

# Cornell Hotel Indices

## First Quarter 2022

# *Beware the Ides of March*

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

### Executive Summary

The price of large hotels fell by .25 percent, while that of smaller hotels increased 3.3 percent this quarter. On a regional basis, the MidAtlantic had the best quarterly gains, with the Pacific region also doing well, while the Midwest suffered price declines. Hotels in both gateway and non-gateway cities continue to post positive performance, with greater gains for hotels in non-gateway cities. Transaction volume declined this quarter (from the previous quarter), although it was still stronger relative to the same quarter last year. Our moving average trendlines indicate that both large and small hotels are priced to buy. Large hotels continue to decline, while smaller hotels are rising, based on our standardized unexpected price (SUP) performance metric. In terms of financing hotels, mortgage-financing volume continued to rise, although the cost of financing hotels rose sharply this quarter. The relative risk premium has remained stationary this quarter, although the hotel delinquency rate has declined along with the riskiness of hotels compared to other major types of commercial real estate. Hotel deals continue to look profitable based on our economic value added (EVA) and shareholder value added (SVA) metrics, although they are nearing breakeven. Looking toward the next quarter, our leading indicators of hotel price performance indicate that in the near term we should expect slower or declining price momentum for both large and small hotels.

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## ABOUT THE AUTHORS



**Crocker H. Liu** is a professor of real estate at the School of Hotel Administration at Cornell, where he is 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 *Journal of Real Estate Finance and Economics*. He is the former co-editor of *Real Estate Economics*, the leading academic real-estate 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 *Journal of Real Estate Finance and Economics*, *Journal of Property Research*, and *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.

**Adam D. Nowak** is an associate 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. 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 *Review of Financial Studies*, *American Economic Review: Insights*, *Economic Inquiry*, *Journal of Urban Economics*, *Regional Science and Urban Economics*, *Journal of Applied Econometrics*, *Real Estate Economics*, and *Journal of Real Estate Research*.



**Robert M. White, Jr., CRE**, is the founder and former president of Real Capital Analytics Inc., an international research firm that publishes the *Capital Trends Monthly*. On August 2, 2021, he sold Real Capital Analytics to MSCI. MSCI-Real Capital Analytics provides real-time data concerning the capital markets for commercial real estate and the values of commercial properties. Mr. White 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 in 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. His research has been published in *Journal of Real Estate Finance and Economics*. A noted authority on the real estate capital markets, he has published in *The Wall Street Journal*, *Barron's*, *The Economist*, *Forbes*, *The New York Times*, and *Financial Times*, among others.



### Acknowledgments

We wish to thank Glenn Withiam for copy editing this paper.

### Disclaimer

The Cornell hotel indices produced by The Center for Real Estate and Finance at the School of Hotel Administration at Cornell University are provided as a free service to academics and practitioners on an as-is, best-effort basis with no warranties or claims regarding its usefulness or implications. The indices are not audited, and they are not necessarily free of errors or omissions although every effort has been made to minimize these. The reported indices for any quarter of any year should be considered preliminary and subject to revision.

Cornell Hotel Indices: *First Quarter 2022*

# Beware the Ides of March

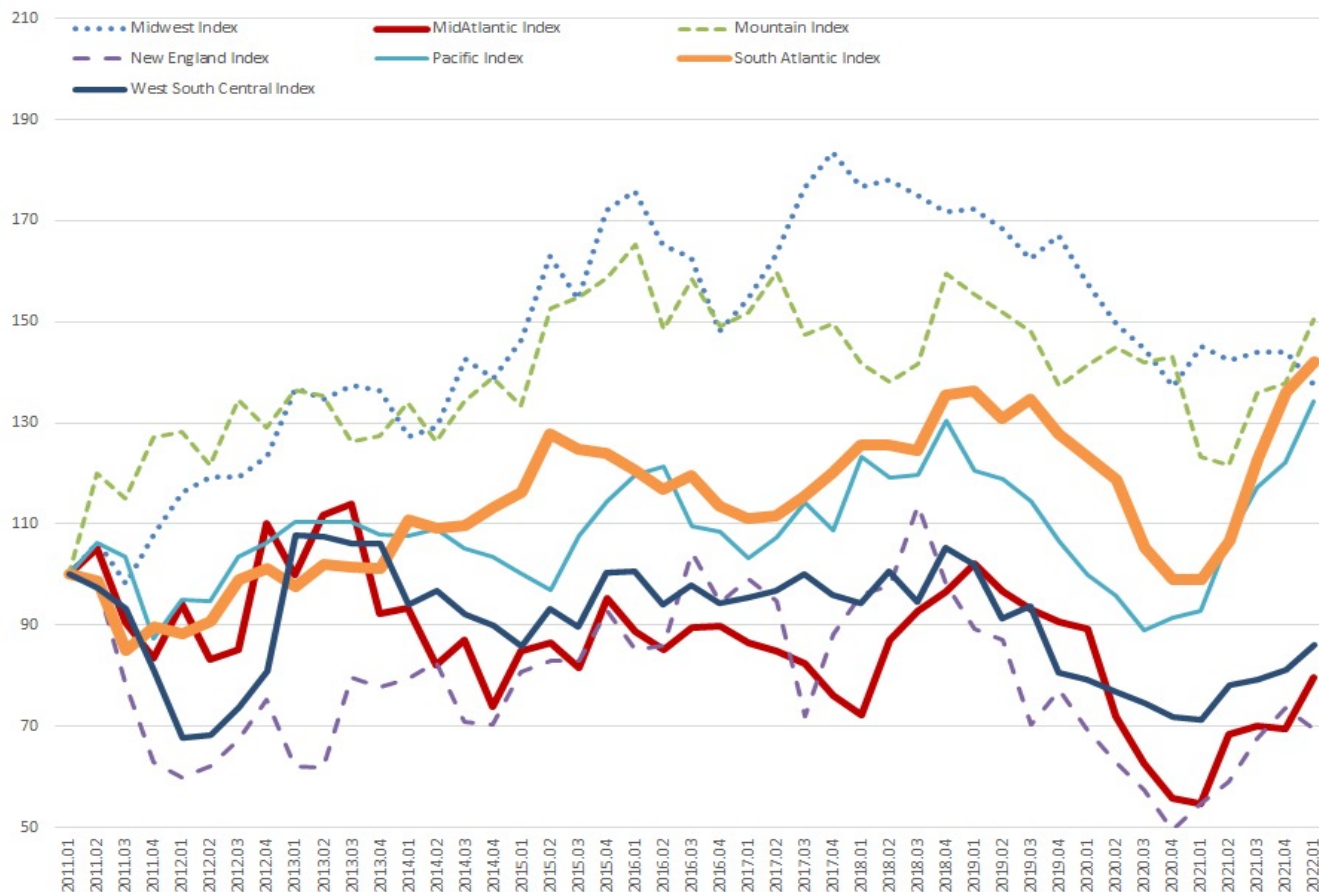
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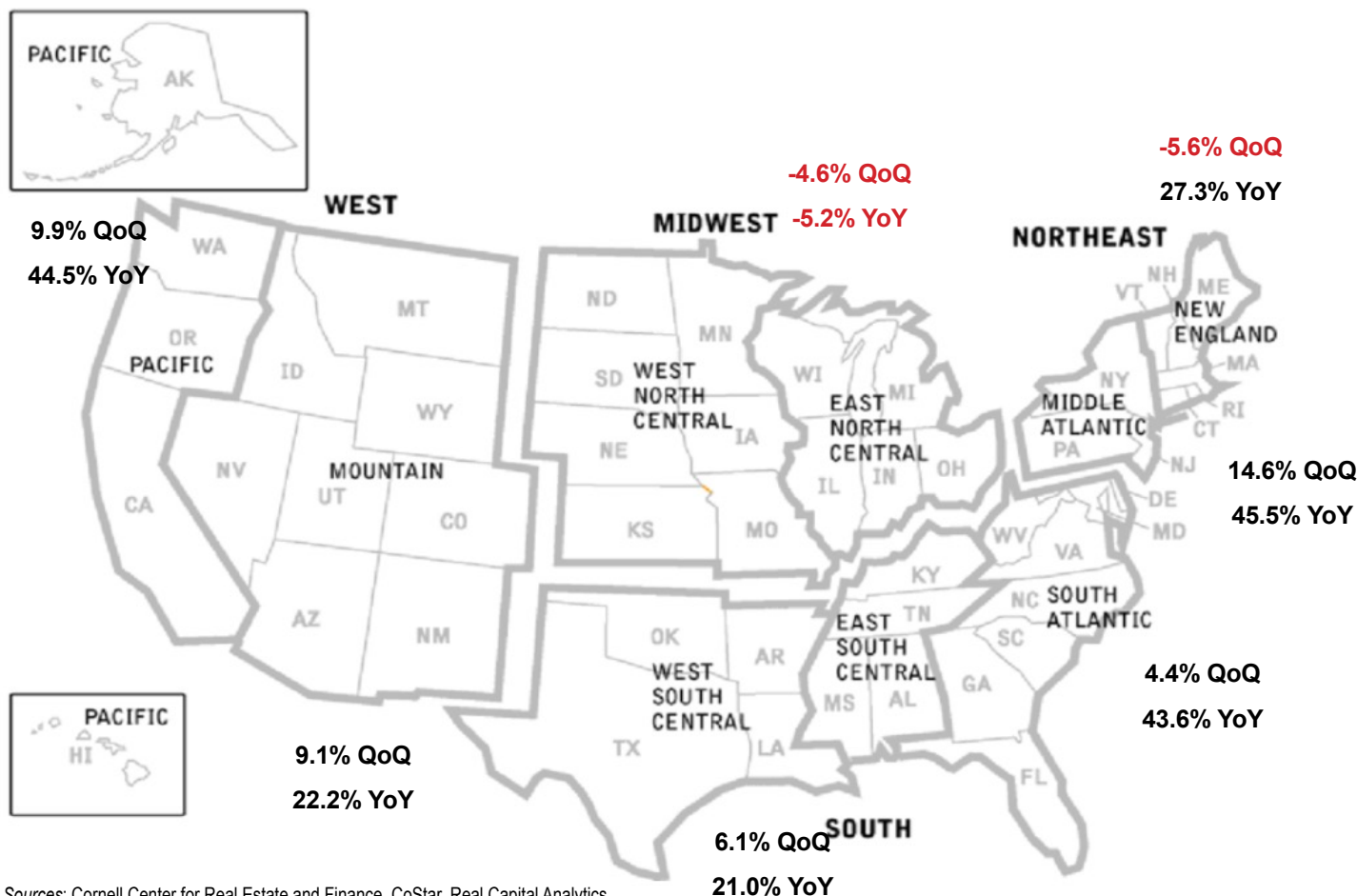
## Analysis of Indices through Q1, 2022

**H**otels in most regions continued their positive price momentum. Exhibit 1A through 1D show that for the first quarter (2022Q1), most regions continued their positive price momentum. The exception to this was the Midwest region which experienced a quarterly decline of 4.6 percent and a year-over-year decline of 5.2 percent. New England hotel prices also saw a quarterly price decline of 5.6 percent, although that region's hotel prices rose 27.3 percent year over year. Exhibit 1D shows that hotel prices reached a new statistical high in the Pacific region with hotel prices in the South Atlantic region approximately near their statistical high. Other regions exhibiting increasing standardized unexpected prices include the Mid-Atlantic, Mountain, and West South Central. Quarter over quarter, Exhibit 1B shows that only the

### EXHIBIT 1A

#### Time series hotel performance for seven regions



**EXHIBIT 1b**
**Cross-section hotel performance for seven regions**


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

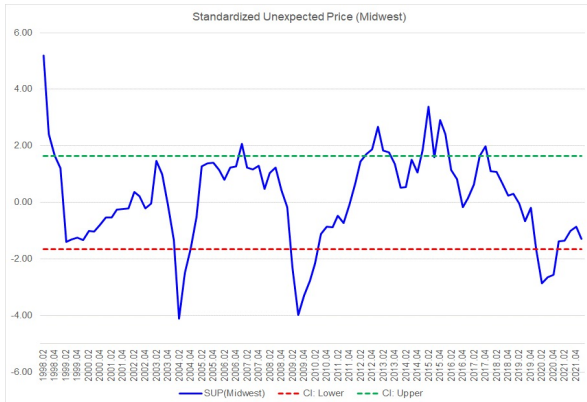
**EXHIBIT 1c**
**Changes in regional price indices, year over year and quarter over quarter**

	Midwest	MidAtlantic	Mountain	New England	Pacific	South Atlantic	West South Central
Y-o-Y							
Current	-5.2%	45.5%	22.2%	27.3%	44.5%	43.6%	21.0%
Prior	5.1%	24.2%	-3.6%	48.7%	33.7%	37.3%	13.0%
Q-to-Q							
Current	-4.6%	14.6%	9.1%	-5.6%	9.9%	4.4%	6.1%
Prior	0.0%	-0.9%	1.6%	8.9%	4.2%	10.6%	2.5%

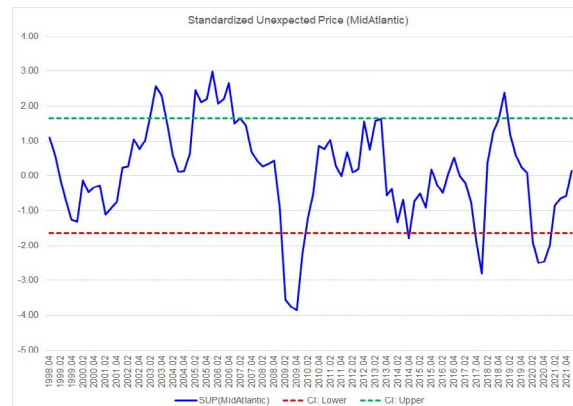
MidAtlantic region had a double-digit price gain (14.6%), although the Pacific region nearly reached double digits with a 9.9-percent price gain. Other regions posting a single-digit gain were the Mountain (9.1%), West South Central (6.1%), and South Atlantic (4.4%). Year over year, all regions except for the Midwest region (-5.2%) experienced double-digit price gains. Compared to the prior year-over-year period, however, most regions fared better this y-o-y period except for the Midwest and New England.

## Regional comparison of standardized unexpected prices (SUP), with confidence boundaries

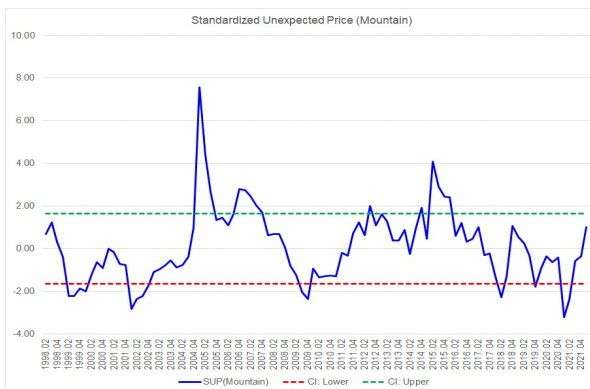
### Midwest



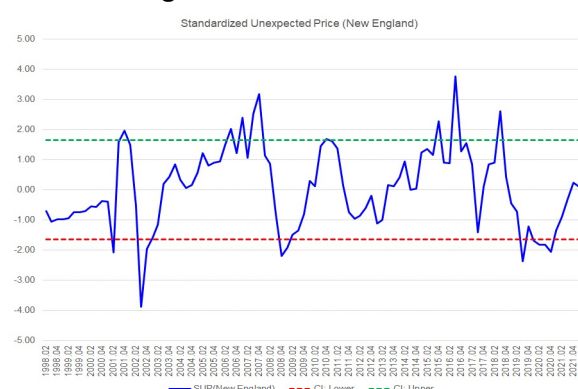
### Middle Atlantic



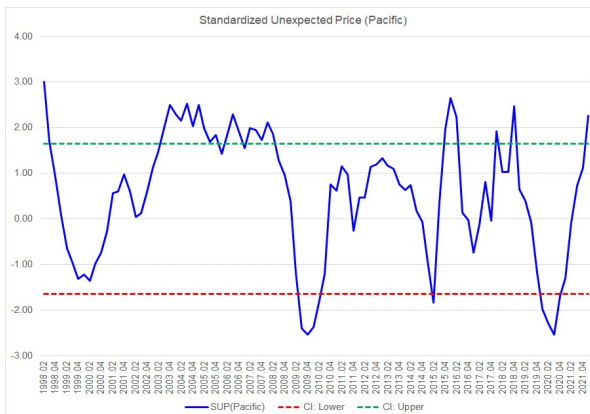
### Mountain



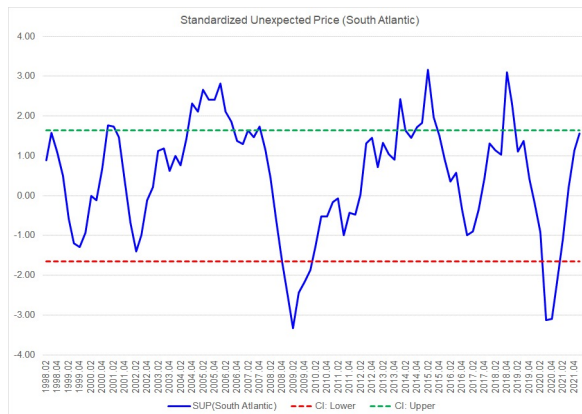
### New England



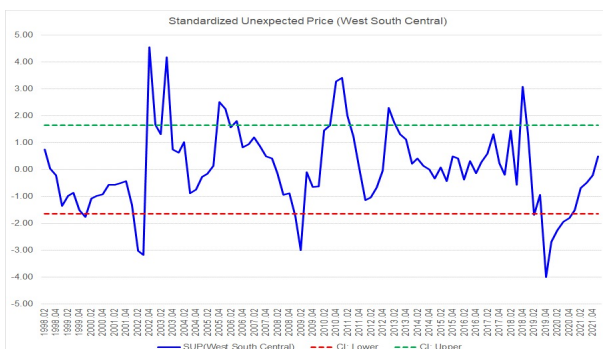
### Pacific



### South Atlantic

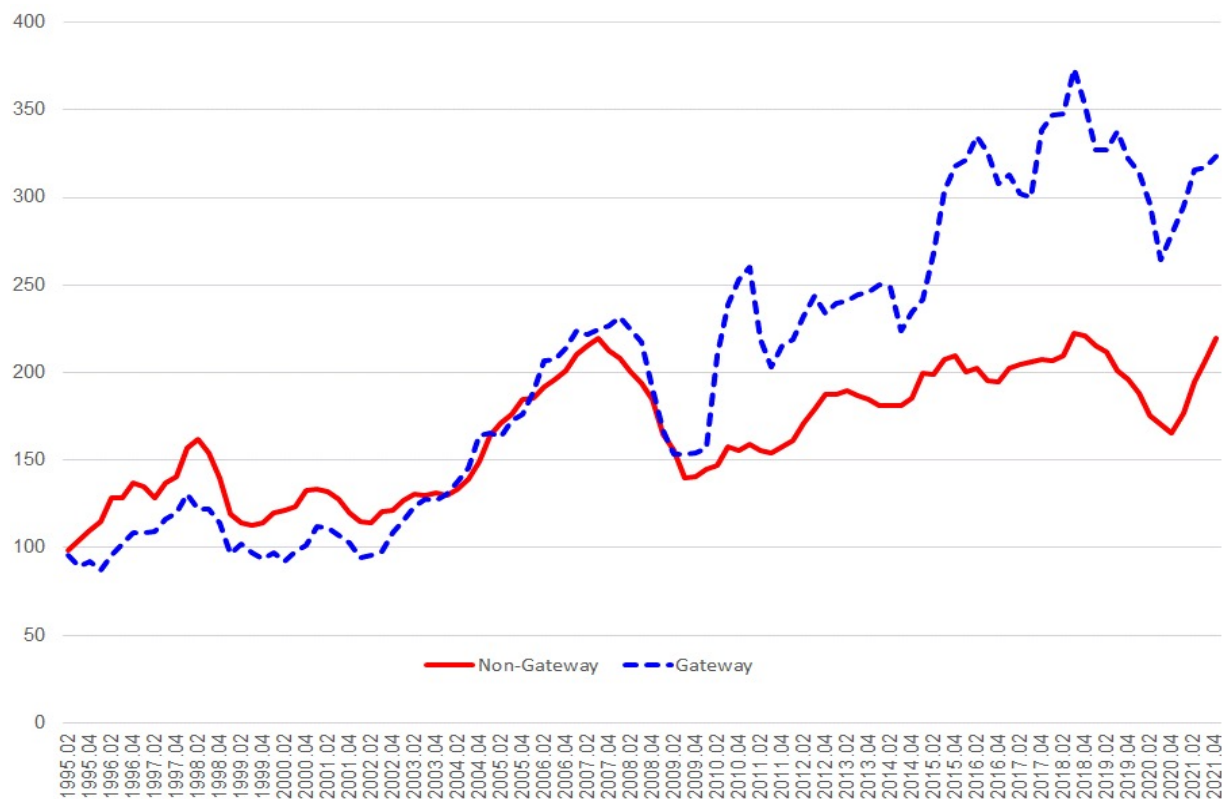


### West South Central



**Note:** Regions are as follows: **Middle Atlantic** region: New Jersey, New York, and Pennsylvania; **New England** region: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont; **South Atlantic** region: Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia; **East South Central** region: Alabama, Kentucky, Mississippi, Tennessee; **East North Central** region: Illinois, Indiana, Michigan, Ohio, and Wisconsin; **Mountain** region: Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming; **West North Central** region: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota; **Pacific**: Alaska, California, Hawaii, Oregon, and Washington.

## Hotel performance for gateway cities versus non-gateway cities



Cities that we define as gateway cities are Boston, Chicago, Honolulu, Los Angeles, Miami, New York, San Francisco, and Washington, DC.

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

**Hotels in both gateway and non-gateway cities exhibit positive performance, with hotels in non-gateway cities posting higher gains.** Exhibit 2 shows that prices of hotels in non-gateway cities continued to rise faster than those in gateway cities, continuing the trend from the prior period. On a quarterly basis, hotels in non-gateway cities increased 6.1 percent versus 2 percent for hotels in gateway cities. In the previous period, the quarterly increase was 6.4 percent for non-gateway hotels but only .3 percent for gateway city hotels. Year over year, the price of hotels in non-gateway cities increased 32.8 percent, which is double the gain of 16.1 percent recorded in gateway cities. The year-over-year gain for non-gateway city hotels exceeded the change in hotel prices of 21.5 percent in the prior year-over-year period. For gateway city hotels, the year-over-year gain in the prior period was slightly higher, at 20 percent.

**Transaction volume increased year over year, but declined quarter over quarter for both large and small hotels.** The transaction volume for all hotels (both large hotels and small hotels combined) declined 11 percent this

quarter, compared to a 10-percent increase in the prior quarter, as shown in Exhibit 3.<sup>1</sup> Year over year, the transaction volume continued to remain strong, increasing 105 percent. This increase was slightly higher than the volume gain of 100 percent in the prior period. When transactions are separated into large hotels and small hotels, transaction volume for large hotels rose 208 percent year over year, but fell 5.5 percent quarter over quarter. In comparison, the transaction volume increase for large hotels in the prior period was 182 percent year over year and 10.4 percent quarter over quarter. With regard to small hotels, the transaction volume increased 82 percent year over year, but declined 12.6 percent quarter over quarter. Those figures are compared to an 82 percent increase year over year and 10 percent quarter over quarter in the prior period. Exhibit 4 and Exhibit 5 show this year-over-year trend in the number of transactions for large hotels and small hotels.

<sup>1</sup> 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 necessarily as being representative of the total market activity.

## Transaction volume (observed) and median sale price (1995–2003)

Year	Quarter	Full Sample		Big			Small			Gateway			No Gateway		
		Median Sale Price	N	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%	\$2,357,500	20	100%	\$3,400,000	7	35%	\$2,100,000	13	65%
1995	2	\$3,150,000	29	\$15,712,500	6	21%	\$2,670,000	23	79%	\$3,800,000	12	41%	\$2,906,150	17	59%
1995	3	\$2,562,500	44	\$12,400,000	4	9%	\$2,378,000	40	91%	\$3,500,000	20	45%	\$2,000,000	24	55%
1995	4	\$3,400,000	41	\$27,750,000	10	24%	\$2,625,000	31	76%	\$5,075,000	14	34%	\$3,100,000	27	66%
1996	1	\$2,500,000	39	\$14,475,000	8	21%	\$1,700,000	31	79%	\$2,500,000	13	33%	\$2,687,500	26	67%
1996	2	\$2,925,000	43	\$29,150,000	12	28%	\$2,500,000	31	72%	\$3,200,000	15	35%	\$2,730,000	28	65%
1996	3	\$6,500,000	57	\$17,740,000	20	35%	\$3,000,000	37	65%	\$5,500,000	25	44%	\$6,890,500	32	56%
1996	4	\$2,735,000	58	\$19,000,000	17	29%	\$2,200,000	41	71%	\$4,650,000	27	47%	\$2,400,000	31	53%
1997	1	\$5,053,250	74	\$16,635,500	23	31%	\$3,500,000	51	69%	\$6,300,000	29	39%	\$4,075,000	45	61%
1997	2	\$2,862,500	72	\$17,750,000	17	24%	\$2,150,000	55	76%	\$2,445,000	24	33%	\$3,047,350	48	67%
1997	3	\$3,437,500	90	\$19,000,000	21	23%	\$2,400,000	69	77%	\$5,140,000	38	42%	\$2,550,000	52	58%
1997	4	\$4,330,950	78	\$17,000,000	27	35%	\$2,300,000	51	65%	\$10,435,445	27	35%	\$3,600,000	51	65%
1998	1	\$4,698,800	92	\$20,000,000	31	34%	\$3,100,000	61	66%	\$6,353,000	33	36%	\$4,600,000	59	64%
1998	2	\$3,630,000	96	\$23,765,000	21	22%	\$3,000,000	75	78%	\$3,998,240	28	29%	\$3,575,000	68	71%
1998	3	\$2,961,059	92	\$16,740,000	12	13%	\$2,690,550	80	87%	\$2,255,000	30	33%	\$3,365,000	62	67%
1998	4	\$2,550,000	84	\$35,000,000	15	18%	\$2,375,000	69	82%	\$4,225,000	30	36%	\$2,500,000	54	64%
1999	1	\$2,425,000	88	\$24,638,095	10	11%	\$2,125,000	78	89%	\$3,500,000	32	36%	\$2,300,000	56	64%
1999	2	\$2,100,000	95	\$67,000,000	5	5%	\$1,950,000	90	95%	\$2,067,500	28	29%	\$2,100,000	67	71%
1999	3	\$2,500,000	99	\$20,711,100	10	10%	\$2,130,000	89	90%	\$1,800,000	19	19%	\$2,522,500	80	81%
1999	4	\$2,440,000	87	\$18,190,000	14	16%	\$2,090,000	73	84%	\$2,210,000	23	26%	\$2,575,000	64	74%
2000	1	\$2,400,000	110	\$23,253,895	10	9%	\$2,300,000	100	91%	\$2,325,000	44	40%	\$2,428,500	66	60%
2000	2	\$2,450,000	88	\$14,500,000	9	10%	\$2,275,000	79	90%	\$2,325,000	24	27%	\$2,450,000	64	73%
2000	3	\$2,600,000	95	\$20,346,875	16	17%	\$2,250,000	79	83%	\$2,925,000	24	25%	\$2,525,000	71	75%
2000	4	\$2,475,000	101	\$18,050,000	14	14%	\$2,300,000	87	86%	\$4,500,000	26	26%	\$2,350,000	75	74%
2001	1	\$2,970,650	104	\$28,437,500	18	17%	\$2,422,500	86	83%	\$2,650,000	29	28%	\$3,000,000	75	72%
2001	2	\$2,800,000	110	\$23,795,000	12	11%	\$2,687,150	98	89%	\$5,825,000	25	23%	\$2,684,300	85	77%
2001	3	\$2,700,000	87	\$16,000,000	6	7%	\$2,500,000	81	93%	\$3,150,000	21	24%	\$2,600,000	66	76%
2001	4	\$2,400,000	73	\$20,500,000	5	7%	\$2,300,000	68	93%	\$2,800,000	17	23%	\$2,300,000	56	77%
2002	1	\$2,125,000	70	\$11,518,052	5	7%	\$2,000,000	65	93%	\$1,700,000	17	24%	\$2,200,000	53	76%
2002	2	\$2,400,000	106	\$18,125,000	10	9%	\$2,287,500	96	91%	\$3,125,000	33	31%	\$2,300,000	73	69%
2002	3	\$2,355,400	81	\$12,750,000	5	6%	\$2,237,500	76	94%	\$2,197,500	24	30%	\$2,470,000	57	70%
2002	4	\$2,907,500	100	\$23,500,000	16	16%	\$2,575,000	84	84%	\$2,907,500	34	34%	\$2,862,500	66	66%
2003	1	\$2,530,000	94	\$13,000,000	9	10%	\$2,425,000	85	90%	\$3,850,000	21	22%	\$2,425,000	73	78%
2003	2	\$2,750,000	110	\$18,500,000	10	9%	\$2,509,500	100	91%	\$3,160,000	31	28%	\$2,600,000	79	72%
2003	3	\$3,333,000	141	\$14,359,286	28	20%	\$2,600,000	113	80%	\$3,660,000	45	32%	\$3,032,500	96	68%
2003	4	\$2,600,000	149	\$16,375,000	18	12%	\$2,425,000	131	88%	\$2,950,000	35	23%	\$2,500,000	114	77%

## Transaction volume (observed) and median sale price (continued, 2004–2012)

Year	Quarter	Full Sample		Big			Small			Gateway			No Gateway		
		Median Sale Price	N	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
2004	1	\$2,925,000	166	\$22,875,250	24	14%	\$2,536,756	142	86%	\$3,450,000	41	25%	\$2,894,000	125	75%
2004	2	\$2,700,000	195	\$16,280,000	28	14%	\$2,450,000	167	86%	\$4,500,000	39	20%	\$2,540,000	156	80%
2004	3	\$3,491,122	216	\$19,350,000	45	21%	\$2,610,000	171	79%	\$4,600,000	51	24%	\$3,306,500	165	76%
2004	4	\$4,000,000	177	\$20,475,000	47	27%	\$3,085,500	130	73%	\$8,850,000	36	20%	\$3,600,000	141	80%
2005	1	\$4,330,000	231	\$18,100,000	52	23%	\$3,300,000	179	77%	\$6,687,500	40	17%	\$3,800,000	191	83%
2005	2	\$4,566,250	316	\$18,956,812	78	25%	\$3,255,150	238	75%	\$6,475,000	68	22%	\$4,385,000	248	78%
2005	3	\$4,150,000	273	\$21,475,000	72	26%	\$3,100,000	201	74%	\$6,100,000	61	22%	\$3,750,000	212	78%
2005	4	\$4,425,000	300	\$25,000,000	93	31%	\$3,150,000	207	69%	\$11,200,000	65	22%	\$4,000,000	235	78%
2006	1	\$5,300,000	301	\$25,750,000	92	31%	\$3,800,000	209	69%	\$18,000,000	64	21%	\$4,943,744	237	79%
2006	2	\$4,750,000	313	\$22,750,000	82	26%	\$3,500,000	231	74%	\$6,175,000	56	18%	\$4,500,000	257	82%
2006	3	\$5,000,000	285	\$22,500,000	86	30%	\$3,650,000	199	70%	\$7,000,000	59	21%	\$4,705,399	226	79%
2006	4	\$4,587,500	248	\$21,200,000	65	26%	\$3,550,000	183	74%	\$8,093,750	56	23%	\$4,270,000	192	77%
2007	1	\$6,155,805	286	\$21,225,000	104	36%	\$3,700,000	182	64%	\$9,500,000	63	22%	\$5,700,000	223	78%
2007	2	\$5,650,000	385	\$25,125,000	120	31%	\$3,750,000	265	69%	\$9,000,000	67	17%	\$5,450,000	318	83%
2007	3	\$5,450,000	330	\$20,100,161	105	32%	\$3,900,000	225	68%	\$8,325,000	53	16%	\$5,011,554	277	84%
2007	4	\$4,680,000	249	\$23,250,000	86	35%	\$3,150,000	163	65%	\$9,375,000	36	14%	\$4,500,000	213	86%
2008	1	\$5,000,000	255	\$16,000,000	61	24%	\$3,985,000	194	76%	\$5,990,000	46	18%	\$4,650,000	209	82%
2008	2	\$5,062,900	228	\$22,150,000	50	22%	\$3,890,000	178	78%	\$8,725,000	38	17%	\$4,800,000	190	83%
2008	3	\$4,190,500	172	\$17,133,333	37	22%	\$3,350,000	135	78%	\$5,500,000	27	16%	\$3,900,000	145	84%
2008	4	\$4,050,000	159	\$18,850,000	32	20%	\$3,500,000	127	80%	\$4,972,500	27	17%	\$3,920,000	132	83%
2009	1	\$4,150,000	81	\$15,800,000	15	19%	\$3,600,000	66	81%	\$7,375,000	16	20%	\$3,700,000	65	80%
2009	2	\$3,090,231	86	\$14,722,500	11	13%	\$2,864,310	75	87%	\$5,410,250	16	19%	\$3,000,000	70	81%
2009	3	\$3,400,000	90	\$22,000,000	16	18%	\$3,000,000	74	82%	\$4,608,750	14	16%	\$3,195,271	76	84%
2009	4	\$3,562,500	84	\$14,100,000	14	17%	\$3,010,250	70	83%	\$4,520,000	12	14%	\$3,400,000	72	86%
2010	1	\$3,900,000	89	\$20,162,500	18	20%	\$2,825,000	71	80%	\$8,450,000	15	17%	\$3,825,000	74	83%
2010	2	\$3,700,000	138	\$30,833,449	34	25%	\$3,000,000	104	75%	\$15,400,000	34	25%	\$3,100,000	104	75%
2010	3	\$4,912,500	120	\$35,500,000	46	38%	\$2,850,000	74	62%	\$25,000,000	37	31%	\$3,117,000	83	69%
2010	4	\$3,988,800	100	\$30,353,182	38	38%	\$2,420,000	62	62%	\$38,500,000	23	23%	\$3,265,000	77	77%
2011	1	\$4,200,000	85	\$34,050,000	24	28%	\$2,795,500	61	72%	\$12,275,000	15	18%	\$3,775,000	70	82%
2011	2	\$4,200,000	97	\$51,200,000	31	32%	\$2,250,000	66	68%	\$15,600,000	23	24%	\$3,175,000	74	76%
2011	3	\$3,350,000	73	\$23,772,500	20	27%	\$2,800,000	53	73%	\$3,700,000	17	23%	\$3,275,000	56	77%
2011	4	\$5,000,000	157	\$32,400,000	43	27%	\$3,229,250	114	73%	\$10,950,000	34	22%	\$4,300,000	123	78%
2012	1	\$5,233,961	131	\$22,100,000	40	31%	\$3,275,000	91	69%	\$13,837,500	28	21%	\$4,200,000	103	79%
2012	2	\$4,000,000	209	\$17,000,000	61	29%	\$2,779,500	148	71%	\$15,900,000	22	11%	\$3,700,000	187	89%
2012	3	\$7,000,000	169	\$19,100,000	67	40%	\$2,720,250	102	60%	\$16,050,000	32	19%	\$5,250,000	137	81%
2012	4	\$5,622,500	207	\$24,866,613	74	36%	\$3,125,000	133	64%	\$16,174,794	39	19%	\$5,070,000	168	81%

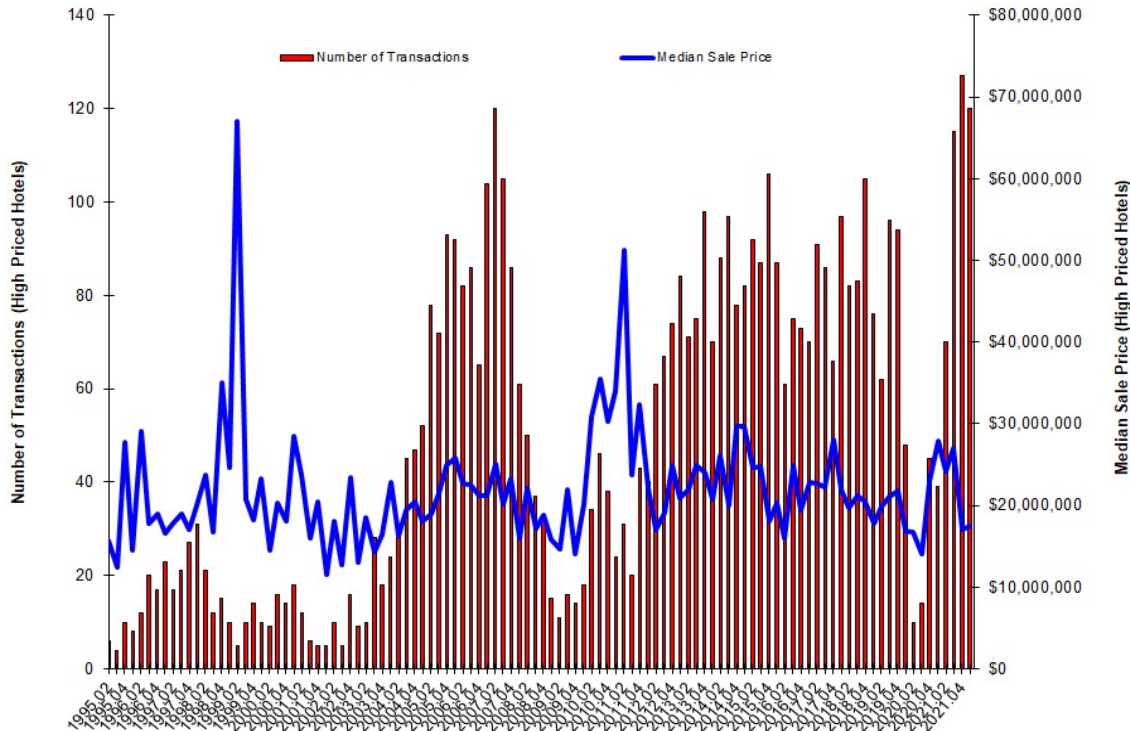
## Transaction volume (observed) and median sale price (concluded, 2013–2022)

Year	Quarter	Full Sample		Big			Small			Gateway			No Gateway		
		Median Sale Price	N	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
2013	1	\$5,997,496	238	\$20,927,291	84	35%	\$2,962,500	154	65%	\$6,500,000	51	21%	\$5,575,000	187	79%
2013	2	\$4,700,000	217	\$22,000,000	71	33%	\$2,500,000	146	67%	\$16,000,000	38	18%	\$4,200,000	179	82%
2013	3	\$5,260,855	246	\$25,000,000	75	30%	\$3,300,000	171	70%	\$9,949,500	35	14%	\$4,750,000	211	86%
2013	4	\$4,537,500	314	\$24,000,000	98	31%	\$2,790,000	216	69%	\$13,500,000	55	18%	\$4,000,000	259	82%
2014	1	\$5,625,000	228	\$20,750,000	70	31%	\$3,300,000	158	69%	\$8,825,900	59	26%	\$5,000,000	169	74%
2014	2	\$4,300,000	320	\$26,125,000	88	28%	\$2,818,750	232	73%	\$11,200,000	59	18%	\$3,700,000	261	82%
2014	3	\$5,500,000	351	\$20,000,000	97	28%	\$3,425,000	254	72%	\$10,567,078	66	19%	\$5,000,000	285	81%
2014	4	\$4,550,000	310	\$29,625,000	78	25%	\$3,107,500	232	75%	\$8,225,000	72	23%	\$3,950,000	238	77%
2015	1	\$5,900,000	253	\$29,750,000	82	32%	\$3,150,000	171	68%	\$8,280,000	47	19%	\$5,500,000	206	81%
2015	2	\$6,350,000	268	\$24,575,000	92	34%	\$3,250,000	176	66%	\$18,765,000	46	17%	\$5,612,500	222	83%
2015	3	\$5,050,000	299	\$24,800,000	87	29%	\$3,012,500	212	71%	\$12,100,000	53	18%	\$4,275,000	246	82%
2015	4	\$6,650,000	292	\$18,080,000	106	36%	\$3,125,000	186	64%	\$14,415,000	51	17%	\$5,400,000	241	83%
2016	1	\$5,600,000	293	\$20,375,000	87	30%	\$3,350,000	206	70%	\$13,600,000	45	15%	\$5,275,000	248	85%
2016	2	\$4,100,000	322	\$16,000,000	61	19%	\$3,300,000	261	81%	\$11,600,000	48	15%	\$3,725,000	274	85%
2016	3	\$4,862,500	284	\$25,000,000	75	26%	\$3,200,000	209	74%	\$24,500,000	34	12%	\$4,362,500	250	88%
2016	4	\$4,000,000	263	\$19,480,000	73	28%	\$2,800,000	190	72%	\$13,352,600	28	11%	\$3,664,706	235	89%
2017	1	\$5,275,000	254	\$22,880,750	70	28%	\$3,600,000	184	72%	\$14,726,254	28	11%	\$4,950,000	226	89%
2017	2	\$5,100,000	331	\$22,660,000	91	27%	\$3,325,000	240	73%	\$16,450,000	37	11%	\$4,462,500	294	89%
2017	3	\$5,000,000	322	\$22,250,000	86	27%	\$3,403,000	236	73%	\$22,250,000	38	12%	\$4,512,500	284	88%
2017	4	\$4,500,000	265	\$28,000,000	66	25%	\$2,875,000	199	75%	\$12,208,000	26	10%	\$4,250,000	239	90%
2018	1	\$5,500,000	310	\$21,882,400	97	31%	\$3,500,000	213	69%	\$14,750,000	40	13%	\$5,000,000	270	87%
2018	2	\$4,805,200	366	\$19,750,000	82	22%	\$3,300,000	284	78%	\$17,625,000	40	11%	\$4,300,000	326	89%
2018	3	\$5,125,000	334	\$21,265,000	83	25%	\$3,710,000	251	75%	\$13,342,500	22	7%	\$5,000,000	312	93%
2018	4	\$6,490,000	279	\$20,500,000	105	38%	\$3,300,000	174	62%	\$14,440,000	33	12%	\$5,580,556	246	88%
2019	1	\$5,350,000	289	\$17,802,698	76	26%	\$3,550,000	213	74%	\$15,750,000	34	12%	\$4,800,000	255	88%
2019	2	\$4,045,000	332	\$19,848,485	62	19%	\$3,372,500	270	81%	\$6,300,000	35	11%	\$3,900,000	297	89%
2019	3	\$4,707,500	402	\$21,000,000	96	24%	\$3,500,000	306	76%	\$15,850,000	42	10%	\$4,362,500	360	90%
2019	4	\$4,950,000	383	\$21,855,650	94	25%	\$3,300,000	289	75%	\$11,000,000	35	9%	\$4,600,000	340	91%
2020	1	\$4,100,000	306	\$16,900,000	48	16%	\$3,470,000	258	84%	\$6,313,000	22	7%	\$4,095,000	284	93%
2020	2	\$3,380,000	80	\$16,787,500	10	13%	\$2,515,000	70	88%	\$6,700,000	7	9%	\$3,360,000	73	91%
2020	3	\$2,800,000	173	\$14,062,500	14	8%	\$2,600,000	159	92%	\$7,219,750	12	7%	\$2,667,500	161	93%
2020	4	\$3,600,000	246	\$23,053,000	45	18%	\$2,750,000	201	82%	\$10,725,000	36	15%	\$3,000,000	210	85%
2021	1	\$3,951,500	215	\$27,900,000	39	18%	\$3,150,000	176	82%	\$11,431,000	20	9%	\$3,750,000	195	91%
2021	2	\$3,500,000	347	\$24,226,000	70	20%	\$2,900,000	277	80%	\$9,675,000	34	10%	\$3,375,000	313	90%
2021	3	\$4,350,000	448	\$27,000,000	115	26%	\$3,125,000	333	74%	\$33,820,000	38	8%	\$4,000,000	410	92%
2021	4	\$4,750,000	493	\$17,100,000	127	26%	\$3,300,000	366	74%	\$9,687,500	36	7%	\$4,400,000	457	93%
2022	1	\$5,131,250	440	\$17,550,000	120	27%	\$3,475,000	320	73%	\$12,025,000	42	10%	\$4,887,500	398	90%

Source: Cornell Center for Real Estate and Finance

# EXHIBIT 4

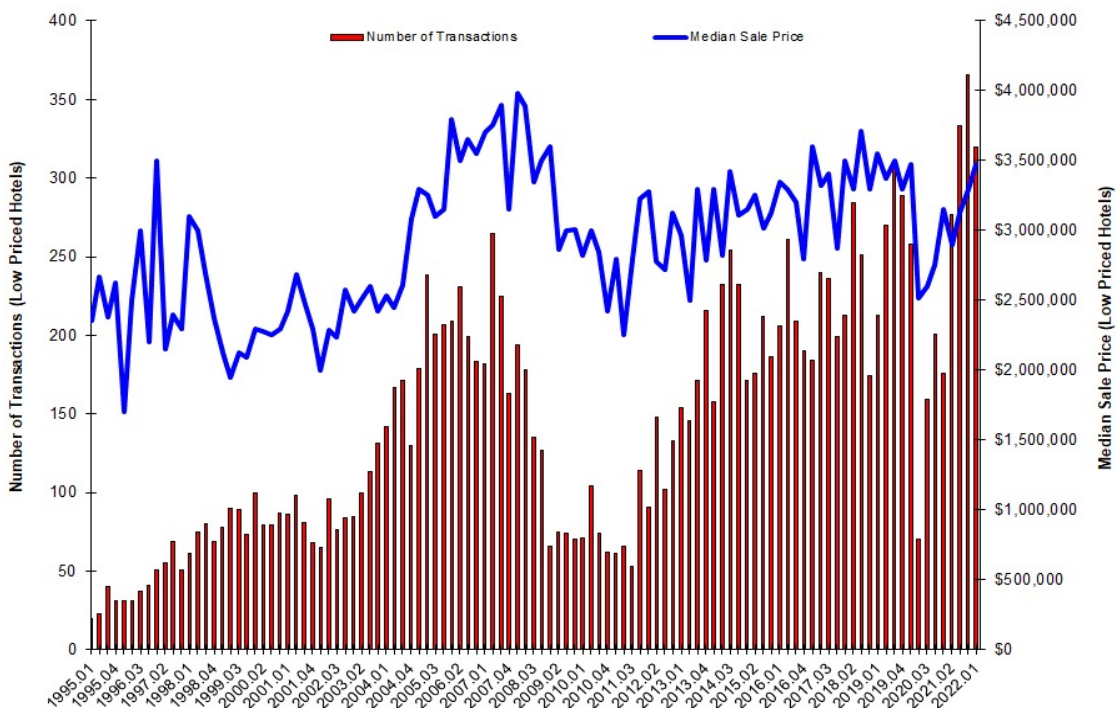
## Median sale price and number of sales, large hotels (sale prices of \$10 million or more)



Sources: CoStar, Real Capital Analytics

# EXHIBIT 5

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



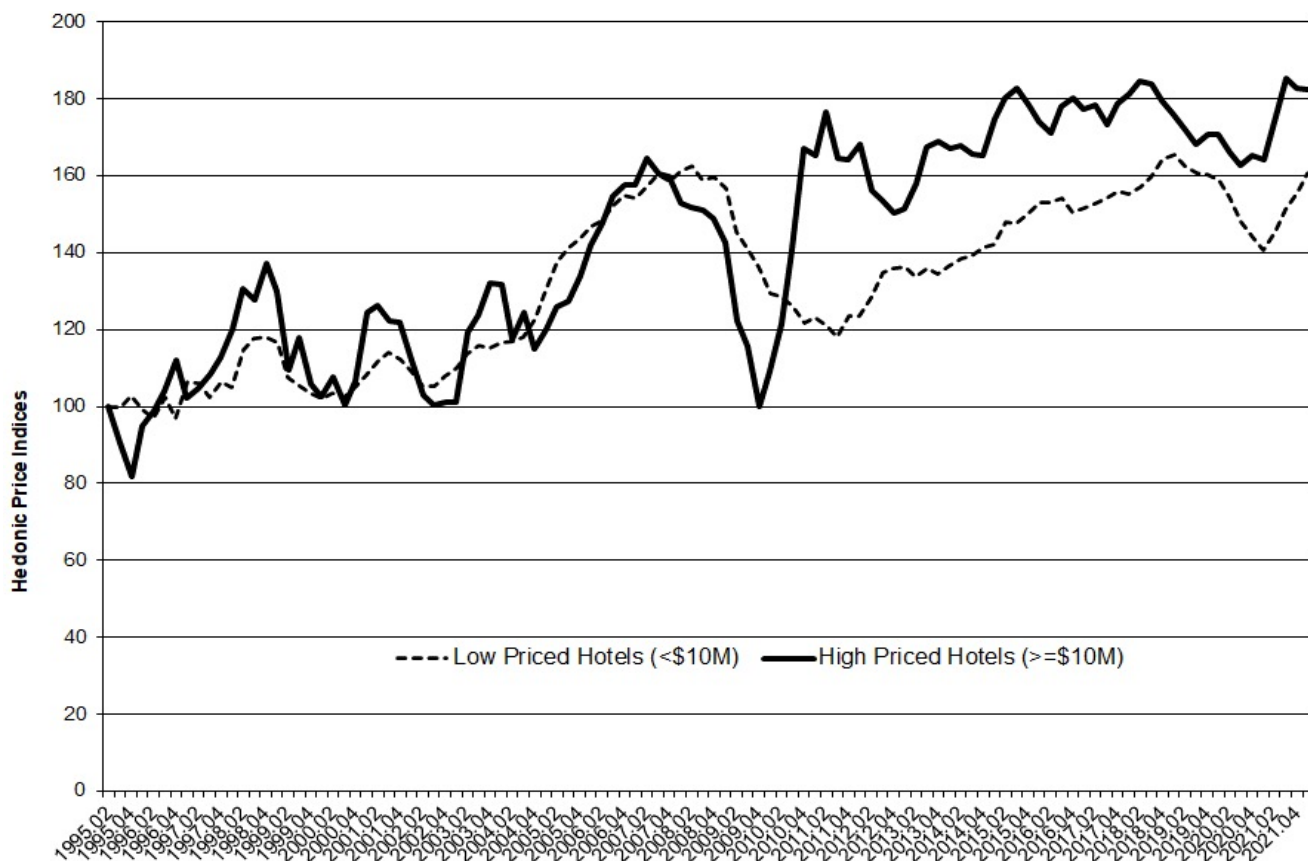
Sources: CoStar, Real Capital Analytics

## Hotel indices through 2022, quarter 1

YrQtr	Low Priced Hotels (<\$10M)	High Priced Hotels (>=\$10M)	Non Gateway Index	Gateway Index	Repeat Sales Index	Index Value Repeat Sales	YrQtr	Low Priced Hotels (<\$10M)	High Priced Hotels (>=\$10M)	Non Gateway Index	Gateway Index	Repeat Sales Index	Index Value Repeat Sales
1995.02	98.17	95.25	82.73	103.92	64.55	NA	2009.01	153.69	135.89	152.67	198.56	155.17	161.59
1995.03	98.00	86.21	81.28	99.56	67.44	NA	2009.02	142.55	116.60	136.20	173.47	151.86	156.23
1995.04	100.75	77.86	85.96	93.03	68.97	NA	2009.03	138.19	110.29	128.49	159.30	138.14	142.92
1996.01	97.13	90.55	90.93	95.81	70.71	NA	2009.04	133.92	95.15	115.84	159.10	124.07	128.91
1996.02	95.32	94.38	95.18	90.50	73.01	NA	2010.01	127.08	103.95	116.35	159.95	118.12	122.85
1996.03	100.39	99.07	106.49	99.06	72.00	NA	2010.02	126.38	115.68	119.68	163.06	109.73	114.85
1996.04	95.01	106.70	106.22	105.85	73.51	NA	2010.03	123.92	134.28	121.48	217.84	110.58	115.84
1997.01	104.39	97.45	113.41	112.38	87.43	NA	2010.04	119.48	159.09	130.25	248.08	112.35	115.56
1997.02	103.92	99.95	111.68	112.44	90.01	NA	2011.01	121.06	157.32	128.83	262.90	111.37	111.60
1997.03	100.41	103.34	106.36	113.16	96.06	NA	2011.02	118.62	168.26	131.55	270.26	111.70	110.95
1997.04	104.53	107.58	113.53	120.67	102.31	NA	2011.03	115.78	156.74	128.78	227.25	110.66	109.88
1998.01	102.97	114.19	116.54	124.93	98.69	NA	2011.04	121.10	156.21	127.32	211.13	112.68	112.23
1998.02	112.73	124.37	129.59	135.79	104.13	NA	2012.01	121.43	160.26	130.67	223.80	114.16	113.24
1998.03	115.48	121.78	133.65	126.81	106.23	NA	2012.02	126.02	148.69	133.61	227.39	118.38	119.73
1998.04	116.07	130.59	127.74	126.47	104.06	NA	2012.03	132.40	146.34	141.78	241.87	122.29	123.07
1999.01	114.37	123.79	115.47	118.58	97.35	NA	2012.04	133.39	143.21	147.89	253.12	123.54	124.23
1999.02	105.64	104.31	98.80	100.24	91.44	NA	2013.01	133.87	144.13	155.04	243.20	125.16	127.32
1999.03	103.22	112.27	94.27	106.20	88.81	NA	2013.02	131.21	150.29	155.39	248.58	125.77	128.26
1999.04	101.64	100.73	93.13	101.12	89.50	NA	2013.03	133.51	159.35	157.07	250.18	126.58	130.46
2000.01	100.08	97.78	94.56	96.82	94.25	98.34	2013.04	131.93	160.80	154.40	254.03	129.06	134.41
2000.02	101.57	102.52	99.00	100.74	97.82	98.34	2014.01	134.24	159.27	153.00	255.45	134.86	139.73
2000.03	100.56	95.72	100.60	95.37	97.68	93.23	2014.02	135.84	159.85	150.04	259.78	134.02	137.33
2000.04	103.29	101.39	102.34	101.68	97.19	93.85	2014.03	136.50	157.80	150.00	258.17	136.38	138.83
2001.01	106.06	118.59	109.71	105.21	96.06	92.12	2014.04	138.68	157.37	150.13	232.54	136.86	137.95
2001.02	109.99	120.26	110.15	116.33	95.92	90.22	2015.01	139.66	166.31	153.34	243.44	139.07	139.55
2001.03	112.12	116.50	109.05	115.88	97.12	94.14	2015.02	145.31	171.76	165.43	250.97	144.36	144.68
2001.04	110.28	116.08	105.66	110.89	96.32	90.86	2015.03	144.73	174.05	164.37	278.51	152.78	153.94
2002.01	107.33	106.63	98.98	106.87	96.54	93.00	2015.04	147.45	169.88	171.81	315.77	161.69	162.62
2002.02	103.43	98.15	95.29	97.65	94.95	92.23	2016.01	150.34	165.89	173.28	330.33	163.50	164.92
2002.03	103.26	95.56	94.54	99.77	94.92	90.41	2016.02	150.41	163.10	165.70	334.11	163.43	165.74
2002.04	105.98	96.19	99.73	101.39	96.53	95.30	2016.03	151.36	169.37	167.35	348.16	163.02	163.95
2003.01	108.05	96.20	100.38	112.89	98.09	95.19	2016.04	147.66	171.74	161.72	338.27	158.34	160.52
2003.02	111.56	113.74	104.90	120.29	100.33	98.91	2017.01	148.72	168.91	161.21	320.11	163.39	165.56
2003.03	113.68	117.86	108.07	128.59	102.42	102.77	2017.02	149.85	169.82	167.53	324.81	171.16	174.02
2003.04	113.20	125.69	107.61	132.53	103.70	105.50	2017.03	151.43	165.11	169.22	314.23	172.38	176.09
2004.01	114.59	125.41	108.77	131.93	103.40	106.93	2017.04	152.93	170.20	170.49	311.48	176.81	179.60
2004.02	114.76	111.85	107.56	135.34	103.78	107.64	2018.01	152.41	172.83	171.64	351.47	176.81	180.08
2004.03	116.07	118.50	110.11	143.10	108.40	112.81	2018.02	154.04	175.80	171.21	360.73	178.08	180.04
2004.04	120.52	109.45	114.97	151.09	109.67	112.81	2018.03	156.60	175.22	173.45	361.39	182.20	184.01
2005.01	127.65	114.21	123.05	170.31	114.38	116.78	2018.04	161.29	171.04	183.94	388.12	184.03	185.45
2005.02	135.36	120.00	135.96	171.88	120.57	123.90	2019.01	162.42	167.41	182.59	366.65	186.24	186.83
2005.03	138.75	121.13	141.35	169.62	123.38	126.21	2019.02	159.59	163.73	178.17	339.88	185.87	185.59
2005.04	140.84	127.53	145.52	179.07	128.85	132.43	2019.03	157.85	160.30	174.96	339.98	186.39	186.46
2006.01	144.21	135.21	152.97	183.31	133.53	137.46	2019.04	157.37	162.73	166.22	351.28	187.47	187.95
2006.02	145.42	140.79	153.11	196.09	136.64	140.11	2020.01	156.06	162.76	162.21	334.75	185.17	186.32
2006.03	149.36	147.35	158.65	214.92	138.67	141.97	2020.02	151.52	158.09	155.87	326.68	184.60	186.38
2006.04	151.89	149.96	162.33	215.38	143.28	144.66	2020.03	145.24	155.10	145.27	308.48	182.86	184.71
2007.01	151.32	150.17	166.50	222.30	147.22	147.89	2020.04	141.43	157.51	140.82	274.67	184.19	186.56
2007.02	154.53	156.74	174.23	232.71	151.36	152.05	2021.01	138.26	156.39	136.75	289.33	183.34	185.40
2007.03	157.24	152.96	177.94	230.38	157.42	159.79	2021.02	142.79	165.89	146.04	306.79	185.84	187.43
2007.04	155.75	152.28	181.95	233.49	158.86	162.05	2021.03	148.56	176.38	160.81	328.28	193.62	194.11
2008.01	158.19	145.59	175.80	235.46	159.96	166.35	2021.04	152.79	174.00	171.16	329.28	203.52	201.47
2008.02	159.44	144.63	172.06	240.41	159.81	167.25	2022.01	157.81	173.57	181.61	335.93	211.10	208.50
2008.03	155.86	143.86	165.98	233.49	158.62	163.55							
2008.04	156.79	141.68	160.30	225.71	159.90	166.34							

Source: Cornell Center for Real Estate and Finance

## Hedonic hotel indices for large and small hotel transactions



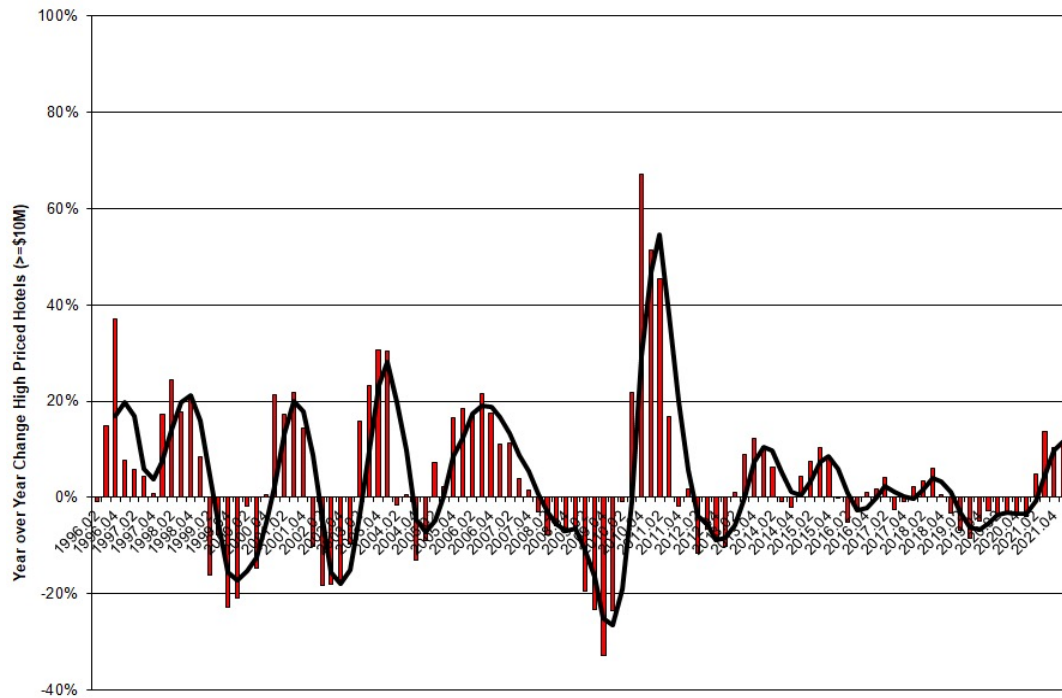
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

**Our moving average trendlines indicate that both large and small hotels are priced to buy.** Large hotels continue to decline in price, while smaller hotels' prices are rising, based on our standardized unexpected price (SUP) performance metric. Exhibit 7, which graphs the prices reported in Exhibit 6, shows that the price of large hotels fell

.25 percent this quarter, while small hotels' price increased 3.3 percent. Year over year, Exhibit 8 shows that the price of large hotels increased 11 percent, compared to 10.5 percent in the prior year-over-year period. Exhibit 9 shows that small hotels' prices rose 14 percent year over year, compared to 8 percent in the prior period.

## EXHIBIT 8

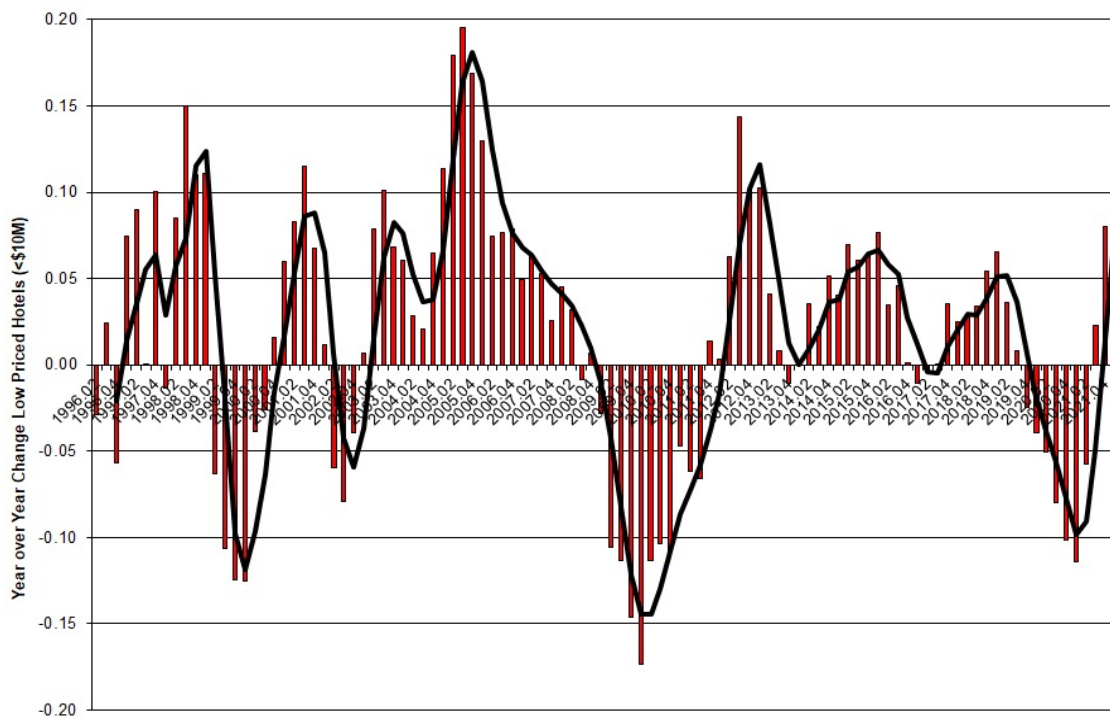
### Year-over-year change in large-hotel index with a moving average trendline



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

## EXHIBIT 9

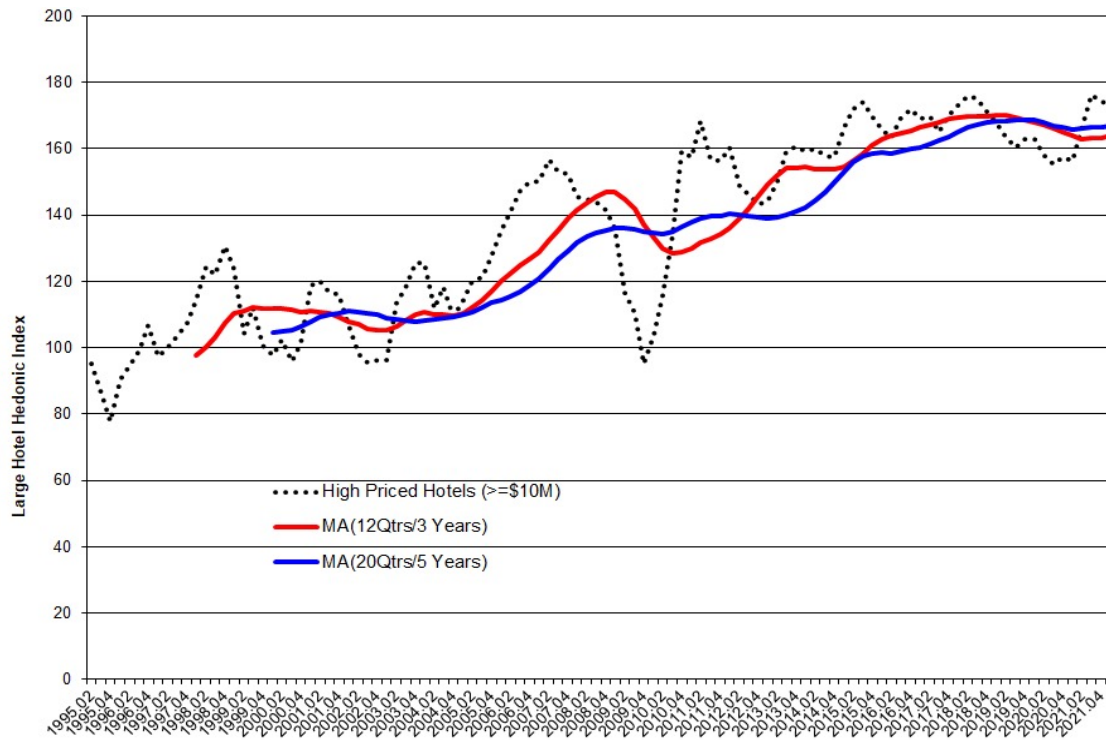
### Year-over-year change in small-hotel index with a moving average trendline



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

## EXHIBIT 10

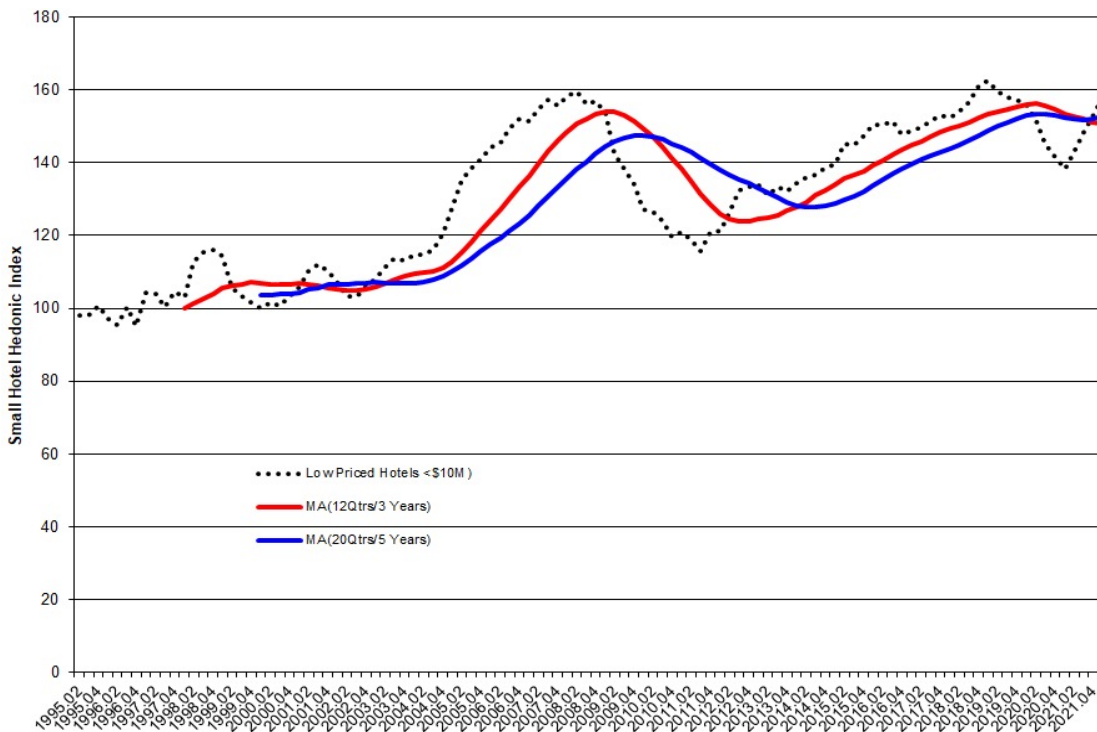
### Moving average trendlines for large hotel index



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

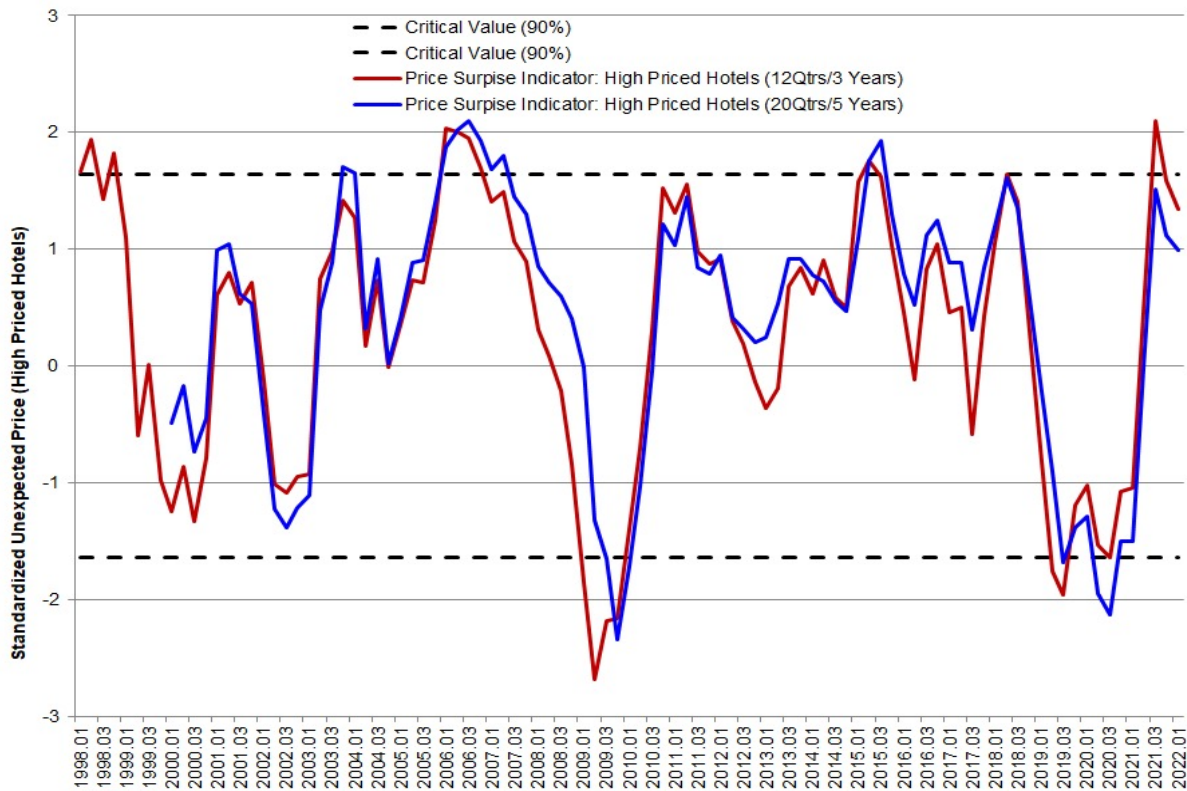
## EXHIBIT 11

### Moving average trendlines for small hotel index



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

## Standardized unexpected price (SUP) for large hotel index



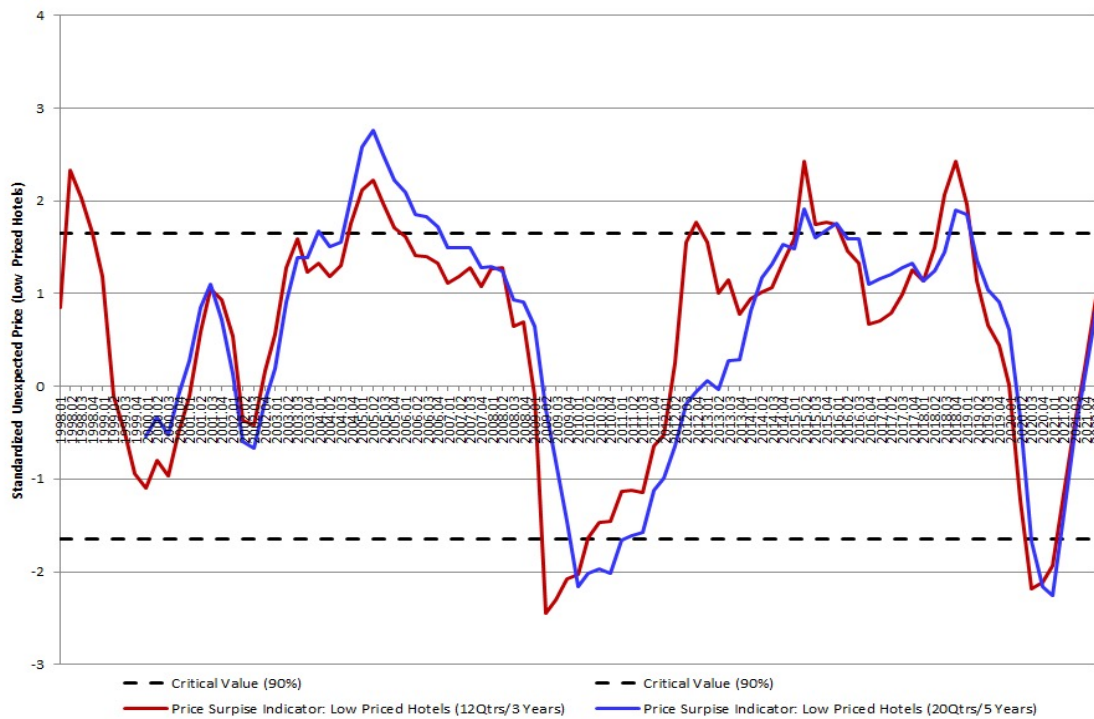
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

Our moving average trendlines for large hotels (in Exhibit 10) shows that the price for large hotels continues to remain above both its short-term and long-term moving averages, indicating that large hotels are still a buy. The price trendlines for smaller hotels (in Exhibit 11) also show that they are now a buy, since the price is above both its short-term and long-term moving average.

Our standardized unexpected price (SUP) metric (in Exhibit 12) shows that the standardized price for large hotels continued its decline from its new statistical high in 2021Q3. In contrast, the standardized price for small hotels continues its ascent towards a new statistical high, as shown in Exhibit 13.

## EXHIBIT 13

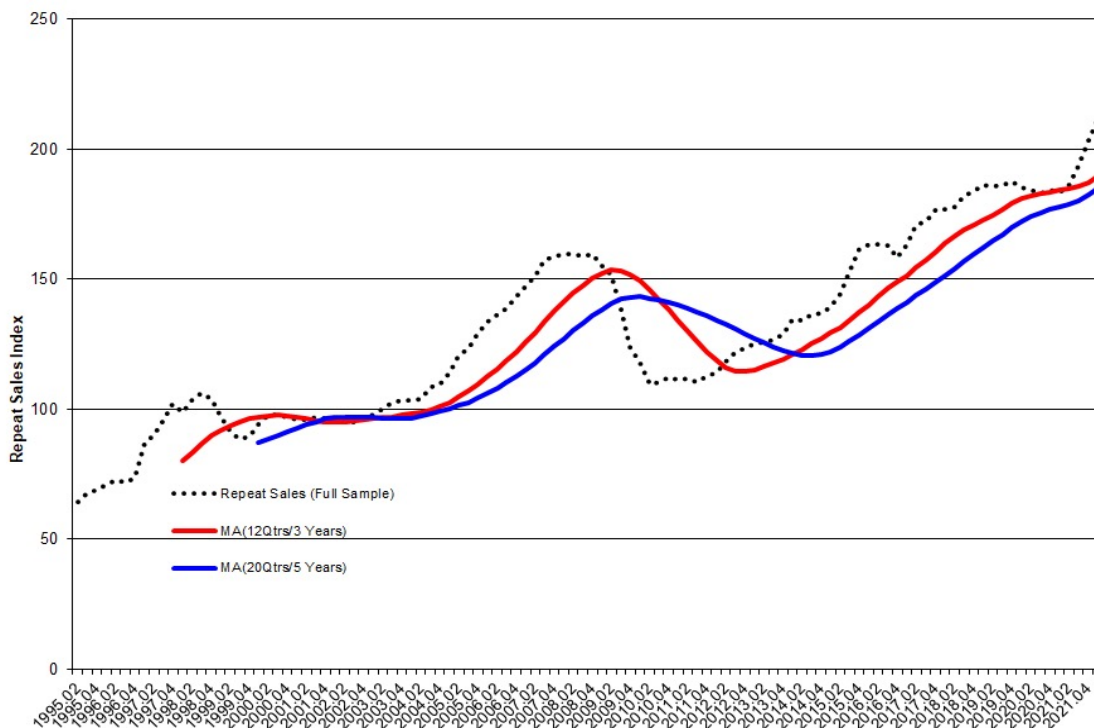
### Standardized unexpected price (SUP) for small hotel index



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

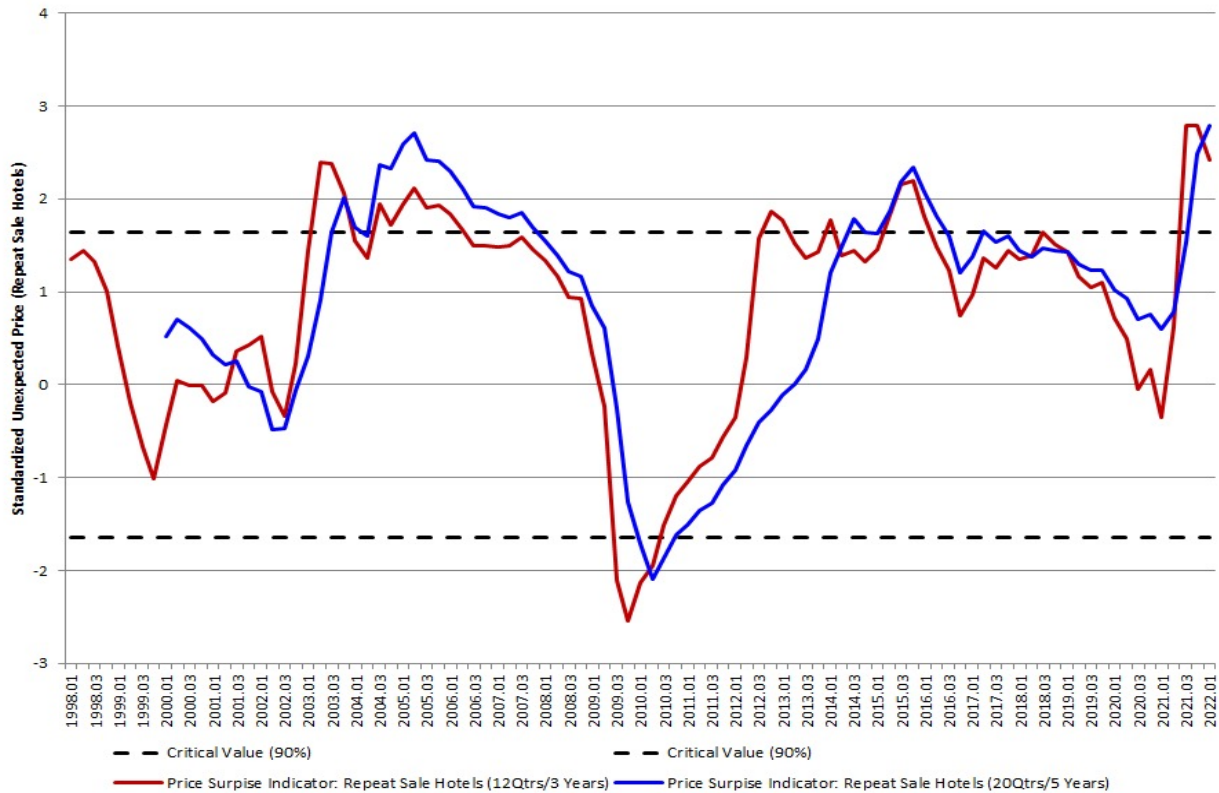
## EXHIBIT 14

### Moving average trend line for repeat-sale index



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

## Standardized unexpected price (SUP) for hotel repeat-sale index (full sample)



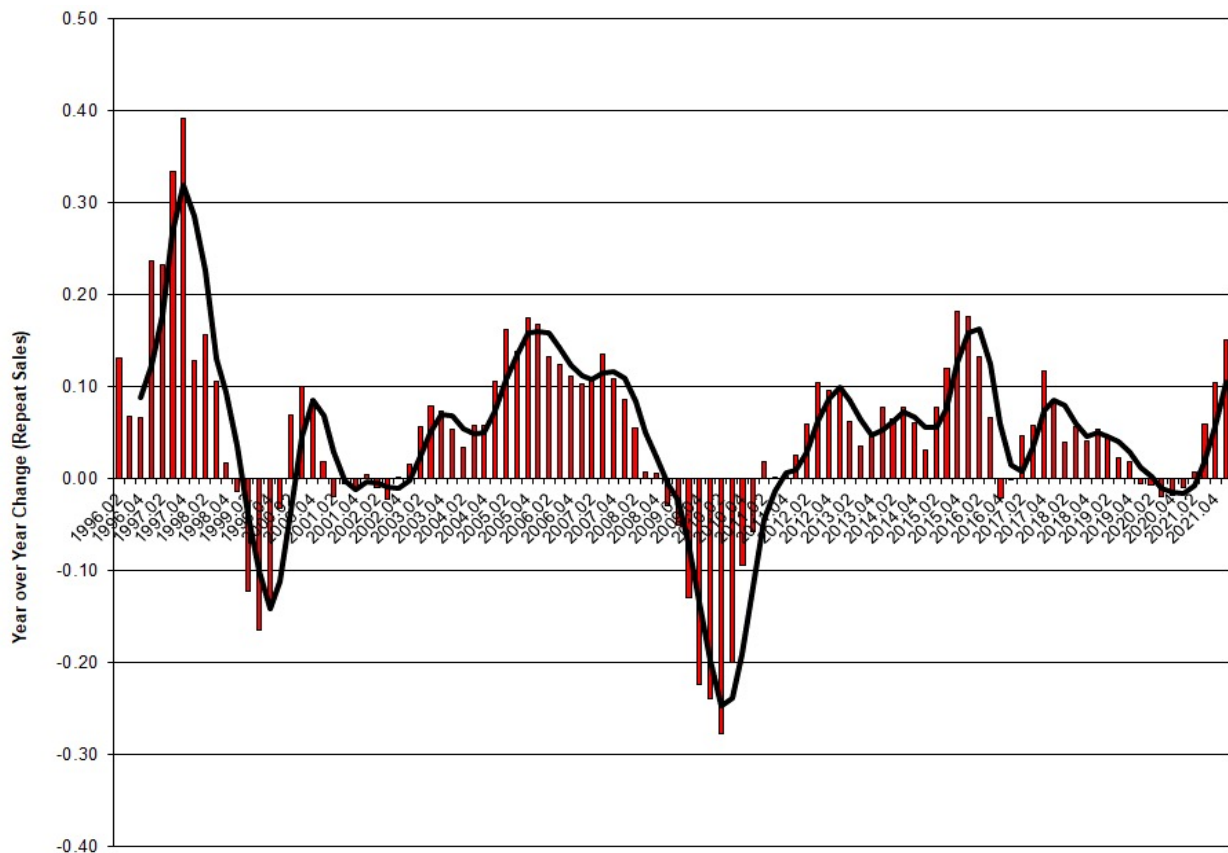
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

**Repeat sales metrics: Prices remain above the moving averages.** Hotel prices continue to reach new highs.<sup>2</sup> Exhibit 14 shows that our repeat sale indicator again stands

<sup>2</sup> 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.

above both its short-term and long-term moving averages, for both large and small hotels. This is another signal that good hotels continue to remain a buy opportunity. Our SUP performance metric in Exhibit 15 indicates that the standardized price, based both its three-year moving average and its five-year moving average, continues to remain above its statistical upper boundary.

## 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 16 shows that the repeat sale price index rose 15 percent year over year, compared to a rise of 10.5 percent in the prior period. Quarter over quarter, the index increased 3.7 percent, compared to a 5.1-percent rise in the prior quarter-over-quarter period.

**Mortgage financing volume continues to rise but at a slower pace both year over year and quarter over quarter.** Exhibit 17 shows that the mortgage origination volume for hotels as reported for the fourth quarter of 2021 rose 168 percent year over year, a figure considerably lower than the 850-percent increase in the prior period.<sup>3</sup> Quarter over quarter, the mortgage originations also posted a smaller gain of 41 percent relative to the 60-percent increase in the previous quarter. The maximum loan-to-value (LTV) ratio for hotels remained at 65 percent.

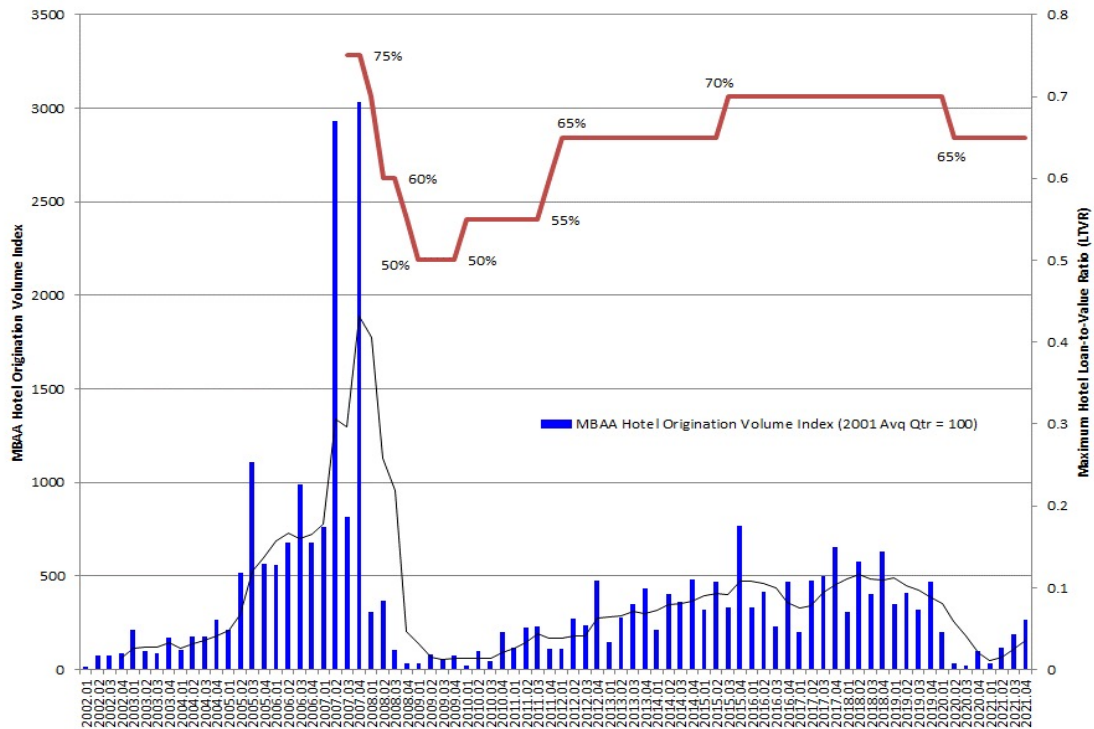
<sup>3</sup> This is the latest information reported by the Mortgage Bankers Association as of the writing of this report.

**The cost of hotel debt financing rose sharply this quarter, as well as year over year.** The cost of obtaining hotel debt financing as reported by Cushman Wakefield Sonnenblick Goldman experienced a double-digit increase this quarter for both Class A and Class B&C Hotels, as shown in Exhibit 18.<sup>4</sup> At this writing in March 2022, the interest rate on Class A Hotels is at 6.66 percent, compared to 5.4 percent in December 2021 and 5.81 percent in March 2021. The interest rate on Class B&C Hotels is 20 basis points higher than Class A properties at 6.86 percent, compared to 5.6 percent last quarter and 6 percent last March. As such rates have advanced sharply year over year and quarter over quarter.

<sup>4</sup> The interest rate reported by Cushman Wakefield Sonnenblick Goldman (CWSG) is based on deals that CWSG has brokered as well as their survey of rates on hotel deals.

## EXHIBIT 17

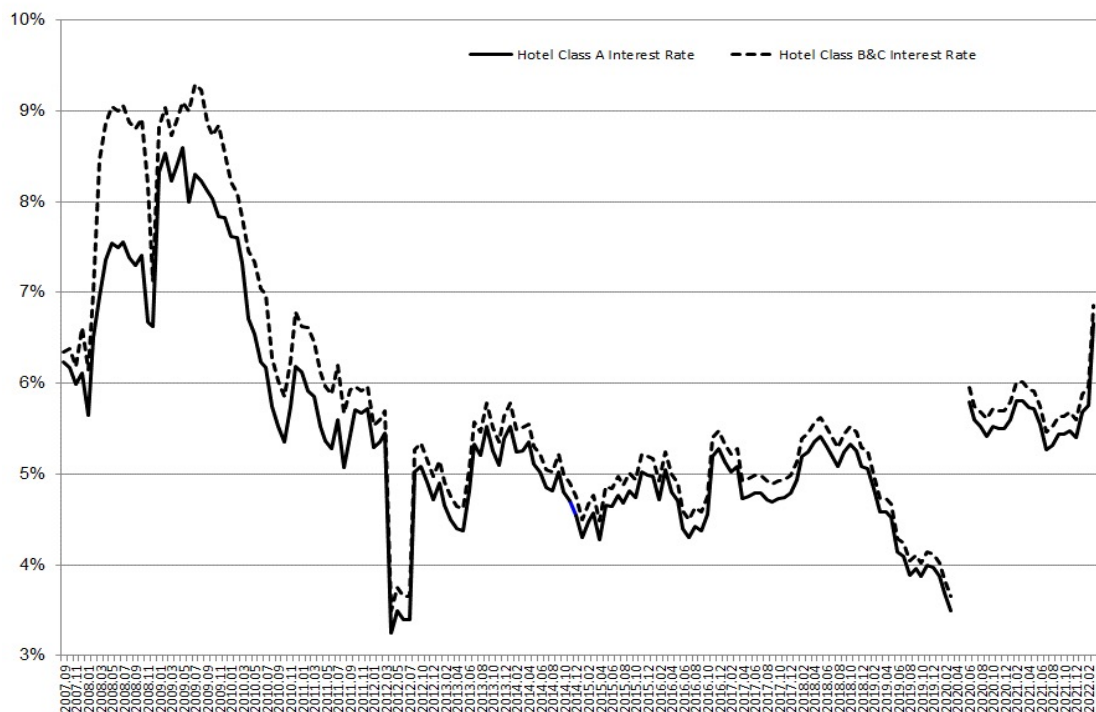
### Mortgage origination volume versus the loan-to-value ratio for hotels



Sources: Mortgage Bankers Association, Cornell Center for Real Estate and Finance, Cushman Wakefield Sonnenblick Goldman

## EXHIBIT 18

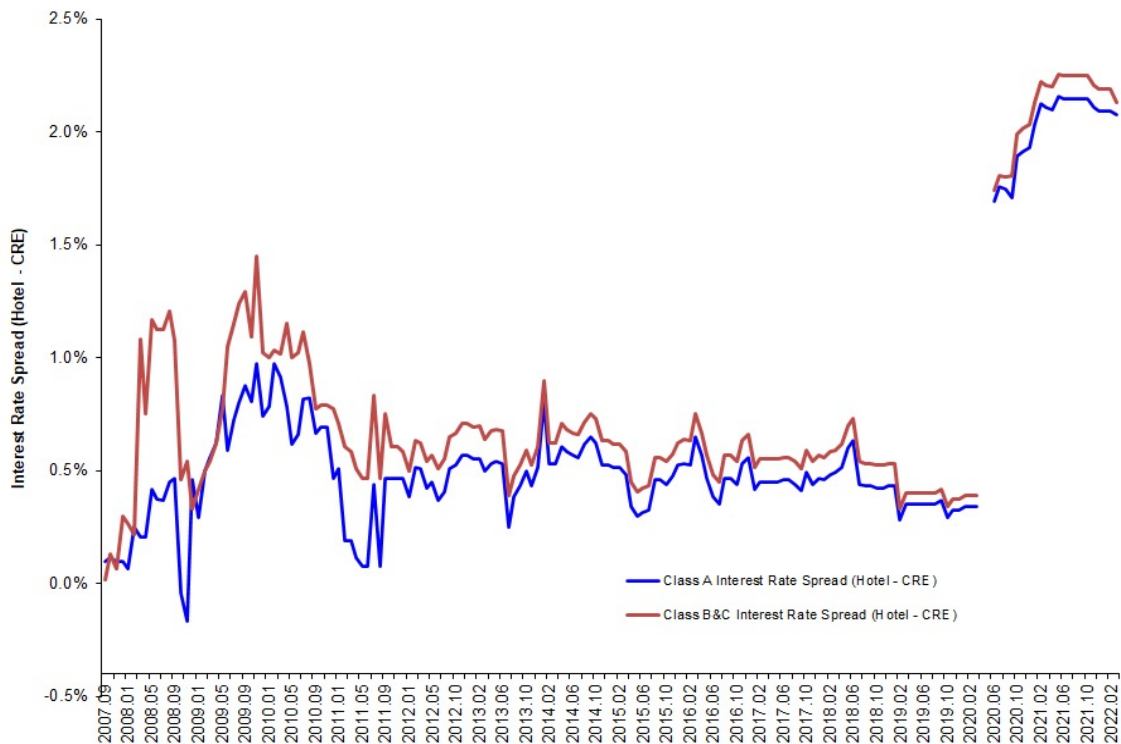
### Interest rates on Class A versus Class B & C hotels



Sources: Cornell Center for Real Estate and Finance, Cushman Wakefield Sonnenblick Goldman

## EXHIBIT 19

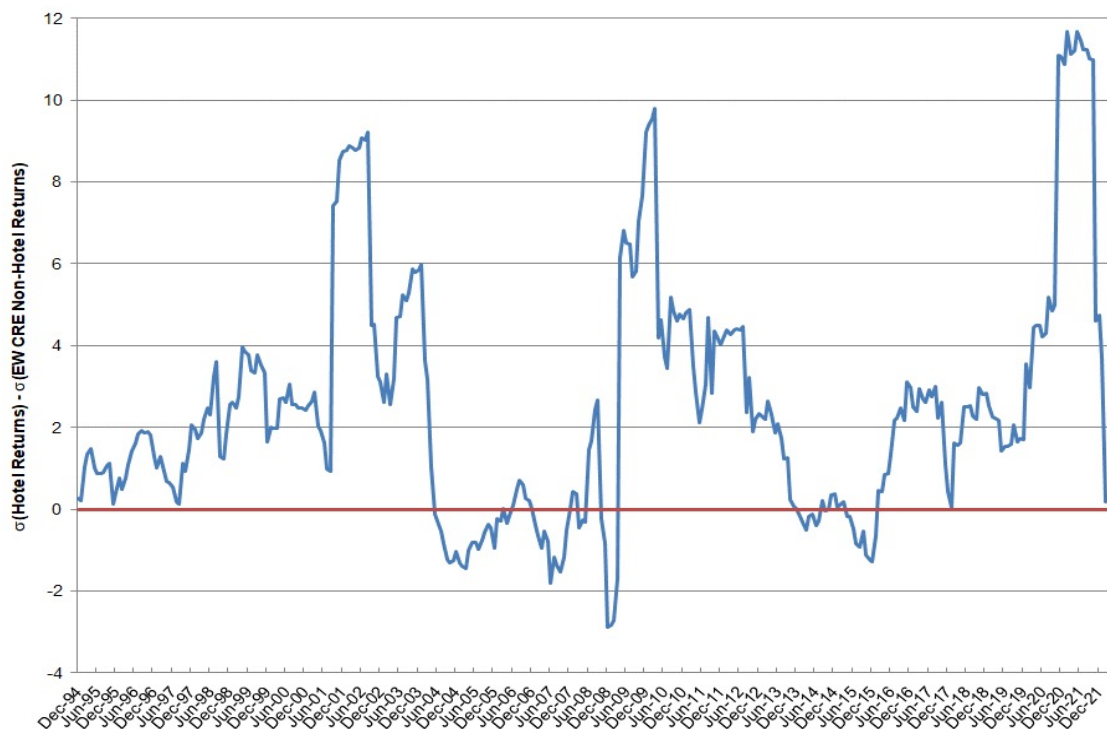
### Interest rate spreads of hotels versus non-hotel commercial real estate



Sources: Cornell Center for Real Estate and Finance, Cushman Wakefield Sonnenblick Goldman

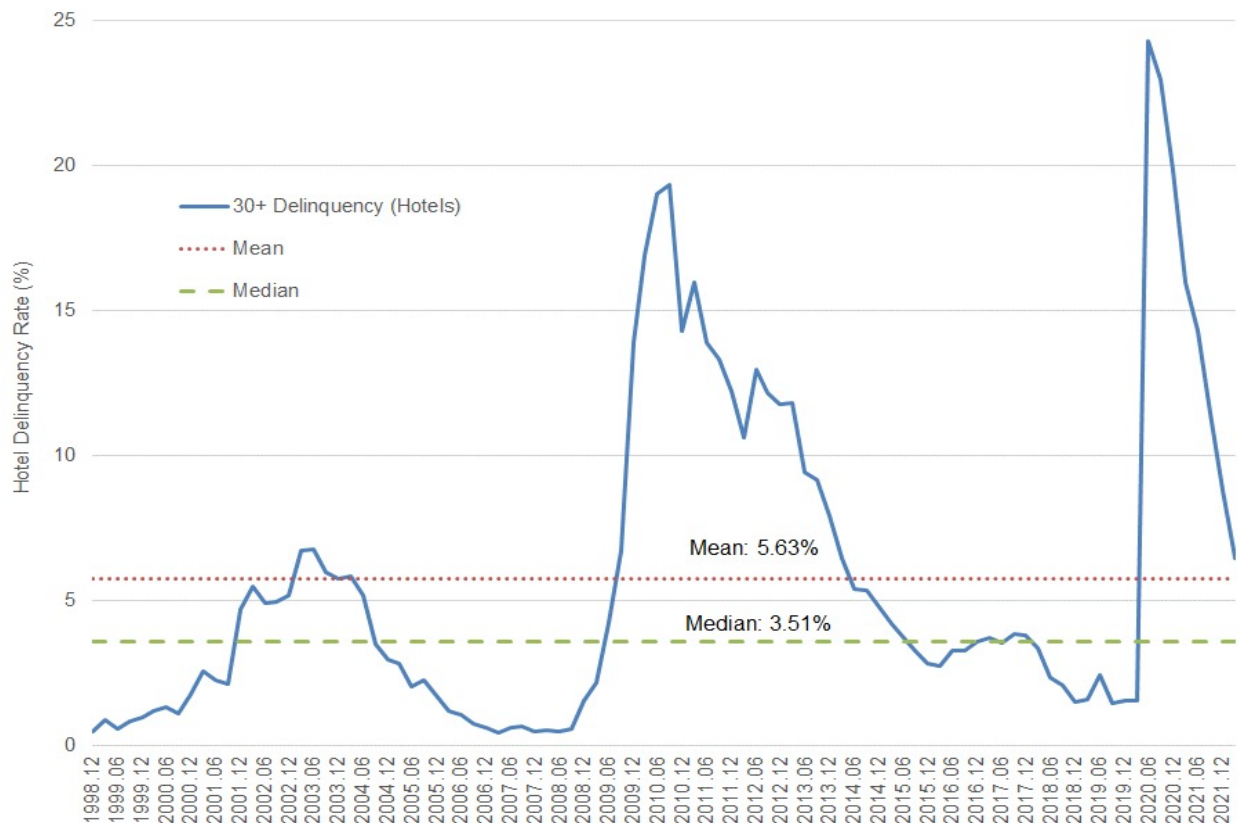
## EXHIBIT 20

### Risk differential between hotel REITs and non-hotel commercial-property REITs



Sources: NAREIT, Cornell Center for Real Estate and Finance

### 30-plus-day delinquency rate for hotels



Source: Trepp

**The relative risk premium that lenders require for hotels over other commercial real estate has remained stable this quarter relative to the prior quarter.** Thus, we find that the riskiness of hotels is now comparable to that of other major property types, which should reduce this premium in the future. Exhibit 19 shows the spread between the interest rate on Class A full-service hotels (as well as class B&C properties) compared to the (equally weighted) interest rate on other (non-hotel) commercial real estate. The positive spread associated with this hotel real estate premium indicates that lenders still demand more compensation to make hotel loans, compared to loans on other major property types, because hotels are perceived to be relatively riskier.<sup>5</sup> The monthly hotel real estate premiums continued to decline imperceptibly this quarter for both high quality hotels (Class A, 2.075%) and lower quality hotels (Class B&C, 2.13%). Those percentages are comparable to 2.09 percent for Class A hotels and 2.19 percent for Class B&C properties last. Thus, although the relative premium for hotel properties fell slightly since the last quarter, they have remained in the same range since January 2021.

Another way to view default risk is to look at the equity market. Exhibit 20 shows the total risk of hotel

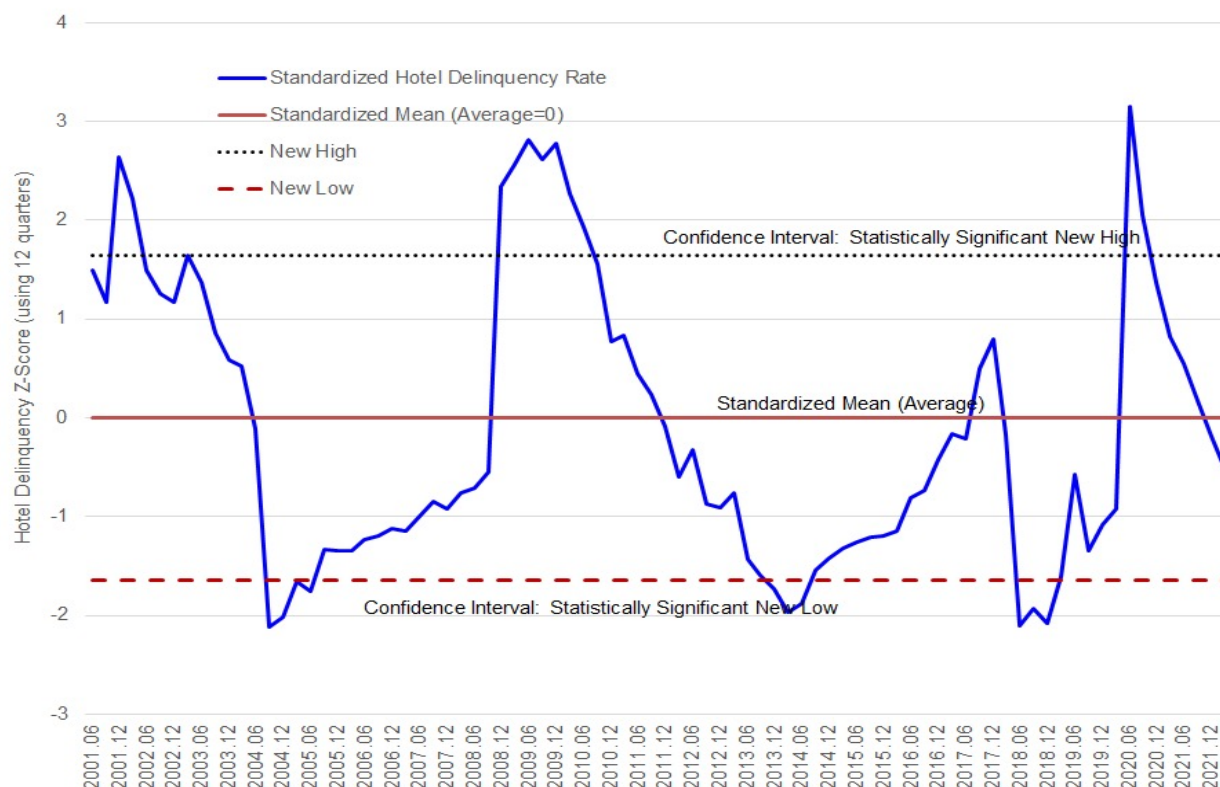
REITs relative to the total risk of an equally weighted portfolio of commercial real estate equity REITs (that is, office, industrial, retail, and multifamily).<sup>6</sup> The risk differential—which should reflect the risk that is unique to hotel properties—is currently at .3 percent at the time of this writing ( $\sigma_{\text{Hotel}} - \sigma_{\text{CRE}} = 5.39\% - 5.06\%$ ), compared to 4.7 percent in the prior quarter. This indicates that the perceived default risk for hotels has continued to decline sharply relative to other major types of commercial real estate, which should lower the financing for hotels relative to other major property types.

**The delinquency rate on hotel loans continues to decline toward its pre-pandemic level.** The CMBS delinquency rate (30+ days) for lodging properties continued to decline in December from its high of 24.3 percent in June of last year. Currently, it is 6.5 percent, compared to 8.8 percent in December 2021. However, it's still higher than its pre-pandemic level of 1.53 percent (recorded in December 2019). Note that this 6.5-percent hotel delinquency rate is lower than the current retail delinquency rate (7.2%). That said, the March 2022 delinquency rate for other property types reported by Trepp is as follows: .33 percent for industrial, .26 percent for multifamily, and 1.56-percent for office. Exhibit 21 displays the historical 30+ day delinquency

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

<sup>6</sup> We calculate the total risk for hotel REITs using a 12-month rolling window of monthly returns on hotel REITs.

## Standardized 30-plus-day delinquency rate for hotels



Source: Trepp

cy rate for hotels, while Exhibit 22 shows the standardized version of the 30+ day delinquency rate for hotels. Exhibit 22 reveals that the delinquency rate for hotels with loans securitized as part of CMBS deals has dropped below its long-term average.<sup>7</sup> Using the standardized metric, the fact that the delinquency rate has reverted to zero is another indication that the relative risk premium for hotels should continue to narrow, which in turn should lead to a lower cost of debt financing for hotels.

**Hotel investment based on operating performance is currently financially feasible.** Our EVA indicator in Exhib-

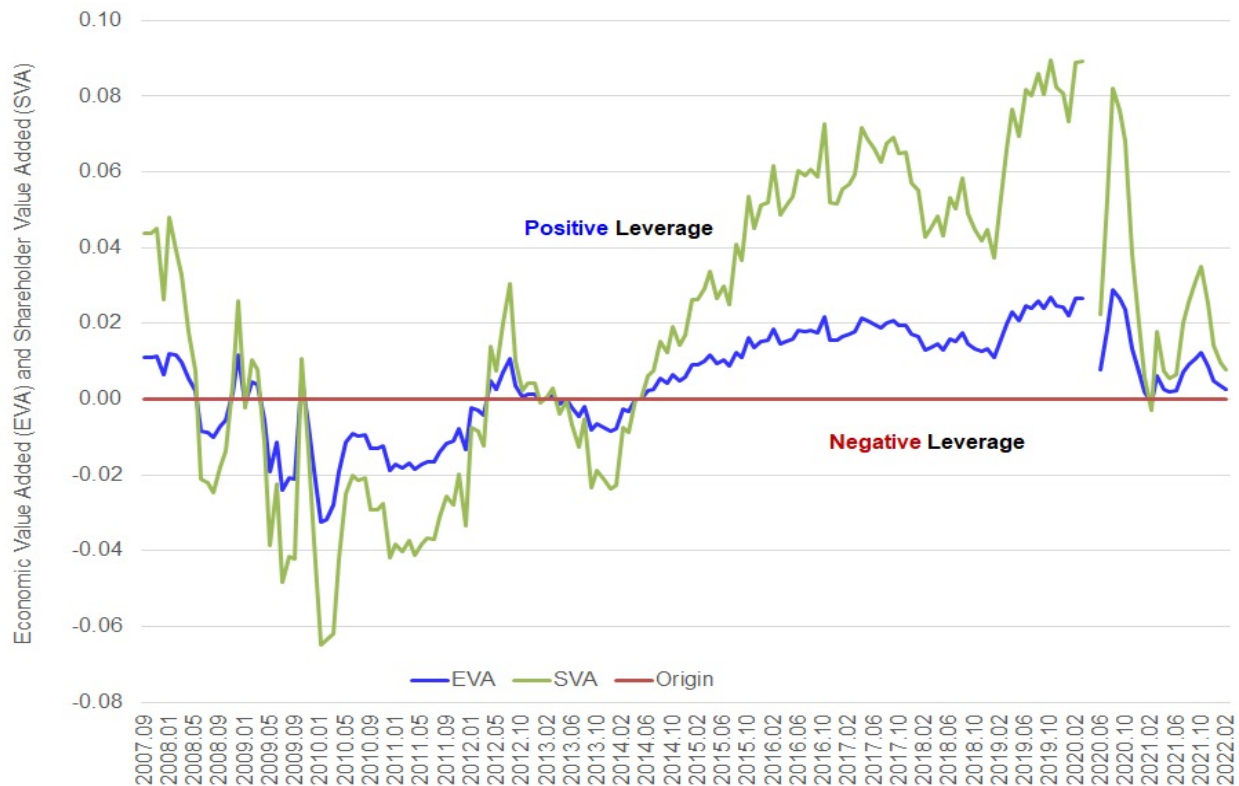
<sup>7</sup> The advantage of standardizing an indicator is that the mean is set equal to zero and the standard deviation is set equal to 1. If the indicator is above or below 1.645 (Z-score), this indicates that the indicator has hit a statistically significant new high or low.

it 23 is at about .27 percent, while our equity holder value added (SVA) metric is .77 percent (as of February 2022). This signals that deals on existing hotels are above breakeven. The return that an investor receives from operations is therefore above the total weighted average borrowing cost (WACC) of 7.73 percent (noting that the cost of equity is 8.9%). Nevertheless, most of the juice is coming from anticipated future price gains.

**Our reading of the tea leaves suggests we should see slower to negative price momentum for both large and small hotels near term.** Our standardized unexpected RevPAR in Exhibit 24 has broken above its standardized mean of zero. We anticipate continued positive price momentum in the near term.

# EXHIBIT 23

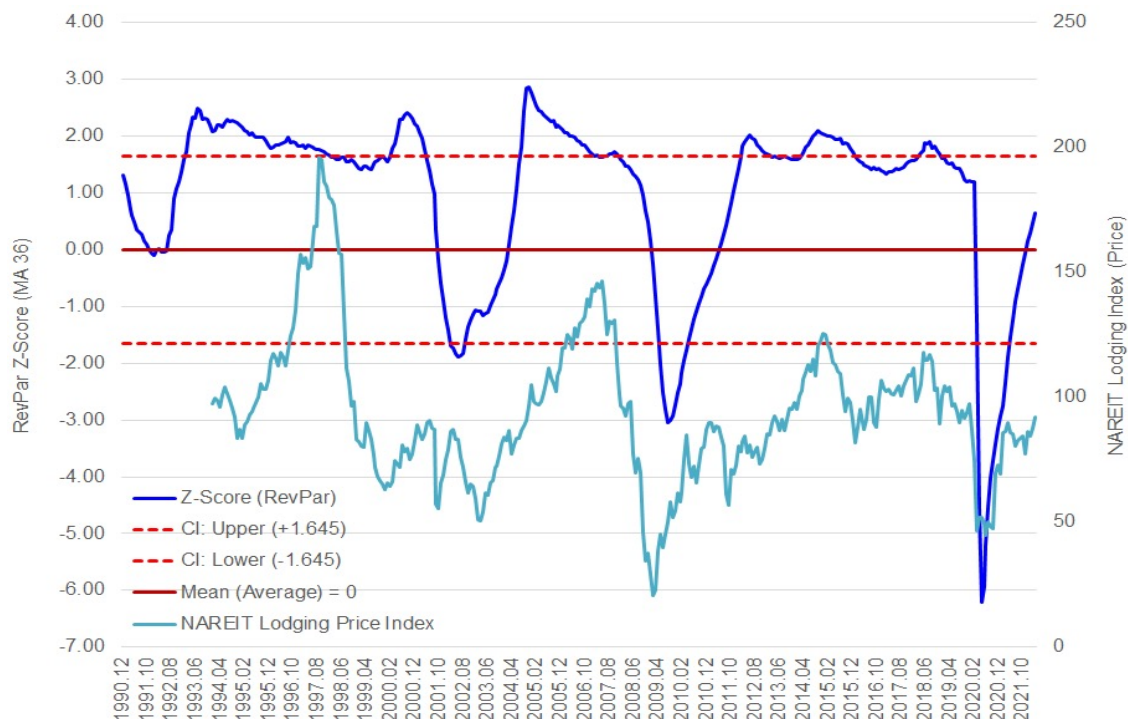
## Economic value added (EVA) and equity (shareholder) value added (SVA) for hotels



Sources: Cornell Center for Real Estate and Finance, Cushman Wakefield, NAREIT, Real Capital Analytics, St Louis Fed

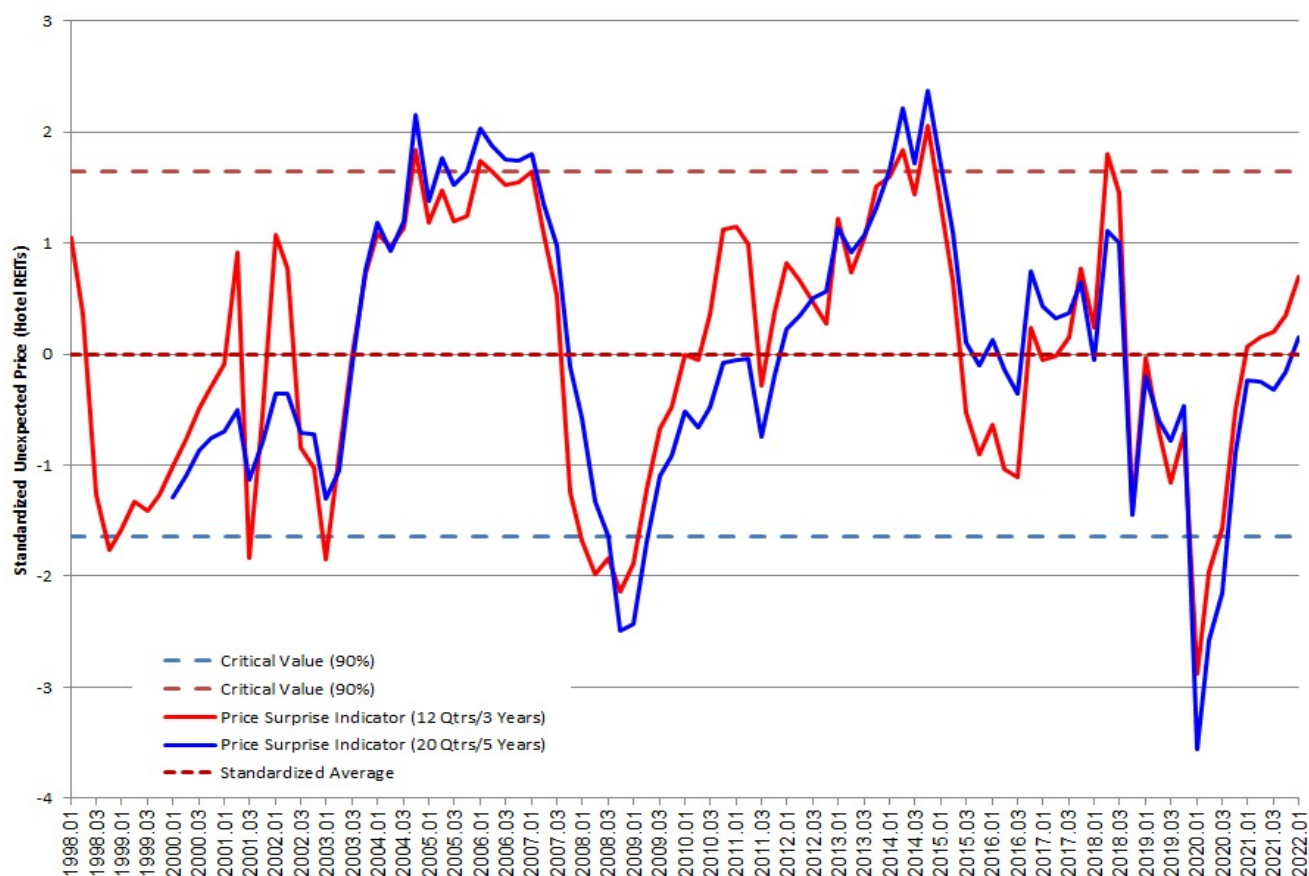
# EXHIBIT 24

## Standardized unexpected RevPAR (36-month moving average) vs. NAREIT lodging-price index



Sources: Cornell Center for Real Estate and Finance, CoStar (STR), NAREIT

## Standardized unexpected NAREIT lodging/resort price index



Sources: Cornell Center for Real Estate and Finance, NAREIT

Exhibit 25 displays the standardized unexpected price of the NAREIT Lodging Index. Since the standardized unexpected lodging price indices continue to rise this quarter, we expect our hotel price based on repeat sales to continue to rise near term.

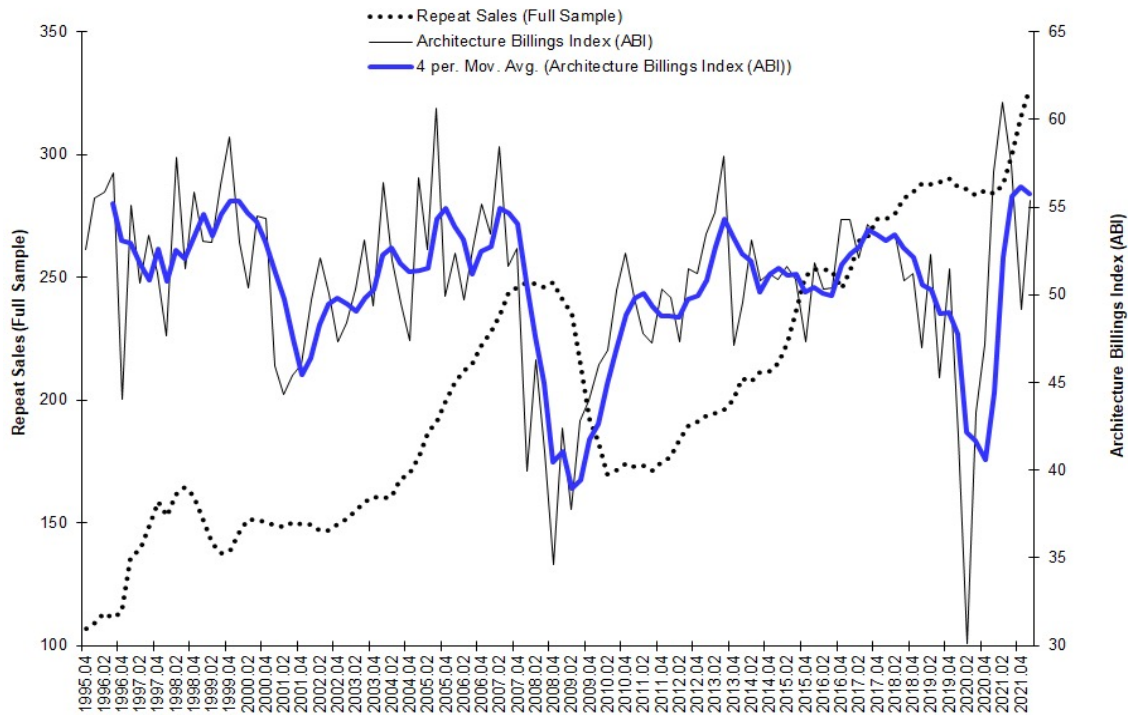
The architecture billings index (ABI) for commercial and industrial property (shown in Exhibit 26) increased 12.6 percent this quarter but fell nearly 3 percent year over year, compared to a 14.3-percent decline in the previous quarter and a rise of 4 percent in the prior year-over-year period.<sup>8</sup> Based on the moving average of the ABI index, we should expect price momentum to moderate at best in the next period.

<sup>8</sup> <http://www.aia.org/practicing/economics/aia076265>

The National Association of Purchasing Managers (NAPM) index (shown in Exhibit 27), an indicator of anticipated business confidence, fell 3 percent this quarter on top of a 4-percent decline last quarter. It also declined 11.7 percent year over year, down from a 3.3-percent year-over-year decrease in the prior period.<sup>9</sup> Expect high price hotels to decline in price near term.

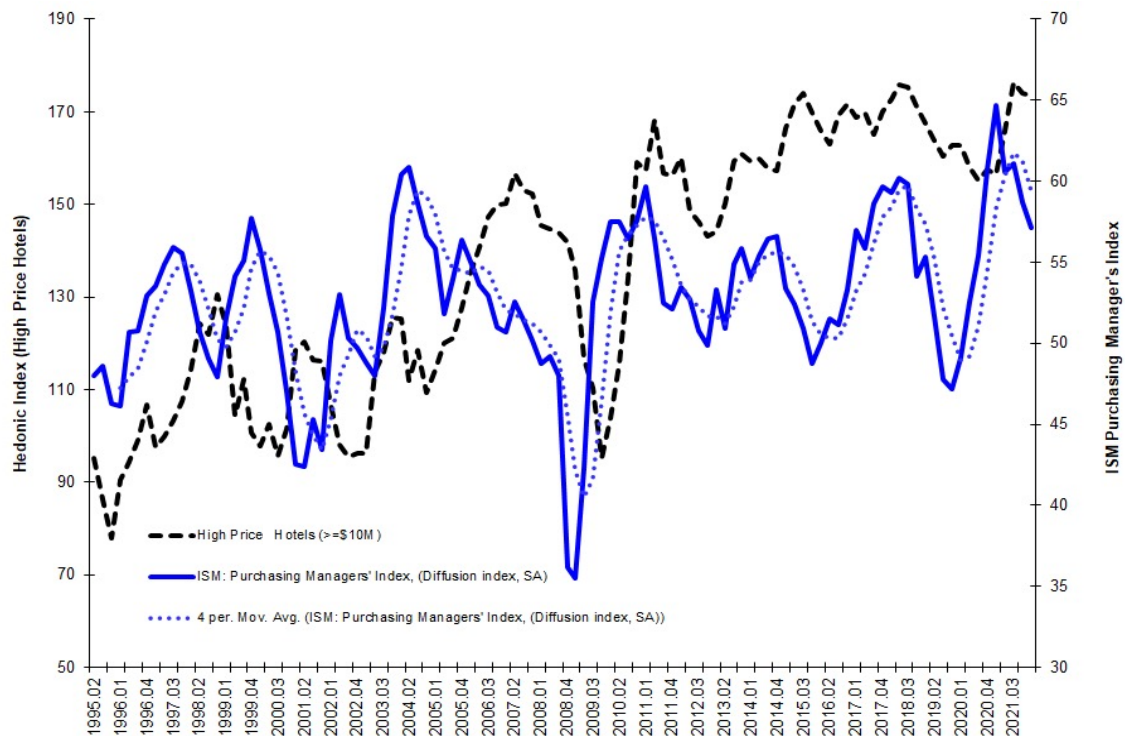
<sup>9</sup> The ISM: Purchasing Managers' Index, (Diffusion index, SA) also known as the National Association of Purchasing Managers (NAPM) index is based on a survey of over 250 companies within twenty-one industries covering all 50 states. It not only measures the health of the manufacturing sector 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.

## Repeat sales index versus the architecture billings index



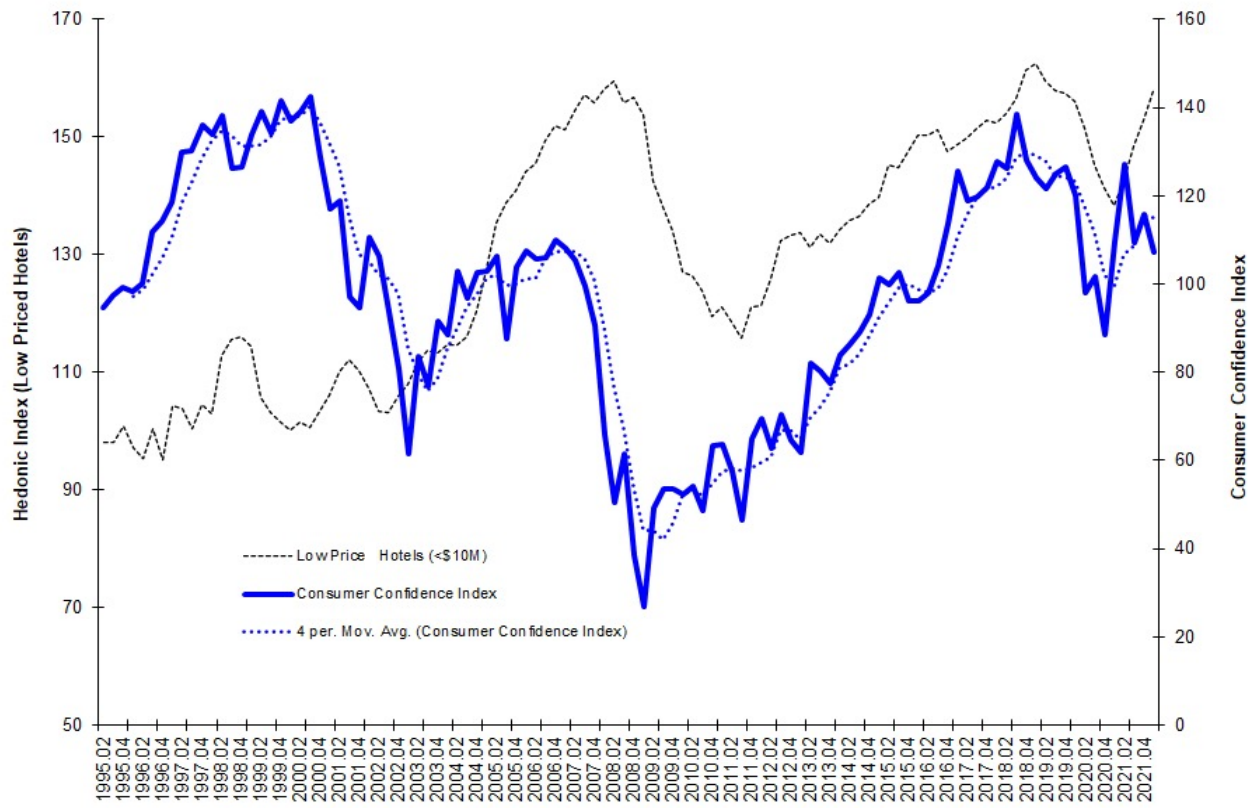
Sources: American Institute of Architects, Cornell Center for Real Estate and Finance Center for Real Estate and Finance

## Business confidence and high-price hotels index



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

## Consumer confidence and low-price hotels



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

The Conference Board's Consumer Confidence Index (graphed in Exhibit 28), our proxy for anticipated consumer demand for leisure travel and a leading indicator of the hedonic index for low price hotels, declined 7.4 percent this quarter, and decreased 2.3 percent year over year. Expect low price hotels to decline near term.

We also look at the average expected growth rate in Wall Street analysts' earnings estimates for hotel REITs, both in terms of next-quarter earnings per share (EPS) and annual EPS.<sup>10</sup> Exhibit 29 indicates that analysts' median quarterly EPS growth rate is a rise of 150 percent (with a mean of 313 percent), and the median anticipated annual EPS growth rate is 186 percent (with a projected mean of 715 percent) on average. Since analysts' estimates reflect the earnings guidance from management, this suggests that we should expect prices to rise reflecting continued positive guidance regarding the EPS. ■

<sup>10</sup> We obtain the growth rate in earnings and revenue estimates from <https://www.earningswhispers.com>

### 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.

## Analysts' forecasts of hotel REIT earnings

Earnings Growth						
E(QEPS)		Median	Mean	StDev	Min	Max
2020Q2		-158.0%	-162.2%	26.9%	-226.2%	-116.3%
2020Q3		-163.0%	-305.3%	529.9%	-2214.3%	-91.1%
2020Q4		-153.3%	-239.9%	229.9%	-866.7%	-90.6%
2021Q1		-241.2%	-389.5%	352.1%	-1400.0%	-76.5%
2021Q2		97.8%	101.6%	52.0%	59.7%	272.7%
2021Q3		136.4%	191.1%	137.4%	99.6%	625.0%
2021Q4		162.5%	381.5%	669.0%	97.1%	2700.0%
2022Q1		150.0%	313.3%	568.6%	-30.0%	2300.0%
E(AEPS)		Median	Mean	StDev	Min	Max
2020Q2		-112.3%	-79.3%	107.6%	-222.2%	175.0%
2020Q3		-147.8%	-93.5%	187.6%	-307.9%	290.6%
2020Q4		-163.1%	-106.0%	196.6%	-325.4%	366.7%
2021Q1		90.2%	96.5%	24.6%	70.9%	170.1%
2021Q2		97.7%	103.8%	25.4%	76.1%	184.4%
2021Q3		104.6%	112.5%	29.1%	87.7%	203.9%
2021Q4		107.1%	114.2%	32.8%	88.1%	220.8%
2022Q1		185.5%	714.8%	1438.0%	108.9%	5650.0%
Revenue Growth						
E(QRev)		Median	Mean	StDev	Min	Max
2020Q2		-73.4%	-72.1%	15.6%	-92.7%	-46.1%
2020Q3		-73.7%	-71.9%	7.5%	-81.6%	-59.5%
2020Q4		-65.4%	-66.0%	11.4%	-79.6%	-45.1%
2021Q1		-58.7%	-57.3%	10.9%	-74.2%	-36.2%
2021Q2		379.3%	444.1%	249.3%	157.2%	1047.7%
2021Q3		157.6%	176.8%	87.0%	67.5%	368.9%
2021Q4		151.3%	173.0%	73.5%	77.2%	361.1%
2022Q1		123.6%	136.0%	69.3%	57.6%	318.2%
E(ARev)		Median	Mean	StDev	Min	Max
2020Q2		-43.7%	-45.1%	10.2%	-66.1%	-28.2%
2020Q3		-63.1%	-61.8%	5.5%	-69.2%	-53.2%
2020Q4		-66.4%	-63.3%	7.4%	-73.7%	-50.6%
2021Q1		45.0%	47.7%	10.7%	32.7%	66.0%
2021Q2		49.9%	47.7%	7.7%	35.0%	60.6%
2021Q3		57.4%	56.4%	10.1%	40.2%	73.5%
2021Q4		66.1%	64.8%	12.5%	43.4%	89.4%
2022Q1		47.8%	49.6%	13.1%	26.4%	69.3%

## 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 ( $\sim N(0,1)$ ). This calculation shows an earnings surprise when earnings are statistically significant, when  $SUE_Q$  exceeds either  $\pm 1.645$  (90% significant) or  $\pm 1.96$  (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 ( $\mu$ ). 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  $\mu$ , 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  $\mu$  and the rolling three- or five-year standard deviation as our measure of  $\sigma$ . 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:

SUP data and $\sigma$ calculation for high-price hotels (12 quarters/3 years)				
Quarter	High-price hotels $\mu$	Moving average	$\sigma$	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

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

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

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

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## 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.<sup>1</sup> In our 2019Q2 issue, we introduced our new Regional Indices to add further granularity to hotel performance. More recently, we have included information on hotel delinquencies as well as short-term and long-term hotel earning expectations to aid hotel decisionmakers. We also present updates and revisions to our hotel indices along with commentary and supporting evidence from the real estate market. Starting in 2021Q2, we included standardized unexpected price for our regional price indices as well as standardized unexpected RevPar for the U.S. as a whole. We also introduced Shareholder Value Added as a complementary metric to EVA so that readers can now compare the profitability (EVA) of hotel real estate to investors' equity return (SVA).

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<sup>1</sup> Cities that we define as gateway cities are 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.

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Vol. 22 No. 2 (April 2022)  
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