

Cornell Hotel Indices: Third Quarter 2015.

Have Hotel Prices Peaked?

Crocker H. Liu, Adam D. Nowak, and Robert M. White, Jr.

EXECUTIVE SUMMARY

The price of large and small hotels appears to have peaked, based on our Standardized Unexpected Price (SUP) metric. Hotel investment based on operating performance is in the black (breakeven). Indicators that hotel prices should start to level off or decline include the historical cycle analysis, a continued rise in cost of debt financing, a widening of the relative risk premium for hotels, higher total risk for hotels relative to other commercial real estate, and continued declines in the hotel REIT index, business confidence index, and the architecture billings index. This is report number 16 of the index series.

ABOUT THE AUTHORS

Crocker H. Liu, Ph.D., is a professor of real estate at the School of Hotel Administration at Cornell where he holds the Robert A. Beck Professor of Hospitality Financial Management. He previously taught at New York University's Stern School of



Business (1988-2006) and at Arizona State University's W.P. Carey School of Business (2006-2009) where he held the McCord Chair. His research interests are focused on issues in real estate finance, particularly topics related to agency, corporate governance, organizational forms, market efficiency and valuation. Liu's research has been published in the *Review of Financial Studies*, *Journal of Financial Economics*, *Journal of Business*, *Journal of Financial and Quantitative Analysis*, *Journal of Law and Economics*, *Journal of Financial Markets*, *Journal of Corporate Finance*, *Review of Finance*, *Real Estate Economics*, *Regional Science and Urban Economics*, *Journal of Real Estate Research* and the *Journal of Real Estate Finance and Economics*. He is the former co-editor of *Real Estate Economics*, the leading real estate academic journal and is on the editorial board of the *Journal of Property Research*. He also previously served on the editorial boards of the *Journal of Real Estate Finance and Economics* and the *Journal of Real Estate Finance*. Liu earned his BBA in real estate

and finance from the University of Hawaii, an M.S. in real estate from Wisconsin under Dr. James Graaskamp, and a Ph.D. in finance and real estate from the University of Texas under Dr. Vijay Bawa.

Adam D. Nowak, Ph.D., is an assistant professor of economics at West Virginia University. He earned degrees in mathematics and economics at Indiana University - Bloomington in 2006 and a degree in near-east languages and cultures that same year. He received a Ph.D. from Arizona State University last May. Nowak taught an introduction to macroeconomics course and a survey of international economics at Arizona State. He was the research analyst in charge of constructing residential and commercial real estate indices for the Center for Real Estate Theory and Practice at Arizona State University. Nowak's research has been published in the *Journal of Real Estate Research*.



Robert M. White, Jr., CRE, is the founder and president of Real Capital Analytics Inc., an international research firm that publishes the *Capital Trends Monthly*. Real Capital Analytics provides real time data concerning the capital markets for



commercial real estate and the values of commercial properties. Mr. White is a noted authority on the real estate capital markets with credits in the *Wall Street Journal*, *Barron's*, *The Economist*, *Forbes*, *New York Times*, *Financial Times*, among others. He is the 2014 recipient of the James D. Landauer/John R. White Award given by The Counselors of Real Estate. In addition, he was named one of *National Real Estate Investor Magazine's* "Ten to Watch" in 2005, *Institutional Investor's* "20 Rising Stars of Real Estate" in 2006, and *Real Estate Forum's* "10 CEOs to Watch" in 2007. Previously, Mr. White spent 14 years in the real estate investment banking and brokerage industry and has orchestrated billions of commercial sales, acquisitions and recapitalizations. He was formerly a managing director and principal of Granite Partners LLC and spent nine years with Eastdil Realty in New York and London. Mr. White is a Counselor of Real Estate, a Fellow of the Royal Institution of Chartered Surveyors and a Fellow of the Homer Hoyt Institute. He is also a member of numerous

industry organizations and a supporter of academic studies. Mr. White is a graduate of the McIntire School of Commerce at the University of Virginia.

Acknowledgments

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Disclaimer

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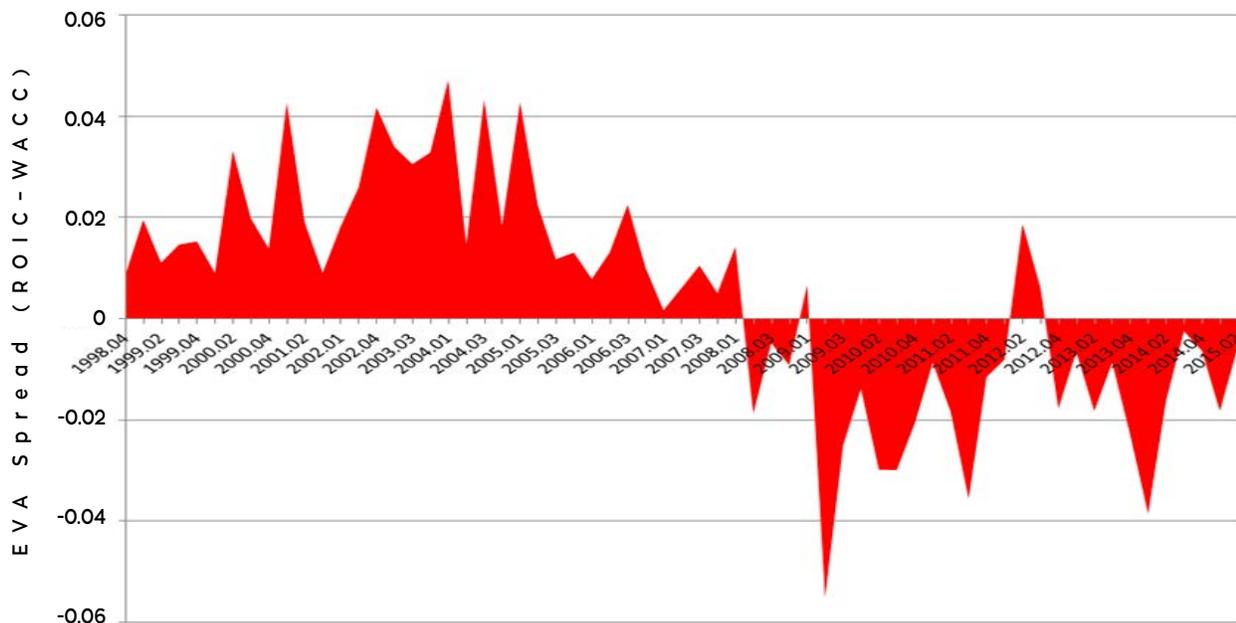
Analysis of Indices through Q3, 2015

Hotel investment based on operating performance is in the black. Our Economic Value Added (EVA) indicator shown in Exhibit 1 is back in breakeven territory (-.006) rising from -1.8% in 2015Q1. It is currently at the same level that it

was back in 2014Q4. The hotel cap rate (6.6%) now exceeds the cost of debt financing (4.5%), which is one indicator of positive leverage for hotel deals. This is in contrast with the previous quarter where the hotel cap rate (5.7%) was approximately

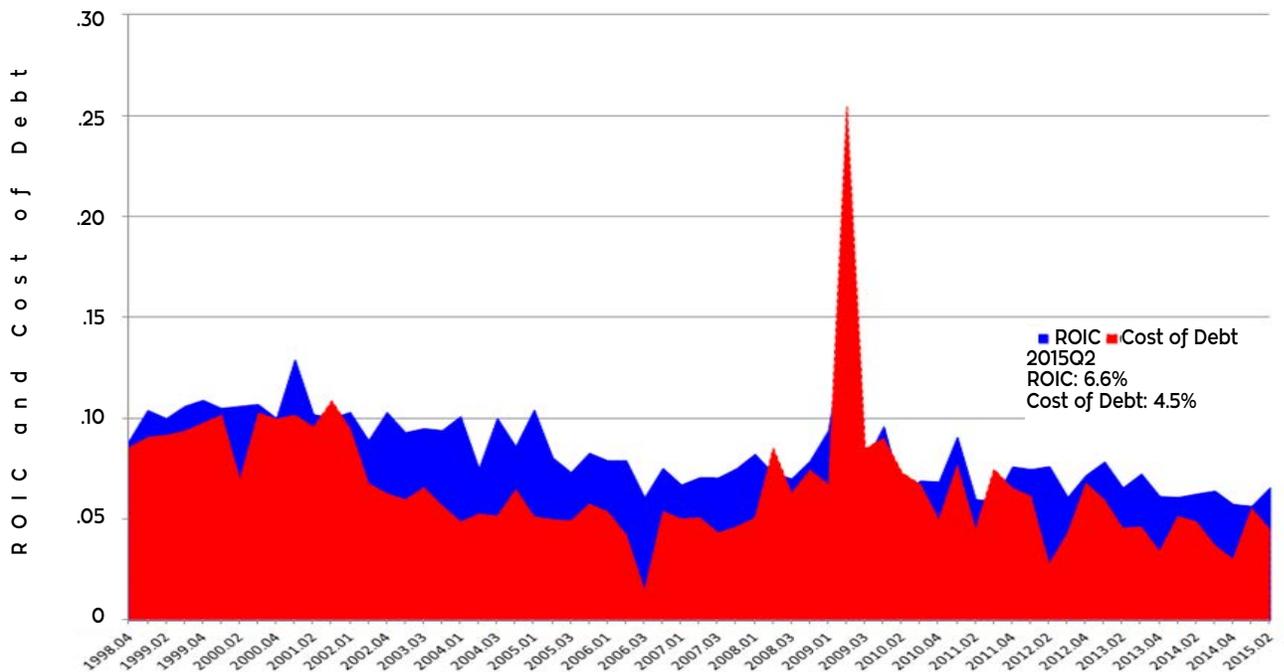
EXHIBIT 1

Economic value added (EVA) for hotels



Sources: ACLI, Cornell Center for Real Estate and Finance, NAREIT, Federal Reserve

Return on investment capital versus cost of debt financing



Sources: ACLI, Cornell Center for Real Estate and Finance

About the Cornell Hotel Indices

In our inaugural issue of the Cornell Hotel Index series, we introduced three new quarterly metrics to monitor real estate activity in the hotel market. These are a large hotel index (hotel transactions of \$10 million or more), a small hotel index (hotels under \$10 million), and a repeat sales index (RSI) that tracks actual hotel transactions. These indices are constructed using the CoStar and Real Capital Analytics (RCA) commercial real estate databases. For the repeat-sale index, we compare the sales and resales of the same hotel over time. All three measures provide a more accurate representation of the current hotel real estate market conditions than does reporting average transaction prices, because the average-price index doesn't account for differences in the quality of the hotels, which also is averaged. A more detailed description of these indices is found in the first edition of this series, "Cornell Real Estate Market Indices," which is available at no charge from the Cornell Center for Real Estate and Finance (CREF). In this fourth edition, we present updates and revisions to our three hotel indices along with commentary and supporting evidence from the real estate market.

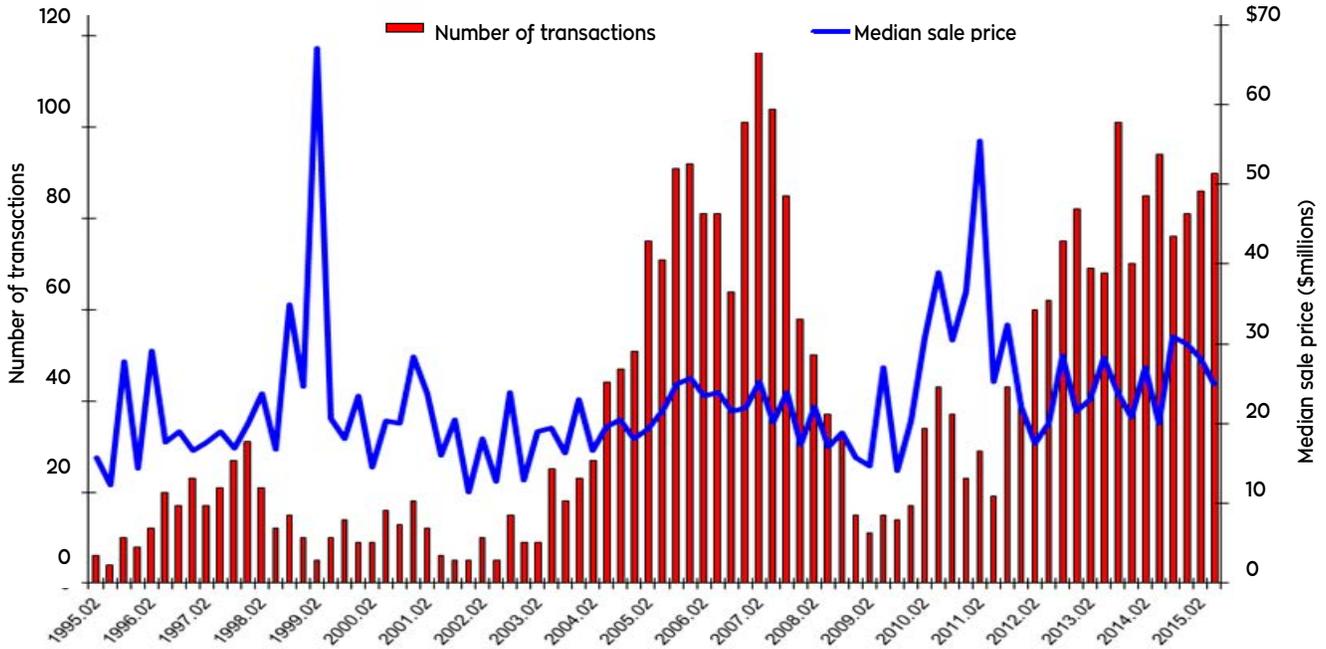
equal to the cost of debt financing (5.6%) for hotels financed by large life insurance companies, as shown in Exhibit 2. Intuitively, the cap rate represents the return on hotel properties assuming all-equity financing. The application of debt financing is used to magnify the return to hotel properties. For positive leverage (return magnification) to occur, the cap rate should exceed the cost of debt financing. That is, your return should be greater than your borrowing cost. In summary, what these two exhibits suggest is that prices are once again starting to reflect underlying fundamentals.

Hotel transaction volume continues to decline year-over-year, along with median prices. The total volume of all hotel transactions (both large hotels and small hotels combined) rose again in the third quarter from the previous quarter increasing 13.4% (2015Q2 to 2015Q3), compared to a 5.1% increase in the earlier quarter (2015Q1 to 2015Q2). On a year-over-year basis however, the hotel transaction volume continued to decline, dropping 13.4% (2014Q3 to 2015Q3), compared to a decline of 16.5% in the prior period (2014Q2 to 2015Q2). With respect to large versus small hotels, the volume of large hotel transactions rose 4.7%, while small hotel transaction volume rose 17.5% from the previous quarter.¹ On a year-

¹ The number of transactions is limited to the sales that are included in the hedonic index and should not be construed as being the total market activity.

EXHIBIT 3

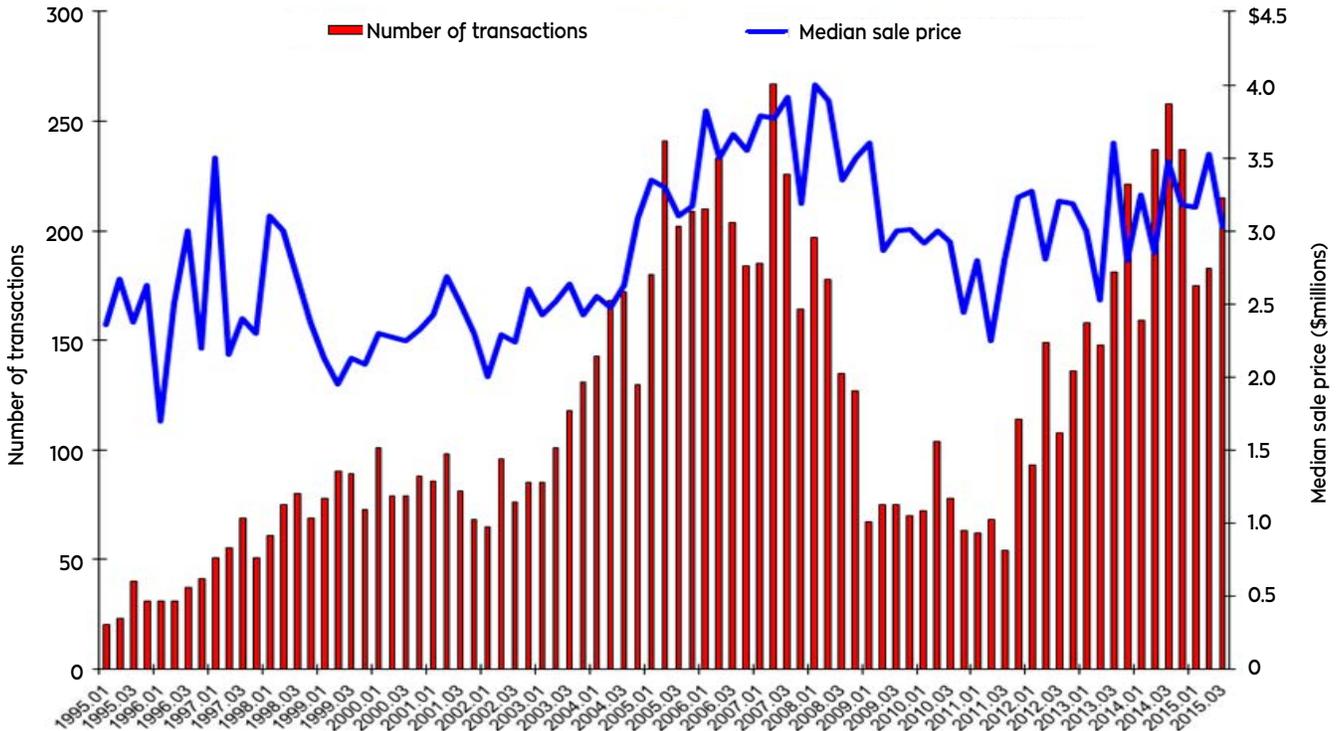
Median sale price and number of sales for high-price hotels (sale prices of \$10 million or more)



Sources: CoStar, Real Capital Analytics

EXHIBIT 4

Median sale price and number of sales for low-price hotels (sale prices of less than \$10 million)



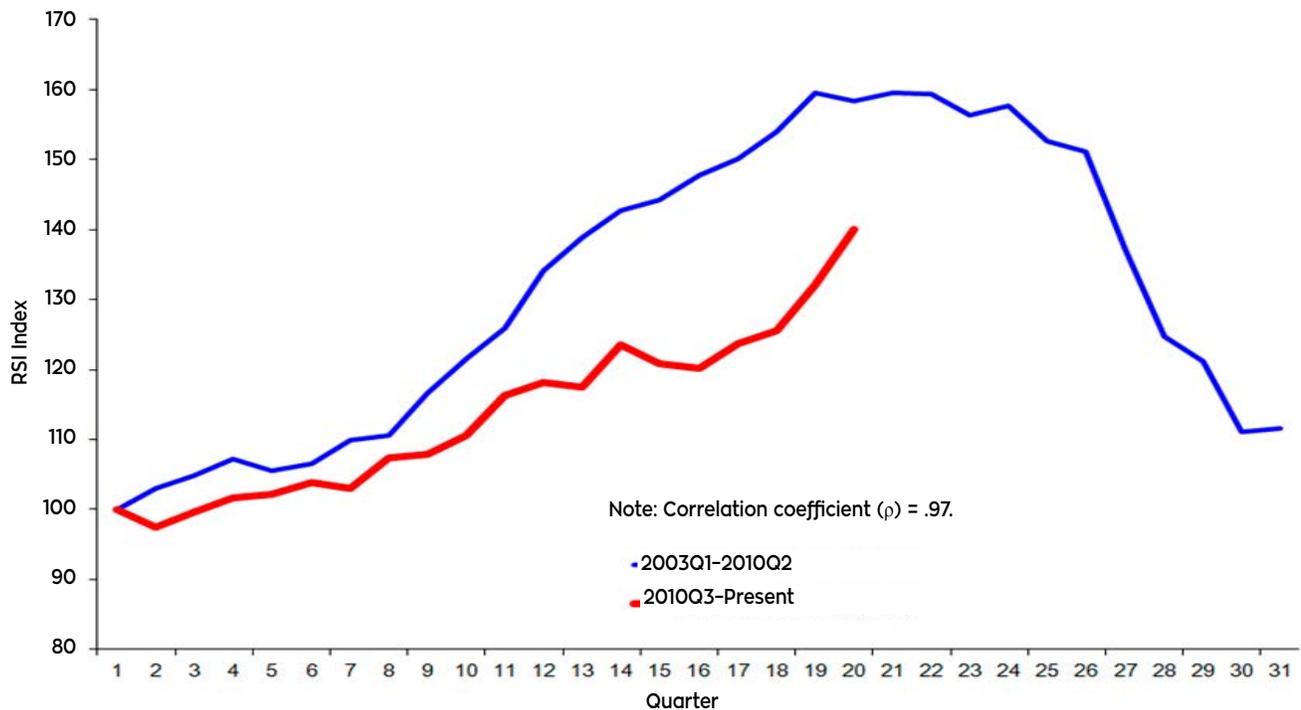
Sources: CoStar, Real Capital Analytics

EXHIBIT 5

Hotel indices through 2015, quarter 3

YrQtr	Index Value				YrQtr	Index Value			
	Hedonic	Hedonic	RSI	RSI		Hedonic	Hedonic	RSI	RSI
	Low Priced Hotels (<\$10M)	High Priced Hotels (>=\$10M)	Repeat Sales Index	Index Value Repeat Sales		Low Priced Hotels (<\$10M)	High Priced Hotels (>=\$10M)	Repeat Sales Index	Index Value Repeat Sales
1995.02	99.31	70.54	63.56		2005.03	138.62	122.95	117.14	140.72
1995.03	99.16	62.71	67.05		2005.04	140.89	130.06	124.79	141.44
1995.04	101.56	57.96	68.44		2006.01	144.12	137.39	129.30	142.19
1996.01	97.55	90.10	69.00		2006.02	145.15	142.59	132.85	145.49
1996.02	95.61	94.56	72.32		2006.03	149.85	149.95	134.27	148.81
1996.03	100.64	99.11	71.29		2006.04	152.50	152.85	137.58	152.33
1996.04	95.46	107.53	71.19		2007.01	152.26	153.66	139.78	152.24
1997.01	105.01	98.86	87.41		2007.02	155.21	160.03	143.33	157.62
1997.02	104.70	101.06	89.54		2007.03	157.10	155.19	148.56	169.05
1997.03	101.08	104.67	96.51		2007.04	155.29	153.91	147.48	161.71
1997.04	104.88	108.92	100.69		2008.01	157.70	148.03	148.46	177.94
1998.01	103.30	115.24	96.80		2008.02	158.72	147.35	148.31	164.28
1998.02	112.36	126.01	102.05		2008.03	154.94	146.60	145.48	155.09
1998.03	114.94	122.82	102.06		2008.04	155.69	144.48	146.76	160.03
1998.04	115.67	132.05	100.47		2009.01	152.31	137.12	142.07	143.36
1999.01	114.07	124.82	92.76		2009.02	141.37	118.17	140.62	142.69
1999.02	105.91	104.94	87.59		2009.03	137.46	112.72	127.51	96.64
1999.03	103.43	114.37	86.29		2009.04	133.27	95.69	116.02	106.03
1999.04	101.79	102.24	88.72		2010.01	127.02	106.00	112.75	121.07
2000.01	99.81	104.67	94.60	100.00	2010.02	126.45	118.17	103.46	105.49
2000.02	101.32	109.01	97.94	107.04	2010.03	125.39	138.49	103.82	100.87
2000.03	100.27	102.15	97.60	88.82	2010.04	121.73	165.78	108.85	124.88
2000.04	103.32	108.51	94.85	89.54	2011.01	123.31	163.81	106.13	113.99
2001.01	106.37	121.45	93.39	96.83	2011.02	120.92	176.15	108.54	112.73
2001.02	110.19	125.45	92.84	102.79	2011.03	117.12	162.75	110.64	108.39
2001.03	112.41	120.20	93.55	100.47	2011.04	121.85	161.67	111.22	124.76
2001.04	110.25	119.09	95.20	96.08	2012.01	121.64	165.76	113.08	114.46
2002.01	107.25	107.92	93.59	104.33	2012.02	126.00	152.33	112.10	125.25
2002.02	103.36	97.84	90.69	84.08	2012.03	133.24	151.31	116.98	125.88
2002.03	103.34	95.24	91.03	93.89	2012.04	134.47	148.53	117.53	128.98
2002.04	106.12	99.71	89.91	96.94	2013.01	135.97	148.25	120.34	125.68
2003.01	108.26	100.95	93.08	101.24	2013.02	133.95	155.14	126.64	139.67
2003.02	112.17	121.33	95.94	107.35	2013.03	135.51	164.98	128.66	141.68
2003.03	115.24	127.69	97.62	108.60	2013.04	133.89	165.80	127.92	139.60
2003.04	114.73	131.16	99.83	109.03	2014.01	134.99	164.66	134.50	163.82
2004.01	116.07	130.92	98.29	104.69	2014.02	136.40	165.02	131.50	133.87
2004.02	115.94	113.99	99.12	109.49	2014.03	136.22	161.64	130.77	140.62
2004.03	116.18	119.01	102.28	121.89	2014.04	138.34	162.26	134.71	145.72
2004.04	120.49	110.30	102.91	106.10	2015.01	139.59	170.07	136.72	163.69
2005.01	127.59	115.16	108.62	129.40	2015.02	145.94	177.76	143.74	163.40
2005.02	135.42	121.52	113.12	128.15	2015.03	145.49	179.72	152.52	173.87

Comparison of hotel real estate cycles using repeat sales



Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

over-year basis, the transaction volume for large hotels fell 4.3%, while small hotel transaction volume declined 16.7%.

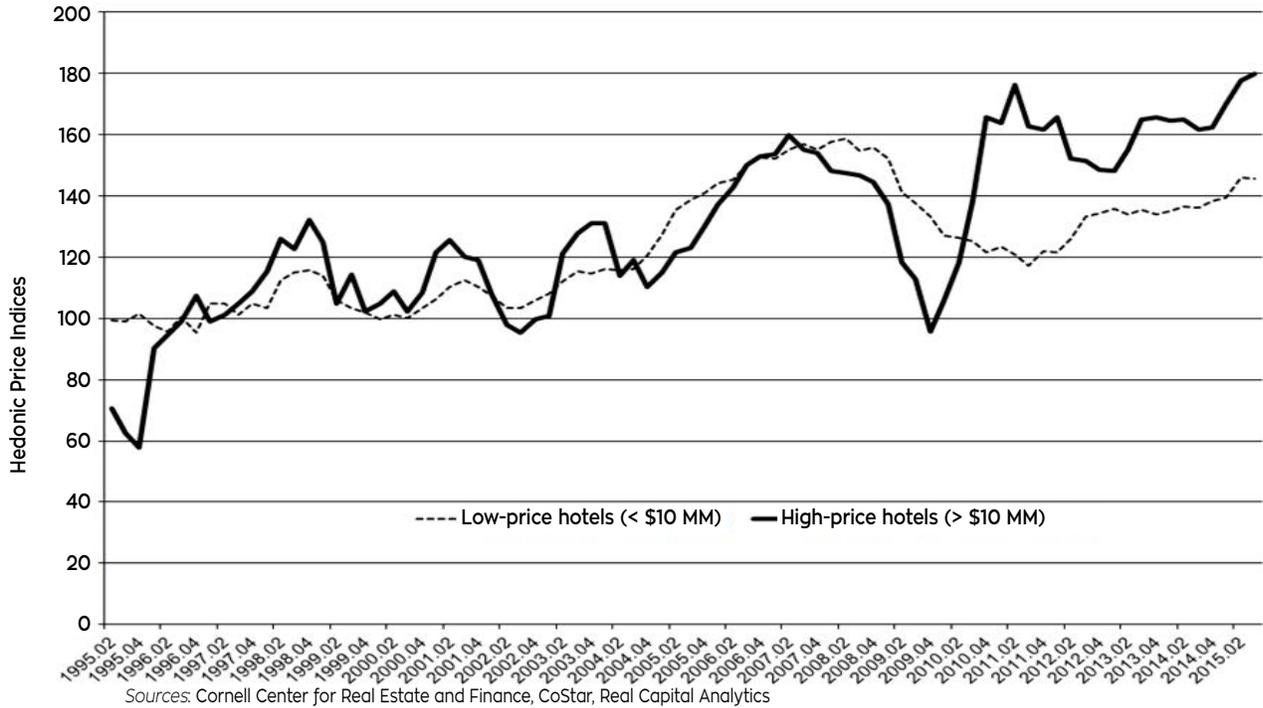
In contrast to transaction volume, the median price for large hotels rose 25% on a year-over-year basis, while the median price for small hotels fell 12.9% on a year-over-year basis. On a quarter-over-quarter basis, though, both large hotels and smaller hotels experienced a decline (-11.5% for large deals and -14.2% for small properties). Exhibit 3 and Exhibit 4 show negative year-over-year trends in the number of transactions for large hotels and small hotels.

In summary, hotel transaction volume has declined for both large and small hotels on a year-over-year basis. In contrast, hotel transaction volume has risen for both large hotels and small hotels on a quarter-over-quarter basis. The median price for

large hotels appears to have increased on a year-over-year basis but not on a quarter-over-quarter basis. For smaller hotels negative momentum exists in median price regardless of whether a year-over-year or quarter-over-quarter basis is applied.

More déjà vu: History continues to repeat. Hotel prices continue to behave in a similar manner relative to the 2003Q1 to 2010Q2 cycle, based on repeat sales. Exhibit 5 provides the price index for the repeat hotel sales used to construct our RSI cycle analysis in Exhibit 6, together with the hedonic price indices for small and large hotels. Exhibit 6 continues to confirm our prior conclusions based on cycle analysis. If history continues to repeat, we should expect a leveling off of prices in the next period.

Hedonic hotel indices for high-price and low-price hotel transactions

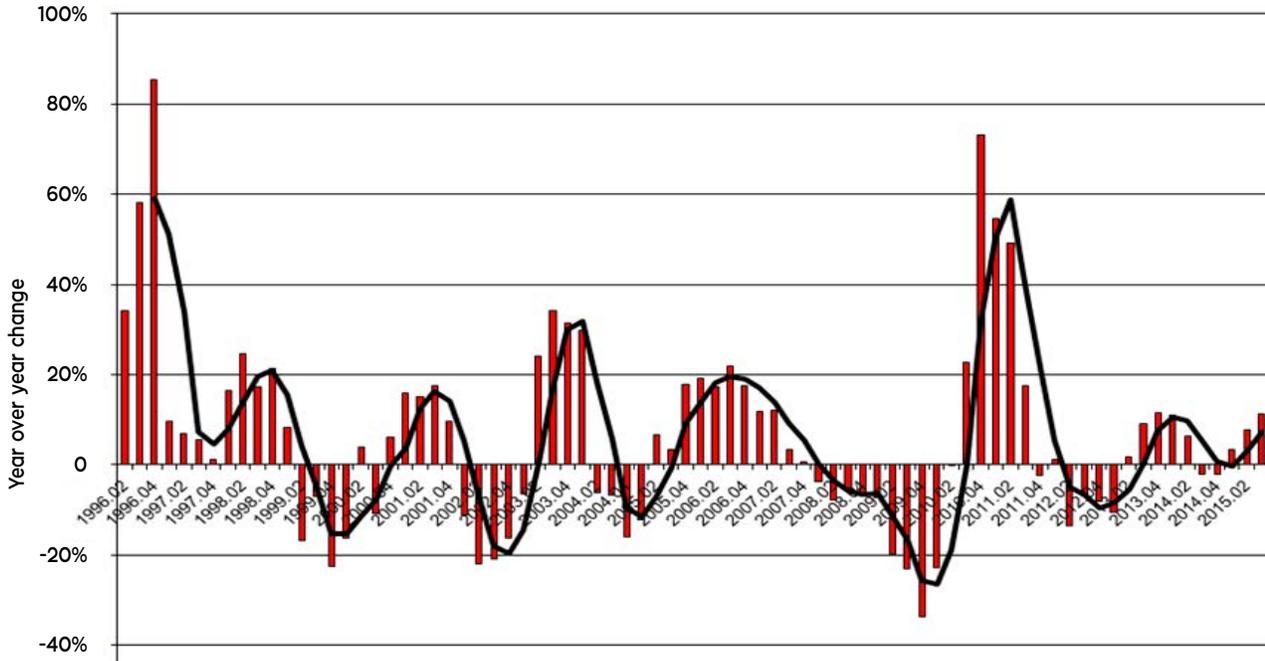


Prices of large and small hotels have both risen; while this price gain continues to be statistically significant according to our standardized unexpected price (SUP) metric, it appears that hotel prices have peaked. Exhibit 7 shows that prices for the large-hotel and small-hotel indices have continued to rise on a year-over-year

basis but not necessarily on a quarter-over-quarter basis. Exhibit 8 and Exhibit 9 reveal that on a year-over-year basis, large hotels experienced a 11.2% increase in price, while smaller hotels have gained 6.8%. Quarter over quarter, the price appreciation from large hotels is smaller at 1.1%, while prices remained flat for smaller hotels (-.3%).

EXHIBIT 8

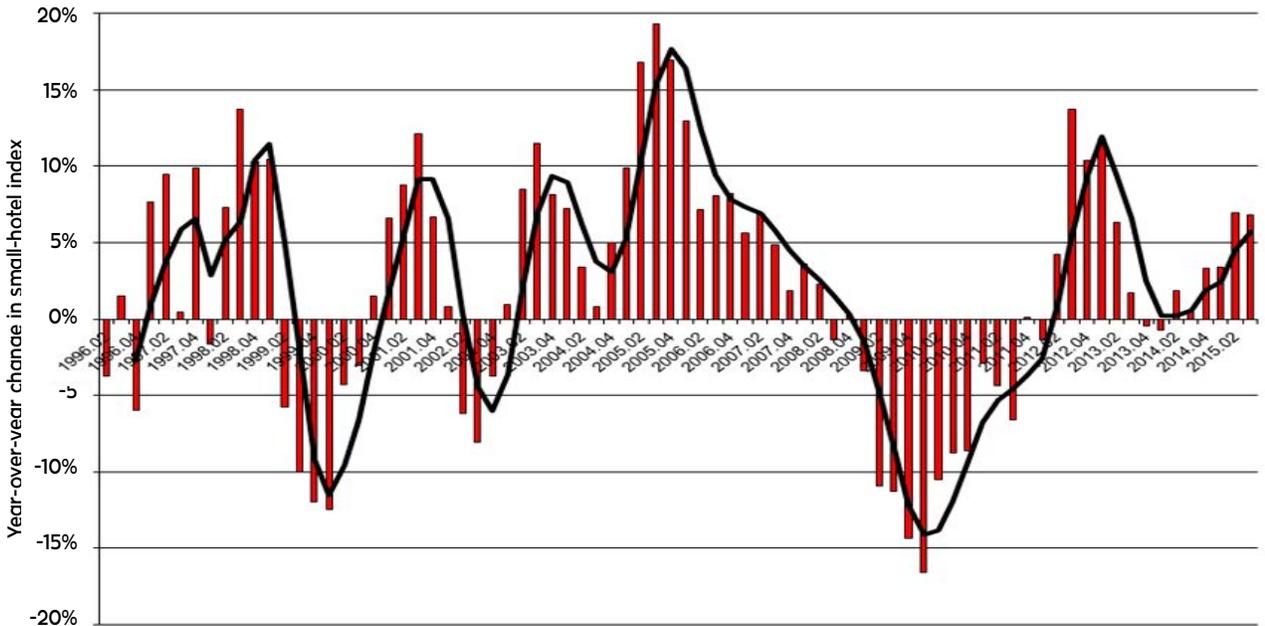
Year-over-year change in high-price hotel index, with moving-average trendline



Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

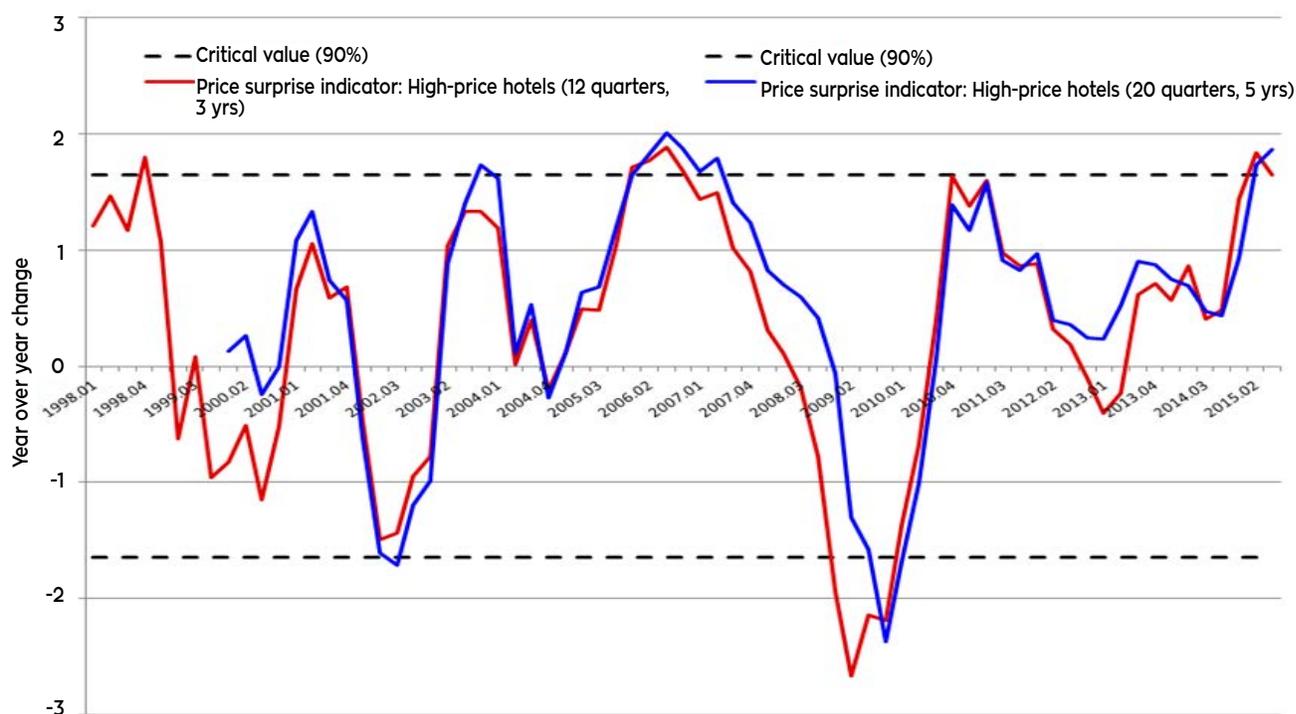
EXHIBIT 9

Year-over-year change in small-hotel index, with moving-average trendline



Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

Standardized unexpected price (SUP) for high-price hotel index



Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

Our Standardized Unexpected Price (SUP) metric displayed in Exhibit 10 shows that while positive price momentum for high price hotels continues to reach new statistical highs (that is, continuing to be above the upper confidence band), it appears to have started a downward turn, raising the question as to whether the prices of large hotels have reached their peak. Consistent with large hotels, Exhibit 11 shows that although the prices for smaller hotels continue to remain above the upper SUP band, mean reversion has started to occur. In our previous report, we had raised this concern regarding reversion of price to the mean. In particular, a situation with prices being above the upper band is not sustainable.

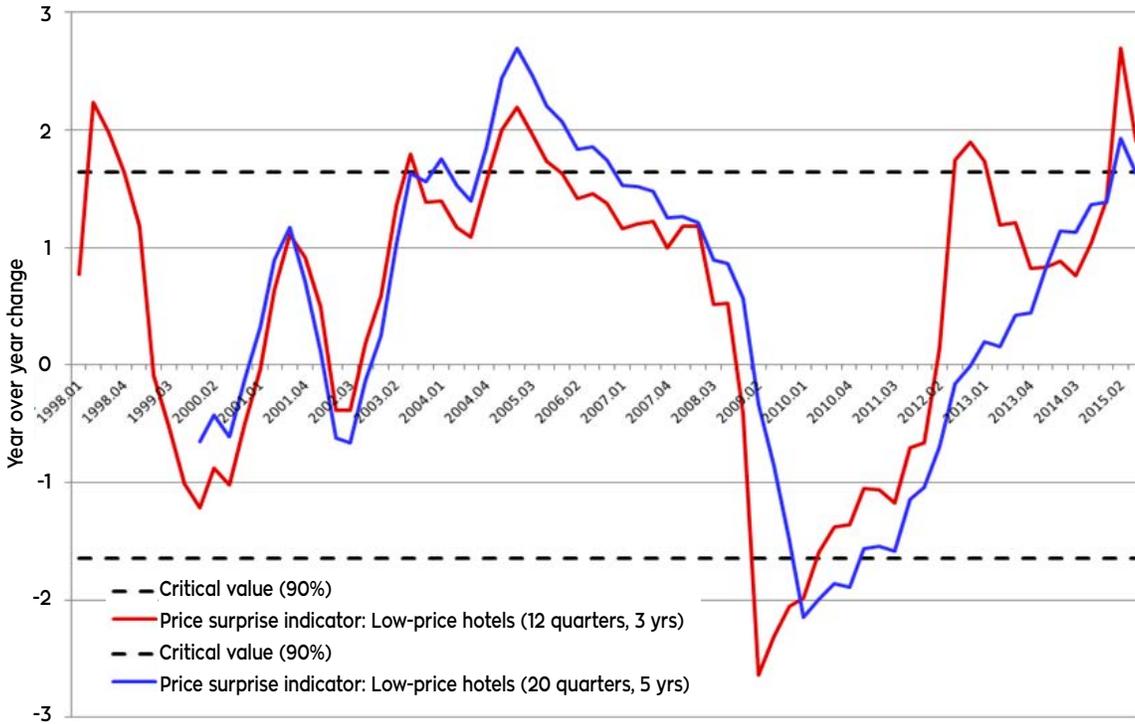
Repeat sales continue to remain above the historical average with positive price momentum on a

year-over-year basis. The SUP indicator for repeat hotel sales in Exhibit 12 also rose, with both the 3-year and 5-year SUP indicator above the SUP upper band.² In contrast to both the large and smaller hotel hedonic indices, the repeat sales metric shows no signs of mean reversion. Exhibit 13 provides an alternative perspective of the price momentum in the repeat sales. The index shows that the repeat sale prices rose on a year-

² We report two repeat sale indices, one which uses all repeat sale pairs, and the other, with a base of 100 at 2000Q1, uses only those sales that occurred on or after the first quarter of 2000. As a result, the latter repeat sale index doesn't use information on sales prior to the first quarter of 2000. As such, if a hotel sold in 1995 and then sold again in 2012, it would be included in the first repeat sale index (i.e., repeat sale full sample index), but it would not be included in the latter repeat sale index.

EXHIBIT 11

Standardized unexpected price (SUP) for small-hotel index



Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

EXHIBIT 12

Standardized unexpected price (SUP) for repeat-sale hotels

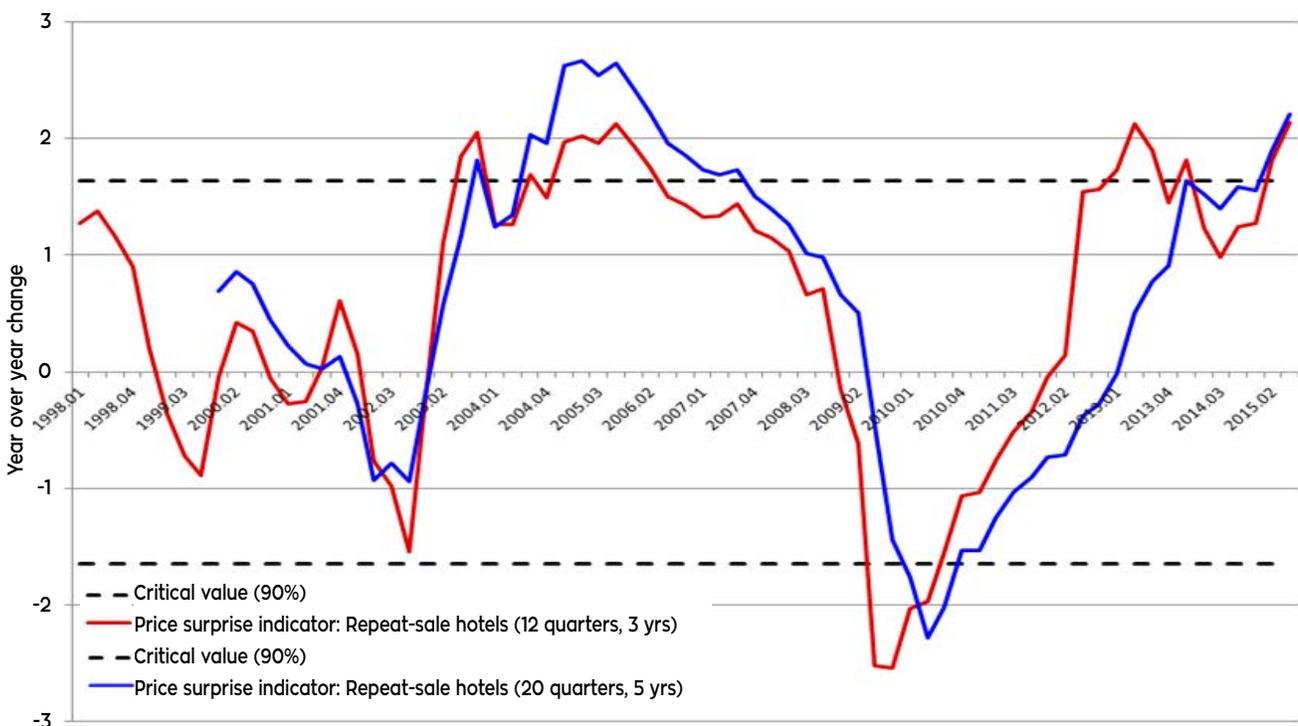
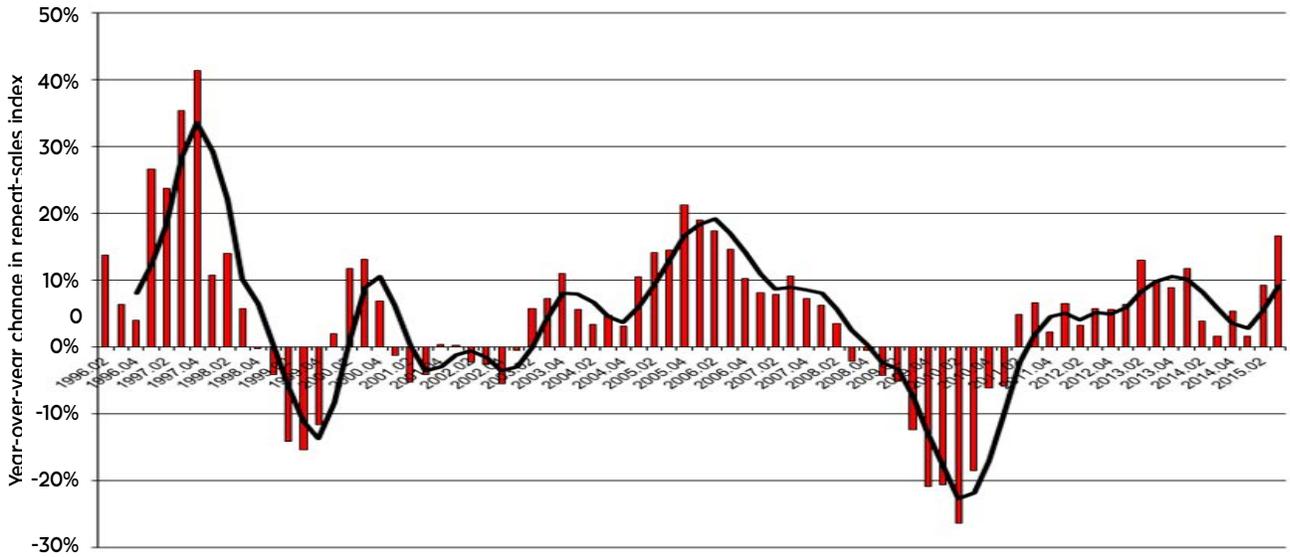


EXHIBIT 13

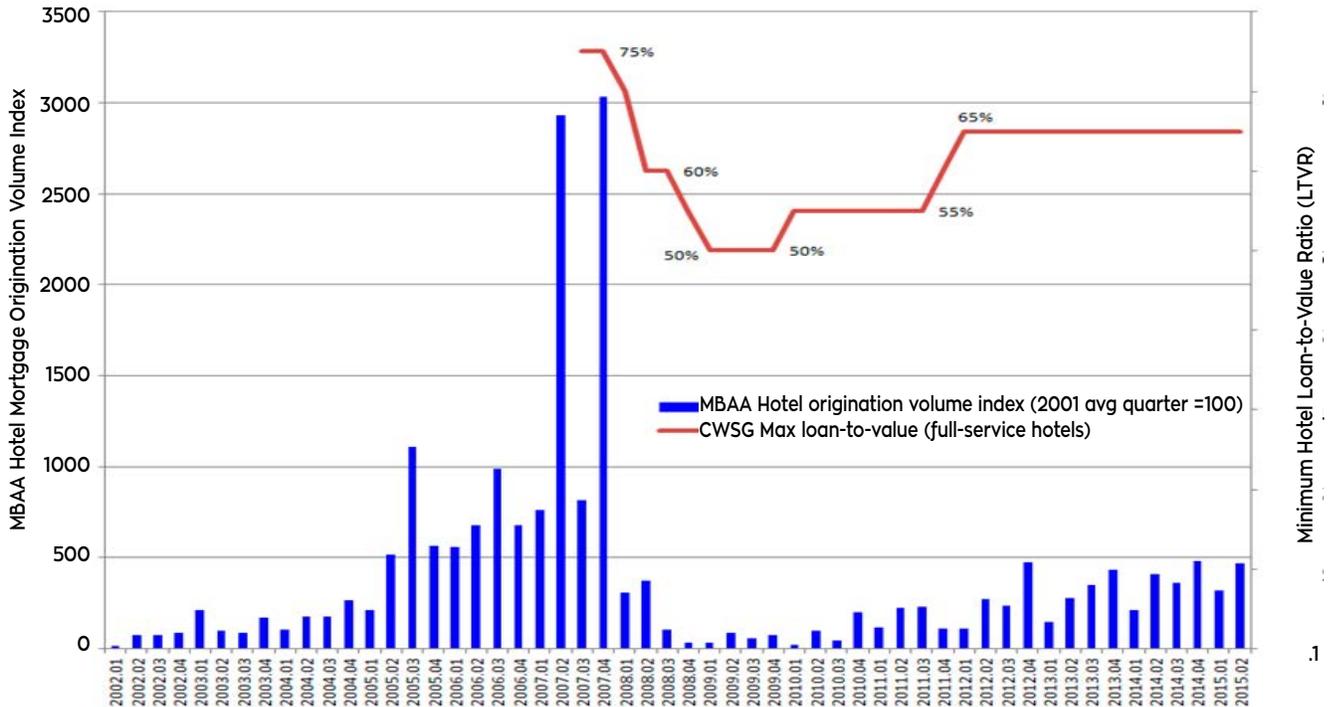
Year-over-year change in repeat-sale index, with moving-average trendline



Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

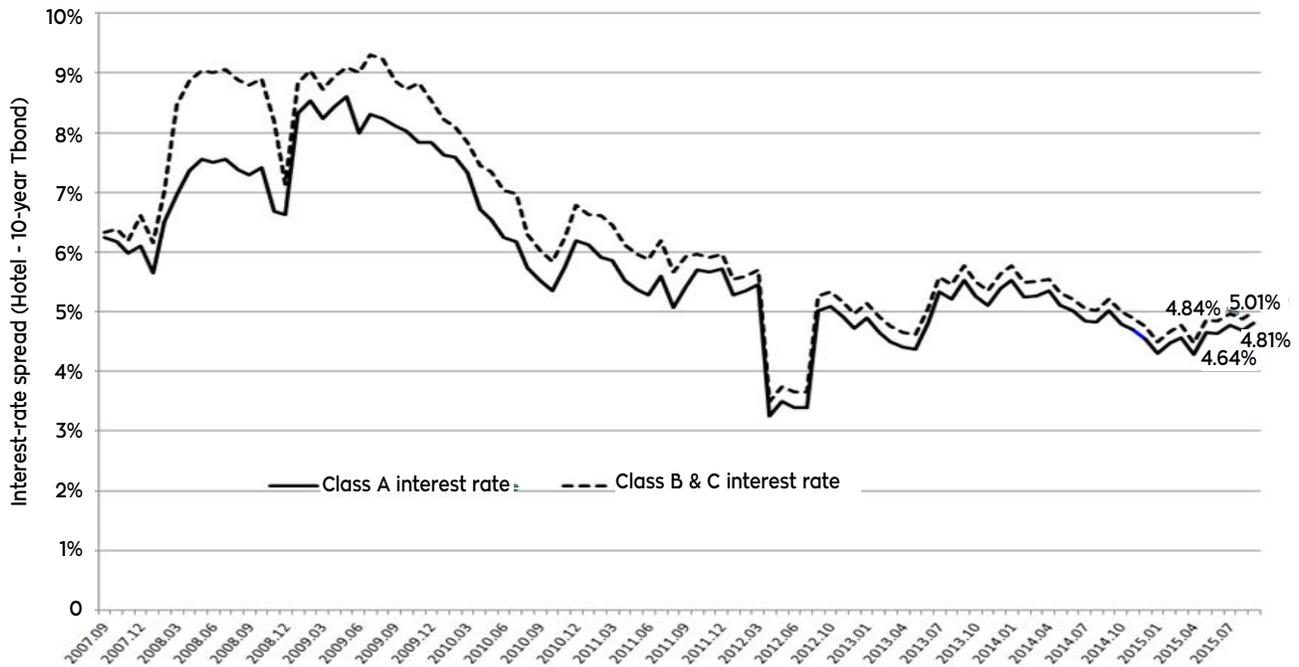
EXHIBIT 14

Mortgage origination volume versus loan-to-value ratio for hotels



Sources: Cornell Center for Real Estate and Finance, Mortgage Bankers Association

Interest rates on Class A hotels versus Class B & C properties



Sources: Cushman Wakefield Sonnenblick Goldman

over-year basis, with the increase of 16.6% being larger than the price increase of 9.2% in the prior year-over-year period.

Mortgage financing volume continues to rise on a year-over-year basis. Exhibit 14 shows that the mortgage origination volume for hotels as reported for 2015Q2 is 15.5% greater than the previous year (2014Q2).³ This compares to a 51.8% year-over-year increase (2015Q1 relative to 2014Q1) in the previous quarter. The rise in loan volume is consistent with the relatively higher loan-to-value (LTV) ratio for hotels which has remained at 65% since the first quarter of 2012. The last time that LTV was this high or higher was prior to the commercial real estate market crash.

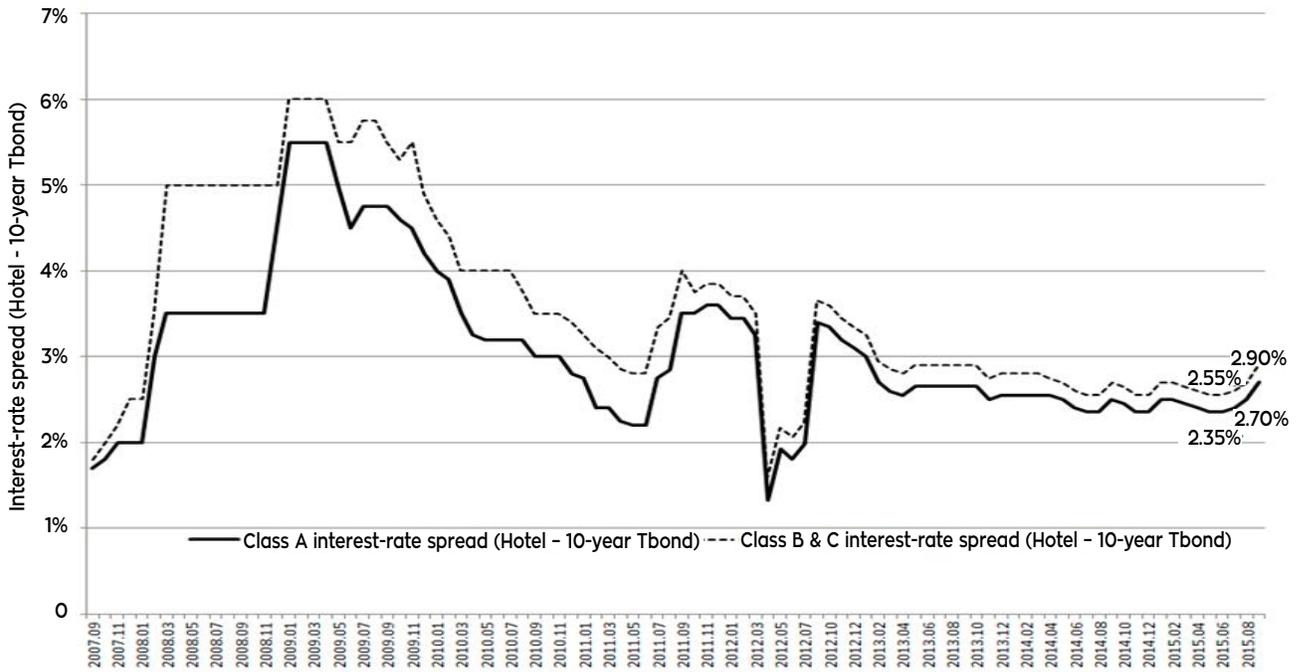
³ This is the latest information reported by the Mortgage Bankers Association as of the writing of this report.

Cost of debt financing continues to increase with a widening of the relative risk premium for hotels.

The cost of obtaining hotel financing as reported by Cushman Wakefield Sonnenblick Goldman has continued to rise since the end of last year (December 2014), when the interest rate was 4.55% for Class A hotels (4.75% for B&C properties).⁴ Exhibit 15 shows that as of the end of September 2015, interest rates had risen to 4.81% for Class A hotels (5.01% for

⁴ The interest rate reported by Cushman Wakefield Sonnenblick Goldman (CWSG) differs from the interest rate used to calculate our EVA metric which is based on the interest rate reported by the American Council of Life Insurers (ACLI). The ACLI interest rate reflects what life insurers are charging for institutional-size hotel deals. Our EVA calculation is based on property specific cap rates and the associated financing terms. The CWSG interest rate is based on deals that CWSG has brokered as well as their survey of rates on hotel deals. The deals are not necessarily similar to deals that are reported by ACLI.

Interest-rate spreads of hotels versus U.S. Treasury ten-year bonds



Source: Cushman Wakefield Sonnenblick Goldman

B&C hotels), compared to an interest rate of 4.64% for Class A properties (4.84% for B&C hotels) at the end of the second quarter). Exhibit 16 and Exhibit 17 depict interest rate spreads relative to different benchmarks. Exhibit 16 shows the spread between Class A interest rates, as well as those for B&C deals, on full-service hotels over the ten-year Treasury bond. On this metric, interest rate spreads have risen over the last four quarters, indicating that the lenders are demanding additional compensation for risk associated with lending on hotels, compared to a year ago. Exhibit 17 shows the spread between the interest rate on Class A full service hotels (as well as B&C properties) over the interest rate corresponding to non-hotel commercial real estate. This represents the hotel real estate premium.⁵ The hotel real estate premiums for both higher quality (Class A) and lower quality (Class B&C) hotels have risen since May 2015. This is a reversal from our previous report, in which we found that hotel real estate premiums had declined. The increase is noticeable. The hotel real estate premium for Class A hotels is

⁵ The interest rate on hotel properties is generally higher than that for apartment, industrial, office, and retail properties, in part because hotels' cash flow is commonly more volatile than that of other commercial properties.

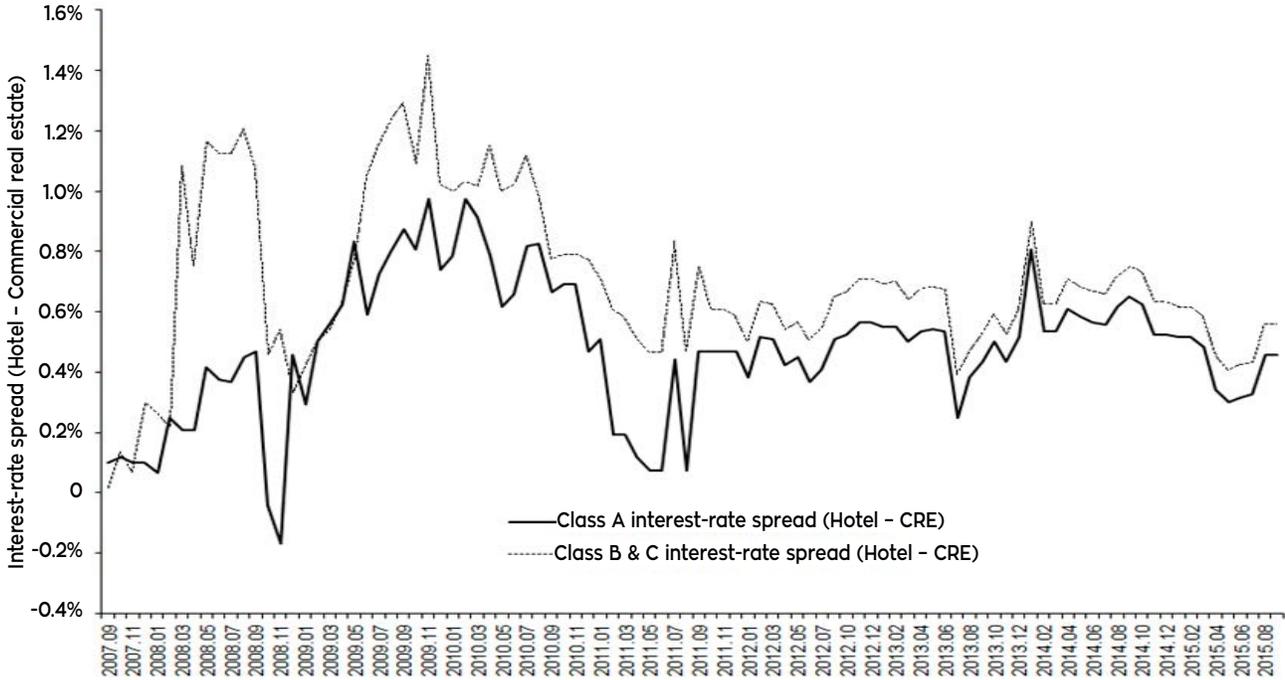
currently at 0.46%, compared to 0.32% in 2015Q2, while the same figures for Class B&C deals are 0.56% for 2015Q3 and 0.43% in 2015Q2. The rise in the premium in the most recent quarter, seen in Exhibit 17, is a signal that the perceived default risk for hotel properties has widened relative to other commercial real estate.

Cost of equity financing continues to be cheap; expect to see similar interest rates for hotel financing relative to other commercial real estate in the near future. The cost of using equity financing for hotels continues to decline, as measured using the Capital Asset Pricing Model (CAPM) on hotel REIT returns, as shown in Exhibit 18. The cost of using equity funds is currently at 9.6% for 2015Q2, down from 9.9% in 2015Q1, and down from 11.6% in the year-earlier second quarter of 2014. This cheaper cost is due to a reduction in the *systematic* risk (beta) of hotel REITs. In terms of *total* risk, that is, systematic risk + risk premium (risk unique to hotel REITs), however, the total risk of Hotel REITs now exceeds to the total risk of equity REITs (Exhibit 19).⁶

⁶ We calculate the total risk for hotel REITs using a 12-month rolling window of monthly return on hotel REITs.

EXHIBIT 17

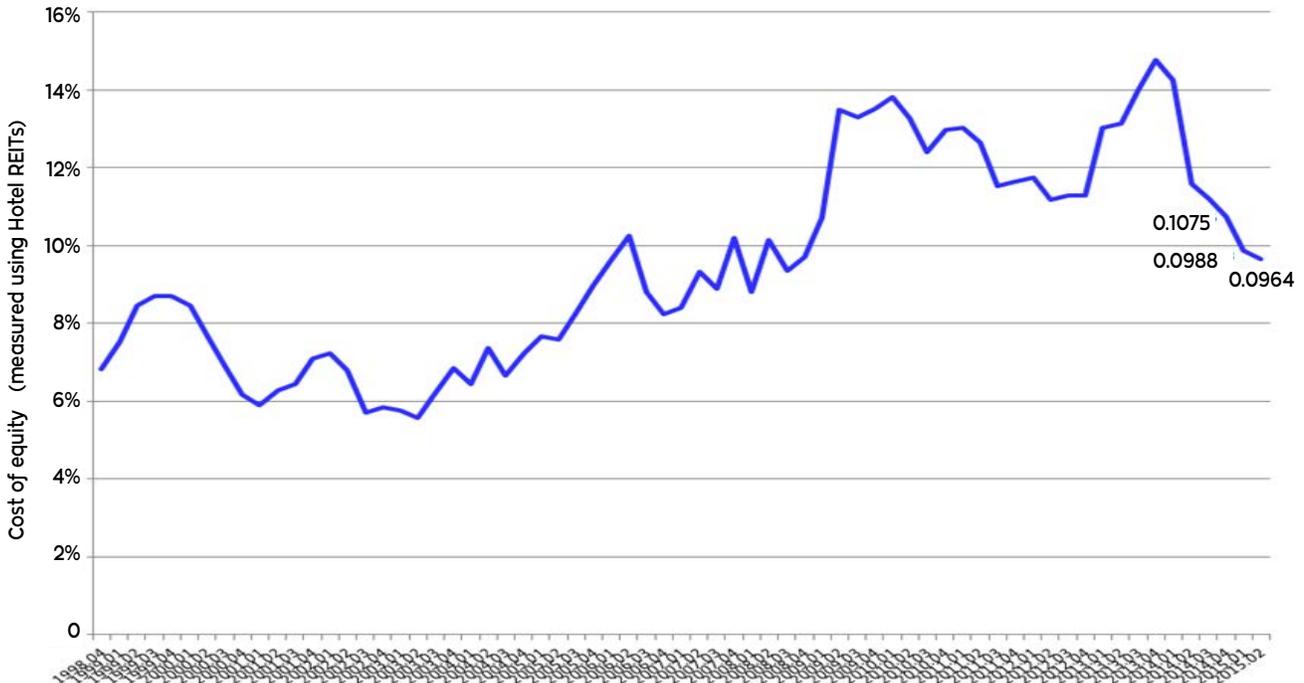
Interest-rate spreads of hotels versus non-hotel commercial real estate



Source: Cushman Wakefield Sonnenblick Goldman

EXHIBIT 18

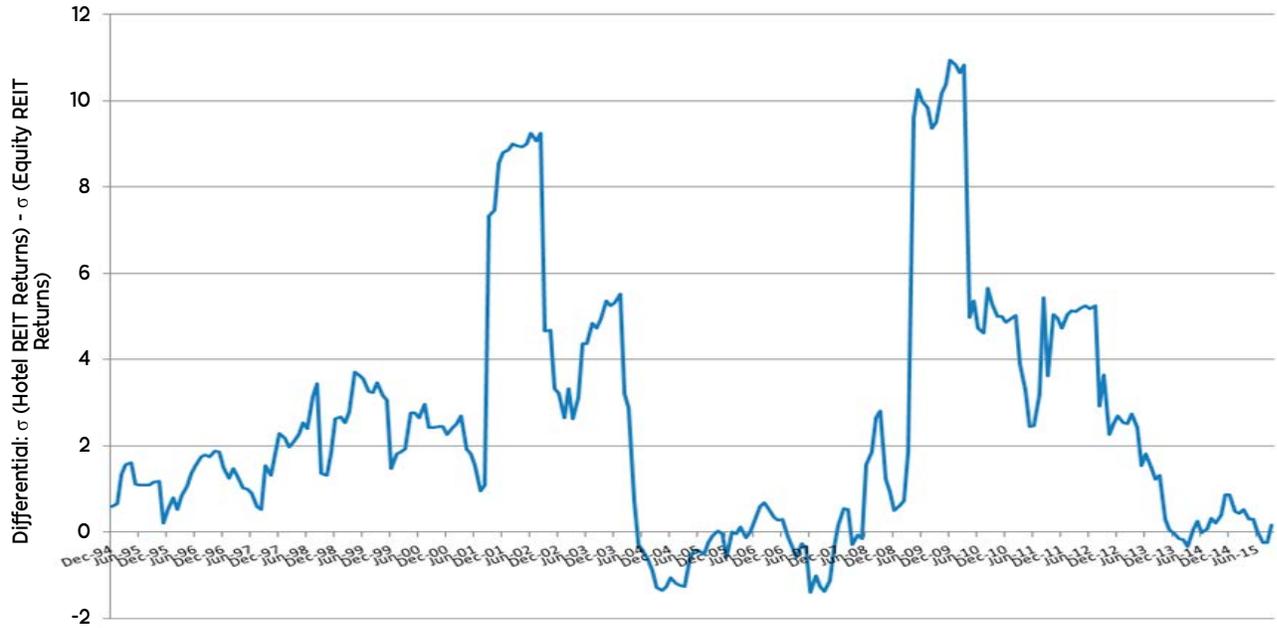
Cost of equity financing using the Capital Asset Pricing Model and hotel REITs



Source: Cornell Center for Real Estate and Finance, NAREIT

EXHIBIT 19

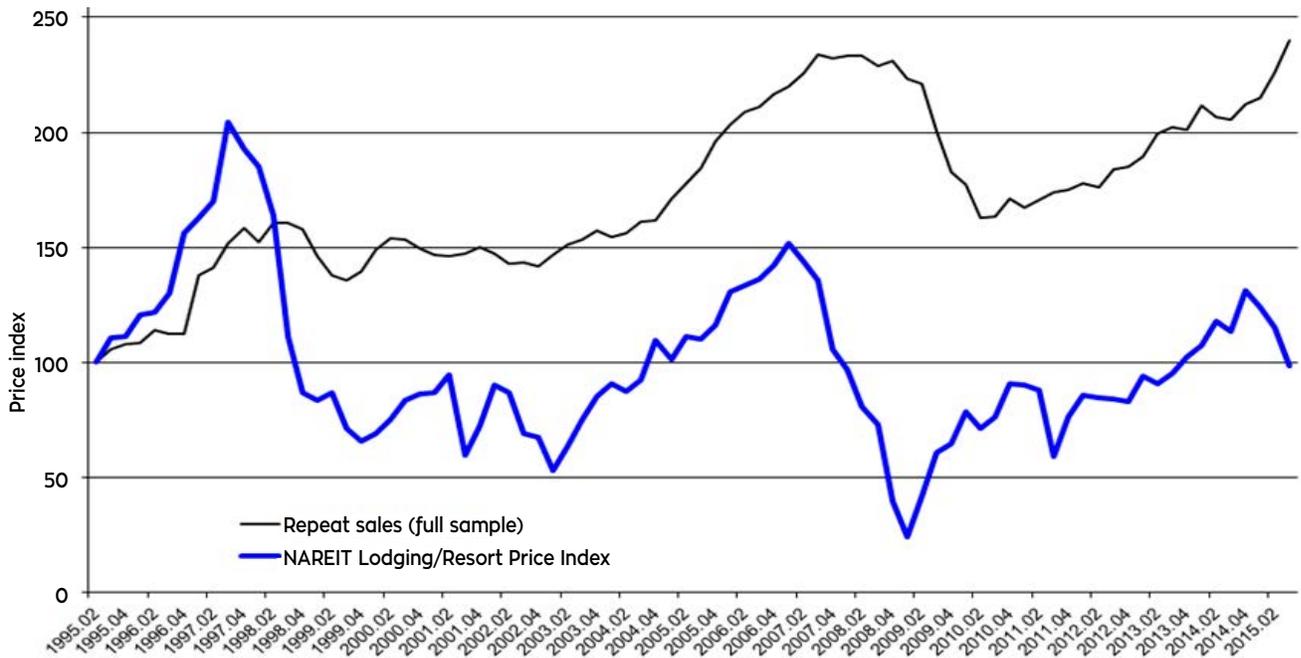
Risk differential between hotel REITs and equity REITs



Source: Cornell Center for Real Estate and Finance, NAREIT

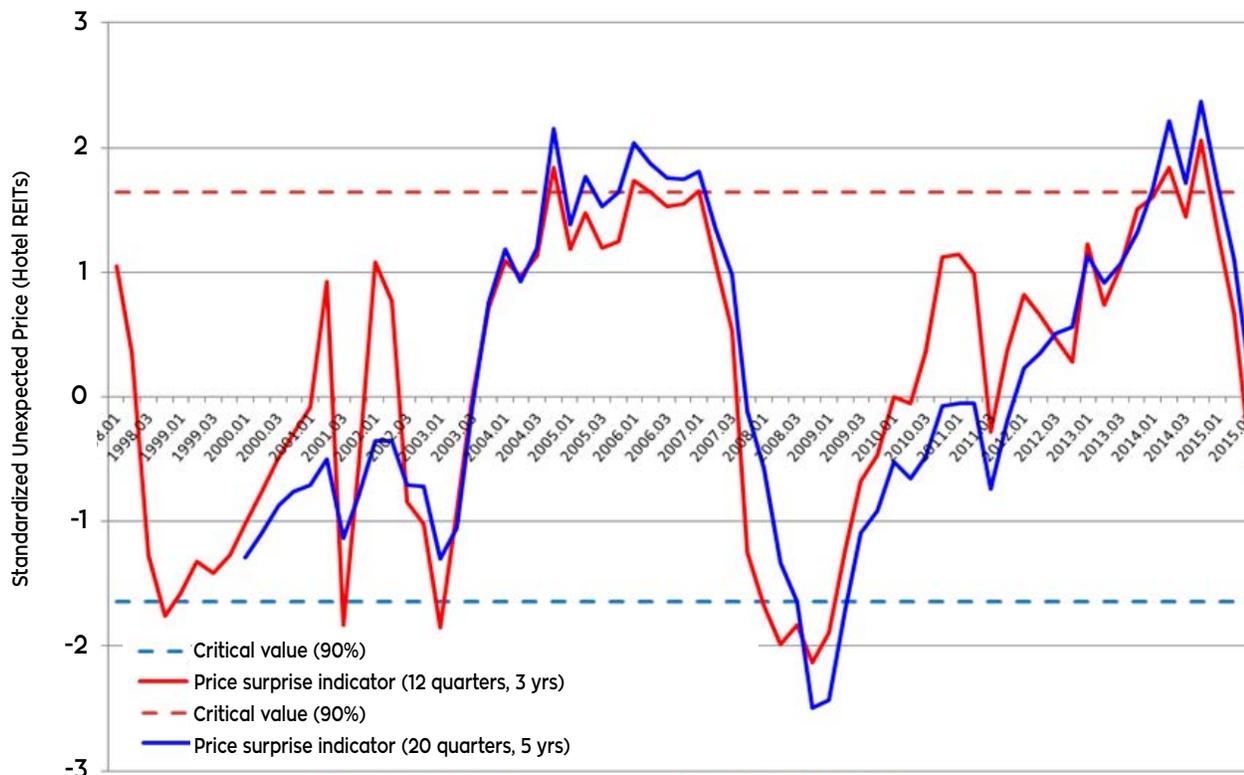
EXHIBIT 20

Hotel repeat sales index versus NAREIT lodging/resort price index



Source: Cornell Center for Real Estate and Finance, NAREIT

Standardized unexpected price (SUP) for NAREIT Lodging/Resort Index



This evidence is consistent with our previous observation that perceived default risk for hotels has risen relative to other types of commercial real estate.

Negative signals exist on the future direction in the price of large hotels, but expect the price of small hotels to continue to rise, according to the tea leaves. Exhibit 20 compares the performance of the repeat sales index relative to the NAREIT Lodging/Resort Price Index. The repeat sales index tends to lag the NAREIT index by at least one quarter or more. This is consistent with studies which find that securitized real estate is a leading indicator of underlying real estate performance, since the stock market is forward looking or efficient. Looking ahead, the NAREIT lodging index continues to lose momentum, falling 14.6% this quarter after declining 7.1% in the prior quarter. Year over year, the NAREIT lodging index is down 13.2% (2014Q3 to 2015Q3); in the previous quarter (2015Q2) it was down 2.2% on a year-over-year basis (2014Q2 to 2015Q2). In terms of the SUP for the NAREIT Hotel Index, shown in Exhibit 21, which provides a complementary perspective, the hotel REIT index trended downwards,

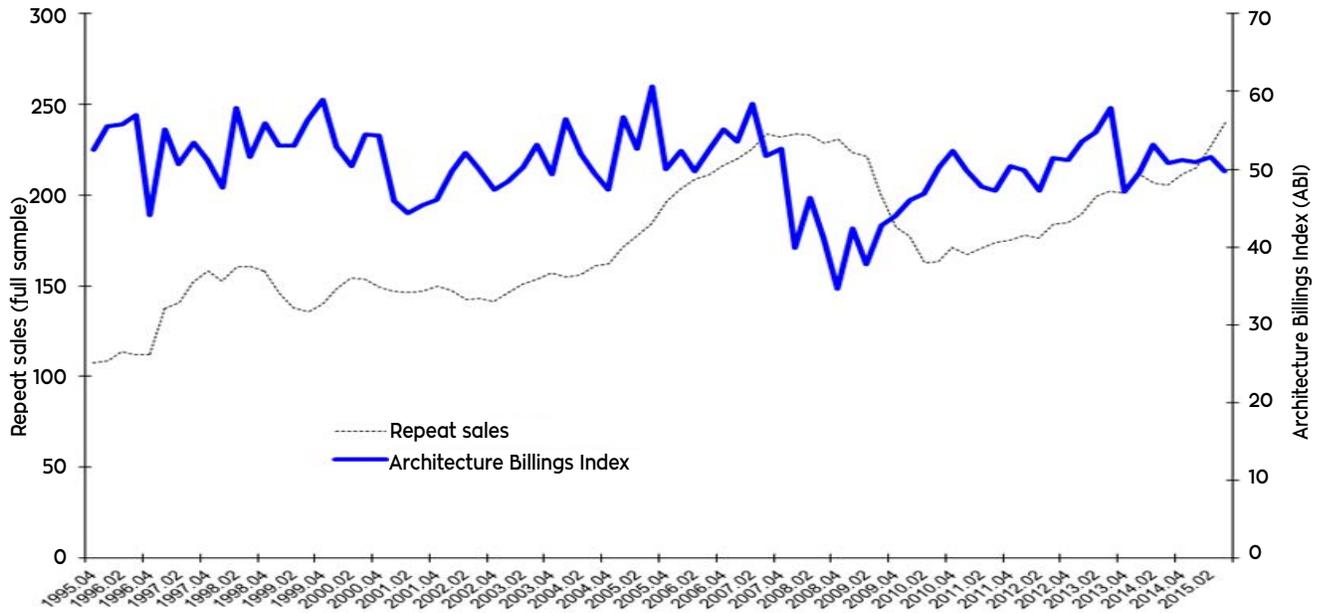
crossing below the upper bound in June 2015. Expect hotel prices to fall in the future. The question is not whether hotel prices will fall but rather when they will start to fall. An educated guess is that the drop will start when the Fed decides to raise interest rates (which apparently is not an immediate prospect).

The architecture billings index (ABI) for commercial and industrial property, which represents another forward looking metric declined in this quarter (2015Q3), continuing its descent from the prior quarter (2015Q2), as shown in Exhibit 22.⁷

⁷ See: www.aia.org/practicing/economics/aia076265. In the previous edition, we had reported that the index increased slightly based on our use of the most current ABI index that was available. However, since the last report was written the index for March 2015 has been published and as such we report the indices that are now available. The ABI anticipates non-residential construction activity by approximately 9-12 months. According to material posted on their website, "The indexes are developed from the monthly Work-on-the-Boards survey panel where participants are asked whether their billings increased, decreased, or stayed the same in the month that just ended. According to the proportion of respondents choosing each option, a score is generated, which represents an index value for each month."

EXHIBIT 22

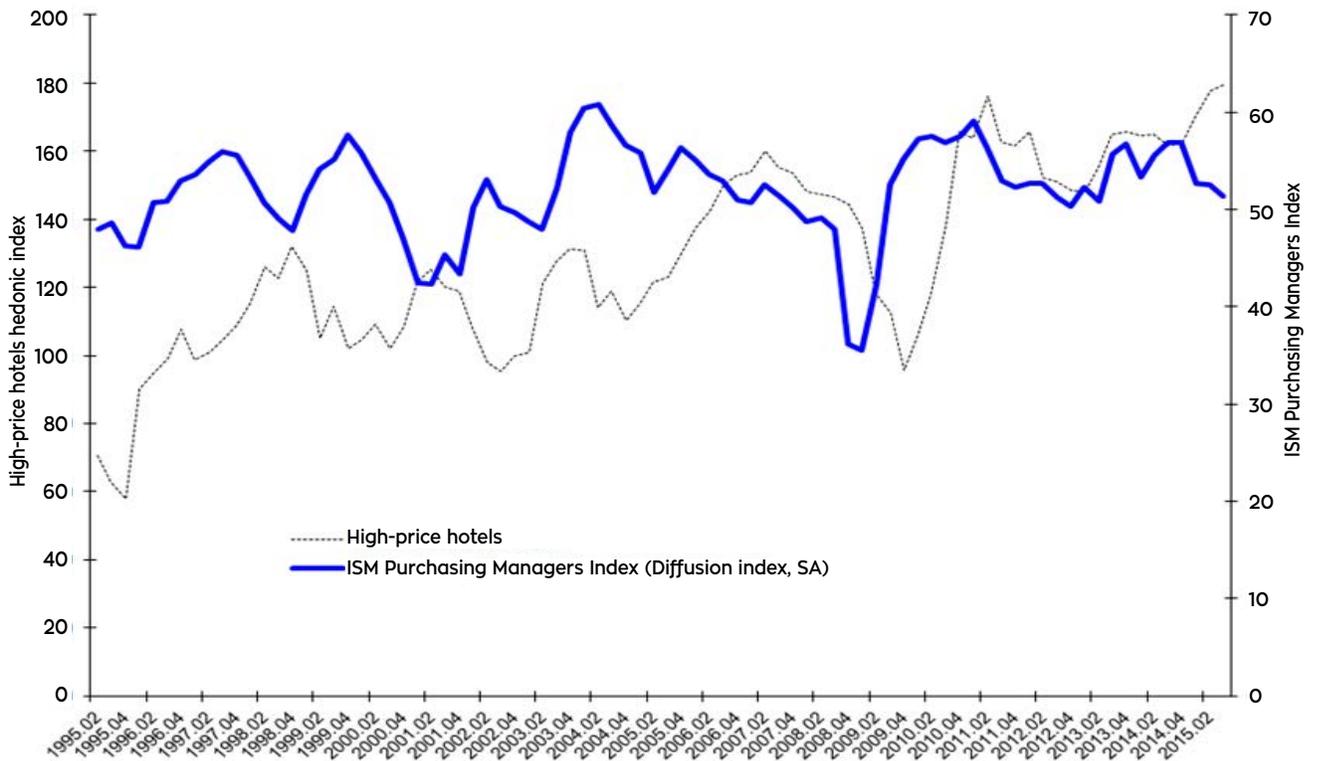
Hotel repeat sales index versus architecture billings index



Sources: Cornell Center for Real Estate and Finance, American Institute of Architects

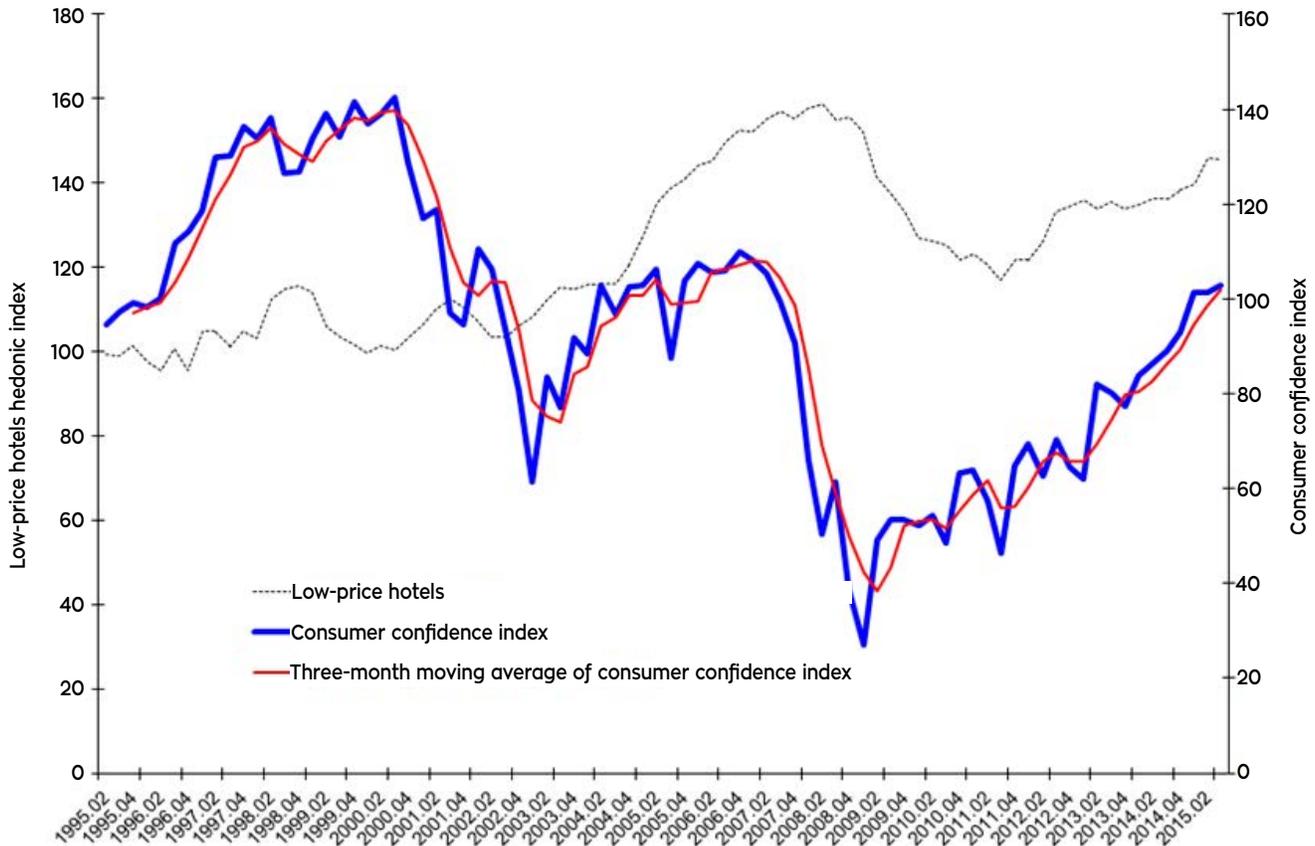
EXHIBIT 23

Business confidence index (National Association of Purchasing Managers) and high-price hotel index



Sources: Cornell Center for Real Estate and Finance, Institute for Supply Management (ISM)

Consumer confidence index and low-price hotel index



Sources: Cornell Center for Real Estate and Finance, Conference Board

Consistent with these indicators, the National Association of Purchasing Managers (NAPM) index shown in Exhibit 23, which is an indicator of anticipated business confidence and thus business traveler demand, continued to decline in this quarter both on a quarter-over-quarter basis (-2.4%) and also on a year-over-year basis (-9.7%).⁸ Although the absolute level of the index continues to remain above 50, indicating continued strength in the manufacturing sector, the manufacturing sector has been losing momentum since the fourth quarter of 2014 with the index falling from 56.87 (2014Q4) to 51.33 (2015Q3).

⁸ The ISM: Purchasing Managers' Index, (Diffusion index, SA) also known as the National Association of Purchasing Managers (NAPM) index is based on a survey of over 250 companies within twenty-one industries covering all 50 states. It not only measures the health of the manufacturing sector but is a proxy for the overall economy. It is calculated by surveying purchasing managers for data about new orders, production, employment, deliveries, and inventory, in descending order of importance. A reading over 50% indicates that manufacturing is growing, while a reading below 50% means it is shrinking.

The Consumer Confidence Index from the Conference Board graphed in Exhibit 24, which we use as a proxy for anticipated consumer demand for leisure travel and a leading indicator of the hedonic index for low price hotels (<\$10 million), continued to rise in September to 103 (blue line), a 1.6% increase on a quarter-over-quarter basis and 15.7% year over year. This suggests that we should expect the price of small hotels to continue to increase next quarter. ■

Hotel Valuation Model (HOTVAL) Has Been Updated.

We have updated our hotel valuation regression model to include the transaction data used to generate this report. We provide this user friendly hotel valuation model in an Excel spreadsheet entitled HOTVAL Toolkit as a complement to this report which is available for download from our [CREF website](#).

Appendix

SUP: The Standardized Unexpected Price Metric

The standardized unexpected price metric (SUP) is similar to the standardized unexpected earnings (SUE) indicator used to determine whether earnings surprises are statistically significant. An earnings surprise occurs when the firm's reported earnings per share deviates from the street estimate or the analysts' consensus forecast. To determine whether an earnings surprise is statistically significant, analysts use the following formula:

$$SUE_Q = (A_Q - \mu_Q) / s_Q$$

where SUE_Q = quarter Q standardized unexpected earnings,

A_Q = quarter Q actual earnings per share reported by the firm,

μ_Q = quarter Q consensus earnings per share forecasted by analysts in quarter Q-1, and

s_Q = quarter Q standard deviation of earnings estimates.

From statistics, the SUE_Q is normally distributed with a mean of zero and a standard deviation of one ($\sim N(0,1)$). This calculation shows an earnings surprise when earnings are statistically significant, when SUE_Q exceeds either ± 1.645 (90% significant) or ± 1.96 (95% significant). The earnings surprise is positive when $SUE_Q > 1.645$, which is statistically significant at the 90% level assuming a two-tailed distribution. Similarly, if $SUE_Q < -1.645$ then earnings are negative, which is statistically significant at the 90% level. Intuitively, SUE measures the earnings surprise in terms of the number of standard deviations above or below the consensus earnings estimate.

From our perspective, using this measure complements our visual analysis of the movement of hotel prices relative to their three-year and five-year moving average (μ). What is missing in the visual analysis is whether prices diverge significantly from the moving average in statistical terms. In other words, we wish to determine whether the current price diverges at least one standard deviation from μ , the historical average price. The question we wish to answer is whether price is reverting to (or diverging from) the historical mean. More specifically, the question is whether this is price mean reverting.

To implement this model in our current context, we use the three- or five-year moving average as our measure of μ and the rolling three- or five-year standard deviation as our measure of σ . Following is an example of how to calculate the SUP metric using high price hotels with regard to their three-year moving average. To calculate the three-year moving average from quarterly data we sum 12 quarters of data then divide by 12:

$$\text{Average } (\mu) = \frac{(70.6+63.11+58.11+90.54+95.24+99.70 +108.38+99.66+101.62+105.34+109.53+115.78)}{12} = 93.13$$

$$\text{Standard Deviation } (\sigma) = 18.99$$

$$\text{Standardized Unexp Price (SUP)} = \frac{(115.78-93.13)}{18.99} = 1.19$$

SUP data and σ calculation for high-price hotels (12 quarters/3 years)				
1995.02	70.60			
1995.03	63.11			
1995.04	58.11			
1996.01	90.54			
1996.02	95.24			
1996.03	99.70			
1996.04	108.38			
1997.01	99.66			
1997.02	101.62			
1997.03	105.34			
1997.04	109.53			
1998.01	115.78	93.13	18.99	1.19
1998.02	126.74	97.81	19.83	1.46

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