Stock price synchronicity in the Hotel industry: a comparison of specialized REITs and Hotel companies

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Abstract

Share price dynamics are not synchronous and investors have to consider and measure the risk related to a lack of correlation with respect to the overall market trend. An effective asset allocation strategy has to consider the synchronicity issue in selecting securities that will be included in the portfolio.

Hotel industry is special asset class in the real estate industry that is characterized by a lack of correlation with respect to other real estate investments and a lack of standardization among investment opportunities that have a performance significantly affected by the location and the reputation of the

The paper compares hotel companies and hotel specialized REITs and evaluates the degree of synchronicity with respect to the market trend in order to the test if REITs' shareholders are exposed to the same risk of hotels' shareholders. Results show that synchronicity and crash risk exposure are different for the two types of shares and the synchronicity drivers are not consistent.

Keywords: Synchronicity, Hotel, asset allocation, performance, risk

EFM codes: 780 – Real Estate, 370 - Portfolio Management and Asset Allocation, 380 - Portfolio Performance Evaluation

1. Introduction

Hotel industry is significantly heterogeneous and the behaviour of the stock prices is affected by the different risk perceived by each type of hotel or each location. In fact hotel specialised on different customer's segment (i.e. casino vs commercial) are characterized by different business models but there is not unique consensus if it has a direct and economically significant effect on the yearly performance (Jang and Yu, 2002). Moreover differences in the business strategy adopted by the hotel company (i.e. manager's features, type of location, brand, etc..) may have a significant effect on the performance achieved and its stability over time (Xiao et al., 2012). The existence of differences among hotel type and location may justify the choice of the hotel companies' owners to diversify their investment strategy and empirical evidence demonstrates that a diversification strategy allows achieving a more stable performance in the stock market for the long term horizon (Lee and Jang, 2007).

During the last decade the REIT industry increased the attention given to the hotel sector as a new asset class that can be included in a diversified portfolio of real estate assets and/or can be used for constructing fully specialized real estate investment (Jackson, 2009). The main motivation related to the increase of interest is the existence of significant differences in the performance of hotels with respect to other real estate classes: empirical evidence show that hotels are characterized by a lower risk exposure and a faster capability to recovery in a downturn market scenario (Petersen et al., 2003). Specialized hotel REITs represent a fast growing market especially in the US market and preliminary evidences on their stock performance demonstrate an higher exposure to systemic risk with respect to other REITs (Kim, et al., 2002).

The paper aims to compare the stock price synchronicity for a set of REITs specialized in the Hotel sector with those of a set of Hotel companies listed in the stock market. The main expected output is to evaluate the existence of a difference in synchronicity in investing in the hotel industry by creating a portfolio of Hotel companies or by investing in a REIT focused on the sector. Results show the synchronicity and the crash risk for the hotel sector and lodging REITs are not comparable and also the explaining variables relevant for forecasting each risk exposure are not comparable among the two categories of shares.

The paper presents a detailed literature review on the hotel performance drivers and the main differences with respect to other real estate asset classes (section 2) and an empirical analysis on the comparison between stock price performance for REITs and hotel listed companies (section 3). The last section summarizes the results and the implication for investors in the stock market that wants to consider the opportunities related to the hotel market.

2. Literature review

The analysis of the performance of Hotel sector focuses the attention on the role of macro-economic factors, shocks and tourism demand on the performance achieved by their shareholders.

Chen (2003) finds money supply and the unemployment rate are the main macro-economic drivers that affect the hotel stock returns. The main explanation is related to the financial constraints that affect the industry and the negative effect on the local demand related to an increase of unemployment in the area. The analysis of the impact of the overall trend of the economy (GDP) on the hotel performance show that a linkage exists in the long term but it is not strong as for other sectors (Chen, 2010)

Chen (2003) evaluates also the impact of extraordinary events on the hotel performance like presidential elections, the 921 earthquake, the 2003 Iraq war, the outbreak of SARS, sports mega-events, the Asian financial crisis, and the 911 terrorist attacks. Empirical evidence show that the sector performance is significantly affected by such type of events that causes a huge change in hotel stock returns for the days of the event and immediately after them (Chen, 2007a).

The main explanatory variable of the hotel sector performance is related to the tourism demand and an increase over time of the demand has a positive impact on the performance for hotel companies (Chen,

2007b). The type of customer (international vs local) matters in evaluating the reaction of the hotel performance to an increase of decrease of the number of arrivals: in an expanding stage of the economy the hotel performance is driven by the local demand while the international arrivals matter the most during crisis phases.

First of all, the information asymmetry regarding the value of assets in a REIT means that public investors cannot distinguish the various qualities of REIT assets (Akerlof, 1970). Therefore, REIT shares generally sell at a discount price that reflects the estimate of the average quality investors. Working and Hotelling, (1929) stresses that real estate prices should be largely independent of changes in the reference market as REITs should also have little covariance with other assets.

There is evidence that bigger REITs have less synchronous stock price because they do not need to report their asset quality. Damodaran and Liu (1993) find that self-reported asset valuations can have informational value, although, they do note that public disclosures of asset valuations may be overlooked by the market since such information generally is not highlighted in earnings reports.

However, short-sale constraints may cause large synchronous movements in REIT stock prices because when there is short-sale constraints only the private information of optimistic investors are capitalized into price because pessimistic investors who do not already own stock cannot trade (Diamond and Verrecchia, 1987).

Using the institutional ownership as a control variable, empirical evidence shows that there is a negative correlation between company performance and institutional ownership (Black, 1998). In addition, Mei and Saunders (1997) consider that institutions tend to increase (decrease) their real estate investments at times when future performance is decreasing (increasing). As a general rule this behaviour is likely to cause a high (low) degree of synchronicity in REIT with high (low) institutional ownership. Chun et al (2008) find that there is a positive relationship between REIT stock price synchronicity and all institution excluding hedge funds and investment advisors.

REIT are attractive to investors, particularly institutional investors, due to their high dividend pay outs and ability to provide more liquidity to the underlying market for direct real estate investment.

Kahn and Winton (1998) show that monitoring and controlling the company is a function of the size of equity investments, so institutional investors will be the most motivated to monitor executives (if they retain a certain share in a medium to long run). To measure the incentive for monitoring institutional ownership is possible follow the Bushee methodology (1998) and classify them into three categories based on their ownership stability and dimension dimensions.

1. Dedicated institutional investors, with stable ownership and large positions in corporate portfolios
2. Transitional investors, with high portfolios turnover and smallholdings in individual companies
3. Quasi-indexes who rarely deal with trading but have smallholdings.

The strong monitoring by dedicated institutional investors reduces managers' extraction of the firm's cash flow and reduce R^2. Gaspar et al (2005) show that investor monitoring depends on shareholder investment

horizon and the weak monitoring of short term shareholders enables managers to make undisciplined acquisitions at the cost of shareholders. Furthermore, Chen et al (2007b) find that independent long-term institutions with large holdings actively monitor firms' acquisition decision and do not capitalize their private information through short-term trade.

Several mechanisms could engender crash risk or, more generally, negative skewness in returns. For example it is well known that trading among investors who have different opinions could reveal the private signals of others and move prices even in the absence of new fundamental information (Romer et al., 1993). In Hong and Stein (2003) this process, combined with short ale constraints, imports an asymmetry in which market declines differentially reveal the private signals of relatively pessimistic investors. Such revelation could lead other investors to downgrade their assessments of a firm's prospects, there by reinforcing the decline.

While the existence of negative asymmetries in market returns is generally not disputed, it is less clear what underlying economic mechanism these asymmetries reflect. Perhaps the most venerable theory is based on leverage effects (Black 1976) whereby a drop in prices raises operating and financial leverage, and hence the volatility of subsequent returns. However, French et al (1987), Campbell and Hentschel (1992) develop the theory based on a "volatility feedback": when a large piece of good news arrives, this signals that market volatility has increased, so the direct positive effect of the good news is partially offset by an increase in the risk premium.

3. Empirical analysis

3.1 Sample

The sample is constructed using the Thomson Eikon database and considering all the hotel companies operating worldwide that are listed in a stock exchange and all REITs fully specialized in hotel or hospitality for the time period 2005-2016 (Table 1).

Table 1. Number of REITs and Hotel listed companies for year.

Year	Number Specialised REITs	Number Hotel listed companies	Country	Hotel	Reits
2005	14	312	America	8.22%	47.37%
2006	19	336		56	27
2007	20	368	Australia	1.03%	1.75%
2008	23	399		7	1
2009	24	394	Europe	38.18%	5.26%
2010	28	409		260	3
2011	32	425	Asia	43.47%	40.35%
2012	37	438		296	23
2013	46	450	Africa	9.10%	5.26%
2014	49	474		62	3
2015	51	487	Tot	100%	100%
2016	56	480		681	57

Source: Thomson Eikon data processed by the author.

The number of REITs in the sample varies from 312 in 2002 up to 480 in 2016 while the sample of REITs, as expected, is significantly smaller and it varies from 14 (2005) up to 56 (2016). Looking at the geographical concentration of the sample hotels are prevalently based in Asia (43.47%) and Europe (38.18%) while the most represented markets for the REIT industry are America (47.47%) and Asia (40.35%).
For each Hotel and Reit the database considers the weekly stock performance and all the information published yearly in the annual report that, on the basis of literature, may affect the synchronicity of the shares.

3.2 Methodology

As preliminary step for measuring the degree of synchronicity we follow the approach proposed by An and Zhan (2013) for identifying the expected return of each share (REIT and Hotel). The approach used is the following:

$$r_{i,k,w} = \alpha_i + \beta_i r_{m,w} + \gamma_i r_{k,w} + \varepsilon_{i,w} \quad (1)$$

where:

$r_{i,k,w}$ is the return of the firm i in industry k in week w

$r_{m,w}$ is the value weighted market return in week w

$r_{k,w}$ is the value weighted return of industry k in week w

The industry benchmark can be alternatively the hotel or the REIT sector and all the indexes are constructed directly on the sample features by considering all existing firms (hotel companies or REITs) at the year t.
The main synchronicity proxy (An and Zhang, 2013) is based on the statistical fit of the linear model previous proposed and it measures the percentage of explanatory power of the forecasting model. In formula:

$$SYNCH_{i,t} = \ln\left(\frac{R^2_{i,t}}{1 - R^2_{i,t}}\right) \quad (2)$$

where $R^2_{i,t}$ is the statistical fit measure used for linear forecasting models and the ratio assumes values from 0 to 1. A higher value of SYNCH indicates that the stock price is more synchronized and less characterized by idiosyncratic risk.
An alternative proxy considered focuses the attention on the extreme events that are not predictable on the basis of the standard linear model and evaluate the sign of unexpected extreme events.
The first proxy of crash risk is COUNT measure proposed by An, Wu and Wu (2015) that is constructed as:

$$COUNT_{i,t} = n^\circ\, Crashes_{i,t} - n^\circ\, Jumps_{i,t} \quad (3)$$

where $n^\circ\, Crashes_{i,t}$ is the number of crashes that are the weeks in which the return achieved is lower that the yearly average minus 3.09 standard deviations while the $n^\circ\, Jumps_{i,t}$ is the number of weeks with a

performance higher that the average plus 3.09 standard deviations. Positive values of the proxy identify investment characterized by an higher risk of extraordinary losses with respect to extraordinary gains.

The second type of proxy for the crash risk considers the skewness of returns and it is constructed following the approach proposed by Kim et al (2011a, 2011b). In formula:

$$NCSKEW_{i,t} = -[n(n-1)^{\frac{3}{2}} \sum_{T=1}^{n} \left(W_{i,r,t} - \bar{W}_{i,t}\right)^3] / [(n-1)(n-2)(\sum_{T=1}^{n} (\left(W_{i,r,t} - \bar{W}_{i,t}\right)^2)^{3/2}] \quad (4)$$

where $W_{i,t}$ is the weekly return of the firm, $\bar{W}_{i,t}$ is the average firm weekly return and n is the number of observations. The measure computes the skewness of the real distribution with respect to the normal distribution and the skewness is expected to be negative.

The last type of crash risk measure is constructed coherently with Chen et al (2001) and compares the standard deviation of return in bull and bear market stages. In formula:

$$DUVOL = \ln\left(\frac{\sigma_{-weeks}}{\sigma_{+weeks}}\right) \quad (5)$$

where σ_{-weeks} is the standard deviation of returns for weeks with below the average performances and σ_{+weeks} is the standard deviation for weeks with above the average performances. Higher values of the index are associated to more higher variability of returns in market down-trends with respect to the variability registered during the up-trends.

The four variables are used for testing the existence of significant differences in synchronicity and crash risk between the sample of Hotels and REITs using standard summary statistics and univariate tests.

We perform also a more detailed analysis of the drivers of synchronicity for the hotel and the REIT sample following the model proposed by Hutton et al. (2009). In formulas:

$$SINCH_{i,t} = \alpha_t + \eta_i + \beta_1 IO_{i,t-1} + \beta_2 DTURN_{i,t-1} + \beta_3 NCSKEW_{i,t-1} + \beta_4 SIGMA_{i,t-1} + \beta_5 RET_{i,t-1} + \beta_6 ROA_{i,t-1} + \beta_7 SIZE_{i,t-1} + \beta_8 MTB_{i,t-1} + \beta_9 LEV_{i,t-1} + \varepsilon_{i,t} \quad (7a)$$

$$COUNT_{i,t} = \alpha_t + \eta_i + \beta_1 IO_{i,t-1} + \beta_2 DTURN_{i,t-1} + \beta_3 NCSKEW_{i,t-1} + \beta_4 SIGMA_{i,t-1} + \beta_5 RET_{i,t-1} + \beta_6 ROA_{i,t-1} + \beta_7 SIZE_{i,t-1} + \beta_8 MTB_{i,t-1} + \beta_9 LEV_{i,t-1} + \varepsilon_{i,t} \quad (7b)$$

$$NCSKEW_{i,t} = \alpha_t + \eta_i + \beta_1 IO_{i,t-1} + \beta_2 DTURN_{i,t-1} + \beta_3 NCSKEW_{i,t-1} + \beta_4 SIGMA_{i,t-1} + \beta_5 RET_{i,t-1} + \beta_6 ROA_{i,t-1} + \beta_7 SIZE_{i,t-1} + \beta_8 MTB_{i,t-1} + \beta_9 LEV_{i,t-1} + \varepsilon_{i,t} \quad (7c)$$

$$DUVOL_{i,t} = \alpha_t + \eta_i + \beta_1 IO_{i,t-1} + \beta_2 DTURN_{i,t-1} + \beta_3 NCSKEW_{i,t-1} + \beta_4 SIGMA_{i,t-1} + \beta_5 RET_{i,t-1} + \beta_6 ROA_{i,t-1} + \beta_7 SIZE_{i,t-1} + \beta_8 MTB_{i,t-1} + \beta_9 LEV_{i,t-1} + \varepsilon_{i,t} \quad (7d)$$

where:

$SYNCH_{i,t}$ is the logistic transformed R^2

$COUNT_{i,t}$ is the number of crashes minus the number of jumps over the fiscal year and a crash (jump) occurs when the firm-specific weekly return is 3.09 standard deviation below (above) its mean over the fiscal year

$NCSKEW_{i,t}$ is the negative conditional skewness of firm-specific weekly return

$DUVOL_{i,t}$ is down-to-up volatility calculated as the log of the ratio of the standard deviation of firm-specific weekly return on up weeks to that on down weeks

$IO_{i,t-1}$ is the percentage of total institutional ownership in the firm in the previous fiscal year

$DTURN_{i,t-1}$ is the difference between average monthly turnover over fiscal year t-1 and the prior fiscal year average monthly turnover

$NCSKEW_{i,t-1}$ is the lagged value of NCSKEW

$SIGMA_{i,t-1}$ is the lagged value of standard deviation of the firm weekly return

$RET_{i,t-1}$ is the average firm weekly return over the fiscal year t-1

$ROA_{i,t-1}$ is the contemporaneous income before extraordinary items dividend by the book value of total assets in the previous fiscal year

$SIZE_{i,t-1}$ is the natural log of the firm's market value of equity at the end of fiscal year t-1

$MBT_{i,t-1}$ is the ratio of the market value of equity to the book value of equity at the end of the previous fiscal year

$LEV_{i,t-1}$ is the book value of all liabilities scaled by total assets of at the end of the fiscal year t-1

All the independent variables are lagged with respect to the dependent one in order to avoid any type of endogeneity issue and the regression model selected on the basis of an Hausman test is a fixed effect regression model.

Following the approach of Chung et al. (2010), the same regression analyses is performed by considering the yearly rate of change (Δ) of dependent and independent variables instead the current year value. In formulas:

$$\Delta SINCH_{i,t} = \alpha_t + \eta_i + \beta_1 \Delta IO_{i,t-1} + \beta_2 \Delta DTURN_{i,t-1} + \beta_3 \Delta NCSKEW_{i,t-1} + \beta_4 \Delta SIGMA_{i,t-1} + \beta_5 \Delta RET_{i,t-1} + \beta_6 \Delta ROA_{i,t-1} + \beta_7 \Delta SIZE_{i,t-1} + \beta_8 \Delta MTB_{i,t-1} + \beta_9 \Delta LEV_{i,t-1} + \varepsilon_{i,t} \quad (8a)$$

$$\Delta COUNT_{i,t} = \alpha_t + \eta_i + \beta_1 \Delta IO_{i,t-1} + \beta_2 \Delta DTURN_{i,t-1} + \beta_3 \Delta NCSKEW_{i,t-1} + \beta_4 \Delta SIGMA_{i,t-1} + \beta_5 RET_{i,t-1} + \beta_6 \Delta ROA_{i,t-1} + \beta_7 \Delta SIZE_{i,t-1} + \beta_8 \Delta MTB_{i,t-1} + \beta_9 \Delta LEV_{i,t-1} + \varepsilon_{i,t} \quad (8b)$$

$$\Delta NCSKEW_{i,t} = \alpha_t + \eta_i + \beta_1 \Delta IO_{i,t-1} + \beta_2 \Delta DTURN_{i,t-1} + \beta_3 \Delta NCSKEW_{i,t-1} + \beta_4 \Delta SIGMA_{i,t-1} + \beta_5 \Delta RET_{i,t-1} + \beta_6 \Delta ROA_{i,t-1} + \beta_7 \Delta SIZE_{i,t-1} + \beta_8 \Delta MTB_{i,t-1} + \beta_9 \Delta LEV_{i,t-1} + \varepsilon_{i,t} \quad (8c)$$

$$\Delta DUVOL_{i,t} = \alpha_t + \eta_i + \beta_1 \Delta IO_{i,t-1} + \beta_2 \Delta DTURN_{i,t-1} + \beta_3 \Delta NCSKEW_{i,t-1} + \beta_4 \Delta SIGMA_{i,t-1} + \beta_5 \Delta RET_{i,t-1} + \beta_6 \Delta ROA_{i,t-1} + \beta_7 \Delta SIZE_{i,t-1} + \beta_8 \Delta MTB_{i,t-1} + \beta_9 \Delta LEV_{i,t-1} + \varepsilon_{i,t} \quad (8d)$$

3.3 Results

The comparison between the hotel and REIT performance allow to identify some interesting differences between the two samples (Table 2).

Table 2. Summary statistics on Syncronicity and Crash measures

Variable		$SYNCH_t$	$COUNTS_t$	$DUVOL_t$	$NCKEW_t$
Number observations	H	5839	5844	5414	5814
	R	447	952	442	448
Mean	H	-1.32	-0.03	-0.08	-0.15
	R	-1.95	-0.07	0.04	0.2
Difference	H-R	-9.06***	-1.66**	4.35***	3.59**
Median	H	-0.91	0	-0.08	-0.19
	R	-1.83	0	0.05	0.13
Standard deviation	H	1.39	0.85	0.53	2.07
	R	1.81	0.42	0.37	1.03
Percentile 25th	H	-0.91	-1	-0.35	-0.91
	R	-3.2	0	-0.18	-0.3
Percentile 75th	H	-0.91	1	0.18	0.48
	R	-0.64	0	0.25	0.61

Legend: $SYNCH$= measure of stock price synchronicity, $NCKEW$= is the negative conditional skewness of firm-specific weekly return, $COUNTS$= is the number of crashes minus the number of jumps, $DUVOL$=is down-to-up volatility calculated as the log of the ratio of the standard deviation of firm weekly return on up weeks to that on down weeks, Samples considered are all the hotels (H) and all the REITs (R).

* Statistical significant at the 90% level; ** Statistical significant at the 95% level; *** Statistical significant at the 99% level.

Source: Thomson Eikon data processed by the authors.

Hotels are characterized by higher value of the skewness and so an higher frequency of values lower than the average. However they present almost the same number of extreme positive and negative events and

the higher value of the count variable demonstrates a lower frequency of crash risks for hotel companies with respect to REITs.

REITs are characterized by higher value of synchronicity with respect to the overall market but also by an higher variability of performances for the lower performance weeks with respect to above the average ones.

Synchronicity is negative for both Hotels and REIT with values in top 25% and bottom 75% negatives as well. The same goes for counts even if there are positive values in the bottom 75% percentile. Duvol and Dturn show difference for Hotels (negative values) and Reit (positive values) on means and top 2% and bottom 75% percentile. While on average for the three crash risk measure means for REIT are generally higher than for Hotels confirming previous studies findings (Callen and Fang, 2013).

Moreover also the analysis of the drivers of the synchronicity proxies show differences for the sample of Hotel companies and REITs and the main differences (Table 3).

Institutional investors holding is on average only the 5% for Hotels and 20% for REIT demonstrating an higher interest for the REITs with respect to the ownership of real estate companies in the lodging industry.

Return on assets is on average 1% for hotels and almost to 0% for REITs while leverage ratio is 12% for Hotels and 45% for REIT, showing a potential increasing interest for the hotel shares due to the better performance achieved and the lower exposure to default risk.

Size values are comparable with REIT slightly larger than Hotels without significant difference also between the top 25% and bottom 75% percentile but interestingly the market value to book value ratio is 86% on average for Hotels and on average 0% on REIT.

The standard deviation of weekly return (sigma) is 7% for hotels and 4% for REIT with consistent values on the top 25% and bottom 76% percentile, without extreme values too far from the average. The direct investment in hotel shares is more interesting for high risk profile investors that are looking for higher average returns but are not so worried about the higher (around the double) variability.

Once identified differences on the basis of the summary statistics, the analysis considers the main drivers of syncronicity and crash risk proxies (synchronicity, nckew, counts and duvol) for the two samples of shares (Hotel vs REITs) (table 4).

Results for synchronicity show that dturn has a positive impact on the synchronicity for both Hotels (h) and Reit (r), while nckew, sigma and mtb have a positive effect only Reit. Considering the negative skewness we note that the only significant negative impact is the lag-nckew negative impact on nckew and only for hotels (h); while size and mtb have a positive impact on nckew for hotels (h). For the Reit sample, the only significant variable is io that has a negative impact on the dependent variable. Finally considering the third and fourth regressions, which have counts and duvol as dependent variable, we find nckew and size with a significant impact for both hotels (h) and Reits (r).

Table 3. Summary statistics on the main drivers of synchronicity and crash risk

Variable	Number obs		Mean		Difference	Median		Standard deviation		Percentile 25th		Percentile 75 th	
	H	R	H	R	H-R	H	R	H	R	H	R	H	R
IO_{t-1}	10506	242	0.05	0.20	12.84***	0.00	0.06	0.17	0.25	0.00	0.00	0.00	0.36
$DTURN_{t-1}$	10506	952	0.01	0.00	-5.56***	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
$NCKEW_{t-1}$	5814	448	-0.15	0.20	3.59**	-0.19	0.13	2.07	1.03	-0.91	-0.30	0.48	0.61
$SIGMA_{t-1}$	5838	446	0.07	0.04	-11.38***	0.06	0.03	0.04	0.02	0.04	0.02	0.08	0.05
RET_{t-1}	5827	952	0.00	0.00	-0.37**	0.00	0.00	0.02	0.01	0.00	0.00	0.01	0.00
ROA_t	10477	952	0.01	0.00	-4.15***	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.00
$SIZE_{t-1}$	5685	435	20.45	20.93	3.69**	20.51	21.35	2.65	1.90	18.80	19.79	22.14	22.00
MTB_{t-1}	10506	952	0.86	0.00	-17.19***	0.00	0.00	1.55	0.05	0.00	0.00	0.98	0.00
LEV_{t-1}	10506	385	0.12	0.45	35.52***	0.00	0.44	0.18	0.21	0.00	0.31	0.23	0.62

Legend: $NCKEW$= is the negative conditional skewness of firm-specific weekly return, $COUNTS$= is the number of crashes minus the number of jumps, $DUVOL$=is down-to-up volatility calculated as the log of the ratio of the standard deviation of firm weekly return on up weeks to that on down weeks, IO = is the institutional ownership for firm, $DTURN$ = is the difference between average monthly turnover over fiscal year t-1 and the prior fiscal year average monthly turnover, $SIGMA$= is the standard deviation of the firm weekly return, RET= is the average firm weekly return, ROA= is the contemporaneous income before extraordinary items dividend by the book value of total assets, $SIZE$= is the natural log of the hotel's market value of equity, MTB= is the ratio of the market value of equity to the book value of equity, LEV= is the book value of all liabilities scaled by total assets. The samples considered are all the hotels (H) and all the REITs (R).

* Statistical significant at the 90% level; ** Statistical significant at the 95% level; *** Statistical significant at the 99% level.

Source: Thomson Eikon data processed by the authors.

Table 4. Stock price synchronicity and crash risk drivers for Hotel and REITs

	$Synch$		$Nckew$		$Counts$		$Duvol$	
	Hotel	**Reit**	**Hotel**	**Reit**	**Hotel**	**Reit**	**Hotel**	**Reit**
IO_{t-1}	0.06	-0.98	0.07	-2.08**	-0.13	-0.60	-0.08	0.80**
$DTURN_{t-1}$	1.16**	3.27*	-0.22	1.49	0.30	0.11	0.10	-4.99
$NCKEW_{t-1}$	-0.01	0.54***	-0.08***	-0.09	0.04***	-0.41***	-0.03***	0.36***
$SIGMA_{t-1}$	-0.07	16.78***	-1.70	1.74	0.34	4.12**	-0.24	-1.76**
RET_{t-1}	-2.56	-12.75	1.74	4.11	-0.41	9.34	1.00	4.22
ROA_t	1.53**	-6.64	-0.31	5.05	0.48	0.66	-0.13	1.50
$SIZE_{t-1}$	0.03	-0.16	0.13**	-0.06	-0.06**	0.27**	0.08***	0.13**
MTB_{t-1}	0.02	3.68**	0.06**	-1.04	-0.01	0.54	0.04***	0.38
LEV_{t-1}	-0.35*	-0.77	-0.03	-0.01	-0.07	0.19	-0.07	-0.23
ε_t	-4.09***	1.97	-2.90***	1.74	1.11*	-5.96**	-1.70***	-2.76**
N obs	3778	171	3766	171	3778	171	3686	171
R^2	0.0212	0.2221	0.0182	0.0002	0.019	0.0157	0.0087	0.3719

Legend: $SYNCH$= measure of stock price synchronicity, $NCKEW$= is the negative conditional skewness of firm-specific weekly return, $COUNTS$= is the number of crashes minus the number of jumps, $DUVOL$=is down-to-up volatility calculated as the log of the ratio of the standard deviation of firm weekly return on up weeks to that on down weeks, IO = is the institutional ownership for firm, $DTURN$ = is the difference between average monthly turnover over fiscal year t-1 and the prior fiscal year average monthly turnover, $SIGMA$= is the standard deviation of the firm weekly return, RET= is the average firm weekly return, ROA= is the contemporaneous income before extraordinary items dividend by the book value of total assets, $SIZE$= is the natural log of the hotel's market value of equity, MTB= is the ratio of the market value of equity to the book value of equity, LEV= is the book value of all liabilities scaled by total assets. The samples considered are all the hotels (H) and all the REITs (R).

* Statistical significant at the 90% level; ** Statistical significant at the 95% level; *** Statistical significant at the 99% level.

Source: Thomson Eikon data processed by the author.

Table 5. Change in synchronicity and in crash risk.

	$\Delta Synch$		$\Delta Nckew$		$\Delta Counts$		$\Delta Duvol$	
	Hotel	**Reit**	**Hotel**	**Reit**	**Hotel**	**Reit**	**Hotel**	**Reit**
ΔIO_{t-1}	-0.055	0.639	-0.146	-0.941	0.063	-2.600*	-0.153**	0.972
$\Delta DTURN_{t-1}$	0.909	-23.267	0.629	-8.090	-0.125	-15.217	0.579**	4.665
$\Delta NCKEW_{t-1}$	-0.013	0.056	-0.513***	-0.564***	0.205***	-0.487***	-0.162***	0.350***
$\Delta SIGMA_{t-1}$	0.044	-6.032	-2.081**	-0.140	0.865	6.790	-0.449	-3.098
ΔRET_{t-1}	-5.434**	-1.232	8.419***	9.829	-5.646***	14.696*	3.203***	3.572
ΔROA_t	0.818	1.796	0.411	2.666	-0.260	2.527	-0.211	0.154
$\Delta SIZE_{t-1}$	0.130	1.106*	0.259**	-0.676	-0.059	0.027	0.017	0.235
ΔMTB_{t-1}	-0.014	3.616**	0.062**	-1.314	-0.009	-0.938	0.011	0.742**
ΔLEV_{t-1}	-0.316	-3.950**	0.047	0.415	-0.228	-2.820**	0.054	0.704
ε_t	0.000	-0.248**	0.000	0.059	0.000	0.030	0.004	0.039
N obs	3330	114	3320	114	3330	114	3233	114
R	0.0452	0.0079	0.1093	0.2199	0.1615	0.5546	0.0587	0.6696

Legend: $SYNCH$= measure of stock price synchronicity, $NCKEW$= is the negative conditional skewness of firm-specific weekly return, $COUNTS$= is the number of crashes minus the number of jumps, $DUVOL$=is down-to-up volatility calculated as the log of the ratio of the standard deviation of firm weekly return on up weeks to that on down weeks, IO = is the institutional ownership for firm, $DTURN$ = is the difference between average monthly turnover over fiscal year t-1 and the prior fiscal year average monthly turnover, $NCKEW$= is the lagged value of $NCSKEW$, $SIGMA$= is the standard deviation of the firm weekly return, RET= is the average firm weekly return, ROA= is the contemporaneous income before extraordinary items dividend by the book value of total assets, $SIZE$= is the natural log of the hotel's market value of equity, MTB= is the ratio of the market value of equity to the book value of equity, LEV= is the book value of all liabilities scaled by total assets. The samples considered are all the hotels (H) and all the REITs (R).

* Statistical significant at the 90% level; ** Statistical significant at the 95% level; *** Statistical significant at the 99% level.

Source: Thomson Eikon data processed by the author.

Table 5 focus the attention of the yearly growth rate of synchronicity and crash risk proxies and the role of the rate of change of the independent variables.

Looking at the syncronicity regression only ret is significant for the hotels while for reits size is negatively related and mtb positively related. The analysis of the skewness show that that nckew and ret have respectively positive impact and negative impact for the hotels while for Reit, only ret has a significant negative impact. Considering the third regression, where counts is the dependent variable, for hotels the impact of nckew and ret have the same relation as for skewness (positive for nckew and negative for ret); on reit we can observe a different situation: io, nckew and lev are negative related with the dependent variable (count). Regarding the fourth regression, results for the hotels show that an increase of the io and nckew lead to an decrease of the duvol, while dturn and ret are positively related. Looking at the same regression, if we focus on Reit we can observe only nckew and mtb as positively related and statistically significant.

4. Conclusion

Stock price behaviour for hotel firms and REITs show trends that are not strictly comparable and investors have to consider their differences in identifying the best investment strategy on the basis of the investors' risk attitude. An investment strategy focused on hotel firms normally expose to higher risk with respect to the choice of investing in REITs but the former allows reducing the risk related to extreme events (crash risk) with respect to the latter.

The empirical analysis demonstrates that not only the size of the exposure is different for hotels and REITs but also the main features that increase the sinchronicity or crash risk are different for the hotel sector with respect to REITs. Sinchronicity and crash risk can be easily forecasted for the hotel sector while, independently with respect to the risk proxy selected, REITs risk is prevalently driven by the institutional ownership share and few other REITs' features.

Results demonstrate that an investment strategy in the hotel industry may perform differently on the basis of the type of share bought (hotel vs REITs) but there is no evidence on the effect of the time horizon of the investment strategy and the choice of the best financial instrument available. Moreover a deeper analysis of the portfolio owned may allow to identify if differences between hotels and REITs are driven by a different diversification strategy in the selection of hotel location in the portfolios owned by hotel chains and by institutional investors (like REITs).

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