Cornell Hotel Indices:
First Quarter 2023

Mixed Signals Portend Greater Uncertainty Ahead

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

EXECUTIVE SUMMARY

Although hotels showed continued positive price momentum in all regions from the prior year (year over year), prices faltered in some regions from the prior quarter, especially in the Mid-Atlantic and to a lesser extent in the South Atlantic regions. Hotels in non-gateway cities continued to outperform hotels in gateway cities, albeit the gain was relatively small compared to prior periods. The transaction volume for both large hotels and small hotels declined again this quarter as well as relative to the previous year. Based on our moving averages, a buying opportunity currently exists for both large and small hotels, although it might pay to continue to keep the gunpowder dry. Not surprisingly, the volume of hotel loan originations fell, while the interest rate on hotel loans continued to rise. Although lenders have reduced the amount of additional compensation they require to make hotel loans relative to other commercial real estate loans (i.e., hotel risk assessment), Wall Street's valuation of REITs reveals an expectation of higher relative risk for hotels. Since the borrowing costs continue to exceed the return on hotels, economic profit and shareholder value added remain negative, indicating that anticipated future price gains are the primary driver of hotel investment performance. Looking towards the next quarter, our leading indicators of hotel price performance indicate that we should expect price momentum to moderate or decline for both large and small hotels.

ABOUT THE AUTHORS

Crocker H. Liu is a professor of real estate at the School of Hotel Administration at Cornell where he is 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.

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 the *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 the *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 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. A graduate of the McIntire School of Commerce at the University of Virginia, Mr. White's is a noted authority on the real estate capital markets whose research has been published in the *Journal of Real Estate Finance and Economics*. He also has 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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# Mixed Signals Portend Greater Uncertainty Ahead

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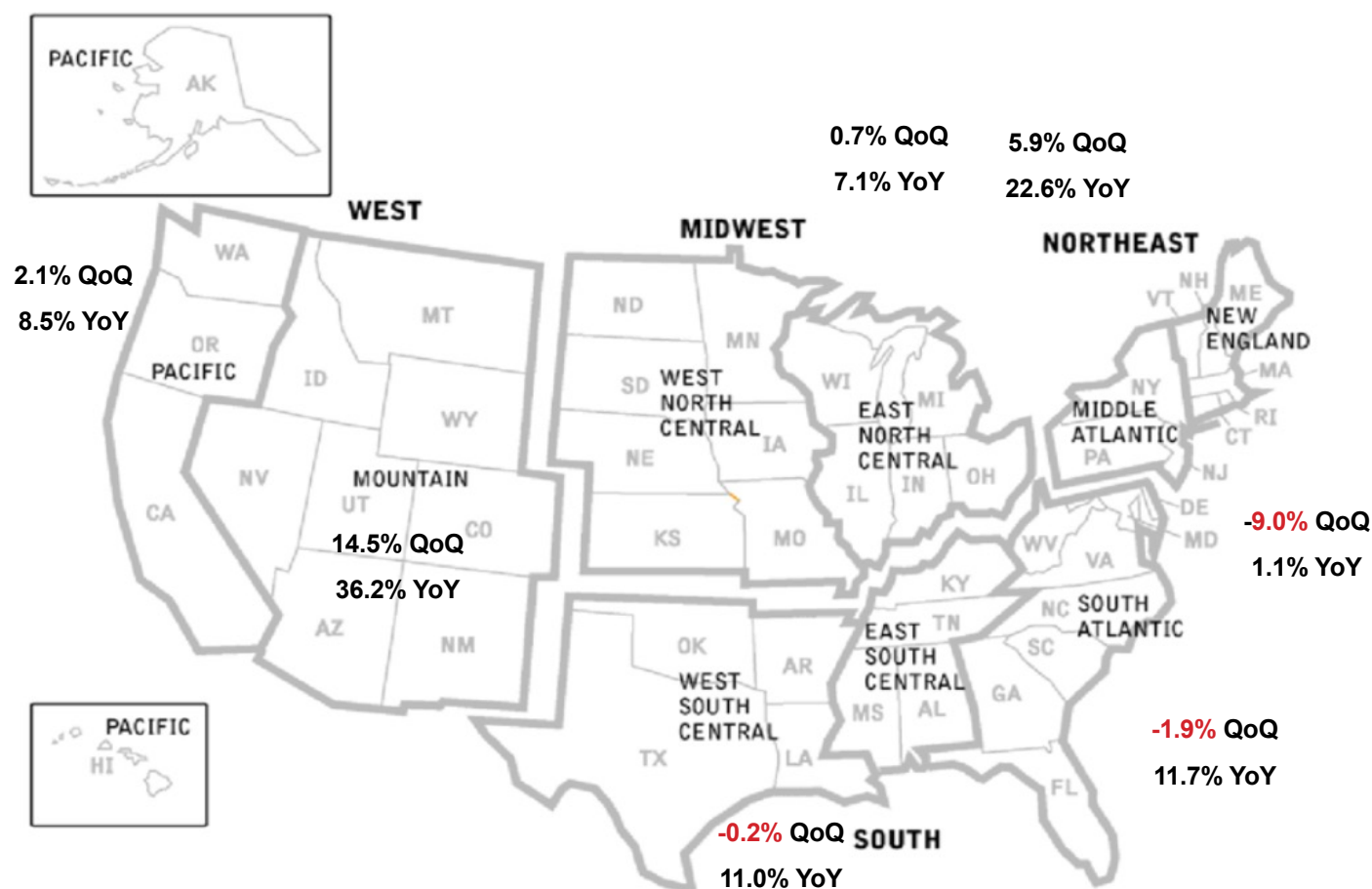
Analysis of Indices through Q1, 2023

Hotel prices in all regions continued to rise year over year, but prices faltered in some regions from a quarterly perspective. Exhibits 1A through 1D show that all regions exhibited a positive year-over-year price increase, continuing the trend in the prior year-over-year period. Quarter over quarter, however, a different story emerges, with the Mid-Atlantic region experiencing the largest price decline and hotel prices in the South Atlantic region also falling. In contrast, hotel prices in the Midwest and West-South-Central regions were relatively flat. The largest price gains occurred in the Mountain region followed by the New England and Pacific regions on a quarter-over-quarter basis.

EXHIBIT 1A

Time series hotel performance for seven regions
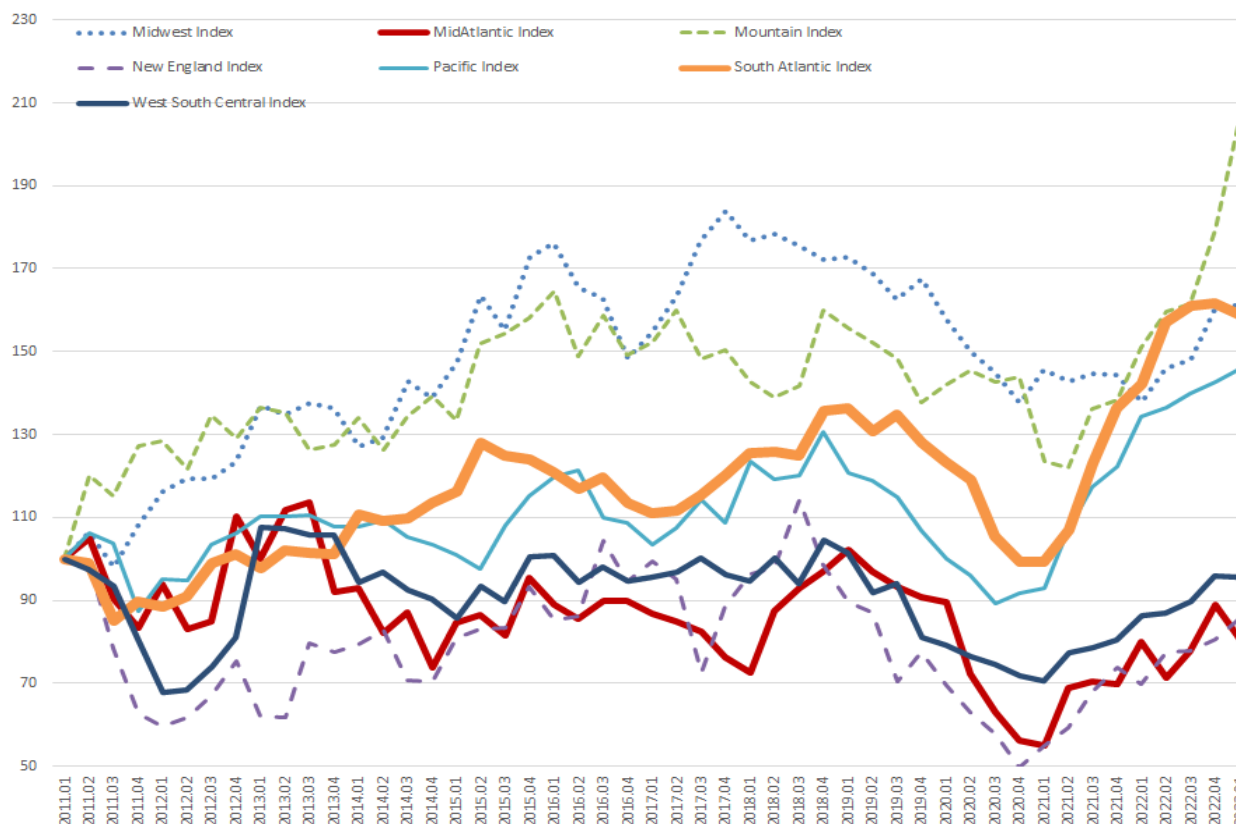
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

Cross-section hotel performance for seven regions

2.1% QoQ
8.5% YoY

14.5% QoQ
36.2% YoY

0.7% QoQ
7.1% YoY

5.9% QoQ
22.6% YoY

-9.0% QoQ
1.1% YoY

-1.9% QoQ
11.7% YoY

-0.2% QoQ SOUTH
11.0% YoY

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

Changes in regional price indices, year over year and quarter over quarter

| YoY	Midwest	Mid-Atlantic	Mountain	New England	Pacific	South Atlantic	West South Central
Current	17.07%	1.14%	36.18%	22.58%	8.45%	11.69%	10.96%
Prior	10.86%	27.41%	29.79%	9.18%	16.73%	18.71%	19.22%
QoQ							
Current	0.73%	-9.02%	14.50%	5.94%	2.14%	-1.88%	-0.16%
Prior	8.27%	14.26%	11.14%	3.83%	2.01%	0.42%	6.78%

Standardized Unexpected Prices (Z-Scores)

	Midwest	Mid-Atlantic	Mountain	New England	Pacific	South Atlantic	West South Central
2022.04	1.57	1.49	3.11	1.48	1.70	1.75	2.78
2023.01	2.16	0.81	3.74	1.88	1.54	1.31	1.98

In terms of standardized unexpected prices (Z-Scores), hotel prices reached a new statistical high in the Midwest and New England regions, while prices continued to remain above their statistical high in the Mountain and West-South-Central regions.[1] However, hotel prices trended downwards below their statistical high confidence band in both the Pacific and South Atlantic regions this quarter. Hotel prices in the Mid-Atlantic region continue to revert downwards toward their (standardized) average price.

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[1] A new statistical high is achieved at z = 1.645 while a new statistical low occurs at z = -1.645.

EXHIBIT 1D

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

Midwest

Middle Atlantic

Mountain

New England

Pacific
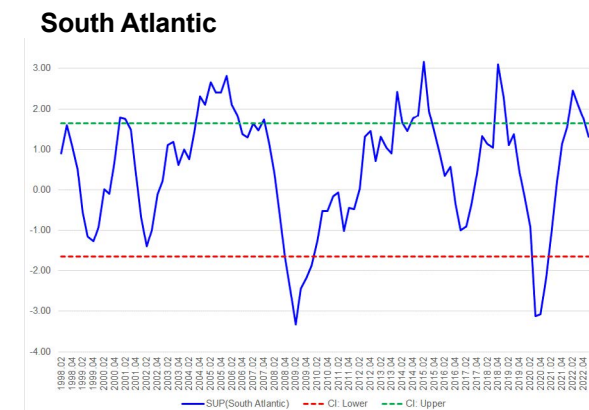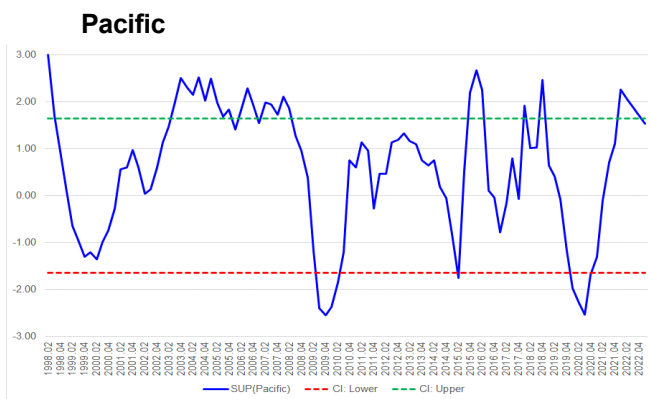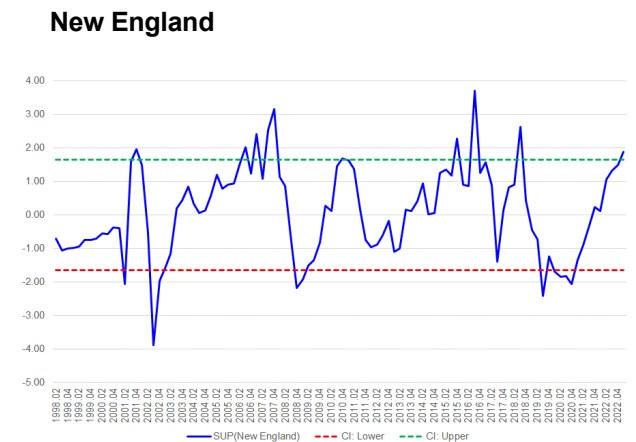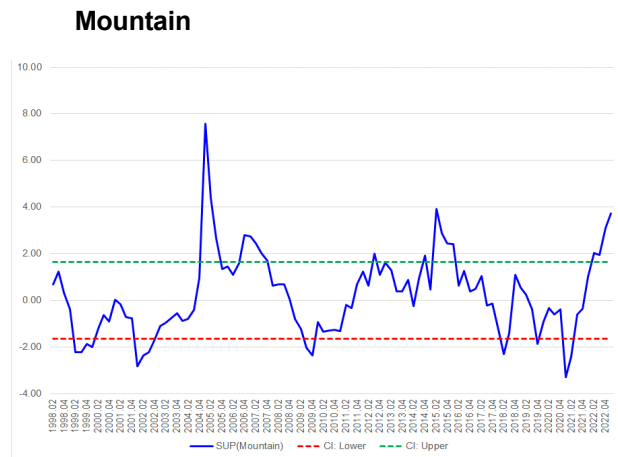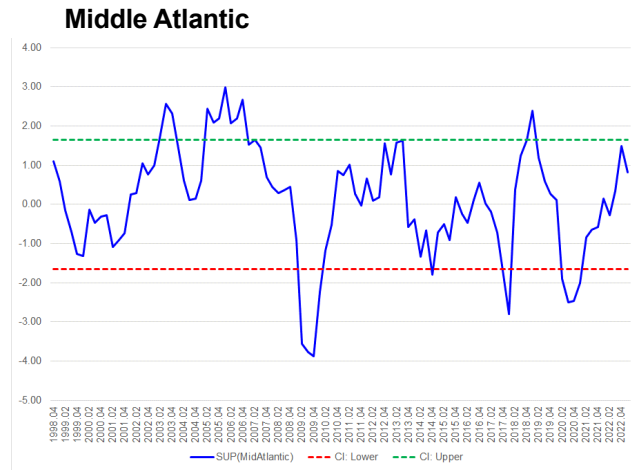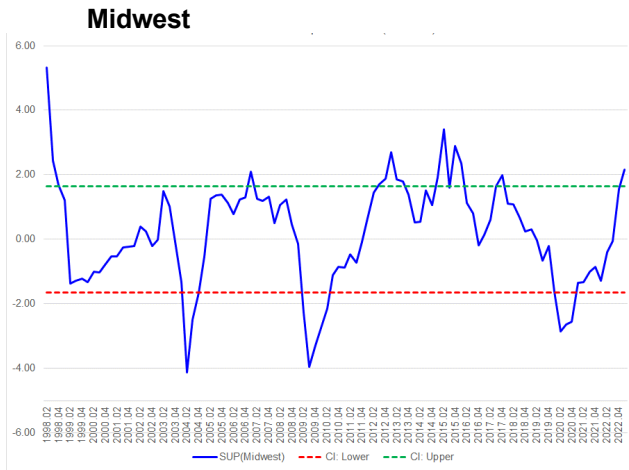
South Atlantic

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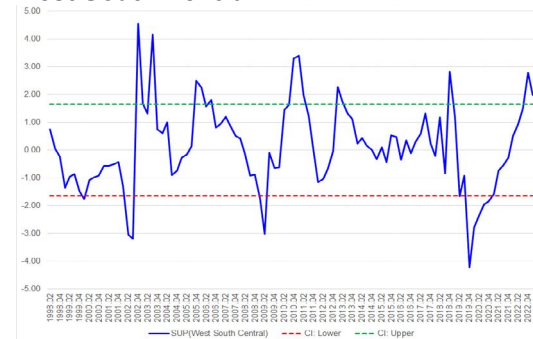
Note: Regions are as follows: **Middle Atlantic** region: New Jersey, New York, and Pennsylvania; **New England** region: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont; **South Atlantic** region: Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina,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

EXHIBIT 2

Hotel performance for gateway cities versus non-gateway cities

Gateway cities are Boston, Chicago, Honolulu, Los Angeles, Miami, New York, San Francisco, and Washington, DC.
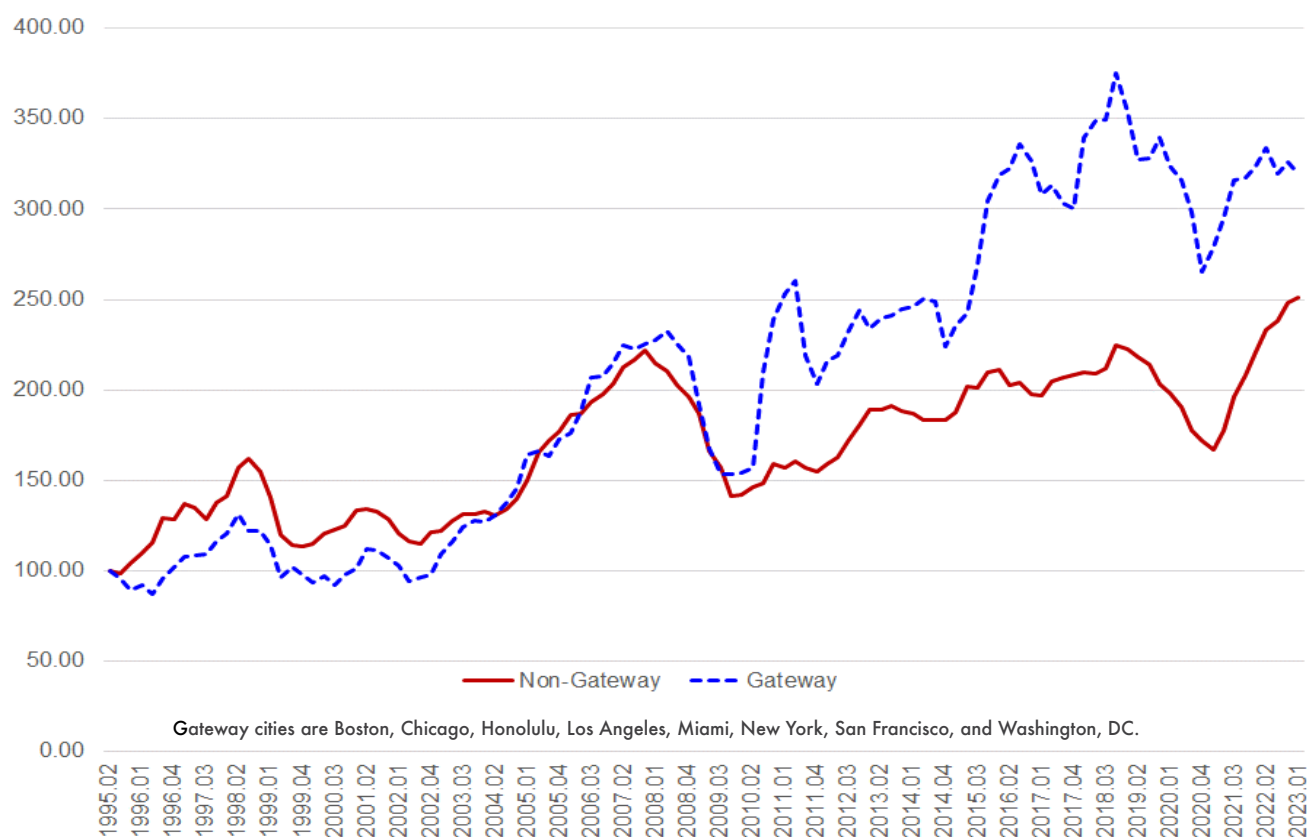
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

Hotels in non-gateway cities continued to outperform gateway cities. Continuing the trend in the prior three periods, hotels in non-gateway cities outperformed those in gateway cities, albeit the gain was relatively smaller compared to prior periods. More specifically, the price of hotels in non-gateway cities rose 1 percent this quarter compared to a 2-percent decline in the price of hotels in gateway cities, as shown in Exhibit 2. Year over year, hotel prices in non-gateway cities rose 13 percent compared to a 1-percent hotel price gain in gateway cities.

Quarter over Quarter	Gateway Cities	Non-Gateway Cities
Current Period (2023Q1)	-2%	1%
Prior Period (2022Q4)	2%	4%
Year over Year		
Current Period (2023Q1/2022Q1)	1%	13%
Prior Period (2022Q4/2021Q4)	3%	19%

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

		Full Sample		Big			Small			Gateway			No Gateway		
Year	Qtr	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	0.00%	$2,357,500	20	100.00%	$3,400,000	7	35.00%	$2,100,000	13	65.00%
1995	2	$3,150,000	29	$15,712,500	6	20.68%	$2,670,000	23	79.31%	$3,800,000	12	41.37%	$2,906,150	17	58.62%
1995	3	$2,562,500	44	$12,400,000	4	9.09%	$2,378,000	40	90.90%	$3,500,000	20	45.45%	$2,000,000	24	54.54%
1995	4	$3,400,000	41	$27,750,000	10	24.39%	$2,625,000	31	75.60%	$5,075,000	14	34.14%	$3,100,000	27	65.85%
1996	1	$2,500,000	39	$14,475,000	8	20.51%	$1,700,000	31	79.48%	$2,500,000	13	33.33%	$2,687,500	26	66.66%
1996	2	$2,925,000	43	$29,150,000	12	27.90%	$2,500,000	31	72.09%	$3,200,000	15	34.88%	$2,730,000	28	65.11%
1996	3	$6,500,000	57	$17,740,000	20	35.08%	$3,000,000	37	64.91%	$5,500,000	25	43.85%	$6,890,500	32	56.14%
1996	4	$2,735,000	58	$19,000,000	17	29.31%	$2,200,000	41	70.68%	$4,650,000	27	46.55%	$2,400,000	31	53.44%
1997	1	$5,053,250	74	$16,635,500	23	31.08%	$3,500,000	51	68.91%	$6,300,000	29	39.18%	$4,075,000	45	60.81%
1997	2	$2,862,500	72	$17,750,000	17	23.61%	$2,150,000	55	76.38%	$2,445,000	24	33.33%	$3,047,350	48	66.66%
1997	3	$3,437,500	90	$19,000,000	21	23.33%	$2,400,000	69	76.66%	$5,140,000	38	42.22%	$2,550,000	52	57.77%
1997	4	$4,330,950	78	$17,000,000	27	34.61%	$2,300,000	51	65.38%	$10,435,445	27	34.61%	$3,600,000	51	65.38%
1998	1	$4,698,800	92	$20,000,000	31	33.69%	$3,100,000	61	66.30%	$6,353,000	33	35.86%	$4,600,000	59	64.13%
1998	2	$3,630,000	96	$23,765,000	21	21.87%	$3,000,000	75	78.12%	$3,998,240	28	29.16%	$3,575,000	68	70.83%
1998	3	$2,961,059	92	$16,740,000	12	13.04%	$2,690,550	80	86.95%	$2,255,000	30	32.60%	$3,365,000	62	67.39%
1998	4	$2,550,000	84	$35,000,000	15	17.85%	$2,375,000	69	82.14%	$4,225,000	30	35.71%	$2,500,000	54	64.28%
1999	1	$2,425,000	88	$24,638,095	10	11.36%	$2,125,000	78	88.63%	$3,500,000	32	36.36%	$2,300,000	56	63.63%
1999	2	$2,100,000	95	$67,000,000	5	5.26%	$1,950,000	90	94.73%	$2,067,500	28	29.47%	$2,100,000	67	70.52%
1999	3	$2,500,000	99	$20,711,100	10	10.10%	$2,130,000	89	89.89%	$1,800,000	19	19.19%	$2,522,500	80	80.80%
1999	4	$2,440,000	87	$18,190,000	14	16.09%	$2,090,000	73	83.90%	$2,210,000	23	26.43%	$2,575,000	64	73.56%
2000	1	$2,400,000	110	$23,253,895	10	9.09%	$2,300,000	100	90.90%	$2,325,000	44	40.00%	$2,428,500	66	60.00%
2000	2	$2,450,000	88	$14,500,000	9	10.22%	$2,275,000	79	89.77%	$2,325,000	24	27.27%	$2,450,000	64	72.72%
2000	3	$2,600,000	95	$20,346,875	16	16.84%	$2,250,000	79	83.15%	$2,925,000	24	25.26%	$2,525,000	71	74.73%
2000	4	$2,475,000	101	$18,050,000	14	13.86%	$2,300,000	87	86.13%	$4,500,000	26	25.74%	$2,350,000	75	74.25%
2001	1	$2,970,650	104	$28,437,500	18	17.30%	$2,422,500	86	82.69%	$2,650,000	29	27.88%	$3,000,000	75	72.11%
2001	2	$2,800,000	110	$23,795,000	12	10.90%	$2,687,150	98	89.09%	$5,825,000	25	22.72%	$2,684,300	85	77.27%
2001	3	$2,700,000	87	$16,000,000	6	6.89%	$2,500,000	81	93.10%	$3,150,000	21	24.13%	$2,600,000	66	75.86%
2001	4	$2,400,000	73	$20,500,000	5	6.84%	$2,300,000	68	93.15%	$2,800,000	17	23.28%	$2,300,000	56	76.71%
2002	1	$2,125,000	70	$11,518,052	5	7.14%	$2,000,000	65	92.85%	$1,700,000	17	24.28%	$2,200,000	53	75.71%
2002	2	$2,400,000	106	$18,125,000	10	9.43%	$2,287,500	96	90.56%	$3,125,000	33	31.13%	$2,300,000	73	68.86%
2002	3	$2,355,400	81	$12,750,000	5	6.17%	$2,237,500	76	93.82%	$2,197,500	24	29.62%	$2,470,000	57	70.37%
2002	4	$2,907,500	100	$23,500,000	16	16.00%	$2,575,000	84	84.00%	$2,907,500	34	34.00%	$2,862,500	66	66.00%
2003	1	$2,530,000	94	$13,000,000	9	9.57%	$2,425,000	85	90.42%	$3,850,000	21	22.34%	$2,425,000	73	77.65%
2003	2	$2,750,000	110	$18,500,000	10	9.09%	$2,509,500	100	90.90%	$3,160,000	31	28.18%	$2,600,000	79	71.81%
2003	3	$3,333,000	141	$14,359,286	28	19.85%	$2,600,000	113	80.14%	$3,660,000	45	31.91%	$3,032,500	96	68.08%
2003	4	$2,600,000	149	$16,375,000	18	12.08%	$2,425,000	131	87.91%	$2,950,000	35	23.48%	$2,500,000	114	76.51%

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

		Full Sample		Big			Small			Gateway			No Gateway		
Year	Qtr	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
2004	1	$2,925,000	166	$22,875,250	24	14.45%	$2,536,756	142	85.54%	$3,450,000	41	24.69%	$2,894,000	125	75.30%
2004	2	$2,700,000	195	$16,280,000	28	14.35%	$2,450,000	167	85.64%	$4,500,000	39	20.00%	$2,540,000	156	80.00%
2004	3	$3,491,122	216	$19,350,000	45	20.83%	$2,610,000	171	79.16%	$4,600,000	51	23.61%	$3,306,500	165	76.38%
2004	4	$4,000,000	177	$20,475,000	47	26.55%	$3,085,500	130	73.44%	$8,850,000	36	20.33%	$3,600,000	141	79.66%
2005	1	$4,330,000	231	$18,100,000	52	22.51%	$3,300,000	179	77.48%	$6,687,500	40	17.31%	$3,800,000	191	82.68%
2005	2	$4,566,250	316	$18,956,812	78	24.68%	$3,255,150	238	75.31%	$6,475,000	68	21.51%	$4,385,000	248	78.48%
2005	3	$4,150,000	273	$21,475,000	72	26.37%	$3,100,000	201	73.62%	$6,100,000	61	22.34%	$3,750,000	212	77.65%
2005	4	$4,425,000	300	$25,000,000	93	31.00%	$3,150,000	207	68.99%	$11,200,000	65	21.66%	$4,000,000	235	78.33%
2006	1	$5,300,000	301	$25,750,000	92	30.56%	$3,800,000	209	69.43%	$18,000,000	64	21.26%	$4,943,744	237	78.73%
2006	2	$4,750,000	313	$22,750,000	82	26.19%	$3,500,000	231	73.80%	$6,175,000	56	17.89%	$4,500,000	257	82.10%
2006	3	$5,000,000	285	$22,500,000	86	30.17%	$3,650,000	199	69.82%	$7,000,000	59	20.70%	$4,705,399	226	79.29%
2006	4	$4,587,500	248	$21,200,000	65	26.20%	$3,550,000	183	73.79%	$8,093,750	56	22.58%	$4,270,000	192	77.41%
2007	1	$6,155,805	286	$21,225,000	104	36.36%	$3,700,000	182	63.63%	$9,500,000	63	22.02%	$5,700,000	223	77.97%
2007	2	$5,650,000	385	$25,125,000	120	31.16%	$3,750,000	265	68.83%	$9,000,000	67	17.40%	$5,450,000	318	82.59%
2007	3	$5,450,000	330	$20,100,161	105	31.81%	$3,900,000	225	68.18%	$8,325,000	53	16.06%	$5,011,554	277	83.93%
2007	4	$4,680,000	249	$23,250,000	86	34.53%	$3,150,000	163	65.46%	$9,375,000	36	14.45%	$4,500,000	213	85.54%
2008	1	$5,000,000	255	$16,000,000	61	23.92%	$3,985,000	194	76.07%	$5,990,000	46	18.03%	$4,650,000	209	81.96%
2008	2	$5,062,900	228	$22,150,000	50	21.92%	$3,890,000	178	78.07%	$8,725,000	38	16.66%	$4,800,000	190	83.33%
2008	3	$4,190,500	172	$17,133,333	37	21.51%	$3,350,000	135	78.48%	$5,500,000	27	15.69%	$3,900,000	145	84.30%
2008	4	$4,050,000	159	$18,850,000	32	20.12%	$3,500,000	127	79.87%	$4,972,500	27	16.98%	$3,920,000	132	83.01%
2009	1	$4,150,000	81	$15,800,000	15	18.51%	$3,600,000	66	81.48%	$7,375,000	16	19.75%	$3,700,000	65	80.24%
2009	2	$3,090,231	86	$14,722,500	11	12.79%	$2,864,310	75	87.20%	$5,410,250	16	18.60%	$3,000,000	70	81.39%
2009	3	$3,400,000	90	$22,000,000	16	17.77%	$3,000,000	74	82.22%	$4,608,750	14	15.55%	$3,195,271	76	84.44%
2009	4	$3,562,500	84	$14,100,000	14	16.66%	$3,010,250	70	83.33%	$4,520,000	12	14.28%	$3,400,000	72	85.71%
2010	1	$3,900,000	89	$20,162,500	18	20.22%	$2,825,000	71	79.77%	$8,450,000	15	16.85%	$3,825,000	74	83.14%
2010	2	$3,700,000	138	$30,833,449	34	24.63%	$3,000,000	104	75.36%	$15,400,000	34	24.63%	$3,100,000	104	75.36%
2010	3	$4,912,500	120	$35,500,000	46	38.33%	$2,850,000	74	61.66%	$25,000,000	37	30.83%	$3,117,000	83	69.16%
2010	4	$3,988,800	100	$30,353,182	38	38.00%	$2,420,000	62	62.00%	$38,500,000	23	23.00%	$3,265,000	77	77.00%
2011	1	$4,200,000	85	$34,050,000	24	28.23%	$2,795,500	61	71.76%	$12,275,000	15	17.64%	$3,775,000	70	82.35%
2011	2	$4,200,000	97	$51,200,000	31	31.95%	$2,250,000	66	68.04%	$15,600,000	23	23.71%	$3,175,000	74	76.28%
2011	3	$3,350,000	73	$23,772,500	20	27.39%	$2,800,000	53	72.60%	$3,700,000	17	23.28%	$3,275,000	56	76.71%
2011	4	$5,000,000	157	$32,400,000	43	27.38%	$3,229,250	114	72.61%	$10,950,000	34	21.65%	$4,300,000	123	78.34%
2012	1	$5,233,961	131	$22,100,000	40	30.53%	$3,275,000	91	69.46%	$13,837,500	28	21.37%	$4,200,000	103	78.62%
2012	2	$4,000,000	209	$17,000,000	61	29.18%	$2,779,500	148	70.81%	$15,900,000	22	10.52%	$3,700,000	187	89.47%
2012	3	$7,000,000	169	$19,100,000	67	39.64%	$2,720,250	102	60.35%	$16,050,000	32	18.93%	$5,250,000	137	81.06%
2012	4	$5,622,500	207	$24,866,613	74	35.74%	$3,125,000	133	64.25%	$16,174,794	39	18.84%	$5,070,000	168	81.15%

Transaction volume (observed) and median sale price (concluded, 2013–2023)

		Full Sample		Big			Small			Gateway			No Gateway		
Year	Qtr	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
2013	1	$5,995,000	237	$21,154,582	83	35.02%	$2,962,500	154	64.97%	$6,500,000	51	21.51%	$5,575,000	186	78.48%
2013	2	$4,700,000	217	$22,000,000	71	32.71%	$2,500,000	146	67.28%	$16,000,000	38	17.51%	$4,200,000	179	82.48%
2013	3	$5,260,855	246	$25,000,000	75	30.48%	$3,300,000	171	69.51%	$9,949,500	35	14.22%	$4,750,000	211	85.77%
2013	4	$4,537,500	314	$24,000,000	98	31.21%	$2,790,000	216	68.78%	$13,500,000	55	17.51%	$4,000,000	259	82.48%
2014	1	$5,625,000	228	$20,750,000	70	30.70%	$3,300,000	158	69.29%	$8,825,900	59	25.87%	$5,000,000	169	74.12%
2014	2	$4,300,000	319	$26,250,000	87	27.27%	$2,818,750	232	72.72%	$11,200,000	59	18.49%	$3,700,000	260	81.50%
2014	3	$5,500,000	351	$20,000,000	97	27.63%	$3,425,000	254	72.36%	$10,567,078	66	18.80%	$5,000,000	285	81.19%
2014	4	$4,600,000	309	$29,625,000	78	25.24%	$3,175,000	231	74.75%	$8,225,000	72	23.30%	$4,000,000	237	76.69%
2015	1	$6,000,000	251	$29,750,000	82	32.66%	$3,150,000	169	67.33%	$8,280,000	47	18.72%	$5,525,000	204	81.27%
2015	2	$6,300,000	267	$25,000,000	91	34.08%	$3,250,000	176	65.91%	$18,765,000	46	17.22%	$5,525,000	221	82.77%
2015	3	$5,050,000	299	$24,800,000	87	29.09%	$3,012,500	212	70.90%	$12,100,000	53	17.72%	$4,275,000	246	82.27%
2015	4	$6,650,000	292	$18,080,000	106	36.30%	$3,125,000	186	63.69%	$14,415,000	51	17.46%	$5,400,000	241	82.53%
2016	1	$5,600,000	293	$20,375,000	87	29.69%	$3,350,000	206	70.30%	$13,600,000	45	15.35%	$5,275,000	248	84.64%
2016	2	$4,100,000	322	$16,000,000	61	18.94%	$3,300,000	261	81.05%	$11,600,000	48	14.90%	$3,725,000	274	85.09%
2016	3	$4,862,500	284	$25,000,000	75	26.40%	$3,200,000	209	73.59%	$24,500,000	34	11.97%	$4,362,500	250	88.02%
2016	4	$4,000,000	263	$19,480,000	73	27.75%	$2,800,000	190	72.24%	$13,352,600	28	10.64%	$3,664,706	235	89.35%
2017	1	$5,275,000	254	$22,880,750	70	27.55%	$3,600,000	184	72.44%	$14,726,254	28	11.02%	$4,950,000	226	88.97%
2017	2	$5,100,000	331	$22,660,000	91	27.49%	$3,325,000	240	72.50%	$16,450,000	37	11.17%	$4,462,500	294	88.82%
2017	3	$5,000,000	321	$22,250,000	86	26.79%	$3,431,000	235	73.20%	$22,250,000	38	11.83%	$4,525,000	283	88.16%
2017	4	$4,500,000	265	$28,000,000	66	24.90%	$2,875,000	199	75.09%	$12,208,000	26	9.81%	$4,250,000	239	90.18%
2018	1	$5,500,000	310	$21,882,400	97	31.29%	$3,500,000	213	68.70%	$14,750,000	40	12.90%	$5,000,000	270	87.09%
2018	2	$4,800,000	365	$20,000,000	81	22.19%	$3,300,000	284	77.80%	$17,625,000	40	10.95%	$4,250,000	325	89.04%
2018	3	$5,125,000	334	$21,265,000	83	24.85%	$3,710,000	251	75.14%	$13,342,500	22	6.58%	$5,000,000	312	93.41%
2018	4	$6,490,000	279	$20,500,000	105	37.63%	$3,300,000	174	62.36%	$14,440,000	33	11.82%	$5,580,556	246	88.17%
2019	1	$5,350,000	289	$17,802,698	76	26.29%	$3,550,000	213	73.70%	$15,750,000	34	11.76%	$4,800,000	255	88.23%
2019	2	$4,060,000	331	$19,848,485	62	18.73%	$3,375,000	269	81.26%	$6,300,000	35	10.57%	$3,921,000	296	89.42%
2019	3	$4,700,000	401	$21,000,000	96	23.94%	$3,500,000	305	76.05%	$15,850,000	42	10.47%	$4,350,000	359	89.52%
2019	4	$4,950,000	383	$21,855,650	94	24.54%	$3,300,000	289	75.45%	$11,000,000	35	9.13%	$4,600,000	340	88.77%
2020	1	$4,100,000	304	$16,900,000	48	15.78%	$3,420,000	256	84.21%	$6,313,000	22	7.23%	$4,095,000	282	92.76%
2020	2	$3,380,000	80	$16,787,500	10	12.50%	$2,515,000	70	87.50%	$6,700,000	7	8.75%	$3,360,000	73	91.25%
2020	3	$2,800,000	173	$14,062,500	14	8.09%	$2,600,000	159	91.90%	$7,219,750	12	6.93%	$2,667,500	161	93.06%
2020	4	$3,600,000	246	$23,053,000	45	18.29%	$2,750,000	201	81.70%	$10,725,000	36	14.63%	$3,000,000	210	85.36%
2021	1	$3,900,000	213	$27,900,000	39	18.30%	$3,075,000	174	81.69%	$11,431,000	20	9.38%	$3,700,000	193	90.61%
2021	2	$3,500,000	346	$24,352,000	69	19.94%	$2,900,000	277	80.05%	$9,675,000	34	9.82%	$3,337,500	312	90.17%
2021	3	$4,350,000	448	$27,000,000	115	25.66%	$3,125,000	333	74.33%	$33,820,000	38	8.48%	$4,000,000	410	91.51%
2021	4	$4,712,500	492	$17,100,000	127	25.81%	$3,300,000	365	74.18%	$9,687,500	36	7.31%	$4,380,000	456	92.68%
2022	1	$5,062,500	439	$17,600,000	119	27.10%	$3,475,000	320	72.89%	$12,025,000	42	9.56%	$4,875,000	397	90.43%
2022	2	$5,300,000	556	$21,140,000	126	22.66%	$3,750,000	430	77.33%	$9,250,000	50	8.99%	$5,074,500	506	91.00%
2022	3	$5,277,500	550	$16,050,000	140	25.45%	$3,650,000	410	74.54%	$11,000,000	61	11.09%	$5,000,000	489	88.90%
2022	4	$5,675,000	468	$16,358,750	126	26.92%	$3,995,000	342	73.07%	$9,300,000	35	7.47%	$5,500,000	433	92.52%
2023	1	$5,000,000	348	$17,456,879	84	24.13%	$3,585,000	264	75.86%	$11,750,000	28	8.04%	$4,850,000	320	91.95%

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)**
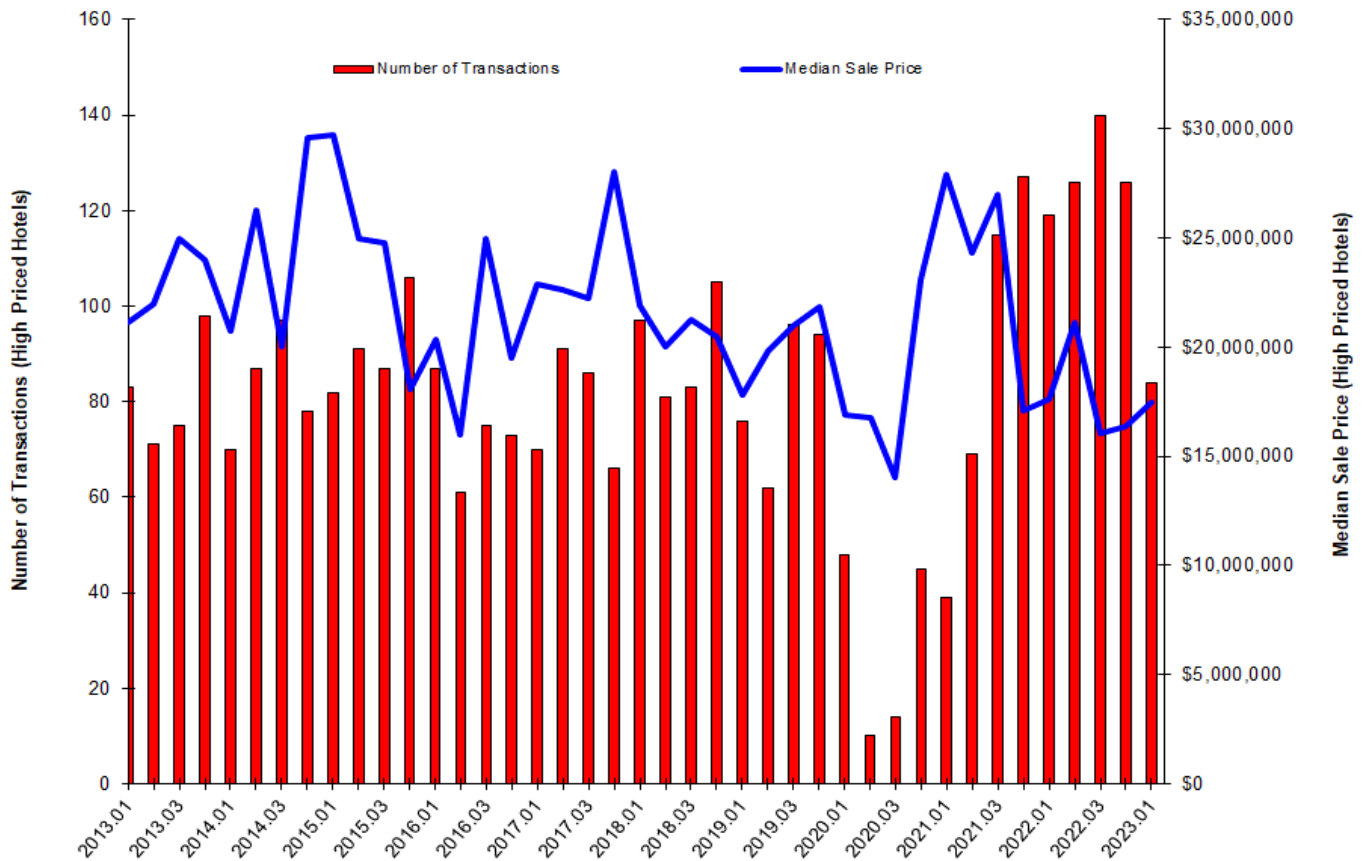
	Full Sample		Large Hotels		Small Hotels	
	Median Price	No. of Sales	Median Price	No. of Sales	Median Price	No. of Sales
2023Q1	$5,000,000	348	$17,456,879	84	$3,585,000	264
Quarter over Quarter	-12%	-26%	7%	-33%	-10%	-23%
Year over Year	-1%	-21%	-1%	-29%	3%	-18%

Transaction volume declined again this quarter. The transaction volume on all hotel transactions (both large hotels and small hotels combined) continued to be weaker whether measured on a quarter-over-quarter or year-over-year basis. [2] The number of smaller hotels traded declined 23 percent compared to a decline of 33 percent for larger hotels that transacted this quarter. Non-gateway hotel transaction volume fell 26 percent compared to 20-percent decrease in sales volume for gateway hotels this quarter. Despite the decline in transaction volume, median hotel prices increased this quarter for both large hotels and for hotels located in gateway cities. In contrast, small hotels, as well as hotels in non-gateway cities, experienced quarter-over-quarter median price declines (-10% for small hotels and -12% for non-gateway properties). However, only

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[2] Please 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.

EXHIBIT 5

Median sale price and number of sales, small hotels (sale prices less than $10 million)
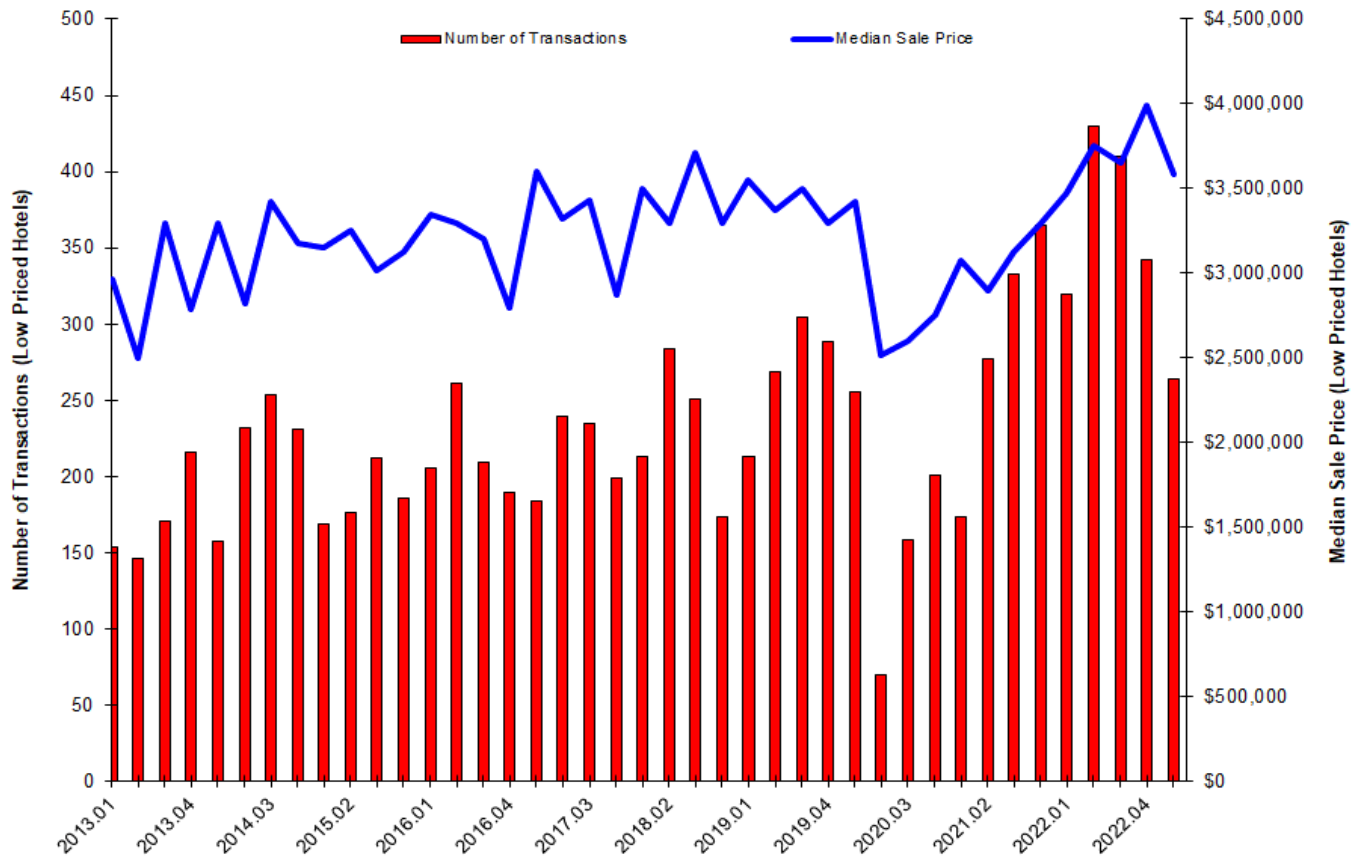
	Full Sample		Gateway Hotels		Non-Gateway Hotels	
	Median Price	No. of Sales	Median Price	No. of Sales	Median Price	No. of Sales
2023Q1	$5,000,000	348	$11,750,000	28	$4,850,000	320
Quarter over Quarter	-12%	-26%	26%	-20%	-12%	-26%
Year over Year	-1%	-21%	-2%	-33%	-1%	-19%

the median price of small hotels rose on a year-over-year basis. Exhibit 3 reports the transaction volume and median price of large and small hotels, as well as hotels located in gateway and non-gateway cities. Exhibit 4 and Exhibit 5 show this year-over-year trend in the number of transactions for large hotels and small hotels.

EXHIBIT 6

Hotel indices through 2022, quarter 3

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	97.92	94.57	82.16	103.35	64.46	NA	2009.01	153.82	135.82	153.40	198.41	155.62	162.33
1995.03	97.72	85.67	80.72	99.02	67.25	NA	2009.02	142.71	116.30	136.81	173.27	151.80	156.50
1995.04	100.52	77.24	85.48	92.49	68.67	NA	2009.03	138.35	109.82	129.00	158.80	137.29	142.15
1996.01	96.97	89.96	90.57	95.40	70.38	NA	2009.04	134.09	94.51	116.26	158.43	123.32	128.04
1996.02	95.20	93.68	94.86	90.03	74.23	NA	2010.01	127.27	103.14	116.77	159.05	117.15	121.51
1996.03	100.29	98.28	106.12	98.56	73.27	NA	2010.02	126.51	114.94	120.03	162.11	109.10	113.88
1996.04	94.90	105.89	105.77	105.29	74.84	NA	2010.03	124.00	133.63	121.92	216.92	110.47	115.52
1997.01	104.23	96.59	112.80	111.72	88.45	NA	2010.04	119.54	158.42	130.77	246.70	112.58	115.97
1997.02	103.73	99.16	111.01	111.90	89.04	NA	2011.01	121.12	156.57	129.24	261.61	112.65	113.88
1997.03	100.25	102.53	105.76	112.72	94.99	NA	2011.02	118.69	167.39	131.97	269.01	112.80	113.05
1997.04	104.38	106.82	112.97	120.28	101.27	NA	2011.03	115.84	155.82	129.14	226.13	111.44	111.55
1998.01	102.82	113.40	115.97	124.58	97.97	NA	2011.04	121.10	155.18	127.47	210.52	112.31	112.52
1998.02	112.63	123.60	129.09	135.52	103.70	NA	2012.01	121.42	159.42	130.86	223.38	113.07	112.30
1998.03	115.39	121.20	133.22	126.51	105.83	NA	2012.02	126.04	148.07	133.92	226.74	116.42	117.50
1998.04	116.02	129.92	127.38	126.22	103.58	NA	2012.03	132.42	145.64	142.03	240.91	120.35	120.88
1999.01	114.33	123.05	115.30	118.27	96.41	NA	2012.04	133.38	142.56	148.16	252.17	122.21	123.09
1999.02	105.60	103.48	98.67	99.88	90.73	NA	2013.01	133.87	143.46	155.17	242.19	124.50	126.94
1999.03	103.18	111.22	94.13	105.85	88.25	NA	2013.02	131.14	149.52	155.37	247.77	125.89	129.02
1999.04	101.60	99.84	93.00	100.83	89.22	NA	2013.03	133.45	158.56	157.13	249.26	127.27	131.76
2000.01	100.06	96.98	94.52	96.60	94.51	97.88	2013.04	131.93	160.06	154.56	252.93	130.02	135.65
2000.02	101.56	102.12	99.02	100.59	97.85	97.88	2014.01	134.23	158.55	153.41	254.22	135.06	140.09
2000.03	100.58	95.32	100.67	95.12	97.57	92.93	2014.02	135.84	159.43	150.45	258.66	134.79	138.37
2000.04	103.34	100.95	102.47	101.48	96.09	92.55	2014.03	136.53	157.50	150.44	257.48	137.07	139.90
2001.01	106.13	118.04	109.79	104.93	94.96	91.09	2014.04	138.72	156.95	150.60	231.84	136.76	138.21
2001.02	110.07	119.24	110.19	115.83	94.69	89.10	2015.01	139.92	165.89	154.17	243.09	138.36	139.19
2001.03	112.19	115.56	109.09	115.42	95.76	92.33	2015.02	145.61	171.31	166.18	250.44	142.53	143.26
2001.04	110.35	115.04	105.65	110.34	95.72	90.10	2015.03	145.02	173.54	165.06	277.74	151.21	152.83
2002.01	107.38	106.09	98.98	106.40	96.47	92.90	2015.04	147.71	169.54	172.47	314.98	161.29	163.02
2002.02	103.50	97.85	95.36	97.37	95.03	92.32	2016.01	150.43	165.48	173.58	329.43	164.15	166.42
2002.03	103.32	95.35	94.60	99.60	95.68	91.17	2016.02	150.51	162.50	166.23	333.04	165.29	168.34
2002.04	106.01	96.07	99.72	101.32	97.19	95.90	2016.03	151.46	168.74	167.91	346.96	164.93	166.60
2003.01	108.07	95.79	100.36	112.77	98.17	95.01	2016.04	147.80	171.03	162.23	337.28	159.61	162.15
2003.02	111.59	113.24	104.92	120.03	100.38	98.60	2017.01	148.83	168.35	161.69	318.78	163.18	165.63
2003.03	113.70	117.30	108.06	128.22	102.37	103.00	2017.02	149.95	169.20	167.95	323.76	169.68	172.63
2003.04	113.26	125.11	107.67	132.12	103.46	105.36	2017.03	151.65	164.62	169.82	313.17	170.51	174.27
2004.01	114.64	124.69	108.86	131.52	102.86	106.42	2017.04	153.16	169.74	171.12	310.72	173.97	177.01
2004.02	114.77	111.18	107.58	134.93	103.61	107.66	2018.01	152.66	172.34	172.32	350.96	174.61	178.05
2004.03	116.09	117.79	110.19	142.69	107.82	112.39	2018.02	154.27	175.45	171.74	360.44	175.44	177.74
2004.04	120.49	108.74	114.96	150.58	109.26	112.70	2018.03	156.76	174.85	173.89	361.27	178.54	180.52
2005.01	127.63	113.58	122.98	169.92	114.38	117.22	2018.04	161.47	170.72	184.45	387.42	181.04	182.69
2005.02	135.36	119.41	135.90	171.63	119.79	123.20	2019.01	162.62	167.09	183.14	365.67	182.07	183.01
2005.03	138.77	120.54	141.34	169.26	122.74	125.63	2019.02	159.90	163.37	179.08	338.72	182.19	182.20
2005.04	140.92	126.89	145.61	178.65	128.50	132.24	2019.03	158.03	159.89	175.78	339.27	182.80	183.23
2006.01	144.32	134.53	153.18	182.46	133.02	137.05	2019.04	157.53	162.27	167.01	351.00	184.66	185.54
2006.02	145.52	140.07	153.33	195.04	136.64	140.58	2020.01	156.15	162.29	163.05	334.96	183.40	184.86
2006.03	149.45	146.64	158.85	214.01	138.36	141.95	2020.02	151.54	157.52	156.52	326.84	184.44	186.75
2006.04	151.95	149.36	162.55	214.58	142.66	144.59	2020.03	145.34	154.77	145.89	308.20	182.80	185.17
2007.01	151.42	149.61	166.77	221.71	146.30	147.49	2020.04	141.53	157.15	141.42	273.92	184.78	187.73
2007.02	154.68	156.21	174.56	232.29	150.36	151.46	2021.01	138.07	155.93	136.97	288.16	184.20	187.02
2007.03	157.42	152.42	178.34	230.03	156.76	159.69	2021.02	142.63	165.72	146.21	305.56	185.57	187.95
2007.04	156.00	151.76	182.46	233.15	158.13	161.57	2021.03	148.39	175.89	160.96	326.61	193.04	194.37
2008.01	158.45	145.15	176.34	235.31	159.84	166.27	2021.04	152.55	173.53	171.30	327.71	201.59	200.35
2008.02	159.68	144.28	172.74	240.17	160.08	167.56	2022.01	157.91	173.23	181.98	334.53	209.40	207.55
2008.03	156.10	143.66	166.72	233.37	159.23	164.39	2022.02	165.11	172.88	191.41	344.83	223.32	221.81
2008.04	157.02	141.66	161.12	225.69	160.81	167.37	2022.03	170.61	163.50	195.50	330.34	227.29	226.41
							2022.04	176.98	165.88	203.79	336.60	228.17	230.16
							2023.01	178.01	169.48	206.07	330.39	235.01	239.27

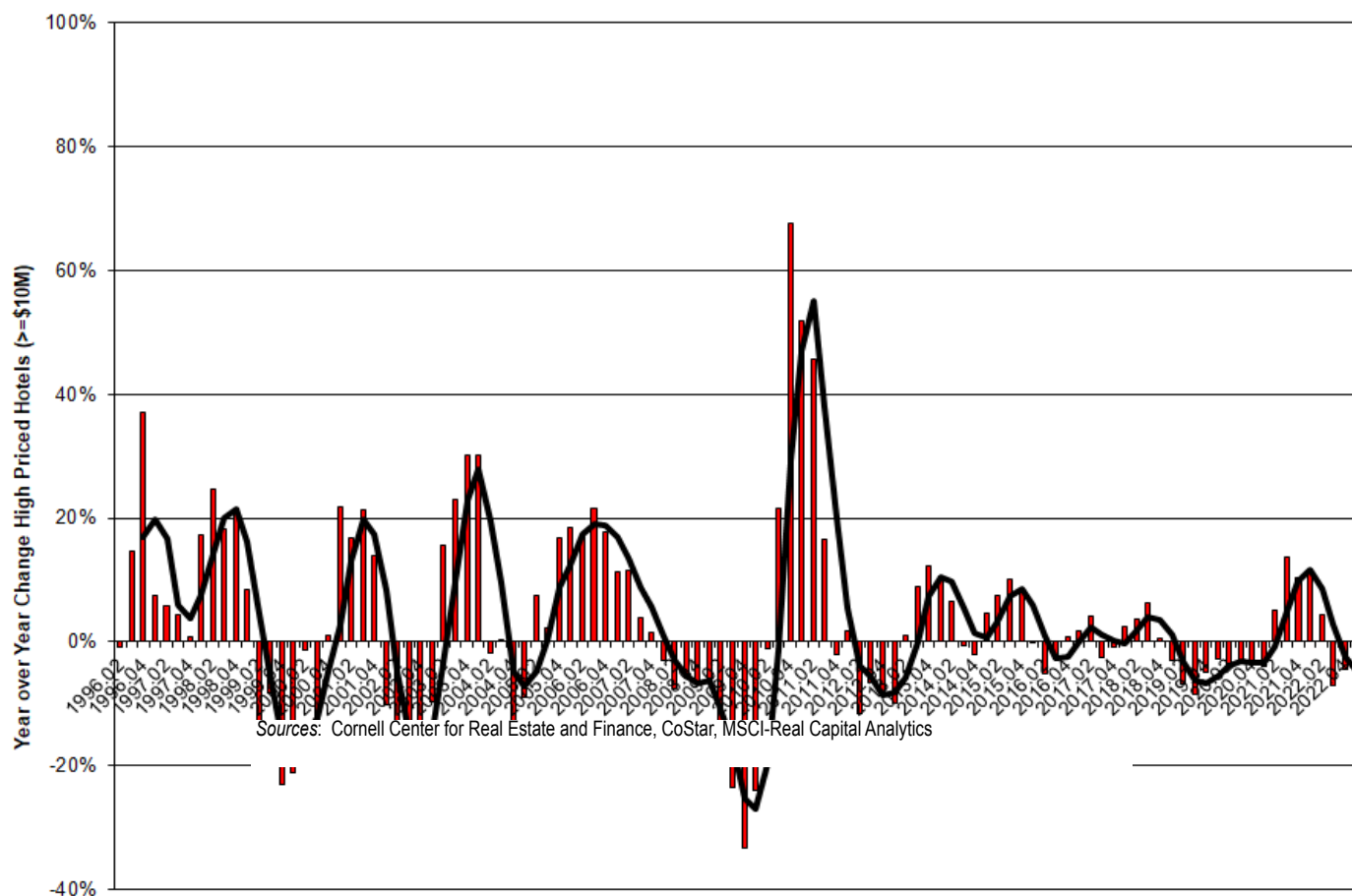*Source*: Cornell Center for Real Estate and Finance

EXHIBIT **7**

Hedonic hotel indices for large and small hotel transactions
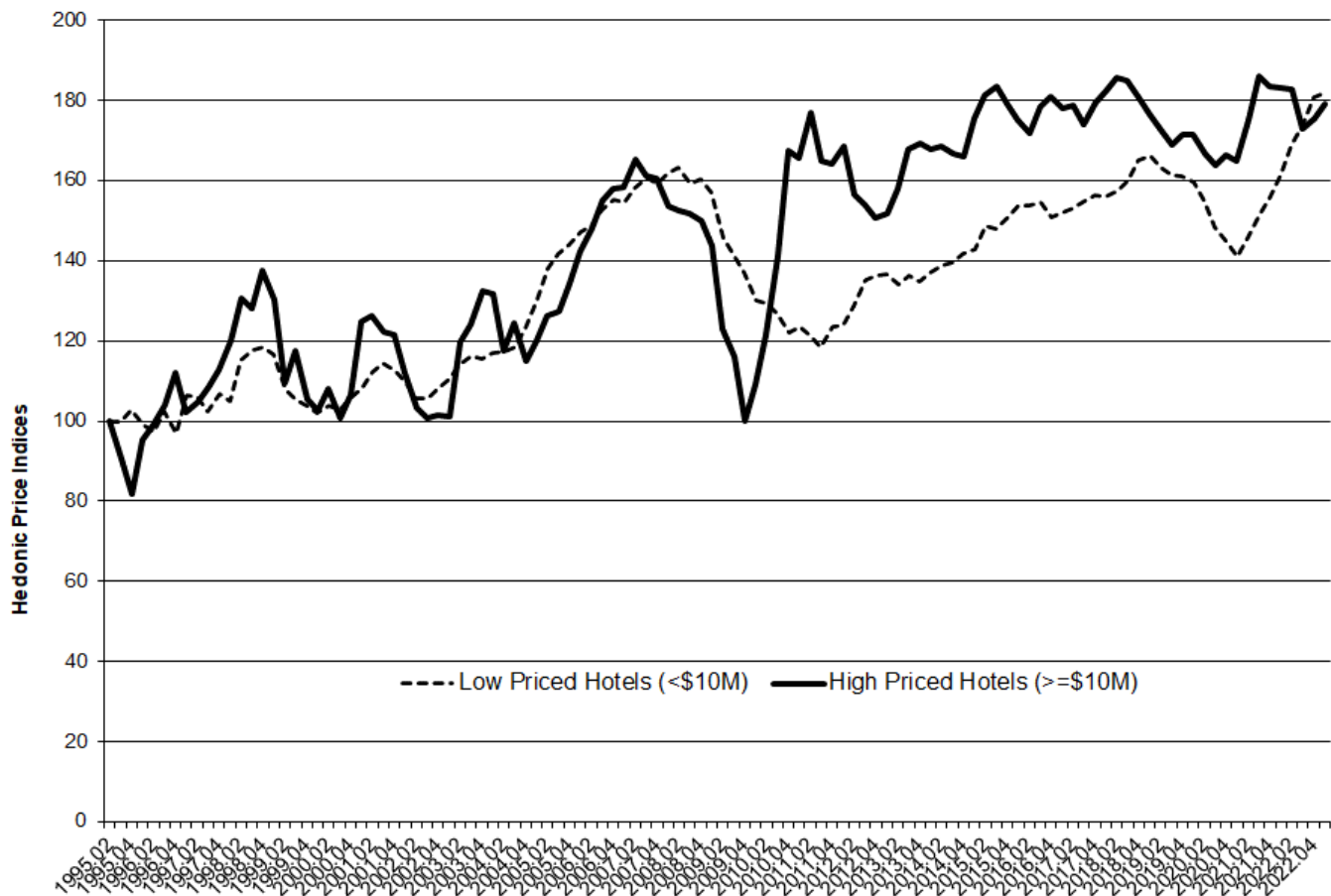
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

A buying opportunity exists for both large and small hotels based on moving averages. Small hotels continue to remain at a statistical high this quarter according to our standardized price metric. Exhibit 7 graphs the prices reported in Exhibit 6. The price of large hotels rose 2.2 percent compared to an almost imperceptible 0.6-percent gain for small hotels this quarter.

EXHIBIT 8

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

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

Exhibit 8 and Exhibit 9 show the historical year-over-year changes in large and small hotel indices. On a year-over-year basis, however, large hotels declined 2.2 percent, compared to a 12.7-percent increase in the price of small hotels—continuing the trend in the last period. To gauge whether the prices of large and small hotels signal a buy or sell, we compare the hedonic price relative to the 3-year and 5-year moving averages. Since the hedonic prices for both large hotels and smaller hotels are both above their associated 3-year and 5-year moving averages, this indicates a buy signal. To assess whether the price of a large or small hotel has reached a new statistical high or low, we use the statistical technique known as Z-scores to standardize prices so that the average price is at zero (see Appendix, page

EXHIBIT 9

Year-over-year change in small-hotel index with a moving average trendline
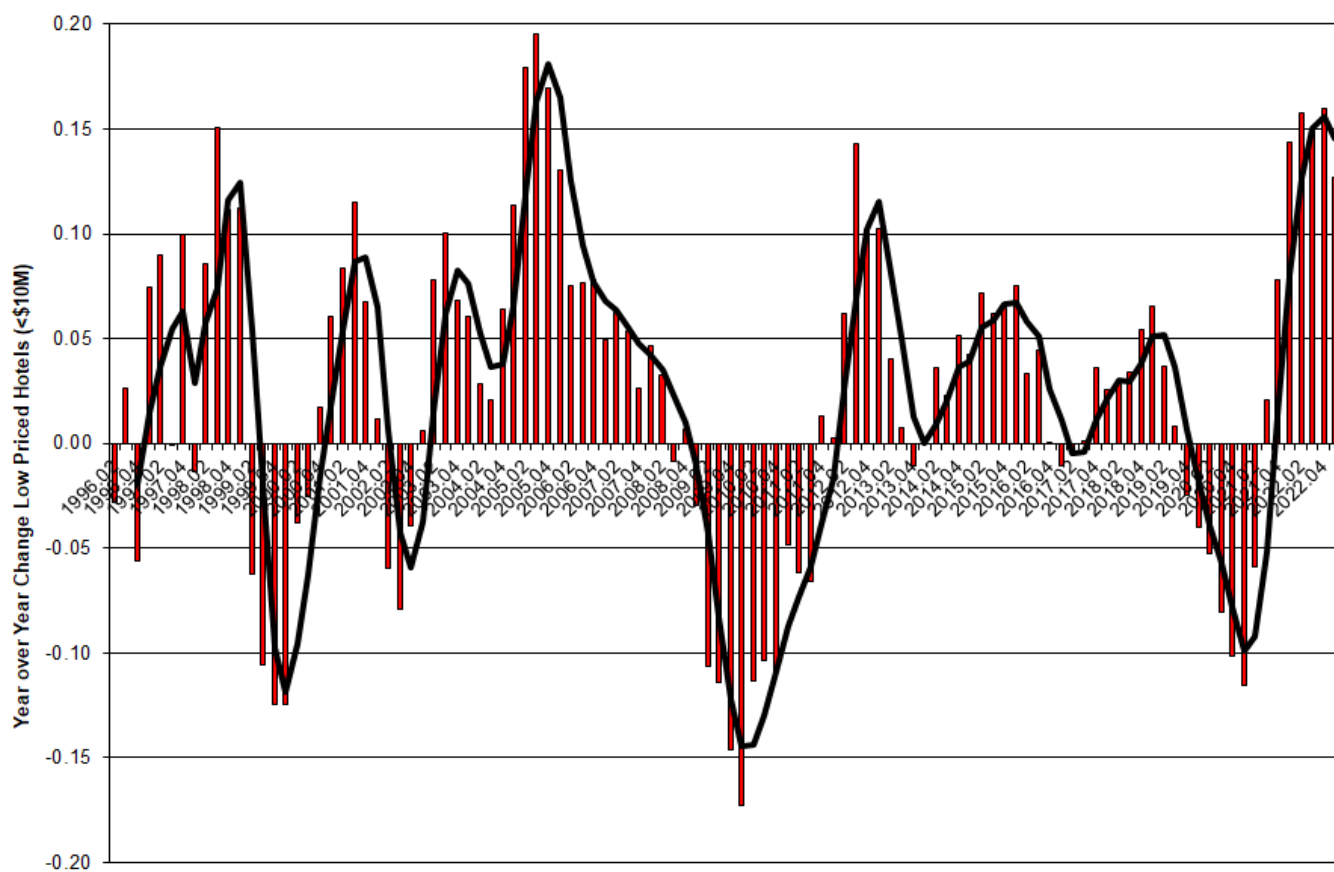
Sources: Cornell Center for Real Estate and Finance, CoStar, MSCI-Real Capital Analytics

EXHIBIT **10**

Moving average trendlines for large hotel index
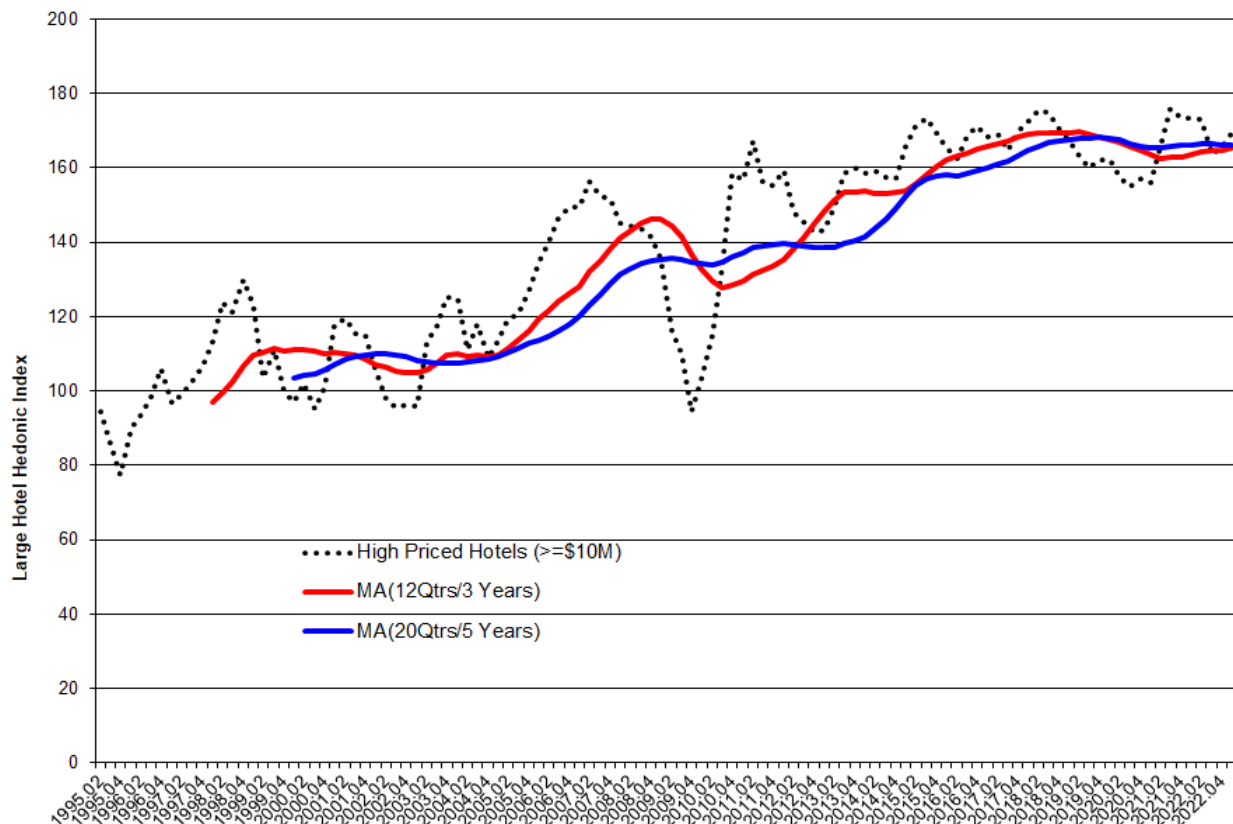
Sources: Cornell Center for Real Estate and Finance, CoStar, MSCI-Real Capital Analytics

	Hedonic Price	Moving Average		Standardized Unexpected Price (Z-Score)	
Large Hotels	Price	3 Year	5 Year	3 Year	5 Year
2022Q3	163.50				
2022Q4	165.88				
2023Q1	169.48	165.46	166.07	0.52	0.49
Quarter over Quarter	2.2%				
Year over Year	-2.2%				
Small Hotels	Price	3 Year	5 Year	3 Year	5 Year
2022Q3	170.61				
2022Q4	176.98				
2023Q1	178.01	155.72	156.77	1.60	1.96*
Quarter over Quarter	0.6%				
Year over Year	12.7%				

EXHIBIT 11

Moving average trendlines for small hotel index
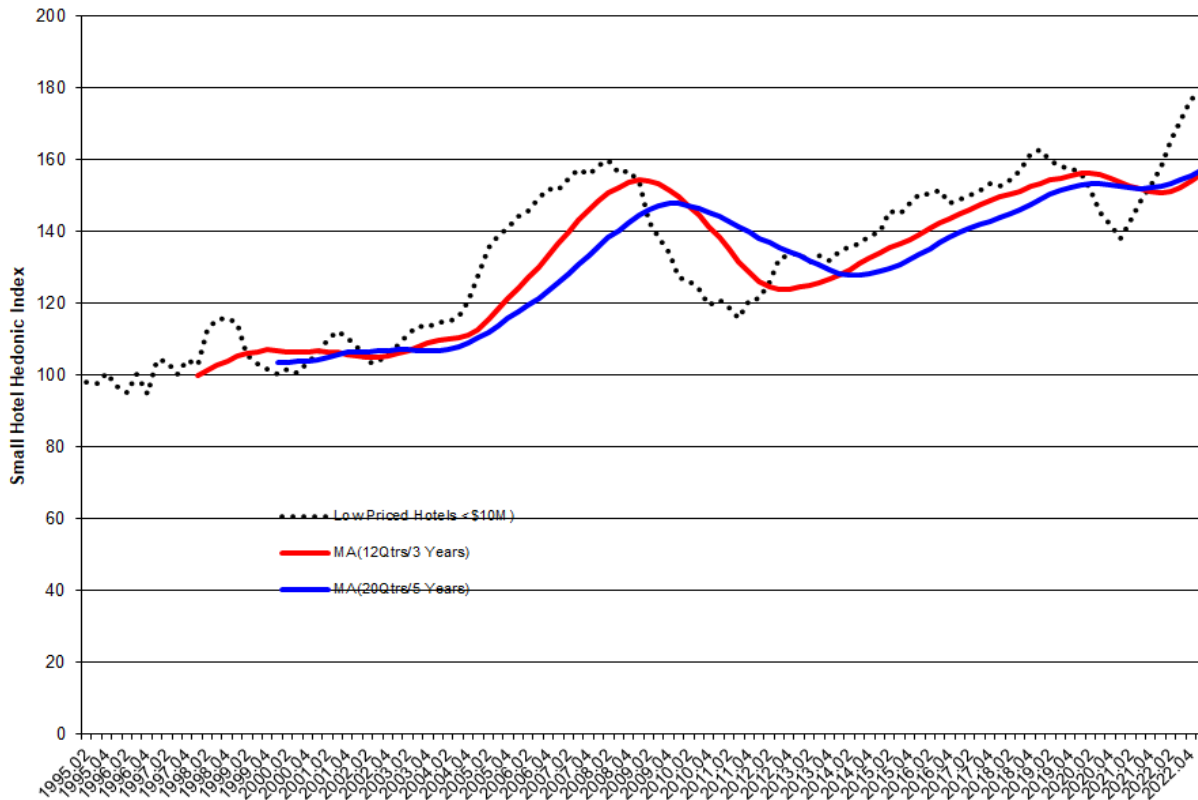
Sources: Cornell Center for Real Estate and Finance, CoStar, MSCI-Real Capital Analytics

34). If prices rise above 1.645, this indicates a new statistical high, while a drop below -1.645 represents a new statistical low. Using this metric, the price of small hotels remains above its statistical high only in terms of using a 5-year mean and standard deviation to calculate standardized prices. Exhibit 12 and Exhibit 13 show standardized prices for large hotels and small hotels. The standardized price of large hotels continues to hover around its mean of zero, while the standardized price of small hotels has started to revert towards its mean of zero.

EXHIBIT 12

Standardized unexpected price (SUP) for large hotel index
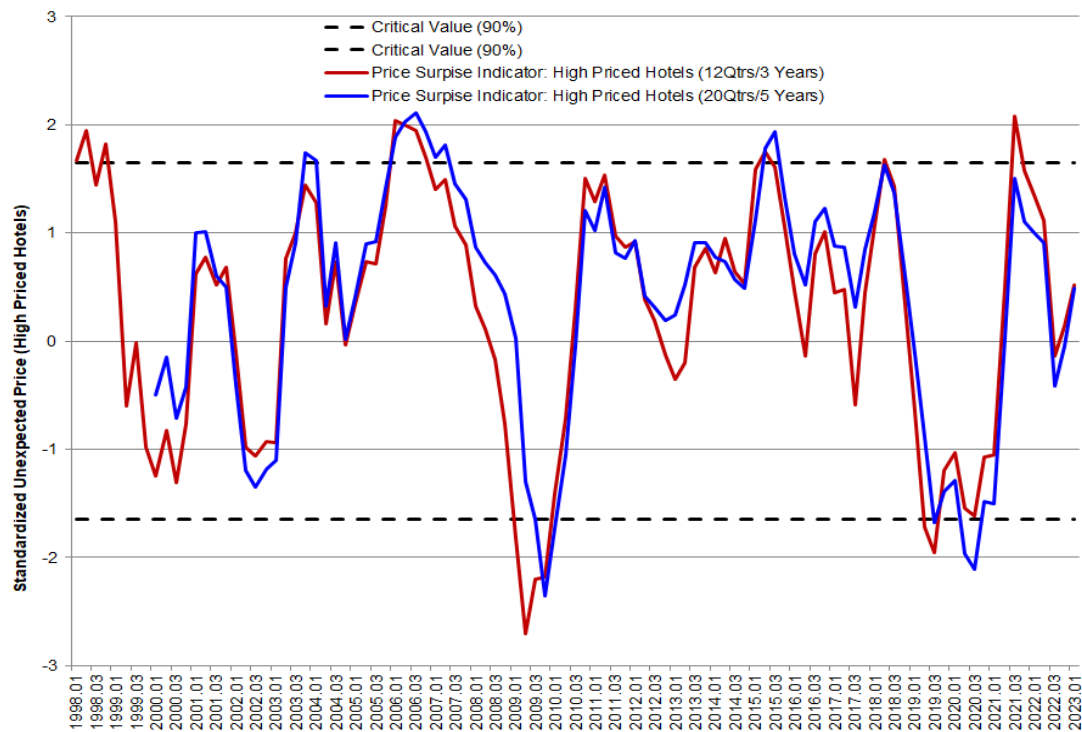
Sources: Cornell Center for Real Estate and Finance, CoStar, MSCI-Real Capital Analytics

EXHIBIT 13

Standardized unexpected price (SUP) for small hotel index
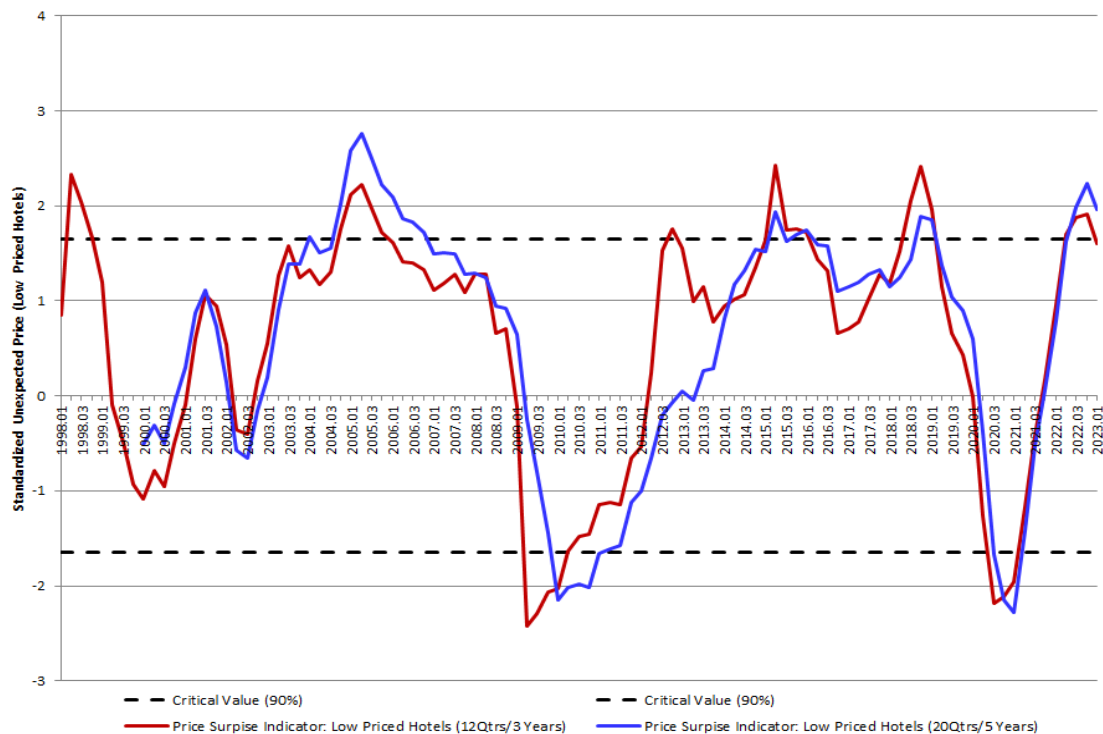
Sources: Cornell Center for Real Estate and Finance, CoStar, MSCI-Real Capital Analytics

EXHIBIT **14**

Moving average trendline for repeat-sale hotel index

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

Legend:
- Repeat Sales (Full Sample)
- MA(12Qtrs/3 Years)
- MA(20Qtrs/5 Years)
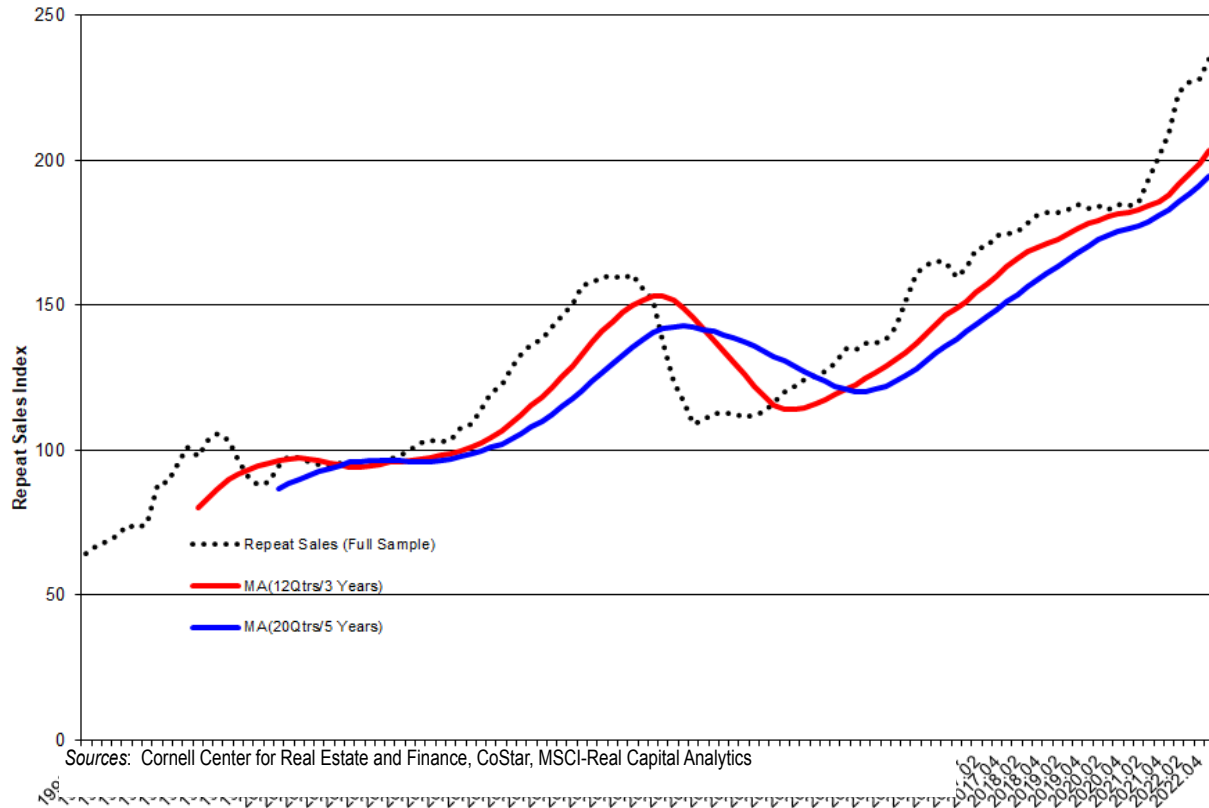
Repeat Sale Hotels	Repeat Sale Price	Moving Average		Standardized Unexpected Price (Z-Score)	
	Price	3 Year	5 Year	3 Year	5 Year
2022Q3	227.29				
2022Q4	228.17				
2023Q1	235.01	203.30	194.49	1.56	2.12*
Quarter over Quarter	3.0%				
Year over Year	12.2%				

Prices of frequently sold hotels remain above their moving averages, signaling a buy or hold. Prices of repeat-sale hotels also remain above statistical highs, based on a 5-year window. Since most hotels that sell frequently tend to be smaller hotels, it is not surprising that like the case of small hotels, hotels that tend to sell frequently (i.e., have repeat sales), rose 3 percent in price this quarter as well as year over year (12.2%; see also Exhibit 16). As is the case with small hotels, our repeat sale indicator continues to remain above

EXHIBIT **15**

Standardized unexpected price (SUP) for hotel repeat-sale index (full sample)
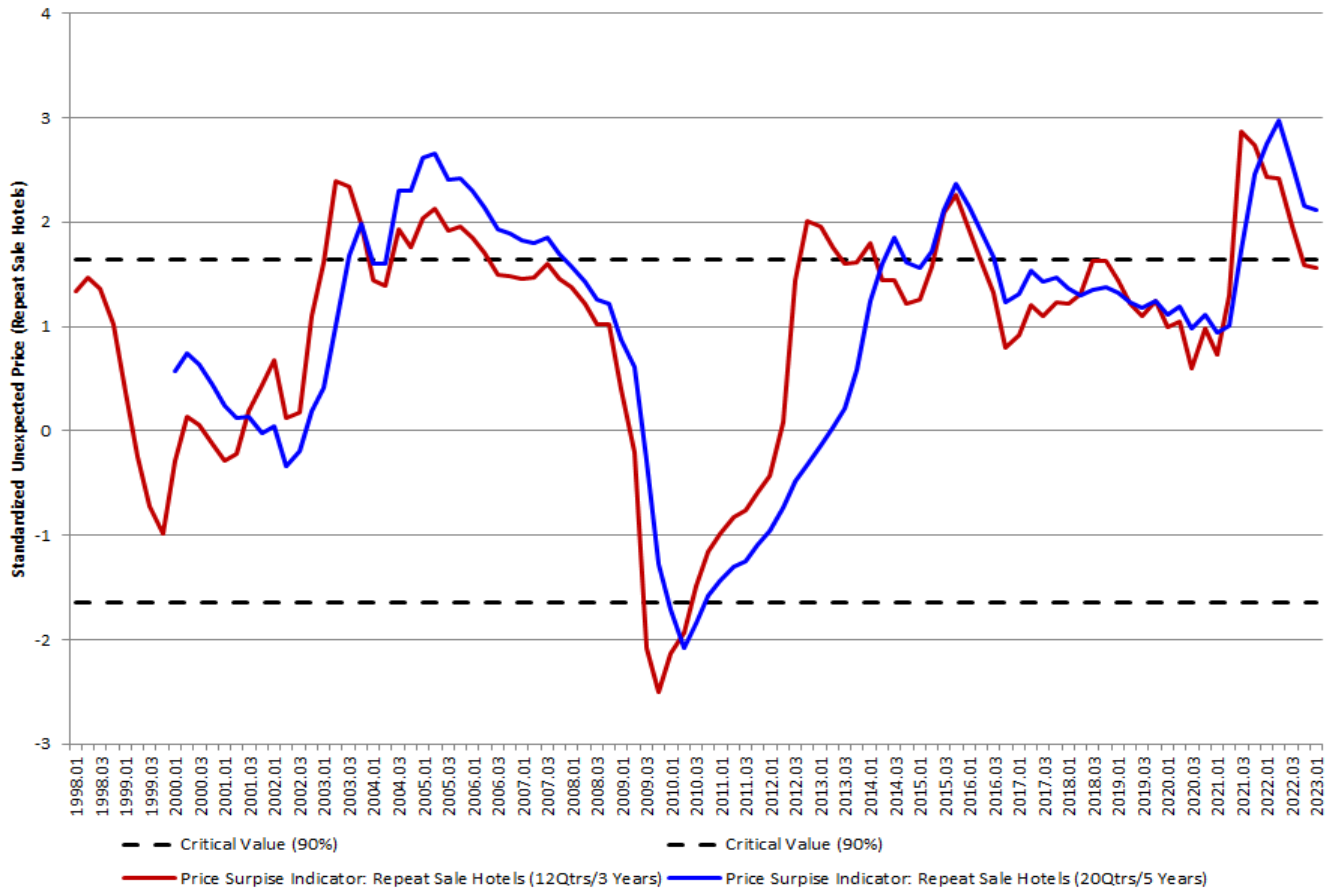
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

both its short-term moving average (235.01>203.30) and its long-term moving average (235.01>194.49; see Exhibit 14), indicating that these hotels continue to remain a buying opportunity. Our SUP performance metric in Exhibit 15 indicates that the standardized price based its 5-year moving average continues to remain above its statistical upper boundary although it continues to be below its 3-year moving average.

EXHIBIT **16**

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

EXHIBIT 17
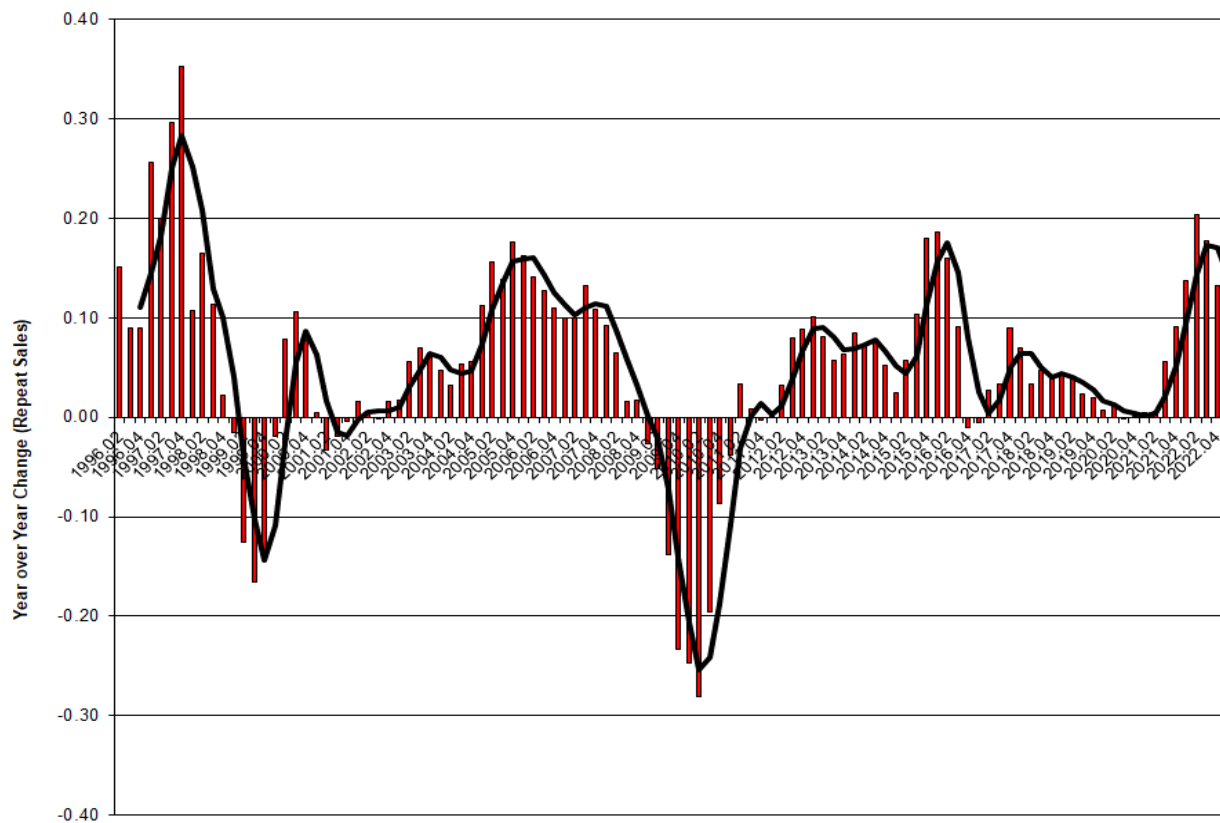
Mortgage origination volume versus the loan-to-value ratio for hotels
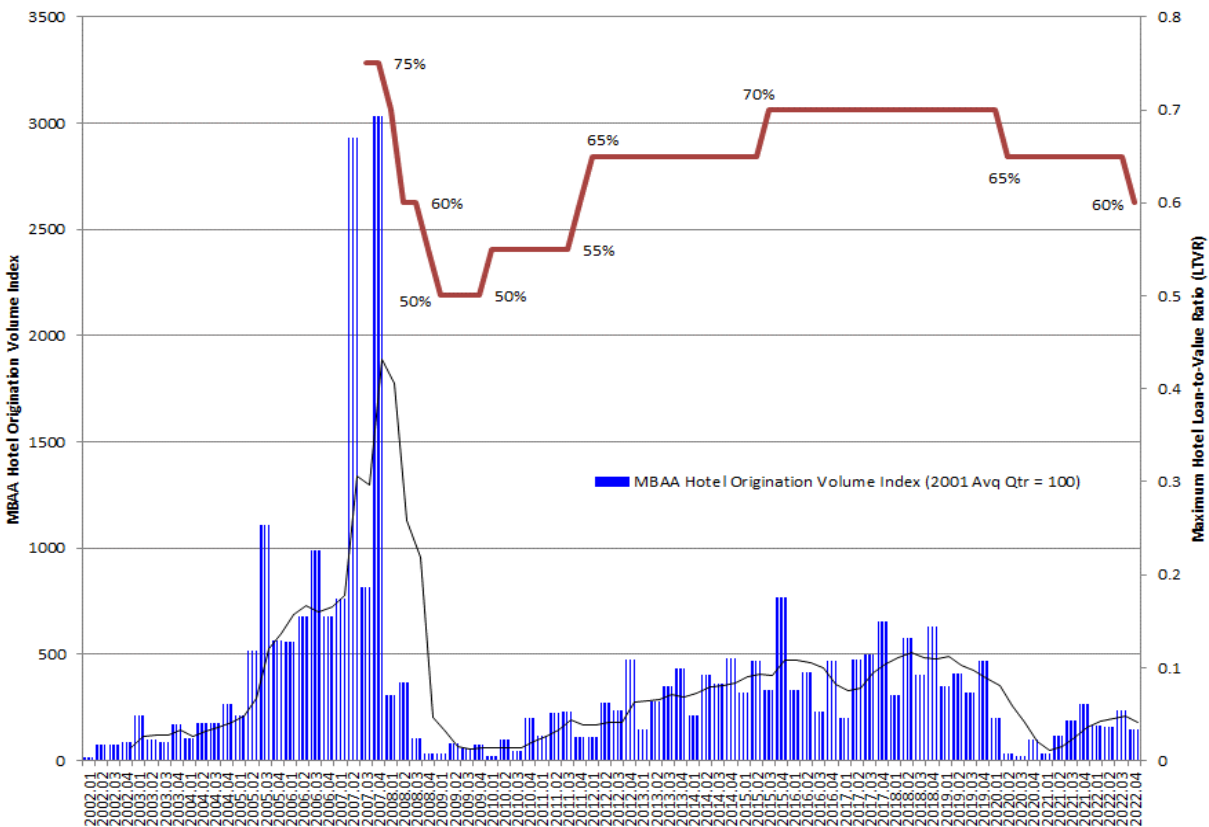
Sources: Mortgage Bankers Association, Cornell Center for Real Estate and Finance, Cushman Wakefield Sonnenblick Goldman

	MBAA Hotel Origination Volume Index (2001 Avq Qtr = 100)
2022Q2	162
2022Q3	236
2022Q4	145
Quarter over Quarter	-38.6%
Year over Year	-45.9%

Mortgage financing volume fell nearly 39 percent for the most recent quarter reported. Exhibit 17 shows that the mortgage origination volume for hotels, as reported for the fourth quarter of 2022, fell 39 percent this quarter.[3] Loan volume was also 46 percent behind the hotel loan origination volume from a year earlier (year over year). The maximum loan to value (LTV) ratio for hotels, however, declined from 65 percent to 60 percent this quarter.

The cost of hotel debt financing continues to rise. Although Main Street lenders have lowered the amount of additional compensation required to make hotel loans relative to other CRE loans, Wall Street via REITs reveals that higher relative risk is expected for hotels. The cost of obtaining hotel debt financing, as reported by Cushman Wakefield Sonnenblick Goldman, continued to rise this quarter as well as year over year.[4] The interest rate as of

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

[4] 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 18

Interest rates on Class A versus Class B & C hotels
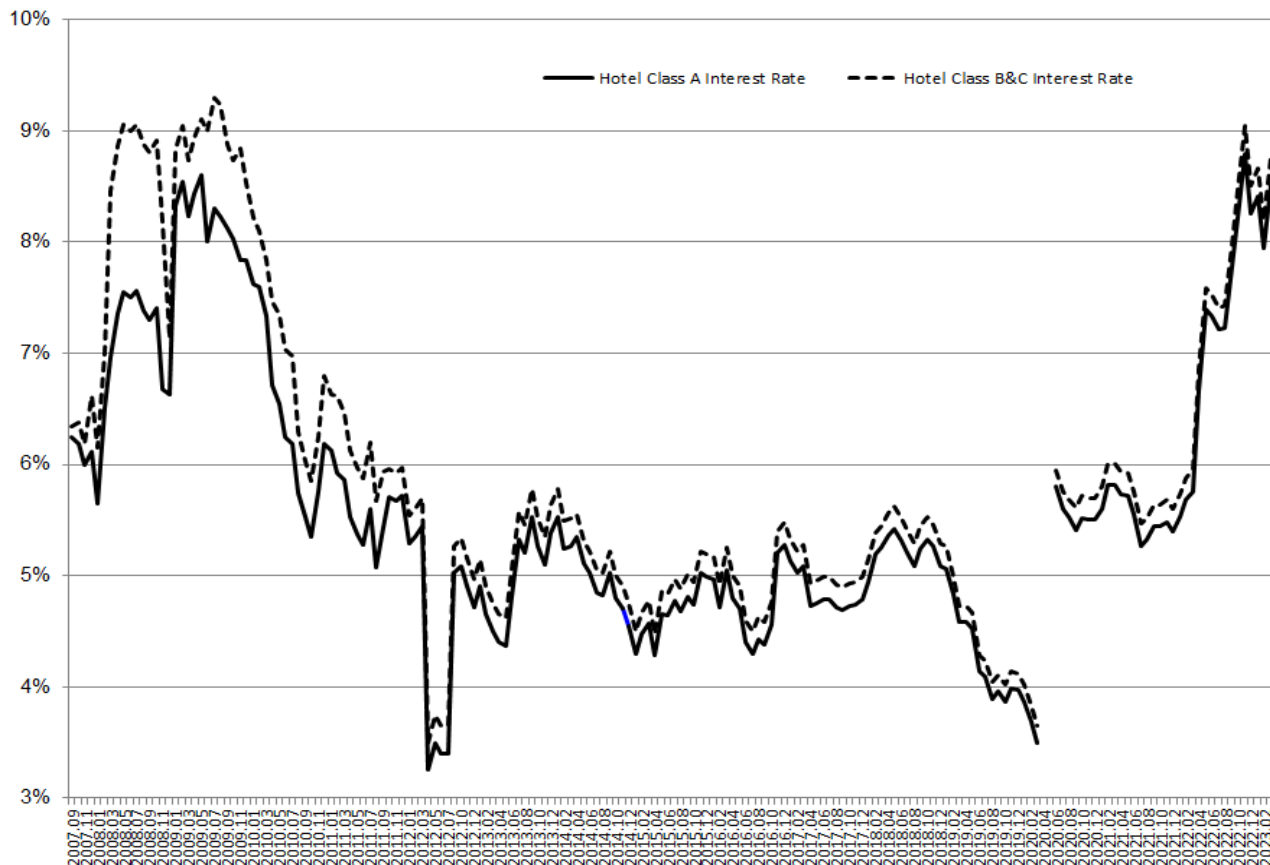
Sources: Cornell Center for Real Estate and Finance, Cushman Wakefield Sonnenblick Goldman

March 3, 2023, was 8.52 percent for full-service Class A hotels and 8.77 percent for Class B&C properties. Those rates are up from 8.25 for Class A hotels and 8.5 percent for Class B&C hotels in December 2022, representing a 3.3-percent increase in interest rates over a three-month period. All told, these figures depict over a 47-percent rise in hotel interest rates over the prior March period, when interest rates stood at 5.76 percent on Class A hotels and 5.96 percent on Class B&C properties. This rise in interest rates continues to make hotel deals less financially feasible in the near term. Exhibit 18 displays the historical time series graph of hotel interest rates.

EXHIBIT **19**

Interest rate spreads of hotels versus non-hotel commercial real estate
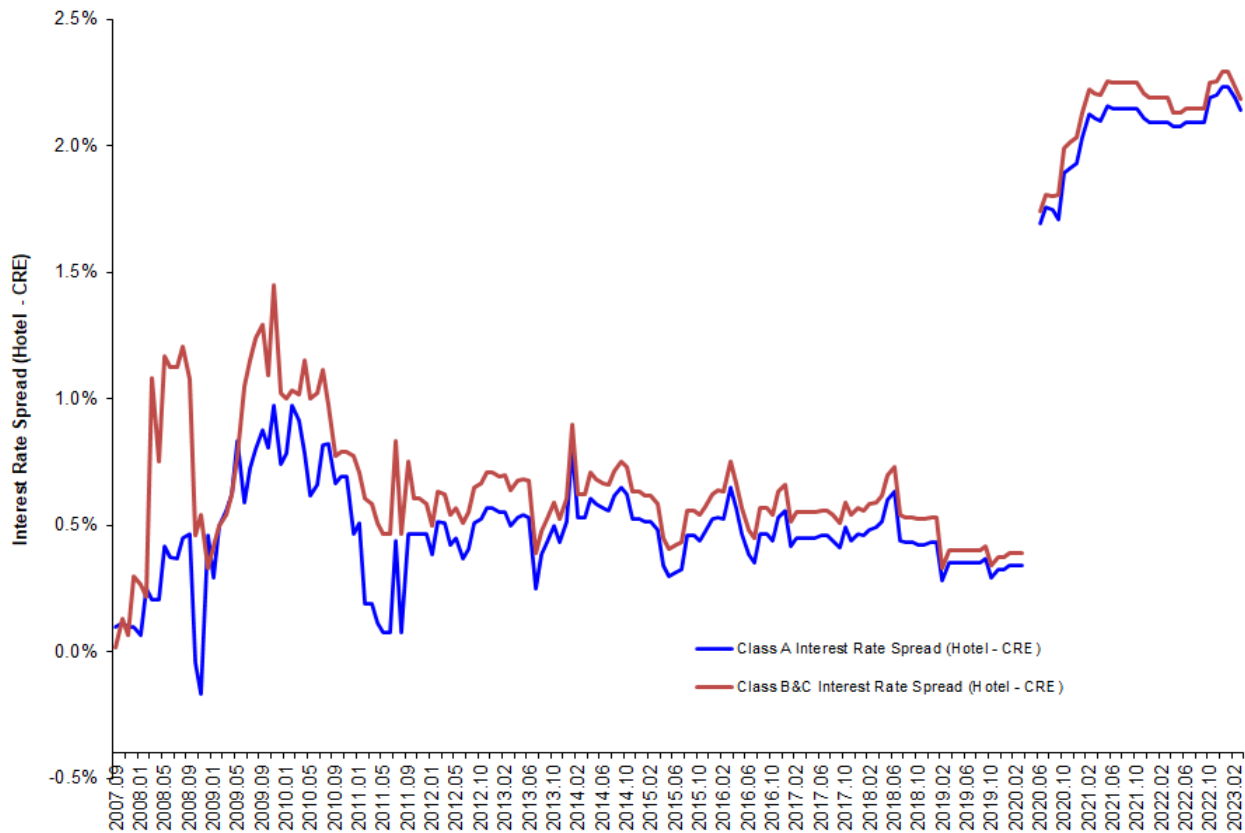
	Interest Rates Full Service Hotels		Interest Rate Spread (Hotel – CRE)		Interest Rate Spread (Hotel – 10 Yr TBond)	
	Class A	Class B&C	Class A	Class B&C	Class A	Class B&C
March 2022	5.76%	5.96%	2.09%	2.19%	4.05%	4.25%
December 2022	8.25%	8.50%	2.23%	2.29%	4.70%	4.95%
March 2023	8.52%	8.77%	2.14%	2.18%	4.55%	4.80%
Quarter over Quarter	3.3%	3.2%	-4.1%	-4.7%	-3.2%	-3.0%
Year over Year	47.9%	47.1%	2.4%	-0.4%	12.3%	12.9%

To evaluate the risk assessment embodied in hotel interest rates, we compare the interest rate on hotels to those for other types of commercial real estate (CRE). We found that the interest rate spreads for both higher quality (Class A) and lower quality (Class B&C) hotels have decreased approximately 10 basis points (bps) this quarter from the previous quarter, indicating that lenders have lowered the additional compensation they demand to make hotel loans, as compared to loans on other major property types (due to the relative riskiness of hotel loans). To obtain further insights, we also compare the interest rate on hotels to the yield on a 10-year Treasury bond. The interest rate spread on this metric has narrowed 15 bps for both Class A and Class B&C hotels from 4.7 percent to 4.55 percent for Class A and, for Class B&C, 4.95 percent to 4.8 percent.

EXHIBIT **20**

Risk differential between hotel REITs and non-hotel commercial-property REITs
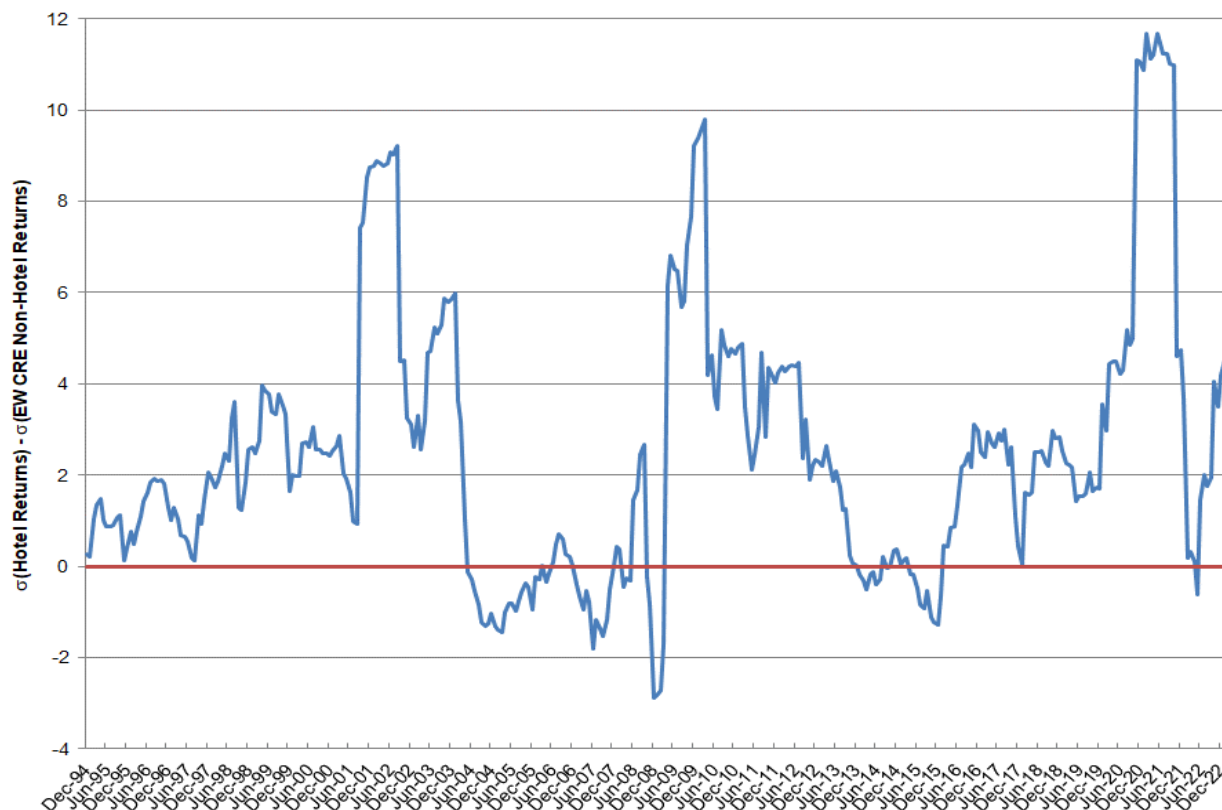
Sources: NAREIT, Cornell Center for Real Estate and Finance

Another way to view default risk is to look at the equity market. Exhibit 20 shows that the total risk of hotel real estate investment trusts relative to the total risk of an equally weighted portfolio of commercial real estate equity REITs (that is, office, industrial, retail, and multifamily properties).[5] The risk differential, which should reflect the

risk that is unique to hotel properties, is currently at 4.82 percent (σHotel - σCRE = 12.38% - 7.56%), up from 4.64 percent (σHotel - σCRE = 12.46% - 7.82%) in the prior quarter. This indicates that the expected default risk for hotels continues to climb relative to other major types of commercial real estate. This suggests that the cost of financing for hotels should be greater for hotels than for other major property types.

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[5] We calculate the total risk for hotel REITs using a 12-month rolling window of monthly returns on hotel REITs.

EXHIBIT **21**

30-plus-day delinquency rate for hotels
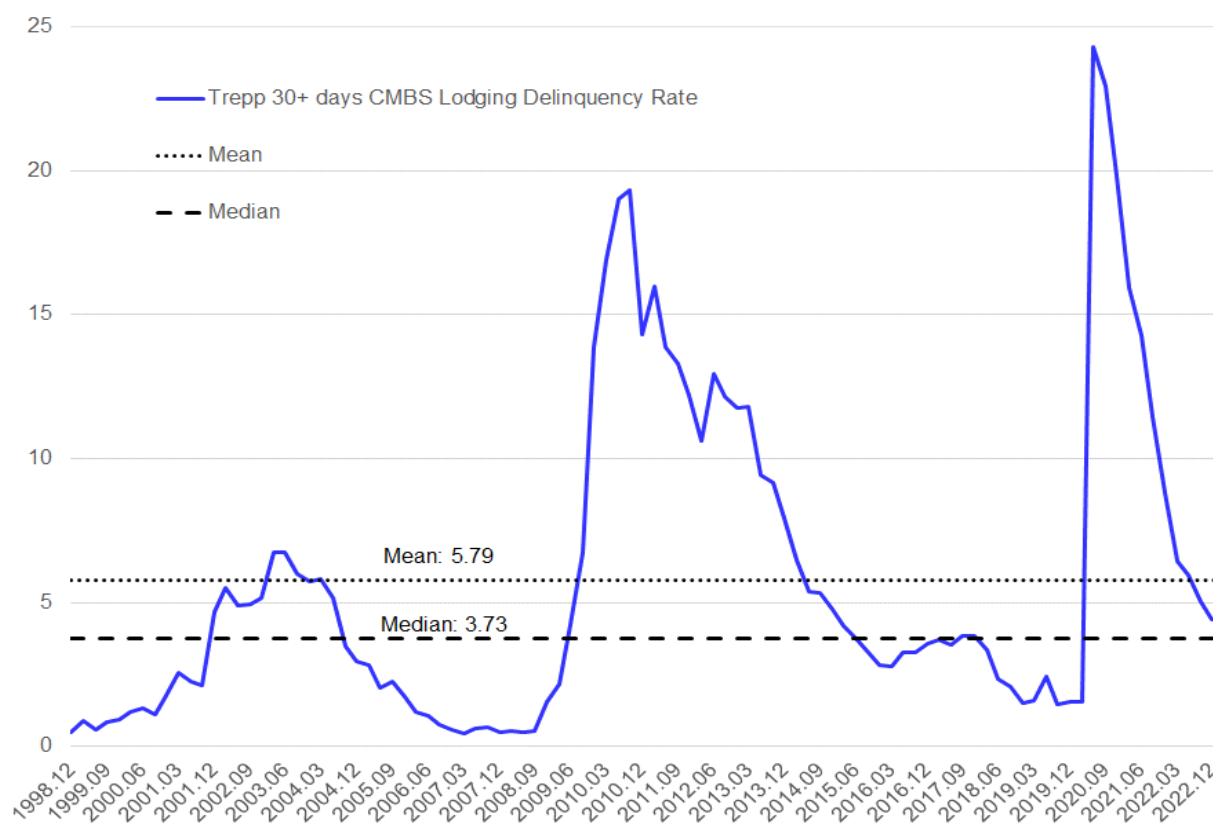
Source: Trepp

	Trepp 30+ days CMBS Lodging Delinquency Rate				
	Lodging	**Industrial**	**Multifamily**	**Office**	**Retail**
March 2022	6.45	0.33	0.26	1.56	7.19
December 2022	4.40	0.42	2.17	1.58	6.97
March 2023	4.41	0.37	1.91	2.61	6.23
Quarter over Quarter	0.2%	-11.9%	-12.0%	65.2%	-10.6%
Year over Year	-31.6%	12.1%	634.6%	67.3%	-13.4%

The delinquency rate on hotel loans was flat this quarter. The CMBS delinquency rate (30+ days) of 4.41 percent for lodging properties in March is comparable to the hotel delinquency rate of 4.42 percent last quarter (December 2022), although it is lower than the 6.45 percent hotel delinquency rate last year (March 2022). The hotel delin-quency rate is lower than the retail delinquency rate of 6.23 percent, but higher than all other property types including office (2.61%), multifamily (1.91%), and industrial (.37%). Exhibit 21 displays the historical 30+ day delinquency rate for hotels, while Exhibit 22 shows the standardized version of the 30+ day delinquency rate for hotels.

EXHIBIT **22**

Standardized 30-plus-day delinquency rate for hotels
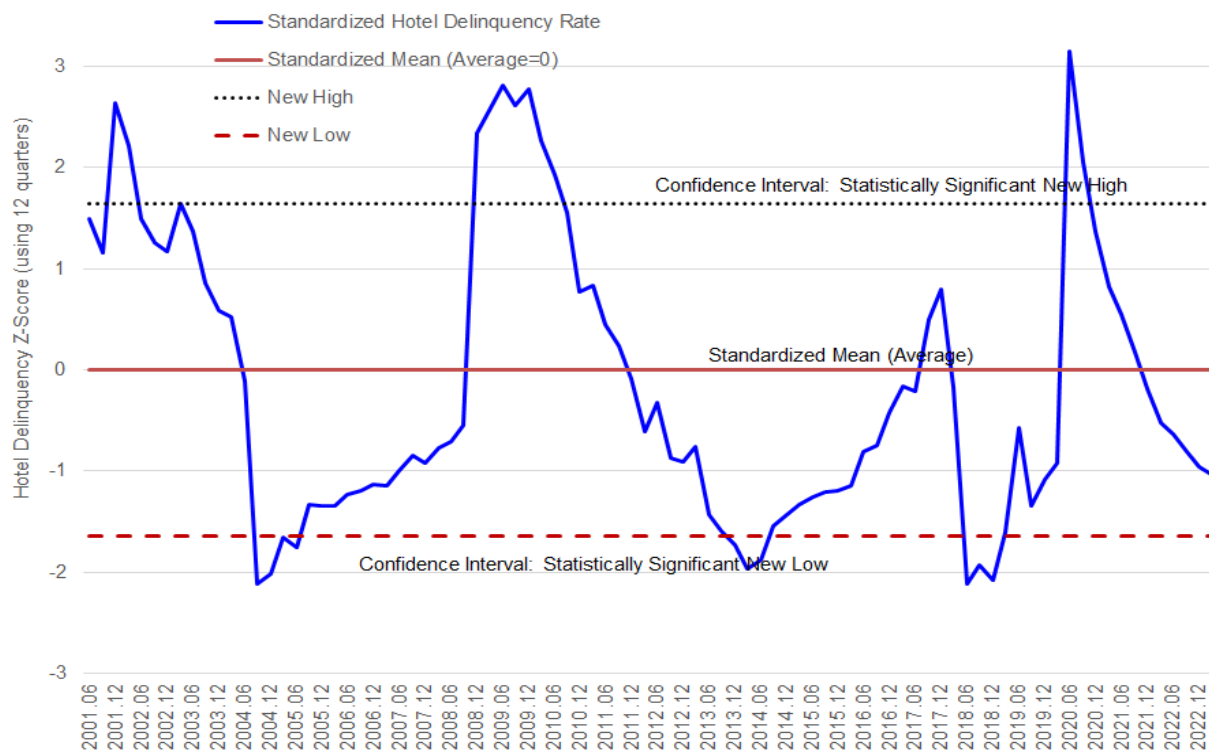
Source: Trepp

EXHIBIT **23**

Economic value added (EVA) and equity (shareholder) value added (SVA) for hotels
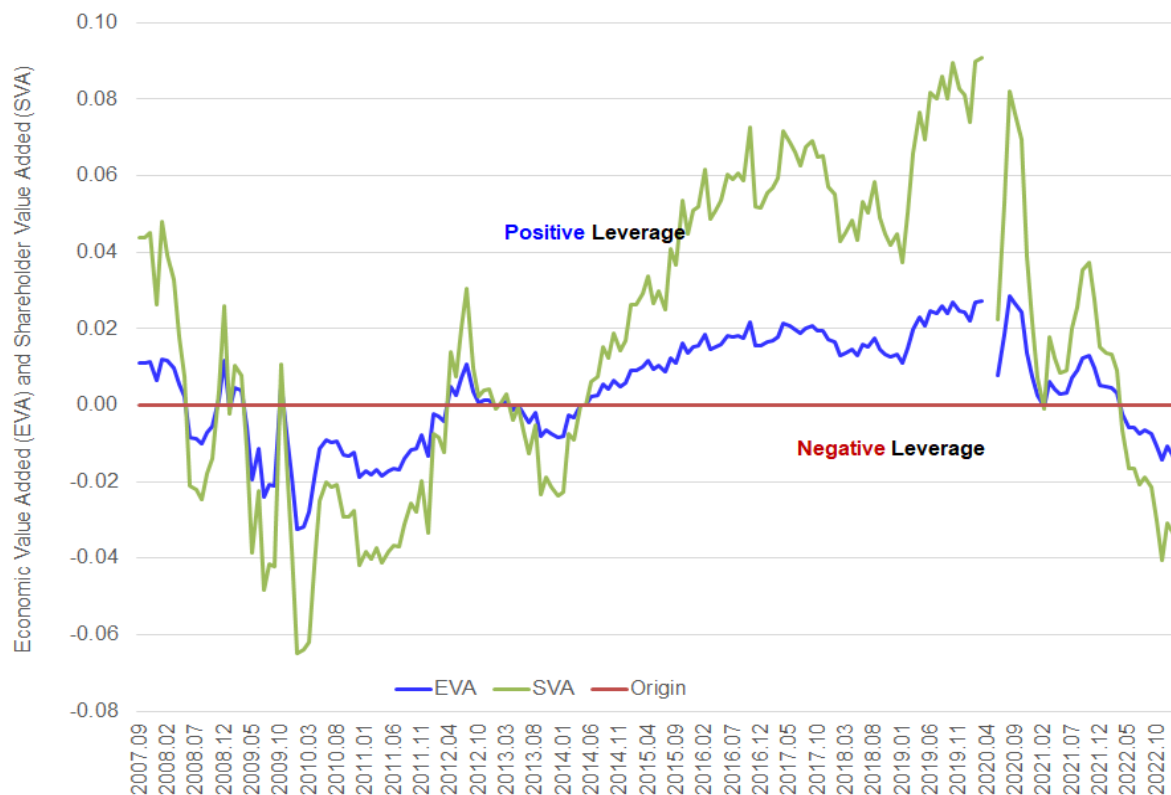
Sources: Cornell Center for Real Estate and Finance, Cushman Wakefield, NAREIT, MSCI-Real Capital Analytics, St Louis Fed

EXHIBIT 24

Standardized unexpected RevPAR (36-month moving average) vs. NAREIT lodging-price index
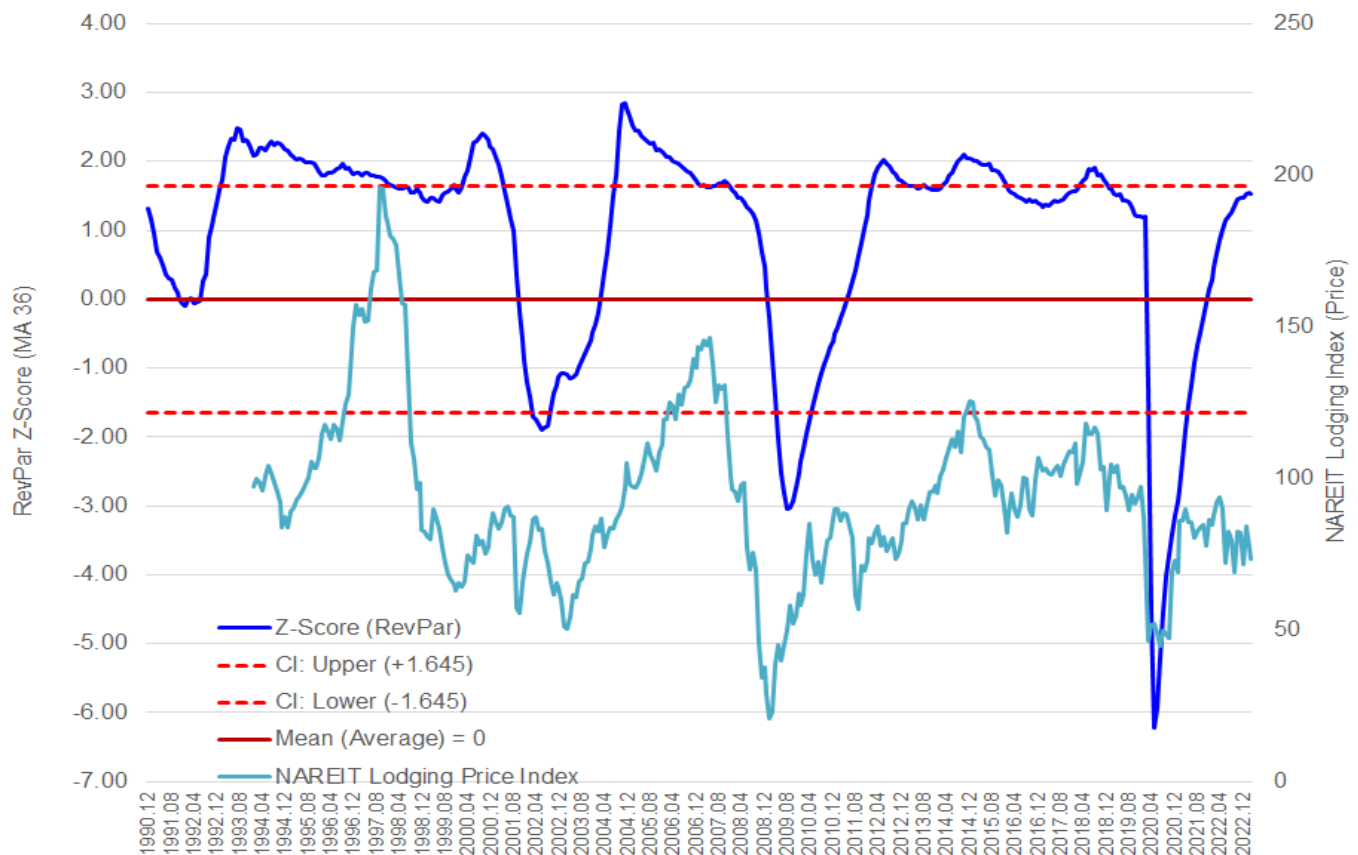
	ROIC	WACC	EVA	ROE	Cost of Equity	SVA
June 2022	8.27%	8.84%	-.57%	8.14%	9.78%	-1.64%
September 2022	8.41%	9.16%	-.75%	7.88%	10.03%	-2.15%
December 2022	8.50%	9.58%	-1.08%	7.34%	10.43%	-3.08%
February 2023	8.50%	9.45%	-.95%	7.98%	10.34%	-2.36%

Cost of borrowing exceeds return for hotels. Our economic value added (EVA) or economic profit is -.95 percent, while the shareholder value added stands at -2.36 percent. Both the EVA and SVA have remained negative since April 2022. This indicates that economic profit for hotels is negative—that is, the return on hotels is less than their total borrowing cost (EVA) and the return on equity for hotels is less than their cost of equity (SVA). Consequently, the return on hotels is driven mainly from anticipated future price gains. Exhibit 23 depicts the historical EVA and SVA hotel performance.

Our reading of the tea leaves suggests we should see slower to negative price momentum for both large and small hotels near term. As predicted in our prior report, the standardized unexpected RevPAR continued to exhibit positive price momentum, increasing from 1.47 in December 2022 to 1.53 in March 2023, as shown in Exhibit 24. The NAREIT Lodging Price Index increased from 71.82 last quarter to 73.36 this quarter. The standardized unexpected price of the NAREIT Lodging Index continues to hover around its standardized average of zero, as Exhibit 25 depicts. Based on a 12-month moving average of the NAREIT Lodging Price Index, we expect hotel prices based on repeat sales to decline near term.

EXHIBIT 25

Standardized unexpected NAREIT lodging/resort price index
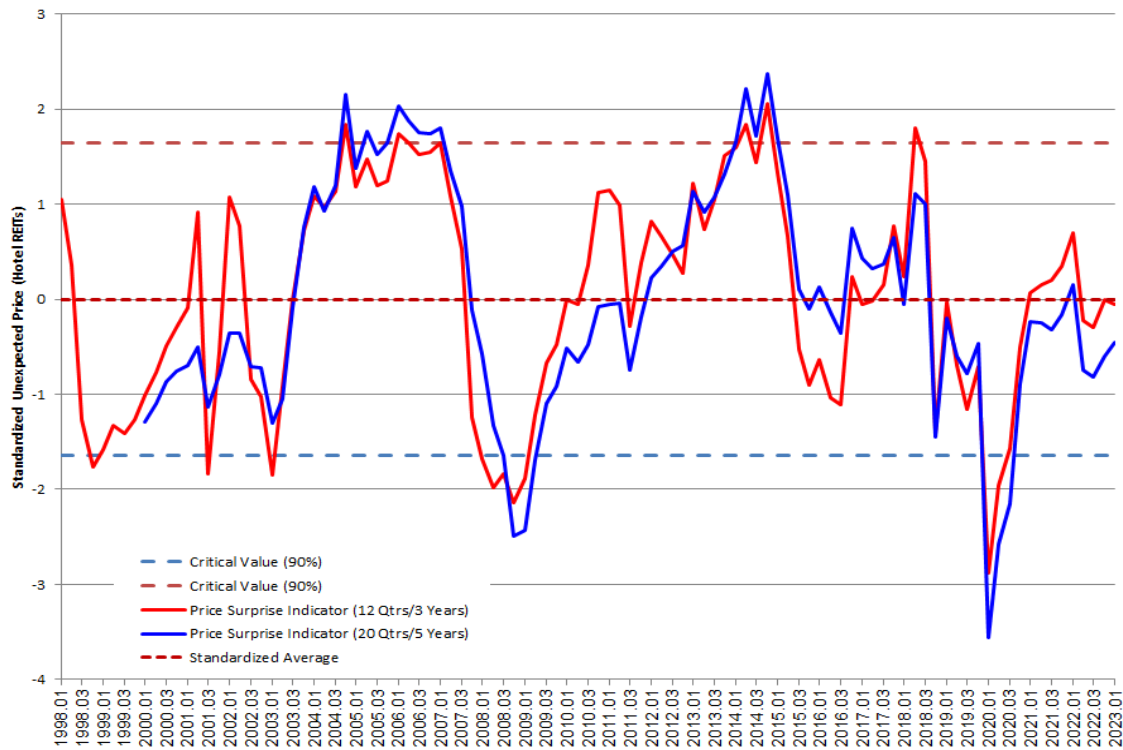
Sources: Cornell Center for Real Estate and Finance, NAREIT

EXHIBIT 26

Repeat sales index versus the architecture billings index
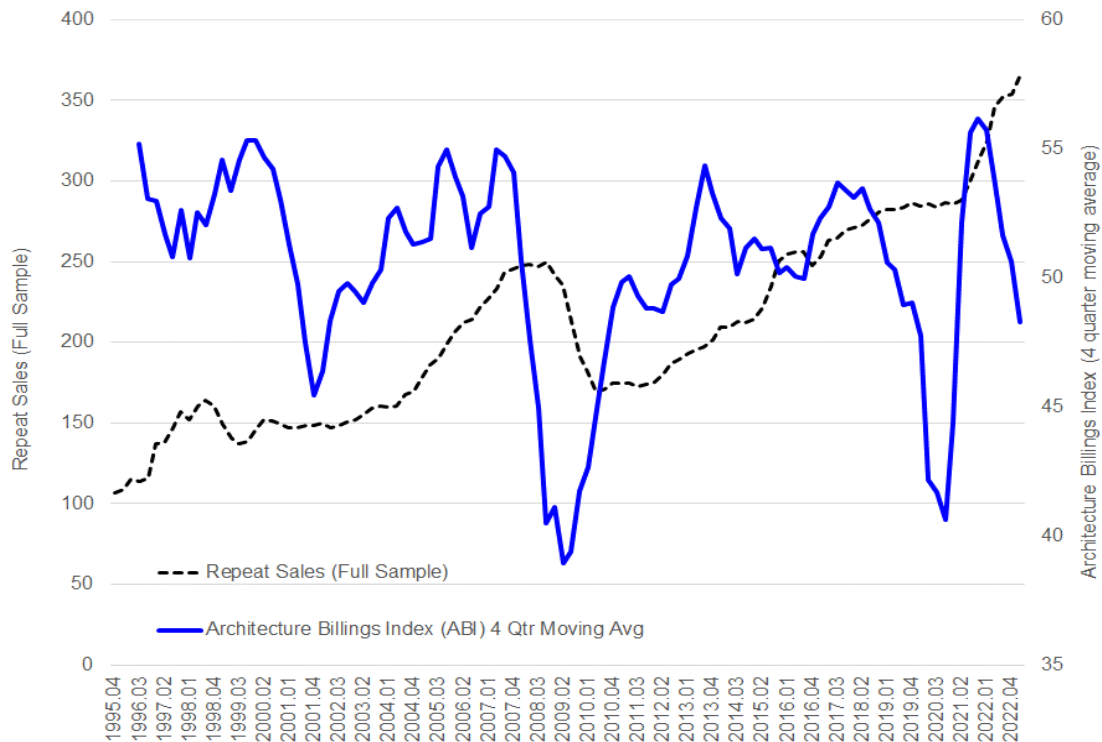
Note: ROIC is the return on invested capital (cap rate), WACC is the weighted average cost of capital, and ROE is the return on equity or cash on cash
Sources: American Institute of Architects, Cornell Center for Real Estate and Finance Center for Real Estate and Finance

EXHIBIT 27

Business confidence and high-price hotels index
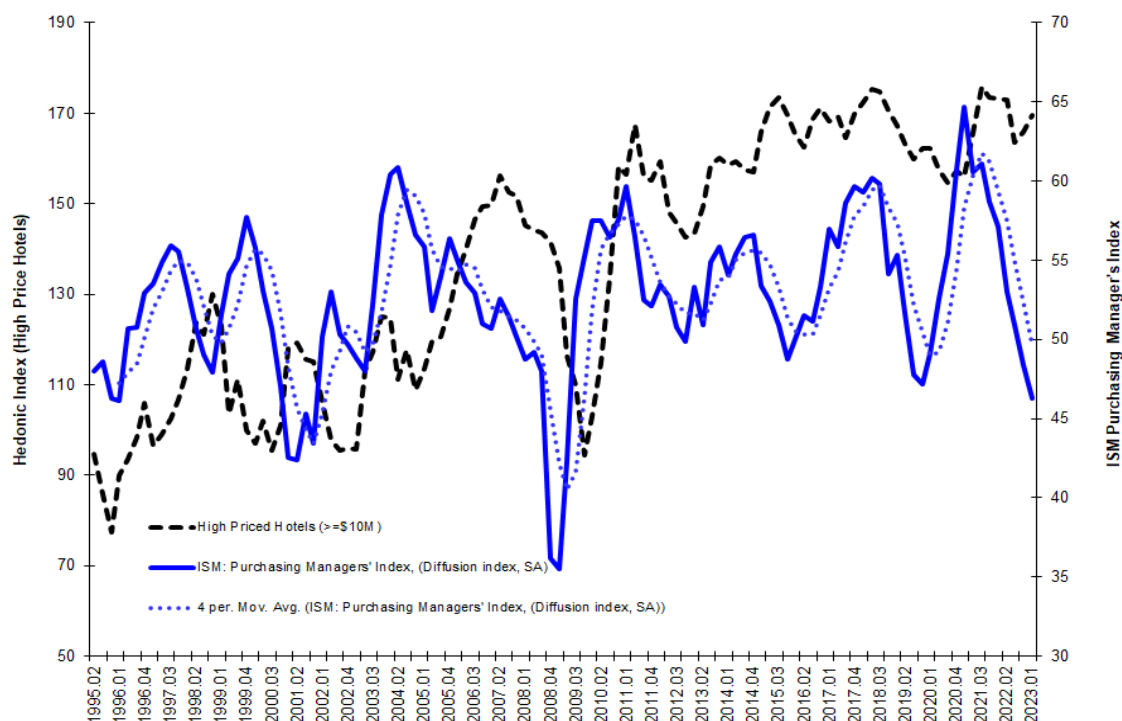
Sources: Cornell Center for Real Estate and Finance, Institute for Supply Management (ISM)

The architecture billings index (ABI) for commercial and industrial property shown in Exhibit 26 rose slightly (1.3%) this quarter to 45.8 from 45.2 (based on the February 2023 report).[6] However, on a year-over-year basis, it was down 17 percent, declining from 55.3 to 45.8. Based on the moving average of the ABI index, which trended down on both a quarter-over-quarter (-4.7%) and year-over-year (-13.4%) basis, we should expect price momentum to trend downwards in the next period.

The National Association of Purchasing Managers (NAPM) index shown in Exhibit 27, an indicator of anticipated business confidence, fell 4 percent this quarter compared to a 5-percent decline last quarter.[7] It also declined 19 percent year over year, down from the 17.5-percent year-over-year decrease in the prior period. Expect high-priced hotels to decline in price near term.

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[6] http://www.aia.org/practicing/economics/aias076265

[7] 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.

EXHIBIT 28

Consumer confidence and low-price hotels
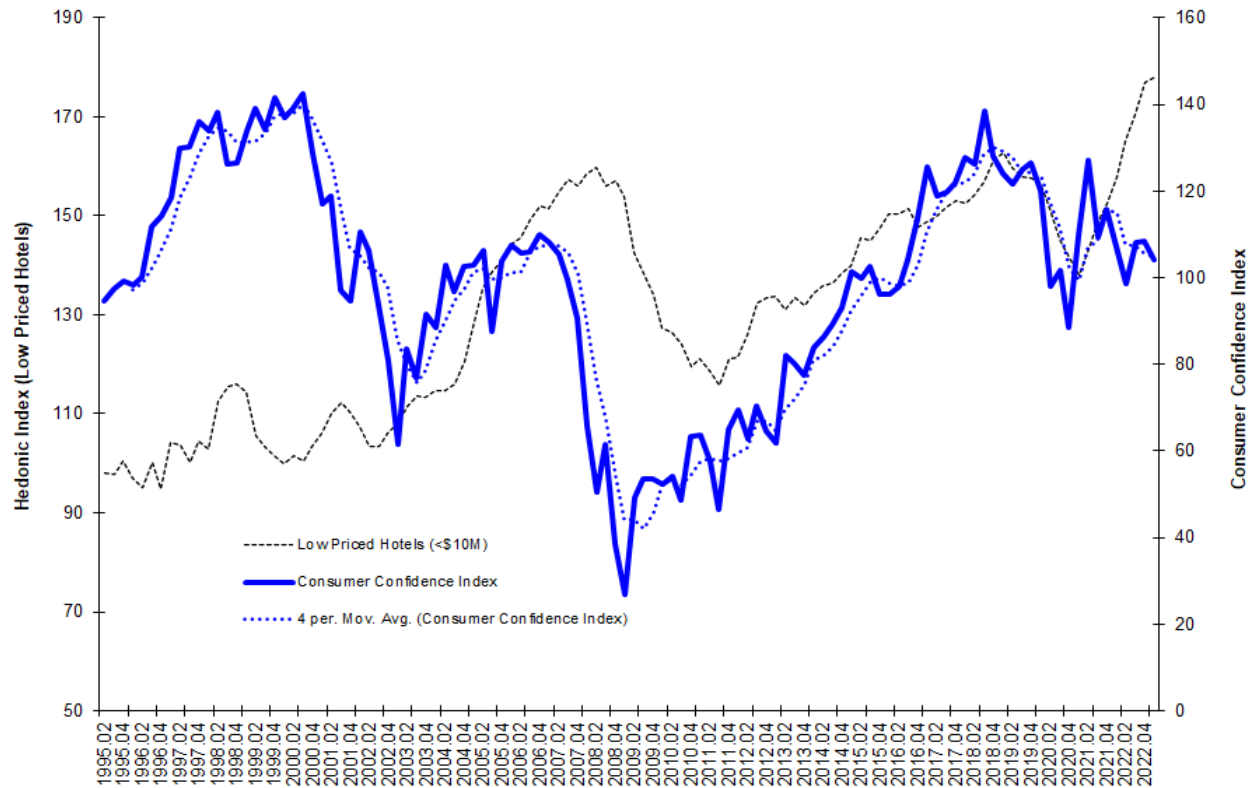
The Conference Board's Consumer Confidence Index graphed in Exhibit 28, our proxy for anticipated consumer demand for leisure travel and a leading indicator of the hedonic index for low price hotels, fell almost 4 percent this quarter. Expect low price hotels to decline in the near term based on a four-quarter moving average of the Consumer Confidence Index.

We also look at the expected growth rate in Wall

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 (cref.cornell.edu).

EXHIBIT **29**

Analysts' forecasts of hotel REIT earnings and revenue growth

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%	568.0%	-30.0%	2300.0%
2022Q2		393.8%	933.1%	1474.1%	-271.4%	5566.7%
2022Q3		137.7%	285.0%	487.9%	11.8%	1900.0%
2022Q4		57.1%	119.2%	164.5%	-69.6%	660.0%
2023Q1		35.3%	21.9%	185.0%	-575.0%	300.0%

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%
2022Q2		207.1%	580.2%	899.1%	114.6%	3350.0%
2022Q3		215.0%	574.8%	848.7%	112.1%	3100.0%
2022Q4		206.3%	568.5%	840.1%	108.8%	3050.0%
2023Q1		163.5%	481.9%	795.5%	-70.5%	2975.0%

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%
2022Q2		69.2%	70.5%	29.1%	14.0%	127.4%
2022Q3		39.3%	38.6%	14.3%	18.1%	65.2%
2022Q4		28.7%	27.6%	14.2%	-5.6%	58.6%
2023Q1		19.6%	21.0%	11.7%	-6.3%	47.8%

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%
2022Q2		50.2%	51.4%	15.0%	26.4%	76.0%
2022Q3		58.1%	59.8%	20.3%	29.6%	88.3%
2022Q4		61.2%	61.3%	20.8%	30.6%	91.0%
2023Q1		6.1%	5.7%	5.1%	-10.6%	11.4%

Note: Adjusted for CDOR (Condor) and CPLG (CorePoint Lodging) which are no longer publicly traded REITs

Street analysts' earnings (revenue) estimates for Hotel REITs both in terms on next quarter earnings per share (EPS) and annual EPS.[8] Exhibit 29 indicates that analysts are expecting the quarterly EPS growth rate to rise between 35 percent (median) and 22 percent (mean), while annual EPS growth rate is expected to rise between 163 percent (median) to 482 percent (mean). Exhibit 30 graphs the median hotel REIT expected EPS growth rates. Taken together, these exhibits show that the expected growth rate in hotel REIT EPS is increasing, albeit at a decreasing rate. Since analysts' estimates reflect the earnings guidance from management, this suggests that we should expect prices to rise at a decreasing rate, reflecting a moderating of earnings guidance near term. ■
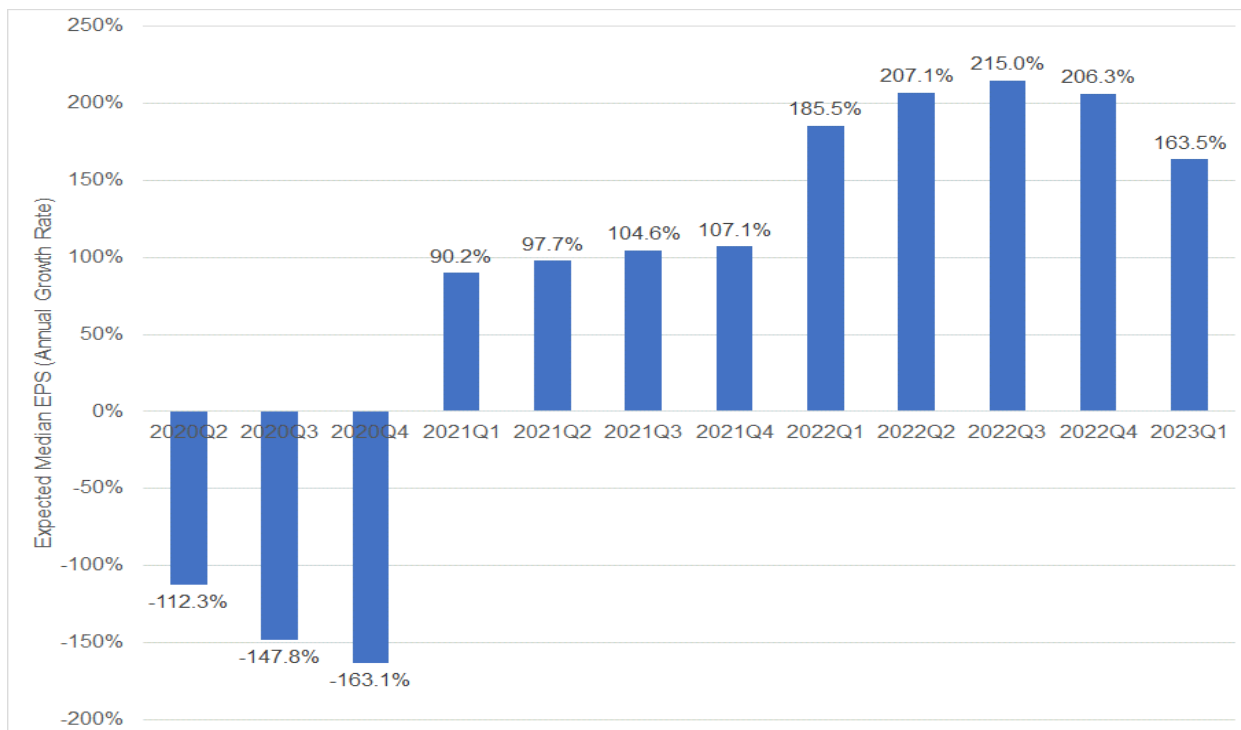
[8] We obtain the growth rate in earnings and revenue estimates from https://www.earningswhispers.com

EXHIBIT 30

Analysts' quarterly and annual REIT forecasts

Expected Median EPS: Quarterly Growth Rate
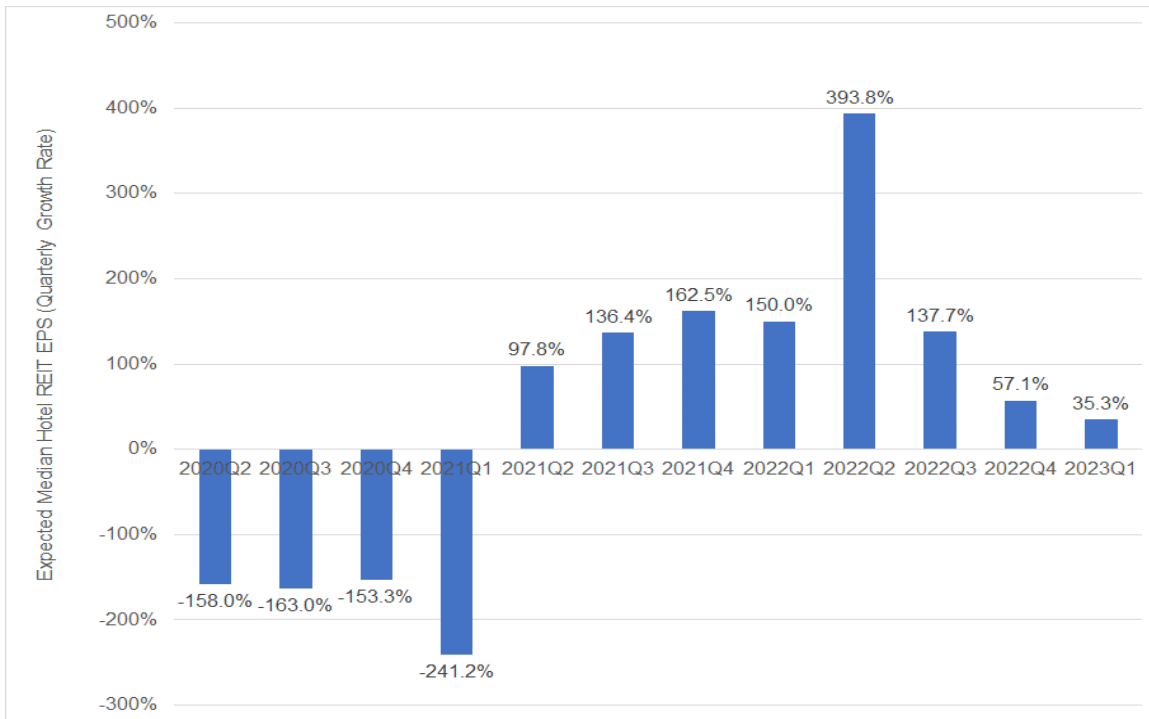
Expected Median EPS: Annual Growth Rate

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.

	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

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

Standard Deviation (σ) = 18.99

Standardized Unexp Price (SUP) = $\dfrac{(115.78-93.13)}{18.99}$ = 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-sale 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.* 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 earnings 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 (SVA) as a complementary metric to EVA so that readers can now compare the profitability of hotel real estate to investors' equity return.

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* 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.