

Cornell Hotel Indices: Fourth Quarter 2019

2019 Ends on a Whimper

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

Only hotels in the New England region, and to a lesser extent the Midwest region, experienced a positive price momentum this quarter, although both regions suffered poor performance from a year-over-year perspective. Hotels located in gateway cities outperformed hotels in non-gateway cities. Hotel financial operating performance continued to post positive profit with operating profit exceeding both a hotel property's operating costs and its financial (borrowing) cost based on economic value analysis (EVA). Although the price of large hotels increased in the fourth quarter (as compared to quarter three), the price of small hotels declined quarter to quarter, and the price of both large and small hotels fell on a year-over-year basis. It appears that the price of both types of hotels is reverting to their moving average. The cost of hotel debt financing remained flat this quarter, while the cost of equity financing declined. In terms of risk premiums, there was no change in the risk premium for hotels compared to the risk-free rate. Besides this, the relative risk premium that lenders require for hotels over and above other commercial real estate has narrowed, indicating that lenders aren't demanding a higher compensation for originating hotel loans. However, the spread between the 10-year Treasury and the 3-month Treasury was flat in the current period, which continues to raise concerns over its impact on market liquidity as well as its contribution to slower price growth in hotels. A reading of our tea leaves suggests that large hotels should be expected to decline in price. In contrast, the price of smaller hotels is anticipated to rise. This is report number 33 of the index series.

ABOUT THE AUTHORS

Crocker H. Liu 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, Journal of Urban 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. He continues to be on the editorial board of Real Estate Economics. He is also an associate editor of Financial Review. He previously served on the editorial boards of the Journal of Real Estate Finance and Economics, the Journal of Property Research, and the Journal of Real Estate Finance. He is a past president of AREUEA (2019), the leading real estate academic organization. Professor 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 A. Graaskamp, and a Ph.D. in finance and real estate from the University of Texas under Dr. Vijay S. Bawa.



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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 serves on the board of directors for the Pension Real Estate Association and the advisory board for the Real Estate Research Institution. 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. White’s research has been published in the Journal of Real Estate Finance and Economics. Mr. White is a noted authority on the real estate capital markets with credits in The Wall Street Journal, Barron’s, The Economist, Forbes, The New York Times, and the Financial Times, among others.



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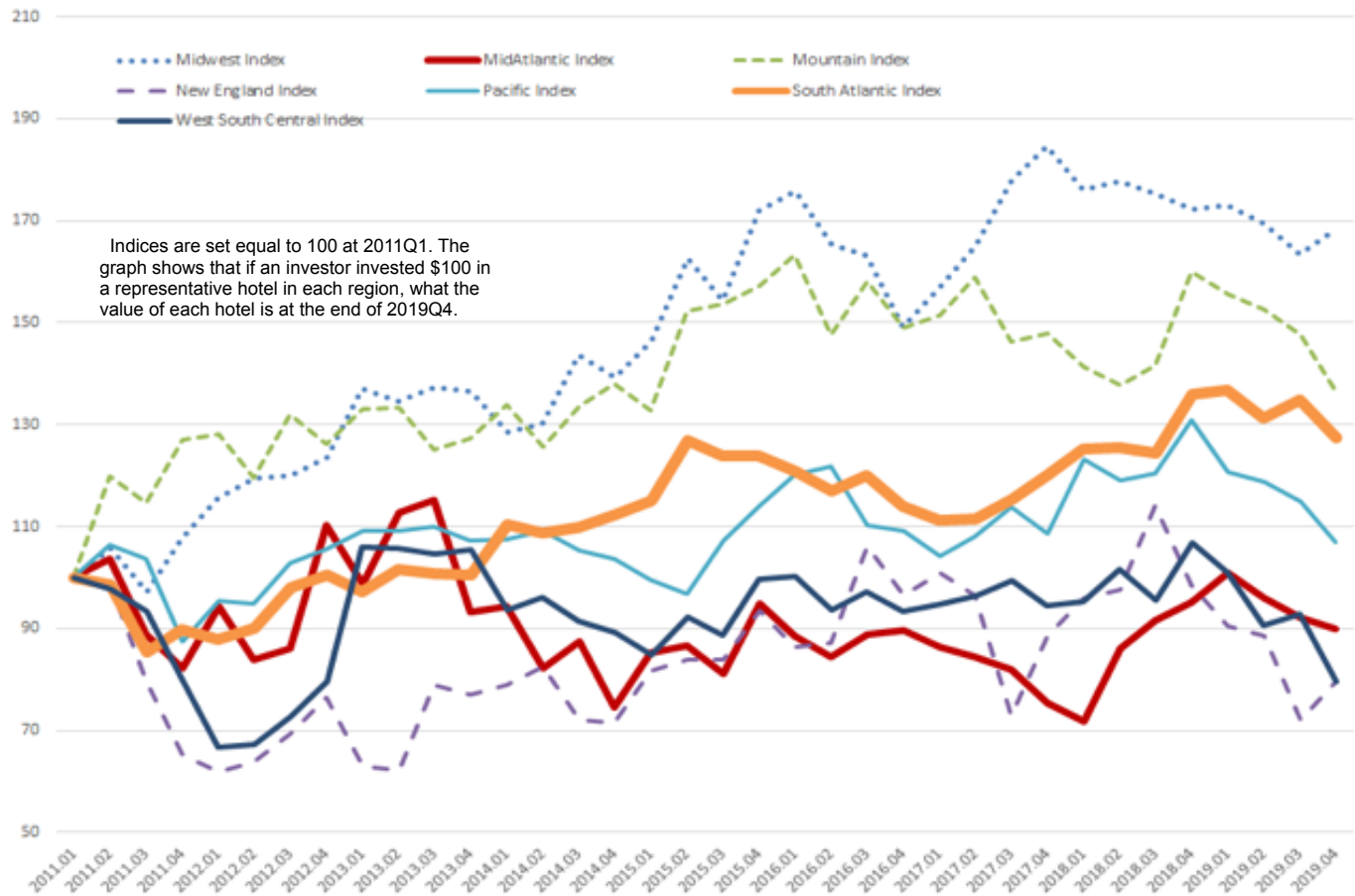
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EXHIBIT 1A

Times series hotel performance for 7 regions (post-recession)

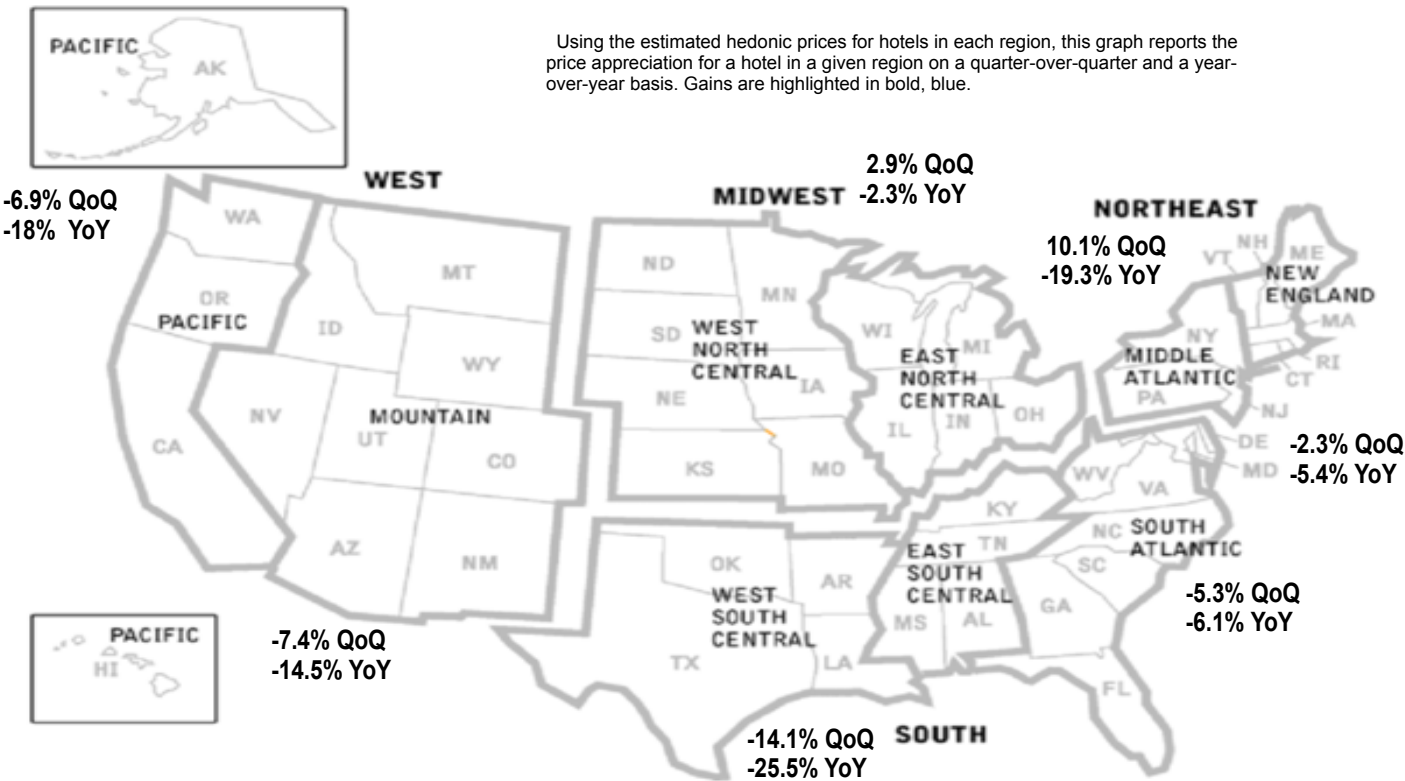


Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

ANALYSIS OF INDICES THROUGH Q4, 2019

Only hotels in the New England and Midwest regions exhibited positive price momentum. Exhibits 1a and 1b show that in the most recent quarter (2019Q4), hotels in the New England region (i.e., Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont) had positive price performance, increasing 10 percent quarter over quarter. Hotels in the Midwest region also exhibited positive price momentum, albeit to a lesser extent (3% quarter over quarter). All other regions experienced price declines. However, hotel price performance was negative on a year-over-year basis for all regions—ending 2019 on a sour note.

Cross-section hotel performance for 7 regions (post-recession)



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

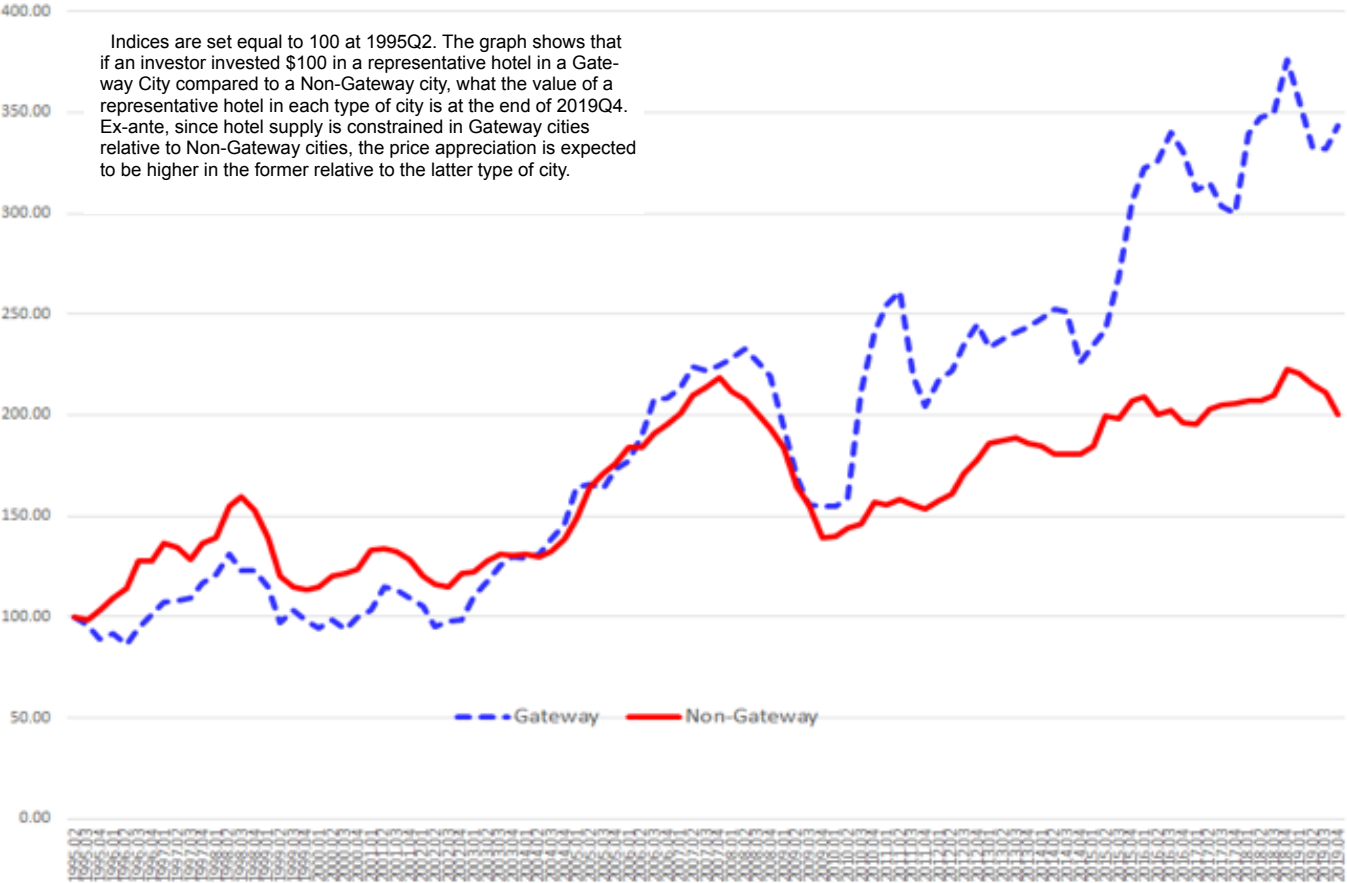
ABOUT THE CORNELL HOTEL INDICES

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 RCA commercial real estate databases. The large and small hotel indices are similar in nature and construction to the consumer price index (CPI), while the repeat sale hotel index is analogous to the retail concept of same store sales. Using a similar logic process for hotels, we compare the sales and resales of the same hotel over time for that index. All three measures provide a more accurate representation of the current hotel real estate market conditions than does reporting the 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. Starting with our 2018Q1 issue, we introduced the Gateway Cities Index as a new metric in our hotel analytics arsenal.¹ In this issue, we introduce our new Regional Indices to add further granularity to hotel performance. We also present updates and revisions to our hotel indices along with commentary and supporting evidence from the real estate market.

New in this issue. Starting with this issue, we include 30+ days delinquent data for hotel loans that have been securitized into CMBS from Trepp to offer further insights to our readers on hotel trends.

¹ Cities that we define as gateway cities include Boston, Chicago, Honolulu, Los Angeles, Miami, New York, San Francisco, and Washington DC. For a general discussion on what constitutes a gateway city, please see Corgel, J.B. (2012), What is a Gateway City?: A Hotel Market Perspective, Center for Real Estate and Finance Reports, Cornell University School of Hotel Administration (<https://scholarship.sha.cornell.edu/cgi/viewcontent.cgi?article=1007&context=crefpubs>). The study of Corgel, J. B., Liu, C., & White, R. M. (2015). Determinants of hotel property prices. Journal of Real Estate Finance and Economics, 51, 415-439 finds that a significant driver of hotel property prices is whether a hotel is located in a gateway city. The presumption is that hotels (and other real estate) in gateway cities exceed other cities as IRR generators in part due to a generally stronger economic climate as a result of higher barriers to entry, tighter supply, and/or relatively stronger performance in terms of revenue per available room than other top cities that are not gateways.

Hotel performance for gateway cities versus non-gateway cities



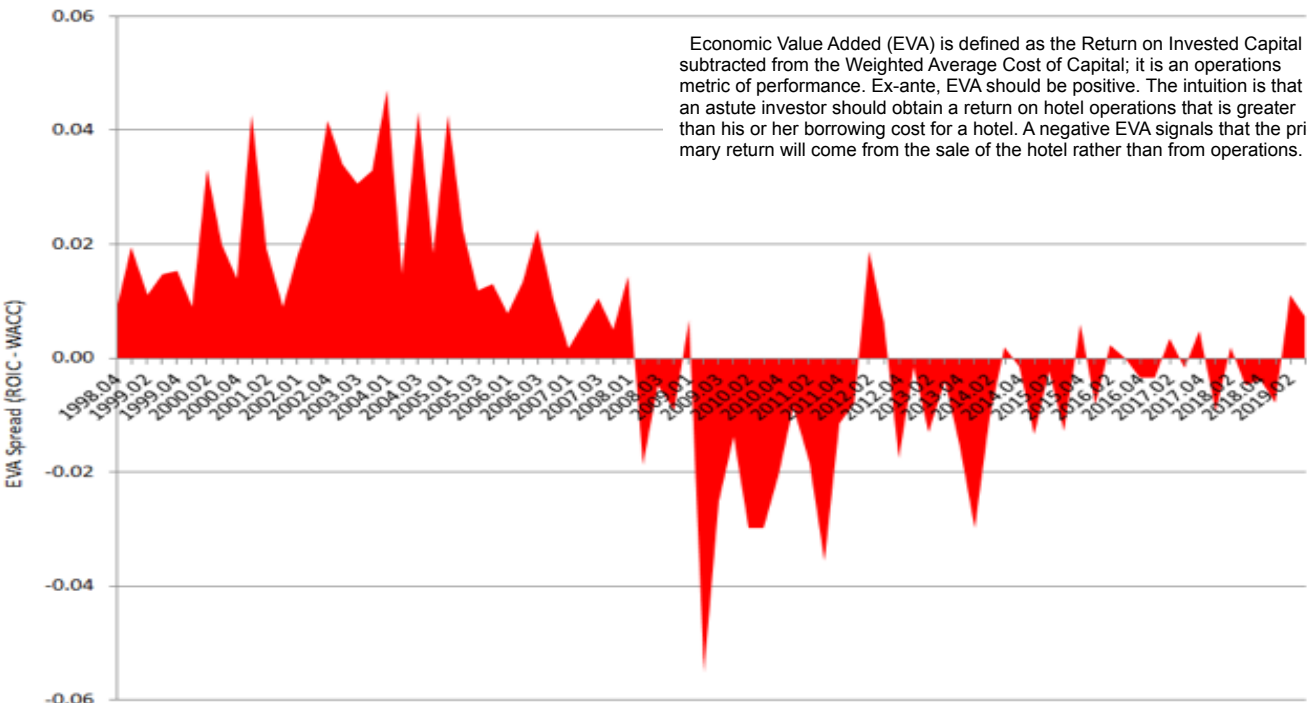
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

Although the performance of hotels in gateway cities rose this quarter, it declined year over year. Non-gateway cities continued to exhibit poor performance. Exhibit 2 shows the relative price performance for hotels sold in gateway cities versus non-gateway cities. The performance of hotels in gateway cities reversed itself, rising 3.4 percent this quarter compared to a drop of 0.1 percent in the previous quarter. Hotels in non-gateway cities continued to decline further this quarter, falling from a reduction of 1.8

percent to a drop of 5.1 percent. Year over year, however, the price of hotels in both gateway and non-gateway cities fell, with a reduction of 8.7 percent for gateway cities and a drop of 10.2 percent for non-gateway cities. This continues the negative momentum that we noted in the prior year-over-year period in gateway cities (which saw a drop of 5 percent) and in non-gateway cities (which had gained just 0.6 percent in the third quarter).

EXHIBIT 3

Economic value added (eva) for hotels)



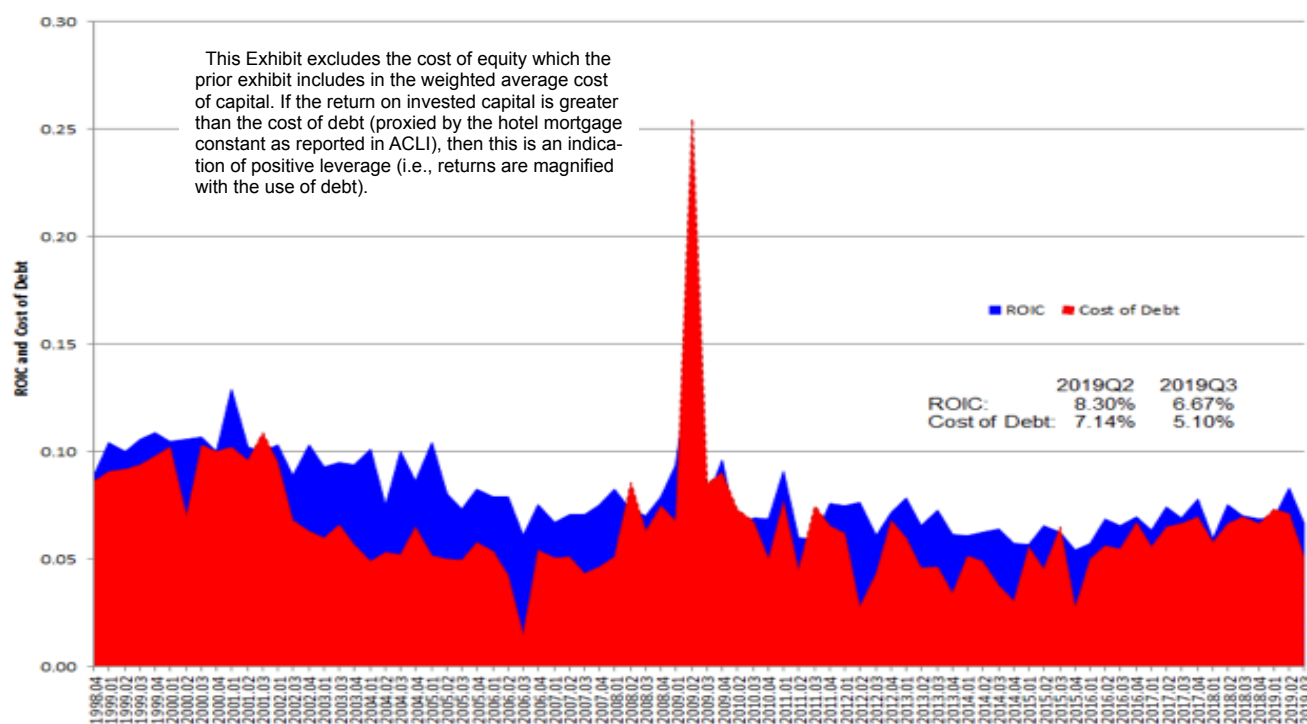
Sources: ACLI, Cornell Center for Real Estate and Finance, NAREIT, Federal Reserve

Hotel investment based on operating performance continues to be in the green (showing modest profit). Our Economic Value Added (EVA) indicator for 2019 Q3, shown in Exhibit 3, continues to be positive at 0.7 percent, compared to a 1.1-percent rise in the prior quarter (that is, 2019Q2). This indicates that at least some of the return on hotels is coming from operations, with profits not only

covering operating costs but also financial costs (both the cost of debt and the cost of equity). Taken from a slightly different perspective (no equity financing considered), the ACLI hotel cap rate, which is a proxy for the return on invested capital (ROIC) fell from 8.3 percent (in 2019Q2) to 6.67 percent (in 2019Q3), while the cost of debt financing as measured by the mortgage constant also declined

EXHIBIT 4

Return on investment capital versus cost of debt financing



Sources: ACLI, Cornell Center for Real Estate and Finance

over the same period, from 7.14 percent to 5.1 percent. Thus, as shown in Exhibit 4, positive leverage continued to exist in 2019Q3, the latest quarter for which ACLI data are available, making penciling deals feasible. Positive leverage means that the return that an investor receives from operations is higher than his or her borrowing cost (cost of debt financing).

The median price of hotels rose on a quarterly basis but declined on a year over year basis continuing the trend in the prior period. The median price based on all hotel transactions (both large hotels and small hotels combined) increased 5 percent from the previous quarter (\$4.9M vs \$4.7M) on weaker volume (381 transactions for 2019Q4 versus 402 transactions for 2019Q3), as reported

Transaction volume (obs) and median sale price, 1995–2004

Year	Qtr	Full Sample		Big			Small			Gateway			No Gateway		
		Median Sale Price	Obs	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
1995	1	\$2,357,500	20	NA	0	0.0%	\$2,357,500	20	100.0%	\$3,400,000	7	35.0%	\$2,100,000	13	65.0%
1995	2	\$3,150,000	29	\$15,712,500	6	20.7%	\$2,670,000	23	79.3%	\$3,800,000	12	41.4%	\$2,906,150	17	58.6%
1995	3	\$2,562,500	44	\$12,400,000	4	9.1%	\$2,378,000	40	90.9%	\$3,500,000	20	45.5%	\$2,000,000	24	54.5%
1995	4	\$3,400,000	41	\$27,750,000	10	24.4%	\$2,625,000	31	75.6%	\$5,075,000	14	34.1%	\$3,100,000	27	65.9%
1996	1	\$2,500,000	39	\$14,475,000	8	20.5%	\$1,700,000	31	79.5%	\$2,500,000	13	33.3%	\$2,687,500	26	66.7%
1996	2	\$2,925,000	43	\$29,150,000	12	27.9%	\$2,500,000	31	72.1%	\$3,200,000	15	34.9%	\$2,730,000	28	65.1%
1996	3	\$6,500,000	57	\$17,740,000	20	35.1%	\$3,000,000	37	64.9%	\$5,500,000	25	43.9%	\$6,890,500	32	56.1%
1996	4	\$2,735,000	58	\$19,000,000	17	29.3%	\$2,200,000	41	70.7%	\$4,650,000	27	46.6%	\$2,400,000	31	53.4%
1997	1	\$5,053,250	74	\$16,635,500	23	31.1%	\$3,500,000	51	68.9%	\$6,300,000	29	39.2%	\$4,075,000	45	60.8%
1997	2	\$2,862,500	72	\$17,750,000	17	23.6%	\$2,150,000	55	76.4%	\$2,445,000	24	33.3%	\$3,047,350	48	66.7%
1997	3	\$3,437,500	90	\$19,000,000	21	23.3%	\$2,400,000	69	76.7%	\$5,140,000	38	42.2%	\$2,550,000	52	57.8%
1997	4	\$4,330,950	78	\$17,000,000	27	34.6%	\$2,300,000	51	65.4%	\$10,435,445	27	34.6%	\$3,600,000	51	65.4%
1998	1	\$4,698,800	92	\$20,000,000	31	33.7%	\$3,100,000	61	66.3%	\$6,353,000	33	35.9%	\$4,600,000	59	64.1%
1998	2	\$3,630,000	96	\$23,765,000	21	21.9%	\$3,000,000	75	78.1%	\$3,998,240	28	29.2%	\$3,575,000	68	70.8%
1998	3	\$2,961,059	92	\$16,740,000	12	13.0%	\$2,690,550	80	87.0%	\$2,255,000	30	32.6%	\$3,365,000	62	67.4%
1998	4	\$2,550,000	84	\$35,000,000	15	17.9%	\$2,375,000	69	82.1%	\$4,225,000	30	35.7%	\$2,500,000	54	64.3%
1999	1	\$2,425,000	88	\$24,638,095	10	11.4%	\$2,125,000	78	88.6%	\$3,500,000	32	36.4%	\$2,300,000	56	63.6%
1999	2	\$2,100,000	95	\$67,000,000	5	5.3%	\$1,950,000	90	94.7%	\$2,067,500	28	29.5%	\$2,100,000	67	70.5%
1999	3	\$2,500,000	99	\$20,711,100	10	10.1%	\$2,130,000	89	89.9%	\$1,800,000	19	19.2%	\$2,522,500	80	80.8%
1999	4	\$2,440,000	87	\$18,190,000	14	16.1%	\$2,090,000	73	83.9%	\$2,210,000	23	26.4%	\$2,575,000	64	73.6%
2000	1	\$2,400,000	110	\$23,253,895	10	9.1%	\$2,300,000	100	90.9%	\$2,325,000	44	40.0%	\$2,428,500	66	60.0%
2000	2	\$2,450,000	88	\$14,500,000	9	10.2%	\$2,275,000	79	89.8%	\$2,325,000	24	27.3%	\$2,450,000	64	72.7%
2000	3	\$2,600,000	95	\$20,346,875	16	16.8%	\$2,250,000	79	83.2%	\$2,925,000	24	25.3%	\$2,525,000	71	74.7%
2000	4	\$2,475,000	101	\$18,050,000	14	13.9%	\$2,300,000	87	86.1%	\$4,500,000	26	25.7%	\$2,350,000	75	74.3%
2001	1	\$2,970,650	104	\$28,437,500	18	17.3%	\$2,422,500	86	82.7%	\$2,650,000	29	27.9%	\$3,000,000	75	72.1%
2001	2	\$2,800,000	110	\$23,795,000	12	10.9%	\$2,687,150	98	89.1%	\$5,825,000	25	22.7%	\$2,684,300	85	77.3%
2001	3	\$2,700,000	87	\$16,000,000	6	6.9%	\$2,500,000	81	93.1%	\$3,150,000	21	24.1%	\$2,600,000	66	75.9%
2001	4	\$2,400,000	73	\$20,500,000	5	6.8%	\$2,300,000	68	93.2%	\$2,800,000	17	23.3%	\$2,300,000	56	76.7%
2002	1	\$2,125,000	70	\$11,518,052	5	7.1%	\$2,000,000	65	92.9%	\$1,700,000	17	24.3%	\$2,200,000	53	75.7%
2002	2	\$2,400,000	106	\$18,125,000	10	9.4%	\$2,287,500	96	90.6%	\$3,125,000	33	31.1%	\$2,300,000	73	68.9%
2002	3	\$2,355,400	81	\$12,750,000	5	6.2%	\$2,237,500	76	93.8%	\$2,197,500	24	29.6%	\$2,470,000	57	70.4%
2002	4	\$2,907,500	100	\$23,500,000	16	16.0%	\$2,575,000	84	84.0%	\$2,907,500	34	34.0%	\$2,862,500	66	66.0%
2003	1	\$2,530,000	94	\$13,000,000	9	9.6%	\$2,425,000	85	90.4%	\$3,850,000	21	22.3%	\$2,425,000	73	77.7%
2003	2	\$2,750,000	110	\$18,500,000	10	9.1%	\$2,509,500	100	90.9%	\$3,160,000	31	28.2%	\$2,600,000	79	71.8%
2003	3	\$3,333,000	141	\$14,359,286	28	19.9%	\$2,600,000	113	80.1%	\$3,660,000	45	31.9%	\$3,032,500	96	68.1%
2003	4	\$2,600,000	149	\$16,375,000	18	12.1%	\$2,425,000	131	87.9%	\$2,950,000	35	23.5%	\$2,500,000	114	76.5%
2004	1	\$2,925,000	166	\$22,875,250	24	14.5%	\$2,536,756	142	85.5%	\$3,450,000	41	24.7%	\$2,894,000	125	75.3%
2004	2	\$2,700,000	195	\$16,280,000	28	14.4%	\$2,450,000	167	85.6%	\$4,500,000	39	20.0%	\$2,540,000	156	80.0%
2004	3	\$3,491,122	216	\$19,350,000	45	20.8%	\$2,610,000	171	79.2%	\$4,600,000	51	23.6%	\$3,306,500	165	76.4%
2004	4	\$4,000,000	177	\$20,475,000	47	26.6%	\$3,085,500	130	73.4%	\$8,850,000	36	20.3%	\$3,600,000	141	79.7%

The Median Sales Price, Number of Sold Transactions, and the Percent of Total Sales is reported for the Full Sample, Large Hotels (≥ \$10 Million), Small Hotels (<\$10 Million), Gateway Cities and Non-Gateway Cities.

Transaction volume (obs) and median sale price, 2005–2014

Year	Qtr	Full Sample		Big			Small			Gateway			No Gateway		
		Median Sale Price	Obs	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
2005	1	\$4,330,000	231	\$18,100,000	52	22.5%	\$3,300,000	179	77.5%	\$6,687,500	40	17.3%	\$3,800,000	191	82.7%
2005	2	\$4,566,250	316	\$18,956,812	78	24.7%	\$3,255,150	238	75.3%	\$6,475,000	68	21.5%	\$4,385,000	248	78.5%
2005	3	\$4,150,000	273	\$21,475,000	72	26.4%	\$3,100,000	201	73.6%	\$6,100,000	61	22.3%	\$3,750,000	212	77.7%
2005	4	\$4,425,000	300	\$25,000,000	93	31.0%	\$3,150,000	207	69.0%	\$11,200,000	65	21.7%	\$4,000,000	235	78.3%
2006	1	\$5,300,000	301	\$25,750,000	92	30.6%	\$3,800,000	209	69.4%	\$18,000,000	64	21.3%	\$4,943,744	237	78.7%
2006	2	\$4,750,000	313	\$22,750,000	82	26.2%	\$3,500,000	231	73.8%	\$6,175,000	56	17.9%	\$4,500,000	257	82.1%
2006	3	\$5,000,000	285	\$22,500,000	86	30.2%	\$3,650,000	199	69.8%	\$7,000,000	59	20.7%	\$4,705,399	226	79.3%
2006	4	\$4,587,500	248	\$21,200,000	65	26.2%	\$3,550,000	183	73.8%	\$8,093,750	56	22.6%	\$4,270,000	192	77.4%
2007	1	\$6,155,805	286	\$21,225,000	104	36.4%	\$3,700,000	182	63.6%	\$9,500,000	63	22.0%	\$5,700,000	223	78.0%
2007	2	\$5,650,000	385	\$25,125,000	120	31.2%	\$3,750,000	265	68.8%	\$9,000,000	67	17.4%	\$5,450,000	318	82.6%
2007	3	\$5,450,000	330	\$20,100,161	105	31.8%	\$3,900,000	225	68.2%	\$8,325,000	53	16.1%	\$5,011,554	277	83.9%
2007	4	\$4,680,000	249	\$23,250,000	86	34.5%	\$3,150,000	163	65.5%	\$9,375,000	36	14.5%	\$4,500,000	213	85.5%
2008	1	\$5,000,000	255	\$16,000,000	61	23.9%	\$3,985,000	194	76.1%	\$5,990,000	46	18.0%	\$4,650,000	209	82.0%
2008	2	\$5,062,900	228	\$22,150,000	50	21.9%	\$3,890,000	178	78.1%	\$8,725,000	38	16.7%	\$4,800,000	190	83.3%
2008	3	\$4,190,500	172	\$17,133,333	37	21.5%	\$3,350,000	135	78.5%	\$5,500,000	27	15.7%	\$3,900,000	145	84.3%
2008	4	\$4,050,000	159	\$18,850,000	32	20.1%	\$3,500,000	127	79.9%	\$4,972,500	27	17.0%	\$3,920,000	132	83.0%
2009	1	\$4,150,000	81	\$15,800,000	15	18.5%	\$3,600,000	66	81.5%	\$7,375,000	16	19.8%	\$3,700,000	65	80.2%
2009	2	\$3,090,231	86	\$14,722,500	11	12.8%	\$2,864,310	75	87.2%	\$5,410,250	16	18.6%	\$3,000,000	70	81.4%
2009	3	\$3,400,000	90	\$22,000,000	16	17.8%	\$3,000,000	74	82.2%	\$4,608,750	14	15.6%	\$3,195,271	76	84.4%
2009	4	\$3,562,500	84	\$14,100,000	14	16.7%	\$3,010,250	70	83.3%	\$4,520,000	12	14.3%	\$3,400,000	72	85.7%
2010	1	\$3,900,000	89	\$20,162,500	18	20.2%	\$2,825,000	71	79.8%	\$8,450,000	15	16.9%	\$3,825,000	74	83.1%
2010	2	\$3,700,000	138	\$30,833,449	34	24.6%	\$3,000,000	104	75.4%	\$15,400,000	34	24.6%	\$3,100,000	104	75.4%
2010	3	\$4,912,500	120	\$35,500,000	46	38.3%	\$2,850,000	74	61.7%	\$25,000,000	37	30.8%	\$3,117,000	83	69.2%
2010	4	\$3,988,800	100	\$30,353,182	38	38.0%	\$2,420,000	62	62.0%	\$38,500,000	23	23.0%	\$3,265,000	77	77.0%
2011	1	\$4,200,000	85	\$34,050,000	24	28.2%	\$2,795,500	61	71.8%	\$12,275,000	15	17.6%	\$3,775,000	70	82.4%
2011	2	\$4,200,000	97	\$51,200,000	31	32.0%	\$2,250,000	66	68.0%	\$15,600,000	23	23.7%	\$3,175,000	74	76.3%
2011	3	\$3,350,000	73	\$23,772,500	20	27.4%	\$2,800,000	53	72.6%	\$3,700,000	17	23.3%	\$3,275,000	56	76.7%
2011	4	\$5,000,000	157	\$32,400,000	43	27.4%	\$3,229,250	114	72.6%	\$10,950,000	34	21.7%	\$4,300,000	123	78.3%
2012	1	\$5,233,961	131	\$22,100,000	40	30.5%	\$3,275,000	91	69.5%	\$13,837,500	28	21.4%	\$4,200,000	103	78.6%
2012	2	\$4,000,000	209	\$17,000,000	61	29.2%	\$2,779,500	148	70.8%	\$15,900,000	22	10.5%	\$3,700,000	187	89.5%
2012	3	\$7,000,000	169	\$19,100,000	67	39.6%	\$2,720,250	102	60.4%	\$16,050,000	32	18.9%	\$5,250,000	137	81.1%
2012	4	\$5,622,500	207	\$24,866,613	74	35.7%	\$3,125,000	133	64.3%	\$16,174,794	39	18.8%	\$5,070,000	168	81.2%
2013	1	\$5,999,992	239	\$21,154,582	85	35.6%	\$2,962,500	154	64.4%	\$7,750,000	52	21.8%	\$5,575,000	187	78.2%
2013	2	\$4,700,000	217	\$22,000,000	71	32.7%	\$2,500,000	146	67.3%	\$16,000,000	38	17.5%	\$4,200,000	179	82.5%
2013	3	\$5,260,855	246	\$25,000,000	75	30.5%	\$3,300,000	171	69.5%	\$9,949,500	35	14.2%	\$4,750,000	211	85.8%
2013	4	\$4,537,500	314	\$24,000,000	98	31.2%	\$2,790,000	216	68.8%	\$13,500,000	55	17.5%	\$4,000,000	259	82.5%
2014	1	\$5,625,000	228	\$20,750,000	70	30.7%	\$3,300,000	158	69.3%	\$8,825,900	59	25.9%	\$5,000,000	169	74.1%
2014	2	\$4,300,000	320	\$26,125,000	88	27.5%	\$2,818,750	232	72.5%	\$11,200,000	59	18.4%	\$3,700,000	261	81.6%
2014	3	\$5,500,000	351	\$20,000,000	97	27.6%	\$3,425,000	254	72.4%	\$10,567,078	66	18.8%	\$5,000,000	285	81.2%
2014	4	\$4,500,000	311	\$29,625,000	78	25.1%	\$3,040,000	233	74.9%	\$8,200,000	73	23.5%	\$3,950,000	238	76.5%

EXHIBIT 5c

Transaction volume (obs) and median sale price, 2015–current

Year	Qtr	Full Sample		Big			Small			Gateway			No Gateway		
		Median Sale Price	Obs	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
2015	1	\$5,752,500	254	\$29,750,000	82	32.3%	\$3,125,000	172	67.7%	\$8,280,000	47	18.5%	\$5,500,000	207	81.5%
2015	2	\$6,350,000	268	\$24,575,000	92	34.3%	\$3,250,000	176	65.7%	\$18,765,000	46	17.2%	\$5,612,500	222	82.8%
2015	3	\$5,050,000	299	\$24,800,000	87	29.1%	\$3,012,500	212	70.9%	\$12,100,000	53	17.7%	\$4,275,000	246	82.3%
2015	4	\$6,650,000	292	\$18,264,737	106	36.3%	\$3,125,000	186	63.7%	\$14,500,000	51	17.5%	\$5,400,000	241	82.5%
2016	1	\$5,600,000	293	\$20,375,000	87	29.7%	\$3,350,000	206	70.3%	\$13,600,000	45	15.4%	\$5,275,000	248	84.6%
2016	2	\$4,100,000	322	\$16,000,000	61	18.9%	\$3,300,000	261	81.1%	\$11,600,000	48	14.9%	\$3,725,000	274	85.1%
2016	3	\$4,862,500	284	\$25,000,000	75	26.4%	\$3,200,000	209	73.6%	\$24,500,000	34	12.0%	\$4,362,500	250	88.0%
2016	4	\$4,000,000	263	\$19,480,000	73	27.8%	\$2,800,000	190	72.2%	\$13,352,600	28	10.6%	\$3,664,706	235	89.4%
2017	1	\$5,300,000	254	\$22,880,750	70	27.6%	\$3,625,000	184	72.4%	\$14,726,254	28	11.0%	\$5,000,000	226	89.0%
2017	2	\$5,100,000	331	\$22,660,000	91	27.5%	\$3,325,000	240	72.5%	\$16,450,000	37	11.2%	\$4,462,500	294	88.8%
2017	3	\$5,000,000	324	\$22,250,000	86	26.5%	\$3,403,000	238	73.5%	\$22,250,000	38	11.7%	\$4,500,000	286	88.3%
2017	4	\$4,500,000	265	\$28,000,000	66	24.9%	\$2,875,000	199	75.1%	\$12,208,000	26	9.8%	\$4,250,000	239	90.2%
2018	1	\$5,600,000	311	\$21,691,200	98	31.5%	\$3,500,000	213	68.5%	\$14,750,000	40	12.9%	\$5,000,000	271	87.1%
2018	2	\$4,805,200	366	\$19,750,000	82	22.4%	\$3,300,000	284	77.6%	\$17,625,000	40	10.9%	\$4,300,000	326	89.1%
2018	3	\$5,125,000	334	\$21,265,000	83	24.9%	\$3,710,000	251	75.1%	\$13,342,500	22	6.6%	\$5,000,000	312	93.4%
2018	4	\$6,490,000	279	\$20,500,000	105	37.6%	\$3,300,000	174	62.4%	\$14,440,000	33	11.8%	\$5,580,556	246	88.2%
2019	1	\$5,340,000	290	\$17,802,698	76	26.2%	\$3,525,000	214	73.8%	\$15,750,000	34	11.7%	\$4,750,000	256	88.3%
2019	2	\$4,015,500	334	\$19,848,485	62	18.6%	\$3,335,000	272	81.4%	\$6,300,000	35	10.5%	\$3,900,000	299	89.5%
2019	3	\$4,707,500	402	\$21,000,000	96	23.9%	\$3,500,000	306	76.1%	\$15,850,000	42	10.4%	\$4,362,500	360	89.6%
2019	4	\$4,944,500	381	\$22,805,650	92	24.1%	\$3,300,000	289	75.9%	\$11,000,000	35	9.2%	\$4,550,000	338	88.7%

in Exhibit 5. Year over year (2018Q4 versus 2019Q4), the median price of hotels fell by 23.8 percent compared to a drop of 8.2 percent in the prior year-over-year period, albeit on stronger volume (36.6% compared to 20.4% in the prior period). A comparison of large hotels relative to small hotels on a year-over-year basis reveals that the median price of large hotels rose 11.25 percent compared to a reduction of 1.2 percent in the prior period, on weaker volume (-12.4%), while the median price of smaller hotels remained constant (zero change) on stron-

ger volume (61%).² A similar situation exists on a quarter-over-quarter basis for large hotels, with the median sale price of large hotels rising 8.6 percent on weaker transaction volume (-4.2%), while the median sale price of smaller hotels fell 5.7 percent on weaker volume (-5.6%). Exhibit 6 and Exhibit 7 show this year-over-year trend in the number of transactions for large hotels and small hotels.

² Note that the number of transactions is limited to the sales that are included in the hedonic index. As such, it should not be construed as being the total market activity.

EXHIBIT 6

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

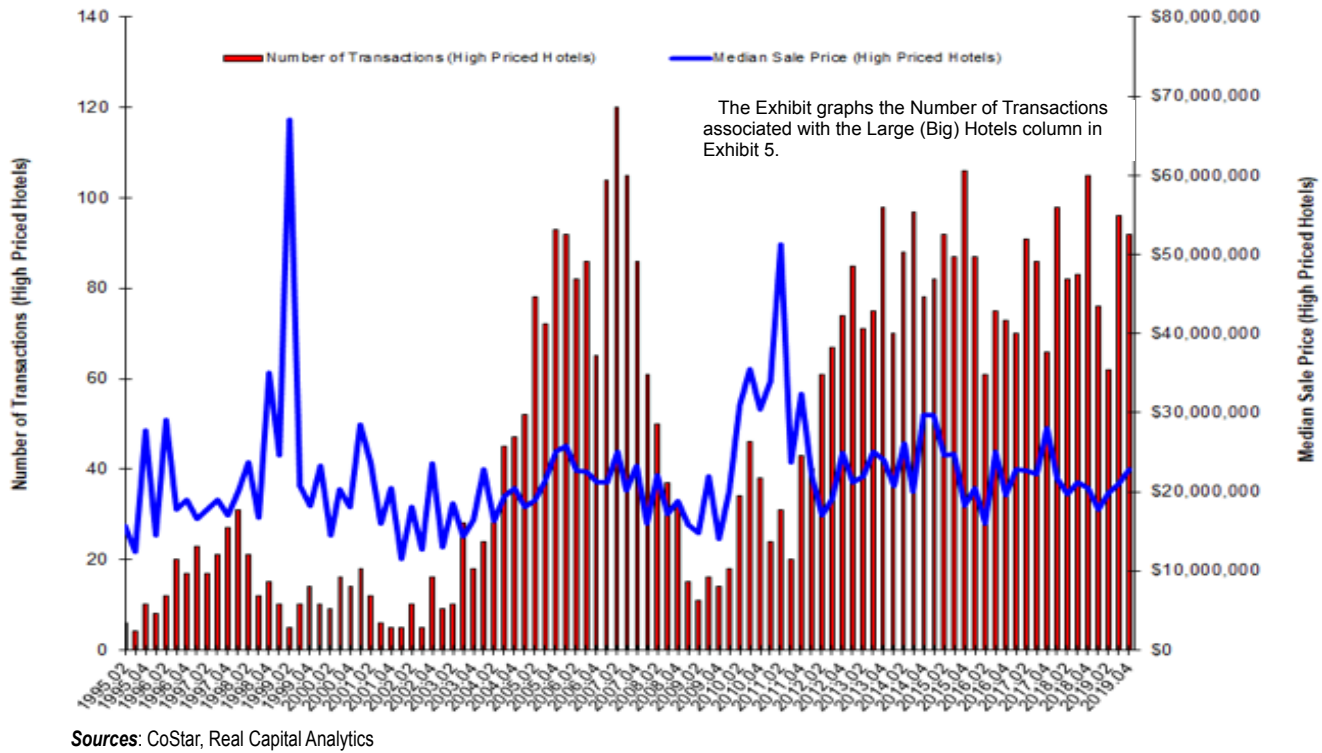
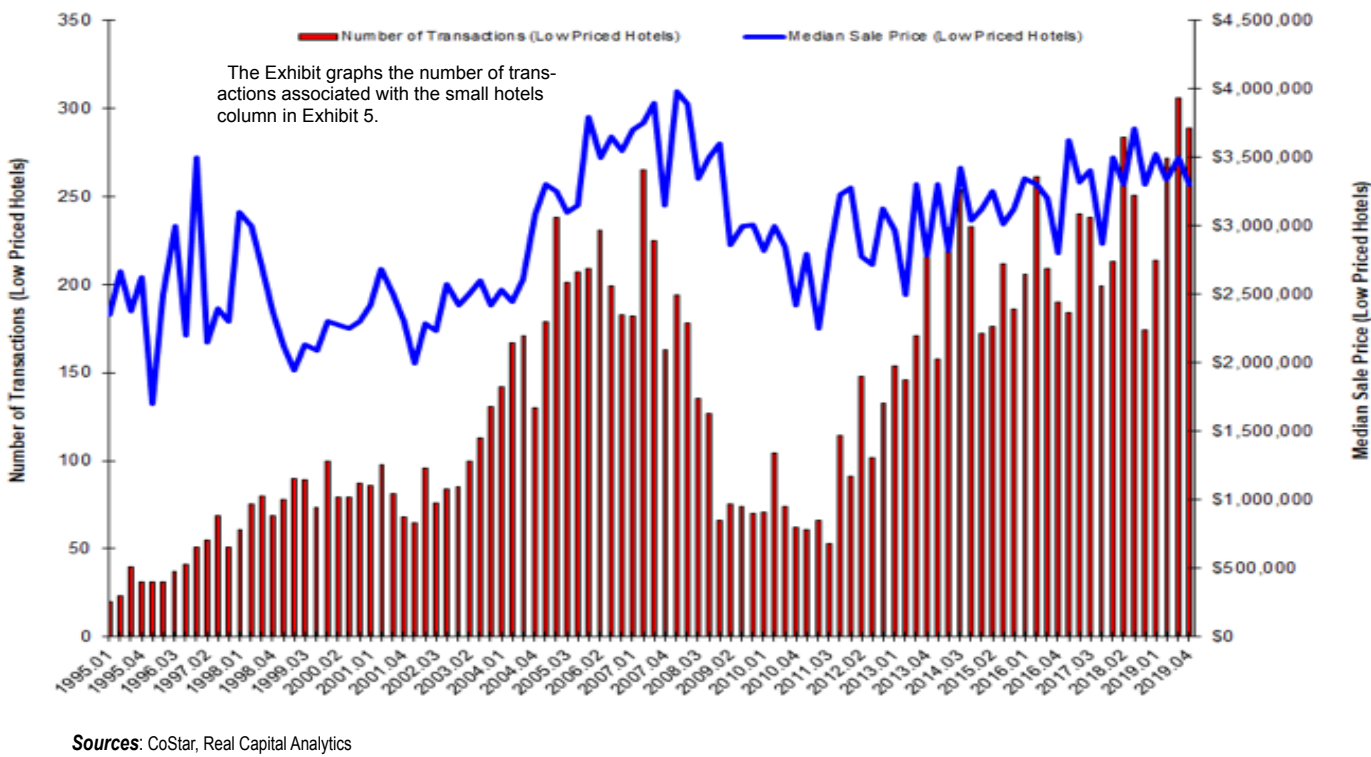


EXHIBIT 7

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

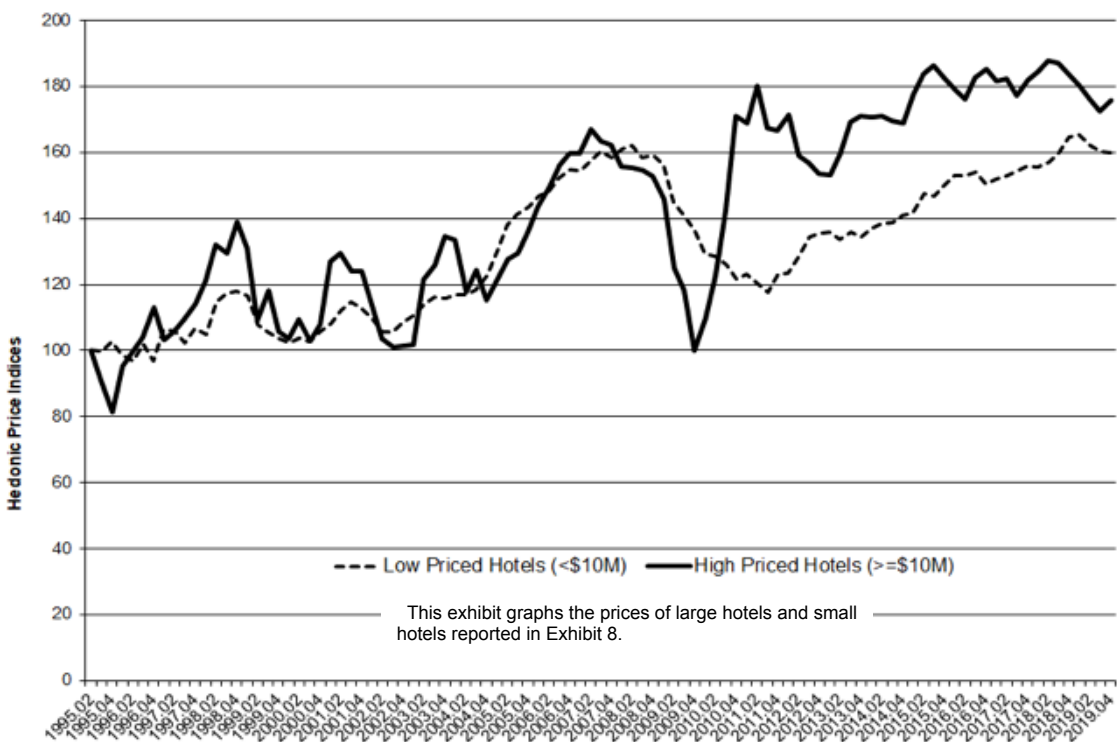


Hotel indices through 2019, quarter 4

	Low Priced Hotels (<\$10M)	High Priced Hotels (>=\$10M)	Non Gateway Index	Gateway Index	Repeat Sales Index	Index Value Repeat Sales		Low Priced Hotels (<\$10M)	High Priced Hotels (>=\$10M)	Non Gateway Index	Gateway Index	Repeat Sales Index	Index Value Repeat Sales
YrQtr							YrQtr						
1995.02	97.97	93.45	82.57	102.19	63.70	NA	2008.01	157.73	145.63	174.82	233.04	159.78	167.51
1995.03	97.90	85.07	81.53	98.06	67.15	NA	2008.02	158.89	145.14	171.35	237.83	160.25	168.74
1995.04	100.54	76.01	85.53	91.22	69.31	NA	2008.03	155.24	144.61	165.44	230.84	158.01	163.90
1996.01	96.80	89.01	90.10	93.74	71.05	NA	2008.04	156.16	142.97	159.93	224.18	160.42	167.93
1996.02	95.04	92.94	94.52	88.47	74.81	NA	2009.01	153.03	136.43	151.84	198.18	156.38	163.94
1996.03	100.07	97.36	105.23	96.57	73.59	NA	2009.02	142.05	116.97	135.73	172.85	151.65	157.12
1996.04	94.82	105.60	105.44	103.65	74.71	NA	2009.03	137.76	110.56	128.20	159.15	138.81	144.88
1997.01	104.27	96.40	112.97	109.79	88.05	NA	2009.04	133.48	93.37	114.85	158.35	123.84	129.67
1997.02	103.84	98.95	111.12	110.54	90.84	NA	2010.01	126.72	102.76	115.70	158.53	116.63	123.69
1997.03	100.38	102.43	105.99	111.69	97.21	NA	2010.02	126.05	114.82	119.09	162.54	109.54	117.33
1997.04	104.39	106.79	112.91	119.08	103.58	NA	2010.03	123.45	133.42	120.39	216.71	110.12	117.89
1998.01	102.80	113.15	115.24	123.49	99.85	NA	2010.04	119.02	159.75	129.67	246.21	112.27	118.05
1998.02	112.28	123.49	127.77	133.99	105.18	NA	2011.01	120.61	157.69	128.31	260.33	112.45	113.57
1998.03	114.98	120.92	131.81	125.30	107.32	NA	2011.02	118.05	168.41	130.78	266.97	112.84	112.85
1998.04	115.73	129.77	126.40	125.44	104.44	NA	2011.03	115.39	156.63	128.34	223.99	111.61	111.42
1999.01	114.17	122.31	114.84	117.67	97.94	NA	2011.04	120.77	155.89	126.94	209.01	113.49	113.53
1999.02	105.74	102.08	99.03	99.44	92.37	NA	2012.01	121.04	160.34	130.26	221.94	113.91	113.22
1999.03	103.37	110.51	94.84	105.23	90.25	NA	2012.02	125.50	148.79	132.89	227.10	117.48	118.91
1999.04	101.73	98.95	93.54	100.15	90.91	NA	2012.03	131.79	146.60	141.11	239.89	122.44	123.59
2000.01	100.15	96.75	94.86	96.43	95.38	99.13	2012.04	132.73	143.36	146.99	250.19	123.92	125.02
2000.02	101.63	102.43	99.19	100.58	98.69	99.13	2013.01	133.24	143.26	153.68	238.86	125.53	128.34
2000.03	100.62	96.03	100.68	96.05	98.27	94.68	2013.02	130.89	149.43	154.52	242.65	127.73	131.20
2000.04	103.35	100.99	102.37	101.87	99.08	96.08	2013.03	133.23	158.27	156.03	246.15	129.17	133.68
2001.01	106.12	118.53	109.72	105.64	98.37	94.52	2013.04	131.72	159.93	153.73	249.19	131.55	137.09
2001.02	110.08	121.15	110.34	117.62	98.46	93.35	2014.01	134.04	159.49	152.57	253.00	137.37	142.27
2001.03	112.26	116.08	109.35	116.27	99.36	96.92	2014.02	135.50	159.83	149.27	257.87	135.42	138.71
2001.04	110.45	116.08	106.13	111.81	98.51	92.52	2014.03	136.13	158.38	149.41	256.80	137.38	140.29
2002.01	107.51	106.31	99.54	107.65	98.66	94.74	2014.04	138.11	157.71	149.35	231.33	137.35	139.26
2002.02	103.57	96.81	95.79	97.34	96.61	93.25	2015.01	138.93	166.01	152.38	240.03	139.85	141.06
2002.03	103.47	94.62	95.08	99.90	97.13	91.41	2015.02	144.57	171.95	164.62	247.85	144.78	145.93
2002.04	106.19	94.84	100.17	100.86	97.57	96.53	2015.03	144.01	174.10	163.50	275.05	152.76	154.99
2003.01	108.32	95.24	101.03	112.17	99.19	96.61	2015.04	146.91	170.55	171.03	313.04	161.47	164.42
2003.02	111.81	113.44	105.40	120.17	101.25	100.02	2016.01	149.93	167.27	172.83	329.17	164.37	167.66
2003.03	113.84	117.80	108.36	128.18	102.49	103.51	2016.02	150.08	164.52	165.45	332.65	163.80	167.92
2003.04	113.36	125.81	107.93	132.41	104.37	106.44	2016.03	151.06	170.77	167.22	347.27	163.68	166.10
2004.01	114.59	124.63	108.53	131.61	104.02	107.73	2016.04	147.45	173.06	161.85	337.78	160.43	163.64
2004.02	114.70	109.99	107.15	134.22	104.89	109.22	2017.01	148.74	169.90	161.58	318.55	165.91	169.55
2004.03	115.97	116.33	109.55	141.71	108.85	113.65	2017.02	149.87	170.45	167.79	322.19	174.70	178.10
2004.04	120.31	107.63	114.23	149.23	110.05	113.48	2017.03	151.25	165.63	169.15	310.03	175.75	180.35
2005.01	127.50	113.26	122.78	167.95	114.32	116.88	2017.04	152.66	170.06	170.00	306.94	179.65	183.02
2005.02	135.28	119.41	135.85	169.51	119.93	123.43	2018.01	152.26	172.51	171.20	346.89	178.45	182.41
2005.03	138.59	120.90	141.25	167.47	124.05	127.30	2018.02	153.86	175.50	170.82	355.41	179.73	183.19
2005.04	140.68	127.03	145.11	176.92	129.61	133.58	2018.03	156.57	174.91	173.31	357.35	184.28	187.38
2006.01	144.00	134.38	152.11	181.39	134.60	139.06	2018.04	161.28	171.53	184.08	384.10	186.38	189.08
2006.02	145.18	139.64	151.97	194.51	137.91	142.01	2019.01	161.91	168.35	182.33	363.73	190.04	192.01
2006.03	149.16	145.88	157.36	212.42	139.90	143.99	2019.02	158.86	164.78	177.57	339.75	189.98	191.23
2006.04	151.81	149.18	161.65	213.33	144.34	146.49	2019.03	157.12	161.34	174.29	339.32	190.75	192.26
2007.01	151.18	149.34	165.68	218.87	147.67	148.56	2019.04	156.63	164.15	165.37	350.73	191.67	193.68
2007.02	154.26	156.04	173.14	228.98	151.58	152.46							
2007.03	156.89	152.56	176.83	227.10	157.15	159.53							
2007.04	155.22	151.76	180.47	229.50	158.05	161.52							

The first four columns are hedonic price indices while the remaining two columns are repeat sale indices. The hedonic price indices are similar in nature to consumer price indices. The repeat-sales method assesses how hotel prices change over time by focusing on the different sale prices of the same hotel property.

Hedonic hotel indices for large and small hotel transactions



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

Our moving average trendlines and our standardized unexpected price (SUP) performance metrics both point to the price for both large hotels and small hotels reverting toward their long run average. Exhibit 9, which graphs

the prices reported in Exhibit 8, shows that the price of large hotels reversed their downward trend, rising 1.74 percent this quarter compared to a decline of 2.1 percent last quarter. However, the price of small hotels fell 0.31 percent

EXHIBIT 10

Year-over-year change in large-hotel index with a moving average trendline

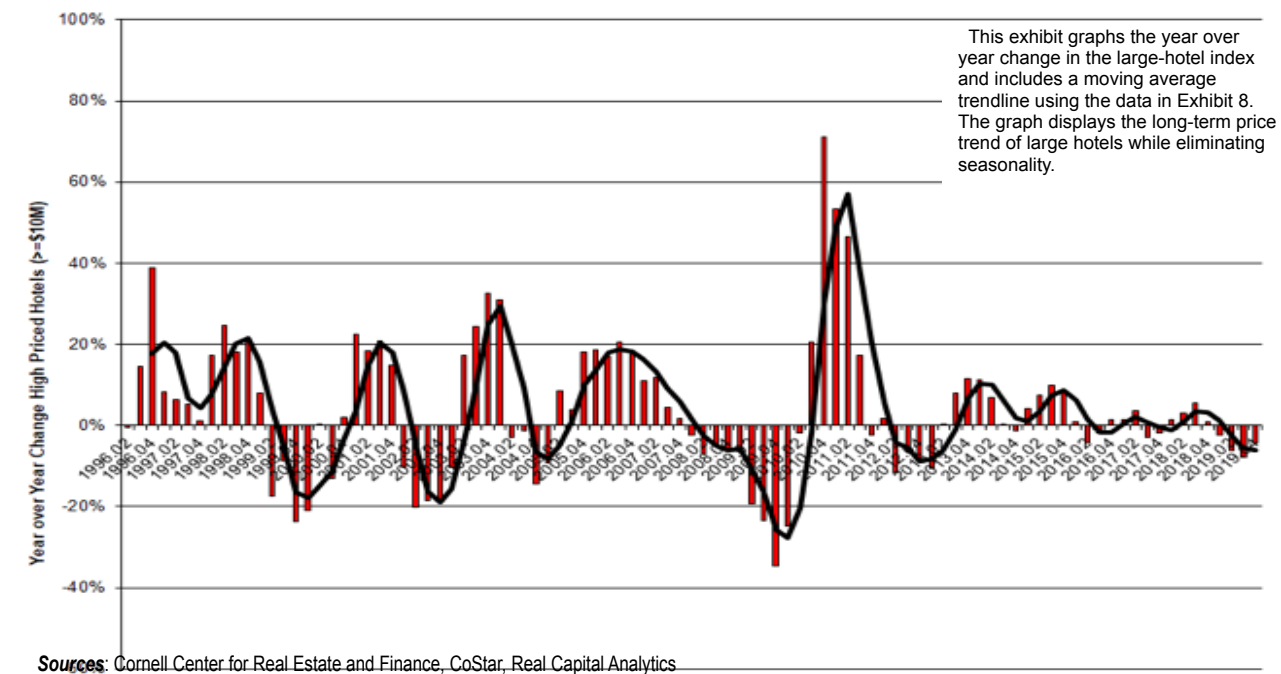


EXHIBIT 11

Year-over-year change in Small-hotel index with a moving average trendline

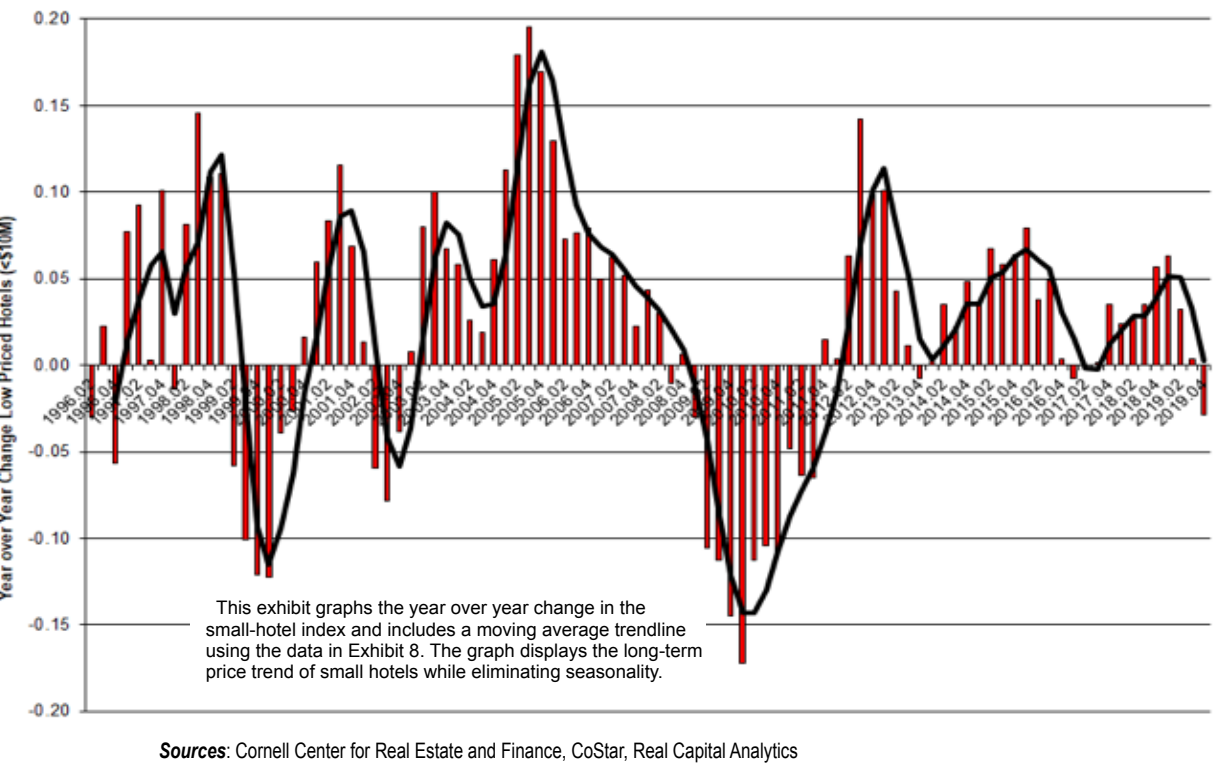
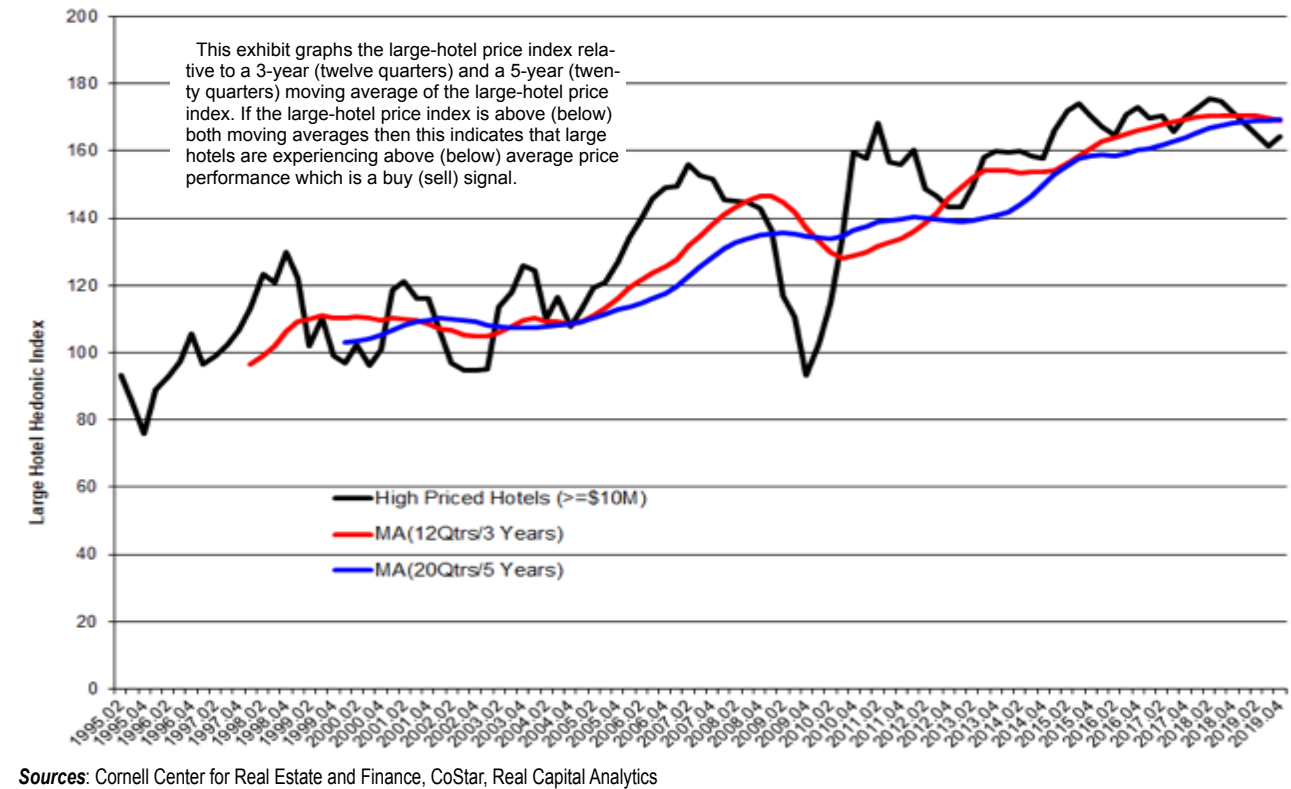


EXHIBIT 12

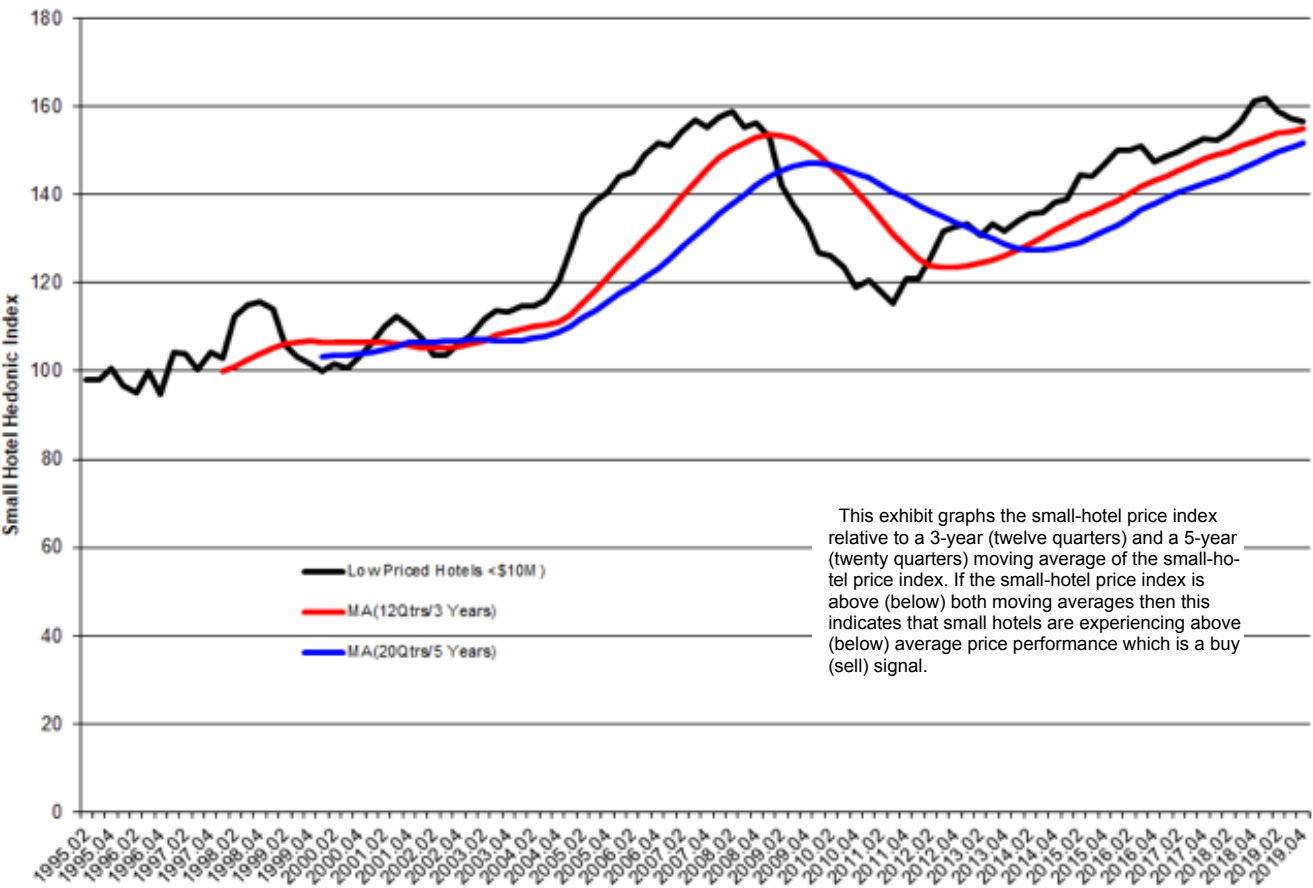
Year-over-year change in large-hotel index with a moving average trendline



this quarter, compared to a drop of 1.1 percent last quarter. Year over year, Exhibit 10 shows that large hotels fell 4.3 percent (2018Q3–2019Q3) compared to a reduction of 7.7 percent posted in the prior year-over-year period (2018Q3–2019Q3). Exhibit 11 shows that smaller hotels declined 2.9 percent year over year (2018Q4–2019Q4), compared to the 0.35 percent increase in the prior period (2018Q3–2019Q3).

Consistent with our analysis thus far, our moving average trend lines for large hotels (in Exhibit 12) shows that the price for large hotels continues to hover below both its short-term and long-term moving average trend lines. This signals that large hotels continue to exhibit a weakness in price (negative price momentum). In contrast to this, Exhib-

Moving average trendline for small-hotel index

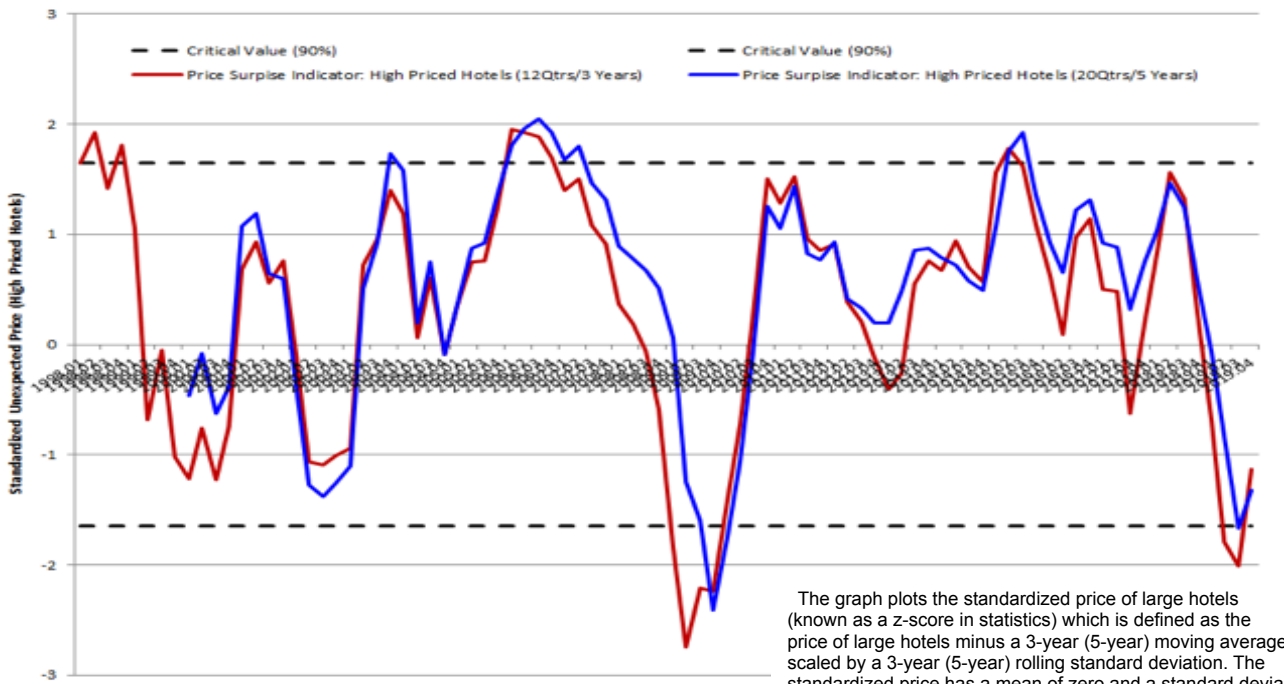


Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

it 13 shows that the price for small hotels is still above both its short term and longer term moving average trend lines, although the spread between the price and these trend lines continued to narrow from the prior period. As stated earlier, this is due to declining price momentum for small hotels this period. This indicates a continued signal that small hotels are still a hold with a sell signal indicated for larger hotels.

Our Standardized Unexpected Price (SUP) metrics in Exhibit 14 show that the standardized price for large hotels has bounced back and is now above its lower confidence band. The standardized price for small hotels continued its negative price momentum converging toward its standardized mean of zero. In other words, Exhibit 15 shows that the standardized price of small hotels is reverting back toward its long-term average.

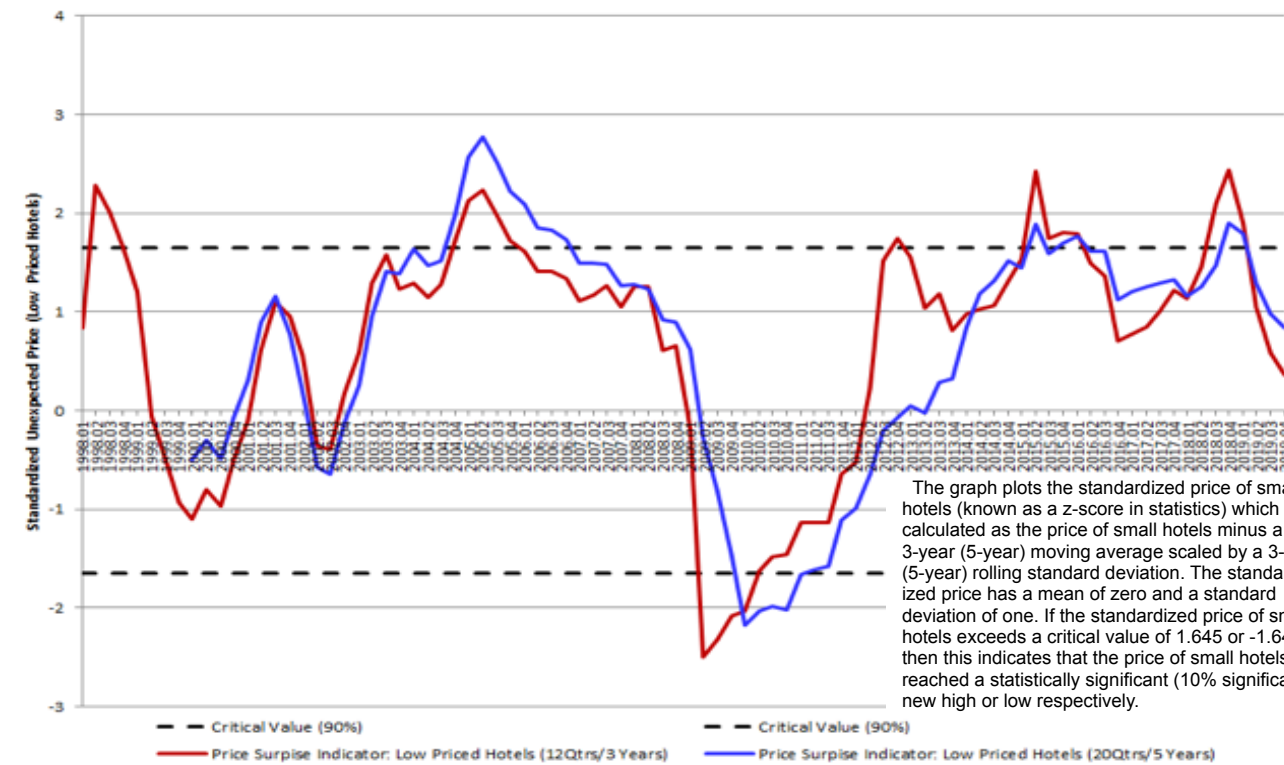
Standardized Unexpected Price (SUP) for large-hotel index



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

The graph plots the standardized price of large hotels (known as a z-score in statistics) which is defined as the price of large hotels minus a 3-year (5-year) moving average scaled by a 3-year (5-year) rolling standard deviation. The standardized price has a mean of zero and a standard deviation of one. If the standardized price of large hotels exceeds a critical value of 1.645 or -1.645 then this indicates that the price of large hotels has reached a statistically significant (10% significance) new high or low respectively.

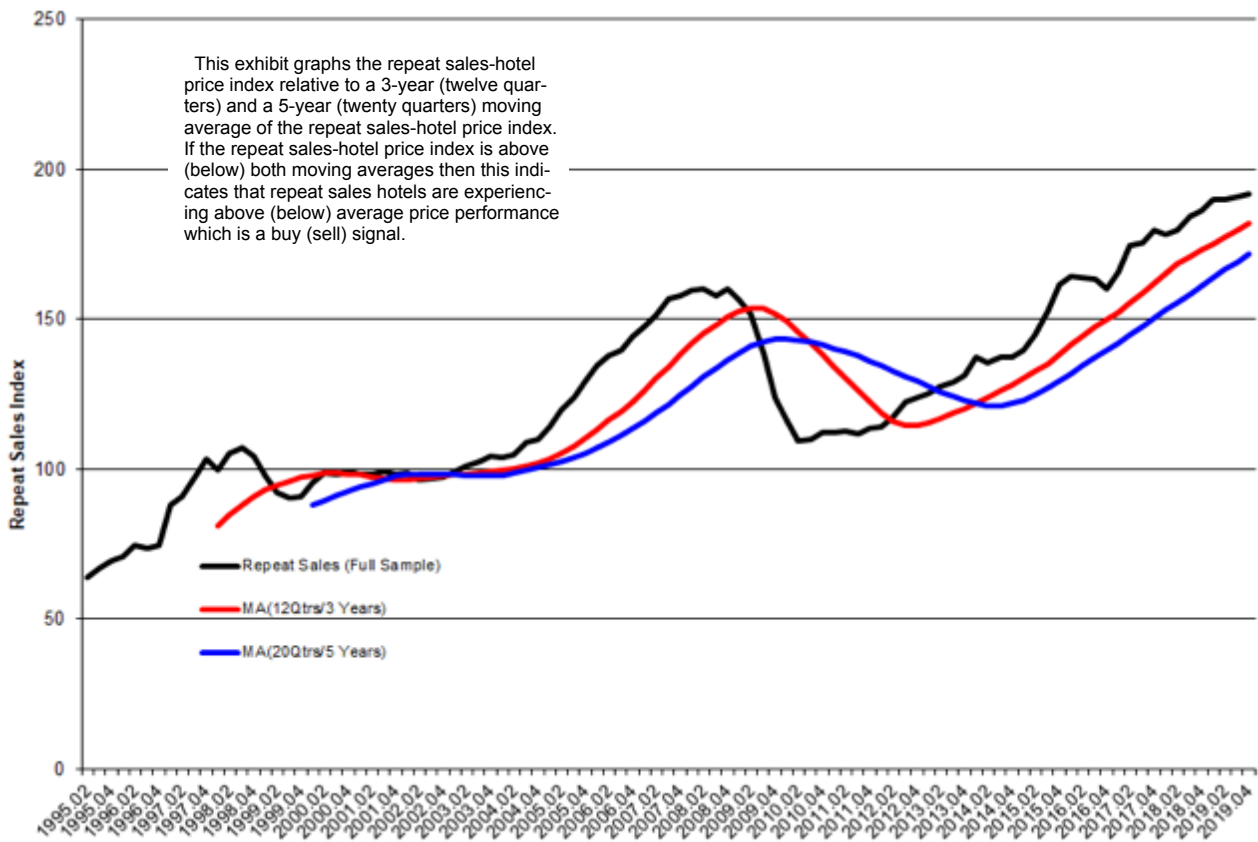
Standardized unexpected price (sup) for small-hotel index



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

The graph plots the standardized price of small hotels (known as a z-score in statistics) which is calculated as the price of small hotels minus a 3-year (5-year) moving average scaled by a 3-year (5-year) rolling standard deviation. The standardized price has a mean of zero and a standard deviation of one. If the standardized price of small hotels exceeds a critical value of 1.645 or -1.645 then this indicates that the price of small hotels has reached a statistically significant (10% significance) new high or low respectively.

Moving average trendline for repeat-sale hotel index



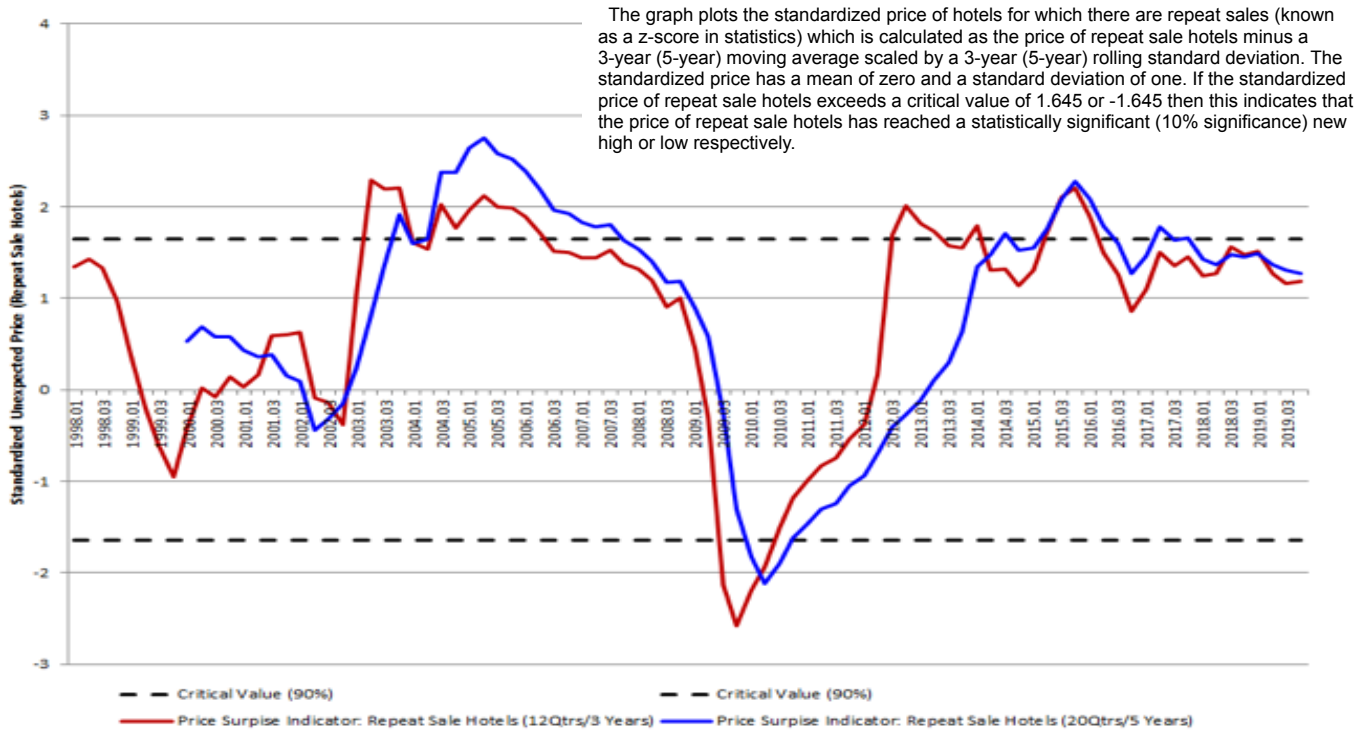
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

Repeat-sales metrics. Prices are slowly reverting to the mean. Our repeat-sale indicator, which reflects the price of hotels that have sold more than once, continues to revert toward both its short-term and long-term moving average, although it is still higher than both averages as displayed in Exhibit 16.³ Our SUP performance metric in Exhibit

17 indicates that standardized prices remained relatively stationary this quarter. Exhibit 18 shows that the repeat sale price index rose 2.8 percent year over year (2018Q4 to 2019Q4) compared to 3.5 percent in the prior period (2018Q3 to 2019Q3). From a quarter-over-quarter perspective, the index remained relatively flat, growing 0.48 percent in the current period (2019Q3-2019Q4) compared to 0.41 percent in the previous quarter (2019Q2-2019Q3).

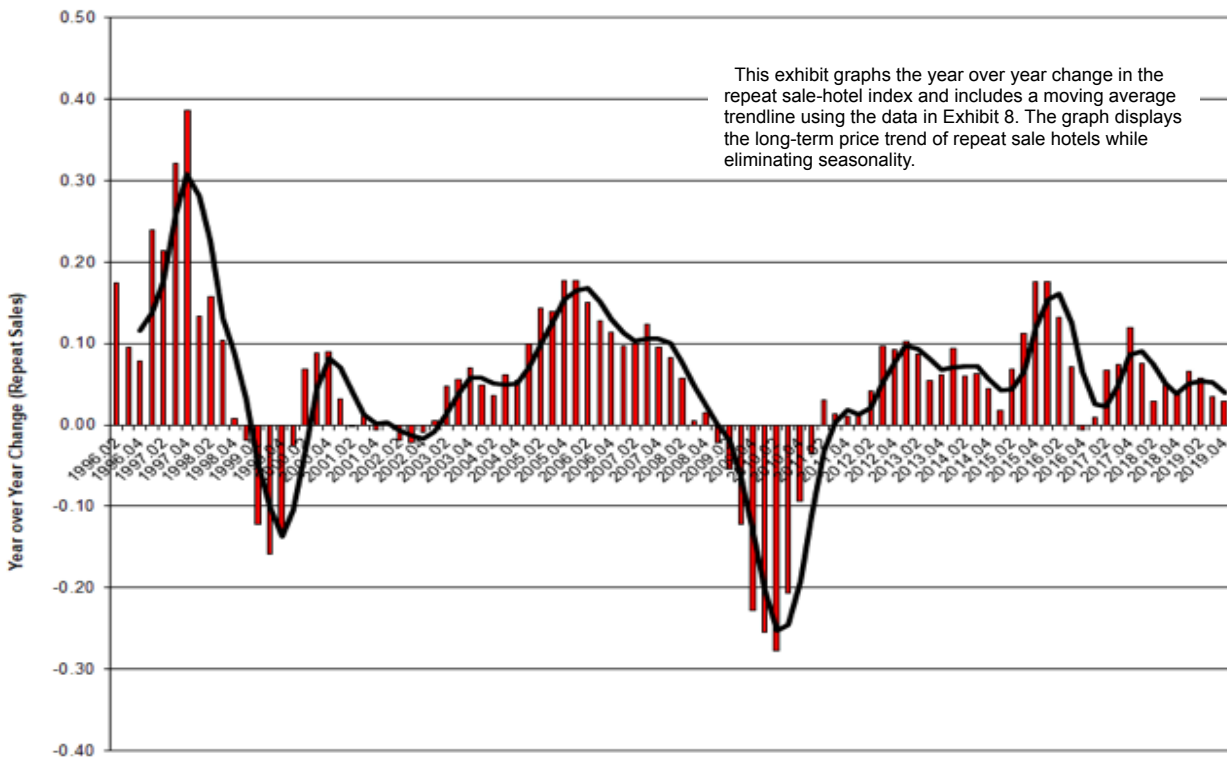
³ Recall from our initial publication that we report two repeat sale indices. The repeat sale full sample index uses all repeat sale pairs whereas the repeat sale index with a base of 100 at 2000Q1 uses only those sales that occurred on or after the first quarter of 2000. In other words, the latter repeat sale index thus 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 e.g., repeat sale full sample index but it would not be included in the latter repeat sale index.

Standardized Unexpected Price (SUP) for repeat-sale hotel index



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

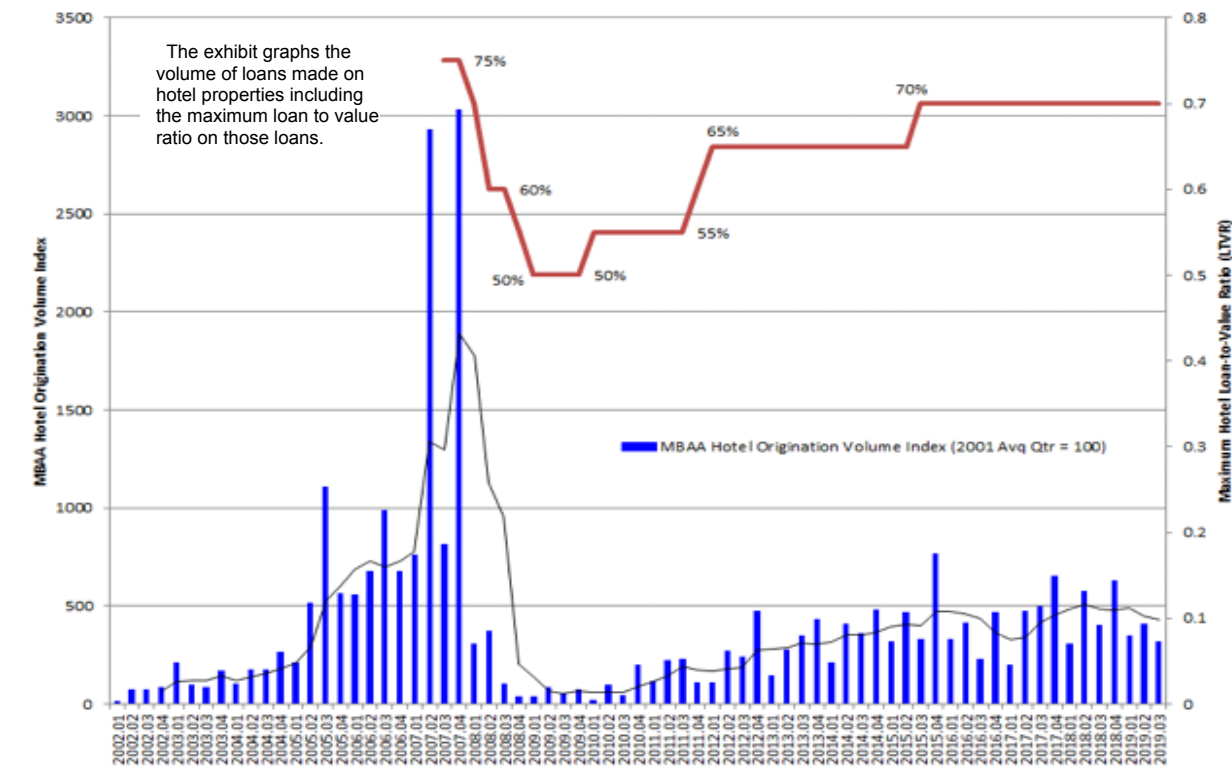
Year over year change in repeat-sale hotel index with a moving average trendline



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

EXHIBIT 19

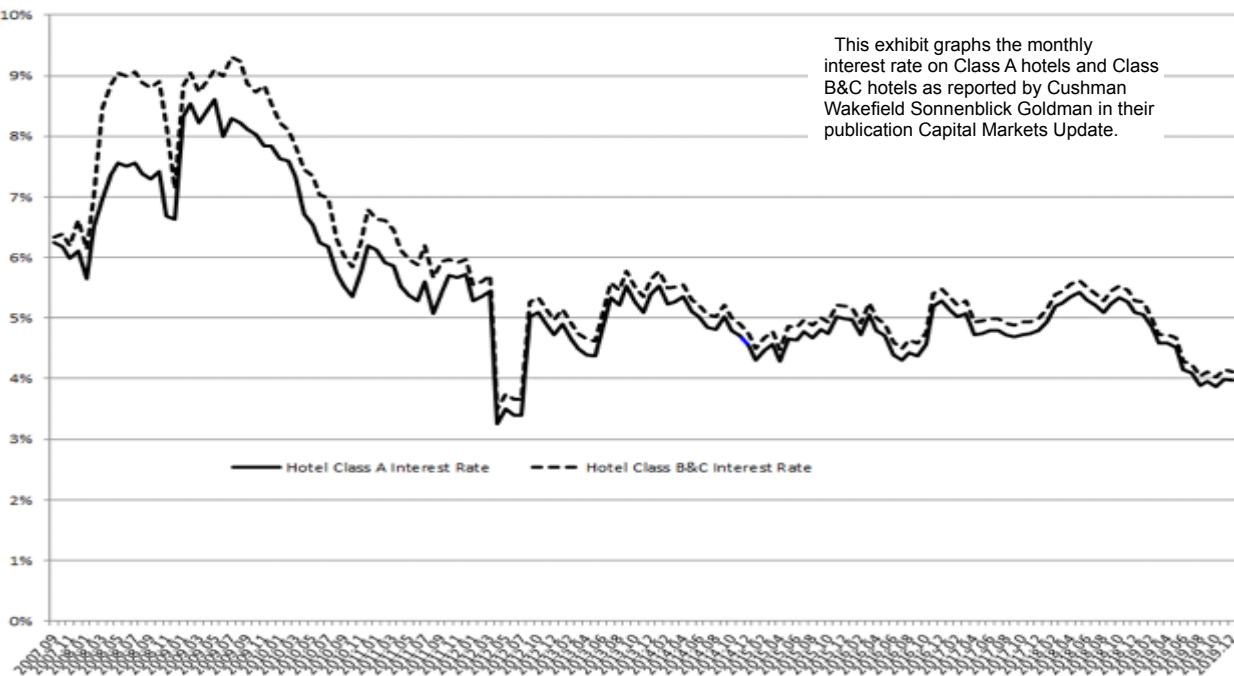
Mortgage origination volume versus the loan-to-value ratio for hotels



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

EXHIBIT 20

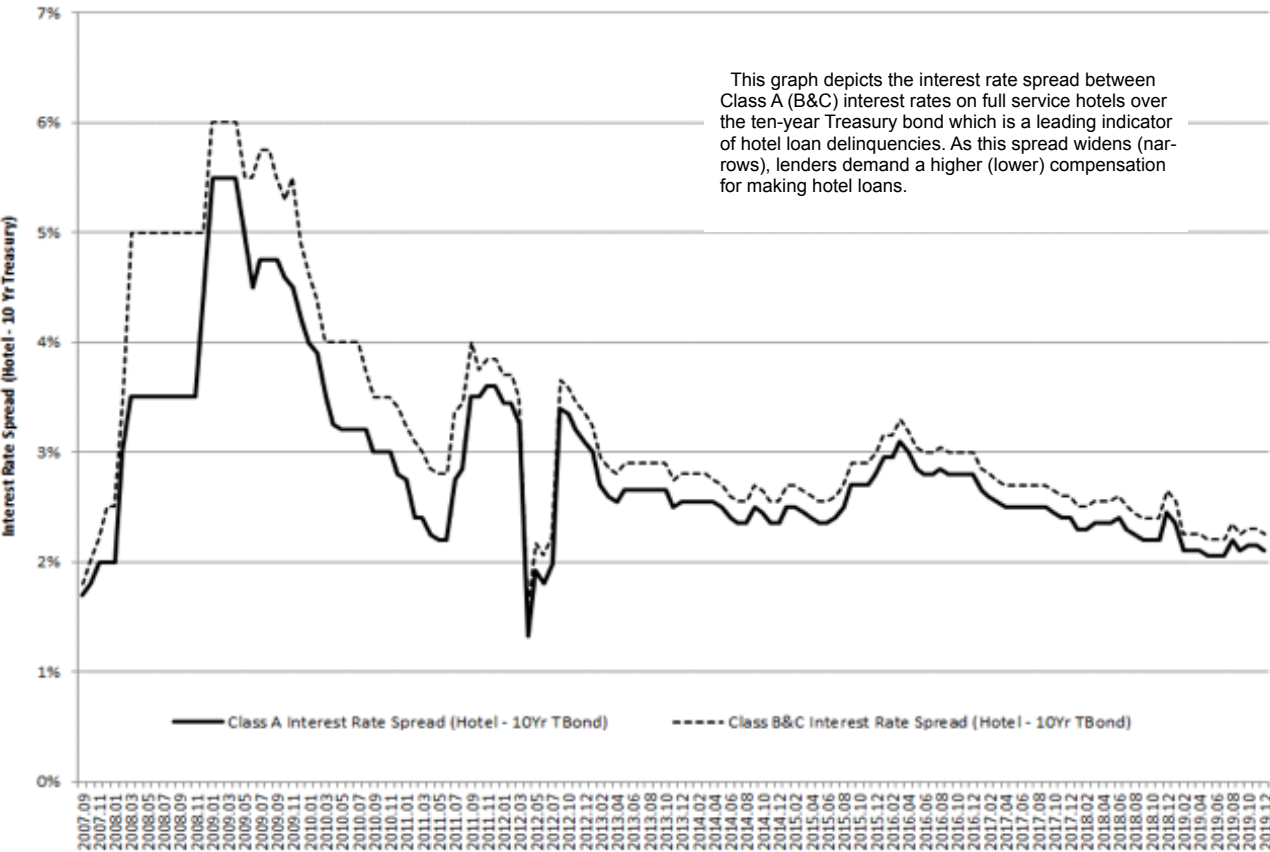
Interest rates on Class A versus Class B & C Hotels



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

EXHIBIT 21

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



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

Mortgage financing volume for hotels fell year-over-year and quarter-over-quarter. Exhibit 19 shows that the mortgage origination volume for hotels as reported for 2019Q3 fell 20.3 percent year over year, continuing the declining trend from the prior period (-28.5%).⁴ From a quarterly perspective, mortgage origination volume fell 22.1 percent. The maximum loan-to-value (LTV) ratio for hotels remains at 70 percent.

The cost of hotel debt financing remained flat this quarter, although it has fallen on a year-over-year basis. The cost of obtaining hotel debt financing as reported by Cushman Wakefield Sonnenblick Goldman remained relatively flat this quarter for both Class A and Class B and C hotels.⁵ Exhibit 20 shows that interest rates on Class A

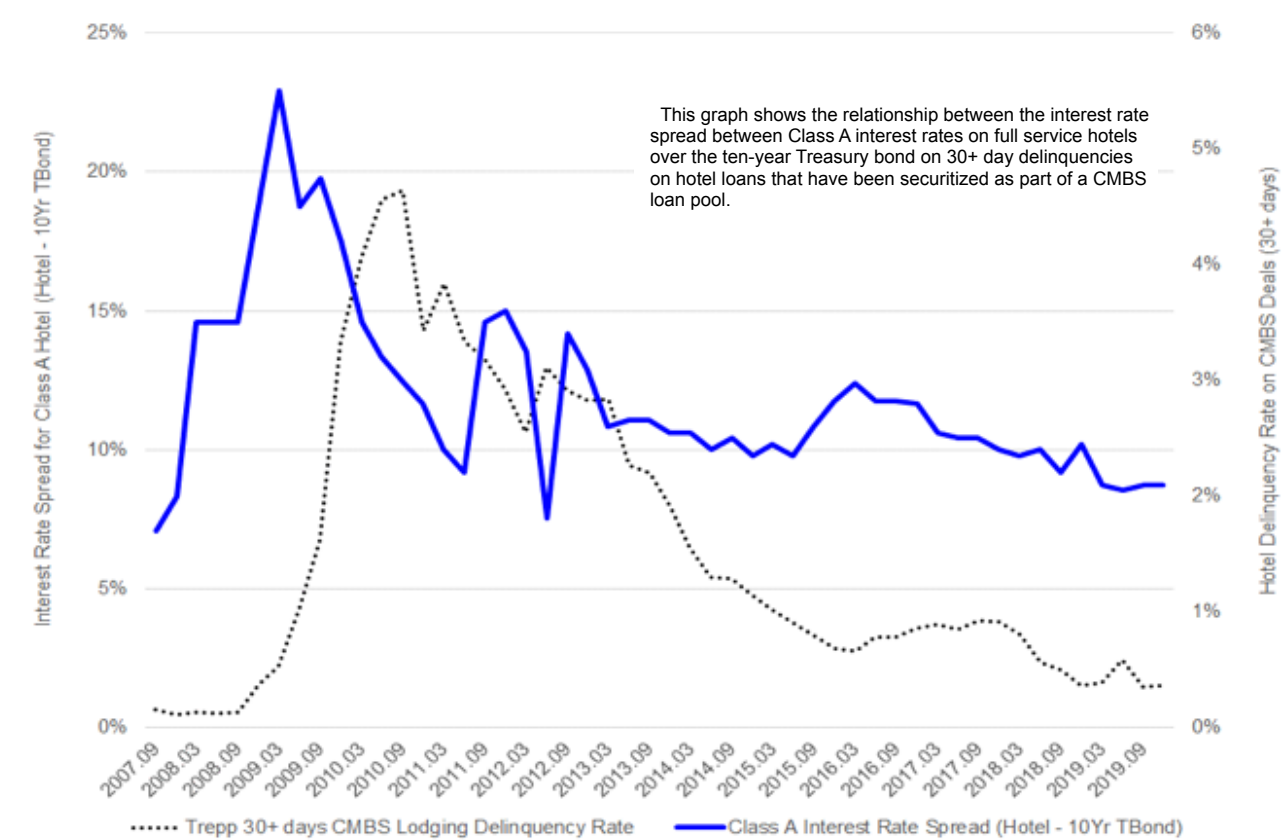
⁴ This is the latest information reported by the Mortgage Bankers Association as of the writing of this report.

⁵ 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 sized 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.

and Class B and C hotel deals declined on a year-over-year basis by 22 percent compared to a 24.4-percent fall in the prior period. In particular, interest rates were 3.97 percent for Class A properties and 4.12 percent for Class B and C hotels this quarter, compared to 3.96 percent for Class A and 4.11 percent for Class B and C in the third quarter (August) of 2019. Year over year, interest rates fell from 5.09 percent to 3.97 percent for Class A Hotels, and from 5.29 percent to 4.12 percent for Class B and C Hotels. This downward trend in interest rates started in November 2018.

No change in the risk premium for hotels over the risk-free rate. Exhibit 21 depicts the interest rate spread between Class A (as well as Class B and C) interest rates on full-service hotels over the ten-year Treasury bond. On this metric, interest rate spreads remained flat at 0 basis points for both Class A and Class B and C hotels in the current quarter relative to the prior quarter (i.e., Class A: 2.10% spread; Class B: 2.25% spread). The stationarity in this spread is a signal that lenders' perception of hotel risk has remained unchanged from the prior quarter. This spread

Interest rate spreads of hotels as a precursor of hotel delinquencies



Source: Cushman Wakefield Sonnenblick Goldman, Trepp

is a leading indicator of hotel loan delinquencies. Exhibit 22 indicates that as this spread widens, which signals that lenders demand a higher compensation for making hotel loans, this demand is justified since delinquencies on hotel loans tend to rise in the subsequent quarters. Likewise, as the spread narrows, signaling that lenders demand lower compensation, the expectation is that delinquencies on hotel loans will tend to fall.

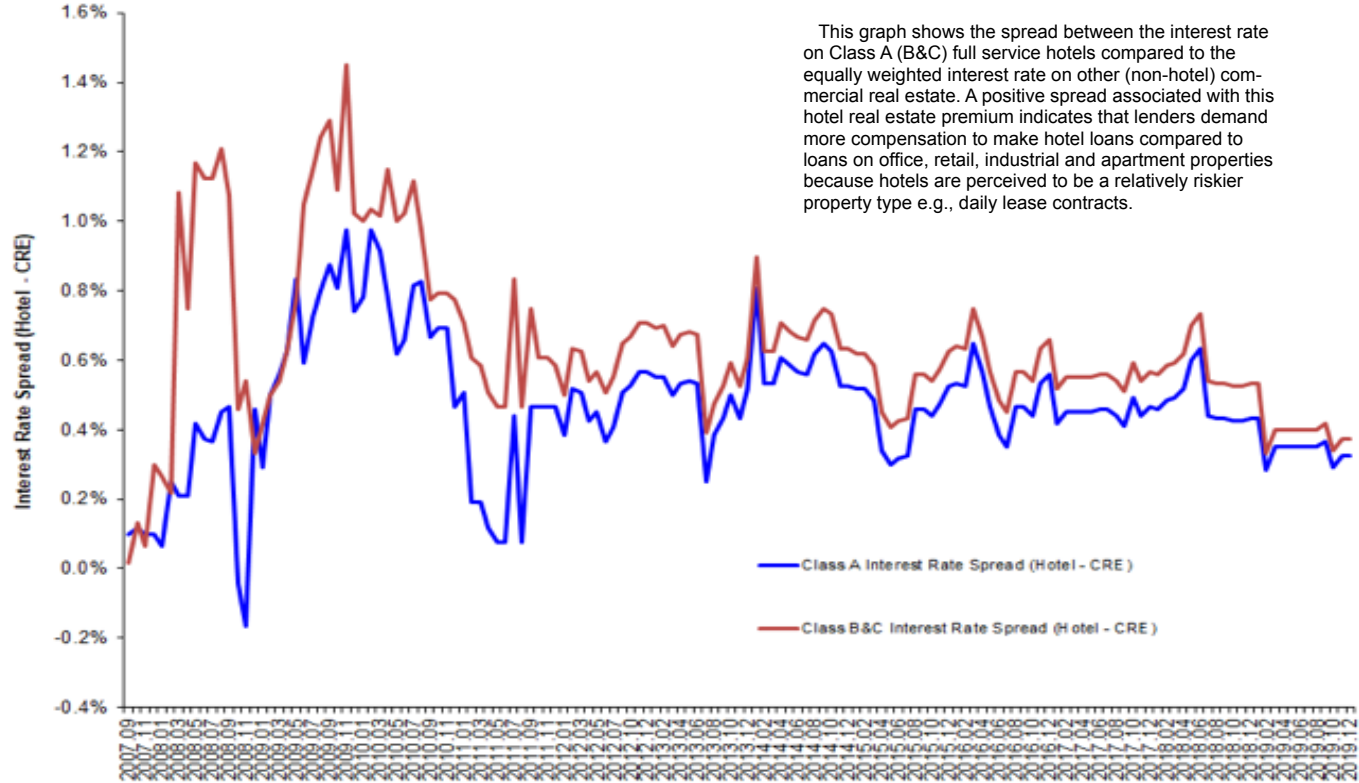
The relative risk premium that lenders require for hotels over other commercial real estate has narrowed. Exhibit 23 shows the spread between the interest rate on Class A (as well as B and C) full-service hotels compared to the (equally weighted) interest rate on other (non-hotel) commercial real estate. A positive spread associated with this hotel real estate premium indicates that lenders demand more compensation to make hotel loans compared to loans on office, retail, industrial and apartment properties because hotels are perceived to be a relatively riskier property type.⁶ The monthly hotel real estate premiums

⁶ The reason for this perception of risk is that hotels' cash flow is commonly more volatile than that of other commercial properties.

for both higher quality (Class A) and lower quality (Class B and C) hotels have declined—Class A by 11.4 percent and Class B and C by 10 percent—relative to the prior quarter. The decline is even larger on a year-over-year basis (-25% for Class A and -30% for Class B and C). This is a signal that the perceived default risk for hotel properties relative to other commercial real estate has declined on both a quarter-over-quarter and year-over-year basis.

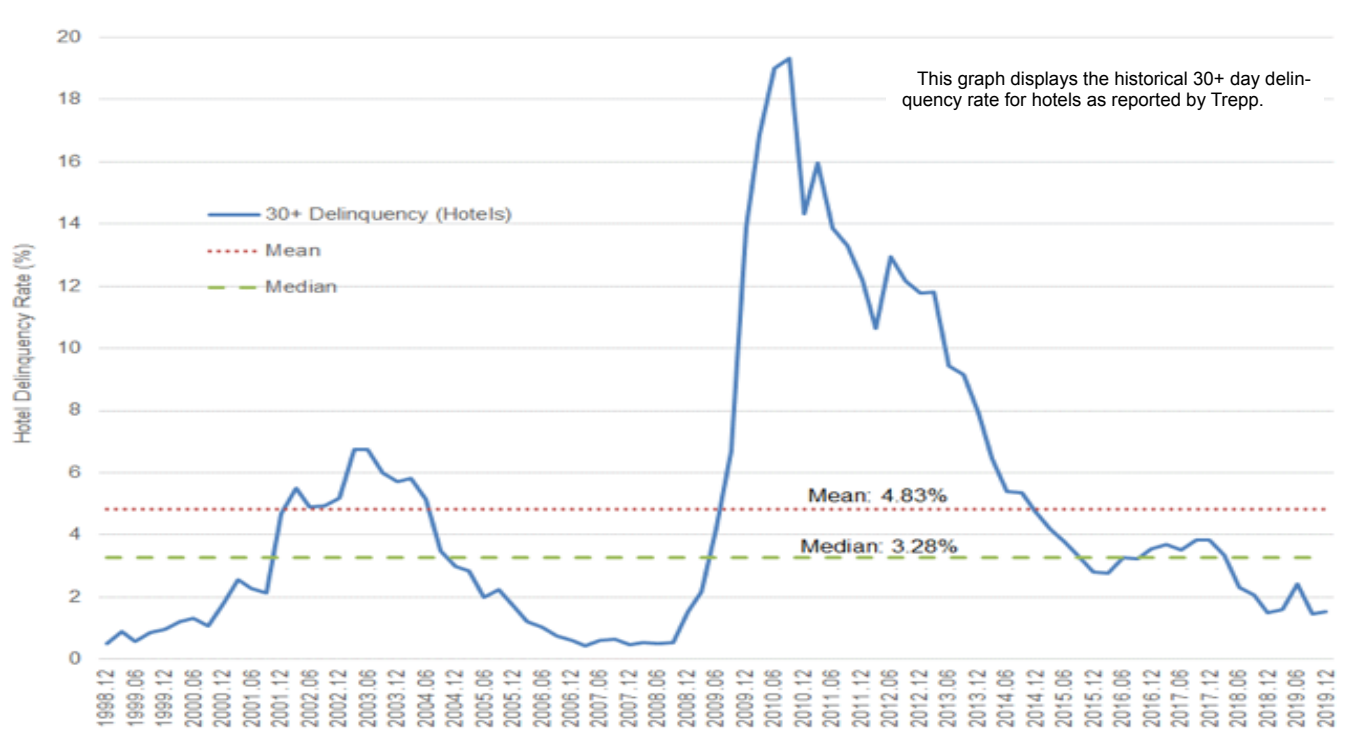
The delinquency rate on hotel loans has inched up, but there is no cause for concern. The CMBS delinquency rate (30+ days) for lodging properties stands at 1.53 percent in December, up from 1.47 percent in September. A year ago, the rate was 1.51 percent. For comparison purposes, the monthly delinquency rate in December for other property types as reported by Trepp is as follows: industrial, 1.45 percent; multifamily, 2 percent; office, 1.98 percent; and retail, 4.42 percent. Thus we see that lodging recorded the second-lowest delinquency rate (after industrial properties), while retail was by far the worst performing major property type. Exhibit 24 displays the historical 30-plus-

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



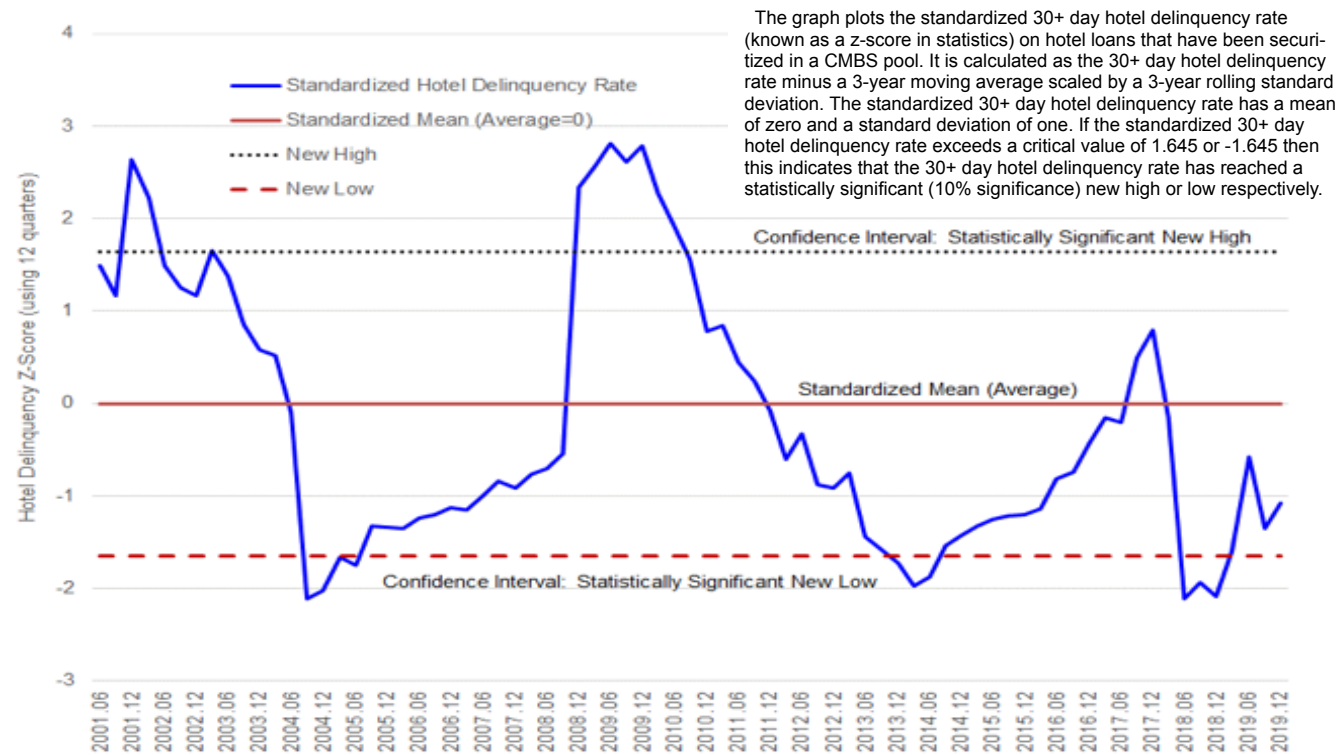
Source: Cushman Wakefield Sonnenblick Goldman

Thirty-plus-day delinquency rate for hotels



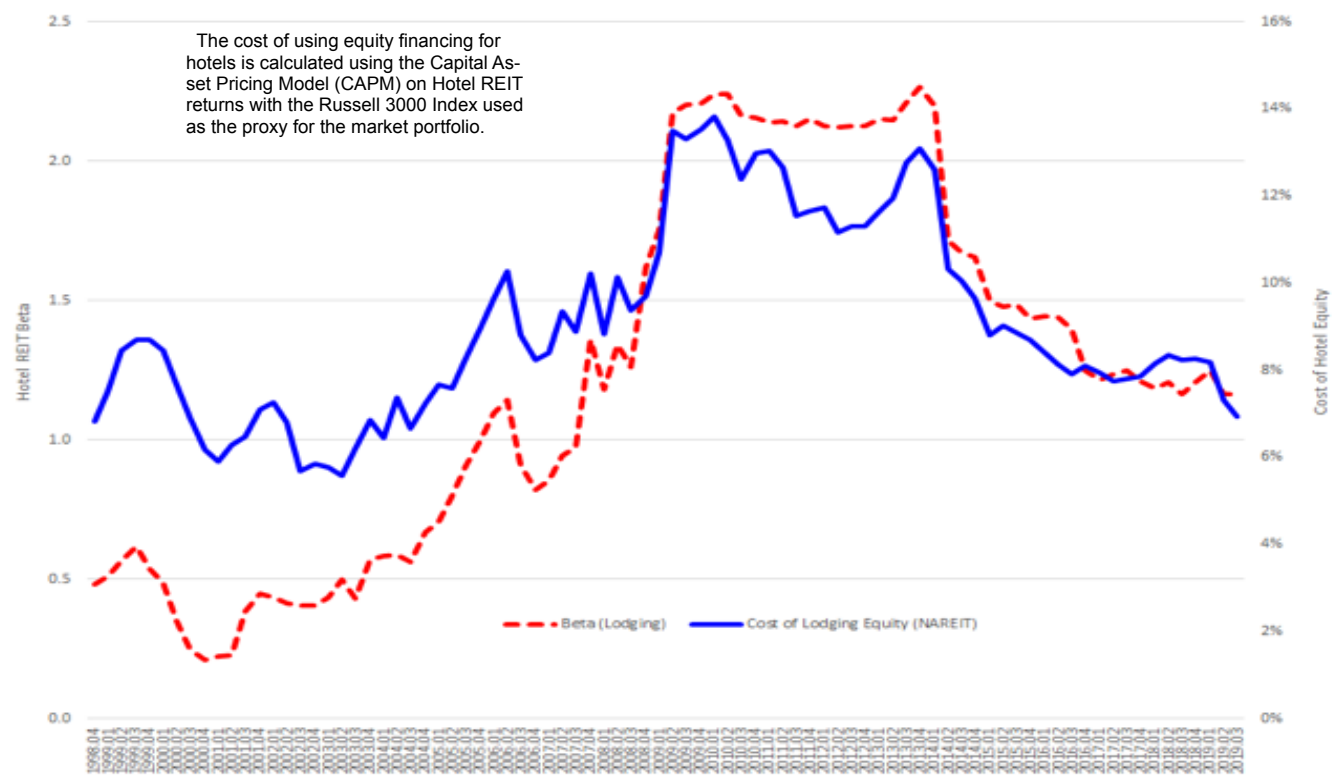
Source: Trepp

Standardized thirty-plus-day delinquency rate for hotels



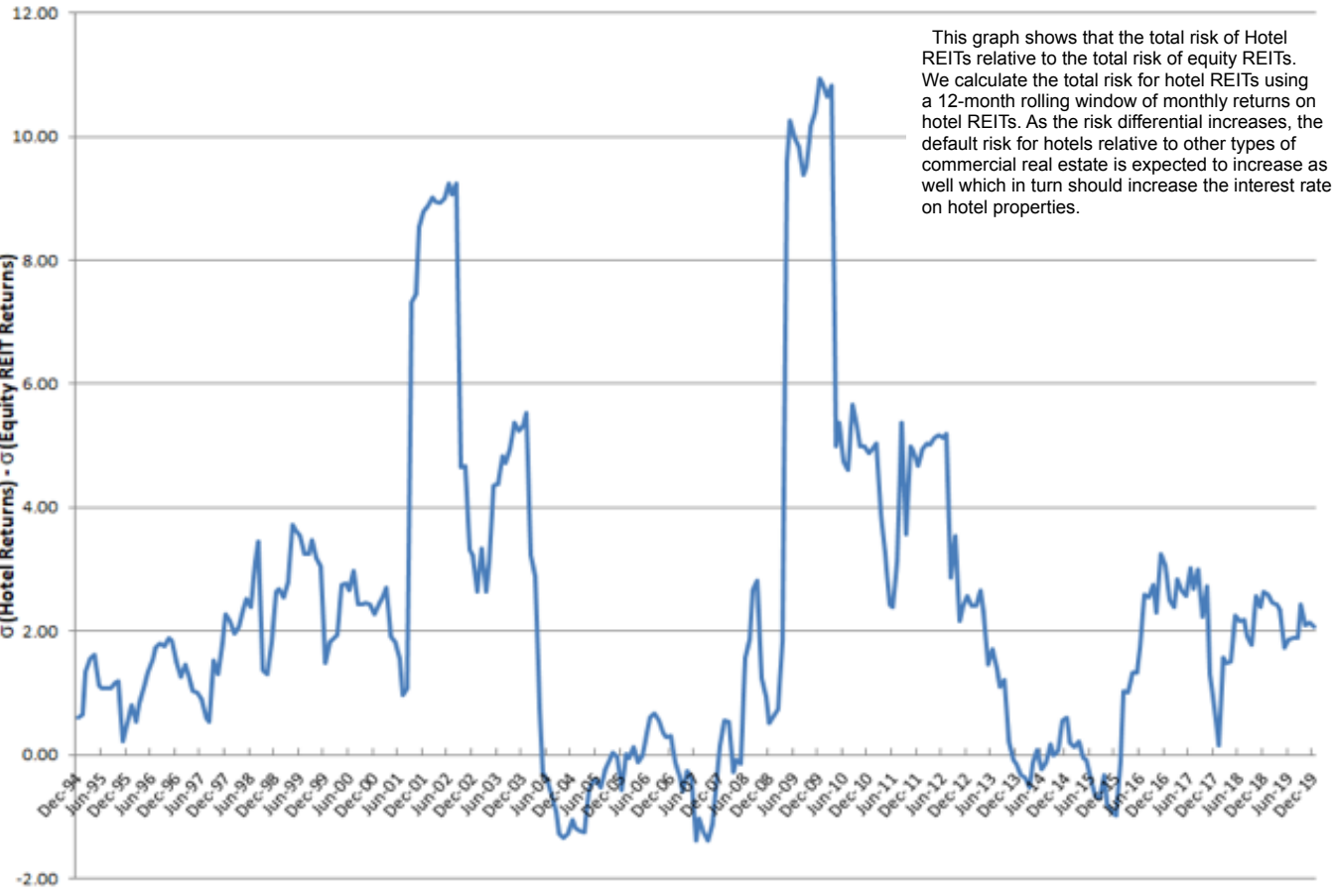
Source: Trepp

Cost of equity financing using the capital asset pricing model and hotel REITs



Sources: Cornell Center for Real Estate and Finance, NAREIT

Risk differential between hotel REITs and equity REITs



Sources: Cornell Center for Real Estate and Finance, NAREIT

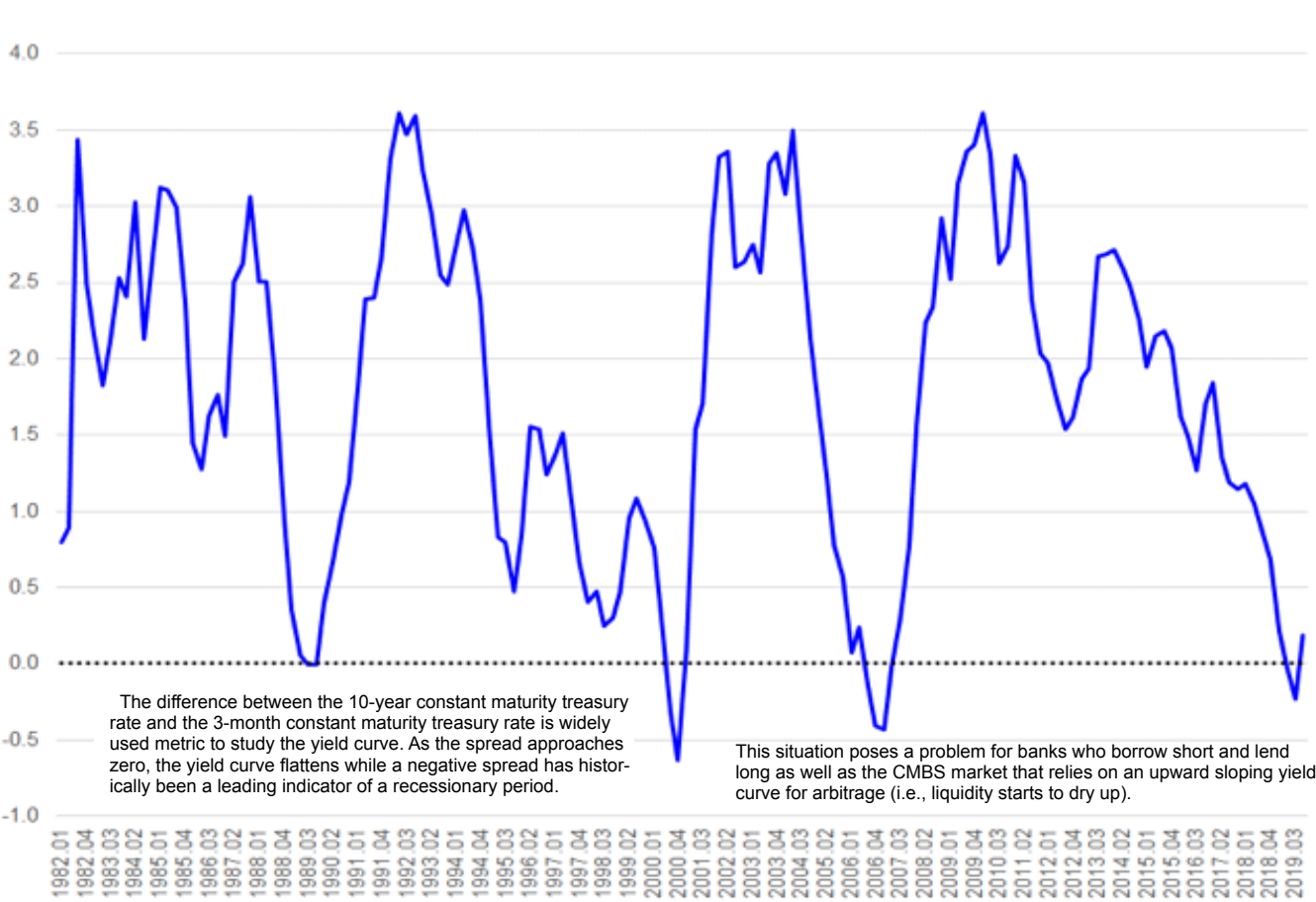
day delinquency rate for hotels, while Exhibit 25 shows the standardized version of the 30-plus-day delinquency rate for hotels. Both exhibits reveal that the delinquency rate for hotels whose loans are securitized as part of CMBS deals are currently below their long-term average, although the standardized version of the hotel delinquency rate shows that the rate is reverting to its standardized average. The advantage of standardizing an indicator is that the mean is set equal to zero and the standard deviation is set equal to 1. If the indicator is above or below 1.645 (Z-score) then this indicates that the indicator has hit a statistically significant new high or low.

Cost of equity financing is now less expensive. The riskiness of hotels has shrunk relative to other types of commercial real estate. The cost of using equity financing for hotels as measured using the Capital Asset Pricing

Model (CAPM) on hotel REIT returns continued to decline this quarter, as shown in Exhibit 26. The cost of using equity funds is currently at 6.9 percent for 2019Q3, compared to 7.3 percent for 2019Q2 (and 8.18 percent for 2019Q1). The cost of borrowing equity capital has thus fallen. In terms of total risk (systematic risk + risk that is unique to hotel REITs), Exhibit 27 shows that the total risk of hotel REITs relative to the total risk of equity REITs declined this quarter (-14.8%), and it declined as well on a year-over-year basis (-21.6%).⁷ This indicates that the perceived default risk for hotels has narrowed relative to other types of commercial real estate consistent with our other hotel-risk-premium indicators. Expect borrowing costs for hotel loans to remain constant if this trend persists, all else equal.

⁷ We calculate the total risk for hotel REITs using a twelve-month rolling window of monthly returns on hotel REITs.

U.S. Treasury 10-year versus 3-month spread



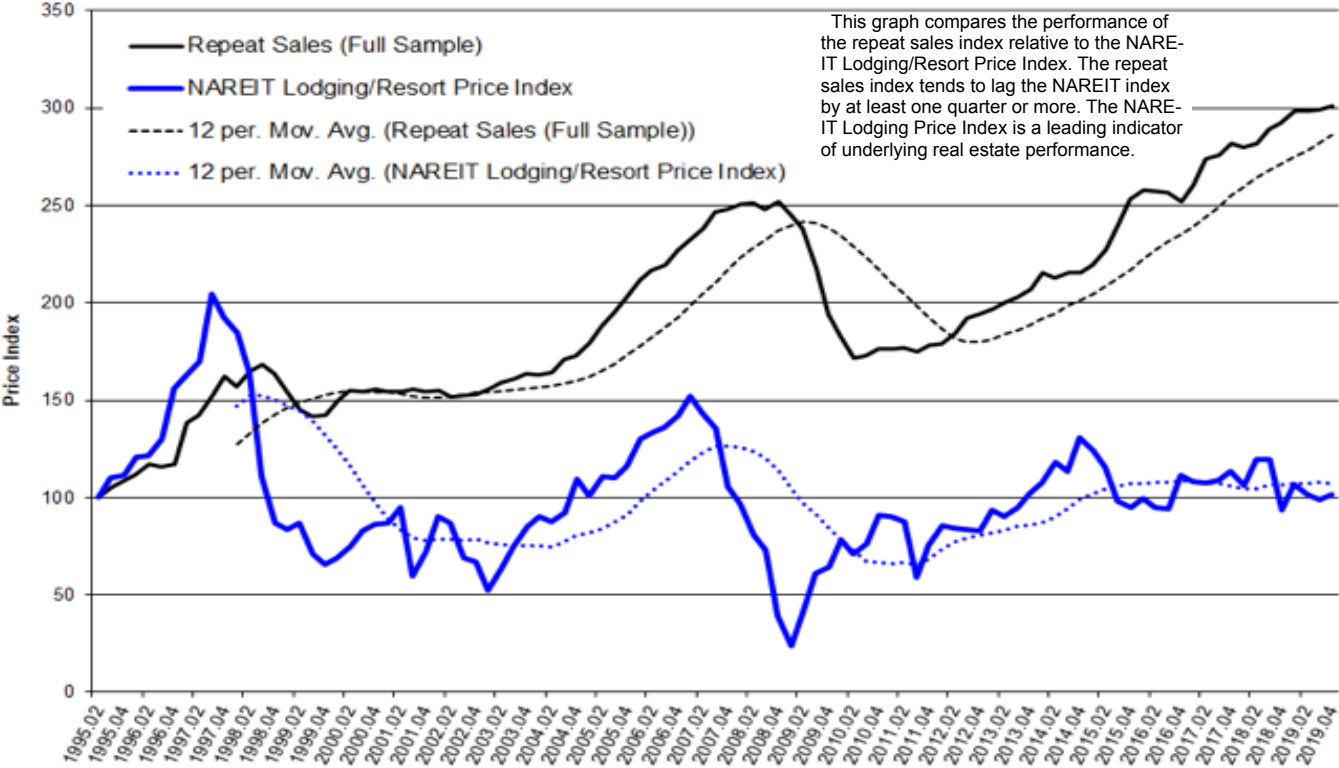
Sources: Cornell Center for Real Estate and Finance, St Louis Federal Reserve

The spread between the 10-year Treasury and 3-month Treasury is flat this quarter and continues to be the Joker in the deck. The difference between the 10-year constant maturity U.S. Treasury rate and the 3-month constant maturity Treasury rate is widely used metric to study the yield curve. As the spread approaches zero, the yield curve flattens, while a negative spread has historically been a leading indicator of a recessionary period. Exhibit 28 shows that the spread has now climbed back into positive territory, although for all practical purposes the yield curve is essentially flat. This situation poses a problem for banks who borrow short and lend long, as well as the CMBS market, which relies on an upward sloping yield curve for arbitrage. This might have an impact on broader market liquidity. A flat or inverted yield curve means that many floating rate loans are going to have rates that are higher than the coupon rate of a fixed-rate loan. Expect to see slower price growth in hotels and more modest gains in hotel sales at best if this trend persists.

Expect the price of large hotels to continue to fall, while the price of small hotels is anticipated to rise, based on our reading of the tea leaves. Exhibit 29 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 prior academic studies which find that securitized real estate is leading indicator of underlying real estate performance since the stock market is forward looking or efficient. Looking ahead, the NAREIT lodging index rose 2.7 percent this quarter, compared to a decline of 2.7 percent in the previous quarter. It also increased 8.8 percent year-over-year, compared to a decline of 17.25 percent in the previous year-over-year period. The architecture billings index (ABI) for commercial and industrial property, which represents another forward-looking metric, rose this quarter from the previous quarter, as shown in Exhibit 30 (52.9 versus 45.3).⁸ Year over year,

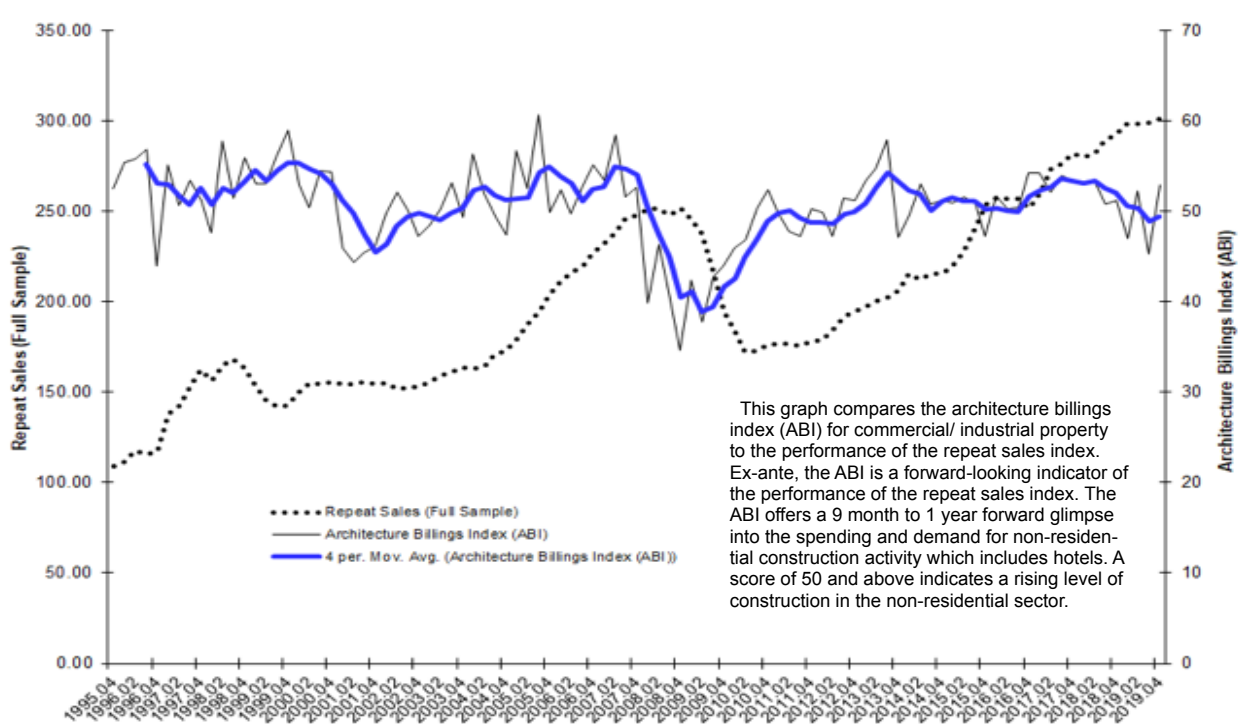
⁸ As of the time of this writing, only the November 2019 AIA Billings Index has been reported (as reported on December 18, 2019). See: www.aia.org/practicing/economics/aiaas076265.

Repeat sales index versus NAREIT lodging/resort price index



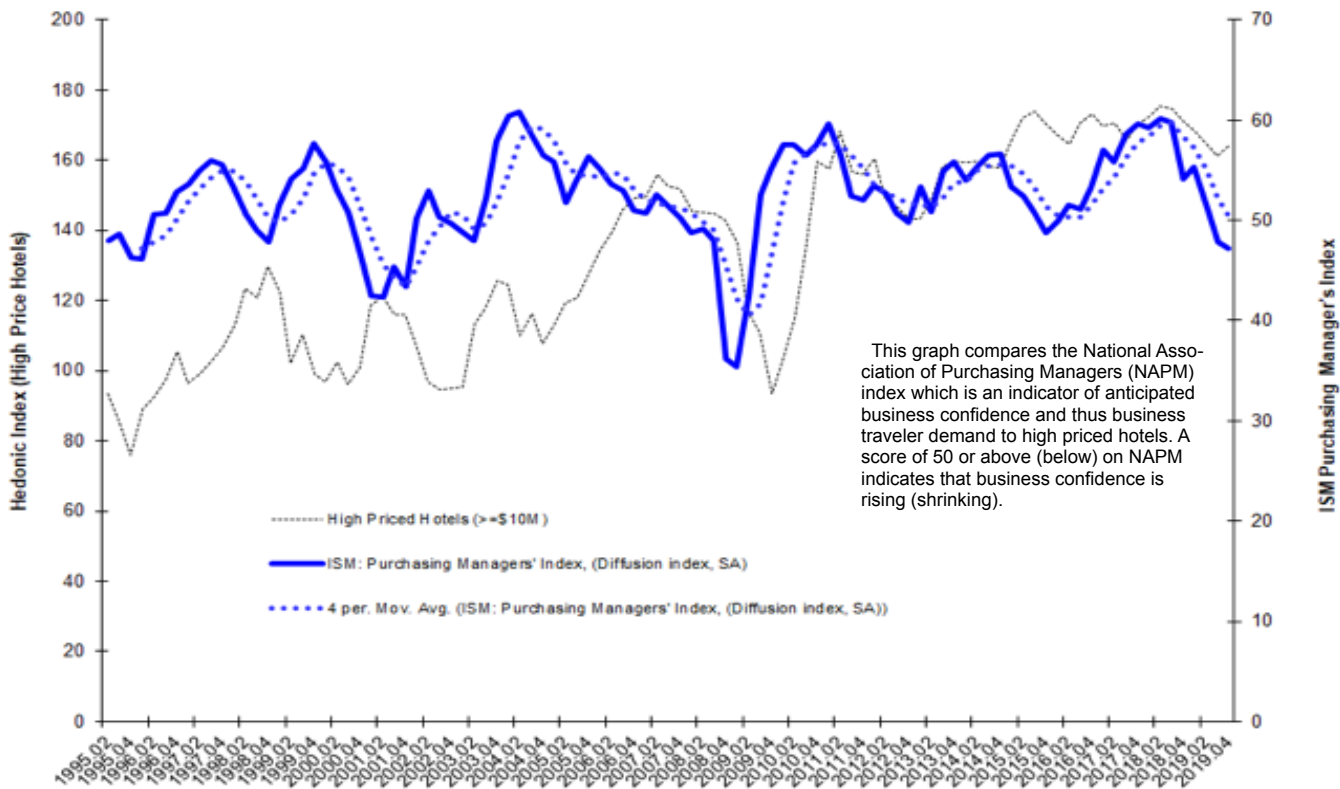
Sources: Cornell Center for Real Estate and Finance, NAREIT

Repeat sales index versus the architecture billings index



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

Business confidence and high-price hotels

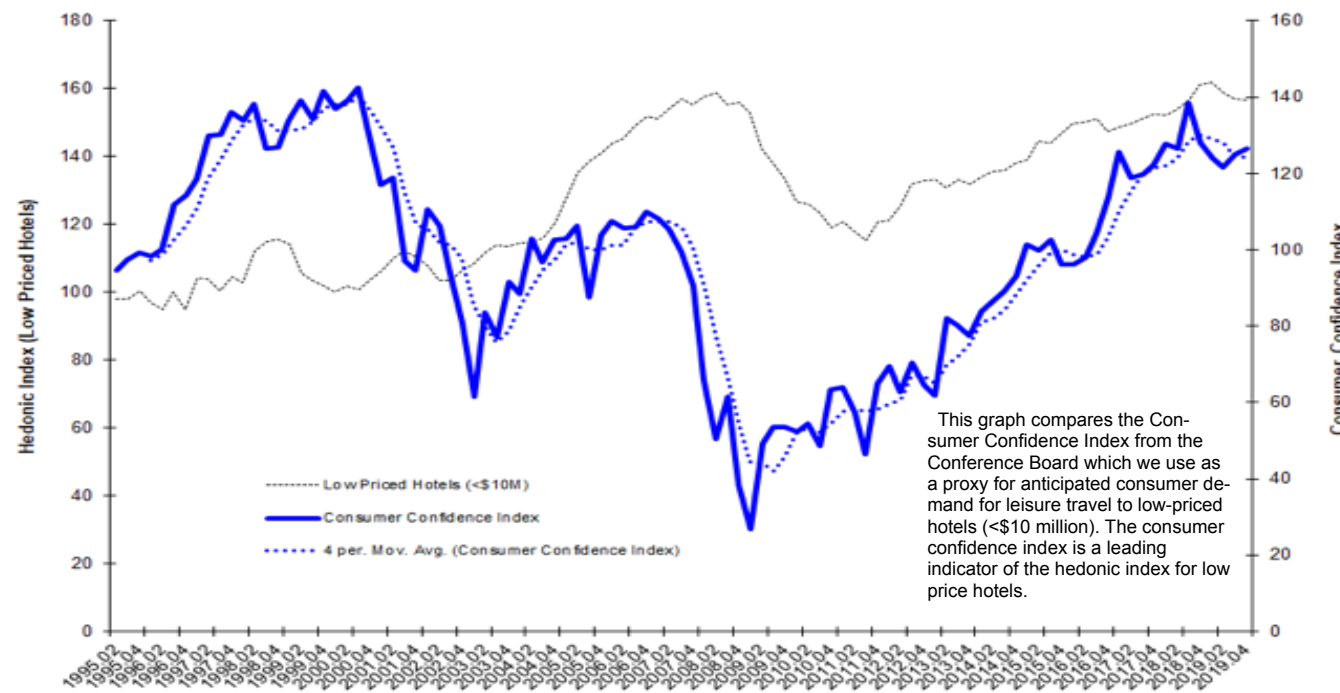


Sources: Cornell Center for Real Estate and Finance, Institute for Supply Management (ISM)

the ABI increased 3.3 percent in the current period, compared to a fall of 10.8 percent in the previous year-over-year period. **Expect positive price momentum based on the year-over-year trend in the ABI.**

The National Association of Purchasing Managers (NAPM) index shown in Exhibit 31, which is an indicator of anticipated business confidence and thus business traveler demand, decreased 12.8 percent year over year (-1.3% on a quarter-over-quarter basis), compared to a drop of 20.1 per-

Consumer confidence and low-price hotels



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

cent in the prior year over year period (2019Q3–2018Q3).⁹ Based on this indicator, **expect the price of large hotels to continue to decline on a year-over-year basis.**

The Consumer Confidence Index from the Conference Board graphed in Exhibit 32, which we use as a proxy for anticipated consumer demand for leisure travel and a leading indicator of the hedonic index for low priced hotels, gained 1.1 percent quarter-over-quarter, but fell 1.2 percent year over year, continuing the trend from the previous period (3%, quarter over quarter; -9.6% year over year). **Expect the price momentum for small hotels to rise in the next quarter.** ■

⁹ 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.

**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 – m_Q)/s_Q

where SUE_Q = quarter Q standardized unexpected earnings,

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

m_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 (~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:

Average (μ) = (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

Standard Deviation (σ) = 18.99

Standardized Unexp Price (SUP) = (115.78-93.13) / 18.99 = 1.19

SUP data and σ calculation for high-price hotels (12 quarters/3 years)				
Quarter	High-price hotels μ	Moving average	σ	Price surprise indicator (SUP)

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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