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Cornell Hotel Indices: Fourth Quarter 2022

Music Refrain:
One More Time

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

EXECUTIVE SUMMARY

The price of hotels showed strength in all regions except the South Atlantic this quarter, with all regions except New England experiencing double-digit growth year over year. Hotels in non-gateway cities posted higher quarterly and yearly gains relative to gateway cities, with the non-gateway hotels' prices increasing 4 percent for the quarter, compared to 2 percent for gateway properties. On a year-to-year basis, non-gateway hotels recorded a 19-percent increase versus 3 percent for gateway properties. However, regardless of price changes, the transaction volume for all hotels (that is, both large hotels and small hotels) fell this quarter. With regard to price, small hotels appear to be undervalued (while large hotels range from correctly priced to overvalued) based on both a 3-year and a 5-year moving average. The cost of hotel debt financing continued to rise this quarter, as well as year over year. Lenders are requiring relatively more compensation for hotel loans relative to the 10-year risk-free rate due to increased perceived risk. As in the previous period (Q3 of 2022), our economic-value-added and shareholder-value-added metrics continue to indicate that the cost of borrowing exceeds the return for hotels. Looking toward the next quarter (*i.e.,* near term), our leading indicators of hotel price performance indicate that we should expect slower or declining price momentum for larger hotels but not necessarily for smaller hotels. This is volume 11, issue 4 of the hotel indices series.

ABOUT THE AUTHORS

Crocker H. Liu is a professor of real estate at the Nolin School of Hotel Administration at Cornell, where he is the Robert A. Beck Professor of Hospitality Financial Management. He previously taught at New York University's Stern School of Business (1988-2006) and at Arizona State University's W.P. Carey School of Business (2006-2009), where he held the McCord Chair. His research interests are focused on issues in real estate finance, particularly topics related to agency, corporate governance, organizational forms, market efficiency and valuation. Liu's research has been published in the *Review of Financial Studies, Journal of Financial Economics, Journal of Business, Journal of Financial and Quantitative Analysis, Journal of Law and Economics, Journal of Financial Markets, Journal of Corporate Finance, Review of Finance, Real Estate Economics, Journal of Urban Economics, Regional Science and Urban Economics, Journal of Real Estate Research*, and the *Journal of Real Estate Finance and Economics*. He is the former co-editor of *Real Estate Economics*, the leading real estate academic journal, where he continues to sit on the editorial board. 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 a noted authority on the real estate capital markets with credits in the *Wall Street Journal, Barron's, The Economist, Forbes, New York Times*, and *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. His research has been published in the *Journal of Real Estate Finance and Economics*.

Acknowledgments
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Analysis of Indices through Q4, 2022

Hotel Prices in All Regions except the South Atlantic Rose this Quarter. 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. All regions except the South Atlantic region also enjoyed a price increase quarter over quarter, with the Mid-Atlantic and Mountain regions experiencing a double-digit gain in hotel transaction prices.

EXHIBIT 1A

Time series hotel performance for seven regions

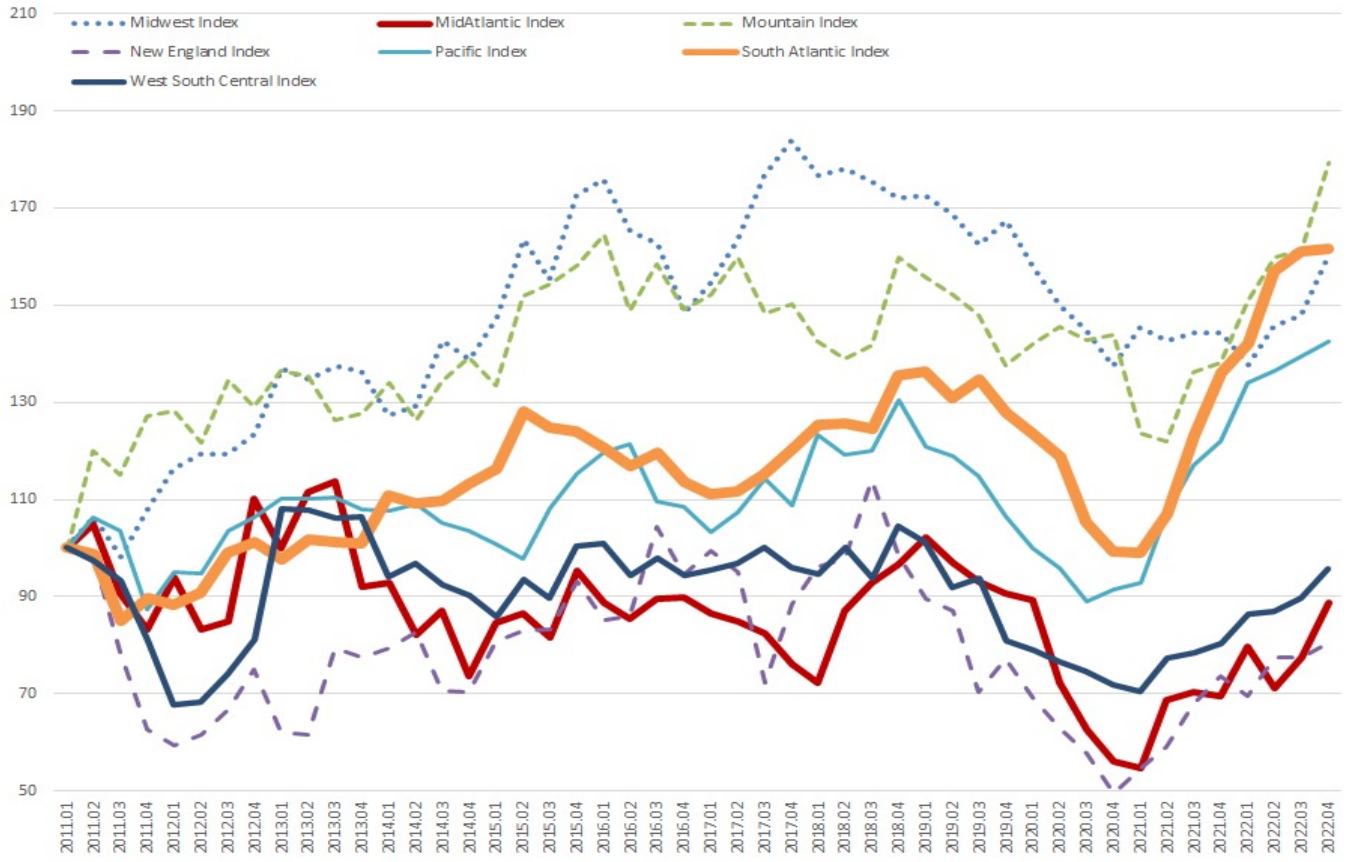
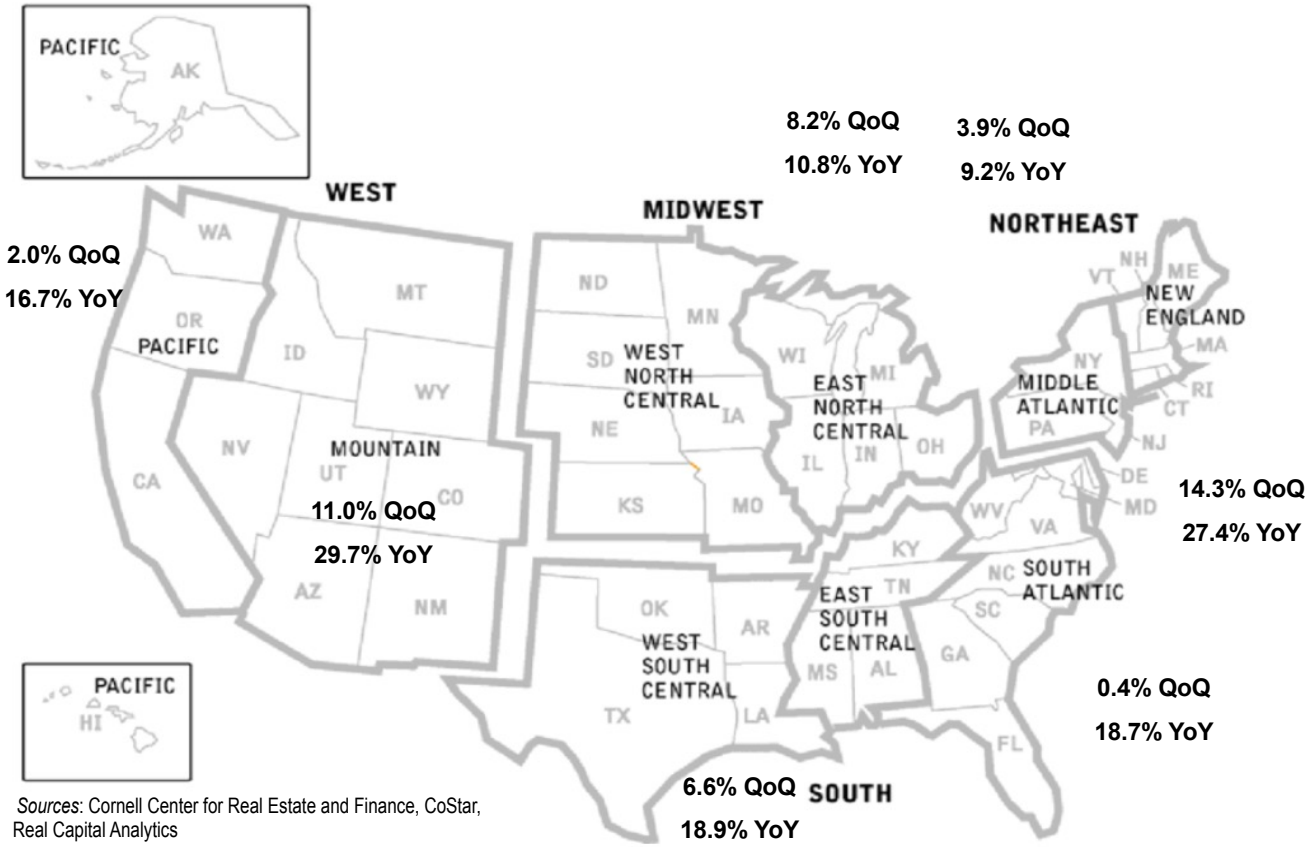


EXHIBIT 1B

Cross-section hotel performance for seven regions



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

EXHIBIT 1C

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

Y-o-Y	Midwest	Mid Atlantic	Mountain	New England	Pacific	South Atlantic	West South Central
Current	10.8%	27.4%	29.7%	9.2%	16.7%	18.7%	18.9%
Prior	2.4%	10.5%	18.6%	14.4%	19.2%	30.8%	14.5%
Q-o-Q							
Current	8.2%	14.3%	11.0%	3.9%	2.0%	0.4%	6.6%
Prior	1.4%	8.9%	1.1%	0.1%	2.3%	2.5%	3.1%

Standardized Unexpected Prices (Z-Scores)

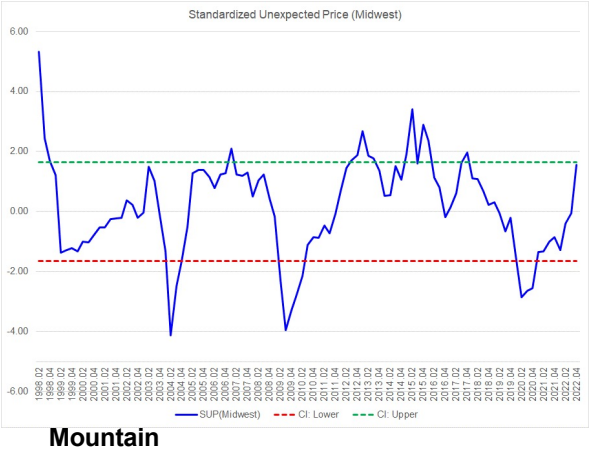
	Midwest	Mid-Atlantic	Mountain	New England	Pacific	South Atlantic	West South Central
2022.03	-0.05	0.34	1.94	1.31	1.90	2.12	1.50
2022.04	1.56	1.49	3.10	1.48	1.70	1.75	2.73

In terms of standardized unexpected prices (Z-Scores), hotel prices remained above their statistical high in the Mountain, Pacific, South Atlantic, and West South Central regions. However, hotel prices trended downwards in both the Pacific and South Atlantic regions this quarter. Hotel prices in the Midwest, Mid-Atlantic, and New England regions continued their upward trend toward a new statistical high (1.645).

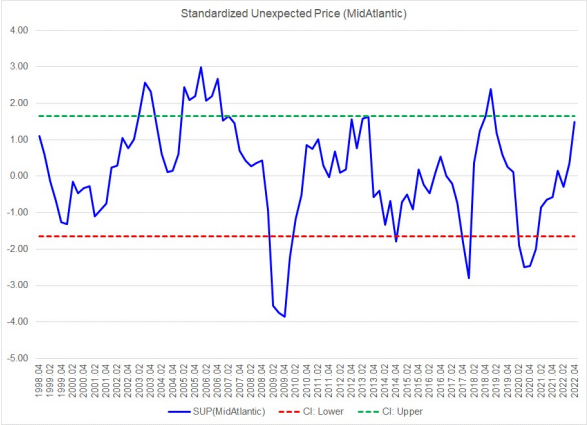
EXHIBIT 1D

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

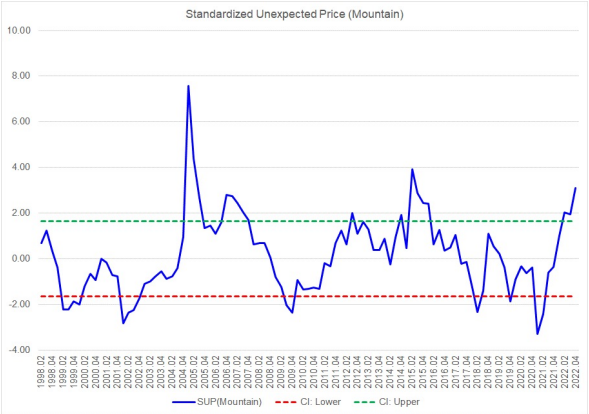
Midwest



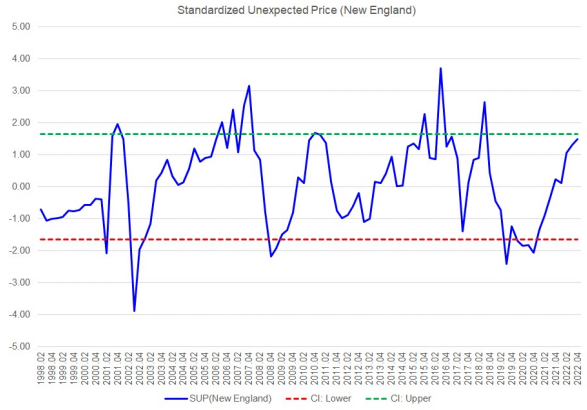
Middle Atlantic



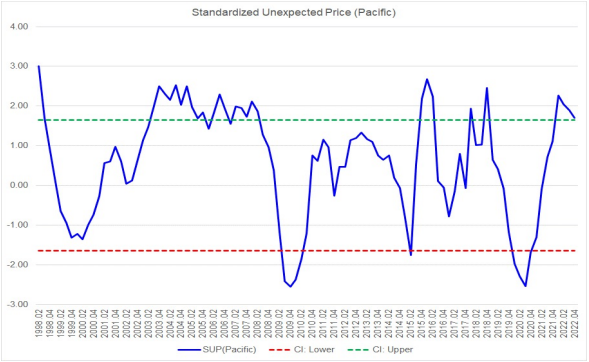
Mountain



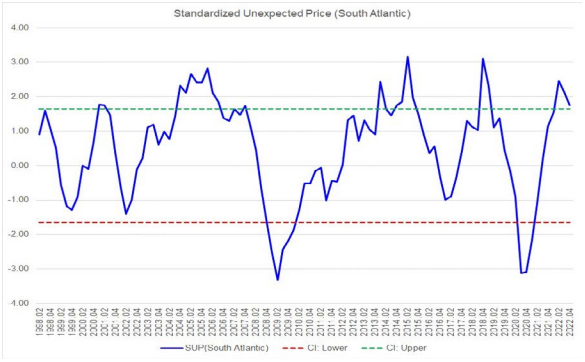
New England



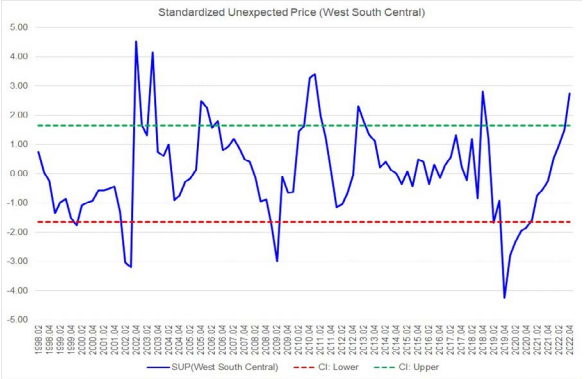
Pacific



South Atlantic



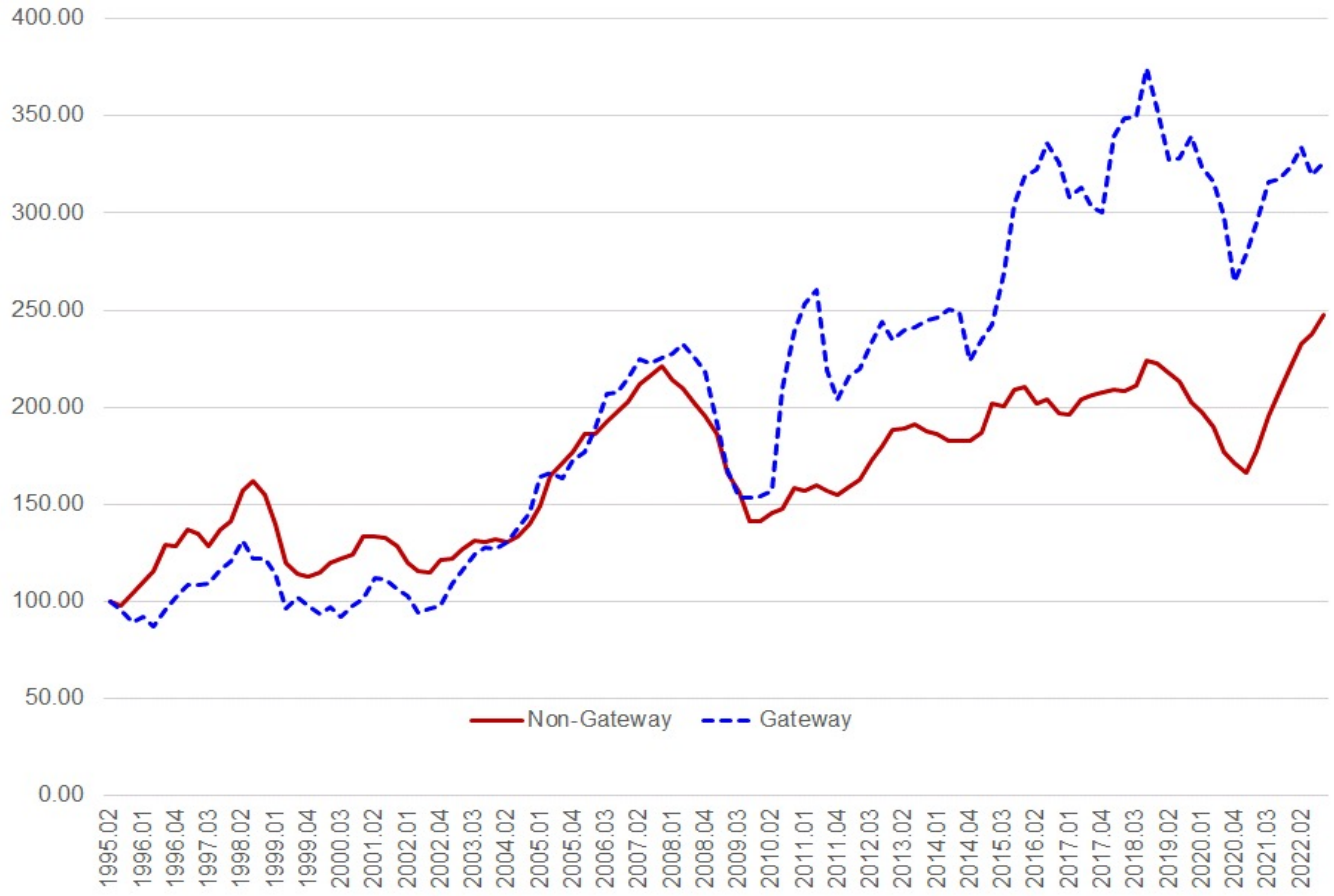
West South Central



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; **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 2

Hotel performance for gateway cities versus non-gateway cities



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

Hotels in Non-Gateway Cities Continued to Outperform Those in Gateway Cities. Continuing the trend in the prior two periods, hotels in non-gateway cities outperformed those in gateway cities, increasing 4 percent in price compared to a 2-percent price gain this quarter, as shown in Exhibit 2. Year over year, hotel prices in non-gateway cities rose 19 percent compared to a 3-percent price gain in gateway cities.

Transaction Volume Declined this Quarter. The transaction volume on all hotel transactions (both large hotels and small hotels combined) fell this quarter, as well as year to year

Quarter over Quarter	Gateway Cities	Non-Gateway Cities
Current Period (2022Q3)	2%	4%
Prior Period (2022Q2)	-4%	2%
Year over Year		
Current Period (2022Q3/2021Q3)	3%	19%
Prior Period (2022Q2/2021Q2)	1%	21%

	Full Sample		Gateway Hotels		Non-Gateway Hotels	
	Median Price	No. of Sales	Median Price	No. of Sales	Median Price	No. of Sales
2022Q4	$5,644,600	470	$9,300,000	35	$5,500,000	435
Quarter over Quarter	7%	-15%	-15%	-43%	10%	-11%
Year over Year	19%	-5%	-4%	-3%	25%	-5%

EXHIBIT 3A

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

		Full Sample		Big			Small			Gateway			No Gateway		
Year	Quarter	Median Sale Price	N	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
1995	1	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%

EXHIBIT 3B

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

		Full Sample		Big			Small			Gateway			No Gateway		
Year	Quarter	Median Sale Price	N	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
2004	1	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%
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

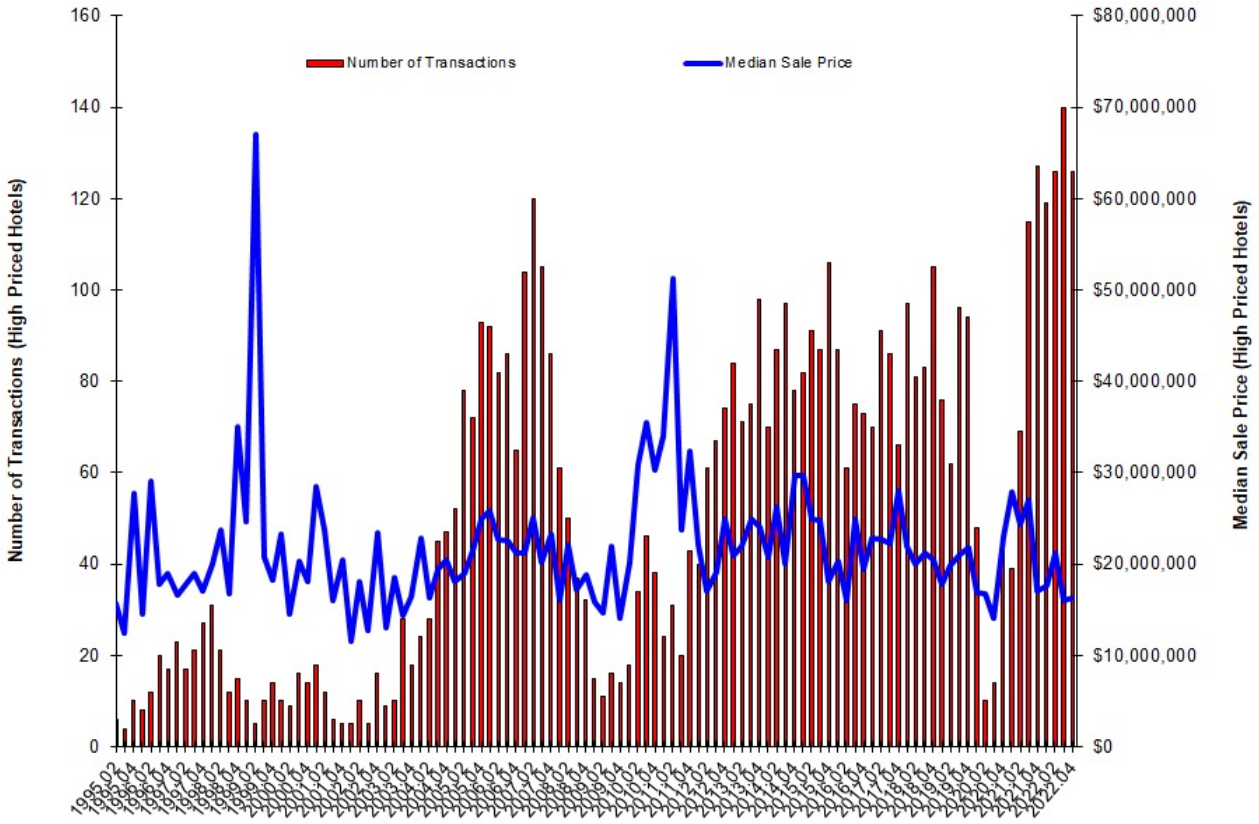
Transaction volume (observed) and median sale price (concluded, 2013–2022)

		Full Sample		Big			Small			Gateway			No Gateway		
Year	Quarter	Median Sale Price	N	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
2013	1	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	319	26250000	87	27.27%	2818750	232	72.72%	11200000	59	18.49%	3700000	260	81.50%
2014	3	5500000	351	20000000	97	27.63%	3425000	254	72.36%	10567078	66	18.80%	5000000	285	81.19%
2014	4	4600000	309	29625000	78	25.24%	3175000	231	74.75%	8225000	72	23.30%	4000000	237	76.69%
2015	1	6000000	251	29750000	82	32.66%	3150000	169	67.33%	8280000	47	18.72%	5525000	204	81.27%
2015	2	6300000	267	25000000	91	34.08%	3250000	176	65.91%	18765000	46	17.22%	5525000	221	82.77%
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	321	22250000	86	26.79%	3431000	235	73.20%	22250000	38	11.83%	4525000	283	88.16%
2017	4	4500000	265	28000000	66	24.90%	2875000	199	75.09%	12208000	26	9.81%	4250000	239	90.18%
2018	1	5500000	310	21882400	97	31.29%	3500000	213	68.70%	14750000	40	12.90%	5000000	270	87.09%
2018	2	4800000	365	20000000	81	22.19%	3300000	284	77.80%	17625000	40	10.95%	4250000	325	89.04%
2018	3	5125000	334	21265000	83	24.85%	3710000	251	75.14%	13342500	22	6.58%	5000000	312	93.41%
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	4060000	331	19848485	62	18.73%	3375000	269	81.26%	6300000	35	10.57%	3921000	296	89.42%
2019	3	4700000	401	21000000	96	23.94%	3500000	305	76.05%	15850000	42	10.47%	4350000	359	89.52%
2019	4	4950000	383	21855650	94	24.54%	3300000	289	75.45%	11000000	35	9.13%	4600000	340	88.77%
2020	1	4100000	304	16900000	48	15.78%	3420000	256	84.21%	6313000	22	7.23%	4095000	282	92.76%
2020	2	3380000	80	16787500	10	12.50%	2515000	70	87.50%	6700000	7	8.75%	3360000	73	91.25%
2020	3	2800000	173	14062500	14	8.09%	2600000	159	91.90%	7219750	12	6.93%	2667500	161	93.06%
2020	4	3600000	246	23053000	45	18.29%	2750000	201	81.70%	10725000	36	14.63%	3000000	210	85.36%
2021	1	3900000	213	27900000	39	18.30%	3075000	174	81.69%	11431000	20	9.38%	3700000	193	90.61%
2021	2	3500000	346	24352000	69	19.94%	2900000	277	80.05%	9675000	34	9.82%	3337500	312	90.17%
2021	3	4350000	448	27000000	115	25.66%	3125000	333	74.33%	33820000	38	8.48%	4000000	410	91.51%
2021	4	4750000	493	17100000	127	25.76%	3300000	366	74.23%	9687500	36	7.30%	4400000	457	92.69%
2022	1	5062500	439	17600000	119	27.10%	3475000	320	72.89%	12025000	42	9.56%	4875000	397	90.43%
2022	2	5300000	556	21140000	126	22.66%	3750000	430	77.33%	9250000	50	8.99%	5074500	506	91%
2022	3	5277500	550	16050000	140	25.45%	3650000	410	74.54%	11000000	61	11.09%	5000000	489	88.90%
2022	4	5644600	470	16358750	126	26.80%	4000000	344	73.19%	9300000	35	7.44%	5500000	435	92.55%

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)



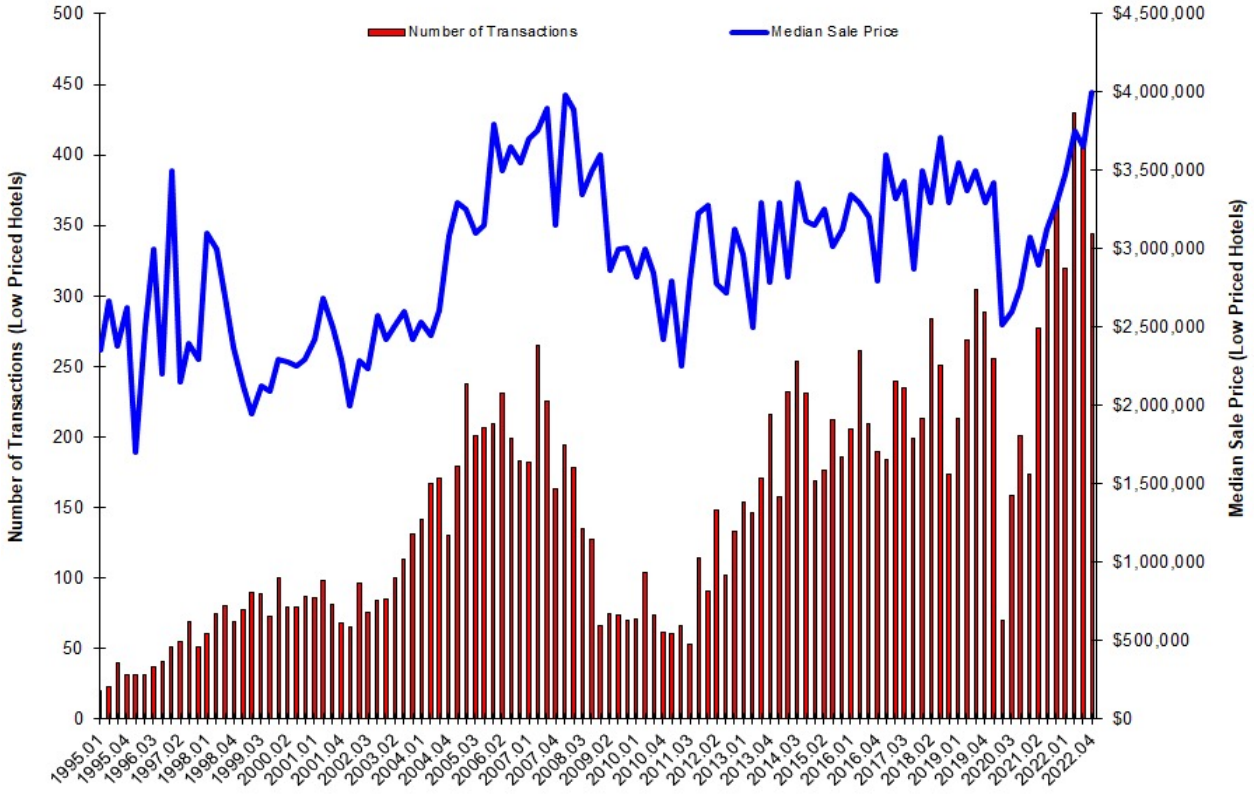
	Median Price	No. of Sales	Median Price	No. of Sales	Median Price	No. of Sales
2022Q4	$5,644,600	470	$16,358,750	126	$4,000,000	344
Quarter over Quarter	7%	-15%	2%	-10%	10%	-16%
Year over Year	19%	-5%	-4%	-1%	21%	-6%

(dropping 5 percent year over year).[1] Quarterly sales volume for small hotels declined 16 percent, while the transaction volume for large hotels fell 10 percent this quarter. With regard to location, transaction volume declined 11 percent for non-gateway hotels, compared to a 43-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 and small hotels. Median prices of hotels in non-gateway cities also increased, but the median price of hotels in gateway cities fell 15 percent on a quarter-to-quarter basis. That was also true of the median price of hotels in gateway cities, which fell 4 percent year to year, as did the median price of large hotels, which also fell 4 percent year over year. This decrease was overshadowed by the double-digit declines of large hotels (-41%) and hotels in gateway cities (-67%) in the prior year-over-year period.

[1] 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)



In contrast, year over year, the median price of small hotels and those in non-gateway cities achieved double-digit increases (a 21-percent increase for small hotels and a 25-percent increase for non-gateway properties). Exhibits 3A, 3B, and 3C report 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

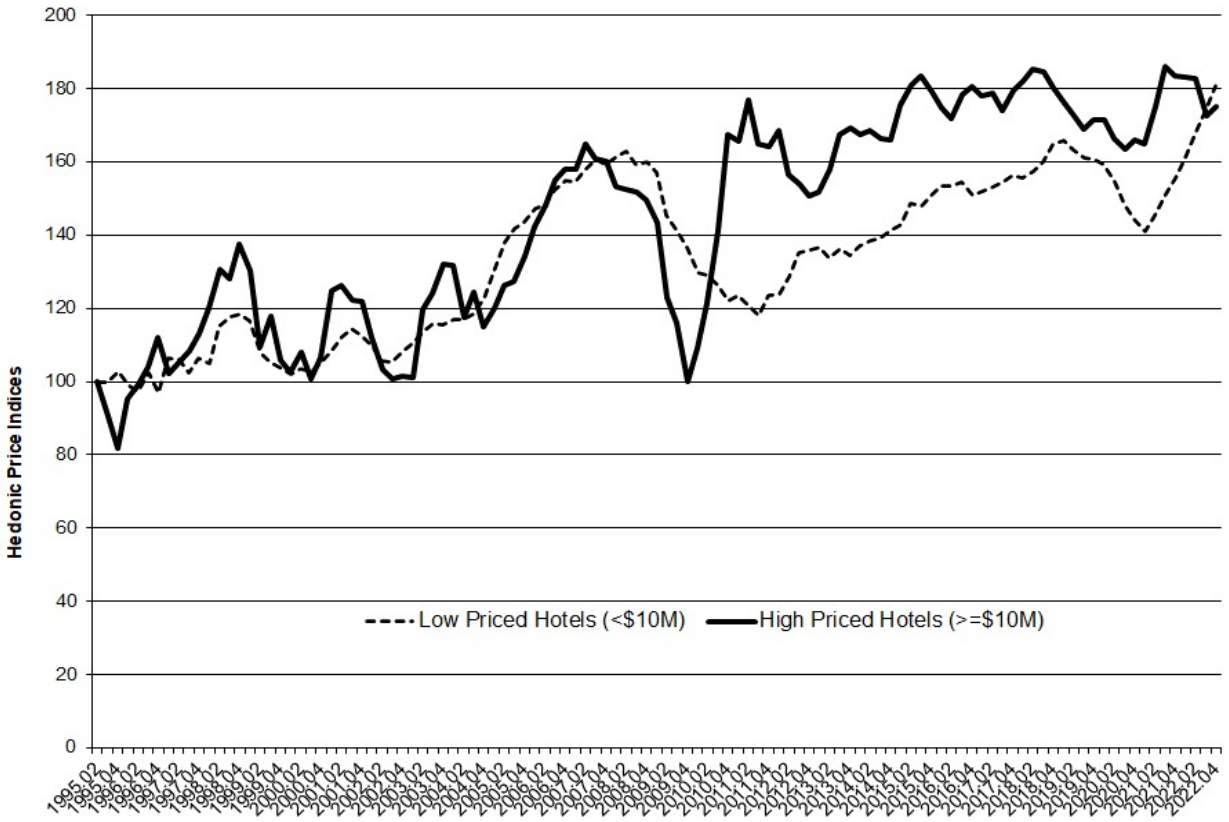
YrQtr	Low Priced Hotels (<$10M)	High Priced Hotels (>=$10M)	Non Gateway Index	Gateway Index	Repeat Sales Index	Index Value Repeat Sales
1995.02	98.01	94.72	82.36	103.40	64.27	NA
1995.03	97.81	85.83	80.92	99.09	67.12	NA
1995.04	100.60	77.42	85.67	92.58	68.57	NA
1996.01	97.03	90.16	90.74	95.48	70.30	NA
1996.02	95.25	93.93	95.03	90.15	72.60	NA
1996.03	100.34	98.55	106.34	98.70	71.60	NA
1996.04	94.95	106.16	106.01	105.43	73.14	NA
1997.01	104.31	96.86	113.11	111.91	86.70	NA
1997.02	103.82	99.41	111.33	112.06	88.87	NA
1997.03	100.32	102.79	106.03	112.83	94.83	NA
1997.04	104.43	107.06	113.19	120.38	101.11	NA
1998.01	102.87	113.64	116.18	124.68	97.83	NA
1998.02	112.69	123.85	129.32	135.61	103.61	NA
1998.03	115.45	121.39	133.42	126.60	105.74	NA
1998.04	116.07	130.13	127.56	126.29	103.51	NA
1999.01	114.36	123.29	115.38	118.35	96.36	NA
1999.02	105.61	103.72	98.69	99.97	90.59	NA
1999.03	103.20	111.54	94.16	105.98	88.11	NA
1999.04	101.61	100.12	93.04	100.94	89.09	NA
2000.01	100.08	97.23	94.56	96.68	94.39	98.05
2000.02	101.56	102.25	99.03	100.65	97.81	98.05
2000.03	100.58	95.42	100.66	95.17	97.51	92.94
2000.04	103.32	101.07	102.46	101.52	96.43	93.07
2001.01	106.11	118.17	109.80	104.98	95.26	91.51
2001.02	110.05	119.49	110.22	115.92	94.94	89.43
2001.03	112.17	115.79	109.12	115.49	95.77	92.69
2001.04	110.34	115.31	105.70	110.43	95.29	89.89
2002.01	107.38	106.22	99.01	106.47	96.00	92.68
2002.02	103.49	97.95	95.37	97.41	94.58	92.10
2002.03	103.32	95.43	94.61	99.63	95.46	90.94
2002.04	106.01	96.11	99.76	101.33	96.99	95.72
2003.01	108.08	95.91	100.41	112.79	98.01	94.86
2003.02	111.59	113.37	104.97	120.05	100.24	98.47
2003.03	113.71	117.44	108.11	128.27	102.25	102.88
2003.04	113.26	125.26	107.70	132.17	103.32	105.21
2004.01	114.64	124.89	108.90	131.58	102.72	106.25
2004.02	114.78	111.40	107.63	135.01	103.44	107.44
2004.03	116.09	118.02	110.23	142.77	107.58	112.06
2004.04	120.49	108.94	115.02	150.66	109.01	112.37
2005.01	127.63	113.74	123.03	170.01	114.11	116.87
2005.02	135.34	119.55	135.94	171.70	119.98	123.47
2005.03	138.74	120.67	141.36	169.36	122.91	125.88
2005.04	140.87	127.04	145.59	178.80	128.56	132.35
2006.01	144.26	134.69	153.14	182.69	133.08	137.12
2006.02	145.46	140.25	153.31	195.29	136.25	140.03
2006.03	149.40	146.83	158.86	214.24	138.14	141.65
2006.04	151.89	149.51	162.54	214.78	142.55	144.42
2007.01	151.36	149.75	166.77	221.88	146.21	147.38
2007.02	154.61	156.32	174.55	232.38	150.10	151.11
2007.03	157.34	152.53	178.31	230.11	156.34	159.12
2007.04	155.91	151.85	182.41	233.23	157.64	160.91
2008.01	158.36	145.21	176.29	235.30	158.96	165.09
2008.02	159.59	144.31	172.66	240.17	159.38	166.59
2008.03	156.01	143.66	166.62	233.35	158.48	163.36
2008.04	156.94	141.59	161.00	225.59	160.20	166.52

YrQtr	Low Priced Hotels (<$10M)	High Priced Hotels (>=$10M)	Non Gateway Index	Gateway Index	Repeat Sales Index	Index Value Repeat Sales
2009.01	153.74	135.77	153.30	198.34	155.39	161.96
2009.02	142.63	116.31	136.71	173.29	151.59	156.14
2009.03	138.27	109.86	128.91	158.87	137.27	142.07
2009.04	134.01	94.64	116.19	158.54	123.20	127.83
2010.01	127.20	103.33	116.72	159.22	117.02	121.31
2010.02	126.45	115.13	119.98	162.29	109.06	113.79
2010.03	123.96	133.80	121.88	217.08	110.38	115.31
2010.04	119.51	158.56	130.71	247.01	112.51	115.80
2011.01	121.09	156.71	129.19	261.93	112.83	113.78
2011.02	118.66	167.57	131.92	269.33	112.88	112.85
2011.03	115.80	156.01	129.09	226.48	111.50	111.35
2011.04	121.06	155.43	127.48	210.71	112.39	112.33
2012.01	121.39	159.65	130.86	223.52	112.95	112.13
2012.02	126.00	148.22	133.90	226.93	116.35	117.36
2012.03	132.38	145.81	142.03	241.19	120.30	120.75
2012.04	133.36	142.72	148.18	252.48	122.16	122.96
2013.01	133.84	143.61	155.40	242.50	124.16	126.47
2013.02	131.12	149.69	155.64	247.99	125.53	128.51
2013.03	133.43	158.74	157.39	249.44	127.17	131.61
2013.04	131.89	160.21	154.79	253.13	129.87	135.46
2014.01	134.20	158.71	153.40	254.42	135.15	140.19
2014.02	135.81	159.60	150.45	258.84	134.68	138.25
2014.03	136.49	157.63	150.42	257.54	136.59	139.26
2014.04	138.69	157.12	150.60	231.86	136.10	137.32
2015.01	139.89	166.06	154.18	243.05	137.69	138.27
2015.02	145.57	171.46	166.19	250.47	142.04	142.54
2015.03	144.99	173.72	165.10	277.81	150.90	152.30
2015.04	147.67	169.67	172.50	315.07	161.10	162.62
2016.01	150.38	165.62	173.60	329.49	163.98	166.07
2016.02	150.45	162.61	166.22	333.08	165.10	167.97
2016.03	151.40	168.84	167.88	347.02	164.47	165.92
2016.04	147.72	171.14	162.19	337.29	159.11	161.45
2017.01	148.76	168.47	161.65	318.94	162.81	165.04
2017.02	149.88	169.34	167.93	323.93	169.40	172.15
2017.03	151.58	164.74	169.80	313.39	170.27	173.84
2017.04	153.09	169.87	171.10	310.87	173.90	176.76
2018.01	152.60	172.37	172.26	351.01	174.87	178.21
2018.02	154.21	175.47	171.68	360.44	175.66	177.84
2018.03	156.70	174.89	173.83	361.22	178.99	180.86
2018.04	161.40	170.72	184.38	387.49	182.00	183.49
2019.01	162.55	167.15	183.09	365.81	183.22	183.96
2019.02	159.82	163.40	179.00	338.86	183.24	183.11
2019.03	157.96	159.93	175.72	339.28	183.74	184.02
2019.04	157.47	162.35	166.96	350.95	185.31	186.05
2020.01	156.08	162.35	162.97	334.81	183.39	184.66
2020.02	151.48	157.61	156.47	326.75	184.68	186.71
2020.03	145.29	154.80	145.83	308.23	183.63	185.77
2020.04	141.49	157.20	141.35	274.03	184.47	187.06
2021.01	138.04	156.04	136.97	288.32	184.26	186.72
2021.02	142.59	165.81	146.18	305.68	185.52	187.49
2021.03	148.35	176.05	160.95	326.82	192.62	193.51
2021.04	152.58	173.64	171.30	327.86	202.17	200.54
2022.01	157.94	173.31	181.96	334.74	209.61	207.38
2022.02	165.15	172.98	191.41	345.05	223.41	221.62
2022.03	170.64	163.57	195.46	330.47	227.25	226.08
2022.04	177.01	165.95	203.73	336.75	228.05	229.85

Source: Cornell Center for Real Estate and Finance

EXHIBIT 7

Hedonic hotel indices for large and small hotel transactions



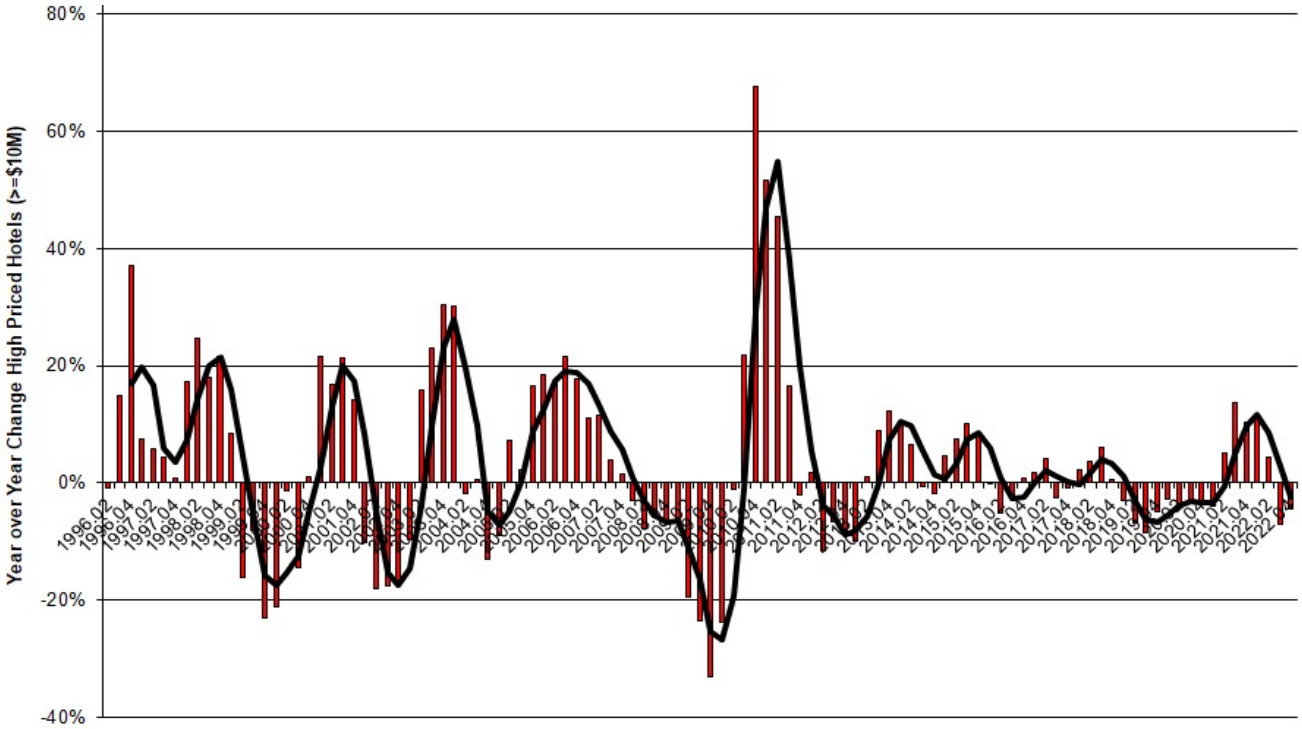
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

	Hedonic Price	Moving Average		Standardized Unexpected Price (Z-Score)	
Large Hotels	**Price**	**3 Year**	**5 Year**	**3 Year**	**5 Year**
2022Q2	172.98				
2022Q3	163.57				
2022Q4	165.95	164.94	166.28	0.13	-0.05
Quarter over Quarter	1.5%				
Year over Year	-4.4%				
Small Hotels	**Price**	**3 Year**	**5 Year**	**3 Year**	**5 Year**
2022Q2	165.15				
2022Q3	170.64				
2022Q4	177.01	153.89	155.47	1.91*	2.24*
Quarter over Quarter	3.7%				
Year over Year	16.0%				

The Price of Small Hotels Continues to Represent a Buying Opportunity based on Moving Averages. A Hold-or-Sell Signal Exists for Large Hotels. According to Our Standardized Price Metric, Smaller Hotels Remain at a Statistical High this Quarter. Exhibit 7 graphs the prices reported in Exhibit 6. The prices of large hotels rose 1.5 percent, compared to a 3.7-percent gain for small hotels. Year over year, large hotels declined 4.4 percent, compared to a 16-percent increase in the price of small hotels. Exhibit 8 and Exhibit 9 show the historical year-over-year change in the large- and small-

EXHIBIT 8

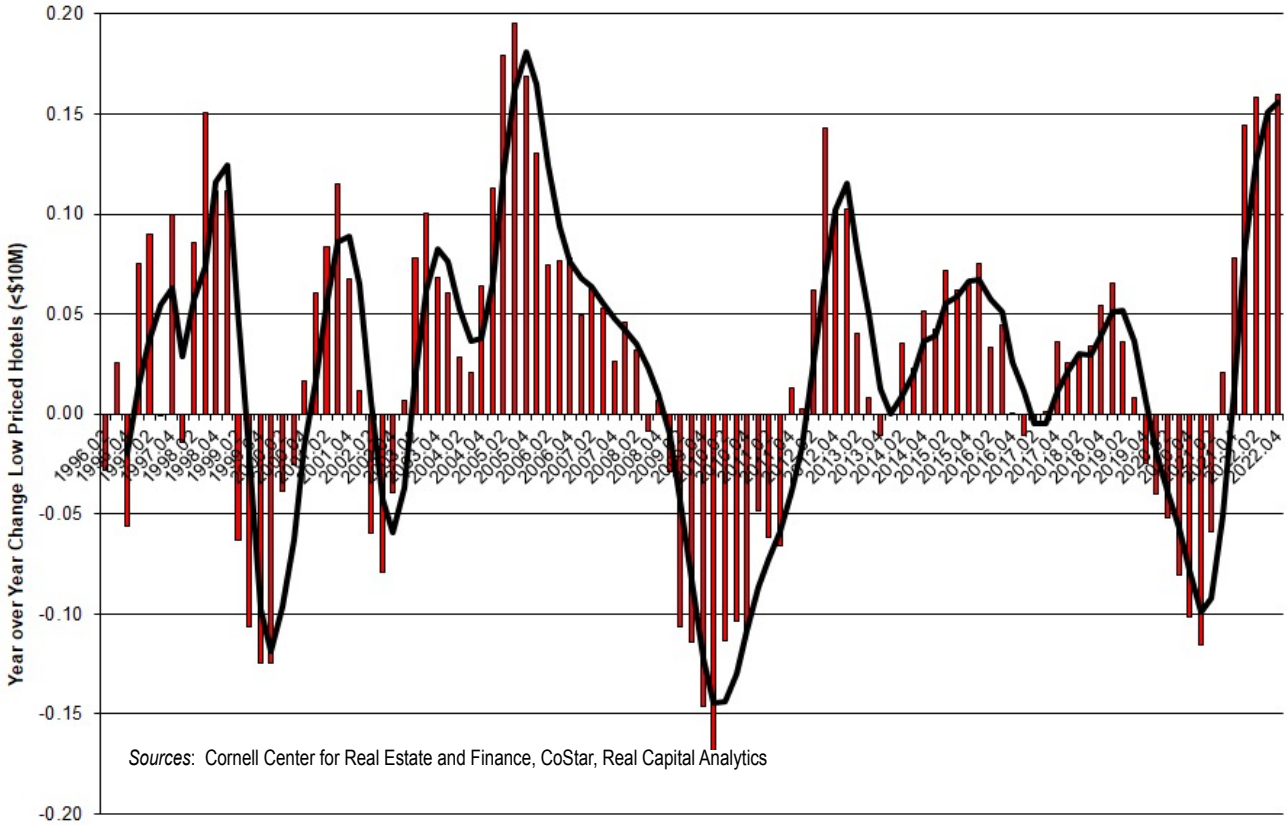
Year-over-year change in large-hotel index with a moving average trendline



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

EXHIBIT 9

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



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

EXHIBIT 10

Moving average trendlines for large hotel index

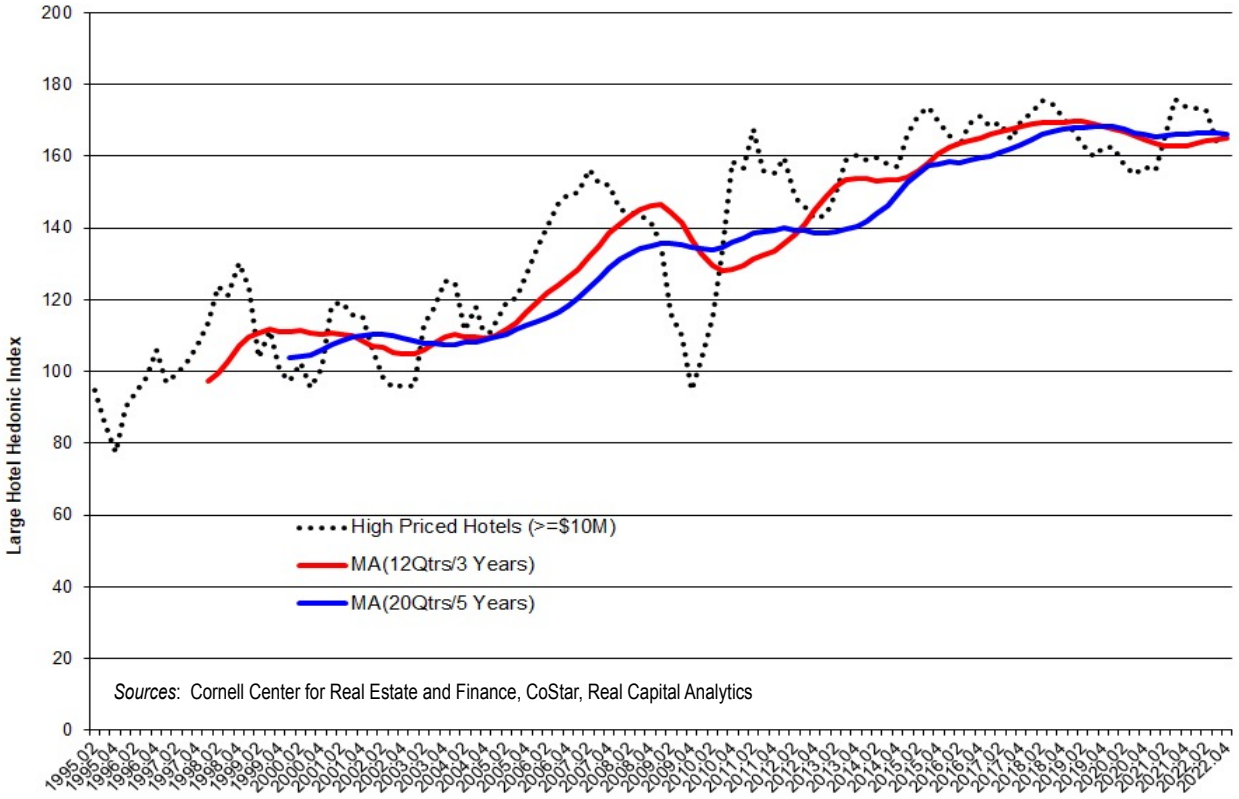


EXHIBIT 11

Moving average trendlines for small hotel index

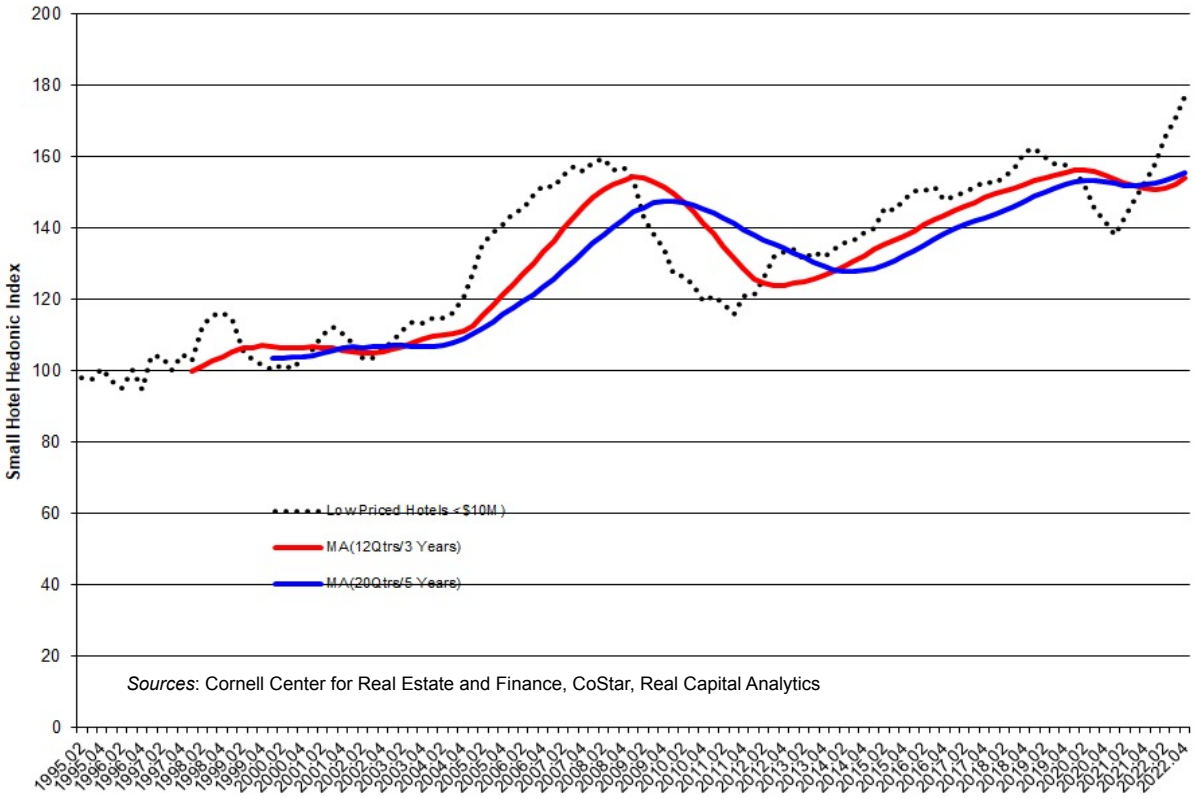
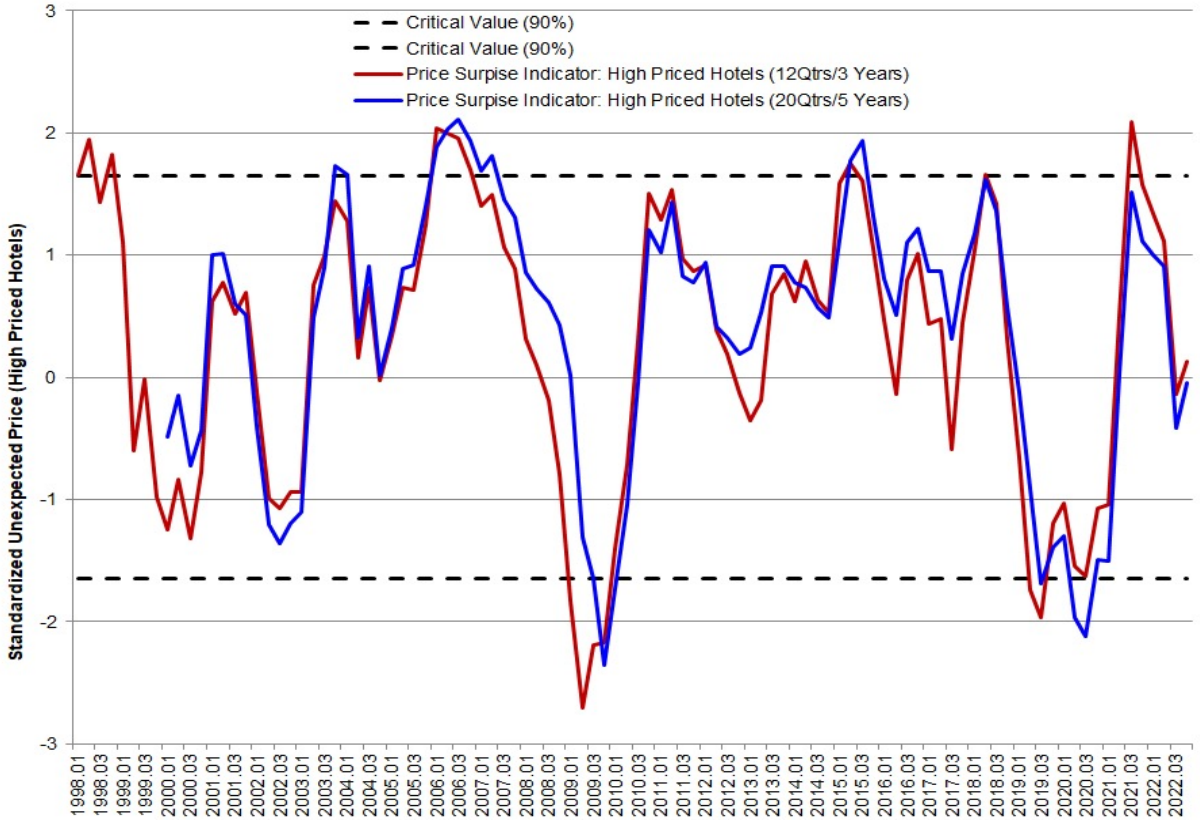


EXHIBIT 12

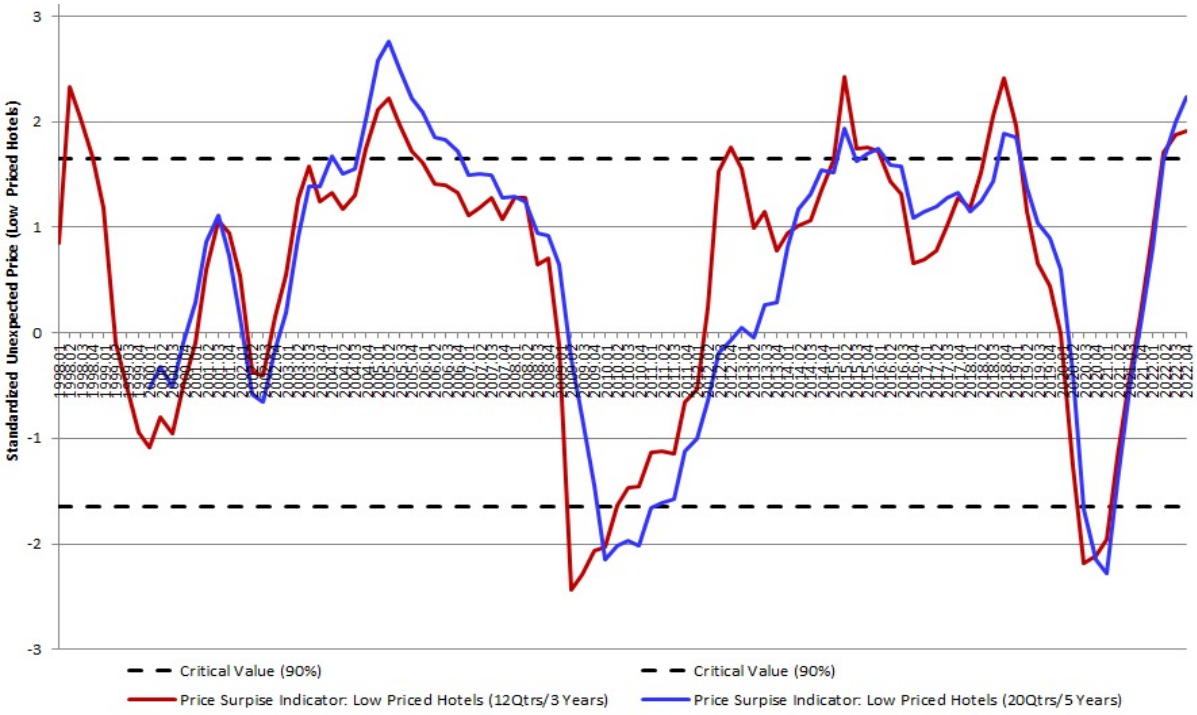
Standardized unexpected price (SUP) for large hotel index



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

EXHIBIT 13

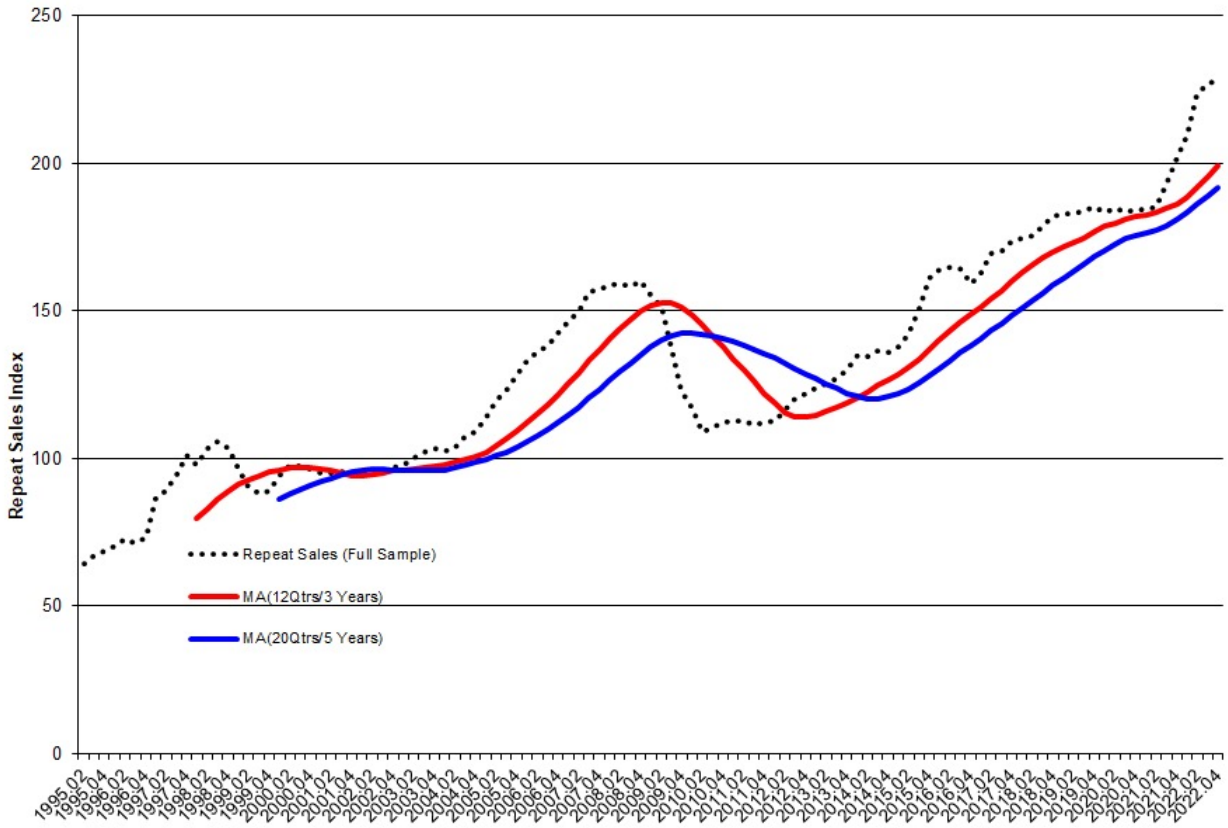
Standardized unexpected price (SUP) for small hotel index



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

EXHIBIT 14

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

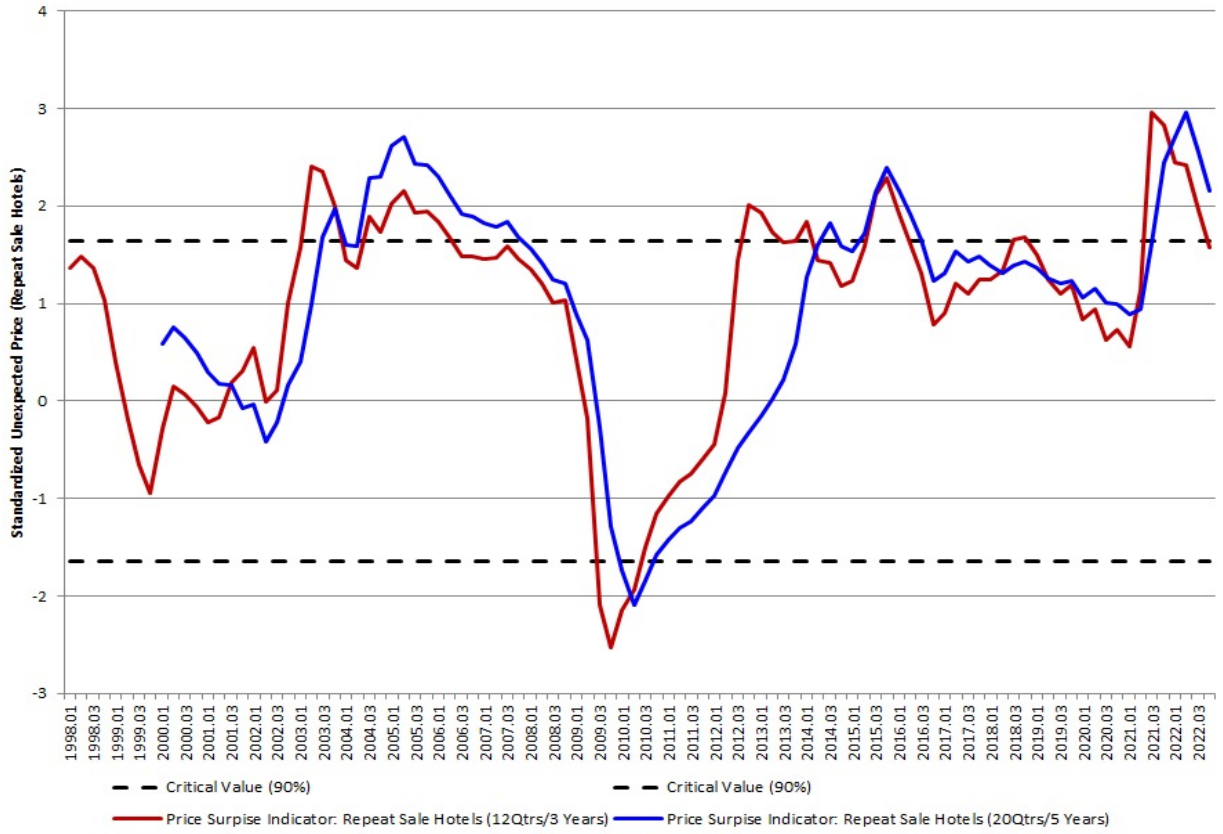
	Repeat Sale Price	Moving Average		Standardized Unexpected Price (Z-Score)	
Repeat Sale Hotels	**Price**	**3 Year**	**5 Year**	**3 Year**	**5 Year**
2022Q2	223.41				
2022Q3	227.25				
2022Q4	228.05	199.09	191.80	1.58	2.15*
Quarter over Quarter	0.4%				
Year over Year	12.8%				

hotel indices. To gauge whether the prices of large or 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 price for large hotels is below its 5-year moving average and hovers around its 3-year moving average, this indicates a hold-or-sell signal for large hotels. Small hotels, in contrast, remain a buy (3-year average: 177.01>153.89; 5-year average: 177.01>155.47). 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, p. 31). If prices rise above 1.645 (or fall below -1.645), this indicates a new statistical high (or low). Using this metric, the price of small hotels remains above its statistical high with regard to either the 3-year or 5-year mean and standard deviation to calculate standardized prices. At the same time, the standardized price of large hotels continues to hover around its mean of zero. Exhibit 12 and Exhibit 13 show these standardized prices.

Repeat Sales Metrics: Prices Remain Above Their Long-term Moving Average, but Not the Shorter-Term

EXHIBIT 15

Moving average trend line for repeat-sale index



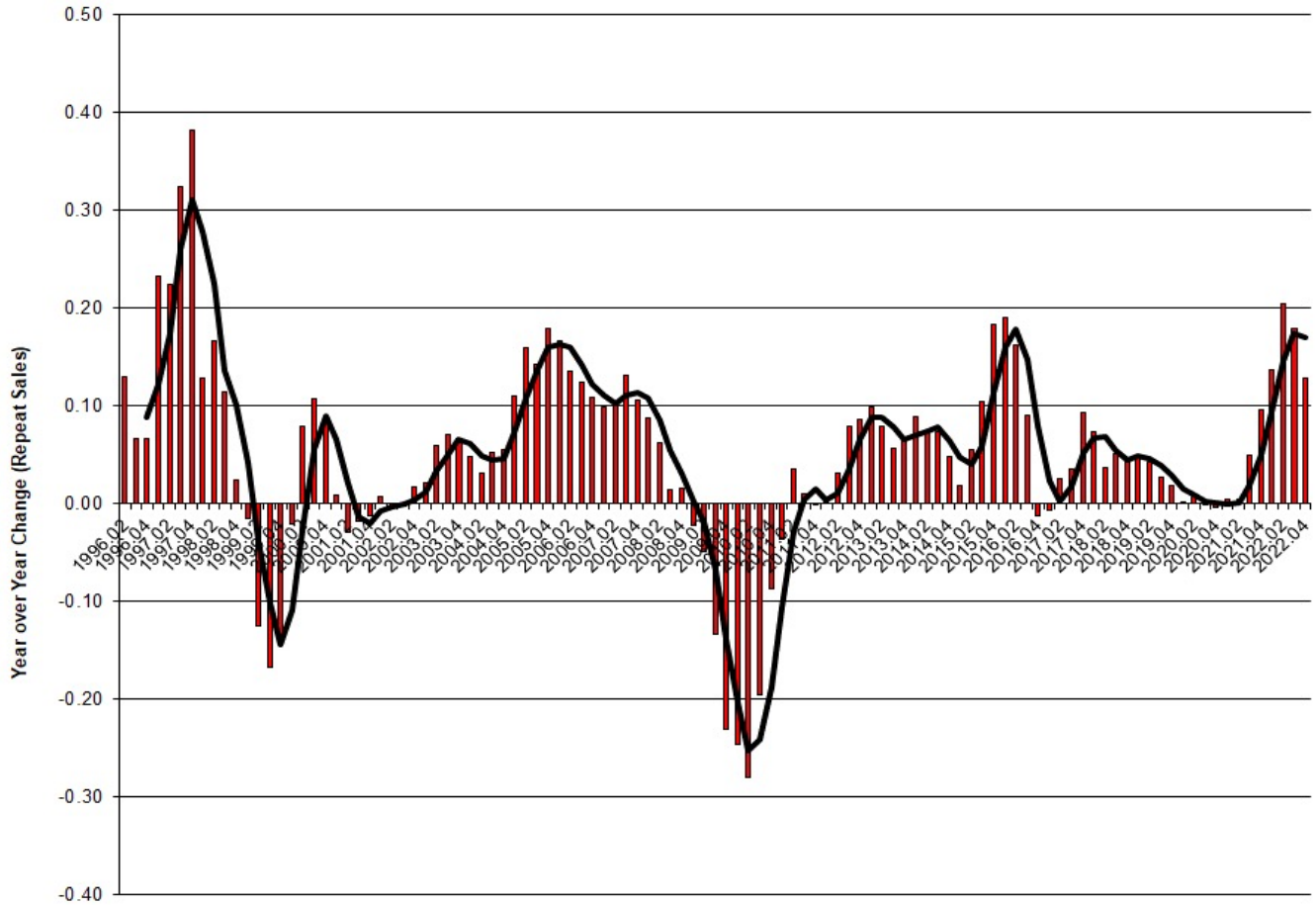
Sources: Cornell Center for Real Estate and Finance; CoStar, Real Capital Analytics

Moving Average, Indicating a Buy-or-Hold. Hotel Prices Remain Above Statistical Highs, Based on a 5-year Window. Since most hotels that sell frequently tend to be small hotels, it is not surprising that (as is the case for all small hotels), hotels that tend to sell frequently (*i.e.*, have repeat sales), rose in price this quarter, albeit slightly (0.4%), as well as year over year (up 12.8%; see also Exhibit 16). As with all small hotels, our repeat-sale indicator remains above both its short-term moving average (228.05>199.09) and its long-term moving average (228.05>191.80; see Exhibit 14). This indicates that these hotels

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

EXHIBIT 16

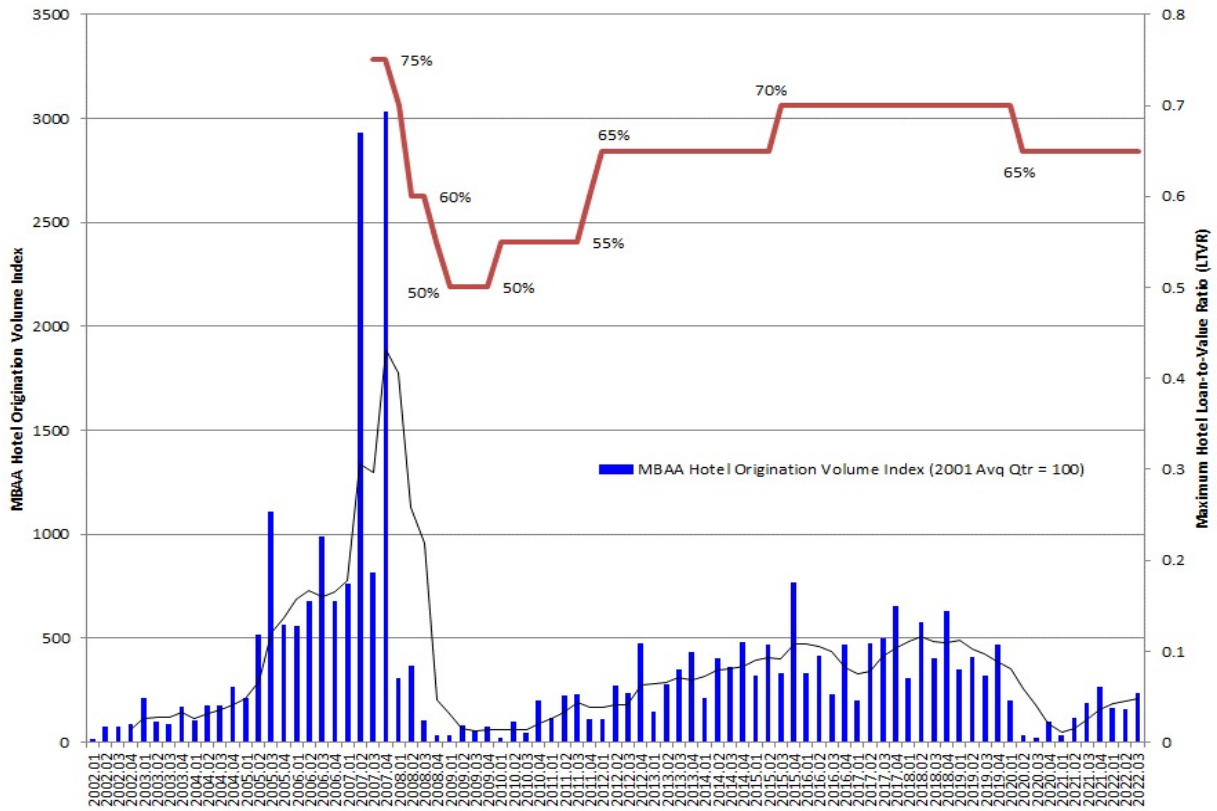
Standardized unexpected price (SUP) for hotel repeat-sale index (full sample)



continue to represent a buy opportunity. Our SUP performance metric in Exhibit 15 indicates that the standardized price based on its 5-year moving average remains above its statistical upper boundary, although it is now below its 3-year moving average.

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

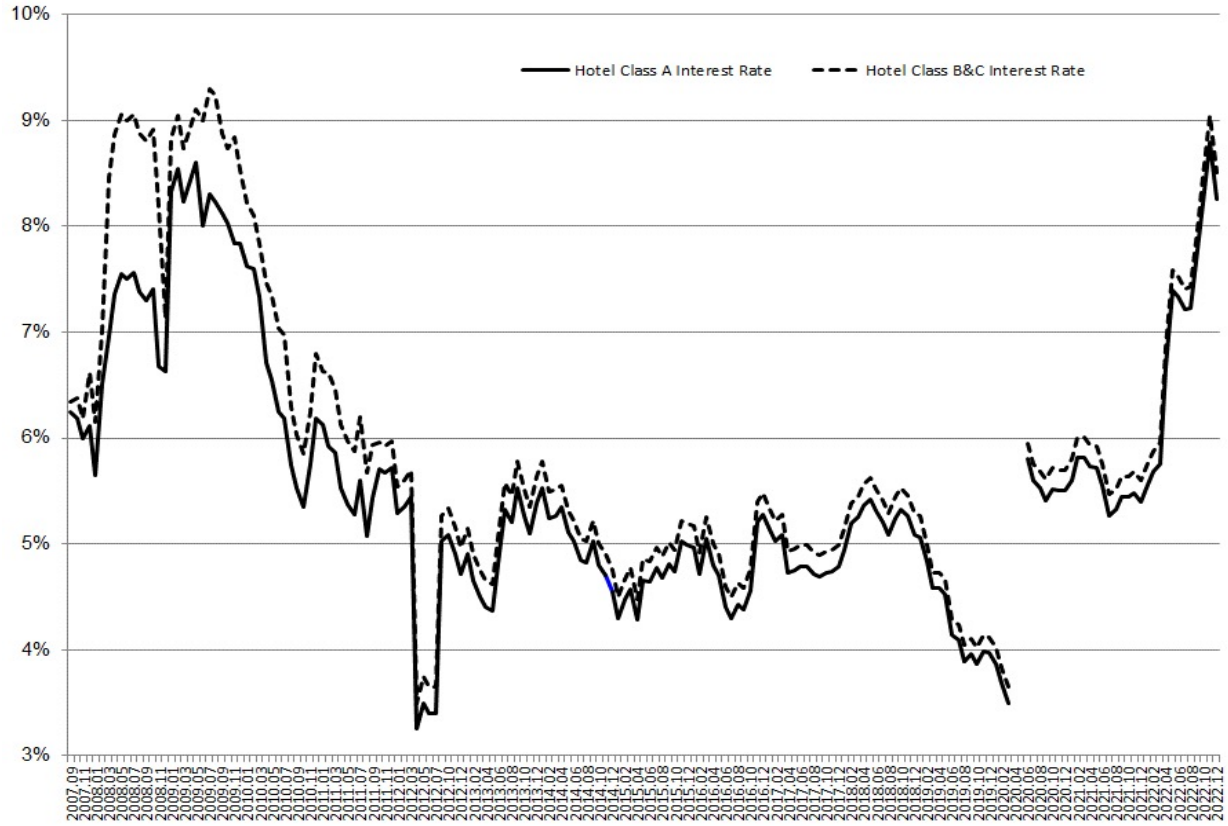
MBAA Hotel Origination Volume Index (2001 Avg Qtr = 100)	
2022Q1	166
2022Q2	162
2022Q3	236
Quarter over Quarter	45.7%
Year over Year	24.2%

Mortgage Financing Volume Rose Nearly 50% for the Most Recent Quarter Reported. Exhibit 17 shows that the mortgage origination volume for hotels as reported for the third quarter of 2022 rose 46 percent.[2] Loan volume was also 24-percent ahead of the volume from a year earlier (year over year). The maximum loan-to-value (LTV) ratio for hotels continues at 65 percent.

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

EXHIBIT 18

Interest rates on Class A versus Class B & C hotels



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

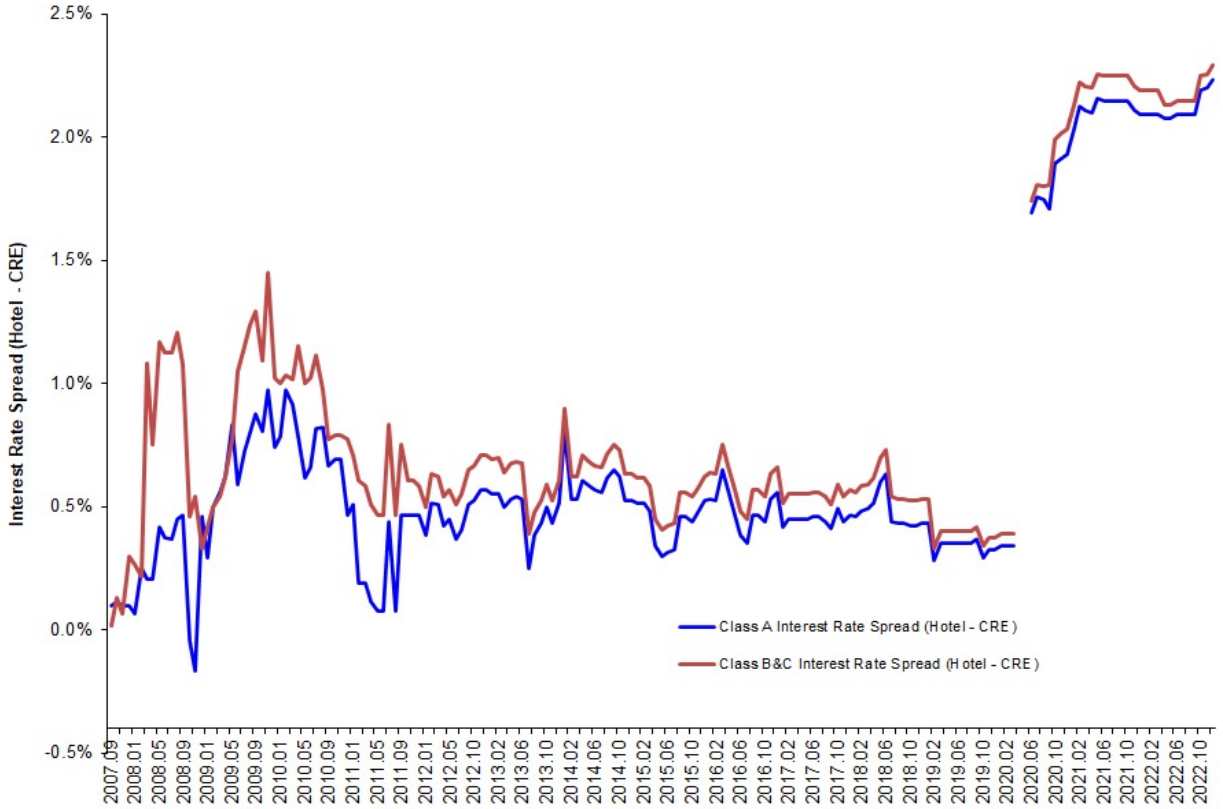
	Interest Rates Full-Service Hotels		Interest Rate Spread (Hotel – CRE)		Interest Rate Spread (Hotel – 10 Yr TBond)	
	Class A	Class B&C	Class A	Class B&C	Class A	Class B&C
December 2021	5.40%	5.60%	2.09%	2.19%	3.90%	4.10%
September 2022	7.77%	7.97%	2.09%	2.15%	4.50%	4.70%
December 2022	8.25%	8.50%	2.23%	2.29%	4.70%	4.95%
Quarter over Quarter	6.0%	6.6%	6.8%	6.6%	4.4%	5.3%
Year over Year	52.8%	51.8%	6.8%	4.6%	20.5%	20.7%

The Cost of Hotel Debt Financing Rose Sharply This Quarter as Well as Year over Year. Lenders Are Requiring Relatively More Compensation for Hotel Loans Relative to Other CRE and the 10-year Risk-free Rate Due to Increased Perceived Risk. The cost of obtaining hotel debt financing, as reported by Cushman Wakefield Sonnenblick Goldman, continues to rise this quarter as well as year over year.[3] The interest rate as of December 5, 2022, was 8.25 percent for full-service Class A hotels, and 8.5 percent for Class B&C properties. Those rates are up from 7.8 percent for Class A and 8 percent for Class B&C, recorded in September 2022. That represents a 6- to 6.6-percent increase in interest rates over a three-month period. Looking farther back, these rates represent more than a 50-percent rise in hotel interest rates over the prior December period, when interest rates on Class A stood at 5.4 percent and those for Class B&C were 5.6 percent. This rise in interest rates is worrisome, as it makes hotel deals less attractive near term. Exhibit 18 displays the historical time series graph of hotel interest rates.

[3] 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 19

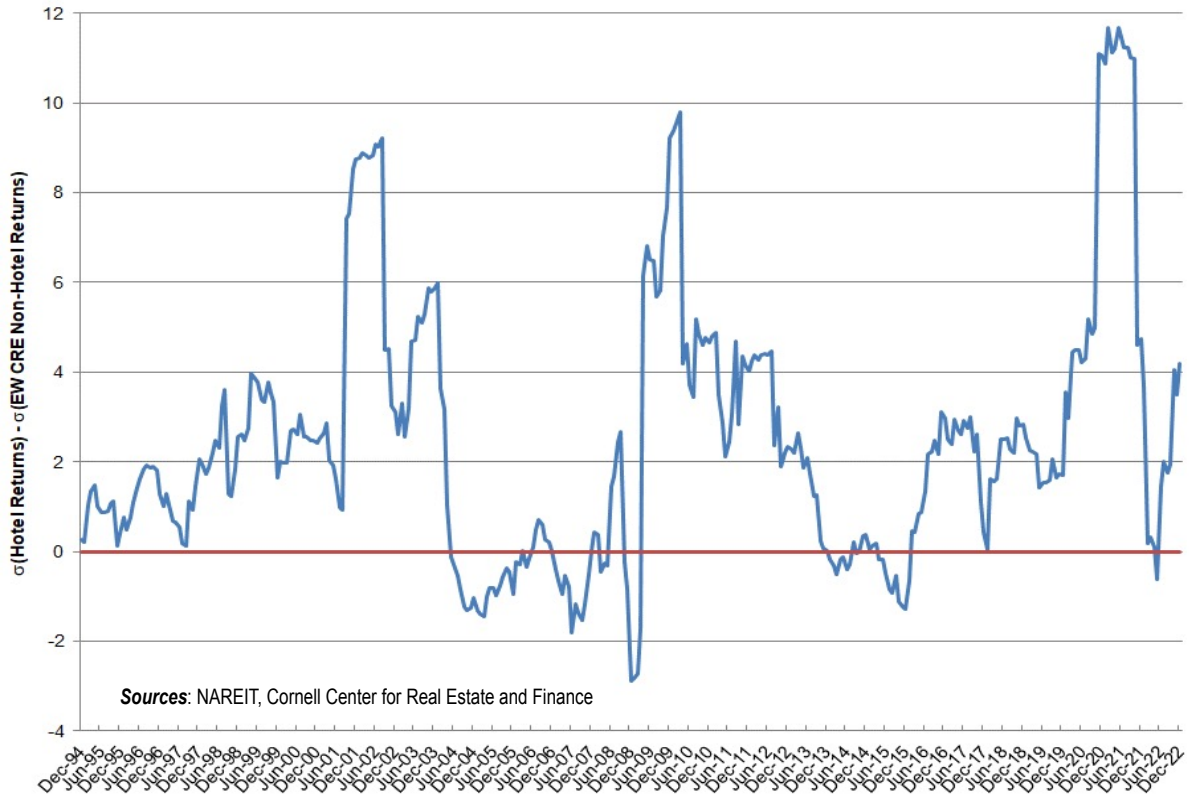
Interest rate spreads of hotels versus non-hotel commercial real estate



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

EXHIBIT 20

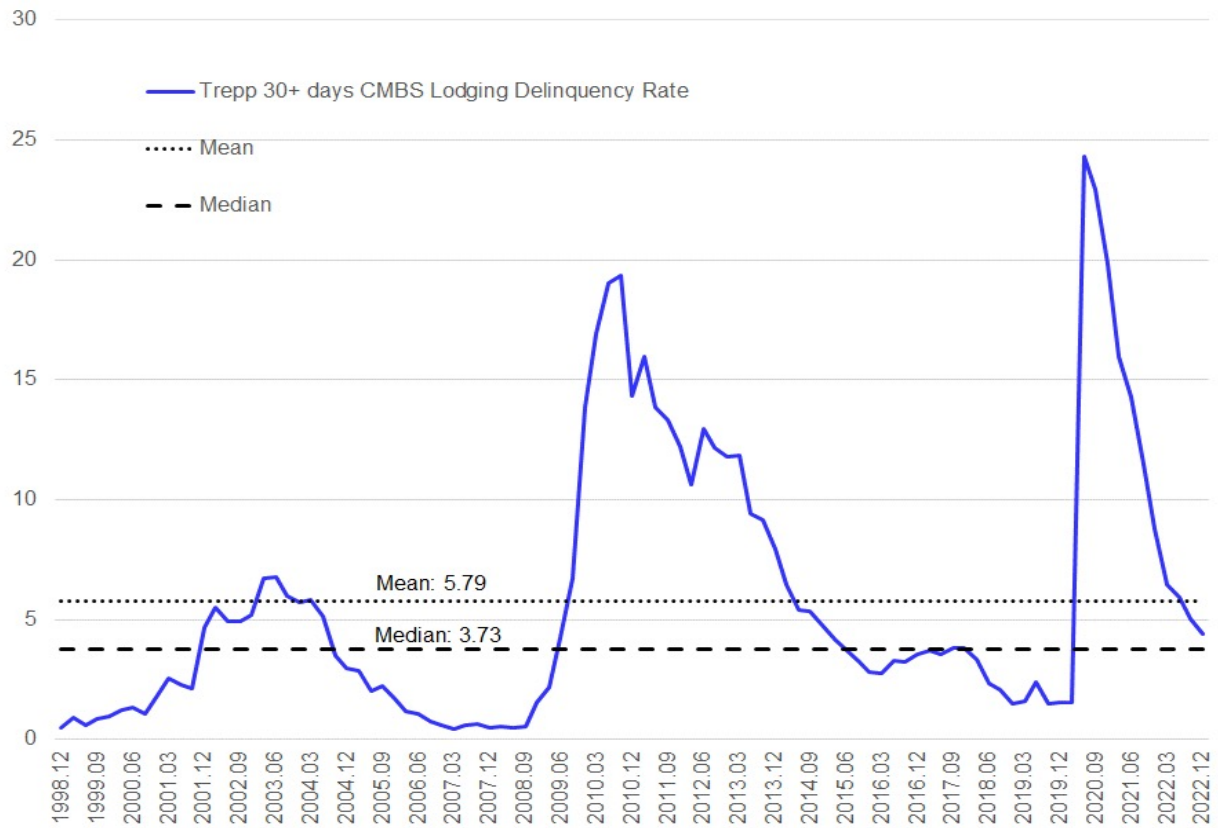
Risk differential between hotel REITs and non-hotel commercial-property REITs



Sources: NAREIT, Cornell Center for Real Estate and Finance

EXHIBIT 21

30-plus-day delinquency rate for hotels



Source: Trepp

	Trepp 30+ days CMBS Lodging Delinquency Rate				
	Lodging	**Industrial**	**Multifamily**	**Office**	**Retail**
2021 December	8.79	0.52	1.76	2.53	8.28
2022 September	5.02	0.43	0.93	1.58	6.61
2022 December	4.40	0.42	2.17	1.58	6.97
Quarter over Quarter	-12.4%	-2.3%	133.3%	0.0%	5.4%
Year over Year	-49.9%	-19.2%	23.3%	-37.5%	-15.8%

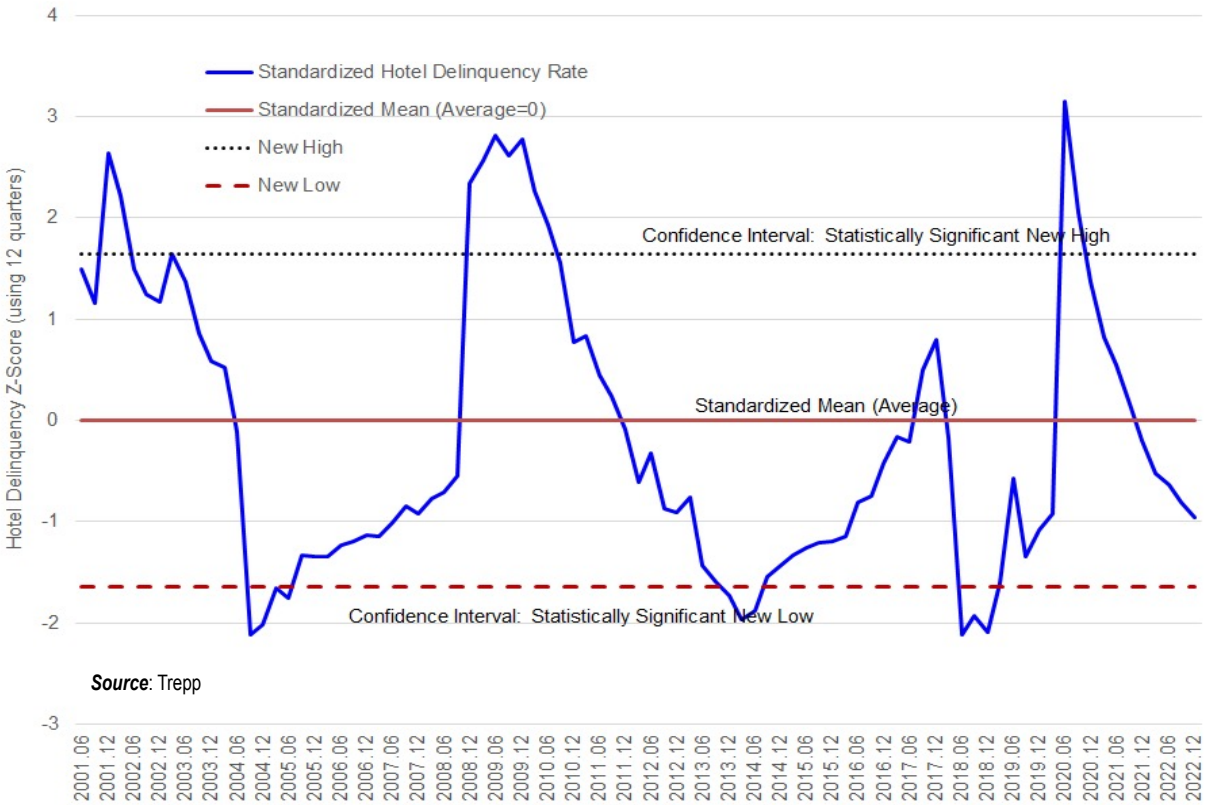
To evaluate the risk embodied in hotel interest rates, we compare the interest rate on hotels to other types of commercial real estate (CRE). The interest rate spread for both higher quality (Class A) and lower quality (Class B&C) hotels has increased 14 basis points (bps) this quarter from the previous quarter, indicating that lenders are demanding additional compensation to make hotel loans, as compared to loans on other major property types, given the increased relative risk for hotels. 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 widened by at least 20 bps for both Class A and Class B&C hotels, from 4.5 percent to 4.7 percent for Class A (and 4.7 percent to 4.95 percent for Class B). In short, lenders are requiring higher compensation relative to the risk-free rate.

Another way to view default risk is to look at the equity market. Exhibit 20 shows that the total risk of hotel REITs relative to the total risk of an equally weighted portfolio of commercial real estate equity REITs (that is, office, industrial, retail and multifamily).[4] The risk differential, which should reflect the risk that is unique to hotel properties, is currently at 4.18 percent ($\sigma_{Hotel} - \sigma_{CRE}$ = 11.11% - 6.93%), up substantially from 1.96 percent in the prior quarter ($\sigma_{Hotel} - \sigma_{CRE}$ = 9.63% - 7.67%). This indicates that the perceived 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 pricier for hotels relative to other major property types.

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

EXHIBIT 22

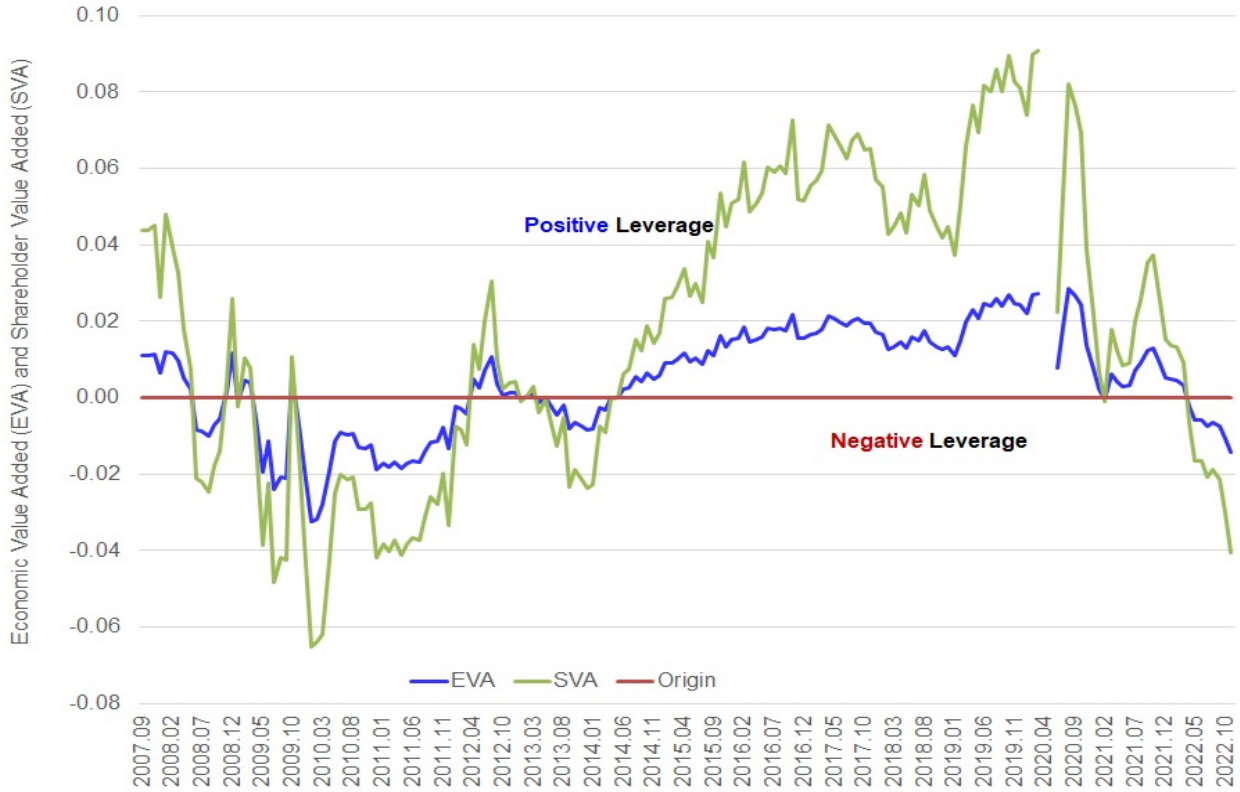
Standardized 30-plus-day delinquency rate for hotels



Source: Trepp

EXHIBIT 23

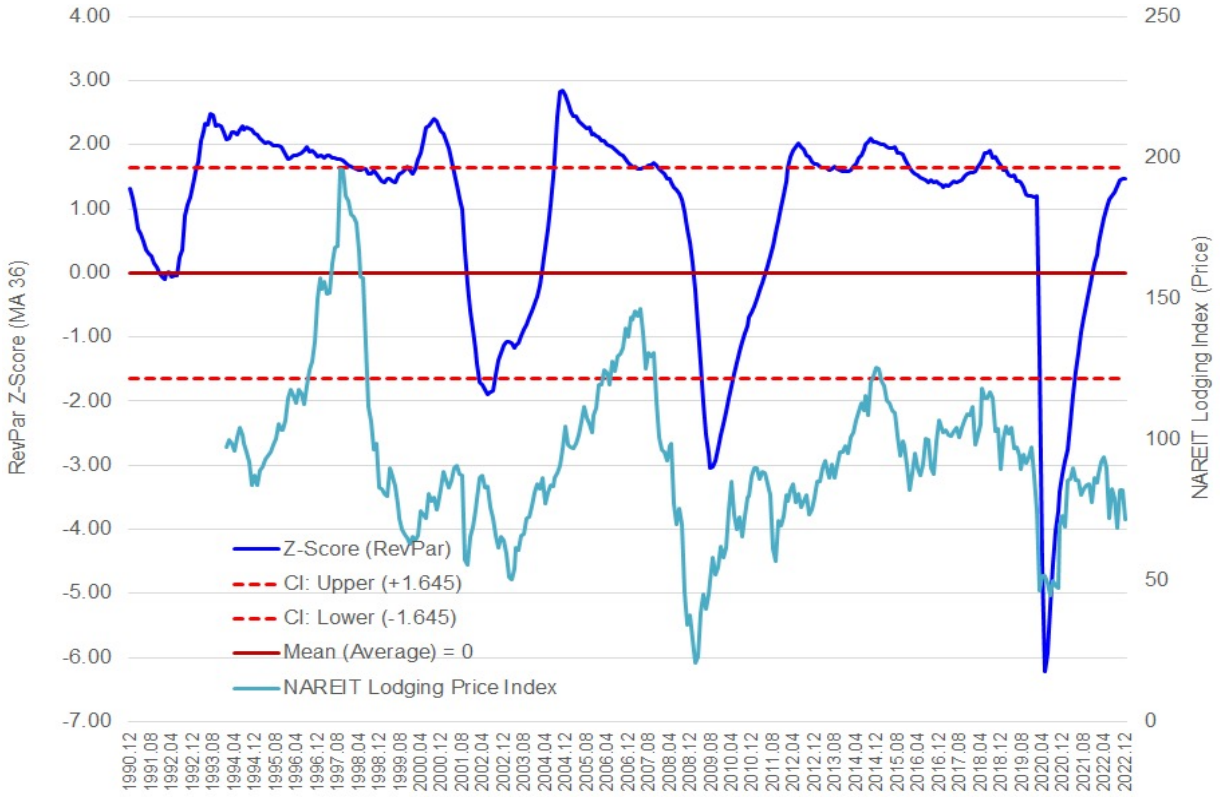
Economic value added (EVA) and equity (shareholder) value added (SVA) for hotels



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



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

	ROIC	WACC	EVA	ROE	Cost of Equity	SVA
November 2021	8.60%	6.87%	.96%	11.8%	9.05%	2.75%
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%
November 2022	8.66%	10.07%	-1.42%	6.93%	11.00%	-4.05%

Note: ROIC is the return on invested capital (cap rate), WACC is the weighted average cost of capital, EVA is economic value added, ROE is the return on equity or cash on cash, and SVA is shareholder value added.

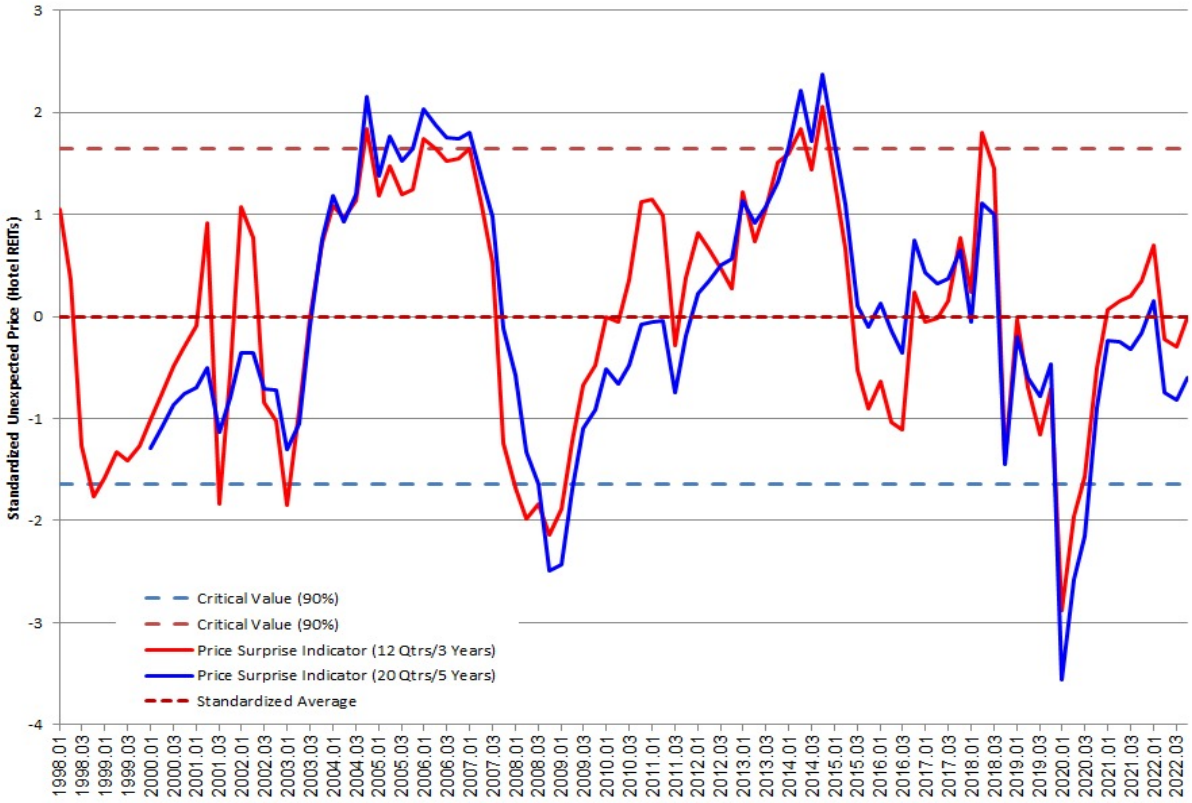
The Delinquency Rate on Hotel Loans Continues to Decline toward Its Pre-pandemic Level. The CMBS delinquency rate (30+ days) for lodging properties in December was 4.4 percent, down from 5.02 percent in the previous quarter (September 2022) and 8.8l percent in the previous year (December 2021). This is a good sign that hotels continue to revert to their pre-pandemic delinquency rate of approximately 1.5 percent (December 2018–March 2020). The 4.4-percent hotel delinquency rate is lower than the retail delinquency rate of 7 percent, but higher than that of other property types, namely, office (1.58%), multifamily (2.17%), and industrial (.42%). 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.

Cost of Borrowing Exceeds Return for Hotels. Our economic value added (EVA) or economic profit is -1.42 percent, while the shareholder value added (SVA) stands at -4.05 percent. Indeed, both the EVA and SVA have been in decline since April 2022. This indicates that economic profit for hotels is negative. That is, the return on hotels (EVA) is less than their total borrowing cost, and the return on equity for hotels (SVA) is less than their cost of equity. Consequently, the return on hotels is driven mainly from anticipated future price gains. Exhibit 23 depicts the historical EVA and SVA hotel performance. The accompanying table shows return on invested capital (cap rate), weighted average cost of capital, and return on equity or cash on cash.

Our Reading of the Tea Leaves Suggests that in the Near Term We Should See Slower to Negative Price Momentum for Large Hotels, but Positive Price Momentum for Smaller Hotels. As predicted in our prior report, the standardized unexpected RevPAR continued to exhibit positive price momentum, increasing from 1.36 in September to 1.47 in December, as shown in Exhibit 24. The NAREIT Lodging Price Index increased from 71.84 last quarter to 75 this quarter, reversing the decline in the prior quarter. The standardized

EXHIBIT 25

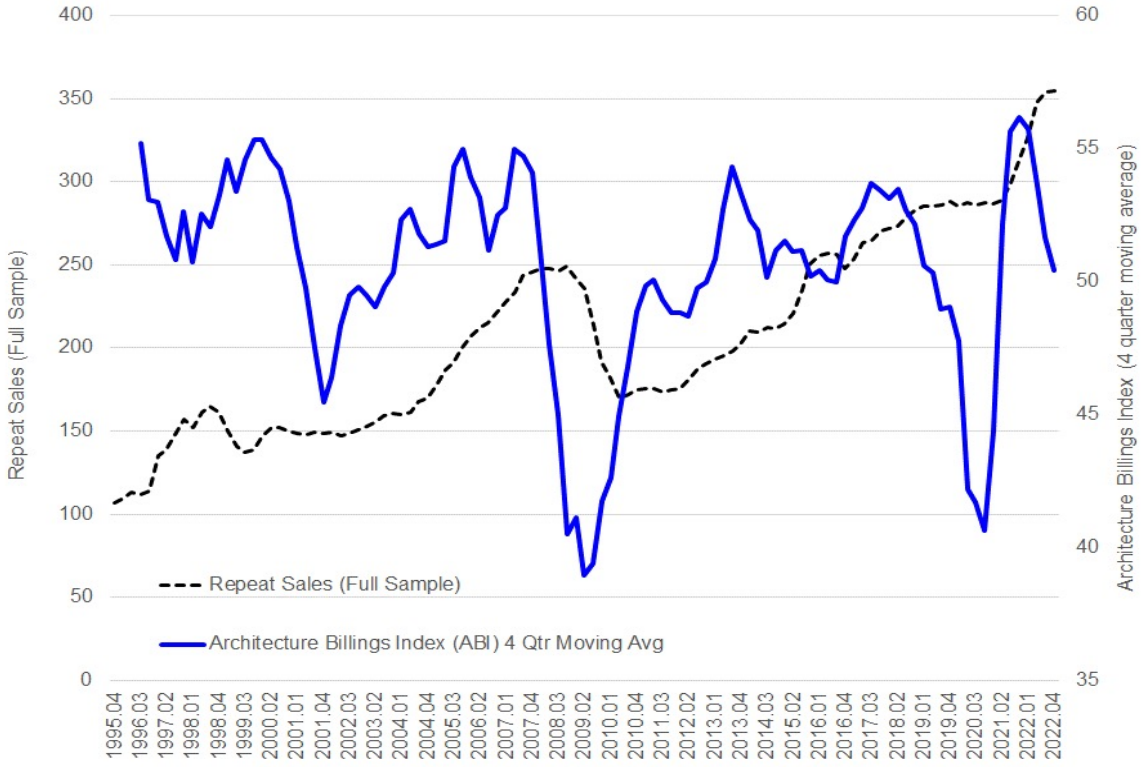
Standardized unexpected NAREIT lodging/resort price index



Sources: Cornell Center for Real Estate and Finance, NAREIT

EXHIBIT 26

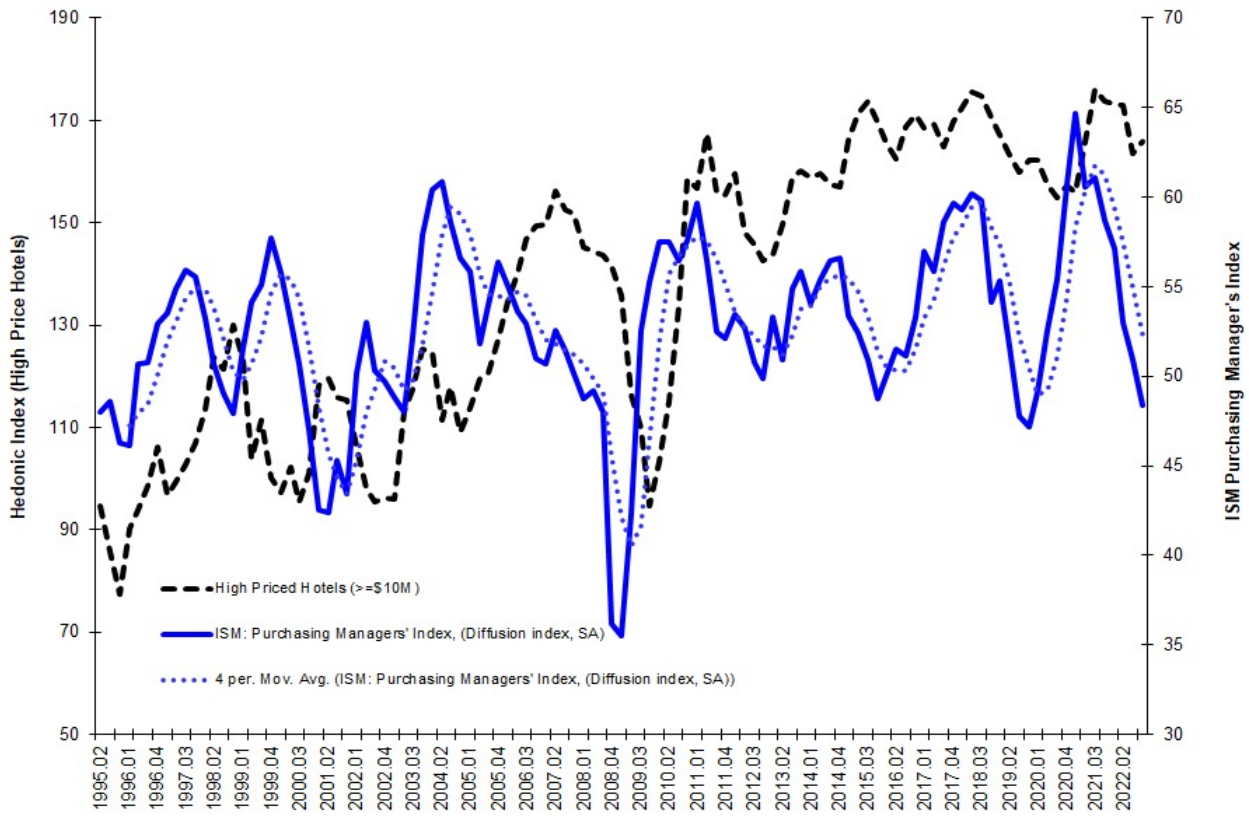
Repeat sales index versus the architecture billings index



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)

unexpected price of the NAREIT Lodging Index is currently hovering 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 our hotel price index based on repeat sales to decline near term.

The architecture billings index (ABI) for commercial and industrial property shown in Exhibit 26 remained relatively constant at .4 percent this quarter (based on the November 2022 report) but increased about 13 percent from the prior year.[5] Based on the moving average of the ABI index, which trended down on both a quarter-over-quarter (-2.4%) and year-over-year (-10.2%) basis, we should expect price momentum to trend downwards in the next period.

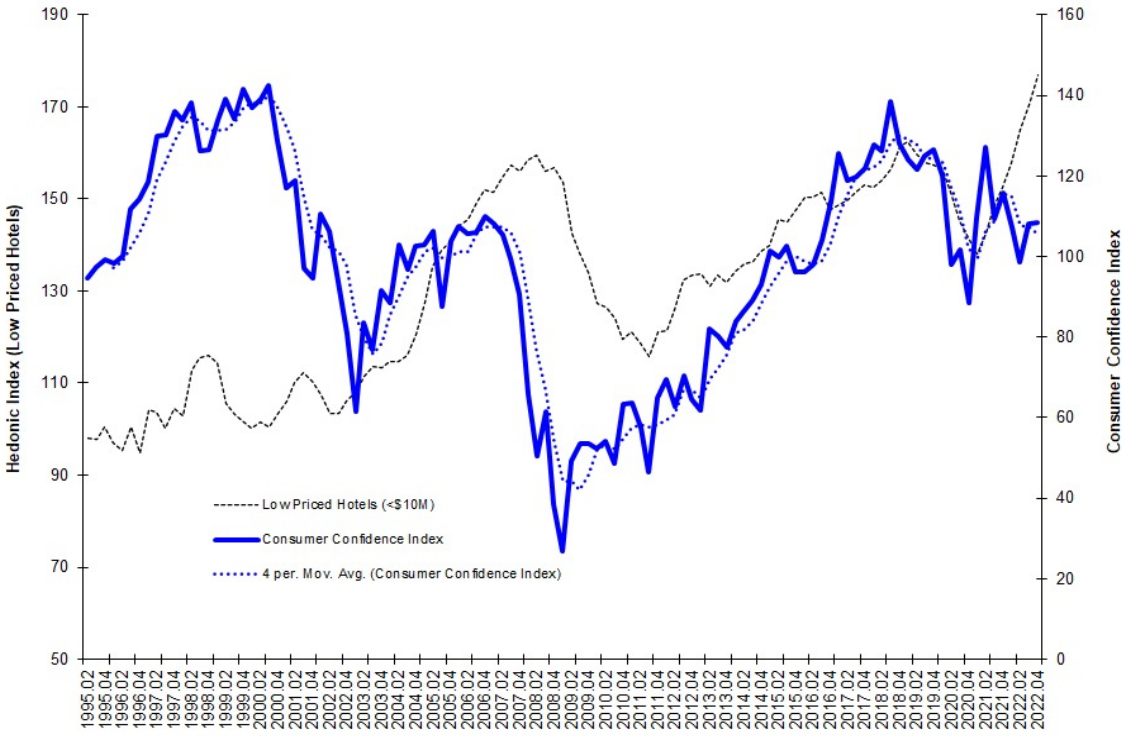
The National Association of Purchasing Managers (NAPM) index shown in Exhibit 27, an indicator of anticipated business confidence, fell 5 percent this quarter compared to a 4-percent decline last quarter.[6] It also declined 17.5 percent year over year, down from the 16.7-percent year-over-year decrease

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

[6] 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



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

in the prior period. Thus, we expect the prices of high-price hotels to decline in the near term.

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 (<$10 million), remained essentially unchanged at 0.3 percent this quarter, although it decreased 6.5 percent year over year. Expect low-price hotels to rise near term based on a four-quarter moving average of the Consumer Confidence Index.

We also look at the expected growth rate in Wall Street analysts' earnings (revenue) estimates for hotel REITs, both in terms of next-quarter earnings per share (EPS) and annual EPS.[7] Exhibit 29 indicates that analysts are expecting the quarterly EPS growth rate to rise between 57 percent (median) and 119 percent (mean) and annual EPS growth rate to rise between 206 percent (median) and 569 percent (mean). Since analysts' estimates reflect the earnings guidance from management, this suggests that we should expect prices to rise, reflecting continued positive guidance regarding the EPS. This is converse to what are other indicators are projecting. ■

[7] We obtain the growth rate in earnings and revenue estimates from https://www.earningswhispers.com.

Hotel Valuation Model (HOTVAL) Has Been Updated

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

EXHIBIT 29

Analysts' forecasts of hotel REIT earnings

Earnings Growth					
E(QEPS)	Median	Mean	StDev	Min	Max
2020Q2	-158.0%	-162.2%	26.9%	-226.2%	-116.3%
2020Q3	-163.0%	-305.3%	529.9%	-2214.3%	-91.1%
2020Q4	-153.3%	-239.9%	229.9%	-866.7%	-90.6%
2021Q1	-241.2%	-389.5%	352.1%	-1400.0%	-76.5%
2021Q2	97.8%	101.6%	52.0%	59.7%	272.7%
2021Q3	136.4%	191.1%	137.4%	99.6%	625.0%
2021Q4	162.5%	381.5%	669.0%	97.1%	2700.0%
2022Q1	150.0%	313.3%	568.6%	-30.0%	2300.0%
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%
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%
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%
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%

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

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.[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 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.

[1] 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.

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:

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

Standard Deviation (σ) = 18.99

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

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