

# **Cornell Hotel Indices: First Quarter 2021**

## *The Phoenix Is Rising*

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

**A**lthough the price of hotels along the east coast declined again this quarter the rate of decline has continued to lessen. Hotels in gateway cities reversed course, outperforming hotels in non-gateway cities. Our moving average trendlines and standardized unexpected price performance metrics indicate that both large and small hotels remain undervalued, pointing to a buy opportunity. There are indications that lenders appetite for hotels continues to increase. A reading of our tea leaves suggests that we should see positive price momentum for both large and small hotels. This is report number 38 of the index series.

## ABOUT THE AUTHORS

**Crocker H. Liu** is a professor of real estate at the School of Hotel Administration at Cornell where he holds the Robert A. Beck Professor of Hospitality Financial Management. He previously taught at New York University's Stern School of Business (1988-2006) and at Arizona State University's W.P. Carey School of Business (2006-2009) where he held the McCord Chair. His research interests are focused on issues in real estate finance, particularly topics related to agency, corporate governance, organizational forms, market efficiency and valuation. Liu's research has been published in the Review of Financial Studies, Journal of Financial Economics, Journal of Business, Journal of Financial and Quantitative Analysis, Journal of Law and Economics, Journal of Financial Markets, Journal of Corporate Finance, Review of Finance, Real Estate Economics, Journal of Urban Economics, Regional Science and Urban Economics, Journal of Real Estate Research and the Journal of Real Estate Finance and Economics. He is the former co-editor of Real Estate Economics, the leading real estate academic journal. He continues to be on the editorial board of Real Estate Economics. He is also an associate editor of Financial Review. He previously served on the editorial boards of the Journal of Real Estate Finance and Economics, the Journal of Property Research, and the Journal of Real Estate Finance. He is a past president of AREUEA (2019), the leading real estate academic organization. Professor Liu earned his BBA in real estate and finance from the University of Hawaii, an M.S. in real estate from Wisconsin under Dr. James A. Graaskamp, and a Ph.D. in finance and real estate from the University of Texas under Dr. Vijay S. Bawa.

**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 president of Real Capital Analytics Inc., an international research firm that publishes the Capital Trends Monthly. Real Capital Analytics provides real time data concerning the capital markets for commercial real estate and the values of commercial properties. Mr. White is a noted authority on the real estate capital markets with credits in the Wall Street Journal, Barron's, The Economist, Forbes, New York Times, Financial Times, among others. He is the 2014 recipient of the James D. Landauer/John R. White Award given by The Counselors of Real Estate. In addition, he was named one of National Real Estate Investor Magazine's "Ten to Watch" in 2005, Institutional Investor's "20 Rising Stars of Real Estate" in 2006, and Real Estate Forum's "10 CEOs to Watch" in 2007. Previously, Mr. White spent 14 years in the real estate investment banking and brokerage industry and has orchestrated billions of commercial sales, acquisitions, and recapitalizations. He was formerly a managing director and principal of Granite Partners LLC and spent nine years with Eastdil Realty in New York and London. Mr. White is a Counselor of Real Estate, a Fellow of the Royal Institution of Chartered Surveyors and a Fellow of the Homer Hoyt Institute. He serves on the board of directors for the Pension Real Estate Association and the advisory board for the Real Estate Research Institution. He is also a member of numerous industry organizations and a supporter of academic studies. Mr. White is a graduate of the McIntire School of Commerce at the University of Virginia. White's research has been published in the Journal of Real Estate Finance and Economics. Mr. White is a noted authority on the real estate capital markets with credits in The Wall Street Journal, Barron's, The Economist, Forbes, The New York Times, and the Financial Times, among others.

### Acknowledgments

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### Disclaimer

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## Cornell Hotel Indices: First Quarter 2021

# The Phoenix Is Rising

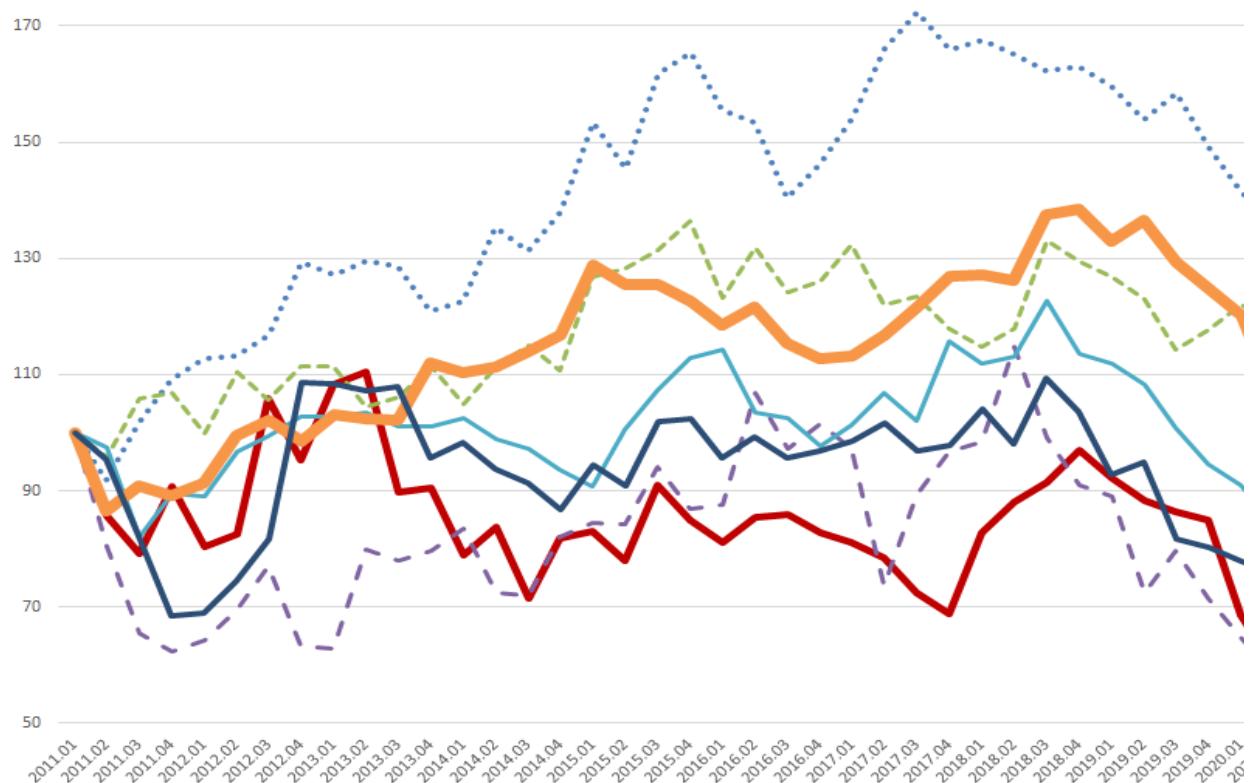
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### Analysis of Indices through Q1, 2021

**P**rice momentum for hotels in some regions turn positive quarter over quarter, with price decline lessening year over year. For the most recent quarter (2021Q1), as shown in Exhibit 1a and 1b, the entire eastern seaboard is still experiencing poor price performance, although the decline has lessened in general on a year-over-year basis. The results look better on a quarter-over-quarter basis, with 4 of the 8 regions exhibiting a positive price gain. The price of hotels in the Middle Atlantic region (hotels in New Jersey, New York, and Pennsylvania) declined 21.6 percent year over year compared to a 38.5-percent fall in the prior year-over-year period (Exhibit 1c). A similar situation existed for the New England region with hotel prices decreasing 21.7 percent year over year, compared to a 23-percent decline in the prior year-over-year period.

#### EXHIBIT 1A

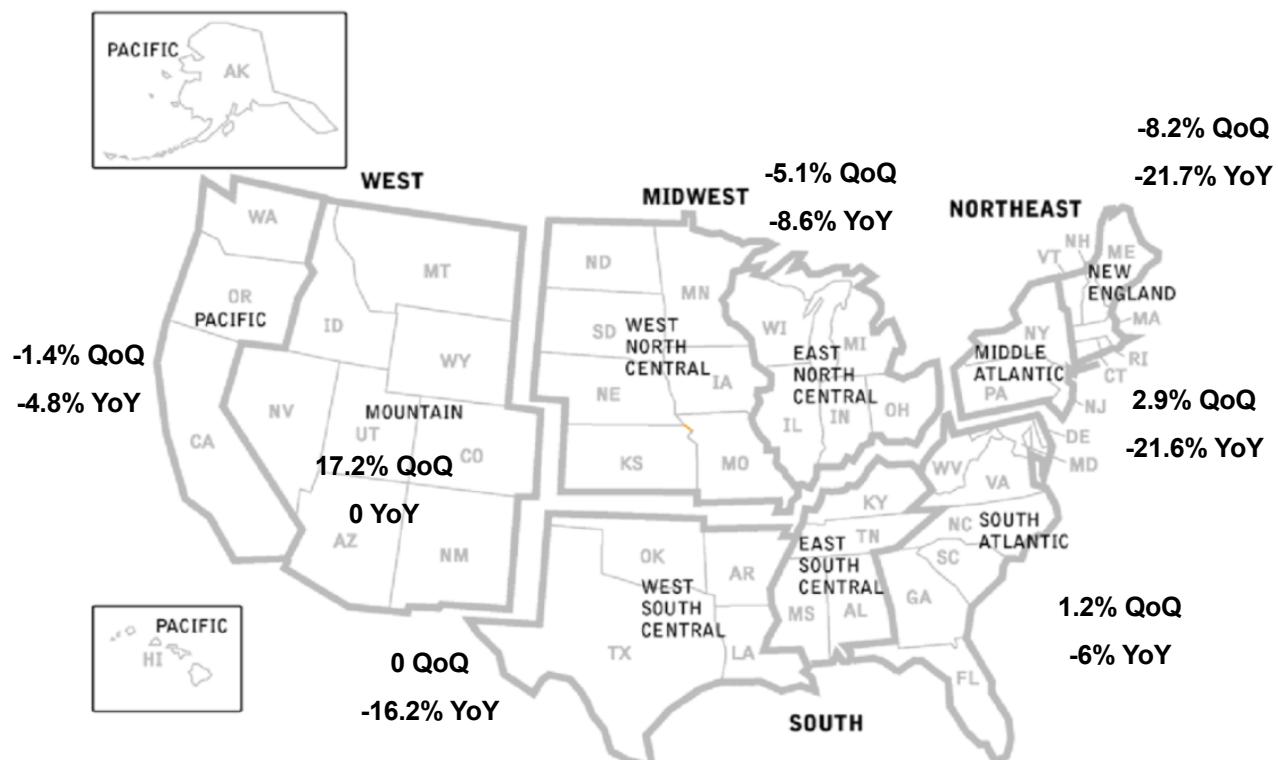
#### Time series hotel performance for seven regions (post-recession)



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

## EXHIBIT 1B

### Cross-section hotel performance for seven regions (post-recession)



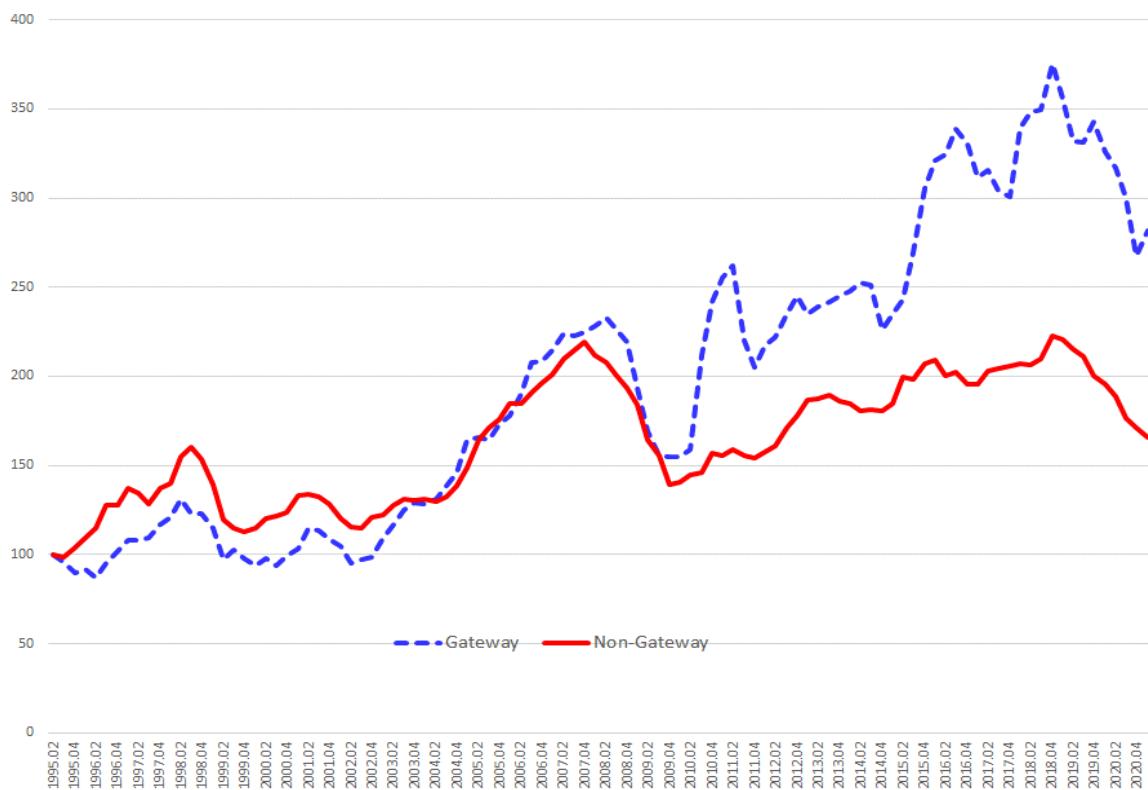
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

**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.

## EXHIBIT 1c

### Regional comparison of year-over-year and quarter-over-quarter indices

Y-o-Y	Midwest Index	MidAtlantic Index	Mountain Index	New England Index	Pacific Index	South Atlantic Index	West South Central Index
Current	-0.086	-0.216	-0.003	-0.217	-0.048	-0.162	-0.060
Prior	-0.088	-0.385	-0.117	-0.230	-0.072	-0.197	-0.098
Q-to-Q							
Current	-0.051	0.029	0.172	-0.082	-0.014	0.004	0.012
Prior	0.056	-0.022	-0.141	0.093	0.016	-0.002	-0.008

**EXHIBIT 2****Hotel performance for gateway cities versus non-gateway cities**

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

The third hardest hit was the South Atlantic region (hotels in Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia) with hotel prices falling 16.2 percent year over year compared to -19.7 percent in the prior year-over-year period. What is encouraging is the fact that the year-over-year price decline for all regions was relatively smaller for the current year-over-year period than for the prior year-over-year period.

**Hotels in gateway cities performed relatively better than those in non-gateway cities.** Exhibit 2 shows that the price performance of hotels in gateway cities reversed course, rising 5.1 percent this quarter compared to a 10.8-percent decline last quarter. In contrast, hotels in non-gateway cities continued to decline by about 3 percent this quarter, which is similar to the decline exhibited in the previous quarter. Year over year, the price of hotels in both gateway and non-gateway cities continued their descent this period. However, the 13.7-percent price decline for gateway cities was less than their 22-percent drop in the prior year-over-year period. In contrast, the 15.1-percent price drop for non-gateway city hotels was slightly more than the 14.7-percent decline in the previous year-over-year period.

**The median price of hotels continued to exhibit positive momentum quarter over quarter. Although negative**

**price momentum still exists on a year-over-year basis, the decline continues to lessen.** The median price based on all hotel transactions (both large hotels and small hotels combined) rose almost 10.5 percent from the previous quarter (\$3.975M versus \$3.6M) on weaker volume (216 transactions for 2021Q1 versus 247 transactions for 2020Q4), as reported in Exhibit 3. Year over year, the median price of hotels fell 3 percent, compared to -27 percent in the prior year-over-year period, on weaker volume (-29.4%). A comparison of large hotels relative to small hotels on a year-over-year basis reveals that the median price of large hotels increased 65 percent compared to a 5.5-percent rise in the prior period on stronger volume (15%), while the median price of small hotels experienced a 7.8-percent decline (compared to -18.2% in the previous quarter) on weaker volume (-2.8%).<sup>1</sup> In contrast, both large and small hotels continued to exhibit positive price momentum on a quarterly basis. Quarter over quarter, larger hotels increased 21 percent (compared to 64% last quarter) on lower transaction volume (39 sales this quarter compared to 45 sales last quarter). The median sale price of small hotels also experienced a relatively larger price increase (18.5% compared to 3.9% the previous quarter) on weaker volume (-12.4%;

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

## EXHIBIT 3A

## Transaction volume (observed) and median sale price

Year	Qtr	Full Sample		Big			Small			Gateway			No Gateway		
		Median Sale Price	Obs	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
1995	1	2357500	20	NA	0	0%	2357500	20	100%	3400000	7	35%	2100000	13	65%
1995	2	3150000	29	15712500	6	20.68%	2670000	23	79.31%	3800000	12	41.37%	2906150	17	58.62%
1995	3	2562500	44	12400000	4	9.09%	2378000	40	90.90%	3500000	20	45.45%	2000000	24	54.54%
1995	4	3400000	41	27750000	10	24.39%	2625000	31	75.60%	5075000	14	34.14%	3100000	27	65.85%
1996	1	2500000	39	14475000	8	20.51%	1700000	31	79.48%	2500000	13	33.33%	2687500	26	66.66%
1996	2	2925000	43	29150000	12	27.90%	2500000	31	72.09%	3200000	15	34.88%	2730000	28	65.11%
1996	3	6500000	57	17740000	20	35.08%	3000000	37	64.91%	5500000	25	43.85%	6890500	32	56.14%
1996	4	2735000	58	19000000	17	29.31%	2200000	41	70.68%	4650000	27	46.55%	2400000	31	53.44%
1997	1	5053250	74	16635500	23	31.08%	3500000	51	68.91%	6300000	29	39.18%	4075000	45	60.81%
1997	2	2862500	72	17750000	17	23.61%	2150000	55	76.38%	2445000	24	33.33%	3047350	48	66.66%
1997	3	3437500	90	19000000	21	23.33%	2400000	69	76.66%	5140000	38	42.22%	2550000	52	57.77%
1997	4	4330950	78	17000000	27	34.61%	2300000	51	65.38%	10435445	27	34.61%	3600000	51	65.38%
1998	1	4698800	92	20000000	31	33.69%	3100000	61	66.30%	6353000	33	35.86%	4600000	59	64.13%
1998	2	3630000	96	23765000	21	21.87%	3000000	75	78.12%	3998240	28	29.16%	3575000	68	70.83%
1998	3	2961059	92	16740000	12	13.04%	2690550	80	86.95%	2255000	30	32.60%	3365000	62	67.39%
1998	4	2550000	84	35000000	15	17.85%	2375000	69	82.14%	4225000	30	35.71%	2500000	54	64.28%
1999	1	2425000	88	24638095	10	11.36%	2125000	78	88.63%	3500000	32	36.36%	2300000	56	63.63%
1999	2	2100000	95	67000000	5	5.26%	1950000	90	94.73%	2067500	28	29.47%	2100000	67	70.52%
1999	3	2500000	99	20711100	10	10.10%	2130000	89	89.89%	1800000	19	19.19%	2522500	80	80.80%
1999	4	2440000	87	18190000	14	16.09%	2090000	73	83.90%	2210000	23	26.43%	2575000	64	73.56%
2000	1	2400000	110	23253895	10	9.09%	2300000	100	90.90%	2325000	44	40%	2428500	66	60%
2000	2	2450000	88	14500000	9	10.22%	2275000	79	89.77%	2325000	24	27.27%	2450000	64	72.72%
2000	3	2600000	95	20346875	16	16.84%	2250000	79	83.15%	2925000	24	25.26%	2525000	71	74.73%
2000	4	2475000	101	18050000	14	13.86%	2300000	87	86.13%	4500000	26	25.74%	2350000	75	74.25%
2001	1	2970650	104	28437500	18	17.30%	2422500	86	82.69%	2650000	29	27.88%	3000000	75	72.11%
2001	2	2800000	110	23795000	12	10.90%	2687150	98	89.09%	5825000	25	22.72%	2684300	85	77.27%
2001	3	2700000	87	16000000	6	6.89%	2500000	81	93.10%	3150000	21	24.13%	2600000	66	75.86%
2001	4	2400000	73	20500000	5	6.84%	2300000	68	93.15%	2800000	17	23.28%	2300000	56	76.71%
2002	1	2125000	70	11518052	5	7.14%	2000000	65	92.85%	1700000	17	24.28%	2200000	53	75.71%
2002	2	2400000	106	18125000	10	9.43%	2287500	96	90.56%	3125000	33	31.13%	2300000	73	68.86%
2002	3	2355400	81	12750000	5	6.17%	2237500	76	93.82%	2197500	24	29.62%	2470000	57	70.37%
2002	4	2907500	100	23500000	16	16%	2575000	84	84%	2907500	34	34%	2862500	66	66%
2003	1	2530000	94	13000000	9	9.57%	2425000	85	90.42%	3850000	21	22.34%	2425000	73	77.65%
2003	2	2750000	110	18500000	10	9.09%	2509500	100	90.90%	3160000	31	28.18%	2600000	79	71.81%
2003	3	3333000	141	14359286	28	19.85%	2600000	113	80.14%	3660000	45	31.91%	3032500	96	68.08%
2003	4	2600000	149	16375000	18	12.08%	2425000	131	87.91%	2950000	35	23.48%	2500000	114	76.51%
2004	1	2925000	166	22875250	24	14.45%	2536756	142	85.54%	3450000	41	24.69%	2894000	125	75.30%
2004	2	2700000	195	16280000	28	14.35%	2450000	167	85.64%	4500000	39	20%	2540000	156	80%
2004	3	3491122	216	19350000	45	20.83%	2610000	171	79.16%	4600000	51	23.61%	3306500	165	76.38%
2004	4	4000000	177	20475000	47	26.55%	3085500	130	73.44%	8850000	36	20.33%	3600000	141	79.66%

## EXHIBIT 3B

## Transaction volume (observed) and median sale price (continued)

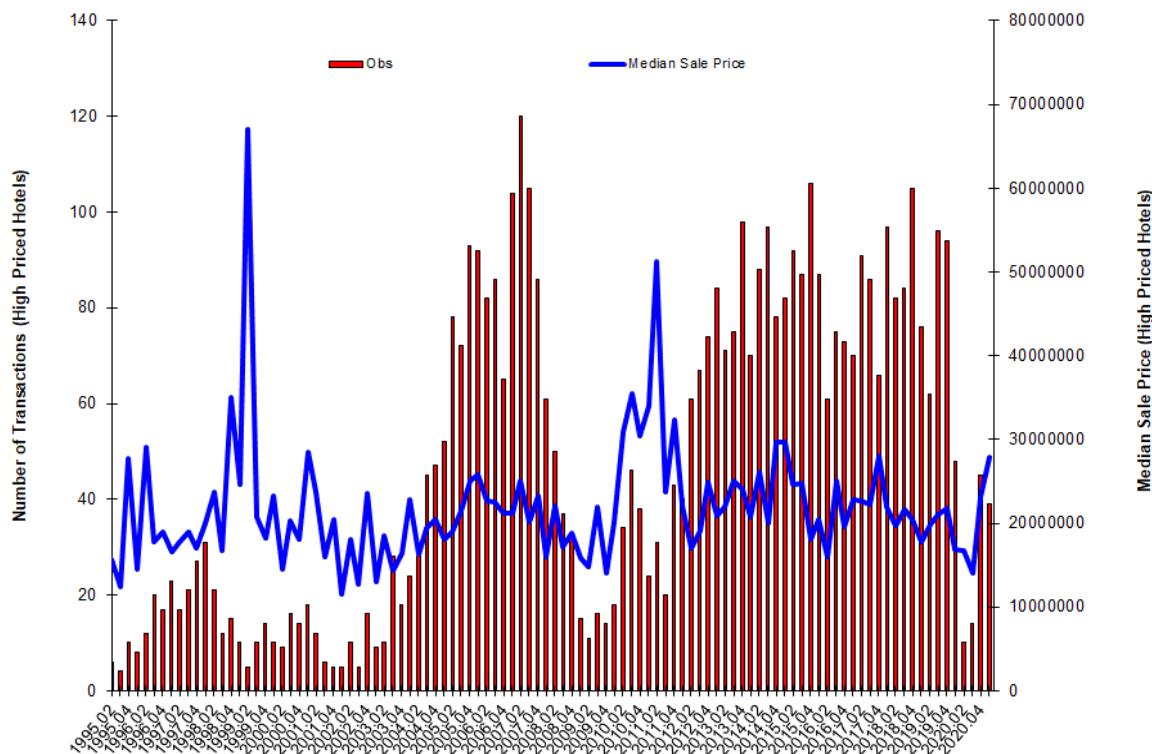
Year	Qtr	Full Sample			Big			Small			Gateway			No Gateway		
		Median Sale Price	Obs	Median Sale NA	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price
1995	1	2357500	20				2357500	20	100%	3400000	7	35%	2100000	13	65%	
1995	2	3150000	29	15712500	6	20.68%	2670000	23	79.31%	3800000	12	41.37%	2906150	17	58.62%	
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1996	3	6500000	57	17740000	20	35.08%	3000000	37	64.91%	5500000	25	43.85%	6890500	32	56.14%	
1996	4	2735000	58	19000000	17	29.31%	2200000	41	70.68%	4650000	27	46.55%	2400000	31	53.44%	
1997	1	5053250	74	16635500	23	31.08%	3500000	51	68.91%	6300000	29	39.18%	4075000	45	60.81%	
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1998	2	3630000	96	23765000	21	21.87%	3000000	75	78.12%	3998240	28	29.16%	3575000	68	70.83%	
1998	3	2961059	92	16740000	12	13.04%	2690550	80	86.95%	2255000	30	32.60%	3365000	62	67.39%	
2005	1	4330000	231	18100000	52	22.51%	3300000	179	77.48%	6687500	40	17.31%	3800000	191	82.68%	
2005	2	4566250	316	18956812	78	24.68%	3255150	238	75.31%	6475000	68	21.51%	4385000	248	78.48%	
2005	3	4150000	273	21475000	72	26.37%	3100000	201	73.62%	6100000	61	22.34%	3750000	212	77.65%	
2005	4	4425000	300	25000000	93	31%	3150000	207	68.99%	11200000	65	21.66%	4000000	235	78.33%	
2006	1	5300000	301	25750000	92	30.56%	3800000	209	69.43%	18000000	64	21.26%	4943744	237	78.73%	
2006	2	4750000	313	22750000	82	26.19%	3500000	231	73.80%	6175000	56	17.89%	4500000	257	82.10%	
2006	3	5000000	285	22500000	86	30.17%	3650000	199	69.82%	7000000	59	20.70%	4705399	226	79.29%	
2006	4	4587500	248	21200000	65	26.20%	3550000	183	73.79%	8093750	56	22.58%	4270000	192	77.41%	
2007	1	6155805	286	21225000	104	36.36%	3700000	182	63.63%	9500000	63	22.02%	5700000	223	77.97%	
2007	2	5650000	385	25125000	120	31.16%	3750000	265	68.83%	9000000	67	17.40%	5450000	318	82.59%	
2007	3	5450000	330	20100161	105	31.81%	3900000	225	68.18%	8325000	53	16.06%	5011554	277	83.93%	
2007	4	4680000	249	23250000	86	34.53%	3150000	163	65.46%	9375000	36	14.45%	4500000	213	85.54%	
2008	1	5000000	255	16000000	61	23.92%	3985000	194	76.07%	5990000	46	18.03%	4650000	209	81.96%	
2008	2	5062900	228	22150000	50	21.92%	3890000	178	78.07%	8725000	38	16.66%	4800000	190	83.33%	
2008	3	4190500	172	17133333	37	21.51%	3350000	135	78.48%	5500000	27	15.69%	3900000	145	84.30%	
2008	4	4050000	159	18850000	32	20.12%	3500000	127	79.87%	4972500	27	16.98%	3920000	132	83.01%	
2009	1	4150000	81	15800000	15	18.51%	3600000	66	81.48%	7375000	16	19.75%	3700000	65	80.24%	
2009	2	3090231	86	14722500	11	12.79%	2864310	75	87.20%	5410250	16	18.60%	3000000	70	81.39%	
2009	3	3400000	90	22000000	16	17.77%	3000000	74	82.22%	4608750	14	15.55%	3195271	76	84.44%	
2009	4	3562500	84	14100000	14	16.66%	3010250	70	83.33%	4520000	12	14.28%	3400000	72	85.71%	
2010	1	3900000	89	20162500	18	20.22%	2825000	71	79.77%	8450000	15	16.85%	3825000	74	83.14%	
2010	2	3700000	138	30833449	34	24.63%	3000000	104	75.36%	15400000	34	24.63%	3100000	104	75.36%	
2010	3	4912500	120	35500000	46	38.33%	2850000	74	61.66%	25000000	37	30.83%	3117000	83	69.16%	
2010	4	3988800	100	30353182	38	38%	2420000	62	62%	38500000	23	23%	3265000	77	77%	
2011	1	4200000	85	34050000	24	28.23%	2795500	61	71.76%	12275000	15	17.64%	3775000	70	82.35%	
2011	2	4200000	97	51200000	31	31.95%	2250000	66	68.04%	15600000	23	23.71%	3175000	74	76.28%	
2011	3	3350000	73	23772500	20	27.39%	2800000	53	72.60%	3700000	17	23.28%	3275000	56	76.71%	
2011	4	5000000	157	32400000	43	27.38%	3229250	114	72.61%	10950000	34	21.65%	4300000	123	78.34%	
2012	1	5233961	131	22100000	40	30.53%	3275000	91	69.46%	13837500	28	21.37%	4200000	103	78.62%	
2012	2	4000000	209	17000000	61	29.18%	2779500	148	70.81%	15900000	22	10.52%	3700000	187	89.47%	
2012	3	7000000	169	19100000	67	39.64%	2720250	102	60.35%	16050000	32	18.93%	5250000	137	81.06%	
2012	4	5622500	207	24866613	74	35.74%	3125000	133	64.25%	16174794	39	18.84%	5070000	168	81.15%	

**EXHIBIT 3c**

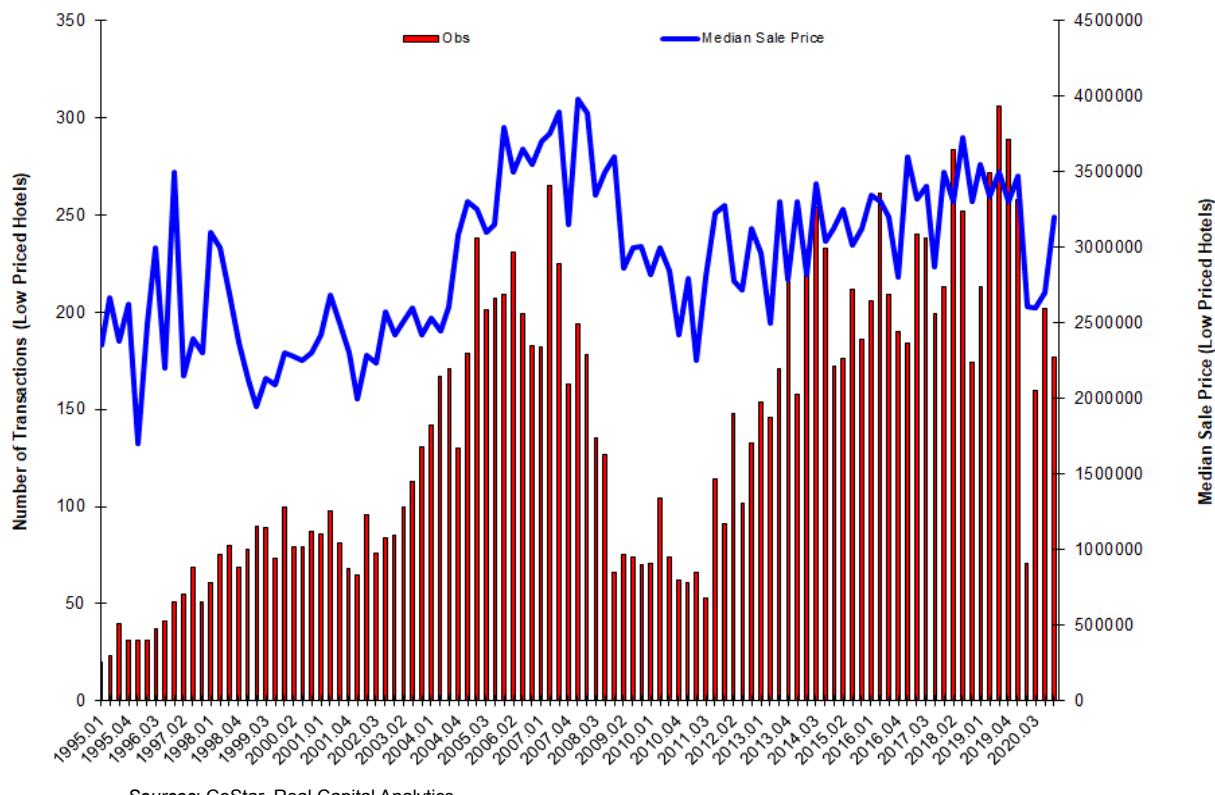
**Transaction volume (observed) and median sale price (concluded)**

Year	Qtr	Full Sample			Big			Small			Gateway			No Gateway		
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1995	4	3400000	41	27750000	10	24.39%	2625000	31	75.60%	5075000	14	34.14%	3100000	27	65.85%	
1996	1	2500000	39	14475000	8	20.51%	1700000	31	79.48%	2500000	13	33.33%	2687500	26	66.66%	
1996	2	2925000	43	29150000	12	27.90%	2500000	31	72.09%	3200000	15	34.88%	2730000	28	65.11%	
1996	3	6500000	57	17740000	20	35.08%	3000000	37	64.91%	5500000	25	43.85%	6890500	32	56.14%	
1996	4	2735000	58	19000000	17	29.31%	2200000	41	70.68%	4650000	27	46.55%	2400000	31	53.44%	
1997	1	5053250	74	16635500	23	31.08%	3500000	51	68.91%	6300000	29	39.18%	4075000	45	60.81%	
1997	2	2862500	72	17750000	17	23.61%	2150000	55	76.38%	2445000	24	33.33%	3047350	48	66.66%	
1997	3	3437500	90	19000000	21	23.33%	2400000	69	76.66%	5140000	38	42.22%	2550000	52	57.77%	
1997	4	4330950	78	17000000	27	34.61%	2300000	51	65.38%	10435445	27	34.61%	3600000	51	65.38%	
1998	1	4698800	92	20000000	31	33.69%	3100000	61	66.30%	6353000	33	35.86%	4600000	59	64.13%	
1998	2	3630000	96	23765000	21	21.87%	3000000	75	78.12%	3998240	28	29.16%	3575000	68	70.83%	
1998	3	2961059	92	16740000	12	13.04%	2690550	80	86.95%	2255000	30	32.60%	3365000	62	67.39%	
2005	1	4330000	231	18100000	52	22.51%	3300000	179	77.48%	6687500	40	17.31%	3800000	191	82.68%	
2005	2	4566250	316	18956812	78	24.68%	3255150	238	75.31%	6475000	68	21.51%	4385000	248	78.48%	
2005	3	4150000	273	21475000	72	26.37%	3100000	201	73.62%	6100000	61	22.34%	3750000	212	77.65%	
2005	4	4425000	300	25000000	93	31%	3150000	207	68.99%	11200000	65	21.66%	4000000	235	78.33%	
2006	1	5300000	301	25750000	92	30.56%	3800000	209	69.43%	18000000	64	21.26%	4943744	237	78.73%	
2006	2	4750000	313	22750000	82	26.19%	3500000	231	73.80%	6175000	56	17.89%	4500000	257	82.10%	
2006	3	5000000	285	22500000	86	30.17%	3650000	199	69.82%	7000000	59	20.70%	4705399	226	79.29%	
2006	4	4587500	248	21200000	65	26.20%	3550000	183	73.79%	8093750	56	22.58%	4270000	192	77.41%	
2007	1	6155805	286	21225000	104	36.36%	3700000	182	63.63%	9500000	63	22.02%	5700000	223	77.97%	
2007	2	5650000	385	25125000	120	31.16%	3750000	265	68.83%	9000000	67	17.40%	5450000	318	82.59%	
2007	3	5450000	330	20100161	105	31.81%	3900000	225	68.18%	8325000	53	16.06%	5011554	277	83.93%	
2007	4	4680000	249	23250000	86	34.53%	3150000	163	65.46%	9375000	36	14.45%	4500000	213	85.54%	
2013	1	5997496	238	20927291	84	35.29%	2962500	154	64.70%	6500000	51	21.42%	5575000	187	78.57%	
2013	2	4700000	217	22000000	71	32.71%	2500000	146	67.28%	16000000	38	17.51%	4200000	179	82.48%	
2013	3	5260855	246	25000000	75	30.48%	3300000	171	69.51%	9949500	35	14.22%	4750000	211	85.77%	
2013	4	4537500	314	24000000	98	31.21%	2790000	216	68.78%	13500000	55	17.51%	4000000	259	82.48%	
2014	1	5625000	228	20750000	70	30.70%	3300000	158	69.29%	8825900	59	25.87%	5000000	169	74.12%	
2014	2	4300000	320	26125000	88	27.50%	2818750	232	72.50%	11200000	59	18.43%	3700000	261	81.56%	
2014	3	5500000	351	20000000	97	27.63%	3425000	254	72.36%	10567078	66	18.80%	5000000	285	81.19%	
2014	4	4500000	311	29625000	78	25.08%	3040000	233	74.91%	8200000	73	23.47%	3950000	238	76.52%	
2015	1	5752500	254	29750000	82	32.28%	3125000	172	67.71%	8280000	47	18.50%	5500000	207	81.49%	
2015	2	6350000	268	24575000	92	34.32%	3250000	176	65.67%	18765000	46	17.16%	5612500	222	82.83%	
2015	3	5050000	299	24800000	87	29.09%	3012500	212	70.90%	12100000	53	17.72%	4275000	246	82.27%	
2015	4	6650000	292	18080000	106	36.30%	3125000	186	63.69%	14415000	51	17.46%	5400000	241	82.53%	
2016	1	5600000	293	20375000	87	29.69%	3350000	206	70.30%	13600000	45	15.35%	5275000	248	84.64%	
2016	2	4100000	322	16000000	61	18.94%	3300000	261	81.05%	11600000	48	14.90%	3725000	274	85.09%	
2016	3	4862500	284	25000000	75	26.40%	3200000	209	73.59%	24500000	34	11.97%	4362500	250	88.02%	
2016	4	4000000	263	19480000	73	27.75%	2800000	190	72.24%	13352600	28	10.64%	3664706	235	89.35%	
2017	1	5275000	254	22880750	70	27.55%	3600000	184	72.44%	14726254	28	11.02%	4950000	226	88.97%	
2017	2	5100000	331	22660000	91	27.49%	3325000	240	72.50%	16450000	37	11.17%	4462500	294	88.82%	
2017	3	5000000	324	22250000	86	26.54%	3403000	238	73.45%	22250000	38	11.72%	4500000	286	88.27%	
2017	4	4500000	265	28000000	66	24.90%	2875000	199	75.09%	12208000	26	9.81%	4250000	239	90.18%	
2018	1	5550000	310	21882400	97	31.29%	3500000	213	68.70%	14750000	40	12.90%	5000000	270	87.09%	
2018	2	4805200	366	19750000	82	22.40%	3300000	284	77.59%	17625000	40	10.92%	4300000	326	89.07%	
2018	3	5150000	336	21632500	84	25%	3730000	252	75%	13342500	22	6.54%	5000000	314	93.45%	
2018	4	6490000	279	20500000	105	37.63%	3300000	174	62.36%	14440000	33	11.82%	5580556	246	88.17%	
2019	1	5350000	289	17802698	76	26.29%	3550000	213	73.70%	15750000	34	11.76%	4800000	255	88.23%	
2019	2	4015500	334	19848485	62	18.56%	3335000	272	81.43%	6300000	35	10.47%	3900000	299	89.52%	
2019	3	4707500	402	21000000	96	23.88%	3500000	306	76.11%	15850000	42	10.44%	4362500	360	89.55%	
2019	4	4950000	383	21855650	94	24.54%	3300000	289	75.45%	11000000	35	9.13%	4600000	340	88.77%	
2020	1	4100000	306	16900000	48	15.68%	3470000	258	84.31%	6313000	22	7.18%	4095000	284	92.81%	
2020	2	3400000	81	16787500	10	12.34%	2610000	71	87.65%	6700000	7	8.64%	3380000	74	91.35%	
2020	3	2825000	174	14062500	14	8.04%	2600000	160	91.95%	7219750	12	6.89%	2668750	162	93.10%	
2020	4	3600000	247	23053000	45	18.21%	2700500	202	81.78%	10725000	36	14.57%	3000000	211	85.42%	
2021	1	3975750	216	27900000	39	18.05%	3200000	177	81.94%	11431000	20	9.25%	3754500	196	90.74%	

Source: Cornell Center for Real Estate and Finance

**EXHIBIT 4****Median sale price and number of sales (hotels with sale prices of \$10 million or more)**

Sources: CoStar, Real Capital Analytics

**EXHIBIT 5****Median sale price and number of sales (hotels with sale prices less than \$10 million)**

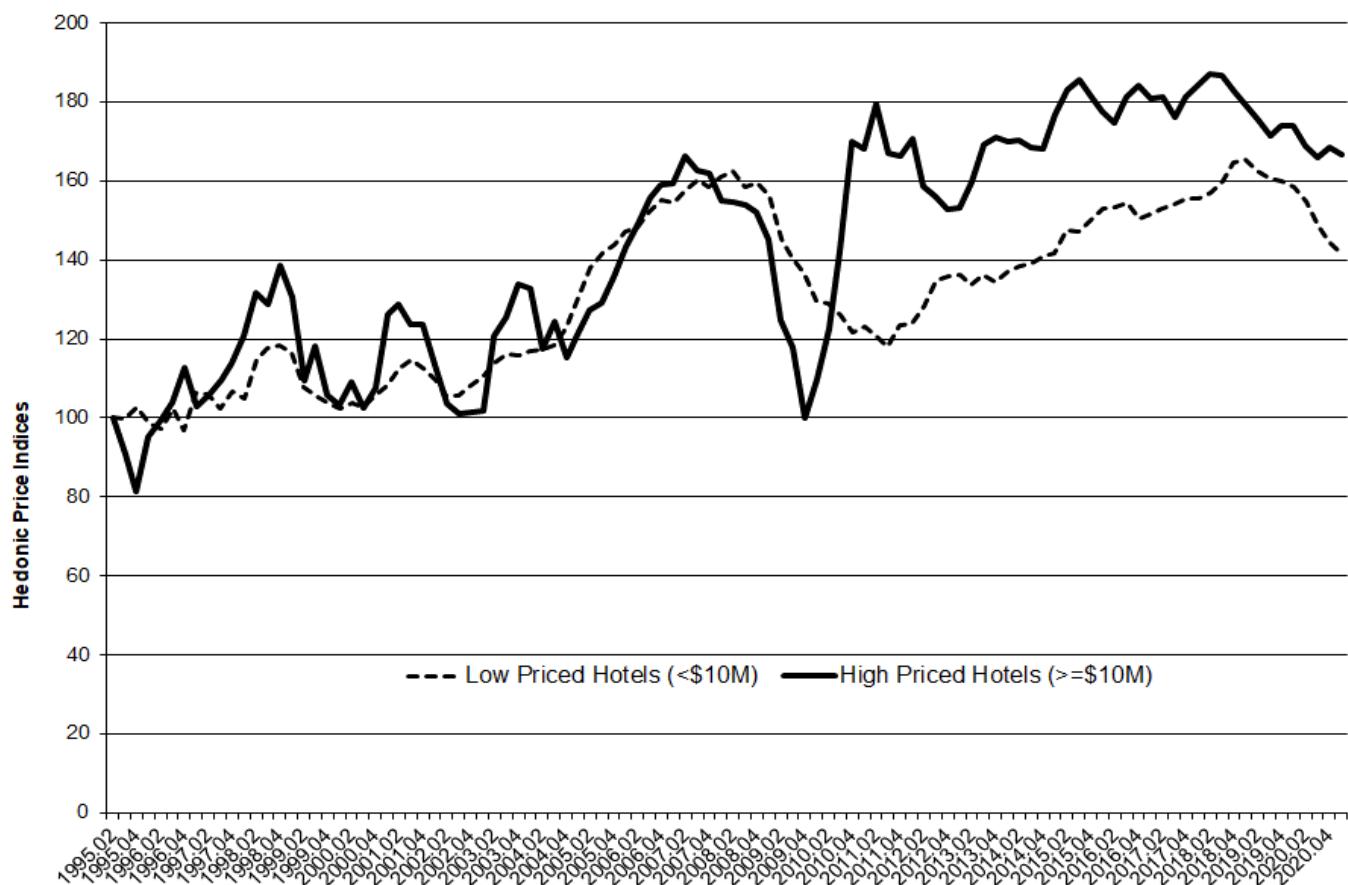
Sources: CoStar, Real Capital Analytics

**EXHIBIT 6**
**Hotel indices through 2021, quarter 1**

	Low Priced Hotels (<\$10M)	High Priced Hotels (>= \$10M)	Non Gateway Index	Repeat Sales Index	Index Value		Low Priced Hotels (<\$10M)	High Priced Hotels (>= \$10M)	Non Gateway Index	Repeat Sales Index	Index Value	
YrQtr						YrQtr						
1995.02	97.9322	93.83469	82.6049	102.65	65.132	NA	2008.01	157.844	145.64	175.104	233.939	156.57
1995.03	97.8526	85.18062	81.4886	98.467	67.536	NA	2008.02	159.003	145.0308	171.536	238.828	157.15
1995.04	100.521	76.38209	85.6219	91.7547	69.16	NA	2008.03	155.391	144.404	165.574	231.859	155.96
1996.01	96.8434	89.22153	90.2717	94.3747	70.853	NA	2008.04	156.296	142.6198	159.994	224.946	158.01
1996.02	95.0767	93.14698	94.6463	89.1278	73.246	NA	2009.01	153.189	136.3469	151.996	198.981	153.51
1996.03	100.089	97.69106	105.5	97.3811	72.186	NA	2009.02	142.186	116.9177	135.833	173.491	149.35
1996.04	94.8101	105.7374	105.604	104.365	73.408	NA	2009.03	137.897	110.6212	128.292	159.753	136.32
1997.01	104.221	96.60251	113.076	110.596	86.42	NA	2009.04	133.626	93.92911	115.111	159.029	122.14
1997.02	103.778	99.16136	111.275	111.139	88.917	NA	2010.01	126.842	103.0406	115.86	159.128	115.57
1997.03	100.333	102.5853	106.087	112.185	95.109	NA	2010.02	126.197	115.056	119.269	163.158	107.71
1997.04	104.406	106.9193	113.085	119.653	101.35	NA	2010.03	123.587	133.6081	120.631	217.736	107.61
1998.01	102.826	113.322	115.559	124.031	97.826	NA	2010.04	119.169	159.6077	129.818	247.8	109.29
1998.02	112.354	123.5594	128.08	134.681	103.26	NA	2011.01	120.752	157.729	128.499	262.193	109.68
1998.03	115.072	121.0142	132.131	125.891	105.24	NA	2011.02	118.184	168.5317	131.001	269.073	110.27
1998.04	115.777	129.936	126.612	125.901	102.96	NA	2011.03	115.494	156.7782	128.524	225.678	109.49
1999.01	114.197	122.6789	114.913	118.082	96.477	NA	2011.04	120.876	156.0554	127.133	210.26	111.56
1999.02	105.721	102.711	99.0082	99.7725	90.926	NA	2012.01	121.177	160.3326	130.425	223.165	112.03
1999.03	103.346	110.9542	94.7209	105.579	89.014	NA	2012.02	125.673	148.7529	133.124	228.004	116.1
1999.04	101.714	99.33588	93.4394	100.428	89.697	NA	2012.03	131.994	146.5398	141.324	241.374	120.54
2000.01	100.118	96.99834	94.7687	96.5668	94.548	100.19	2012.04	132.912	143.3054	147.214	251.873	121.91
2000.02	101.598	102.4217	99.1386	100.633	98.309	100.19	2013.01	133.378	143.7675	154.003	241.268	123.56
2000.03	100.577	96.05582	100.659	95.982	97.56	94.413	2013.02	130.952	149.9016	154.746	245.271	125.59
2000.04	103.306	101.1333	102.338	101.914	97.025	94.416	2013.03	133.27	158.8417	156.277	248.413	126.13
2001.01	106.093	118.5877	109.694	105.698	95.552	91.8	2013.04	131.76	160.4439	153.907	251.593	128.19
2001.02	110.066	120.9948	110.253	117.59	95.275	89.856	2014.01	134.076	159.4207	152.684	254.337	133.93
2001.03	112.234	116.1783	109.239	116.401	96.374	93.61	2014.02	135.56	159.8524	149.437	259.099	131.53
2001.04	110.411	116.0873	105.978	111.793	96.114	90.105	2014.03	136.19	158.2371	149.521	257.886	133.89
2002.01	107.476	106.4131	99.3729	107.558	96.555	92.637	2014.04	138.155	157.6282	149.478	232.051	134.2
2002.02	103.533	97.17206	95.6482	97.4348	94.556	91.217	2015.01	138.953	166.1054	152.482	241.309	136.56
2002.03	103.406	94.91583	94.9487	99.8319	95.08	89.445	2015.02	144.594	171.9247	164.703	249.143	141.74
2002.04	106.114	95.26418	100.068	100.97	96.217	94.623	2015.03	144.041	174.0938	163.613	276.322	150.22
2003.01	108.226	95.47235	100.858	112.364	97.813	94.664	2015.04	146.961	170.2407	171.133	313.875	159.94
2003.02	111.718	113.4059	105.252	120.203	100.21	98.616	2016.01	150.028	166.725	172.921	329.633	162.77
2003.03	113.774	117.7138	108.27	128.338	101.43	102.05	2016.02	150.143	163.9262	165.455	333.096	161.94
2003.04	113.301	125.6543	107.817	132.485	102.8	105.04	2016.03	151.12	170.2219	167.196	347.945	161.34
2004.01	114.57	124.7156	108.553	131.737	102.29	106.1	2016.04	147.501	172.672	161.776	339.019	156.42
2004.02	114.709	110.3903	107.214	134.561	102.59	106.8	2017.01	148.568	169.625	161.307	320.041	161.03
2004.03	115.993	116.8124	109.639	142.127	107.02	111.87	2017.02	149.708	170.264	167.567	323.893	168.65
2004.04	120.379	108.0684	114.382	149.917	108.11	111.57	2017.03	151.101	165.4202	168.919	311.862	169.58
2005.01	127.594	113.5276	122.865	168.799	112.55	115.26	2017.04	152.513	170.0128	169.825	308.872	173.41
2005.02	135.372	119.6193	135.922	170.418	118.22	121.72	2018.01	152.324	172.7348	171.198	348.692	172.93
2005.03	138.725	121.0491	141.34	168.429	121.54	124.53	2018.02	153.925	175.714	170.779	357.415	175.07
2005.04	140.823	127.2448	145.296	177.876	126.9	130.67	2018.03	156.631	175.1817	173.276	358.883	179.63
2006.01	144.133	134.6657	152.38	182.449	131.59	135.75	2018.04	161.351	171.605	184.03	385.491	181.45
2006.02	145.312	139.9946	152.319	195.492	134.75	138.62	2019.01	162.127	168.0962	182.433	365.2	184.43
2006.03	149.275	146.2604	157.75	213.542	136.55	140.37	2019.02	159.063	164.5244	177.692	340.499	184.42
2006.04	151.893	149.3928	161.907	214.309	141.07	142.97	2019.03	157.314	161.0338	174.4	340.222	185.09
2007.01	151.25	149.5594	165.986	220.008	144.51	145.61	2019.04	156.812	163.2528	165.586	351.719	186.44
2007.02	154.361	156.2154	173.494	230.258	148.44	149.45	2020.01	155.362	163.4173	161.451	334.635	183.53
2007.03	156.987	152.6607	177.162	228.252	154.29	156.92	2020.02	151.66	158.4687	155.956	325.695	183.18
2007.04	155.349	151.9022	180.888	230.769	155.3	158.76	2020.03	145.63	155.8005	145.758	307.923	181.07
							2020.04	141.825	158.2714	141.236	274.707	182.4
							2021.01	138.821	156.3847	137.093	288.842	181.74
												184.93

Source: Cornell Center for Real Estate and Finance

## Hedonic hotel indices for large and small hotel transactions

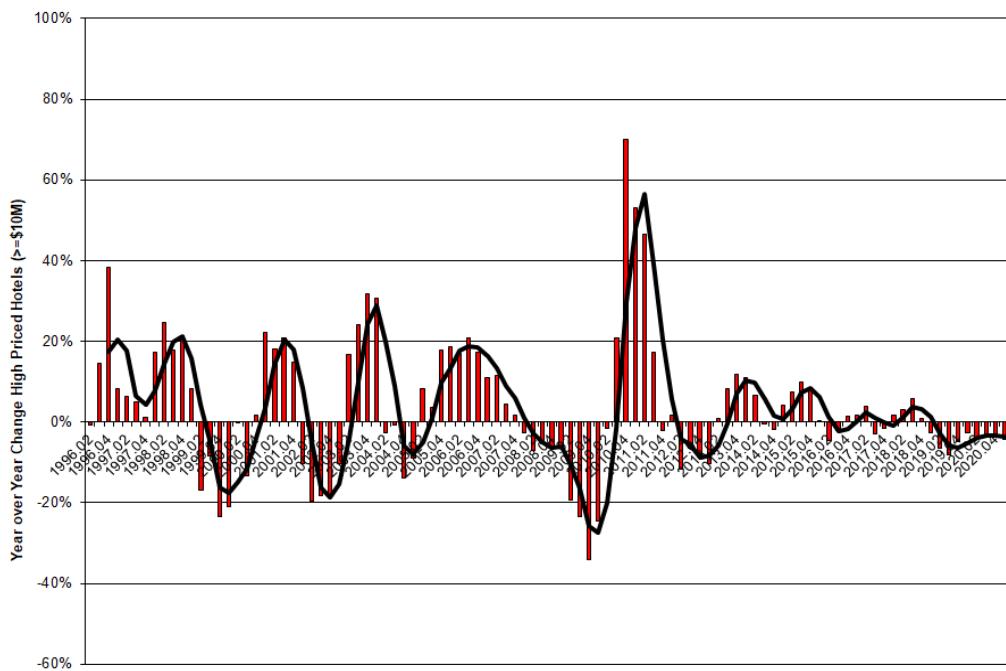


**Sources:** Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

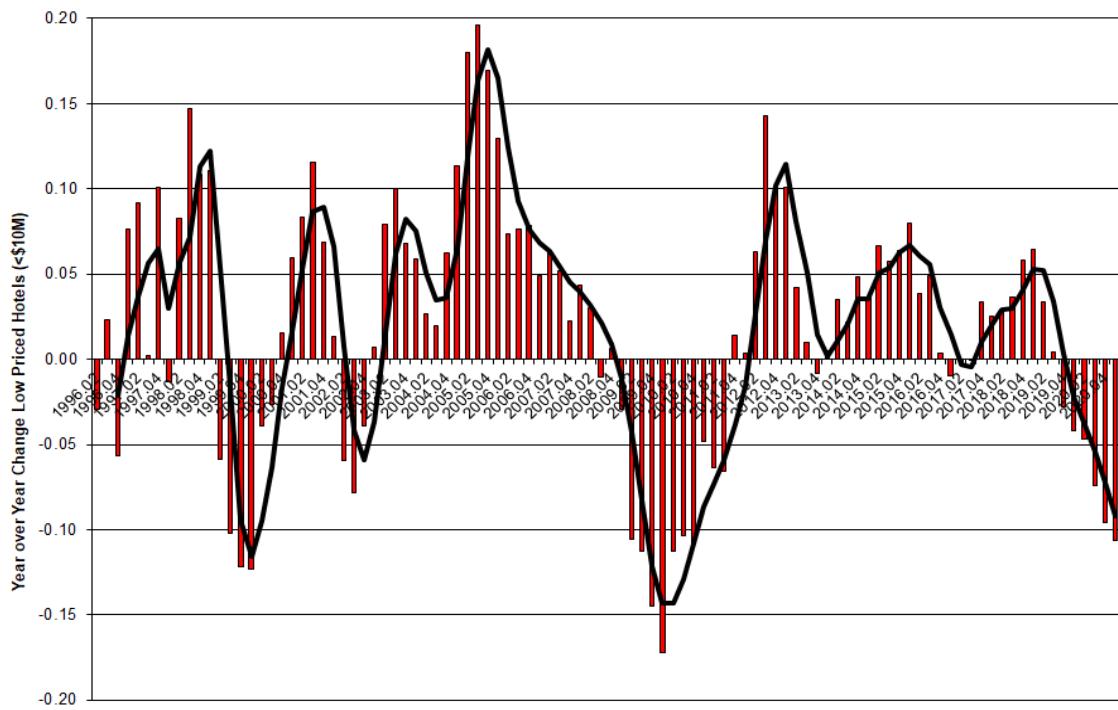
177 sales this quarter compared to 202 sales in the previous quarter). Exhibit 4 and Exhibit 5 show this year-over-year trend in the number of transactions.

**Our moving average trendlines indicate that both large and small hotels continue to remain undervalued (a buy opportunity). Our Standardized Unexpected Price (SUP) Performance metrics validate that both types of hotels are either at or near their pricing trough.** Exhibit 7, which graphs the prices reported in Exhibit 6, shows that

the price of large hotels fell 1.2 percent this quarter reversing their 1.6-percent rise last quarter. Smaller hotels fell 2 percent this quarter continuing their decline from last quarter (-2.6%). Year over year, Exhibit 8 shows that large hotels fell 4.3 percent (2020Q1-2021Q1) compared to -3.1 percent in the prior year-over-year period (2019Q4-2020Q4). Exhibit 9 shows that smaller hotels declined 10.7 percent year over year (2020Q1-2021Q1) compared to a 9.5-percent fall in the prior period (2019Q4-2020Q4).

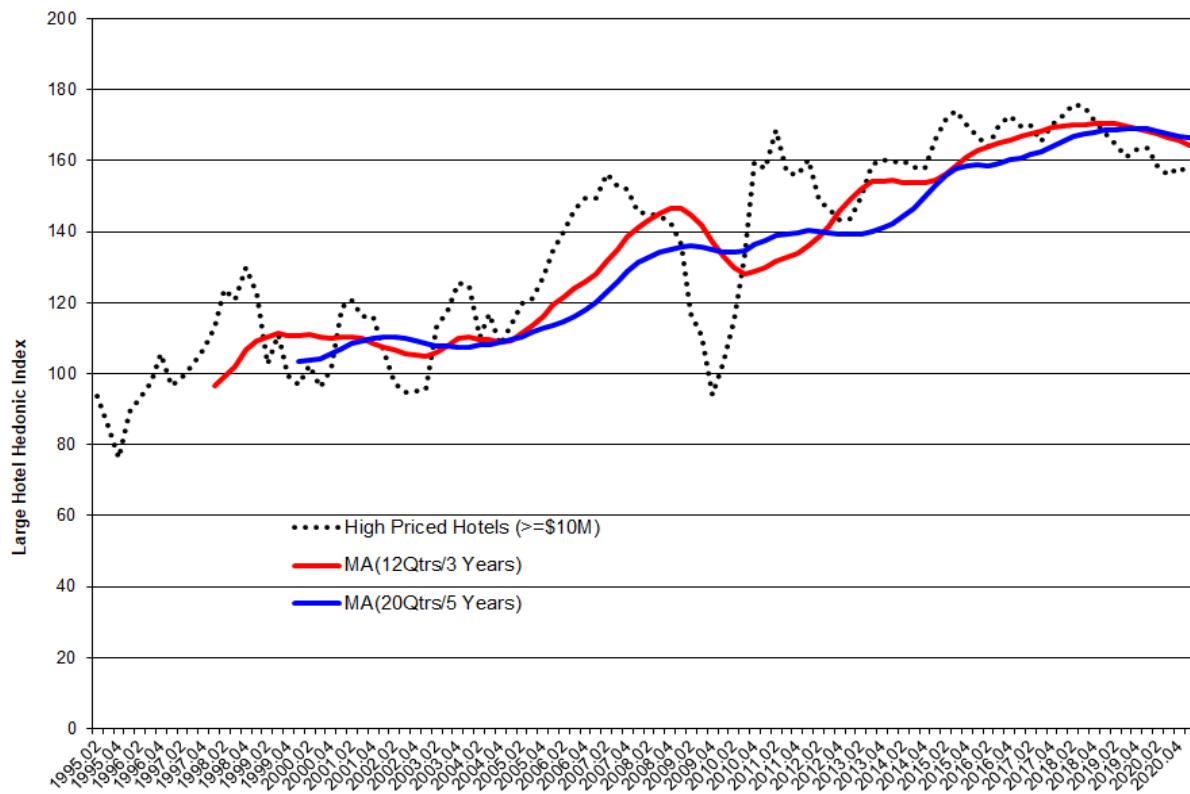
**EXHIBIT 8****Year-over-year change in large-hotel index with a moving average trendline**

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

## Moving average trendline for large hotel index



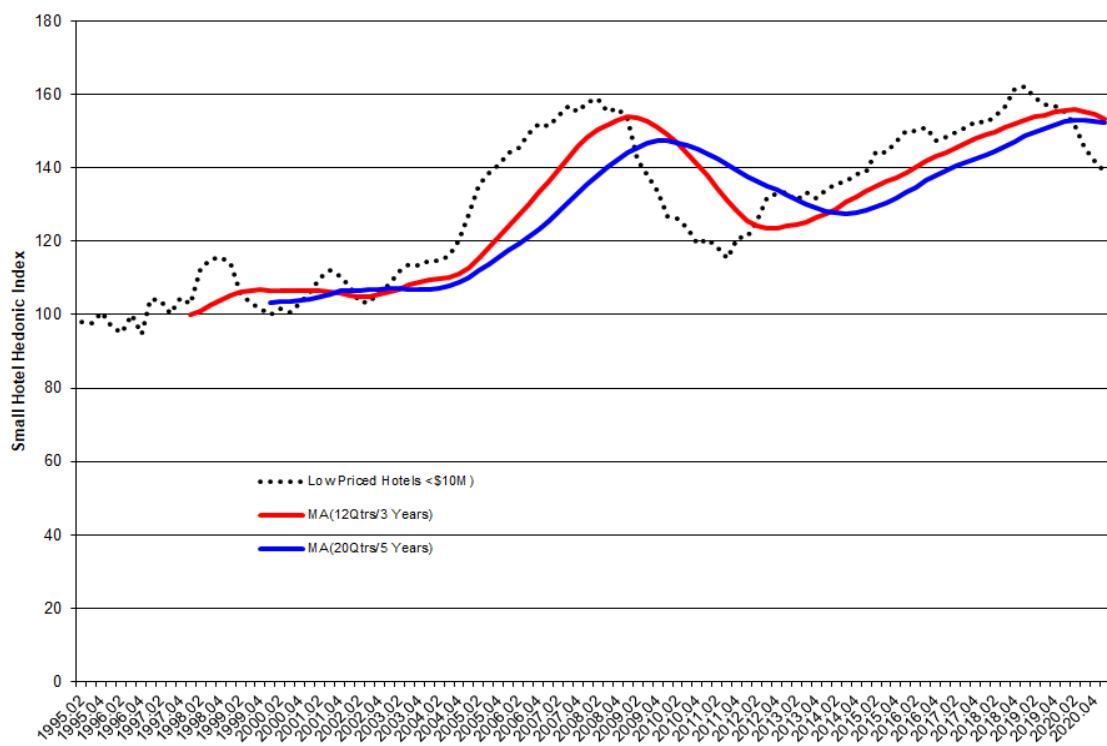
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

### About the Cornell Hotel Indices

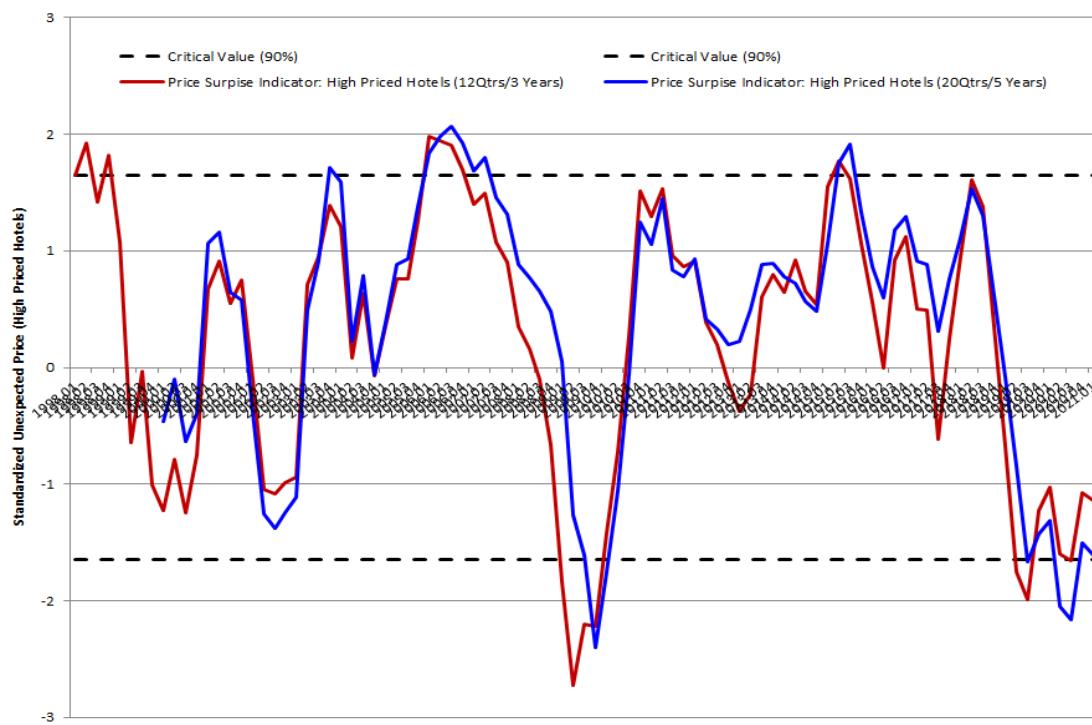
In our inaugural issue of the Cornell Hotel Index series, we introduced three quarterly metrics to monitor real estate activity in the hotel market. These are a large hotel index (hotel transactions of \$10 million or more), a small hotel index (hotels under \$10 million), and a repeat sales index (RSI) that tracks actual hotel transactions. These indices are constructed using the CoStar and RCA commercial real estate databases. The large and small hotel indices are similar in nature and construction to the consumer price index (CPI), while the repeat sale hotel index is analogous to the retail concept of same store sales. Using a similar logic process for hotels, we compare the sales and resales of the same hotel over time for that index. All three measures provide a more accurate representation of the current hotel real estate market conditions than does reporting the average transaction prices, because the average-price index doesn't account for differences in the quality of the hotels, which also is averaged. A more detailed description of these indices is found in the first edition of this series, "Cornell Real Estate Market Indices," which is available at no charge from the Cornell Center for Real Estate and Finance. Starting with our 2018Q1 issue, we introduced the Gateway Cities Index as a new metric in our hotel analytics arsenal.\*1 In 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.

Due to the continuing pandemic, several of the data sources that we use in our analysis have either not updated their statistics or have switched to providing talking points. As such we have suspended our commentary on the Economic Value Added and have shortened our analysis of the real-estate capital market from a debt perspective.

\* 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, or relatively stronger performance in terms of revenue per available room than other top cities that are not gateways.

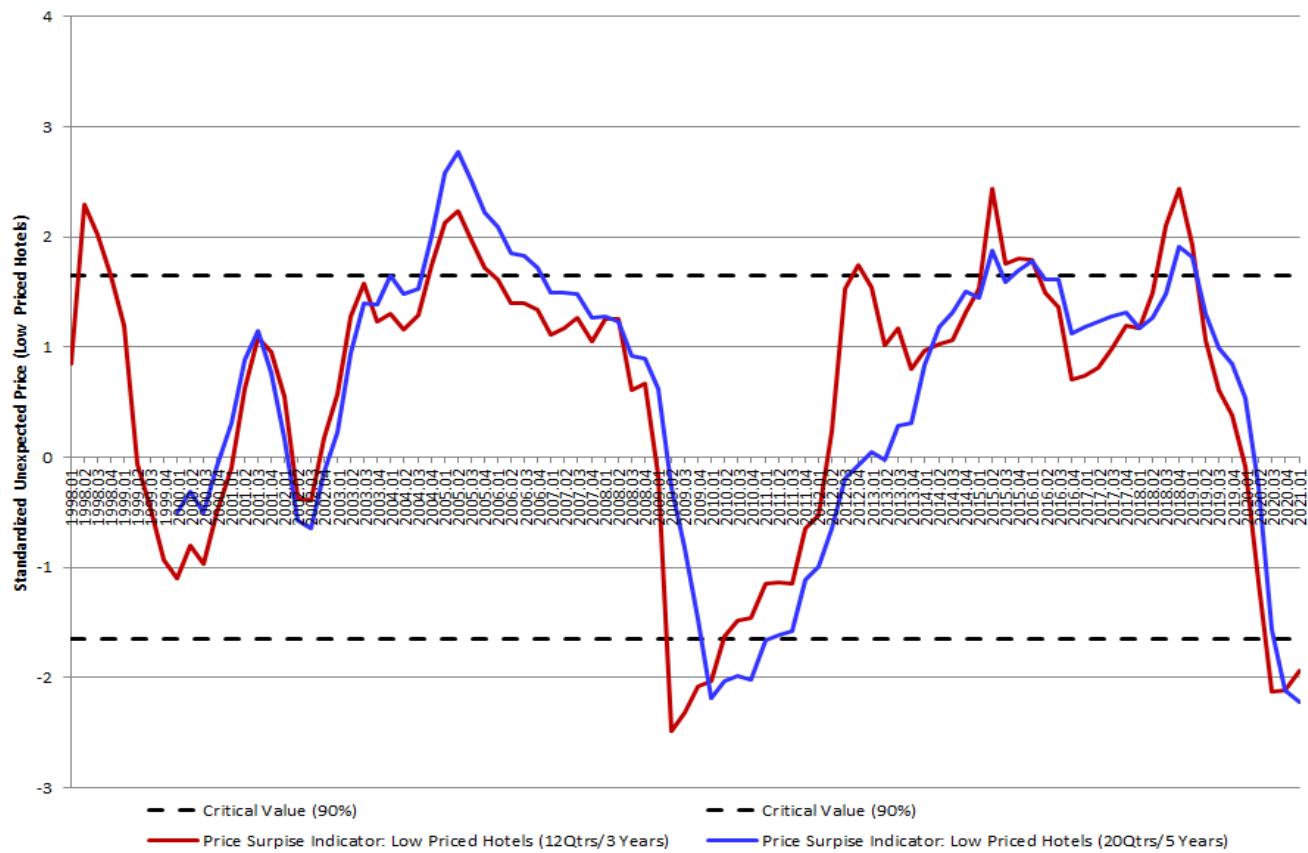
**EXHIBIT 11****Moving average trend line for small hotel index**

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

**EXHIBIT 12****Standardized Unexpected Price (SUP) for large hotel index**

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

## Standardized Unexpected Price (SUP) for small hotel index



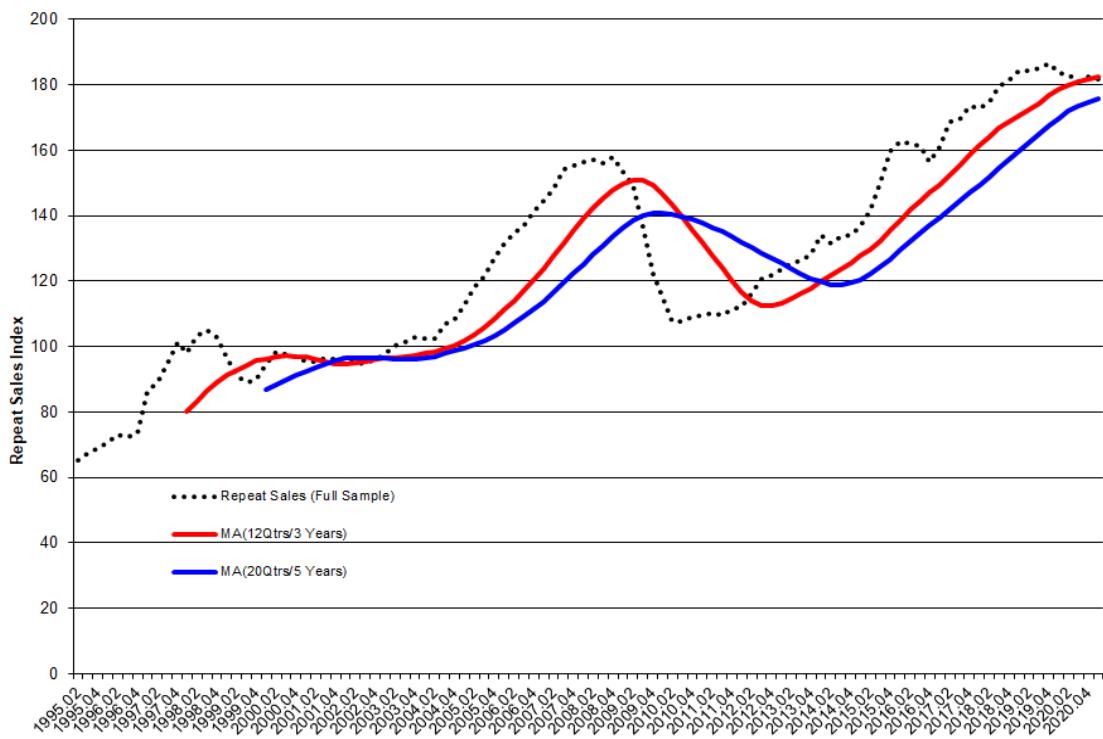
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

Consistent with our analysis, our moving average trend lines for large hotels (in Exhibit 10) shows that the price for large hotels continues to remain below both its short-term and long-term moving average, indicating that large hotels still represent an undervalued opportunity. The price for small hotels (in Exhibit 11) also continues to be priced below 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 remains above its statistically significant lower bound, although it still is in a trough near its lower bound. In contrast to large hotels, the standardized price for small hotels remains below its lower confidence interval (*i.e.*, it also remains at a trough, as shown in Exhibit 13).

## EXHIBIT 14

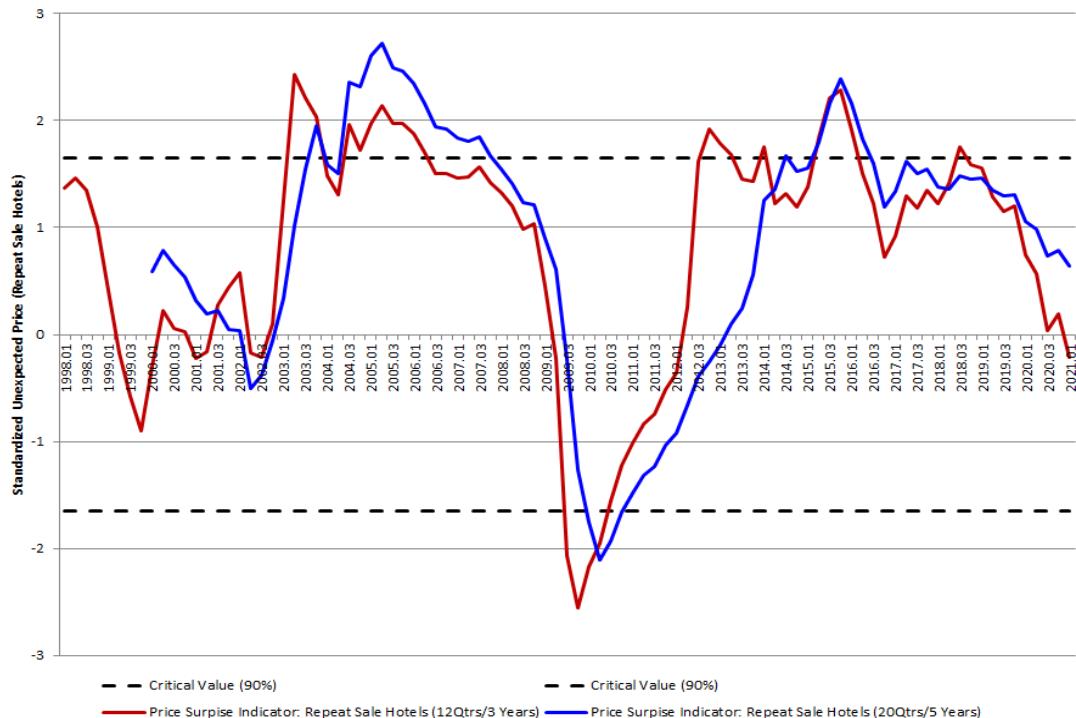
### Moving average trend line for repeat-sale index



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

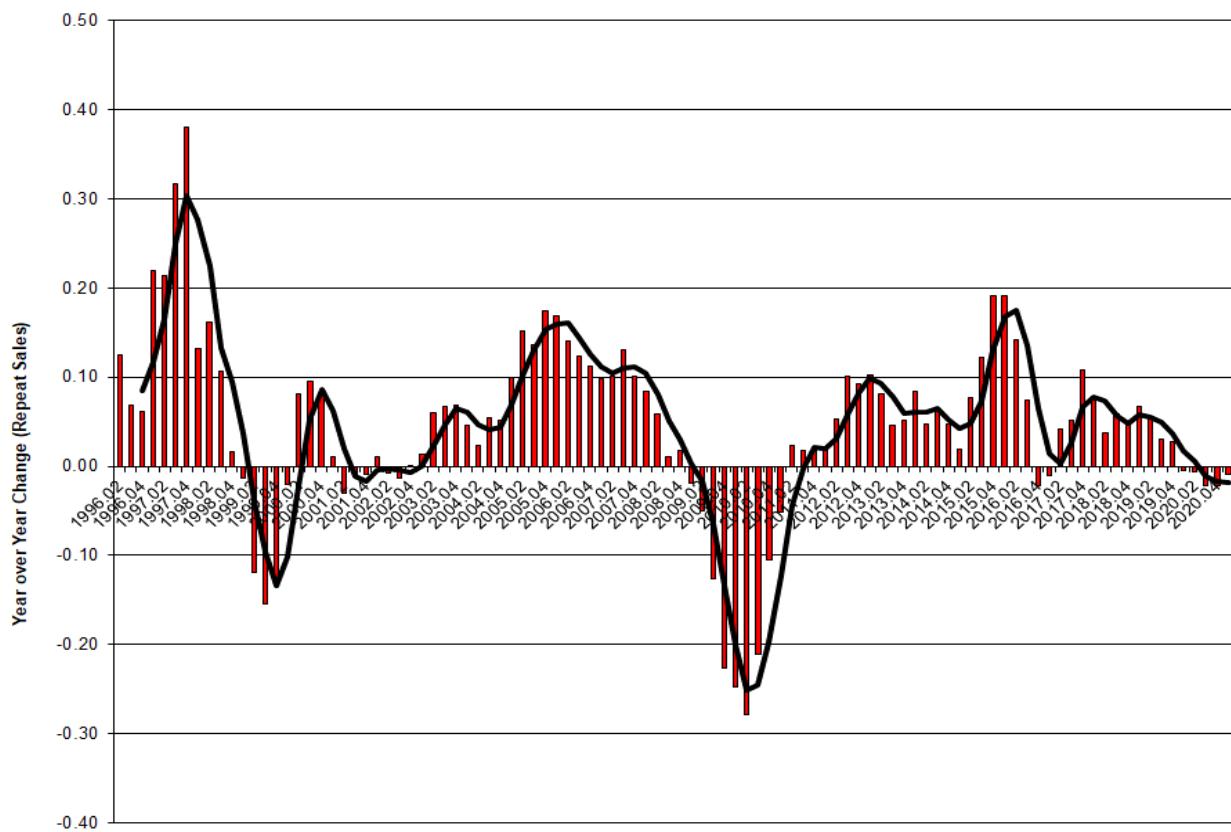
## EXHIBIT 15

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



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

## 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

**Repeat-sales metrics: Prices fall imperceptibly.** Our repeat sale indicator, which reflects the price of hotels that have sold more than once, is imperceptibly below its short-term moving average but continues above its longer-term moving average, as displayed in Exhibit 14.<sup>2</sup> Our SUP performance metric in Exhibit 15 indicates that the 3-year standardized price has declined below its standardized mean of zero. While the 5-year standardized price remains positive, it continues its reversion to a mean of zero. Exhibit 16 shows that although the repeat sale price index declined 1 percent year over year (2020Q1 to 2021Q1), this decline was slightly less than the 2.1-percent decline in the prior

period (2019Q4 to 2020Q4). From a quarter-over-quarter perspective, the index didn't change in the current period (0 change), which is similar to that in the prior quarter-over-quarter period.

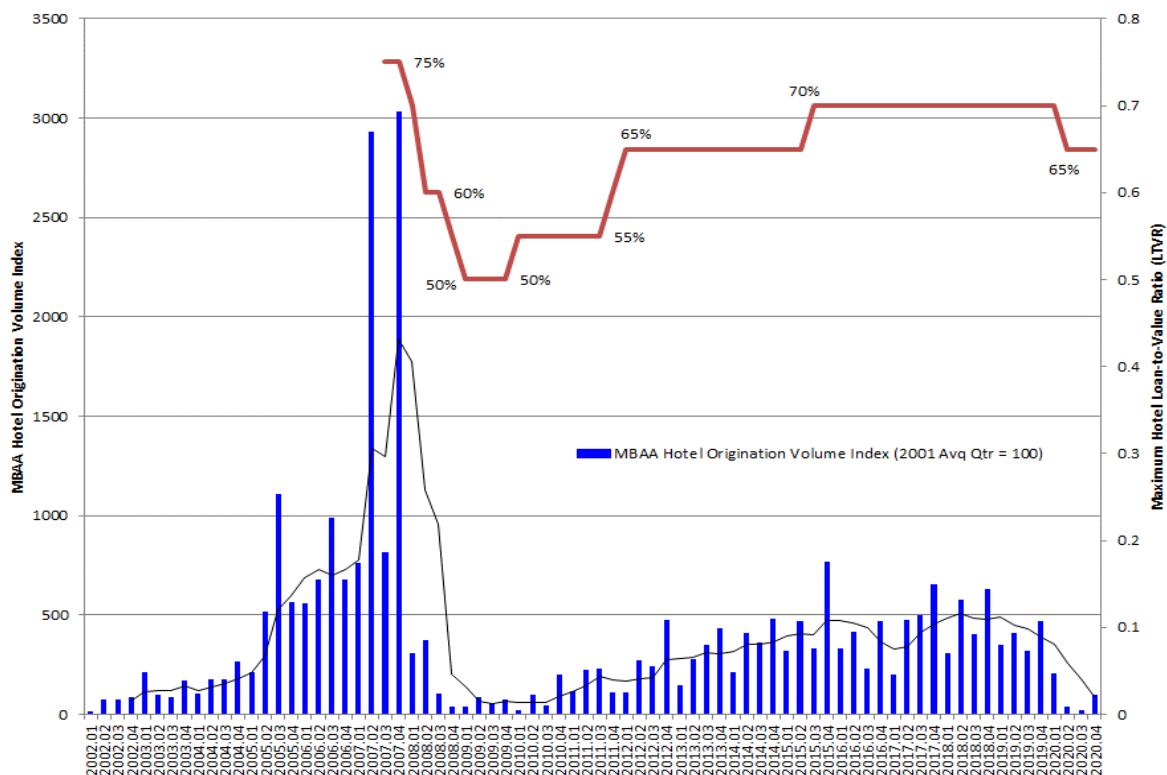
**Mortgage financing volume for hotels declined less than the previous year-over-year period but rose quarter-over-quarter.** Exhibit 17a shows that the mortgage origination volume for hotels, as reported for the fourth quarter of 2020 fell 51 percent year over year, continuing the declining trend from the prior period (-94%).<sup>3</sup> This quarterly decline was 46 percent that of the previous year-over-year period. However, loan origination volume for hotels rose 400 percent quarter over quarter, reversing the 44 percent decline of the previous quarter. The maximum loan-to-value ratio for hotels remained at 65 percent.

<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.

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

## EXHIBIT 17A

### 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 17B

### Financing ratios for commercial property

Source of Capital	LTV/LTC	Basis-point Spread	Base	Other Metrics
Banks	55%-60%	High-300 to Mid-400	LIBOR	Debt Yield > 10%
Life Insurance	60%	Low to High 400	LIBOR/Treas	
Debt Funds				
1 <sup>st</sup> Tier (Best)	65%-70%	Low-400 to Low-500	LIBOR	
2 <sup>nd</sup> Tier	70%-75%	Mid-500 to Low-600	LIBOR	
3 <sup>rd</sup> Tier	75%-80%	Mid-600	LIBOR	
CMBS Source: JLL Debt Commentary	60%-65%	Fixed rates: 4.25-5%		Debt Yield: 10-12%

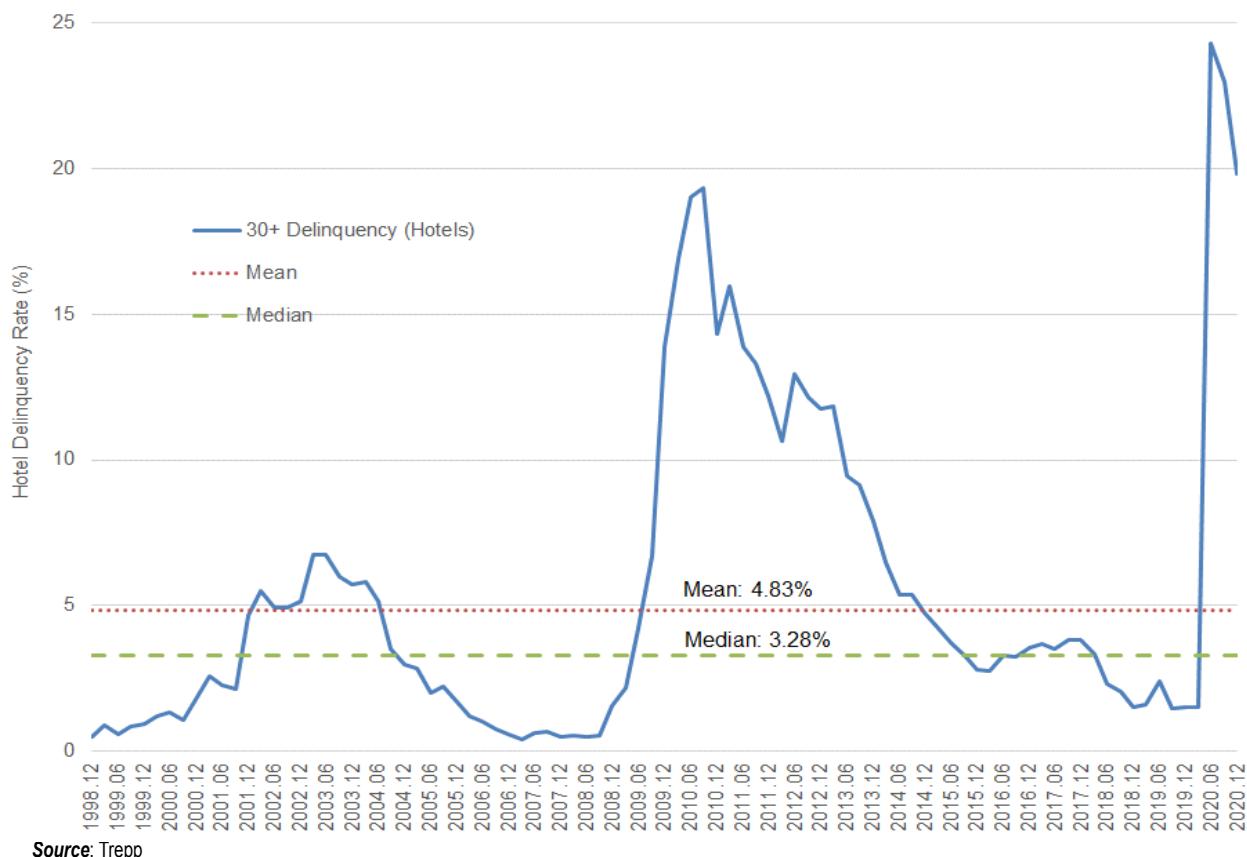
**Availability of hotel debt financing increased for best-in-class hotels.** Unfortunately, our source for the cost of obtaining hotel debt financing has not been updated since our last report.<sup>4</sup> Fortunately, JLL posted their Hospitality Debt Market Commentary in March. Their report

is consistent with our findings that hotels are continuing to head towards recovery, which in turn has incentivized lenders to return to the market for hotels. These data are summarized in Exhibit 17b.

From the information in Exhibit 17b, it is obvious from the quoted spreads that sourcing is primarily available for best-in-class hotel deals. For lenders who are willing to lend selectively on non-top-tier hotel properties, the wide basis-point spread will hinder a lot of lower quality projects from pencilng out.

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

## 30-plus-day delinquency rate for hotels



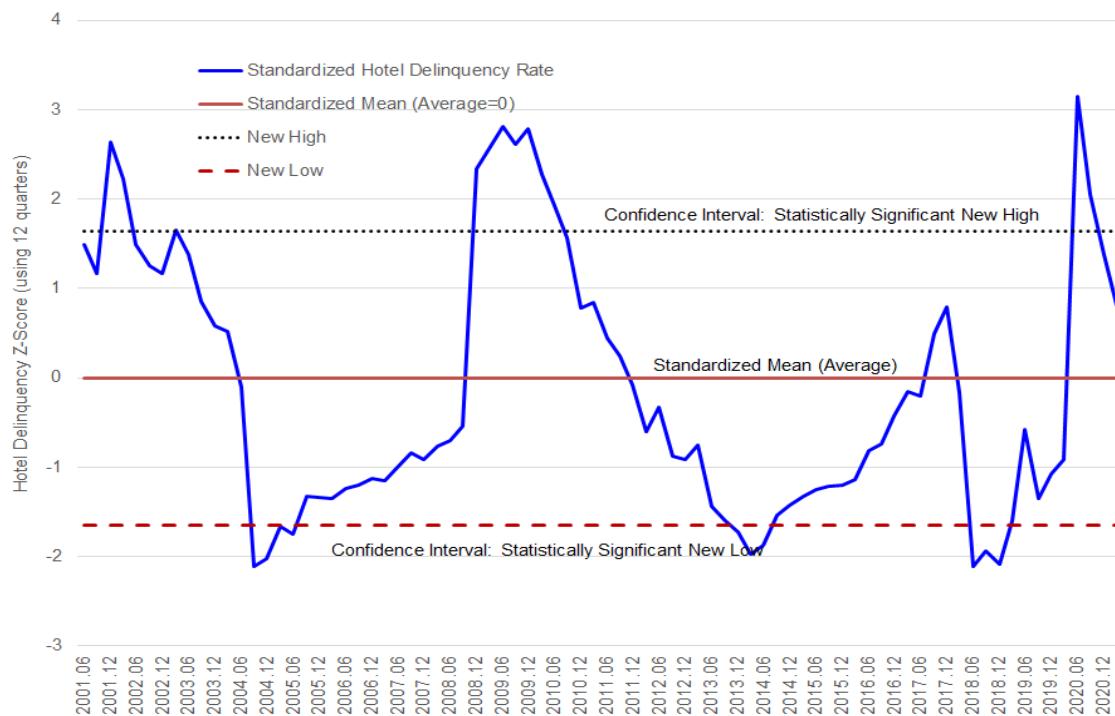
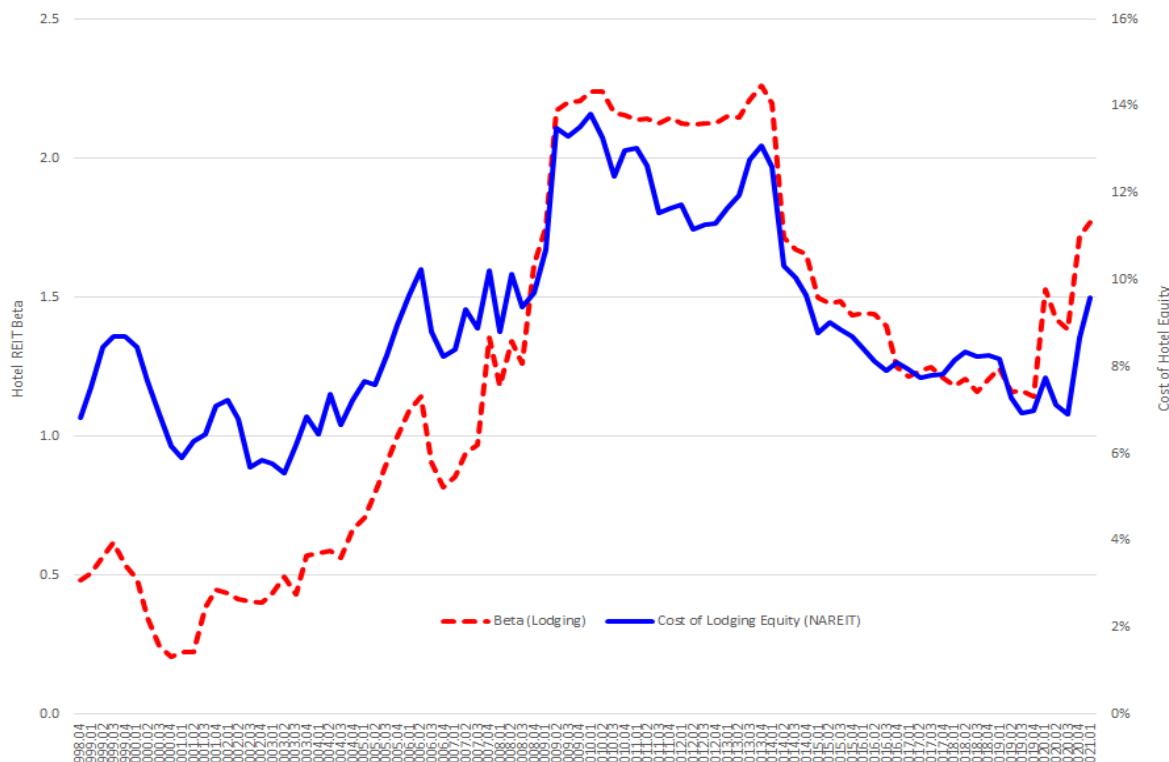
**The delinquency rate on hotel loans continues to decline toward its pre-pandemic average.** The CMBS delinquency rate (30+ days) for lodging properties continued to decline in March from its previous high of 24.3 percent, set in June. Currently, it is at 15.95 percent, compared to 19.8 percent in December. This 15.95-percent delinquency rate for hotels remains higher than that for retail properties, which was 10.89 percent in March. The March delinquency rate for other property types reported by Trepp is as follows: Industrial, 73%; Multifamily, 3.14%; and Office, 2.21%. The delinquency rates for each of these property types declined slightly from December except for multifamily properties (Industrial, 1.14%; Multifamily, 2.75%; and Office, 2.18%). Exhibit 18 displays the historical 30+ day delinquency rate for hotels, while Exhibit 19 shows the standardized version of the 30+ day delinquency rate for hotels. Both exhibits reveal that the delinquency rate for hotels whose loans are securitized as part of CMBS deals continues to converge toward its long-term average, even though it remains above this average. Using the standardized metric, the fact that the delinquency rate is reverting towards zero suggests that the worst is over.<sup>5</sup>

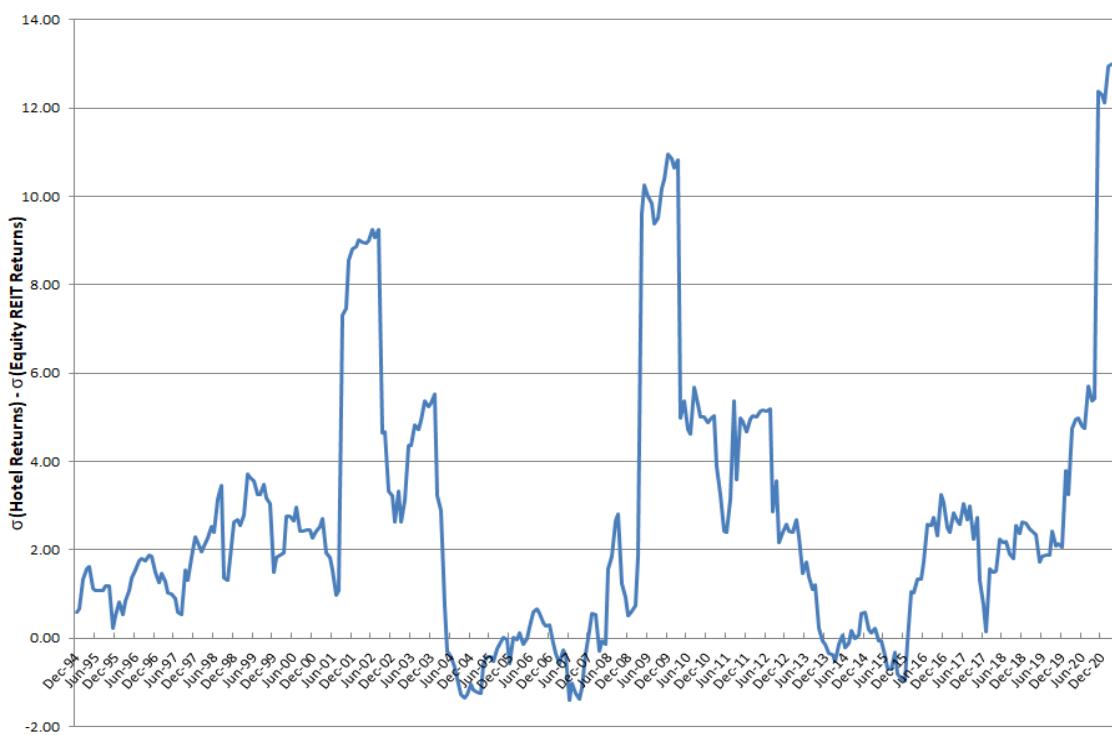
<sup>5</sup> The advantage of standardizing an indicator is that the mean is set equal to zero and the standard deviation is set equal to 1. If the indicator is above or below 1.645 (Z-score) then this indicates that the indicator has hit a statistically significant new high or low.

**The cost of equity financing is now more expensive, the riskiness of hotels has risen relative to other types of commercial real estate.** The cost of using equity financing for hotels as measured using the Capital Asset Pricing Model (CAPM) on hotel REIT returns, as shown in Exhibit 20, continued to increase in March, making it more expensive to borrow from equity markets. The cost of using equity is currently 9.6 percent for 2021Q1, compared to 8.7 percent in the prior quarter. In terms of total risk (systematic risk + risk that is unique to hotel REITs), Exhibit 21 shows that the total risk of hotel REITs relative to the total risk of equity REITs increased by almost 6 percent this quarter and also increased 174 percent on a year-over-year basis, compared to the previous period increases of 129 percent quarter over quarter and 495 percent year over year.<sup>6</sup> This indicates that the perceived default risk for hotels continues to widen relative to other types of commercial real estate, consistent with our other hotel risk premium indicators.

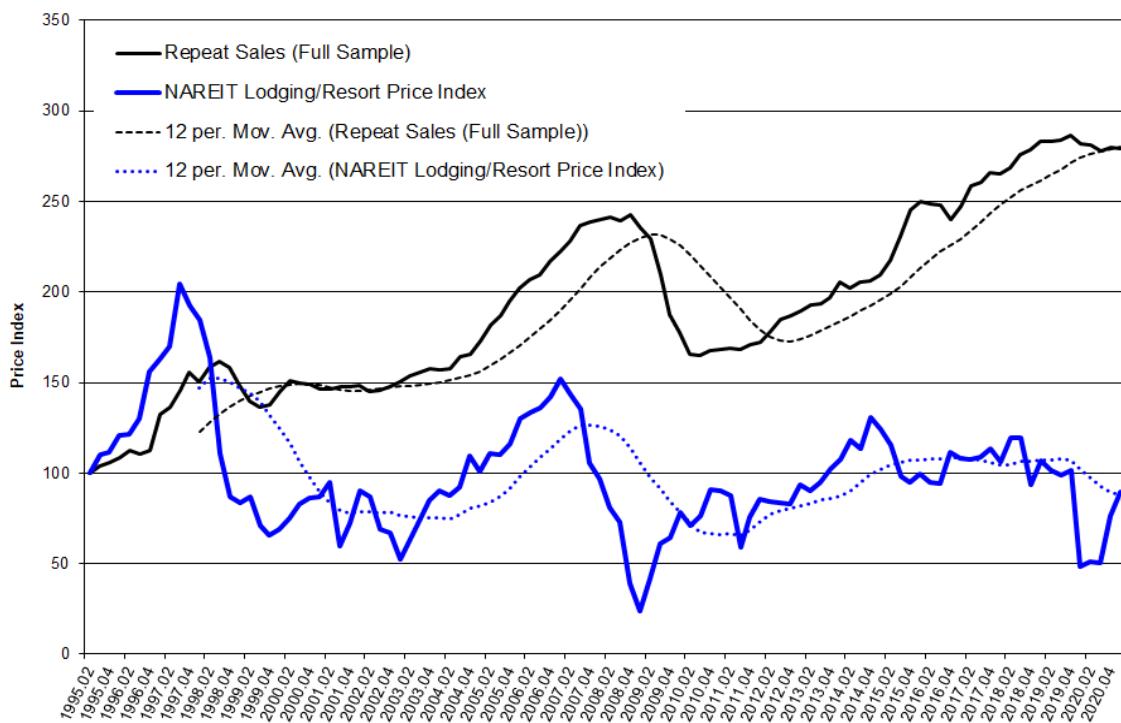
**Our reading of the tea leaves suggests we should see positive price momentum for both large and small hotels near term.** Exhibit 22 compares the performance of the hotel repeat sales index relative to the NAREIT Lodging

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

**EXHIBIT 19****Standardized 30-plus-day delinquency rate for hotels****EXHIBIT 20****Cost of equity financing using the capital asset pricing model and hotel REITs**

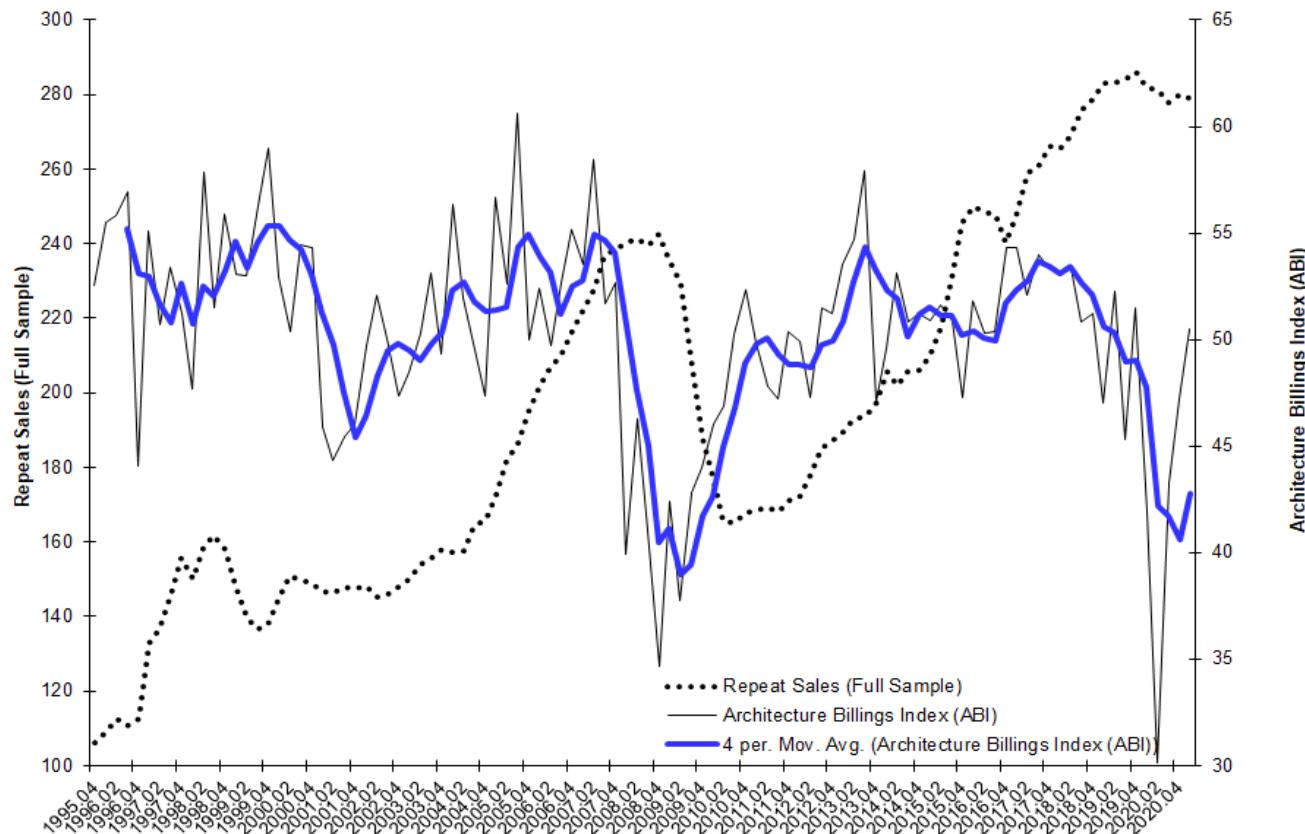
**EXHIBIT 21****Risk differential between hotel REITs and equity REITs**

Sources: NAREIT, Cornell Center for Real Estate and Finance

**EXHIBIT 22****Repeat sales index versus NAREIT lodging/resort price index**

Sources: NAREIT, Cornell Center for Real Estate and Finance

## Repeat sales index versus architectural billings index



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

Resort Price Index.<sup>7</sup> Looking ahead, the NAREIT lodging index rose 18 percent this quarter and 85 percent year-over-year, compared to a 51-percent gain last quarter and a 25-percent decline year-over-year.

The architecture billings index (ABI) for commercial/industrial property shown in Exhibit 23 rose 7 percent this quarter, continuing its upward momentum from the previous quarter.<sup>8</sup> Year over year, the ABI rose 20.5 percent. This is a reversal from the decline of 8.3 percent year-over-year in the previous period.

The National Association of Purchasing Managers (NAPM) index shown in Exhibit 24, which is an indicator

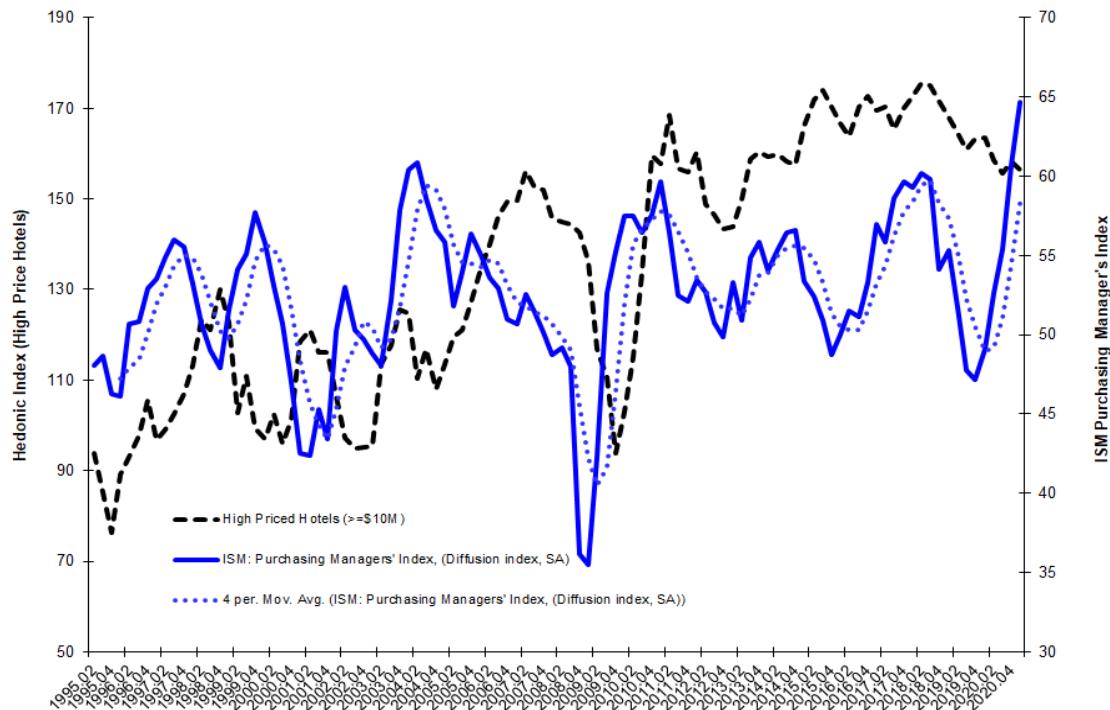
of anticipated business confidence, rose 6.6 percent this quarter, compared to a rise of 9.6 percent last quarter.<sup>9</sup> It also increased 31.8 percent year over year, which is up from the 28.6-percent year-over-year gain in the prior period. This metric has increased in each of the last five quarters.

The Conference Board's Consumer Confidence Index, graphed in Exhibit 25, which we use as a proxy for anticipated consumer demand for leisure travel and a leading indicator of the hedonic index for low price hotels, rose 24 percent this quarter, reversing a 13-percent fall in the previous quarter. Year over year, however, it declined 8.6 percent, which is a modest decline compared to the 30-percent year-over-year decline recorded in the previous period.

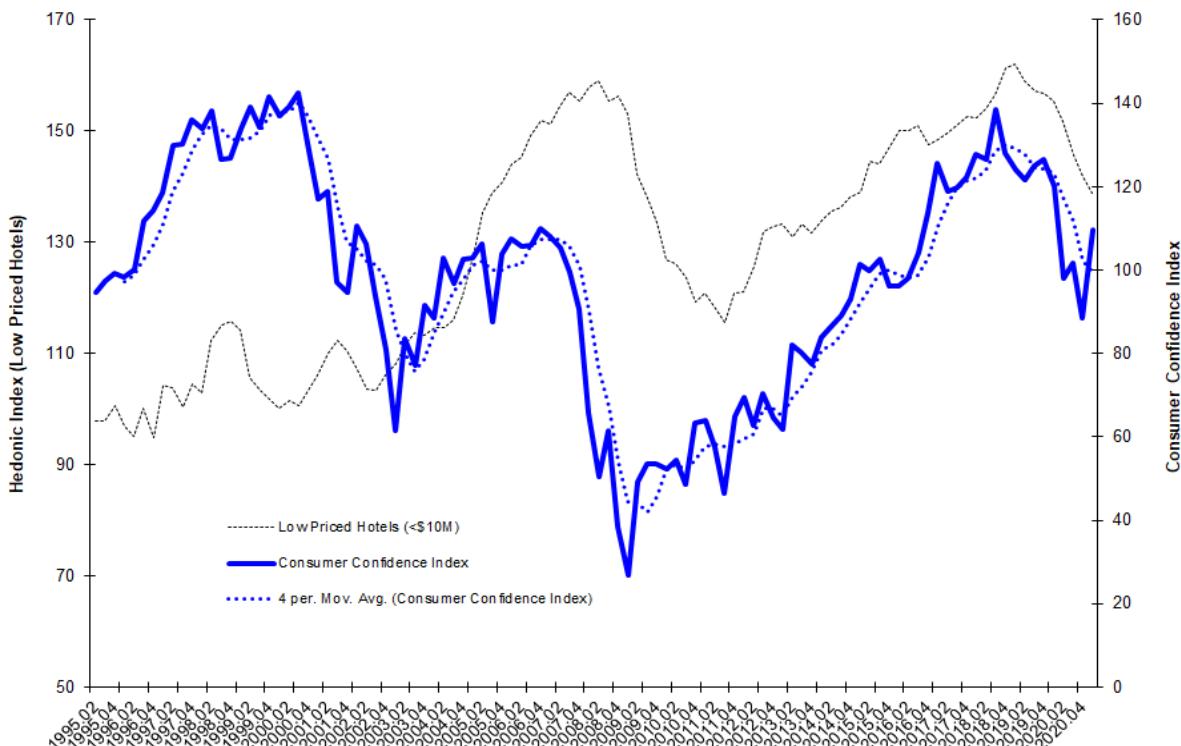
<sup>7</sup> The repeat sales index tends to lag the NAREIT index by at least one quarter or more. This is consistent with prior academic studies which find that securitized real estate is leading indicator of underlying real estate performance since the stock market is forward looking or efficient.

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

<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.

**EXHIBIT 24****Business confidence and high-price hotels**

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

**EXHIBIT 25****Consumer confidence and low-price hotels**

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

## Analysts forecast of hotel REIT earnings

<b>Earnings</b>					
E(QEPS)	Median	Mean	StDev	Min	Max
2020Q2	-158.0%	-161.7%	30.2%	-226.2%	-110.7%
2020Q3	-160.0%	-283.9%	499.4%	-2214.3%	-91.1%
2020Q4	-151.9%	-225.1%	219.3%	-866.7%	-86.7%
2021Q1	-233.3%	-364.4%	336.9%	-1400.0%	-76.5%
E(EPS)	Median	Mean	StDev	Min	Max
2020Q2	-112.3%	-80.3%	101.7%	-222.2%	175.0%
2020Q3	-135.0%	-89.1%	176.0%	-307.9%	290.6%
2020Q4	-160.0%	-100.1%	184.8%	-325.4%	366.7%
2021Q1	92.4%	97.6%	23.2%	70.9%	170.1%
<b>Revenue</b>					
E(QRev)	Median	Mean	StDev	Min	Max
2020Q2	-71.9%	-69.9%	16.1%	-92.7%	-45.2%
2020Q3	-72.4%	-69.4%	10.1%	-81.6%	-46.5%
2020Q4	-63.7%	-62.5%	14.9%	-79.6%	-26.8%
2021Q1	-57.6%	-52.6%	17.8%	-74.2%	0.0%
E(ARev)	Median	Mean	StDev	Min	Max
2020Q2	-43.6%	-43.6%	10.5%	-66.1%	-28.2%
2020Q3	-62.4%	-60.2%	6.8%	-69.2%	-47.7%
2020Q4	-63.0%	-60.7%	10.2%	-73.7%	-40.5%
2021Q1	43.1%	45.7%	12.3%	18.6%	66.0%

We also look at Wall Street analysts' earnings estimates for hotel REITs, both in terms of next quarter earnings per share (EPS) and also annual EPS.<sup>10</sup> Exhibit 26 indicates that analysts are expecting average quarterly EPS to decline between 233 percent (median) and 364 percent (mean), but project median annual EPS to rise 92 percent and mean EPS to increase 98 percent. Since analysts' estimates reflect the earnings guidance from management, this suggests that we should expect prices to rise if markets are efficient and reflect positive guidance regarding the annual EPS. ■

<sup>10</sup> We obtain earnings 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. All items are available for download from our [CREF website](#).

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## 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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