22	19
Mean	3.4	5.0	5.8	4.7	7.0	7.6	9.5	9.4	16.8	2.3	17.8	8.4	4.9	4.3	11.1	25.8	35.5	35.3
Standard Derivation	56.2	41.5	33.2	27.9	30.3	32.9	36.4	56.5	96.0	108.3	161.6	68.3	66.9	41.9	62.2	73.0	100.5	62.6
Maximum	529.5	367.9	317.7	239.0	317.1	326.3	405.4	360.2	996.0	636.9	2146.2	417.9	391.9	290.0	371.7	555.2	680.0	207.0
Minimum	-192.8	-55.0	-74.3	-124.4	-4.4	-86.2	-68.0	-622.0	-194.8	-932.0	-217.8	-252.1	-459.8	-198.9	-353.2	-37.8	-93.7	-5.9

Panel B: Market Portfolio

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Stock Numbers	7404	7916	8375	9605	10128	10972	11151	11104	11425	11588	11576	11073	10466	10115	9836	9574	9139	8367
Mean	9.9	7.4	5.6	8.0	11.5	12.3	14.7	16.0	16.0	18.1	19.5	1.7	1.3	26.0	35.4	42.7	56.1	62.7
Standard Derivation	80.9	75.2	152.1	105.7	75.8	105.9	105.0	120.8	200.7	146.8	199.9	493.7	495.7	286.7	277.1	332.6	456.9	382.2
Maximum	2884.3	3126.5	2542.0	4115.4	2563.0	5605.0	7070.0	6695.0	26615.0	7530.0	6673.0	11408.0	5662.0	24932.0	8420.0	10710.0	22628.0	10895.0
Minimum	-2246.8	-2467.8	-21043.7	-8672.0	-3198.2	-5223.0	-3078.0	-3052.7	-5821.6	-4928.0	-7063.8	-66047.8	-54244.0	-16023.7	-18438.9	-16912.0	-43029.1	-3551.0

Table 3.3
Fama-French Three Factor Regression and Ljung-Box-Q Statistics Based on Monthly Return for equal-weighted Hotel Stock Portfolio

This table reports the regression estimated over monthly data of the Hotel stock portfolio in the U.S. The dependent variable is the monthly return in excess of the risk-free rate (treasure bill rate). The explanatory variables are the monthly returns from the Fama and French (1993) Research Factor portfolio for size and book-to-market factors and monthly return in excess of the Treasury bill rate on the equal-weighted market portfolio of all the component stocks from the Research Factor portfolio. The sample includes all Hotel stocks traded on the NYSE, AMEX, and NASDAQ. In Panel A, FF factor loadings are the slope coefficient in Fama-French three-factor model time-series regressions. "T Stat." is the T statistic. "Market" is the market factor (the value-weighted index minus the risk-free rate), "SMB" is the size factor (small stocks minus big stocks), and "HML" is the book-to-market factor (high minus low book-to-market stocks). "Alpha" is the intercept term or three factor risk-adjusted abnormal return. The T statistics for market factor test the null that the loading is equal to 1. Panel B reports the Ljung-Box-Q statistics for dependent variable – monthly rate of return of Hotel stock portfolio, Fama-French three factors – Market, SMB, and HML, and residuals (or risk-adjusted rate of return of Hotel stock portfolio). "Q(4)", "Q(8)", "Q(12)", "Q(16)", and "Q(20)" are the Ljung-Box-Q tests for up to fourth, eighth, twelfth, sixteenth, and twentieth month order autocorrelation in the residuals. P-Values are shown in parentheses below the Ljung-Box Q Statistics. The sample period is January 1990 to December 2007.

Panel A: Regression Statistics Summary

FF factors	FF factor loadings	T Stat.	P-Value
Alpha	0.21	0.72	0.47
Market (Beta)	0.83	2.36	0.00
SMB	0.78	8.51	0.00
HML	0.56	6.81	0.00

Panel B: Ljung-Box Q statistics

Variables	Q statistics				
	Q(4)	Q(8)	Q(12)	Q(16)	Q(20)
Hotel Stock returns (Not risk-adjusted)	15.50 (0.00)*	22.55 (0.00)*	24.81 (0.01)*	27.33 (0.03)*	29.39 (0.06)*
Residuals or Hotel Stock returns (Risk-adjusted)	4.74 (0.19)	10.60 (0.16)	17.19 (0.10)*	25.71 (0.04)*	28.02 (0.08)*
Market Factor	2.61 (0.46)	5.34 (0.62)	7.31 (0.77)	10.24 (0.80)	15.86 (0.67)
SMB Factor	4.72 (0.19)	8.58 (0.28)	10.92 (0.45)	15.88 (0.39)	16.47 (0.63)
HML Factor	5.82 (0.12)	16.40 (0.02)*	17.67 (0.09)*	22.53 (0.09)*	23.08 (0.23)

* Significant at the 10% level for a two-tailed T-test.

3.3 Research Design

Based on the short-term reversal portfolio strategy of Lehmann (1990) and intermediate-term momentum portfolio strategy of Jegadeesh and Titman (1993, 2001), this study includes the most critical explanatory variables to investigate the determinants of the contrarian or momentum profits of the hotel real estate industry.

This study refers to the strategies of long winners (losers) and short losers (winners) based on past returns as "price momentum (contrarian)" strategies, and those based on past earnings surprises as "earning momentum (contrarian) strategies".

The study employs weekly data in short-term study since much of the short horizon contrarian literature focuses on this interval and hence the profits of this paper can be easily compared to others. Quarterly returns and earnings data are used for the intermediate-term and the long-term because earnings are only available on a quarterly basis in Compustat file.

At the beginning of each period (week for short-term; quarter for intermediate- and long-term) starting from January 1990, all stocks are sorted based on their previous period *K* returns or standard unexpected earnings (SUE) divided into three equally-weighted portfolios. *R1* represents the loser portfolio with the lowest returns in the low 33.3% of the sample pool, *R3* represents the winner portfolio with the highest returns in the upper 33.3%, and *R2* represents the portfolio between the low 33.3% and the upper 33.3% during the previous K period. In the same manner, *E1* represents the portfolio with the most unfavorable earning surprise (SUE) in the low 33.3% of the sample pool, *E3* represents the portfolio that have delivered the most favorable earning surprises (SUE) in the upper 33.3%, and *E2* represents the portfolio between the low 33.3% and the upper 33.3% during the previous formation period. All stocks are equally-weighted within a given portfolio.

The ranking variable used in the price momentum (contrarian) strategies is a stock's past compound return in the formation period *K*. In my earning momentum (contrarian) strategies, the study uses the commonly used standard unexpected earnings (SUE) as the measure of earning news.

$$SUE_{iq} = \frac{e_{iq} - e_{iq-1}}{\sigma_i}$$

where e_{iq} is quarterly earnings (net income) most recently announced as of quarter q for stock i, e_{iq-1} is earnings one quarter ago, and σ_i is the standard deviation of unexpected

earnings, $e_{iq} - e_{iq-1}$ over the period January 1990 to December 2007. The *SUE* model uses the assumptions of Random walk and Martingale process; that is, the changes in earnings are serially uncorrelated and this quarter's earnings are the expectation of next quarter's earnings.

The research indicates *K* as formation period. Stocks are ranked and grouped into 3 portfolios on the basis of their returns over the previous week for short-term, previous 3, 6, 9, and 12 months for intermediate and long-term. *J* represents holding periods where *J* = 3, 6, 9, or 12 months for intermediate-term and *J* = 36 months, 48 months, and 60 months for long-term strategies; *J* = 1, 2, or 4 weeks for short-term strategies. Holding period returns are calculated as contrarian or momentum profits.

Using the mean value as breakpoints, firm sizes and holding period trading volume are divided into two categories. The smaller firms are in size class C1, and the larger firms are in C2. V1 represents the lowest trading volume portfolio, and V2 represents the highest trading volume portfolio. Based on to the studies of Jegadeesh and Titman (1993, 2001), this study uses mean market capitalization as the measure of firm size.

Taken together, the stocks are grouped together to form a portfolios based on the four explanatory variables (J, K, R/E, V/C). While the most of previous studies employed 2 or 3 explanatory variables in their research model, the study integrates at most 4 variables into a single portfolio.

For simplification, the study classifies the portfolios into two general sets according to whether using R (past return) or E (past earning surprise), price momentum (contrarian) strategies and earning momentum strategies.

To increase the power of the tests, the study constructs special overlapping portfolios as suggested by Jegadeesh and Titman (1993, 2001). A momentum (contrarian) portfolio in any particular week (for short-term) or quarter (for intermediate-term and long-term) holds stocks ranked in that portfolio in any of the previous K formation period. For example, in the intermediate-term J=12 and K=3 months analysis, in December 1995 (the fourth quarter in 1995) the winner portfolio is comprised of 25 percent of the R3 stocks format on the first day of January 1995 (which will be held to the last day of December 1995), 25 percent of the R3 stocks formatted on the first day of April 1995 (which will be hold to the last day of March 1996), 25 percent of the R3 stocks formatted on the first day of July 1995 (which will be hold to the last day of June 1996), and the remaining 25 percent of the R3 stocks formatted on the first day of October 1995 (which will be hold to the last day of September 1996).

Because the Compustat database only offers quarterly earnings data, in short horizon, only price contrarian strategies will be used in the analysis. In the intermediate and long horizon, both price momentum (contrarian) series and earning momentum (contrarian) series strategies are used in the analysis.

In the short-term, mean monthly holding period returns are employed for periods following the portfolio formation. In intermediate- and long-term study, annual holding period returns (annualized rate of return on holding period average basis) are computed.

To provide additional evidence on the source of the profits of various portfolio investment strategies, the Fama-French three-factor model (Fama and French, 1993) are used. Risks premium due to market factor (Market), book-to-market equity ratio (HML) factor, and size (SMB) factor will be adjusted from the original portfolio returns.

Throughout the paper, I use the convention that statistics must have two-tailed P-values less than 0.10 to be termed significant. Thus, a P-value lowers than 0.10 implies a significant statistical difference. Also for simplifying the calculation, all portfolios are equal weighted.

4. Empirical Results

4.1 Short-term Price Contrarian Strategies

In this section, the empirical results for different price contrarian strategies over short-term are discussed. Subsection (1) confirms that the price contrarian strategy is profitable for the hotel portfolio and market portfolio. In subsection (2) and (3), the study introduces two-way analysis -- volume-based price contrarian strategies and size-based price contrarian strategies for hotel stock and the whole market, and examines return predictability. Subsection (4) compares Fama-French-Three-Factor risk-adjusted returns of the basic contrarian portfolio and four advanced contrarian strategy portfolios based on past trading volume or firm size. In subsection (5) the study tests the lead-lag hypothesis (Lo and Mackinlay, 1990) for short-term contrarian strategy profitability.

(1) Basic Price Contrarian Strategy

This subsection gives the general view of the short-term contrarian strategies. Table 4.1 summarizes mean monthly stock returns of price contrarian strategy portfolios for the hotel real estate industry and the whole market. The associated T statistics are shown to test whether the returns are reliably different from zero.

The table illustrates that the mean return is negative for winners and positive for losers in all holding periods. Both winners and losers experience fast price reversals. The results in the last two rows indicate that the profits of the contrarian portfolios are significantly positive at the 5% level. For instance, buying previous week losers and selling previous week winners, and holding the contrarian portfolio for one week will earn 6.3% monthly return for hotel stocks.

The results are highly consistent with findings in previous studies (e.g. Lehmann (1990), Conrad et al (1991) and Jegadeesh (1990)). The results show that holding the contrarian portfolios for one week will earn the highest contrarian returns, however, the contrarian profits drop fast in the 2-week and 4-week holding periods, because the decrease in mean returns for losers R1 and the increase for the winners R3.

It is worthy to note that hotel returns of a stock contrarian portfolio are higher than those of a market contrarian portfolio, particularly in the first week, because hotel stocks experience faster price reversion on average than the market portfolio. In subsection (3), the study reveals that this difference happens because small hotel stocks experience faster price reversals than small market stocks.

Table 4.1
Mean Monthly Returns of Price Contrarian Strategy for Hotel Stock and Market Portfolio

This table reports the mean monthly returns of hotel stock price and market contrarian strategy portfolio in the U.S. The equal-weighted market portfolio includes all stocks traded on the NYSE, AMEX, and NASDAQ. The sample of equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. At the beginning of each week starting from January 1990, all hotel stocks are sorted based on their previous one-week return and divided into three equal-weighted portfolios. R1 represents the loser portfolio with the lowest returns in the low 33.3% of the sample pool, and R3 represents the winner portfolio with the highest returns in the upper 33.3% during the previous one-week. Combined portfolio R1-R3 represents long the R1 portfolio and short the R3 portfolio at the same time. All returns used in this study are geometric average annual returns above the risk-free rate of return (30 days U.S. Treasury Bill rate of return). T statistics are shown in parentheses to test whether the returns are reliably different from zero. The sample period is January 1990 to December 2007.

	Hotel Portfolio			**Market Portfolio**		
Portfolio	**J=1 Week**	**J=2 Week**	**J=4 Week**	**J=1 Week**	**J=2 Week**	**J=4 Week**
R1	0.052	0.030	0.019	0.049	0.031	0.021
	(10.67)**	(9.52)**	(8.96)**	(124.40)**	(116.90)**	(113.10)**
R3	-0.018	-0.007	0.002	-0.012	-0.002	0.005
	(-4.71)**	(-2.78)**	(0.81)	(-33.60)**	(-6.28)**	(30.75)**
R1-R3	0.063	0.038	0.016	0.055	0.030	0.015
	(8.28)**	(7.91)**	(4.88)**	(27.10)**	(21.50)**	(15.00)**

* Significant at the 10% level for a two-tailed T-test.
** Significant at the 5% level for a two-tailed T-test.

(2) Volume-Based Price Contrarian Strategy

This subsection introduces the trading volume as an explanatory variable and control another variable, firm size, by sample randomization to examine the impacts of trading volume on the predictability of contrarian portfolio.

Table 4.2 reports monthly returns of hotel and market portfolios formed on the basis of a two-way analysis between price contrarian and past trading volume. Table values represent the mean monthly returns over the next holding period J weeks (J=1, 2 or 4).

Several important results are found. First, conditional on past returns of R1 or R3, high volume stocks generally do better than low volume stocks over the next 1, 2 and 4 weeks for either hotel stocks or the market portfolio. This is seen from the consistently positive returns to the (V2-V1) portfolio conditional on past returns (R1 or R3). For instance, within a one-week holding period, low volume winners underperform high volume winners by 1.3% per month for the hotel portfolio. Apparently, firms that experience high trading volume in the past one-week tend to outperform firms with low trading volume. Second, high (low) volume losers (winners) experience faster reversals than high (low) volume winners (losers) stocks. This finding is not consistent with previous studies such as Campbell et al (1993) and Conrad et al (1994). For example, Campbell et al. claim, “Price changes accompanied by high volume will tend to be reversed; this will be less true of price changes on days with low volume”. Third, both high and low trading volume portfolios can earn significant positive profits in a contrarian portfolio (R1-R3). Interestingly, contrarian portfolios of low volume firms tend to outperform their high volume counterparts, but the differences are not significant. Finally, similar with the general contrarian strategy, the contrarian profits of volume-based price contrarian strategy decrease when holding period becomes longer.

These evidences suggest that the magnitude and persistence of mean return of hotel stocks can be predicted based on trading volume as stated by Conrad et al (1991) and Conrad et al (1994). Traders can learn valuable information about stocks by observing both past price and past volume information, thus traders who include volume measures in their technical analysis perform better in the market than those who do not.

Table 4.2
Mean Monthly Returns of Price Contrarian Strategy Based on Past Return and Past Trading Volume for Hotel Stock and Market Portfolio

This table reports the mean monthly returns of hotel stocks and market price contrarian strategy portfolio based on past return and past trading volume. The equal-weighted market portfolio includes all stocks traded on the NYSE, AMEX, and NASDAQ. The sample of the equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. At the beginning of each week starting from January 1990, all hotel stocks are sorted based on their previous one-week return and divided into three equal-weighted portfolios. R1 represents the loser portfolio with the lowest returns in the low 33.3% of the sample pool, and R3 represents the winner portfolio with the highest returns in the upper 33.3% during the previous one-week. Combined portfolio R1-R3 represents that the portfolio is long the R1 portfolio and short the R3 portfolio at the same time. The holding period trading volume is divided into 2 equal-weighted groups. V1 represents the lowest trading volume portfolio, and V2 represents the highest trading volume portfolio. V2-V1 represents that the portfolio longs the V2 and shorts the V1 portfolio at the same time. All returns used in this study are geometric average monthly return above the risk-free rate of return (30 days U.S. Treasury Bill rate of return). T statistics are shown in parentheses below the returns values. The sample period is January 1990 to December 2007.

Panel A: Hotel Portfolio

	J = 1 Week			J = 2 Week			J = 4 Week		
	R1	**R3**	**R1-R3**	**R1**	**R3**	**R1-R3**	**R1**	**R3**	**R1-R3**
V1	0.048	-0.027	0.075	0.028	-0.012	0.044	0.022	-0.003	0.019
	(4.66)**	(-4.35)**	(7.78)**	(3.45)**	(-2.72)**	(7.32)**	(4.52)**	(-0.90)	(4.53)**
V2	0.055	-0.012	0.053	0.021	-0.003	0.030	0.025	0.005	0.014
	(5.29)**	(-2.29)**	(4.63)**	(4.94)**	(-1.14)	(4.27)**	(5.15)**	(2.10)**	(2.98)**
V2-V1	0.005	0.009	-0.024	0.007	0.006	-0.013	0.001	0.006	-0.004
	(1.30)	(0.85)	(-1.55)	(0.99)	(0.98)	(-1.41)	(0.22)	(1.00)	(-0.67)

Panel B: Market Portfolio

V1	0.040	-0.027	0.058	0.021	-0.010	0.032	0.020	0.001	0.016
	(58.00)**	(-53.40)**	(33.10)**	(99.37)**	(-29.00)**	(26.60)**	(64.78)**	(1.85)*	(18.70)**
V2	0.048	-0.005	0.050	0.025	-0.005	0.029	0.027	0.008	0.015
	(69.79)**	(-1.81)**	(19.80)**	(67.98)**	(-15.96)**	(16.10)**	(96.96)**	(38.32)**	(11.40)**
V2-V1	0.004	0.013	-0.009	0.005	0.006	-0.002	0.003	0.003	-0.001
	(1.50)	(5.52)**	(-5.06)**	(2.20)**	(3.67)**	(-1.35)	(2.63)**	(2.44)**	(-0.77)

* Significant at the 10% level for a two-tailed T-test.
** Significant at the 5% level for a two-tailed T-test.

(3) Size-Based Price Contrarian Strategy

This subsection examines the impact of firm size on the predictability of the contrarian portfolios.

Table 4.3 reports returns of hotel and market portfolios formed on the basis of a two-way analysis between price contrarian and firm size. Several key results are found. First, small firms tend to experience faster price reversals. Consequently, small losers C1R1 earns the highest return and small winners C1R3 earns the lowest. For example, in a one-week holding period, small hotel losers have a highest monthly return of 7.2% per month in the first week; whereas, small hotel winners earn –2.9%. Second, significant positive profits in the contrarian portfolio (R1-R3) are found for small firms as well as for large firms. The contrarian portfolio of small firms significantly outperforms that of large firms over all holding periods for both market and hotel portfolios. This evidence illustrates that firm size can predict contrarian profits in a short horizon. Third, the contrarian returns decay quickly in 2-week and 4-week holding periods. Finally, the table also illustrates that the contrarian profits of the hotel portfolio tend to outperform those of the overall market. For example, the average profit in one week is 8.8% per month for the hotel portfolio, but only 8.2% for the market portfolio.

A possible explanation for the high contrarian profits of small stocks is that small stocks are hard to trade in the market thus needs a higher liquidity risk premium. Furthermore, because it is expensive to trade smaller stocks in several weeks interval, it may not be possible to execute active trading strategies with small stocks although they offer higher profits.

Table 4.3
Mean Monthly Returns of Price Contrarian Strategy Based on Past Return and Firm Size for Hotel Stock and Market Portfolio

This table reports the mean monthly returns of hotel stock and market price contrarian strategy portfolio based on past return and firm size. The equal-weighted market portfolio includes all stocks traded on the NYSE, AMEX, and NASDAQ. The sample of equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. At the beginning of week starting from January 1990, all hotel stocks are sorted based on their previous one-week return and are divided into three equal-weighted portfolios. R1 represents the loser portfolio with the lowest returns in the low 33.3% of the sample pool, and R3 represents the winner portfolio with the highest returns in the upper 33.3%, during the previous one-week. R1-R3 represents that the portfolio is long the R1 portfolio and short the R3 portfolio at the same time. The firm size is divided into 2 equal-weighted groups. C1 represents the smallest firm size portfolio, and C2 represents the largest firm size portfolio. C2-C1 represents that the portfolio is long the C2 and short the C1 portfolio at the same time. All returns used in this study are geometric average monthly return above the risk-free rate of return (30 days U.S. Treasury Bill rate of return). T statistics are shown in parentheses below the returns values. The sample period is January 1990 to December 2007.

Panel A: Hotel Portfolio									
	J = 1 Week			**J = 2 Week**			**J = 4 Week**		
	R1	**R3**	**R1-R3**	**R1**	**R3**	**R1-R3**	**R1**	**R3**	**R1-R3**
C1	0.072	-0.029	0.088	0.041	-0.013	0.055	0.024	-0.003	0.024
	(9.36)**	(-4.57)**	(7.12)**	(8.48)**	(-3.16)**	(6.86)**	(7.56)**	(-0.85)	(4.47)**
C2	0.025	-0.006	0.037	0.015	0.000	0.022	0.012	0.006	0.007
	(5.19)	(-1.52)	(5.49)	(4.35)	(-0.11)	(4.58)	(4.85)**	(3.02)**	(2.16)**
C2-C1	-0.035	0.017	-0.052	-0.020	0.014	-0.034	-0.010	0.007	-0.017
	(-3.27)**	(1.83)*	(-3.52)**	(-2.74)**	(2.39)**	(-3.50)**	(-1.92)*	(1.81)*	(-2.56)**
Panel B: Market Portfolio									
C1	0.068	-0.022	0.082	0.041	-0.006	0.046	0.027	0.002	0.024
	(112.20)**	(-38.60)**	(33.70)**	(102.50)**	(-16.70)**	(28.10)**	(95.49)**	(10.76)**	(20.30)**
C2	0.023	0.000	0.026	0.017	0.004	0.015	0.012	0.007	0.008
	(54.18)**	(-0.27)	(12.70)**	(56.40)**	(16.01)**	(10.10)**	(61.20)**	(41.03)**	(7.01)**
C2-C1	-0.042	0.017	-0.060	-0.024	0.008	-0.031	-0.013	0.002	-0.016
	(-17.20)**	(7.10)**	(-28.77)**	(-12.00)**	(4.40)	(-23.86)**	(-8.57)**	(1.98)*	(-18.53)**

* Significant at the 10% level for a two-tailed T-test.
** Significant at the 5% level for a two-tailed T-test.

(4) Risk-Adjusted Returns of Contrarian Strategy

To provide additional evidence on the source of the Contrarian profits, the Fama-French three-factor model (Fama and French, 1993) are utilized. Table 4.4 summarizes the returns and risk-adjusted returns for the basic and four advanced contrarian strategy portfolios based on past trading volume or firm size. The formation period is one week.

If the profitability of contrarian strategies can be explained by the three-factor model (Fama and French (1993)), the estimated intercept coefficients of these regressions, which are interpreted as the risk-adjusted return of the portfolio relative to the three-factor model, will not differ from zero in short horizon. The results indicate that risk-adjusted contrarian returns are still significantly positive over all holding periods. It means that the results in Table 4.4 are not compatible with the Fama and French's hypothesis. Thus, something other than the market, size, and BE/ME factors explain the profits of contrarian portfolios.

(5) Lead-lag Hypothesis

The empirical results that the price contrarian strategy for small firms could earn higher contrarian profit than that for big firms suggest that short-horizon excess profits are possibly partially due to lead-lag effects; returns of large stocks lead those of smaller stocks (Lo and Mackinlay, 1990).

Table 4.5 presents the Ljung-Box-Q statistics of autocorrelation or cross-autocorrelation for the hotel portfolio and the market portfolio. The first point to note is that the Q statistics in risk-adjusted return data are generally smaller than those of non-risk-adjusted return. This implies that the autocorrelations or cross-autocorrelation in non-risk-adjusted returns are partially explained by the autocorrelations of Fama-French three factors, but the fact that Q statistics of risk-adjusted returns are still significant at a 5% level, except in "Small-Lead-Big" category, suggests that other factors also influence the autocorrelations and cross-autocorrelations. Second, the Q statistics of "Big-Lead-Small" (cross autocorrelations between previous return of big firms with lag period return of small firms) are statistically below 5% significance in risk-adjusted returns. The evidence implies that previous big firm returns have a significant impact on future returns of small firms on FF three-factor risk-adjusted basis. The third key finding is that the small hotel firms' risk-adjusted returns have a stronger trend to positively correlate to previous big hotel firms risk-adjusted. However, this evidence is relatively weake for the market portfolio.

Table 4.4

Risk-adjusted and Non-Risk-Adjusted Mean Monthly Returns for Hotel Price Contrarian (R1-R3) Strategy Portfolios

This table reports the mean monthly returns and Fama-French three-factor risk adjusted mean monthly abnormal returns for hotel price contrarian strategy portfolio based on past trading volume, and firm size. The sample of equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. At the beginning of week starting from January 1990, all hotel stocks are sorted based on their previous one-week return is divided into three equal-weighted portfolios. R1 represents the loser portfolio with the lowest returns in the low 33.3% of the sample pool; R3 represents the winner portfolio with the highest returns in the upper 33.3% during the previous one-week. Price Contrarian Strategy (R1-R3) represents that the portfolio is long the R1 portfolio and short the R3 portfolio at the same time. Besides, using the lower and upper 33.3%s as breakpoints, the holding period trading volume and firm size are divided into 2 equal-weighted groups. C1 (V1) represents the smallest firm size (lowest trading volume) portfolio, and C2 (V2) represents the largest firm size (highest trading volume) portfolio. "All" portfolio is the basic momentum portfolio not classified by firm size and trading volume. Returns used in this study are geometric average monthly return above the risk-free rate of return. T statistics are shown in parentheses below the returns values. The sample period is January 1990 to December 2007.

	Not Risk-Adjusted			**Risk-Adjusted**		
	J = 1 Week	**J = 2 Week**	**J = 4 Week**	**J = 1 Week**	**J = 2 Week**	**J = 4 Week**
Portfolio	**R1-R3**	**R1-R3**	**R1-R3**	**R1-R3**	**R1-R3**	**R1-R3**
V1	0.058	0.032	0.016	0.060	0.032	0.016
	(33.10)**	(26.60)**	(18.70)**	(34.09)**	(26.72)**	(18.54)**
V2	0.050	0.029	0.015	0.051	0.030	0.016
	(19.80)**	(16.10)**	(11.40)**	(20.07)**	(16.16)**	(11.18)**
C1	0.082	0.046	0.024	0.086	0.048	0.024
	(33.70)**	(28.10)**	(20.30)**	(34.08)**	(27.91)**	(19.56)**
C2	0.026	0.015	0.008	0.025	0.015	0.008
	(12.70)**	(10.10)**	(7.01)	(12.90)**	(10.13)**	(7.17)**
All	0.055	0.030	0.015	0.055	0.031	0.016
	(27.10)**	(21.50)**	(15.00)**	(27.86)**	(21.66)**	(14.77)**

* Significant at the 10% level for a two-tailed T-test.
** Significant at the 5% level for a two-tailed T-test.

Table 4.5
Ljung-Box-Q Statistics for Autocorrelation and Cross-Autocorrelation for Hotel Stock Portfolio and Market Portfolio

This table reports the Statistics summary of the Ljung-Box-Q test for hotel stock portfolio (presented in Panel A) and market portfolio (presented in Panel B) in the U.S. The equal-weighted market portfolio includes all stocks traded on the NYSE, AMEX, and NASDAQ. The sample of equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. "Small" represents small firms. "Big" represents big firms. "Small-Lead-Big" represents that the Q test examines the cross autocorrelation between past return of small firms with lag period return of big firms; and so on for "Big-Lead-Small". "Risk-Adjusted" represents that the returns of small and big firms are risk-adjusted by Fama-French three-factor model. "Q(4)", "Q(8)", and "Q(12)", are the Ljung-Box-Q tests for up to fourth, eighth, twelfth order autocorrelation. P-Values are shown in parentheses below the Ljung-Box Q Statistics. The sample period is January 1990 to December 2005.

Panel A: Hotel Portfolio

Autocorrelation or Cross-autocorrelation of	Not Risk-Adjusted			Risk-Adjusted		
	Q(4)	Q(8)	Q(12)	Q(4)	Q(8)	Q(12)
Small	129.21	137.34	142.78	40.97	41.99	46.56
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**
Big	33.79	41.84	54.23	38.36	41.89	56.66
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**
Small-Lead-Big	19.66	23.99	34.82	5.43	7.62	13.53
	(0.00)**	(0.01)**	(0.00)**	(0.14)	(0.75)	(0.26)
Big-Lead-Small	142.54	171.57	185.31	67.79	72.27	79.84
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**

Panel B: Market Portfolio

Autocorrelation or Cross-autocorrelation of	Not Risk-Adjusted			Risk-Adjusted		
	Q(4)	Q(8)	Q(12)	Q(4)	Q(8)	Q(12)
Small	165.29	179.50	187.37	93.15	95.16	105.29
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**
Big	14.51	25.99	39.71	12.94	20.33	27.00
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**
Small-Lead-Big	7.76	18.06	35.00	3.44	9.73	12.88
	(0.05)*	(0.08)*	(0.00)**	(0.33)	(0.55)	(0.30)
Big-Lead-Small	145.04	162.29	174.33	28.68	29.93	36.43
	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**	(0.00)**

* Significant at the 10% level for a two-tailed T-test.
** Significant at the 5% level for a two-tailed T-test.

4.2 Intermediate- and Long-term Momentum and Contrarian Strategies

At the intermediate-term ranging from three to 12 months, the empirical puzzle is not return reversal but return continuation. Many finance studies also find the long-term price reversal up to five years after the events. Therefore, this study extends the holding period to five years. In this section, the results for different price or earning momentum strategies over the intermediate-term and contrarian strategies over the long-term are discussed. Subsection (1) confirms the basic price and earning momentum/contrarian strategies for the hotel portfolio and the market portfolio. Subsection (2) and (3) introduces volume-based and size-based strategy portfolios and examines the return predictability for these two-way analyses. Subsection (4) provides Fama-French risk-adjusted results.

(1) Basic Price and Earning Strategies

Table 4.6 presents mean annual returns for basic price momentum strategy portfolios based on different formation periods. In the past two decades, momentum strategies have become more popular among institutional investors. One might expect that the frequent trading activities of these institutions would eliminate the momentum effect in intermediate-term and the reversal effect in long-term, at least for the large stocks that they can trade at low transaction cost. However, Table 4.6 reveals that in the recent period from 1990 to 2007, both winners and losers experience price momentum from three to 12 months and price reversal in the long-term from three to five years. The evidence confirms the results of intermediate price momentum and reversal in previous studies. Furthermore, Table 4.6 also presents the difference between hotel stocks and the overall market portfolio. The significances of the 60-month holding period negative momentum profits of hotel stocks are generally less than those of market portfolio. This result means that price information will be likely impounded in hotel stock prices within five years compared with the whole market.

Table 4.7 presents mean annual returns for basic earning momentum strategy portfolios based on different formation periods. It indicates that, the news reflected in the past earnings announcement continues to leave its traces in the next several years holding period following the formation. Interestingly, the mean returns of the earning momentum portfolio, that is the spread in returns between stocks with delivered favorable surprises (E3) and those with unfavorable surprise (E1) is significantly positive up to three years for hotel stocks and five years for the market portfolio.

Based on the empirical results, we could get some main findings. First, sorting on past return and earning surprise (measured using SUE) give rise to large profits in intermediate-term momentum portfolios for hotel stocks as well as for the whole market. In the long-term, price contrarian strategies and earning momentum strategies are profitable. This evidence strongly supports that average hotel and market stock returns in different horizons can be predicted by past returns and past earnings.

Second, this subsection finds that two pieces of publicly available information, stocks' prior return and prior earning surprise, help to predict future returns. Each of the momentum strategies is individually successful, and that one effect is not subsumed by the other.

Third, the market price momentum portfolio experiences price revision and have a significant negative momentum profits in three- to five-year holding periods after portfolio formation. The evidence is important because it refutes the common presumption that price momentum is simply a market underreaction (Chan et al, 1996). Instead, the finding tends to support the overreaction hypothesis --- at least a portion of the momentum profits is better characterized as an overreaction. However, this evidence is weak for the hotel portfolio.

Forth, compared to the results of the price momentum strategy, the profits associated with earning momentum strategies tend to persist for a longer period up to five years. This evidence confirm the underreaction hypothesis of Chan et al (1996), that a market does not incorporate the news of past earnings promptly and indeed the adjustment is gradual, so that there are drifts in subsequent returns. But my evidence is not consistent with their idea that the market also sluggishly responds to past price information.

Fifth, focusing on earning momentum portfolios, we get some interesting findings. Although earning information for market momentum portfolios is not likely incorporated into their prices in five years, earning momentum profits for hotel portfolios will disappear within four years after formation. The results show that past earning information has longer persistence and larger effect on the performance of the whole stock market compared with that on the performance of hotel stocks. This evidence indicates that in general the earning momentum effect of a market portfolio tends to be stronger and longer-lived than that of a hotel portfolio.

Furthermore, this subsection finds that the formation period does not explain the profitability for price and earning momentum strategies.

Finally, I also find that price news tends to have a larger impact in significance on future long-term stock prices than past earnings news does. It is not surprising when we look back at the U.S. hotel industry's "overbuilding" which started in the earlier 1980s and continued through the decade. In spite of the serious successive losses reported during this time investors and developers still dreamed big, build big, and profited royally (Lundberg et al, 1995). The stock price information overreaction dominated earning underreaction with the overbuilding of the hotel industry.

Figure 4.1
Mean Profits of Price Momentum Strategy for Hotel Stock and Market Portfolio (Intermediate- and Long-term)

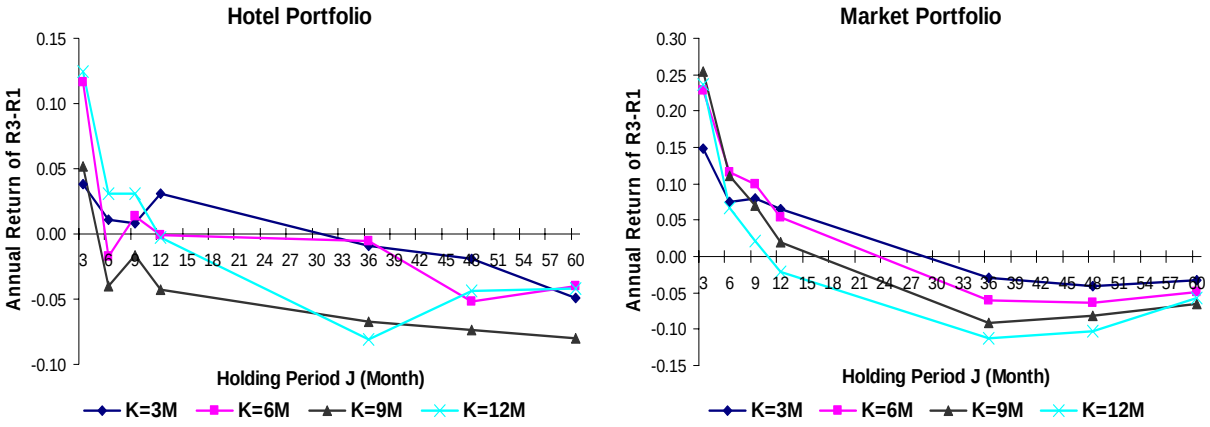

Figure 4.2
Mean Profits of Earning Momentum Strategy for Hotel Stock and Market Portfolio (Intermediate- and Long-term)

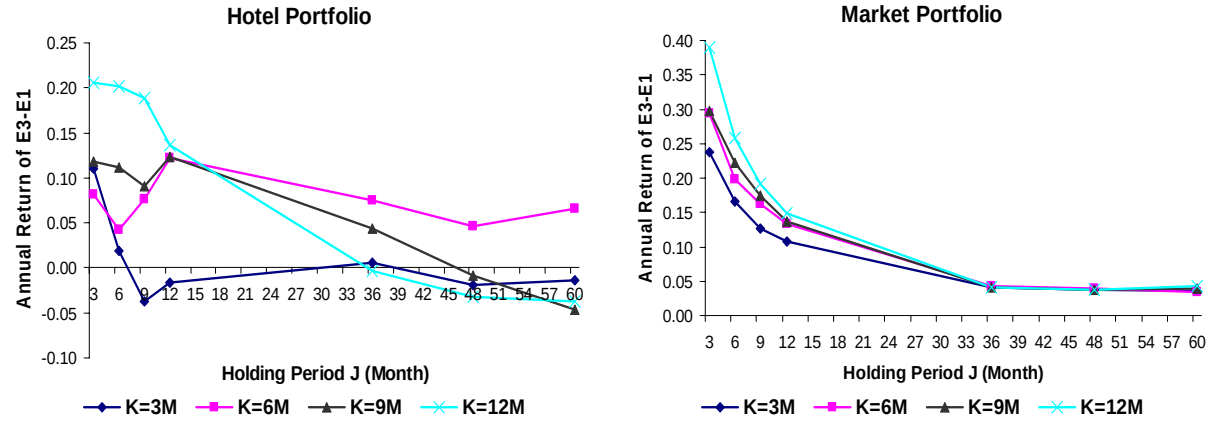

Table 4.6
Mean Annual Returns of Price Momentum Strategy for Hotel Stock and Market Portfolios (Intermediate- and Long-term)

This table reports the mean annual returns of price momentum strategy for hotel stock and market portfolio in the U.S. The equal-weighted market portfolio includes all stocks traded on the NYSE, AMEX, and NASDAQ. The sample of an equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. At the beginning of each quarter starting from January 1990, all hotel stocks are sorted based on their previous formation period return is divided into three equal-weighted portfolios. R1 represents the loser portfolio with the lowest returns in the low 33.3% of the sample pool, and R3 represents the winner portfolio with the highest returns in the upper 33.3% during the previous formation period. R1-R3 represents the portfolio is long the R1 portfolio and short the R3 portfolio. Formation periods K are listed in the first column. All returns used in this study are geometric average annual return above the risk-free rate of return (30 days U.S. Treasury Bill rate of return). T statistics are shown in parentheses to test whether the returns are reliably different than zero. The sample period is January 1990 to December 2007.

		Hotel Portfolio							Market Portfolio						
Portfolio		**J=3**	**J=6**	**J=9**	**J=12**	**J=36**	**J=48**	**J=60**	**J=3**	**J=6**	**J=9**	**J=12**	**J=36**	**J=48**	**J=60**
K		**Mon**	**Mon**	**Mon**	**Mon**	**Mon**	**Mon**	**Mon**	**Mon**	**Mon**	**Mon**	**Mon**	**Mon**	**Mon**	**Mon**
3 Mon	**R1**	-0.117	0.075	0.111	0.102	0.117	0.120	0.118	-0.146	0.128	0.141	0.162	0.194	0.185	0.180
		(-1.58)	(1.54)	(2.77)*	(2.86)*	(4.68)*	(4.75)*	(4.10)*	(-3.74)*	(4.41)*	(6.00)*	(7.72)*	(17.74)*	(19.81)*	(19.04)*
	R3	-0.071	0.097	0.125	0.138	0.112	0.108	0.090	-0.014	0.207	0.223	0.227	0.173	0.162	0.164
		(-1.23)	(1.78)*	(2.39)*	(3.60)*	(5.55)*	(5.82)*	(4.99)*	(-0.50)	(8.54)*	(10.56)*	(11.55)*	(19.68)*	(22.55)*	(19.97)*
	R3-R1	0.038	0.011	0.008	0.031	-0.009	-0.019	-0.049	0.148	0.075	0.080	0.065	-0.030	-0.040	-0.032
		(0.39)	(0.16)	(0.15)	(0.64)	(-0.29)	(-0.53)	(-1.18)	(3.58)*	(3.15)*	(4.29)*	(3.43)*	(-2.32)*	(-2.65)*	(-1.82)*
6 Mon	**R1**	-0.158	0.117	0.102	0.126	0.128	0.121	0.123	-0.172	0.122	0.144	0.175	0.204	0.191	0.185
		(-2.00)*	(2.17)*	(2.30)*	(2.96)*	(4.10)*	(4.23)*	(4.08)*	(-4.27)*	(4.23)*	(6.00)*	(7.75)*	(18.16)*	(19.17)*	(19.50)*
	R3	-0.047	0.105	0.115	0.119	0.131	0.108	0.093	0.027	0.244	0.247	0.229	0.164	0.156	0.162
		(-0.81)	(2.42)*	(3.08)*	(3.64)*	(6.14)*	(6.19)*	(5.72)*	(0.95)	(9.55)*	(11.11)*	(11.52)*	(18.73)*	(21.36)*	(19.50)*
	R3-R1	0.116	-0.017	0.014	-0.001	-0.005	-0.052	-0.040	0.229	0.115	0.100	0.054	-0.060	-0.063	-0.049
		(1.23)	(-0.28)	(0.27)	(-0.01)	(-0.12)	(-1.17)	(-1.03)	(4.60)*	(4.74)*	(4.53)*	(2.43)*	(-3.92)*	(-3.80)*	(-2.50)*
9 Mon	**R1**	-0.083	0.154	0.129	0.150	0.153	0.129	0.139	-0.166	0.138	0.163	0.197	0.215	0.199	0.191
		(-1.05)	(2.76)*	(2.85)*	(3.80)*	(5.23)*	(4.87)*	(4.51)*	(-4.13)*	(4.61)*	(6.33)*	(7.97)*	(18.29)*	(20.29)*	(20.50)*
	R3	-0.016	0.134	0.125	0.121	0.114	0.099	0.093	0.057	0.255	0.235	0.217	0.155	0.155	0.161
		(-0.27)	(3.56)*	(3.82)*	(4.40)*	(6.12)*	(5.79)*	(5.12)*	(2.05)*	(10.18)*	(11.35)*	(12.24)*	(18.83)*	(21.23)*	(17.83)*
	R3-R1	0.052	-0.040	-0.016	-0.043	-0.067	-0.074	-0.080	0.255	0.111	0.070	0.020	-0.092	-0.082	-0.065
		(0.56)	(-0.64)	(-0.33)	(-0.99)	(-1.63)*	(-1.65)*	(-1.82)*	(5.14)*	(3.70)*	(2.50)*	(0.73)	(-4.93)*	(-4.46)*	(-2.78)*
12 Mon	**R1**	-0.051	0.176	0.147	0.144	0.151	0.122	0.137	-0.151	0.157	0.189	0.219	0.220	0.203	0.196
		(-0.63)	(2.97)*	(3.09)*	(3.48)*	(5.13)*	(4.84)*	(4.62)*	(-3.75)*	(5.04)*	(6.92)*	(8.52)*	(18.44)*	(19.68)*	(19.86)*
	R3	0.056	0.219	0.181	0.143	0.095	0.091	0.087	0.059	0.230	0.212	0.199	0.149	0.149	0.154
		(0.99)	(3.74)*	(3.57)*	(4.29)*	(5.15)*	(4.96)*	(4.47)*	(2.05)*	(9.53)*	(10.97)*	(11.76)*	(17.81)*	(22.32)*	(19.81)*
	R3-R1	0.125	0.031	0.031	-0.003	-0.081	-0.044	-0.042	0.237	0.067	0.022	-0.021	-0.112	-0.103	-0.057
		(1.39)	(0.47)	(0.52)	(-0.05)	(-2.23)*	(-1.15)	(-1.46)	(4.76)*	(2.02)*	(0.73)	(-0.70)	(-5.69)*	(-4.99)*	(-4.10)*

* Significant at the 10% level for a two-tailed T-test.

Table 4.7
Mean Annual Returns of Earning Momentum Strategy for Hotel Stock and Market Portfolio (Intermediate- and Long-term)

This table reports the mean annual returns of the earning momentum strategy for hotel stocks and the market portfolio in the U.S. The equal-weighted market portfolio includes all stocks traded on the NYSE, AMEX, and NASDAQ. The sample of equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. At the beginning of each quarter starting from January 1990, all hotel stocks are sorted based on there previous one-quarter, two-quarter, three-quarter, or four-quarter SUE (standard unexpected earnings) is divided into three equal-weighted portfolios. E1 represents the portfolio with the most unfavorable earning surprise (SUE) in the low 33.3% of the sample pool, E3 represents the portfolio that have delivered the most favorable earning surprises (SUE) in the upper 33.3%, and E2 represents the portfolio between the low 33.3% and the upper 33.3% during the previous formation period. E1-E3 represents that the portfolio is long the E1 portfolio and short the E3 portfolio at the same time. Formation periods K are listed in the first column. All returns used in this study are geometric average annual return above the risk-free rate of return (30 days U.S. Treasury Bill rate of return). T statistics are shown in parentheses to test whether the returns are reliably different than zero. The sample period is January 1990 to December 2007.

		Hotel Portfolio							Market Portfolio						
Portfolio K		J=3 Mon	J=6 Mon	J=9 Mon	J=12 Mon	J=36 Mon	J=48 Mon	J=60 Mon	J=3 Mon	J=6 Mon	J=9 Mon	J=12 Mon	J=36 Mon	J=48 Mon	J=60 Mon
3 Mon	E1	-0.051	0.179	0.184	0.167	0.136	0.126	0.110	-0.158	0.077	0.105	0.121	0.149	0.146	0.140
		(-0.73)	(2.92)*	(3.88)*	(4.34)*	(5.11)*	(5.36)*	(4.59)*	(-4.97)*	(3.37)*	(5.39)*	(6.93)*	(17.70)*	(19.96)*	(22.84)*
	E3	0.089	0.217	0.179	0.175	0.133	0.107	0.096	0.051	0.249	0.235	0.230	0.181	0.172	0.162
		(1.49)	(4.59)*	(4.75)*	(5.53)*	(5.85)*	(5.07)*	(4.39)*	(1.54)	(9.47)*	(10.92)*	(11.63)*	(18.78)*	(20.08)*	(20.98)*
	E3-E1	0.110	0.019	-0.037	-0.017	0.006	-0.019	-0.014	0.237	0.165	0.127	0.108	0.041	0.038	0.036
		(1.21)	(0.24)	(-0.55)	(-0.33)	(0.15)	(-0.52)	(-0.38)	(15.41)*	(16.09)*	(15.34)*	(13.41)*	(7.55)*	(5.65)*	(6.08)*
6 Mon	E1	0.042	0.186	0.135	0.102	0.112	0.090	0.084	-0.159	0.075	0.097	0.116	0.149	0.145	0.139
		(0.61)	(2.73)*	(2.89)*	(2.82)*	(4.70)*	(3.90)*	(3.89)*	(-5.03)	(3.28)	(5.17)	(6.88)	(17.55)	(20.34)	(21.21)
	E3	0.127	0.277	0.252	0.236	0.165	0.136	0.143	0.100	0.281	0.262	0.250	0.182	0.172	0.161
		(2.03)*	(4.82)*	(6.14)*	(6.14)*	(5.28)*	(5.00)*	(4.53)*	(3.06)*	(10.52)*	(11.78)*	(12.15)*	(19.37)*	(21.00)*	(22.47)*
	E3-E1	0.081	0.042	0.076	0.122	0.075	0.046	0.066	0.294	0.199	0.162	0.134	0.043	0.040	0.035
		(0.91)	(0.44)	(1.17)	(2.24)*	(1.83)*	(1.10)	(1.51)	(18.69)*	(20.20)*	(18.42)*	(17.25)*	(8.45)*	(9.00)*	(8.20)*
9 Mon	E1	-0.029	0.119	0.113	0.092	0.112	0.111	0.111	-0.155	0.064	0.091	0.115	0.150	0.147	0.140
		(-0.42)	(1.92)*	(2.25)*	(2.44)*	(3.55)*	(4.17)*	(3.80)*	(-4.87)*	(2.72)*	(4.72)*	(6.63)*	(16.86)*	(19.83)*	(20.58)*
	E3	0.084	0.254	0.222	0.223	0.144	0.117	0.108	0.109	0.293	0.270	0.251	0.182	0.173	0.164
		(1.31)	(4.66)*	(5.07)*	(6.24)*	(6.08)*	(6.04)*	(5.12)*	(3.37)*	(10.86)*	(11.41)*	(11.76)*	(19.04)*	(21.03)*	(21.96)*
	E3-E1	0.118	0.111	0.091	0.123	0.044	-0.009	-0.047	0.298	0.223	0.175	0.136	0.041	0.038	0.039
		(1.25)	(1.31)	(1.46)	(2.55)*	(1.21)	(-0.23)	(-0.97)	(17.78)*	(21.89)*	(20.43)*	(15.10)*	(7.06)*	(7.32)*	(6.70)*
12 Mon	E1	-0.072	0.045	0.055	0.079	0.113	0.110	0.107	-0.193	0.046	0.083	0.111	0.148	0.147	0.139
		(-1.15)	(0.89)	(1.12)	(1.94)*	(4.10)*	(4.17)*	(3.76)*	(-6.12)*	(1.97)*	(4.10)*	(6.03)*	(16.96)*	(18.88)*	(20.03)*
	E3	0.186	0.280	0.275	0.234	0.126	0.101	0.084	0.142	0.310	0.278	0.259	0.180	0.172	0.165
		(2.82)*	(4.90)*	(5.62)*	(6.29)*	(5.97)*	(5.03)*	(4.42)*	(4.38)*	(10.70)*	(11.48)*	(11.54)*	(18.67)*	(20.87)*	(21.96)*
	E3-E1	0.205	0.202	0.189	0.136	-0.003	-0.032	-0.037	0.390	0.258	0.191	0.148	0.041	0.037	0.043
		(2.98)*	(2.95)*	(2.71)*	(2.55)*	(-0.08)	(-0.83)	(-0.94)	(20.61)*	(22.13)*	(17.63)*	(14.87)*	(6.06)*	(5.90)*	(7.08)*

* Significant at the 10% level for a two-tailed T-test.

(2) Volume-Based Price and Earning Momentum Strategies

Table 4.8 presents returns for hotel and market momentum portfolios on the basis of a two-way model between past return and past trading volume. Several general empirical results are found. First, conditional on past returns R1 or R3, low volume stocks V1, tend to outperform stocks with high past trading volume V2, over the intermediate- and long-term holding periods. But this result is somewhat weak in the long-term for the hotel portfolio. This evidence is consistent with previous findings. This result from the market portfolio provides support for the liquidity hypothesis suggested by Lee and Swaminathan (2000), Campbell et al (1993), and Conrad et al (1994). Second, looking at each column of R3-R1 in Panel A for hotel stocks, both low and high volume momentum portfolios do not earn significant profits in the intermediate-term. Only in the long-term after three years, longer formation (K= 9 and 12 months) low volume hotel portfolios can earn significant negative momemtum profits. Meanwhile, for the market portfolio, we see that both high and low volume stocks tend to earn significant momentum profits over the intermediate and long-term (the momentum profits in long-term is significantly negative). Third, the cells crossed by column (R3-R1) and row (V2-V1) illustrate that the hotel price momentum portfolio with high past volume trading firms significantly outperforms that of low volume firms in the long-term. These results suggest that low volume stocks contribute more to reversal profits than high volume stocks. Interestingly, however, for the market portfolio, high volume stocks tend to contribute more to intermediate-term momentrum profits and long-term reversal profits. A probable explanation for high volume momentum portfolios underperforming low volume momentum portfolios for hotel stocks is that high volume hotel stocks are big size REITs which are less likely to overinvest because the dividend policy of REITs together with their more limited free cash flow, mitigate any tendency toward overinvestment in the hotel industry. Low volume hotel stocks are normally small firms which are associated with lower analyst followings and thus are more easily overreact to past return information and are prone to overinvestment in the long run.

Table 4.9 presents the results of volume-based earning momentum strategy. Some empirical results are reported below. First, conditional on past earnings news, for hotel portfolio, low volume stocks V1 tends to outperform stocks with high past trading volume V2 over the intermediate-term and 3-year horizon; however, over holding periods of 4-year and longer, high volume stocks V2 tends to outperform low volume

stocks V1. But for the market portfolio, low volume stocks tends to outperform high wolume stocks both in the intermediate-term and long-term. Second, at each column of (E3-E1) in market portfolio, we see both high volume V2 and low volume V1 momentum profits are positive in the intermediate- and long-term. This finding of is consistent with the earning underreaction hypothesis. It means the market stocks tend to gradually respond to prior earning news. Similar but weak result could also be found for the hotel portfolio over the intermediate-term.

Figure 4.3
Mean Profits for Hotel Stock and Market Price Momentum Strategy Portfolios Based on Past Return and Past Trading Volume

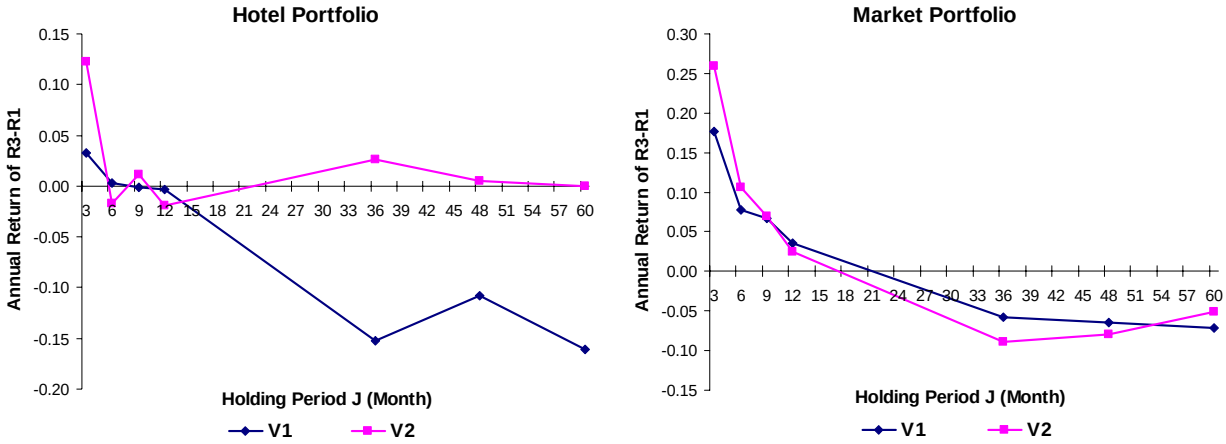

Figure 4.4
Mean Profits for Hotel Stock and Market Earning Momentum Strategy Portfolios Based on Past Earning and Past Trading Volume

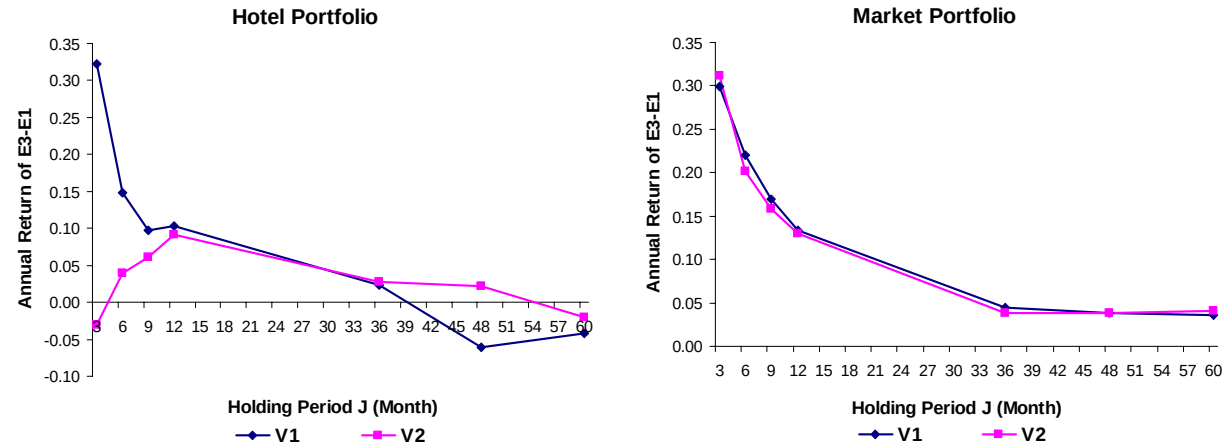

Table 4.8
Mean Annual Returns for Hotel Stock and Market Price Momentum Strategy Portfolios Based on Past Return and Past Trading Volume

This table reports the mean annual returns of hotel stocks and market price momentum strategy portfolios based on past return and past trading volume. The equal-weighted market portfolio includes all stocks traded on the NYSE, AMEX, and NASDAQ. The sample of the equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. At the beginning of each quarter starting from January 1990, all hotel stocks are sorted based on their previous one-quarter, two-quarter, three-quarter, or four-quarter return is divided into three equal-weighted portfolios. R1 represents the loser portfolio with the lowest returns in the low 33.3% of the sample pool, and R3 represents the winner portfolio with the highest returns in the upper 33.3% during the previous formation period. Combined portfolio R3-R1 represents that the portfolio longs the R3 portfolio and shorts the R1 portfolio at the same time. The holding period trading volume is divided into 2 equal-weighted groups. V1 represents the lowest trading volume portfolio, and V2 represents the highest trading volume portfolio. V2-V1 represents that the portfolio is long the V2 and short the V1 portfolio at the same time. Formation periods K are listed in the first column. All returns used in this study are geometric average annual return above the risk-free rate of return (30 days U.S. Treasury Bill rate of return). T statistics are shown in parentheses below the returns values. The sample period is January 1990 to December 2007.

Panel A: Hotel Portfolio

Portfolio	J = 3 Mon			J = 6 Mon			J = 9 Mon			J = 12 Mon			J = 36 Mon			J = 48 Mon			J = 60 Mon		
K	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1
3 Mon V1	0.017	-0.053	-0.094	0.114	0.107	-0.022	0.167	0.134	-0.048	0.155	0.140	-0.017	0.118	0.091	-0.029	0.104	0.103	-0.004	0.097	0.089	-0.034
	(0.21)	(-0.80)	(-0.92)	(1.82)*	(2.50)*	(-0.29)	(2.86)*	(2.25)*	(-0.61)	(2.97)*	(2.89)*	(-0.24)	(3.49)*	(3.43)*	(-0.61)	(3.26)*	(4.18)*	(-0.08)	(3.03)*	(3.57)*	(-0.67)
V2	-0.220	-0.089	0.114	0.043	0.087	0.043	0.063	0.115	0.040	0.055	0.136	0.045	0.116	0.134	0.031	0.134	0.114	0.003	0.135	0.091	-0.048
	(-1.91)*	(-0.94)	(0.83)	(0.58)	(0.87)	(0.40)	(1.14)	(1.34)	(0.46)	(1.13)	(2.27)*	(0.65)	(3.14)*	(4.40)*	(0.85)	(3.49)*	(4.06)*	(0.07)	(2.97)*	(3.46)*	(-0.65)
V2-V1	-0.235	-0.037	0.243	-0.078	-0.010	0.076	-0.115	-0.014	0.099	-0.097	-0.011	0.067	-0.003	0.052	0.032	0.048	0.038	-0.013	0.035	0.040	0.005
	(-2.07)	(-0.42)	(1.44)	(-1.06)	(-0.11)	(0.58)	(-1.59)	(-0.15)	(0.75)	(-1.44)	(-0.17)	(0.64)	(-0.07)	(1.38)	(0.56)	(0.96)	(1.11)	(-0.22)	(0.49)	(1.19)	(0.05)
6 Mon V1	-0.132	0.018	0.133	0.139	0.150	0.011	0.175	0.144	-0.008	0.162	0.151	0.010	0.148	0.121	-0.072	0.139	0.092	-0.131	0.147	0.091	-0.188
	(-1.44)	(0.27)	(1.28)	(1.93)*	(2.63)*	(0.12)	(2.48)*	(2.73)*	(-0.10)	(2.44)*	(3.26)*	(0.11)	(2.83)*	(3.67)*	(-0.97)	(3.10)*	(4.03)*	(-1.52)	(2.81)*	(3.97)*	(-1.43)
V2	-0.178	-0.110	0.127	0.100	0.060	-0.046	0.047	0.085	0.023	0.096	0.087	-0.026	0.110	0.141	0.017	0.106	0.124	-0.004	0.101	0.115	0.015
	(-1.48)	(-1.16)	(0.93)	(1.29)	(0.93)	(-0.61)	(0.83)	(1.63)*	(0.37)	(1.75)*	(1.87)*	(-0.47)	(3.03)*	(5.15)*	(0.40)	(2.86)*	(4.70)*	(-0.08)	(3.11)*	(4.14)*	(0.28)
V2-V1	-0.055	-0.063	0.003	-0.018	-0.067	-0.054	-0.067	-0.033	0.026	-0.022	-0.064	-0.047	-0.039	0.052	0.087	-0.049	0.068	0.104	-0.063	0.055	0.096
	(-0.43)	(-0.72)	(0.02)	(-0.25)	(-0.91)	(-0.51)	(-0.85)	(-0.55)	(0.25)	(-0.25)	(-1.02)	(-0.47)	(-0.56)	(1.35)	(1.22)	(-0.72)	(2.03)*	(1.44)	(-0.70)	(1.35)	(0.89)
9 Mon V1	0.020	0.032	0.021	0.212	0.171	0.003	0.182	0.152	0.028	0.191	0.147	0.009	0.192	0.099	-0.187	0.154	0.091	-0.165	0.175	0.086	-0.300
	(0.20)	(0.49)	(0.19)	(2.90)*	(3.56)*	(0.04)	(2.68)*	(3.24)*	(0.41)	(3.56)*	(3.95)*	(0.13)	(4.11)*	(4.32)*	(-2.22)*	(4.18)*	(3.91)*	(-2.10)*	(3.56)*	(3.52)*	(-1.78)*
V2	-0.154	-0.065	0.079	0.111	0.095	-0.076	0.089	0.096	-0.045	0.119	0.094	-0.077	0.117	0.130	0.006	0.107	0.108	-0.013	0.104	0.100	-0.020
	(-1.36)	(-0.69)	(0.64)	(1.38)	(1.62)	(-0.89)	(1.46)	(2.12)*	(-0.71)	(2.09)*	(2.31)*	(-1.37)	(3.26)*	(4.37)*	(0.14)	(2.85)*	(4.24)*	(-0.26)	(2.80)*	(3.71)*	(-0.34)
V2-V1	-0.088	-0.028	0.073	0.018	-0.043	-0.070	0.010	-0.048	-0.072	0.012	-0.058	-0.087	-0.096	0.062	0.150	-0.057	0.069	0.133	-0.117	0.052	0.102
	(-0.73)	(-0.32)	(0.54)	(0.18)	(-0.77)	(-0.68)	(0.12)	(-0.80)	(-0.82)	(0.16)	(-1.19)	(-1.04)	(-1.45)	(1.69)*	(2.09)*	(-0.95)	(2.36)*	(2.26)*	(-1.06)	(1.51)	(0.98)
12Mon V1	0.081	0.062	0.069	0.232	0.188	0.018	0.216	0.156	0.024	0.189	0.124	-0.014	0.222	0.058	-0.322	0.150	0.069	-0.133	0.185	0.080	-0.120
	(0.90)	(1.00)	(0.78)	(3.33)*	(3.89)*	(0.26)	(3.31)*	(3.65)*	(0.37)	(3.92)*	(3.30)*	(-0.27)	(4.59)*	(2.44)*	(-3.09)*	(3.70)*	(2.81)*	(-1.82)*	(3.79)*	(2.90)*	(-1.68)*
V2	-0.139	0.050	0.172	0.137	0.255	0.009	0.095	0.208	0.026	0.109	0.162	-0.020	0.078	0.129	0.052	0.098	0.113	0.035	0.071	0.094	0.054
	(-1.15)	(0.51)	(1.31)	(1.54)	(2.27)*	(0.11)	(1.40)	(2.17)*	(0.30)	(1.72)*	(2.90)*	(-0.26)	(2.58)*	(4.72)*	(1.59)	(3.14)*	(4.17)*	(0.84)	(3.15)*	(3.38)*	(1.50)
V2-V1	-0.108	-0.023	0.094	0.023	0.011	-0.017	-0.001	0.003	-0.005	0.020	0.010	-0.014	-0.206	0.091	0.202	-0.073	0.065	0.102	-0.748	0.026	0.125
	(-0.96)	(-0.28)	(0.66)	(0.24)	(0.13)	(-0.17)	(-0.01)	(0.04)	(-0.05)	(0.25)	(0.18)	(-0.16)	(-2.43)*	(2.45)*	(2.77)*	(-1.12)	(1.74)*	(1.55)	(-2.61)*	(0.60)	(1.81)*

Panel B: Market Portfolio

Portfolio		J = 3 Mon			J = 6 Mon			J = 9 Mon			J = 12 Mon			J = 36 Mon			J = 48 Mon			J = 60 Mon		
K		R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1
3 Mon	V1	-0.060	0.048	0.113	0.152	0.214	0.058	0.158	0.230	0.070	0.175	0.237	0.063	0.204	0.191	-0.018	0.197	0.178	-0.033	0.190	0.170	-0.042
		(-1.38)	(1.57)	(3.08)*	(4.61)*	(8.61)*	(2.38)*	(6.32)*	(10.15)*	(3.58)*	(7.69)*	(10.83)*	(3.06)*	(13.54)*	(16.09)*	(-1.21)	(14.05)*	(17.69)*	(-1.80)*	(14.51)*	(18.92)*	(-2.13)*
	V2	-0.226	-0.074	0.183	0.104	0.200	0.092	0.124	0.216	0.090	0.150	0.217	0.067	0.184	0.154	-0.043	0.173	0.146	-0.046	0.171	0.159	-0.023
		(-3.59)*	(-1.54)	(3.69)*	(2.19)*	(4.80)*	(3.36)*	(3.12)*	(6.05)*	(4.29)*	(4.23)*	(6.63)*	(3.27)*	(11.59)*	(12.11)*	(-3.00)*	(14.17)*	(14.61)*	(-3.19)*	(12.48)*	(11.43)*	(-1.06)
	V2-V1	-0.174	-0.118	0.065	-0.044	-0.012	0.032	-0.032	-0.013	0.020	-0.025	-0.020	0.005	-0.029	-0.054	-0.023	-0.042	-0.055	-0.011	-0.039	-0.020	0.016
		(-4.32)*	(-3.52)*	(2.39)*	(-1.48)	(-0.40)	(1.59)	(-1.20)	(-0.50)	(1.24)	(-1.07)	(-0.87)	(0.29)	(-2.19)*	(-4.80)*	(-1.70)*	(-3.99)*	(-4.67)*	(-0.81)	(-2.73)*	(-1.03)	(0.83)
6 Mon	V1	-0.085	0.080	0.176	0.147	0.241	0.088	0.162	0.255	0.090	0.189	0.242	0.054	0.214	0.184	-0.046	0.203	0.171	-0.058	0.196	0.169	-0.061
		(-1.85)*	(2.67)*	(3.83)8	(4.55)*	(9.90)*	(3.37)*	(6.08)*	(11.42)*	(3.55)*	(7.24)*	(10.79)*	(2.02)*	(13.38)*	(16.16)*	(-2.84)*	(13.40)*	(18.00)*	(-3.07)*	(14.00)*	(18.65)*	(-2.98)*
	V2	-0.253	-0.023	0.284	0.098	0.247	0.143	0.127	0.240	0.110	0.161	0.216	0.055	0.193	0.143	-0.073	0.179	0.140	-0.068	0.173	0.155	-0.037
		(-3.93)*	(-0.47)	(5.05)*	(2.05)*	(5.49)*	(5.71)*	(3.17)*	(6.21)*	(5.22)*	(4.36)*	(6.57)*	(2.69)*	(12.30)*	(10.98)*	(-4.19)*	(14.00)*	(12.87)*	(-3.96)*	(13.75)*	(11.04)*	(-1.65)*
	V2-V1	-0.180	-0.097	0.096	-0.046	0.006	0.053	-0.033	-0.014	0.019	-0.028	-0.026	0.002	-0.033	-0.059	-0.024	-0.043	-0.052	-0.008	-0.050	-0.027	0.019
		(-4.37)*	(-2.83)*	(4.26)*	(-1.54)	(0.17)	(3.38)*	(-1.36)	(-0.49)	(1.30)	(-1.30)	(-1.03)	(0.10)	(-2.23)*	(-4.51)*	(-1.71)*	(-3.69)*	(-3.92)*	(-0.60)	(-3.95)*	(-1.37)	(1.16)
9 Mon	V1	-0.084	0.110	0.206	0.157	0.261	0.097	0.174	0.249	0.072	0.205	0.232	0.027	0.225	0.175	-0.077	0.211	0.172	-0.072	0.203	0.170	-0.075
		(-1.84)*	(3.88)*	(4.62)*	(4.58)*	(10.93)*	(3.03)*	(5.80)*	(11.45)*	(2.39)*	(6.86)*	(11.88)*	(0.86)	(13.14)*	(16.42)*	(-3.64)*	(13.85)*	(16.89)*	(-3.24)*	(14.44)*	(14.95)*	(-3.01)*
	V2	-0.243	0.006	0.305	0.118	0.249	0.124	0.151	0.222	0.068	0.189	0.203	0.014	0.205	0.135	-0.107	0.187	0.136	-0.092	0.179	0.152	-0.056
		(-3.77)*	(0.14)	(5.29)*	(2.42)*	(5.65)*	(4.13)*	(3.61)*	(6.27)*	(2.43)*	(4.79)*	(6.83)*	(0.52)	(12.74)*	(10.94)*	(-5.72)*	(15.39)*	(13.65)*	(-5.12)*	(14.90)*	(10.78)*	(-2.24)*
	V2-V1	-0.171	-0.095	0.087	-0.036	-0.011	0.026	-0.022	-0.026	-0.004	-0.016	-0.029	-0.013	-0.031	-0.058	-0.025	-0.044	-0.062	-0.015	-0.052	-0.035	0.014
		(-4.06)*	(-2.80)*	(3.40)*	(-1.19)	(-0.31)	(1.55)	(-0.93)	(-0.97)	(-0.26)	(-0.74)	(-1.16)	(-0.79)	(-2.08)*	(-4.37)*	(-1.84)*	(-3.63)*	(-4.82)*	(-0.98)	(-4.36)*	(-2.18)*	(1.00)
12Mon	V1	-0.074	0.126	0.211	0.173	0.248	0.069	0.199	0.236	0.035	0.226	0.223	-0.003	0.231	0.174	-0.091	0.216	0.167	-0.095	0.208	0.164	-0.107
		(-1.61)	(4.49)*	(4.42)*	(4.80)*	(10.64)*	(2.02)*	(6.18)*	(11.81)*	(1.10)	(7.28)*	(12.12)*	(-0.10)	(13.28)*	(15.94)*	(-4.04)*	(13.28)*	(19.25)*	(-3.92)*	(13.83)*	(19.30)*	(-4.13)*
	V2	-0.224	-0.005	0.264	0.142	0.211	0.065	0.178	0.188	0.009	0.212	0.174	-0.038	0.209	0.123	-0.134	0.190	0.130	-0.110	0.184	0.144	-0.088
		(-3.46)*	(-0.10)	(4.82)*	(2.79)*	(5.02)*	(1.90)*	(4.05)*	(5.71)*	(0.30)	(5.15)*	(6.16)*	(-1.30)	(12.82)*	(10.08)*	(-6.66)*	(15.30)*	(13.34)*	(-5.35)*	(14.66)*	(10.98)*	(-3.43)*
	V2-V1	-0.160	-0.119	0.046	-0.028	-0.032	-0.004	-0.020	-0.045	-0.025	-0.014	-0.049	-0.035	-0.035	-0.073	-0.035	-0.049	-0.062	-0.011	-0.055	-0.040	0.012
		(-3.72)*	(-3.35)*	(2.02)*	(-0.97)	(-1.02)	(-0.26)	(-0.82)	(-1.73)*	(-1.64)*	(-0.63)	(-2.14)*	(-2.13)*	(-2.28)*	(-6.30)*	(-2.27)*	(-3.65)*	(-4.70)*	(-0.68)	(-3.48)*	(-2.29)*	(0.74)

* Significant at the 10% level for a two-tailed T-test.

Table 4.9
Mean Annual Returns for Hotel Stock and Market Earning Momentum Strategy Portfolios Based on Past Earning and Past Trading Volume

This table reports the mean annual returns of hotel stock and market earning momentum strategy portfolios based on past earning and past trading volume. The equal-weighted market portfolio includes all stocks traded on the NYSE, AMEX, and NASDAQ. The sample of equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. At the beginning of each quarter starting from January 1990, all hotel stocks are sorted based on there previous one-quarter, two-quarter, three-quarter, or four-quarter SUE (surprised unexpected earnings) is divided into three equal-weighted portfolios. E1 represents the portfolio with the most unfavorable earning surprise (SUE) in the low 33.3% of the sample pool, and E3 represents the portfolio that have delivered the most favorable earning surprises (SUE) in the upper 33.3% during the previous formation period. Combined portfolio E3-E1 represents that the portfolio is long the E3 portfolio and short the E1 portfolio at the same time. The holding period trading volume is divided into 2 equal-weighted groups. V1 represents the lowest trading volume portfolio, and V2 represents the highest trading volume portfolio. V2-V1 represents that the portfolio longs the V2 and shorts the V1 portfolio at the same time. Formation periods K are listed in the first column. All returns used in this study are geometric average annual return above the risk-free rate of return (30 days U.S. Treasury Bill rate of return). T statistics are shown in parentheses below the returns values. The sample period is January 1990 to December 2007.

Panel A: Hotel Portfolio

Portfolio	J = 3 Mon			J = 6 Mon			J = 9 Mon			J = 12 Mon			J = 36 Mon			J = 48 Mon			J = 60 Mon		
K	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1
3 Mon V1	-0.079	0.104	0.164	0.169	0.291	0.052	0.198	0.226	-0.032	0.206	0.191	-0.048	0.156	0.147	-0.016	0.129	0.085	-0.079	0.092	0.082	-0.053
	(-0.98)	(1.24)	(1.19)	(1.62)	(4.11)*	(0.36)	(2.33)*	(4.35)*	(-0.28)	(3.02)*	(4.33)*	(-0.52)	(4.72)*	(4.30)*	(-0.31)	(3.88)*	(3.26)*	(-1.49)	(4.18)*	(3.15)*	(-1.18)
V2	-0.025	0.073	-0.001	0.188	0.135	-0.055	0.171	0.127	-0.079	0.131	0.156	0.002	0.118	0.119	-0.007	0.124	0.124	-0.004	0.123	0.105	-0.006
	(-0.22)	(0.85)	(-0.01)	(2.80)*	(2.21)*	(-0.86)	(3.76)*	(2.32)*	(-1.37)	(3.34)*	(3.43)*	(0.04)	(2.85)*	(3.96)*	(-0.11)	(3.76)*	(3.93)*	(-0.08)	(3.24)*	(3.30)*	(-0.10)
V2-V1	0.075	-0.078	-0.155	-0.026	-0.121	-0.101	-0.044	-0.077	-0.029	-0.075	-0.024	0.056	-0.006	-0.024	-0.016	0.029	0.043	0.029	0.086	0.058	0.019
	(0.57)	(-0.88)	(-1.11)	(-0.19)	(-1.58)	(-0.69)	(-0.38)	(-1.05)	(-0.23)	(-0.82)	(-0.36)	(0.51)	(-0.08)	(-0.51)	(-0.19)	(0.55)	(1.02)	(0.34)	(1.43)	(1.06)	(0.16)
6 Mon V1	-0.074	0.262	0.361	0.133	0.449	0.198	0.160	0.362	0.133	0.133	0.333	0.170	0.153	0.191	0.084	0.115	0.137	-0.073	0.085	0.160	0.029
	(-0.79)	(2.86)*	(2.12)*	(1.14)	(4.85)*	(1.12)	(1.88)*	(6.02)*	(1.05)	(2.05)*	(5.35)*	(1.64)*	(3.84)*	(3.56)*	(0.97)	(2.82)*	(3.08)*	(-1.04)	(2.79)*	(2.94)*	(0.65)
V2	0.164	0.005	-0.152	0.238	0.126	-0.089	0.112	0.149	0.024	0.074	0.144	0.076	0.073	0.140	0.079	0.069	0.136	0.095	0.083	0.128	0.066
	(1.66)*	(0.06)	(-2.05)*	(3.39)*	(1.86)*	(-1.32)	(2.56)*	(2.75)*	(0.42)	(2.05)*	(3.26)*	(1.55)	(2.79)*	(4.19)*	(1.77)*	(2.76)*	(4.03)*	(2.27)*	(2.73)*	(3.60)*	(1.24)
V2-V1	0.343	-0.153	-0.405	0.078	-0.200	-0.264	-0.047	-0.159	-0.109	-0.050	-0.144	-0.103	-0.059	-0.054	-0.010	-0.012	0.012	0.130	0.019	-0.028	0.046
	(2.08)*	(-1.64)*	(-2.93)*	(0.50)	(-2.34)*	(-1.66)*	(-0.43)	(-2.14)*	(-0.83)	(-0.58)	(-2.15)*	(-0.89)	(-1.03)	(-0.68)	(-0.09)	(-0.27)	(0.19)	(1.70)*	(0.50)	(-0.34)	(0.45)
9 Mon V1	-0.138	0.192	0.404	0.126	0.281	0.122	0.146	0.219	0.048	0.136	0.237	0.095	0.112	0.158	0.034	0.096	0.107	-0.004	0.084	0.130	-0.013
	(-1.42)	(2.37)*	(2.35)*	(1.16)	(4.09)*	(0.80)	(1.65)*	(3.71)*	(0.39)	(2.08)*	(4.53)*	(0.95)	(2.81)*	(4.26)*	(0.62)	(3.13)*	(4.61)*	(-0.12)	(3.01)*	(4.52)*	(-0.29)
V2	0.098	-0.012	-0.109	0.112	0.230	0.088	0.081	0.226	0.111	0.049	0.209	0.157	0.112	0.131	0.013	0.121	0.125	-0.012	0.127	0.091	-0.115
	(1.03)	(-0.13)	(-1.35)	(1.91)*	(2.73)*	(1.33)	(1.67)*	(3.47)*	(1.85)*	(1.28)	(4.28)*	(3.37)*	(2.32)*	(4.35)*	(0.19)	(3.02)*	(4.22)*	(-0.19)	(2.90)*	(3.05)*	(-1.34)
V2-V1	0.340	-0.174	-0.419	-0.012	-0.060	-0.042	-0.053	-0.004	0.049	-0.094	-0.039	0.058	0.038	-0.004	-0.016	0.061	0.020	-0.014	0.094	-0.030	-0.094
	(1.93)*	(-2.26)*	(-3.11)*	(-0.08)	(-0.86)	(-0.27)	(-0.44)	(-0.06)	(0.33)	(-1.03)	(-0.62)	(0.48)	(0.42)	(-0.07)	(-0.14)	(1.10)	(0.39)	(-0.14)	(1.50)	(-0.45)	(-0.50)
12Mon V1	-0.100	0.219	0.358	0.059	0.259	0.222	0.077	0.269	0.243	0.110	0.244	0.197	0.141	0.128	-0.011	0.131	0.089	-0.089	0.109	0.064	-0.132
	(-1.12)	(2.53)*	(2.94)*	(0.70)	(3.87)*	(1.95)*	(0.85)	(4.39)*	(1.92)*	(1.46)	(4.62)*	(1.98)*	(3.36)*	(4.31)*	(-0.19)	(3.13)*	(3.23)*	(-1.27)	(2.54)*	(2.59)*	(-1.71)*
V2	-0.046	0.157	0.139	0.033	0.300	0.215	0.036	0.280	0.189	0.052	0.225	0.131	0.089	0.124	0.024	0.096	0.111	0.008	0.106	0.096	-0.027
	(-0.52)	(1.61)	(1.47)	(0.55)	(3.30)	(2.53)*	(0.76)	(3.71)*	(2.90)*	(1.35)	(4.28)*	(2.72)*	(2.44)*	(4.17)*	(0.55)	(2.79)*	(3.85)*	(0.18)	(2.76)*	(3.61)*	(-0.49)
V2-V1	0.060	-0.101	-0.107	-0.032	0.002	0.040	-0.025	-0.044	-0.029	-0.033	-0.074	-0.058	-0.076	-0.014	0.075	-0.033	0.010	0.077	0.070	0.090	0.027
	(0.49)	(-1.02)	(-0.70)	(-0.31)	(0.02)	(0.26)	(-0.23)	(-0.54)	(-0.19)	(-0.38)	(-1.09)	(-0.49)	(-1.30)	(-0.39)	(0.91)	(-0.64)	(0.22)	(0.86)	(1.40)	(2.31)*	(0.23)

Panel B: Market Portfolio

Portfolio		J = 3 Mon			J = 6 Mon			J = 9 Mon			J = 12 Mon			J = 36 Mon			J = 48 Mon			J = 60 Mon		
K		E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1
3 Mon	V1	-0.074	0.126	0.212	0.096	0.268	0.164	0.121	0.255	0.130	0.136	0.247	0.111	0.164	0.196	0.042	0.162	0.185	0.035	0.155	0.175	0.034
		(-2.36)*	(3.83)*	(15.70)*	(4.54)*	(10.14)*	(16.76)*	(7.09)*	(11.59)*	(14.84)*	(9.10)*	(12.01)*	(11.25)*	(16.07)*	(16.30)*	(8.96)*	(17.39)*	(17.58)*	(7.13)*	(19.11)*	(18.03)*	(6.72)*
	V2	-0.236	-0.020	0.262	0.059	0.230	0.166	0.089	0.216	0.125	0.107	0.212	0.106	0.134	0.165	0.040	0.130	0.158	0.040	0.124	0.148	0.037
		(-4.44)*	(-0.36)	(12.49)*	(1.45)	(5.08)*	(11.28)*	(2.54)*	(5.83)*	(11.04)*	(3.36)*	(6.30)*	(9.60)*	(10.02)*	(11.03)*	(4.31)*	(11.67)*	(11.76)*	(3.33)*	(14.05)*	(12.46)*	(3.63)*
	V2-V1	-0.172	-0.134	0.043	-0.035	-0.033	0.002	-0.031	-0.036	-0.005	-0.030	-0.035	-0.005	-0.042	-0.045	-0.002	-0.052	-0.045	0.006	-0.060	-0.054	0.004
		(-4.21)*	(-3.45)*	(2.72)*	(-1.11)	(-1.07)	(0.15)	(-1.14)	(-1.35)	(-0.41)	(-1.15)	(-1.43)	(-0.38)	(-3.93)*	(-3.60)*	(-0.21)	(-5.82)*	(-3.65)*	(0.44)	(-6.76)*	(-4.22)*	(0.37)
6 Mon	V1	-0.079	0.180	0.275	0.091	0.304	0.204	0.110	0.283	0.169	0.129	0.263	0.134	0.164	0.200	0.048	0.161	0.188	0.041	0.155	0.175	0.034
		(-2.61)*	(5.75)*	(22.91)*	(4.42)*	(11.99)*	(22.87)*	(6.51)*	(13.24)*	(19.22)*	(8.26)*	(13.31)*	(15.67)*	(15.20)*	(16.93)*	(9.23)*	(16.35)*	(17.91)*	(6.50)*	(17.45)*	(18.29)*	(5.74)*
	V2	-0.234	0.025	0.314	0.059	0.257	0.193	0.084	0.242	0.155	0.103	0.236	0.133	0.134	0.164	0.038	0.128	0.154	0.038	0.123	0.147	0.036
		(-4.38)*	(0.44)	(13.32)*	(1.44)	(5.50)*	(13.73)*	(2.50)*	(6.19)*	(12.82)*	(3.44)*	(6.54)*	(12.74)*	(10.26)*	(11.30)*	(4.96)*	(12.84)*	(12.53)*	(5.43)*	(13.19)*	(14.03)*	(5.21)*
	V2-V1	-0.165	-0.137	0.032	-0.031	-0.041	-0.010	-0.026	-0.039	-0.014	-0.026	-0.027	-0.001	-0.041	-0.053	-0.011	-0.054	-0.059	-0.004	-0.060	-0.057	0.002
		(-3.85)*	(-3.37)*	(1.76)*	(-0.99)	(-1.23)	(-0.77)	(-0.96)	(-1.42)	(-1.20)	(-1.09)	(-1.05)	(-0.12)	(-3.52)*	(-4.68)*	(-1.26)	(-6.58)*	(-5.28)*	(-0.41)	(-5.89)*	(-5.39)*	(0.22)
9 Mon	V1	-0.081	0.200	0.298	0.069	0.322	0.244	0.101	0.289	0.184	0.125	0.266	0.142	0.165	0.198	0.044	0.163	0.189	0.040	0.155	0.178	0.039
		(-2.73)*	(6.51)*	(23.31)*	(3.41)*	(12.66)*	(23.96)*	(5.85)*	(13.24)*	(18.95)*	(7.75)*	(13.40)*	(16.64)*	(14.90)*	(17.37)*	(7.11)*	(16.01)*	(18.53)*	(5.35)*	(17.46)*	(19.02)*	(6.21)*
	V2	-0.226	0.023	0.299	0.058	0.265	0.202	0.080	0.250	0.167	0.105	0.236	0.131	0.135	0.165	0.038	0.130	0.156	0.036	0.124	0.149	0.039
		(-4.12)*	(0.42)	(12.00)*	(1.37)	(5.59)*	(14.52)*	(2.34)*	(5.97)*	(14.04)*	(3.42)*	(6.24)*	(9.71)*	(9.71)*	(10.81)*	(4.02)*	(12.42)*	(12.25)*	(4.18)*	(12.39)*	(13.01)*	(4.19)*
	V2-V1	-0.155	-0.154	0.001	-0.011	-0.049	-0.038	-0.020	-0.036	-0.017	-0.020	-0.030	-0.011	-0.042	-0.049	-0.007	-0.053	-0.057	-0.004	-0.060	-0.059	0.000
		(-3.45)*	(-3.96)*	(0.03)	(-0.34)	(-1.50)	(-3.01)*	(-0.74)	(-1.16)	(-1.28)	(-0.81)	(-1.07)	(-0.81)	(-3.47)*	(-3.71)*	(-0.57)	(-5.99)*	(-4.83)*	(-0.30)	(-5.69)*	(-5.08)*	(0.02)
12Mon	V1	-0.132	0.239	0.410	0.055	0.332	0.270	0.094	0.294	0.197	0.121	0.268	0.147	0.163	0.198	0.046	0.163	0.187	0.036	0.157	0.178	0.037
		(-4.37)*	(8.17)*	(22.75)*	(2.51)*	(12.85)*	(23.04)*	(5.08)*	(13.48)*	(18.31)*	(6.99)*	(13.76)*	(15.58)*	(14.11)*	(17.75)*	(7.74)*	(15.16)*	(18.39)*	(5.27)*	(16.93)*	(19.11)*	(5.01)*
	V2	-0.251	0.051	0.371	0.037	0.288	0.247	0.073	0.263	0.186	0.101	0.250	0.149	0.133	0.161	0.036	0.130	0.156	0.037	0.119	0.151	0.049
		(-4.65)*	(0.91)	(15.29)*	(0.90)	(5.57)*	(15.53)*	(2.01)*	(6.06)*	(12.74)*	(3.11)*	(6.17)*	(10.80*)	(10.23)*	(10.32)*	(3.34)*	(11.86)*	(12.17)*	(4.53)*	(12.20)*	(12.96)*	(5.77)*
	V2-V1	-0.133	-0.160	-0.030	-0.017	-0.038	-0.020	-0.020	-0.030	-0.010	-0.020	-0.018	0.002	-0.041	-0.054	-0.011	-0.054	-0.053	0.001	-0.072	-0.054	0.013
		(-2.95)*	(-3.80)*	(-1.73)*	(-0.55)	(-0.98)	(-1.42)	(-0.71)	(-0.87)	(-0.72)	(-0.78)	(-0.55)	(0.15)	(-3.11)*	(-3.88)*	(-1.01)	(-5.62)*	(-4.79)*	(0.09)	(-6.49)*	(-3.91)*	(1.24)

* Significant at the 10% level for a two-tailed T-test.

(3) Size-Based Price and Earning Momentum Strategies

Table 4.10 presents returns for hotel and market momentum portfolios on the basis of a two-way model between past return and firm size.

Several key results emerge from this table. First, conditional on past returns for the hotel portfolio, the big firms tend to earn the highest significant positive returns in the intermediate- and long-term. The result is consistent with the findings of Jegadeesh and Titman (1993, 2001) that return reversals in long-term (36 month to 60 month) for small firms are stronger. The result for the market portfolio is different, small firms C1 tend to outperform big firms C2 over all holding periods except 3-month period. Second, the columns R3-R1 indicate that for the market portfolios, we see both big and small firms earning significant momentum or reversal (negative momentum) profits over the intermediate and long-term. However, for hotel portfolio the significance and magnitude of the intermediate-term momentum profits and long-term reversal momentum profits are less than their market counterparts. Third, the cells crossed by column (R3-R1) and row (C2-C1) illustrate that hotel price momentum portfolios of small firms outperform that of big firms over all intermediate- and long-term holding periods. Whereas for the overall market portfolio, price momentum portfolios of big firms significantly outperforms that of small firms over all holding periods except for a portfolio based on past three-month returns. It strongly suggests that firm size is a valuable variable to predict the profitability of price momentum portfolios. Thus, we cannot reject hypothesis that the magnitude of the profit of intermediate-term momentum (or contrarian) price strategies for big hotel firms is higher than small hotel firms. It also implies that we should be very cautious when trying to generalize the results from the whole stock market to a special industry.

Table 4.11 presents the results of size-based earning momentum strategy. Some empirical results are reported as followings. First, focusing on the firm size, we do not find the highest rewarding portfolio for hotel stocks. However, for the market portfolio, the small firms tend to outperform big firm portfolios over both intermediate and long-term holding periods except 3-month period. Second, at each column of E3-E1 in Panel A, we see that some hotel firms' momentum profits are significantly positive over the intermediate-term holding period and across formation periods of 6-month, 9-month, and 12-month cases. In Panel B, the market momentum portfolio can earn significant positive momentum profits over the intermediate and long-term holding periods and

across all formation periods. This finding of earning momentum in the long-term is highly consistent with the earning underreaction hypothesis. Finally, the cells crossed by column (E3-E1) and row (C2-C1) indicates that price momentum portfolio of small firms tends to significantly outperform that of big firms over all holding periods for both the hotel and market portfolio, except in the formation period of the 3-month case for hotel earning momentum portfolios.

Figure 4.5

Mean Profits for Hotel Stock and Market Price Momentum Strategy Portfolios Based on Past Return and Firm Size

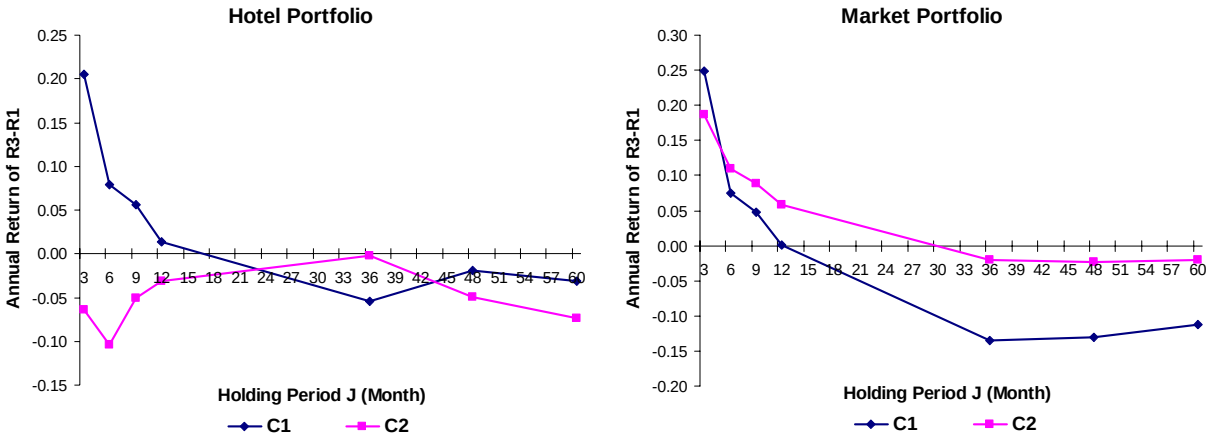

Figure 4.6

Mean Profits for Hotel Stock and Market Earning Momentum Strategy Portfolios Based on Past Earning and Firm Size

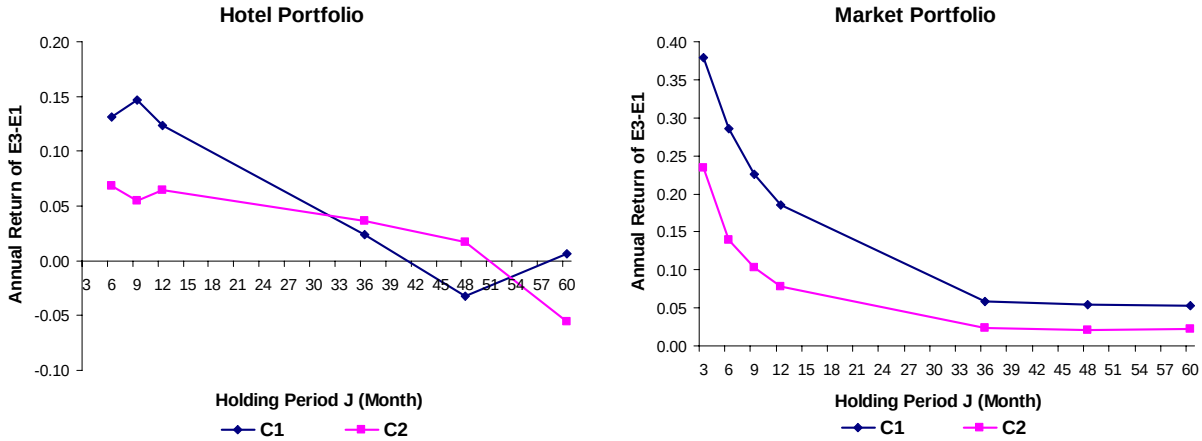

Table 4.10
Mean Annual Returns for Hotel Stock and Market Price Momentum Strategy Portfolios Based on Past Return and Firm Size

This table reports the mean annual returns of hotel stock and market price momentum strategy portfolios based on past return and firm size. The equal-weighted market portfolio includes all stocks traded on the NYSE, AMEX, and NASDAQ. The sample of equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. At the beginning of each quarter starting from January 1990, all hotel stocks are sorted based on their previous formation period return is divided into three equal-weighted portfolios. R1 represents the loser portfolio with the lowest returns in the low 33.3% of the sample pool, and R3 represents the winner portfolio with the highest returns in the upper 33.3% during the previous formation period. Combined portfolio R3-R1 represents that the portfolio longs the R3 portfolio and shorts the R1 portfolio at the same time. The firm size is divided into 2 equal-weighted groups. C1 represents the smallest firm size portfolio, and C2 represents the largest firm size portfolio. C2-C1 represents that the portfolio is long the C2 and short the C1 portfolio at the same time. Formation periods K are listed in the first column. All returns used in this study are geometric average annual return above the risk-free rate of return (30 days U.S. Treasury Bill rate of return). T statistics are shown in parentheses below the returns values. The sample period is January 1990 to December 2007.

Panel A: Hotel Portfolio

Portfolio		J = 3 Mon			J = 6 Mon			J = 9 Mon			J = 12 Mon			J = 36 Mon			J = 48 Mon			J = 60 Mon		
K		R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1
3 Mon	C1	-0.204	-0.163	0.104	0.000	0.087	0.113	0.078	0.138	0.082	0.069	0.140	0.076	0.095	0.088	0.018	0.092	0.091	0.020	0.070	0.070	0.028
		(-1.94)*	(-1.69)*	(0.67)	(0.00)	(0.88)	(1.02)	(1.25)	(1.44)	(0.88)	(1.22)	(2.07)*	(0.98)	(2.62)*	(2.65)*	(0.36)	(2.64)*	(3.28)*	(0.41)	(2.20)*	(2.55)*	(0.65)
	C2	0.001	0.032	0.023	0.169	0.107	-0.078	0.151	0.110	-0.045	0.142	0.136	-0.014	0.142	0.134	-0.011	0.148	0.122	-0.031	0.158	0.106	-0.103
		(0.01)	(0.55)	(0.26)	(2.55)*	(2.47)*	(-1.30)	(3.27)*	(2.99)*	(-1.09)	(3.57)*	(3.94)*	(-0.34)	(4.13)*	(5.49)*	(-0.25)	(4.09)*	(4.87)*	(-0.62)	(3.52)*	(4.44)*	(-1.18)
	C2-C1	0.265	0.150	-0.086	0.201	-0.004	-0.174	0.076	-0.050	-0.135	0.084	-0.005	-0.092	0.044	0.043	-0.023	0.092	0.041	-0.031	0.090	0.034	-0.092
		(2.13)*	(1.45)	(-0.59)	(2.64)*	(-0.04)	(-1.58)	(1.21)	(-0.65)	(-1.43)	(1.50)	(-0.08)	(-1.10)	(0.78)	(1.06)	(-0.29)	(1.82)*	(1.18)	(-0.44)	(1.28)	(0.96)	(-0.77)
6 Mon	C1	-0.280	-0.142	0.257	0.030	0.078	0.058	0.035	0.098	0.080	0.082	0.106	0.049	0.137	0.122	0.007	0.119	0.081	-0.041	0.115	0.062	-0.028
		(-2.80)*	(-1.44)	(1.64)*	(0.39)	(1.02)	(0.57)	(0.53)	(1.48)	(0.85)	(1.25)	(1.78)*	(0.54)	(2.82)*	(3.22)*	(0.10)	(2.70)*	(3.28)*	(-0.63)	(2.34)*	(2.37)*	(-0.46)
	C2	0.050	0.054	-0.029	0.247	0.131	-0.119	0.198	0.131	-0.058	0.185	0.132	-0.062	0.116	0.139	0.000	0.124	0.130	-0.022	0.131	0.130	-0.043
		(0.40)	(0.91)	(-0.31)	(3.50)*	(3.21)*	(-1.86)*	(3.82)*	(3.76)*	(-1.10)	(4.06)*	(4.46)*	(-1.33)	(3.37)*	(5.99)*	(0.01)	(3.58)*	(5.40)*	(-0.44)	(3.85)*	(5.48)*	(-0.70)
	C2-C1	0.411	0.105	-0.234	0.210	0.015	-0.143	0.129	-0.001	-0.130	0.096	-0.009	-0.081	0.025	0.020	-0.037	0.063	0.060	-0.020	0.080	0.073	-0.239
		(2.71)*	(0.98)	(-1.52)	(2.20)*	(0.20)	(-1.22)	(1.72)*	(-0.02)	(-1.16)	(1.52)	(-0.14)	(-0.85)	(0.75)	(0.37)	(-0.47)	(1.88)*	(1.65)*	(-0.30)	(2.04)*	(1.89)*	(-1.76)*
9 Mon	C1	-0.239	-0.084	0.174	0.046	0.119	0.032	0.064	0.108	0.018	0.120	0.093	-0.055	0.149	0.066	-0.142	0.101	0.057	-0.055	0.113	0.041	-0.121
		(-2.37)*	(-0.80)	(1.24)	(0.64)	(1.81)*	(0.38)	(1.02)	(1.85)*	(0.23)	(2.10)*	(1.92)*	(-0.74)	(3.19)*	(2.29)*	(-1.95)*	(2.72)*	(2.02)*	(-0.81)	(2.41)*	(1.37)	(-1.08)
	C2	0.184	0.048	-0.135	0.316	0.147	-0.145	0.223	0.139	-0.074	0.191	0.147	-0.057	0.159	0.151	-0.002	0.161	0.131	-0.078	0.166	0.126	-0.113
		(1.56)	(0.96)	(-1.59)	(3.70)*	(3.63)*	(-2.08)*	(3.52)*	(4.15)*	(-1.51)	(3.71)*	(4.97)*	(-1.30)	(5.06)*	(6.30)*	(-0.05)	(4.29)*	(6.39)*	(-1.33)	(4.29)*	(5.81)*	(-1.49)
	C2-C1	0.496	0.115	-0.261	0.202	0.033	-0.157	0.104	0.027	-0.094	0.048	0.049	-0.016	0.002	0.101	0.099	0.096	0.081	-0.013	0.073	0.082	0.032
		(3.37)*	(1.25)	(-1.99)*	(2.59)*	(0.57)	(-1.77)*	(1.70)*	(0.57)	(-1.14)	(0.85)	(1.13)	(-0.18)	(0.04)	(2.91)*	(1.75)*	(2.29)*	(2.51)*	(-0.20)	(0.95)	(2.13)*	(0.31)
12Mon	C1	-0.208	0.060	0.284	0.109	0.301	0.111	0.111	0.223	0.044	0.134	0.138	-0.016	0.155	0.049	-0.101	0.097	0.055	-0.002	0.113	0.052	-0.005
		(-1.96)*	(0.58)	(2.01)*	(1.32)	(2.56)*	(1.00)	(1.66)*	(2.20)*	(0.48)	(2.17)*	(2.16)*	(-0.19)	(3.34)*	(1.85)*	(-1.60)	(2.89)*	(1.97)*	(-0.04)	(2.61)*	(1.65)*	(-0.13)
	C2	0.220	0.052	-0.113	0.278	0.149	-0.073	0.202	0.143	-0.026	0.159	0.147	0.006	0.145	0.131	0.005	0.154	0.119	-0.068	0.143	0.112	-0.037
		(1.87)*	(1.00)	(-1.18)	(3.44)*	(3.73)*	(-1.09)	(3.13)*	(4.47)*	(-0.49)	(3.31)*	(5.38)*	(0.13)	(4.59)*	(5.30)*	(0.12)	(4.03)*	(4.99)*	(-1.24)	(4.39)*	(4.61)*	(-0.74)
	C2-C1	0.432	-0.014	-0.326	0.118	-0.081	-0.183	0.031	-0.028	-0.066	0.013	0.027	-0.002	0.019	0.100	0.059	0.101	0.067	-0.054	0.032	0.038	-0.053
		(2.92)*	(-0.15)	(-2.25)*	(1.45)	(-0.93)	(-1.43)	(0.48)	(-0.36)	(-0.64)	(0.22)	(0.44)	(-0.03)	(0.40)	(2.74)*	(0.91)	(2.51)*	(1.92)*	(-0.82)	(0.65)	(0.90)	(-0.57)

Panel B: Market Portfolio

Portfolio		J = 3 Mon			J = 6 Mon			J = 9 Mon			J = 12 Mon			J = 36 Mon			J = 48 Mon			J = 60 Mon		
K		R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1	R1	R3	R3-R1
3 Mon	C1	-0.211	-0.069	0.169	0.180	0.249	0.064	0.198	0.269	0.068	0.226	0.278	0.052	0.239	0.198	-0.065	0.220	0.180	-0.078	0.212	0.185	-0.062
		(-3.48)*	(-1.50)	(3.82)*	(3.57)*	(5.90)*	(2.51)*	(4.81)*	(7.24)*	(3.53)*	(6.10)*	(8.07)*	(2.59)*	(14.01)*	(13.99)*	(-3.76)*	(15.34)*	(16.04)*	(-3.89)*	(14.46)*	(13.85)*	(-2.54)*
	C2	-0.077	0.042	0.127	0.077	0.166	0.086	0.085	0.178	0.092	0.099	0.176	0.077	0.145	0.146	0.002	0.147	0.143	-0.006	0.145	0.142	-0.006
		(-1.61)	(1.24)	(2.97)*	(2.67)*	(6.89)*	(3.30)*	(3.81)*	(8.94)*	(4.41)*	(5.31)*	(9.72)*	(3.95)*	(13.09)*	(15.53)*	(0.16)	(15.05)*	(17.22)*	(-0.39)	(15.26)*	(17.22)*	(-0.35)
	C2-C1	0.160	0.117	-0.038	-0.094	-0.074	0.021	-0.108	-0.085	0.024	-0.127	-0.102	0.025	-0.157	-0.076	0.059	-0.153	-0.064	0.058	-0.186	-0.097	0.045
		(3.40)*	(3.33)*	(-1.49)	(-2.40)*	(-2.60)*	(1.09)	(-3.17)*	(-2.90)*	(1.59)	(-3.84)*	(-3.56)*	(2.07)*	(-6.60)*	(-4.74)*	(4.30)*	(-6.21)*	(-4.58)*	(4.10)*	(-6.21)*	(-4.75)*	(2.54)*
6 Mon	C1	-0.231	-0.002	0.277	0.177	0.295	0.109	0.207	0.302	0.091	0.244	0.280	0.036	0.251	0.181	-0.116	0.227	0.169	-0.119	0.218	0.179	-0.097
		(-3.78)*	(-0.05)	(5.34)*	(3.53)*	(6.53)*	(4.44)*	(4.96)*	(7.62)*	(4.18)*	(6.24)*	(7.94)*	(1.50)	(14.43)*	(12.73)*	(-5.90)*	(14.63)*	(14.14)*	(-5.21)*	(14.88)*	(13.17)*	(-3.56)*
	C2	-0.109	0.058	0.182	0.068	0.194	0.121	0.083	0.193	0.109	0.106	0.179	0.073	0.153	0.145	-0.010	0.152	0.142	-0.015	0.149	0.143	-0.009
		(-2.12)*	(1.73)*	(3.53)*	(2.38)*	(8.09)*	(4.36)*	(3.54)*	(9.74)*	(4.33)*	(5.02)*	(10.16)*	(3.15)*	(13.38)*	(15.09)*	(-0.69)	(14.97)*	(17.92)*	(-1.07)	(15.88)*	(16.74)*	(-0.53)
	C2-C1	0.148	0.060	-0.079	-0.100	-0.089	0.012	-0.118	-0.101	0.017	-0.138	-0.101	0.037	-0.168	-0.051	0.086	-0.161	-0.044	0.075	-0.202	-0.075	0.063
		(3.20)*	(1.87)*	(-3.11)*	(-2.54)*	(-2.82)*	(0.60)	(-3.54)*	(-3.29)*	(1.08)	(-4.18)*	(-3.33)*	(2.58)*	(-6.96)*	(-3.61)*	(7.23)*	(-6.24)*	(-3.21)*	(5.69)*	(-6.36)*	(-3.82)*	(3.98)*
9 Mon	C1	-0.216	0.025	0.287	0.204	0.306	0.093	0.235	0.284	0.047	0.275	0.261	-0.014	0.261	0.167	-0.165	0.234	0.166	-0.147	0.222	0.179	-0.114
		(-3.58)*	(0.54)	(5.90)*	(3.95)*	(6.95)*	(2.97)*	(5.33)*	(7.82)*	(1.60)	(6.52)*	(8.48)*	(-0.46)	(14.71)*	(12.65)*	(-7.15)*	(15.92)*	(14.16)*	(-5.87)*	(15.82)*	(11.79)*	(-3.32)*
	C2	-0.114	0.090	0.223	0.073	0.205	0.128	0.092	0.187	0.093	0.119	0.173	0.054	0.165	0.143	-0.029	0.160	0.142	-0.028	0.156	0.143	-0.025
		(-2.18)*	(2.90)*	(4.04)*	(2.45)*	(8.55)*	(3.98)*	(3.56)*	(9.56)*	(3.21)*	(4.93)*	(10.23)*	(1.96)*	(12.74)*	(14.80)*	(-1.63)	(14.82)*	(17.19)*	(-1.62)	(15.88)*	(16.30)*	(-1.28)
	C2-C1	0.122	0.064	-0.053	-0.120	-0.088	0.034	-0.136	-0.091	0.046	-0.156	-0.088	0.068	-0.170	-0.033	0.100	-0.163	-0.039	0.081	-0.196	-0.076	0.060
		(2.43)*	(1.97)*	(-1.79)*	(-2.91)*	(-2.96)*	(1.59)	(-3.87)*	(-3.26)*	(2.90)*	(-4.50)*	(-3.36)*	(4.42)*	(-6.82)*	(-2.86)*	(7.67)*	(-6.47)*	(-2.77)*	(5.21)*	(-6.53)*	(-2.96)*	(3.04)*
12Mon	C1	-0.190	0.032	0.259	0.235	0.272	0.034	0.267	0.249	-0.017	0.300	0.232	-0.069	0.265	0.157	-0.194	0.235	0.156	-0.179	0.226	0.165	-0.178
		(-3.16)*	(0.67)	(5.45)*	(4.31)*	(6.46)*	(0.94)	(5.75)*	(7.41)*	(-0.52)	(6.86)*	(7.92)*	(-2.09)*	(14.34)*	(11.57)*	(-7.56)*	(15.17)*	(15.26)*	(-6.63)*	(15.10)*	(12.97)*	(-5.27)*
	C2	-0.111	0.087	0.216	0.083	0.187	0.101	0.112	0.175	0.062	0.138	0.165	0.027	0.172	0.142	-0.043	0.167	0.142	-0.042	0.163	0.143	-0.038
		(-2.08)*	(2.71)*	(3.75)*	(2.70)*	(8.00)*	(2.91)*	(4.06)*	(9.31)*	(2.01)*	(5.45)*	(10.06)*	(0.95)	(13.52)*	(14.43)*	(-2.40)*	(14.16)*	(16.65)*	(-2.22)*	(15.26)*	(16.74)*	(-1.85)*
	C2-C1	0.092	0.054	-0.036	-0.136	-0.075	0.066	-0.146	-0.070	0.079	-0.163	-0.067	0.096	-0.162	-0.020	0.106	-0.148	-0.022	0.086	-0.189	-0.044	0.077
		(1.89)*	(1.70)*	(-1.12)	(-3.21)*	(-2.64)*	(2.77)*	(-4.15)*	(-2.74)*	(4.23)*	(-4.61)*	(-2.68)*	(5.50)*	(-6.79)*	(-1.60)	(7.68)*	(-6.36)*	(-2.09)*	(6.39)*	(-6.28)*	(-2.64)*	(5.04)*

* Significant at the 10% level for a two-tailed T-test.

Table 4.11
Mean Annual Returns for Hotel Stock and Market Earning Momentum Strategy Portfolios Based on Past Earning and Firm Size

This table reports the mean annual returns of hotel stock and market earning momentum strategy portfolios based on past return and firm size. The equal-weighted market portfolio includes all stocks traded on the NYSE, AMEX, and NASDAQ. The sample of equal-weighted hotel stock portfolio includes all hotel stocks traded on the NYSE, AMEX, and NASDAQ. At the beginning of each quarter starting from January 1990, all hotel stocks are sorted based on there previous one-quarter, two-quarter, three-quarter, or four-quarter SUE (surprised unexpected earnings) is divided into three equal-weighted portfolios. E1 represents the portfolio with the most unfavorable earning surprise (SUE) in the low 33.3% of the sample pool, and E3 represents the portfolio that have delivered the most favorable earning surprises (SUE) in the upper 33.3% during the previous formation period. Combined portfolio E3-E1 represents that the portfolio longs the E3 portfolio and shorts the E1 portfolio at the same time. The firm size is divided into two equal-weighted groups. C1 represents the smallest firm size portfolio, and C2 represents the largest firm size portfolio. C2-C1 represents that the portfolio is long the C2 and short the C1 portfolio at the same time. Formation periods K are listed in the first column. All returns used in this study are geometric average annual return above the risk-free rate of return (30 days U.S. Treasury Bill rate of return). T statistics are shown in parentheses below the returns values. The sample period is January 1990 to December 2007.

Panel A: Hotel Portfolio

Portfolio	J = 3 Mon			J = 6 Mon			J = 9 Mon			J = 12 Mon			J = 36 Mon			J = 48 Mon			J = 60 Mon		
K	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1
3 Mon C1	-0.157	0.084	0.222	0.208	0.216	0.006	0.202	0.183	-0.035	0.197	0.178	-0.073	0.119	0.114	0.010	0.104	0.064	-0.062	0.058	0.045	-0.015
	(-1.39)	(0.86)	(1.40)	(1.84)*	(2.69)*	(0.04)	(2.32)*	(2.78)*	(-0.27)	(2.84)*	(3.13)*	(-0.73)	(3.36)*	(2.80)*	(0.15)	(2.93)*	(1.89)*	(-0.96)	(2.31)*	(1.55)	(-0.28)
C2	0.068	0.094	-0.005	0.149	0.218	0.031	0.166	0.176	-0.026	0.136	0.173	0.003	0.151	0.148*	0.010	0.143	0.137	-0.019	0.150	0.127	-0.046
	(0.91)	(1.29)	(-0.07)	(3.20)*	(3.97)*	(0.62)	(4.46)*	(4.27)*	(-0.57)	(4.28)*	(5.22)*	(0.08)	(3.84)*	(5.81)	(0.22)	(4.54)*	(5.19)*	(-0.38)	(4.10)*	(4.30)*	(-0.70)
C2-C1	0.230	-0.006	-0.201	-0.090	-0.059	0.030	-0.057	-0.047	0.008	-0.075	-0.031	0.070	0.018	0.011	-0.043	0.029	0.043	-0.023	0.078	0.082	-0.049
	(1.80)*	(-0.06)	(-1.44)	(-0.67)	(-0.70)	(0.18)	(-0.50)	(-0.67)	(0.06)	(-0.78)	(-0.46)	(0.62)	(0.35)	(0.26)	(-0.51)	(0.55)	(1.37)	(-0.22)	(1.62)	(2.12)*	(-0.32)
6 Mon C1	-0.046	0.063	0.199	0.174	0.283	0.102	0.106	0.258	0.182	0.080	0.243	0.201	0.102	0.142	0.029	0.082	0.095	-0.058	0.044	0.125	0.022
	(-0.40)	(0.62)	(1.67)*	(1.39)	(2.83)*	(0.57)	(1.26)	(3.66)*	(1.66)*	(1.24)	(3.50)*	(1.82)*	(2.52)*	(2.34)*	(0.53)	(2.08)*	(2.01)*	(-0.95)	(1.51)	(2.27)*	(0.39)
C2	0.138	0.190	0.011	0.198	0.270	0.020	0.165	0.246	0.081	0.126	0.229	0.094	0.121	0.184	0.079	0.097	0.171	0.117	0.118	0.160	0.065
	(2.05)*	(2.70)*	(0.19)	(3.93)*	(4.70)*	(0.34)	(4.04)*	(5.62)*	(1.88)*	(3.88)*	(6.59)*	(2.53)*	(4.52)*	(6.31)*	(1.79)*	(3.93)*	(5.64)*	(2.59)*	(3.88)*	(4.70)*	(1.01)
C2-C1	0.261	0.077	-0.171	0.002	-0.076	-0.084	0.016	-0.063	-0.109	0.010	-0.083	-0.104	0.017	0.002	0.020	0.030	0.070	0.147	0.061	0.006	0.084
	(1.64)*	(0.66)	(-1.10)	(0.01)	(-0.78)	(-0.47)	(0.15)	(-0.79)	(-0.90)	(0.11)	(-1.06)	(-0.90)	(0.38)	(0.03)	(0.22)	(0.67)	(1.12)	(1.87)*	(1.47)	(0.07)	(0.79)
9 Mon C1	-0.119	0.022	0.276	0.114	0.271	0.113	0.108	0.270	0.120	0.092	0.253	0.139	0.090	0.135	0.068	0.066	0.085	-0.018	0.042	0.107	0.053
	(-1.05)	(0.21)	(2.49)*	(1.01)	(2.77)*	(0.68)	(1.18)	(3.44)*	(0.93)	(1.36)	(4.00)*	(1.39)	(2.18)*	(3.21)*	(1.25)	(2.04)*	(3.04)*	(-0.39)	(1.54)	(3.15)*	(0.89)
C2	0.067	0.145	0.059	0.124	0.239	0.125	0.119	0.178	0.089	0.092	0.194	0.115	0.131	0.151	0.040	0.144	0.139	-0.003	0.153	0.108	-0.082
	(0.90)	(1.95)*	(0.83)	(2.52)*	(4.53)*	(2.61)*	(2.84)*	(4.21)*	(2.48)*	(2.82)*	(5.59)*	(3.61)*	(2.80)*	(5.64)*	(1.02)	(3.70)*	(5.33)*	(-0.05)	(3.59)*	(4.00)*	(-1.25)
C2-C1	0.317	0.092	-0.203	0.003	0.013	0.001	-0.017	-0.057	-0.044	-0.026	-0.047	-0.033	0.021	0.013	-0.017	0.056	0.048	0.072	0.062	-0.005	0.046
	(1.86)*	(0.83)	(-1.24)	(0.02)	(0.16)	(0.01)	(-0.15)	(-0.76)	(-0.33)	(-0.30)	(-0.76)	(-0.31)	(0.48)	(0.25)	(-0.24)	(1.39)	(1.09)	(0.93)	(1.63)	(-0.10)	(0.46)
12Mon C1	-0.105	0.232	0.347	0.023	0.393	0.306	0.023	0.375	0.320	0.049	0.308	0.226	0.102	0.108	-0.010	0.075	0.084	0.009	0.041	0.073	-0.036
	(-1.08)	(2.12)*	(2.37)*	(0.28)	(4.01)*	(2.53)*	(0.27)	(4.43)*	(2.45)*	(0.69)	(4.89)*	(2.19)*	(2.54)*	(3.68)*	(-0.16)	(1.99)*	(3.10)*	(0.12)	(1.26)	(3.02)*	(-0.51)
C2	-0.035	0.138	0.172	0.070	0.169	0.097	0.089	0.171	0.077	0.111	0.157	0.045	0.124	0.140	0.016	0.138	0.116	-0.025	0.157	0.091	-0.158
	(-0.46)	(1.90)*	(2.43)*	(1.21)	(2.92)*	(1.63)*	(2.09)*	(3.81)*	(1.68)*	(3.04)*	(4.29)*	(1.00)	(3.23)*	(4.69)*	(0.34)	(3.78)*	(3.96)*	(-0.45)	(3.75)*	(3.33)*	(-1.72)*
C2-C1	0.139	-0.002	-0.134	0.081	-0.090	-0.177	0.091	-0.122	-0.238	0.044	-0.112	-0.161	0.002	0.030	0.061	0.082	0.043	-0.052	0.153	0.086	-0.116
	(1.13)	(-0.02)	(-0.94)	(0.77)	(-1.21)	(-1.42)	(0.82)	(-1.77)*	(-1.76)*	(0.50)	(-1.80)*	(-1.37)	(0.04)	(0.75)	(0.72)	(1.39)	(0.95)	(-0.41)	(2.77)*	(2.02)*	(-0.73)

Panel B: Market Portfolio

Portfolio		J = 3 Mon			J = 6 Mon			J = 9 Mon			J = 12 Mon			J = 36 Mon			J = 48 Mon			J = 60 Mon		
K		E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1	E1	E3	E3-E1
3 Mon	C1	-0.246	-0.009	0.292	0.076	0.308	0.224	0.117	0.293	0.171	0.140	0.292	0.152	0.171	0.216	0.061	0.163	0.202	0.060	0.154	0.186	0.054
		(-4.80)*	(-0.15)	(12.38)*	(1.82)*	(6.34)*	(12.40)*	(3.29)*	(7.40)*	(11.87)*	(4.34)*	(8.10)*	(11.15)*	(11.90)*	(13.19)*	(6.21)*	(13.07)*	(14.07)*	(5.21)*	(14.94)*	(14.20)*	(5.14)*
	C2	-0.062	0.113	0.183	0.079	0.191	0.108	0.093	0.179	0.084	0.103	0.167	0.065	0.127	0.144	0.021	0.129	0.139	0.015	0.125	0.135	0.015
		(-1.82)*	(3.48)*	(13.71)*	(4.04)*	(9.42)*	(14.93)*	(5.83)*	(10.82)*	(14.37)*	(7.53)*	(11.69)*	(10.93)*	(15.93)*	(18.54)*	(5.29)*	(18.83)*	(20.94)*	(3.24)*	(21.44)*	(24.48)*	(3.70)*
	C2-C1	0.227	0.123	-0.089	0.003	-0.102	-0.105	-0.023	-0.107	-0.084	-0.037	-0.125	-0.087	-0.061	-0.113	-0.045	-0.056	-0.123	-0.054	-0.054	-0.117	-0.049
		(5.14)*	(2.46)*	(-4.49)*	(0.09)	(-2.44)*	(-6.23)*	(-0.74)	(-2.92)*	(-6.01)*	(-1.27)	(-3.45)*	(-6.50)*	(-3.79)*	(-5.15)*	(-3.96)*	(-3.73)*	(-5.60)*	(-4.05)*	(-3.89)*	(-4.95)*	(-3.57)*
6 Mon	C1	-0.242	0.061	0.371	0.080	0.352	0.262	0.110	0.335	0.219	0.134	0.325	0.191	0.171	0.215	0.059	0.161	0.197	0.055	0.154	0.182	0.049
		(-4.78)*	(1.07)	(16.55)*	(1.95)*	(7.10)*	(15.10)*	(3.23)*	(8.17)*	(14.76)*	(4.39)*	(8.64)*	(13.24)*	(12.02)*	(13.65)*	(6.94)*	(13.55)*	(14.30)*	(6.69)*	(13.83)*	(15.08)*	(6.67)*
	C2	-0.070	0.140	0.221	0.069	0.211	0.137	0.084	0.191	0.105	0.098	0.174	0.076	0.126	0.146	0.026	0.128	0.145	0.024	0.124	0.138	0.022
		(-2.00)	(4.54)*	(13.56)*	(3.48)*	(10.71)*	(15.53)*	(5.22)*	(11.77)*	(14.03)*	(6.89)*	(12.63)*	(12.26)*	(15.06)*	(18.14)8	(6.03)*	(18.02)*	(20.91)*	(5.49)*	(20.29)*	(24.26)*	(4.57)*
	C2-C1	0.212	0.075	-0.118	-0.011	-0.121	-0.111	-0.025	-0.133	-0.108	-0.036	-0.151	-0.115	-0.063	-0.107	-0.038	-0.054	-0.098	-0.036	-0.056	-0.099	-0.033
		(4.95)*	(1.59)	(-5.95)*	(-0.31)	(-2.80)*	(-6.33)*	(-0.87)	(-3.44)*	(-7.21)*	(-1.31)	(-3.94)*	(-7.21)*	(-4.12)*	(-5.17)*	(-3.85)*	(-3.91)*	(-4.56)*	(-3.28)*	(-3.84)*	(-4.67)*	(-3.25)*
9 Mon	C1	-0.233	0.071	0.368	0.069	0.378	0.300	0.100	0.352	0.246	0.133	0.328	0.195	0.172	0.215	0.057	0.163	0.198	0.053	0.154	0.185	0.052
		(-4.56)*	(1.27)	(16.46)*	(1.61)	(7.49)*	(17.58)*	(2.85)*	(8.02)*	(16.14)*	(4.22)*	(8.34)*	(11.56)*	(11.35)*	(13.05)*	(5.53)*	(13.35)*	(14.12)*	(5.55)*	(13.31)*	(14.51)*	(5.54)*
	C2	-0.072	0.147	0.231	0.059	0.211	0.149	0.082	0.189	0.105	0.096	0.174	0.077	0.128	0.147	0.024	0.130	0.146	0.022	0.125	0.141	0.025
		(-2.02)*	(4.74)*	(12.86)*	(3.01)*	(11.15)*	(14.96)*	(5.08)*	(11.89)*	(12.54)*	(6.82)*	(12.68)*	(11.04)*	(15.05)*	(19.86)*	(3.98)*	(16.82)*	(22.20)*	(3.34)*	(19.99)*	(24.86)*	(4.21)*
	C2-C1	0.196	0.072	-0.108	-0.010	-0.141	-0.132	-0.018	-0.150	-0.133	-0.037	-0.154	-0.118	-0.062	-0.105	-0.037	-0.053	-0.097	-0.036	-0.055	-0.099	-0.034
		(4.96)*	(1.49)	(-5.52)*	(-0.27)	(-3.10)*	(-7.67)*	(-0.57)	(-3.54)*	(-7.88)*	(-1.26)	(-3.84)*	(-6.36)*	(-3.48)*	(-4.62)*	(-2.74)*	(-3.67)*	(-4.24)*	(-2.50)*	(-3.58)*	(-4.22)*	(-2.70)*
12Mon	C1	-0.264	0.127	0.486	0.048	0.411	0.355	0.097	0.368	0.265	0.136	0.340	0.204	0.168	0.209	0.055	0.164	0.195	0.048	0.151	0.186	0.057
		(-5.27)*	(2.23)*	(22.19)*	(1.15)	(7.54)*	(18.90)*	(2.62)*	(8.19)*	(15.01)*	(4.06)*	(8.18)*	(11.72)*	(11.73)*	(12.56)*	(5.03)*	(12.97)*	(13.77)*	(5.10)*	(13.11)*	(14.64)*	(6.78)*
	C2	-0.117	0.157	0.299	0.044	0.213	0.165	0.070	0.191	0.119	0.087	0.179	0.092	0.128	0.148	0.026	0.129	0.147	0.025	0.125	0.142	0.027
		(-3.24)*	(5.09)*	(13.25)*	(2.13)*	(11.17)*	(12.74)*	(4.06)*	(11.75)*	(11.77)*	(5.59)*	(12.63)*	(10.35)*	(13.66)*	(19.33)*	(3.78)*	(15.31)*	(22.36)*	(3.25)*	(17.98)*	(23.29)*	(3.33)*
	C2-C1	0.185	0.028	-0.138	-0.004	-0.166	-0.162	-0.026	-0.163	-0.138	-0.049	-0.161	-0.112	-0.057	-0.093	-0.032	-0.056	-0.088	-0.026	-0.049	-0.097	-0.039
		(4.63)*	(0.58)	(-7.05)*	(-0.12)	(-3.40)*	(-8.17)*	(-0.81)	(-3.85)*	(-7.68)*	(-1.66)*	(-3.82)*	(-5.84)*	(-3.83)*	(-4.03)*	(-2.38)*	(-4.22)*	(-3.82)*	(-2.01)*	(-3.70)*	(-4.13)*	(-2.87)*

* Significant at the 10% level for a two-tailed T-test.

5. Conclusions and Discussions

This study examines the performance of hotel stocks from 1990 to 2007. Taken together, several important results are found in this study.

The momentum (or contrarian) strategies based on past price, past earning surprise, past trading volume, and firm size give rise to significant profits in the short-term, intermediate-term, and long-term for both hotel stocks and the overall stock market in the United States. This finding strongly supports that average hotel and market stock returns in different horizons can be predicted by past returns and past earnings.

The study finds that contrarian price strategies in the short-term can earn significant profit even if the returns of these portfolios are risk-adjusted by the Fama-French three-factor model. In the intermediate- and long-term, the study finds momentum (or contrarian) price strategies profit of can be significantly reduced by Fama-French three-factor model.

Positive cross autocorrelations due to big firms lead small firms' returns can be one of the reasonable factors for short-term contrarian profits. This evidence supports the lead-lag hypothesis (Lo and Mackinlay, 1990). I also find the contrarian portfolio of small firms significantly outperforms that of large firms is also supported.

Two pieces of publicly available information, stocks' past return and the past earning surprises individually predict future returns in the intermediate-term and long-term. The study suggests that their abilities to predict stock returns are compatible; one effect is not subsumed by the other. The difference in the performances of the two kinds of strategies – price momentum strategy and earning momentum strategy – has some intuitive basis. The earnings momentum strategies are based on the performance of the most recent two quarters' announced net incomes (earnings), their spread divided by the standard deviation of unexpected earnings. Earnings or net income is a financial value which is an indicator of the operational performance in the earning period reported. In comparison, past returns reflect a broad set of market expectations of the firm's future outlook not limited to near-term profitability. On this basis these two kinds of momentum strategies are not subsumed by each other. They individually predict future returns.

Price momentum portfolios experience price revision in the long-term confirms the price overreaction hypothesis (Lehmann, 1990; Lo and Mackinlay, 1988 and 1990, and etc.). It suggests that at least a portion of momentum profits is better characterized as an

overreaction; the market initially tends to be overly optimistic and then adjusts downward over time. For earning surprises, the evidence that the earning momentum profits persist for up to five years supports the earning underreaction theory (Chan et al, 1996) that the market does not incorporate the news of past earnings promptly, and indeed, the adjustment is gradual so that there are drifts in subsequent returns. The empirical results of this paper are clearly inconsistent with the earning overreaction hypothesis of Conrad and Kaul (1998) and the price underreaction hypothesis (Chan et al, 1996).

The intermediate-term stock price overreaction and long-term error correction could possibly be caused by a combination effect of business cycles and oversupply cycles. The business cycles of the hotel industry are closely positively related to the general economic climate. For instance, Choi et al, and Tse (1999) report the cyclical pattern in the hotel sector. Lundberg et al (1995), Powers and Barrows (2001), and Vogel (2002) find overbuilding cycles which are characterized by the oversupply in expansion and huge losses in recession. These oversupply cycles overlap the economic cyclical curve and exaggerate the performance of hotel firms. Therefore, in prosperity, hotel stock prices tend to overreact with the irrational expansion or oversupply of the hotel industry. In recession, hotel stock prices drop until the demand can catch up with supply.

The evidence of the study confirms that in general the earning momentum effect of the market portfolio tends to be stronger and longer-lived than that of the hotel portfolio. The possible explanation is as follows. Products and services of hotel industry such as hotel guestrooms and conference rooms are highly perishable and intangible (Harris and Brown, 1998), if the consumption of them does not take place, the loss will be occurred simultaneously. On the other hand, unlike the goods produced in factories and sold elsewhere, the operation information of the hotel products and services can be simply acquired. Their current operational performance (such as sales) could be more easily observed, and near-term financial performance (such as earnings) could be more precisely estimated by analysts and investors than what could be done for other industries, such as the traditional manufacturing industry, whose unsold products can be stored and sold after the next earning quarterly disclosure to recover a proportion of cost in a worst-case scenario and whose earnings information could not be easily observed by the public. Since, the market has already made very large revisions based on the earnings information revealed before the earnings disclosure for the current quarter or fiscal year for hotel

stocks, the earning momentum effect for hotel stocks is expected to be more short-lived in persistence and smaller in magnitude than for the whole market on average.

Trading volume and firm size are useful information sources about future price responses. The evidence in this section supports. The magnitude and persistence of momentum (or contrarian) profitability can be predicted based on past trading volume and firm size. The study finds that market price momentum portfolios of big firms significantly outperform that of small firms over the intermediate- and long-term. The evidence that the price momentum portfolio of big firms significantly outperforms that of small firms is perhaps due to the big firms' aggressive expansion in prosperity and other good news. One might expect the same findings for the hotel stocks. Because that in the past decades, the hotel industry has been dominated by a few major players. Historical evidence in 1980's shows that big firms tend to oversupply in prosperity or to other good news, such as tax deregulation, "cheap" dollar policy, and hotel construction cost declination (Powers and Barrows, 2002; Vogel, 2001; and Lundberg et al., 1995). Apparently, the big hotel firms should be largely responsible for the irrational fluctuation. For example, the "overbuilding" in the U.S. hotel industry in the middle 1980s caused by the combined impact of tax deregulation and general economic expansion. The dramatic expansion resulted in a serious oversupply and financial problems for the hotel sector from the middle of 1980s to the beginning of 1990s (Vogel, 2001).

However, examining the sample period from 1990 to 2007, the hotel industry exhibits significantly different statistical behavior patterns than that of the market portfolio -- the stock prices of big hotel firms tend to overreact less aggressively in magnitude than that of small hotel stocks. More precisely, price momentum portfolios (or contrarian portfolios) of big hotel firms underperform that of small hotel firms and the hotel price momentum portfolio (or contrarian portfolios) significantly underperform that of the overall market over the intermediate-term (or the long-term). The reasons could because part of the big hotel stocks is REITs[5] (real estate investment trusts). Mooradian and Yang (2001) argues that REITs hotel are less likely to overinvest because the dividend policy of REITs together with their more limited free cash flow, mitigate any tendency toward overinvestment in the hotel industry. Another reason is that learning from lesson of the 1980's oversupply and financial problem of hotel industry, the capital market might more

strictly monitor the management of hotel firms than before who has the incentive to overbuild or overpay for assets, then reduce the risks of overinvestment.

A note of caution is necessary when we try to generalize the results from the whole stock market to a special industry. In the comparison between the stock performance between the overall market and the hotel portfolio, I find that the hotel portfolio has its own characteristics. In many cases, the performance of portfolios based on past returns and past earnings is very different between the hotel and market portfolios. For example, the effect of price information will be more likely to be impounded in hotel stock prices within five years; thus it has a shorter contrarian effect than the market portfolio.

Given the real constraints many investors faceing, the contrarian returns for the short-term can generally produce arbitrage profits when considering transactions costs and risk premium. However, it may not be profitable to establish intermediate-term momentum strategies and long-term contrarian strategies. A momentum (or contrarian) strategy is trading-intensive. Thus trading costs tend to be relatively high. These implementation issues will substantially reduce the benefits from pursuing a momentum (or contrarian) portfolio. To illustrate the point, suppose investors always exploit price momentum by using the optimal size-based momentum strategy – C1(R3-R1). This would yield a mean annual return of about 28.7% per year when the holding period of the portfolio is 3 months. If risk-adjusted by the Fama-French three factors, the investors earn an extra 11.5% per year. Chan, Jegadeesh and Lakonishok (1996) report average trading costs for small firms of about 3% (combining a purchase and sale), so the excess return for this momentum strategy is around –0.5% per year, which is not profitable.

The study contributes to the hotel industry by providing more understanding of its impacts on stock performance. Overinvestment in the hotel industry resulting from prosperity had hurt hotel stocks' return and increased their volatility. Two suggestions regarding the hotel industry can be made based on the results of this present study. First, fast expansion due to market overreaction will create serious financial problems in recession. Consolidation via mergers and acquisitions within the hotel industry, rather than aggressive expansion by building new properties, is a wise growth strategy to pursue for the hotel industry.

[5] As report in Mooradian and Yang (2001) paper, there are 16 hotel REITs which accounts for ¼ of the 67 hotel stocks from 1993 to 1999.

Mergers and acquisitions with other related companies may bring additional returns to existing shareholders due to a reduction in operating and capital costs gained from consequent economies of scale. Such a strategy helped reduce oversupply and created favorable market conditions for the hotel industry, and therefore helped improve stock performance in the post-1990 period. Second, the hotel industry should be very careful about their new financing activities in the open market. Such activities, particularly when used in funding new properties, not only magnify the financial and market risks but also create downward pressure on hotel stocks due to earnings dilution and increased uncertainty (Brueggeman and Fisher, 1997). A conservative growth policy would be helpful. In brief, executives of hotel companies and policy decision marker in hotel industry should carefully review their growth strategies and financing policies. A conservative growth strategy accompanied by an internal-oriented financing policy can lower risk and improve their return, and thus improve their risk-adjusted performance.

Admittedly, this empirical research is in non-experimental settings and thus it is limited by data availability. The sample pool for the hotel industry is small, so the explanatory power of some evidence could be subject to the criticism “out-of-sample performance”. On the other hand, it is difficult to justify the reliability of the explanations of investment patterns, such as price or earning momentum strategy, from individual studies which have different methodologies and samples. In this vein, the explanations of this study are only suggestive and an open area of research.

References

Angelo, Rocco M. and Andrew N. Vladimir, 2001, Hospitality Today – An Introduction, 4th edition, Educational Institute of the American Hotel & Lodging Association

American Hotel & Lodging Association, 2007, The 2007 Lodging Industry Profile

Ball, Ray and Philip Brown, 1968, "An empirical Evaluation of Accounting Income Numbers", *Journal of Accounting Research* 6, 159-178

Ball, Ray, S. P. Kothari, and Jay Shanken, 1995, "Problems in measuring portfolio Performance: An application to contrarian investment strategies", *Journal of Financial Economics* 38, 79-107

Ball, Ray and S. P. Kothari, 1989, "Nonstationary Expected Returns: Implications for Tests of Market Efficiency and Serial Correlation in Returns", *Journal of Financial Economics* 25, 51-74

Banz, Rolf W., 1981, "The relationship Between Return and Market Value of Common Stocks", *Journal of Financial Economics* 9, 3-18

Barberis, Nicholas, Andrei Shleifer, and Robert Vishny, 1998, "A Model of Investor Sentiment", *Journal of Financial Economics* 49, 307-343

Basu, Sanjoy, 1983, "The Relationship between Earnings Yield, Market Value, and Return for NYSE Common Stocks: Further Evidence", *Journal of Financial Economics* 12, 129-156

Beaver, William H., Roger Clarke, and William F. Wright, 1979, "The Association between Unsystematic Security Returns and the Magnitude of Earnings Forecast Errors", *Journal of Accounting Research* 17, 316-340

Bernard, V., and J. Thomas, 1990, "Evidence that Stock Prices do not Fully Reflect the Implications of Current Earnings for Future Earnings," *Journal of Accounting and Economics* 12, 305-341

Blume, L., D. Easley, and M. O'Hara, 1994, "Market Statistics and Technical Analysis: The Role of Volume," *Journal of Finance*, 49, 153-181

Brown, K., W. Harlow, and S. Tinic, 1988, "Risk Aversion, Uncertain Information, and Market Efficiency," *Journal of Financial Economics*, 22, 355-385

Brueggeman, W.B., J.D. Fisher, 1997, "*Real Estate Finance and Investments*", Irwin McGraw-Hill, Boston, MA

Burch, K., R.S. Taylor, 1997, "The internal conflicts of hotel REITs: Part I", *Real Estate Review* 27 (3), 10-18

Campbell, J.Y., S.J. Grossman, and J. Wang, 1993, "Trading Volume and Serial Correlation in Stock Returns," *Quarterly Journal of Economics* 108, 905-940

Chan Louis K., Y. Hamao, and J. Lakonishok, 1991, "Fundamentals and Stock Returns in Japan", *Journal of Finance* 46, 1739-1764

Chan, Louis K., N. Jegadeesh and J. Lakonishok, 1996, "Momentum Strategies," *Journal of Finance,* 51, 5, 1681-1713

Choi, Jeong-Gil, Michael D. Olsen, Francis A. Kwansa, Eliza Ching-Yick Tse, 1999, "Forecasting industry turning points: the US hotel industry cycle model", *Hospitality Management* 18, 159-170

Chopra, Navin, Josef Lakonishok, and Jay R. Ritter, 1992, "Measuring Abnormal Performance: Do Stocks Overreaction?", *Journal of Financial Economics* 31, 235-268

Conrad, J.S., Al Hameed, and C. Niden, 1994, "Volume and Autocovariances in Short-horizon Individual Returns", *Journal of Finance* 49, 1305-1329

Conrad, J.S., G. Kaul, and M. Nimalendran, 1991, "Components of short-horizon individual Security Returns", *Journal of Financial Economics* 29, 365-384

Conrad, J.S., G. Kaul, 1998, "An Anatomy of Trading Strategies", *The Review of Financial Studies* 11, 489-519

Conrad, J.S., G. Kaul, 1993, "Long-Term Market Overreaction or Biases in Computed Returns?", *Journal of Finance* 48, 39-63

Cutler, David M., James M. Poterba, and Lawrence H. Summers, 1989, "What Moves Stock Prices?", *The Journal of Portfolio Management* 15, 4- 12

Daniel, Kent D.; D. Hirshleifer, A. Subrahmanyam, 1998, "Investor Psychology and Security Market Under- and Overreactions", *The Journal of Finance* 53, 1839-1885

DeBondt, Werner F. M. and Richard H. Thaler, 1985, "Does the Stock Market overreact?", *Journal of Finance* 40, 793-805

DeBondt, Werner F. M. and Richard H. Thaler, 1987, "Further Evidence on Investor Overreaction and Stock Market Seasonality", *Journal of Finance* 42, 557-581

DeLong, J. Bradford, Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldmann, 1990, "Positive Feedback Investment Strategies and Destabilizing Rational Speculation", *Journal of Finance* 45, 375-395

Enders, Walter, 1995, *Applied Econometric Time Series*, John Wiley & Sons, Inc

Fama, Eugene F., and Kenneth R. French, 1988, "Permanent and Temporary Components of Stock Market Prices", *Journal of Political Economy* 96, 246-273

Fama, Eugene F. and Kenneth R. French, 1993, "Common risk factors in the returns on stocks and bonds", *Journal of Financial Economics* 33, 3-56

Fama, Eugene F. and Kenneth R. French, 1996, "Multifactor Explanations of Asset Pricing Anomalies", *The Journal of Finance* 51, 55-84

Fama, Eugene F. and Kenneth R. French, 1995, "Size and Book-to-Market Factors in Earnings and Returns", *The Journal of Finance* 50, 131-155

Harris, P., J. Brander Brown, 1998, "Research and development in hospitality accounting and financial management", *International Journal of Hospitality Management 17*,161-181

Hong, H. and J.C. Stein, 1999, "A Unified Theory of Underreaction, Momentum Trading and Overreaction in Asset Markets", *Journal of Finance* 54, 3143-2184

Hong, H., T. Lim, and J. C. Stein, 2000, "Bad News Travels Slowly: Size, Analyst Coverage, and the Profitability of Momentum Strategies", *Journal of Finance* 55, 265-295

Houthakker, Hendrick S. and Lester Taylor, 1970, "*Consumer Demand in the United States: Analysis and Projections*", Cambridge, MA: Harvard University

IBISWorld Inc., 2008, IBISWorld Industry Report: Hotels & Motels in the US

Jegadeesh, N. and S. Titman, 1993, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency", *Journal of Finance* 48, 65-91

Jegadeesh, N. and S. Titman, 2001, "Profitability of Momentum Strategies: An Evaluation of Alternative Explanations", *Journal of Finance*, April 56, 699-720

Jegadeesh, N., 1990, "Evidence of Predictable Behavior of Security Returns", *The Journal of Finance* 45, 881-898

Jensen, Michael C., 1978, "Some Anomalous Evidence Regarding Market Efficiency", *Journal of Financial Economics* 6, 95-102

Jones, C.M., G. Kaul, and M.L. Lipson, 1994, "Transactions, Volume and Volatility," *Review of Financial Studies* 4, 543-569

Karpoff, J.M., 1987, "The Relation Between Price Changes and Trading Volume: A Survey," *Journal of Quantitative and Financial Analysis* 22, 109-126

Kim, Hyunjoon, Anna S.Mattila, Zheng Gu, "Performance of hotel real estate investment trusts: a comparative analysis of Jensen indexes", *Hospitality Management* 21, 85-97

Lakonishok, Josef, Andrei Shleifer, and Robert W. Vishny, 1994, "Contrarian Investment, Extrapolation, and Risk", *Journal of Finance* 49, 1541-1587

Lehmann, R., 1990, "Fads, Martingales, and Market Efficiency," *Quarterly Journal of Economics* 105, 1-28

Lintner, John, 1965, "The Valuation of Risk Assets and The Selection of Risky Investments in Stock Portfolios and Capital Budgets", *Review of Economics and Statistics* 47, 13-37

Lee, C.M.C. and B. Swaminathan, October 2000, "Price Momentum and Trading Volume", *The Journal of Finance* 55, 2017-2069

Legg Mason Wood Walker, Inc., April 1999, "Equity research: hospitality industry sector overview", Baltimore, MD

Lo, A. and C. MacKinlay, 1988, "Stock market prices do not follow Random Walks: Evidence from a Simple Specification Test", *Review of Financial Studies* 1, 41-66

Lo, A. and C. MacKinlay, 1990, "When are Contrarian Profits due to Stock Market Overreaction? ", *Review of Financial Studies* 3, 175-205

Lundberg, D., Krishnamoorthy M. and M. Stavenga, 1995, *Tourism Economics*, John Wiley & Sons, Inc

Mattson, Robert, 1997, "International Tourists Intrigued With United States", *Restaurants U.S.*, June/July

Mia, Lokman, Anoop Patiar, 2001, "The use of management accounting systems in hotels: an exploratory study", *Hospitality Management* 20, 111-128

Mooradian, R.M. and Yang, S.X., 2001, Dividend Policy and Firm Performance: Hotel REITs vs Non-REIT Hotel Companies, *Journal of Real Estate Portfolio Management* 7, 79-87.

Morrison, Steven A. and Clifford Winston, 1995, "The Evolution of the Airline Industry", Brookings Institution Press

Moskowitz, Tobias J. and Mark Grinblatt, 1999, "Do Industries Explain Momentum?", *Journal of Finance* 54, 1249-1290

National Restaurant Association, 2001, "The Restaurant Industry 1999 Year in Review"

Powers, Tom and Clayton W. Barrows, 2002, *Introduction to Management in the Hospitality Industry*, 7th edition, John Wiley & Sons, Inc.

Rosenberg, Barr, Kenneth Reid, and Ronald Lanstein, spring 1985, "Persuasive Evidence of Market Inefficiency", *Journal of Portfolio Management* 11, 9-17

Rouwenhorst, K.G., 1998, "International Momentum Strategies", *The Journal of Finance* 53, 267-284

Schwartz, N.D., 1999, "Still perking after these years", *Fortune* 139, 203-207

Sharpe, William F., 1964, "Capital Asset Prices: A Theory of Market Equilibrium under Condition of Risk", *Journal of Finance* 19, 425-442

Shleifer, Andrei and Lawrence H. Summers, 1990, "The Noise Trader Approach to Finance", *The Journal of Economic Perspectives* 4, 19-33

Shiller, Robert J., 1981, "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?", *American Economic Review* 71, 421-436

Singh, A.J., Francis A. Kwansa, "Financing the lodging industry in the next millennium", *Hospitality Management* 18, 415-425

The 1999 Travel and Tourism Market Research Handbook, 1999, Richard K. Miller & Associates, Inc.

Vogel, Harold L., 2001, *Travel Industry Economics,* Cambridge University Press

World Travel & Tourism Council TSA Research Report, 2002, http://www.wttc.org/

Zheng, Gu, 2002, "Analyzing bankruptcy in the restaurant industry: A multiple discriminant model", *Hospitality Management* 21, 25-42

2000 Technomic Top 100, 2000, Chicago: Technomic, Inc.

--, Sept 23, 1998, Hotel REITs' Market Cap Rate Reaches $19.4 Billion - Real Estate

Investment Trusts, *Real Estate Weekly*