

Cornell Hotel Indices: Third Quarter 2017

Bigger Is Not Better: Smaller Hotels Outperform Larger Hotels

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

EXECUTIVE SUMMARY

Our moving average trend lines, supported by our standardized unexpected price (SUP) performance metrics, indicate a positive price momentum for smaller hotels with a decline for larger hotels. The return on invested capital for hotels exceeded total borrowing cost this quarter, resulting in a positive economic value added. This was partly attributable to a slight decline in the cost of debt financing, with no change in the cost of equity financing during the current quarter. The total risk of hotel REITs relative to the total risk of equity REITs as a whole has declined during the recent period. If this trend continues, expect lenders to loosen lending standards, at best, or maintain current lending standards, at worst. Expect the price of large hotels and smaller hotels to rise per our leading indicators of hotel price performance. This is report number 24 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*, *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 also 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*. 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 Graaskamp, and a Ph.D. in finance and real estate from the University of Texas under Dr. Vijay Bawa.



Adam D. Nowak is an assistant 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. Nowak taught an introduction to macroeconomics course and a survey of international economics at Arizona State. 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 *Journal of Urban Economics*, *Regional Science and Urban Economics*, *Journal of Applied Econometrics*, 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. 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, 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. 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 is also a member of numerous industry organizations and a supporter of academic studies. 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

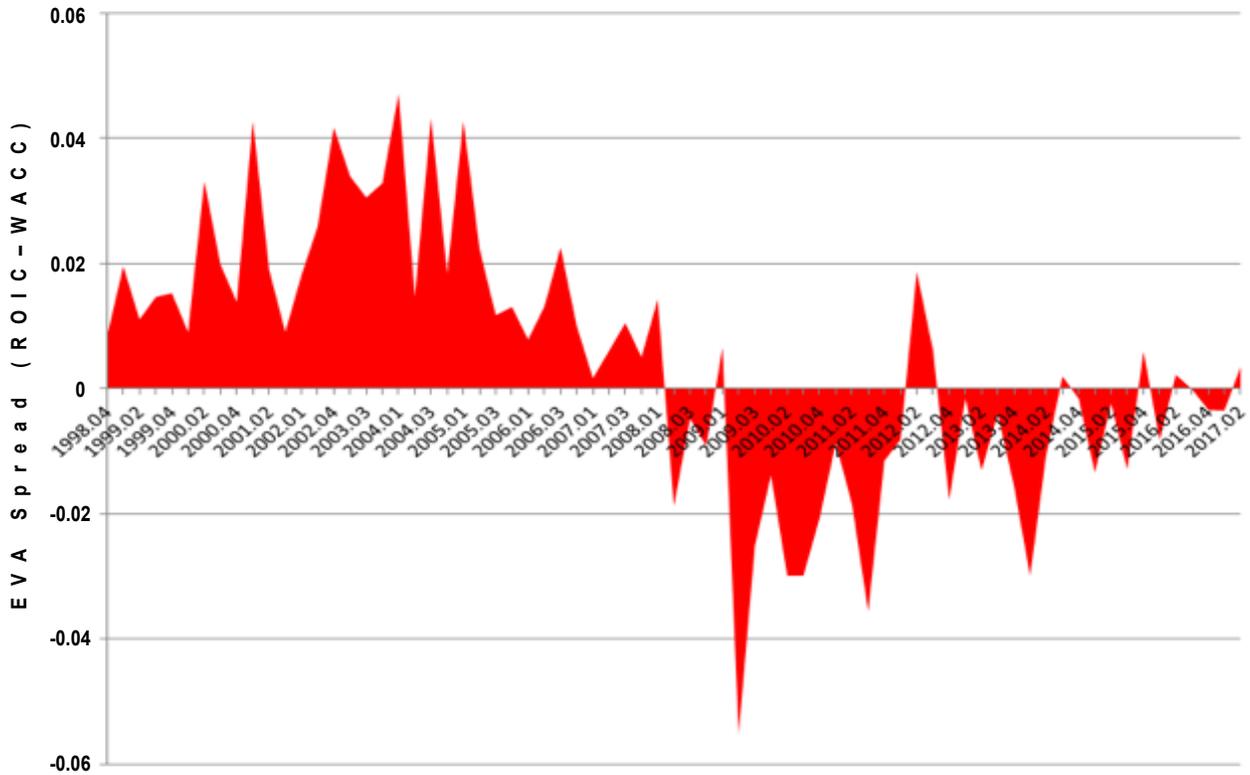
We wish to thank Glenn Withiam for copy editing this paper.

Disclaimer

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EXHIBIT 1

Economic value added (EVA) for hotels

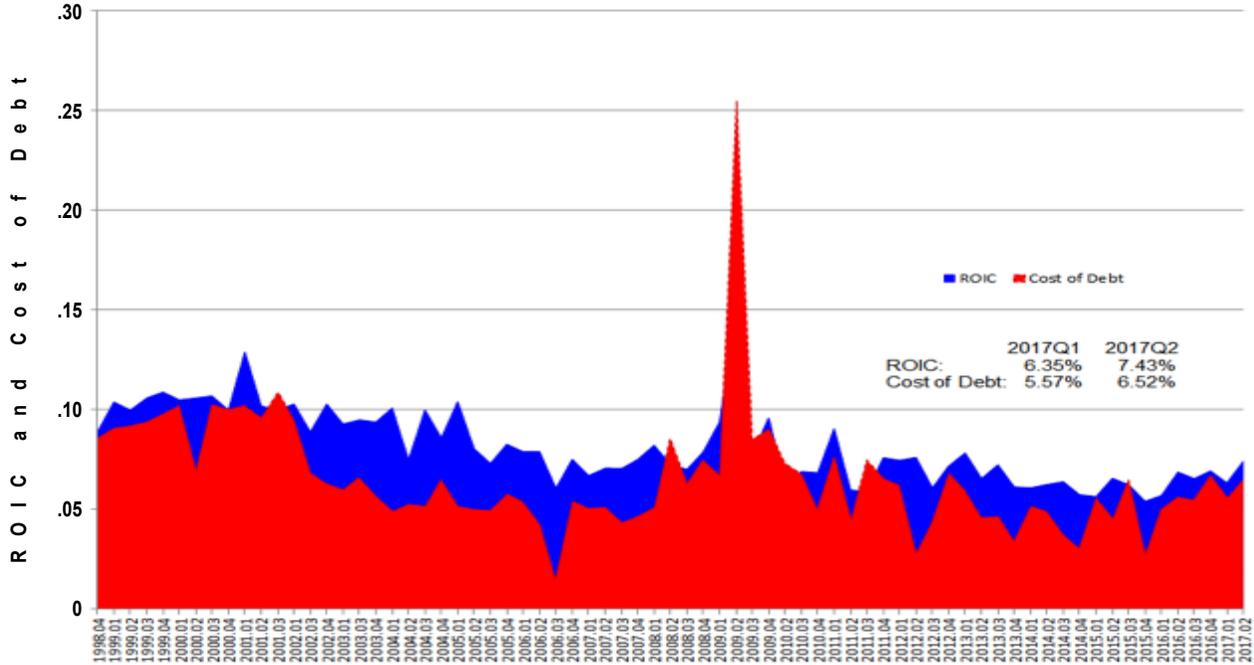


Sources: ACLI, Cornell Center for Real Estate and Finance, NAREIT, Federal Reserve

Analysis of Indices through Q3, 2017

Hotel investment based on operating performance has turned green (profitable). Our Economic Value Added (EVA) indicator shown in Exhibit 1 has turned slightly positive. Although the cost of debt financing has risen from 5.57 percent in 2017Q1 to 6.52 percent in 2017Q2, the ACLI hotel cap rate also increased from 6.35 percent (2017Q1) to 7.43 percent (2017Q2). Thus, as suggested in Exhibit 2, *positive leverage* continues to be the norm for hotels. In summary, these two exhibits signal a positive market trend.

Return on investment capital versus cost of debt financing



Sources: ACLI, Cornell Center for Real Estate and Finance

About the Cornell Hotel Indices

In our inaugural issue of the Cornell Hotel Index series, we introduced three new quarterly metrics to monitor real estate activity in the hotel market. These are a large hotel index (hotel transactions of \$10 million or more), a small hotel index (hotels under \$10 million), and a repeat sales index (RSI) that tracks actual hotel transactions. These indices are constructed using the CoStar and Real Capital Analytics (RCA) commercial real estate databases. For the repeat-sale index, we compare the sales and resales of the same hotel over time. All three measures provide a more accurate representation of the current hotel real estate market conditions than does reporting 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 (CREF). In this fourth edition, we present updates and revisions to our three hotel indices along with commentary and supporting evidence from the real estate market.

The median price of hotels remained unchanged this quarter on weaker transaction volume, but both price and volume were up on a year-over-year basis. The median price of hotels remained unchanged, while the total volume of all hotel transactions (327 for both large hotels and small hotels combined, as reported in Exhibit 3) was lower than the 334 transactions reported in the previous quarter. However, on a year-over-year basis (2016Q3 vs 2017Q3), both the volume of hotel transactions and the median price of hotels rose (14.7% for transaction volume, and 3.6% for median price). A comparison of large hotels to small hotels on a year-over-year basis reveals that the median price of large hotels declined 7 percent on higher volume (19.2%), while the median price of smaller hotels rose 6.7 percent, also on higher volume (13.2%).¹ A similar situation exists on a quarter-over-quarter basis, with the median sale price of large hotels falling 7 percent compared to a 2.7-percent rise in the median sale price of smaller hotels. The change in median sale price for both large and small hotels occurred on weaker transaction volume (a drop of approximately 2 percent in each case). Exhibit 4 and Exhibit 5 show this

¹ The number of transactions is limited to the sales that are included in the hedonic index, and does not represent total market activity.

Transaction volume (obs) and median sale price (part 1: 1995–2004)

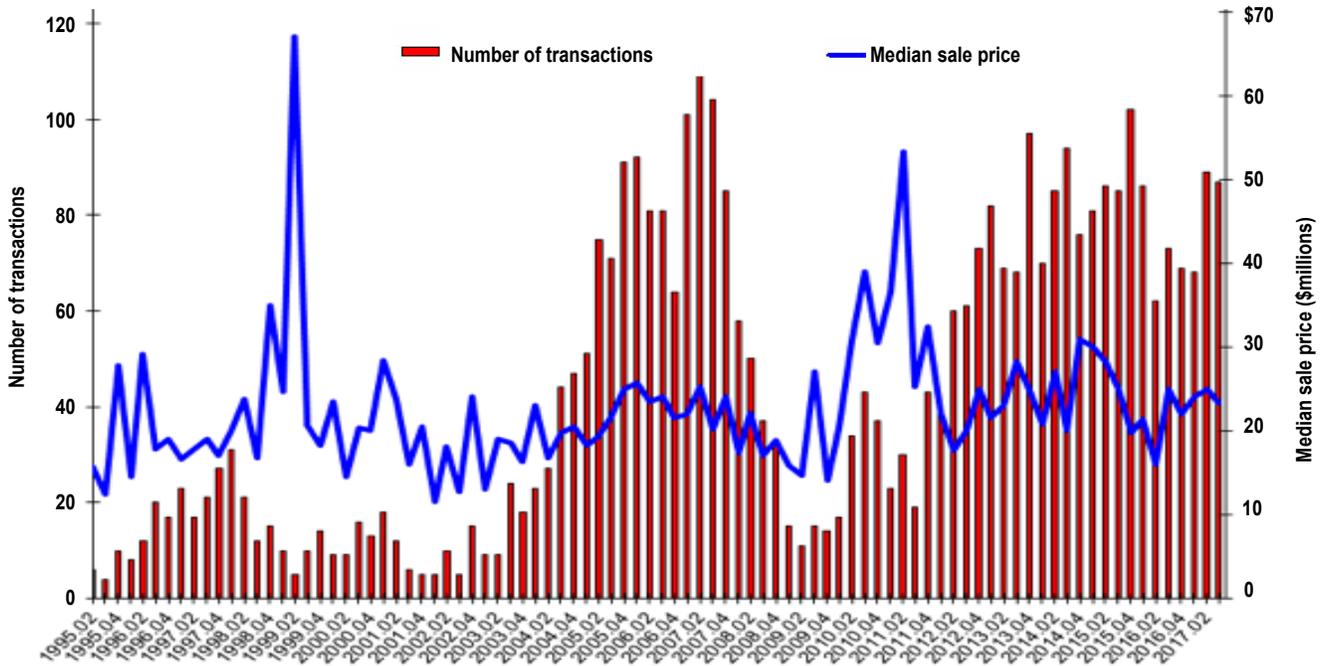
Year	Quarter	Full Sample		Big			Small		
		Median Sale Price	Obs	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
1995	1	2,357,500	20				2,357,500	20	
1995	2	3,150,000	29	15,712,500	6	20.69%	2,670,000	23	79.31%
1995	3	2,562,500	44	12,400,000	4	9.09%	2,378,000	40	90.91%
1995	4	3,400,000	41	27,750,000	10	24.39%	2,625,000	31	75.61%
1996	1	2,500,000	39	14,475,000	8	20.51%	1,700,000	31	79.49%
1996	2	2,925,000	43	29,150,000	12	27.91%	2,500,000	31	72.09%
1996	3	6,500,000	57	17,740,000	20	35.09%	3,000,000	37	64.91%
1996	4	2,735,000	58	19,000,000	17	29.31%	2,200,000	41	70.69%
1997	1	5,053,250	74	16,635,500	23	31.08%	3,500,000	51	68.92%
1997	2	2,862,500	72	17,750,000	17	23.61%	2,150,000	55	76.39%
1997	3	3,437,500	90	19,000,000	21	23.33%	2,400,000	69	76.67%
1997	4	4,330,950	78	17,000,000	27	34.62%	2,300,000	51	65.38%
1998	1	4,698,800	92	20,000,000	31	33.70%	3,100,000	61	66.30%
1998	2	3,630,000	96	23,765,000	21	21.88%	3,000,000	75	78.13%
1998	3	2,961,059	92	16,740,000	12	13.04%	2,690,550	80	86.96%
1998	4	2,550,000	84	35,000,000	15	17.86%	2,375,000	69	82.14%
1999	1	2,425,000	88	24,638,095	10	11.36%	2,125,000	78	88.64%
1999	2	2,100,000	95	67,000,000	5	5.26%	1,950,000	90	94.74%
1999	3	2,500,000	99	20,711,100	10	10.10%	2,130,000	89	89.90%
1999	4	2,440,000	87	18,190,000	14	16.09%	2,090,000	73	83.91%
2000	1	2,400,000	110	23,500,000	9	8.18%	2,300,000	101	91.82%
2000	2	2,450,000	88	14,500,000	9	10.23%	2,275,000	79	89.77%
2000	3	2,600,000	95	20,346,875	16	16.84%	2,250,000	79	83.16%
2000	4	2,475,000	101	20,000,000	13	12.87%	2,325,000	88	87.13%
2001	1	2,970,650	104	28,437,500	18	17.31%	2,422,500	86	82.69%
2001	2	2,800,000	110	23,795,000	12	10.91%	2,687,150	98	89.09%
2001	3	2,700,000	87	16,000,000	6	6.90%	2,500,000	81	93.10%
2001	4	2,400,000	73	20,500,000	5	6.85%	2,300,000	68	93.15%
2002	1	2,125,000	70	11,518,052	5	7.14%	2,000,000	65	92.86%
2002	2	2,400,000	106	18,125,000	10	9.43%	2,287,500	96	90.57%
2002	3	2,355,400	81	12,750,000	5	6.17%	2,237,500	76	93.83%
2002	4	2,907,500	100	24,000,000	15	15.00%	2,600,000	85	85.00%
2003	1	2,530,000	94	13,000,000	9	9.57%	2,425,000	85	90.43%
2003	2	2,750,000	110	19,000,000	9	8.18%	2,519,000	101	91.82%
2003	3	3,333,000	141	18,500,000	24	17.02%	2,625,000	117	82.98%
2003	4	2,600,000	149	16,375,000	18	12.08%	2,425,000	131	87.92%
2004	1	2,925,000	166	23,050,000	23	13.86%	2,550,000	143	86.14%
2004	2	2,700,000	195	16,700,000	27	13.85%	2,475,000	168	86.15%
2004	3	3,491,122	216	19,675,000	44	20.37%	2,630,000	172	79.63%
2004	4	4,000,000	177	20,475,000	47	26.55%	3,085,500	130	73.45%

Transaction volume (obs) and median sale price (part 2: 2005–present)

Year	Quarter	Full Sample		Big			Small		
		Median Sale Price	Obs	Median Sale Price	Obs	% Total Sales	Median Sale Price	Obs	% Total Sales
2005	1	4,330,000	231	18,200,000	51	22.08%	3,350,000	180	77.92%
2005	2	4,566,250	316	19,316,925	75	23.73%	3,300,000	241	76.27%
2005	3	4,150,000	273	21,750,000	71	26.01%	3,100,000	202	73.99%
2005	4	4,425,000	300	25,000,000	91	30.33%	3,170,000	209	69.67%
2006	1	5,300,000	301	25,750,000	92	30.56%	3,800,000	209	69.44%
2006	2	4,675,000	314	23,500,000	81	25.80%	3,500,000	233	74.20%
2006	3	5,000,000	285	24,000,000	81	28.42%	3,657,500	204	71.58%
2006	4	4,587,500	248	21,600,000	64	25.81%	3,550,000	184	74.19%
2007	1	6,155,805	286	22,000,000	101	35.31%	3,789,500	185	64.69%
2007	2	5,650,000	385	25,250,000	119	30.91%	3,760,000	266	69.09%
2007	3	5,450,000	330	20,175,081	104	31.52%	3,911,750	226	68.48%
2007	4	4,680,000	249	24,000,000	85	34.14%	3,184,000	164	65.86%
2008	1	5,000,000	255	17,420,000	58	22.75%	4,000,000	197	77.25%
2008	2	5,062,900	228	22,150,000	50	21.93%	3,890,000	178	78.07%
2008	3	4,190,500	172	17,133,333	37	21.51%	3,350,000	135	78.49%
2008	4	4,050,000	159	18,850,000	32	20.13%	3,500,000	127	79.87%
2009	1	4,150,000	81	15,800,000	15	18.52%	3,600,000	66	81.48%
2009	2	3,090,231	86	14,722,500	11	12.79%	2,864,310	75	87.21%
2009	3	3,400,000	90	27,000,000	15	16.67%	3,000,000	75	83.33%
2009	4	3,562,500	84	14,100,000	14	16.67%	3,010,250	70	83.33%
2010	1	3,900,000	89	20,325,000	17	19.10%	2,912,500	72	80.90%
2010	2	3,700,000	138	30,833,449	34	24.64%	3,000,000	104	75.36%
2010	3	4,912,500	120	39,000,000	43	35.83%	2,850,000	77	64.17%
2010	4	3,988,800	100	30,500,000	37	37.00%	2,440,000	63	63.00%
2011	1	4,200,000	85	36,600,000	23	27.06%	2,797,750	62	72.94%
2011	2	4,200,000	97	53,350,000	30	30.93%	2,300,000	67	69.07%
2011	3	3,350,000	73	25,250,000	19	26.03%	2,800,000	54	73.97%
2011	4	5,000,000	157	32,400,000	43	27.39%	3,229,250	114	72.61%
2012	1	5,233,961	131	22,100,000	39	29.77%	3,337,500	92	70.23%
2012	2	4,000,000	209	17,600,000	60	28.71%	2,809,000	149	71.29%
2012	3	7,000,000	169	20,000,000	61	36.09%	3,202,000	108	63.91%
2012	4	5,622,500	207	24,933,226	73	35.27%	3,150,000	134	64.73%
2013	1	5,999,996	240	21,502,126	82	34.17%	3,000,000	158	65.83%
2013	2	4,700,000	217	23,000,000	69	31.80%	2,525,000	148	68.20%
2013	3	5,260,855	246	28,200,000	68	27.64%	3,600,000	178	72.36%
2013	4	4,633,750	316	24,800,000	97	30.70%	2,800,000	219	69.30%
2014	1	5,625,000	228	20,750,000	70	30.70%	3,300,000	158	69.30%
2014	2	4,300,000	321	27,000,000	85	26.48%	2,860,000	236	73.52%
2014	3	5,500,000	351	20,000,000	94	26.78%	3,450,000	257	73.22%
2014	4	4,550,000	312	30,920,684	76	24.36%	3,185,000	236	75.64%
2015	1	5,752,500	256	30,000,000	81	31.64%	3,162,100	175	68.36%
2015	2	6,300,000	269	28,250,000	86	31.97%	3,525,000	183	68.03%
2015	3	5,050,000	300	25,000,000	85	28.33%	3,025,000	215	71.67%
2015	4	6,700,000	293	19,750,000	102	34.81%	3,300,000	191	65.19%
2016	1	5,608,750	294	21,437,500	86	29.25%	3,415,000	208	70.75%
2016	2	4,100,000	324	15,950,000	62	19.14%	3,250,000	262	80.86%
2016	3	4,825,000	285	25,000,000	73	25.61%	3,225,000	212	74.39%
2016	4	4,050,000	264	22,000,000	69	26.14%	2,850,000	195	73.86%
2017	1	5,300,000	256	24,030,750	68	26.56%	3,693,112	188	73.44%
2017	2	5,000,000	334	25,000,000	89	26.65%	3,350,000	245	73.35%
2017	3	5,000,000	327	23,250,000	87	26.61%	3,440,500	240	73.39%

EXHIBIT 4

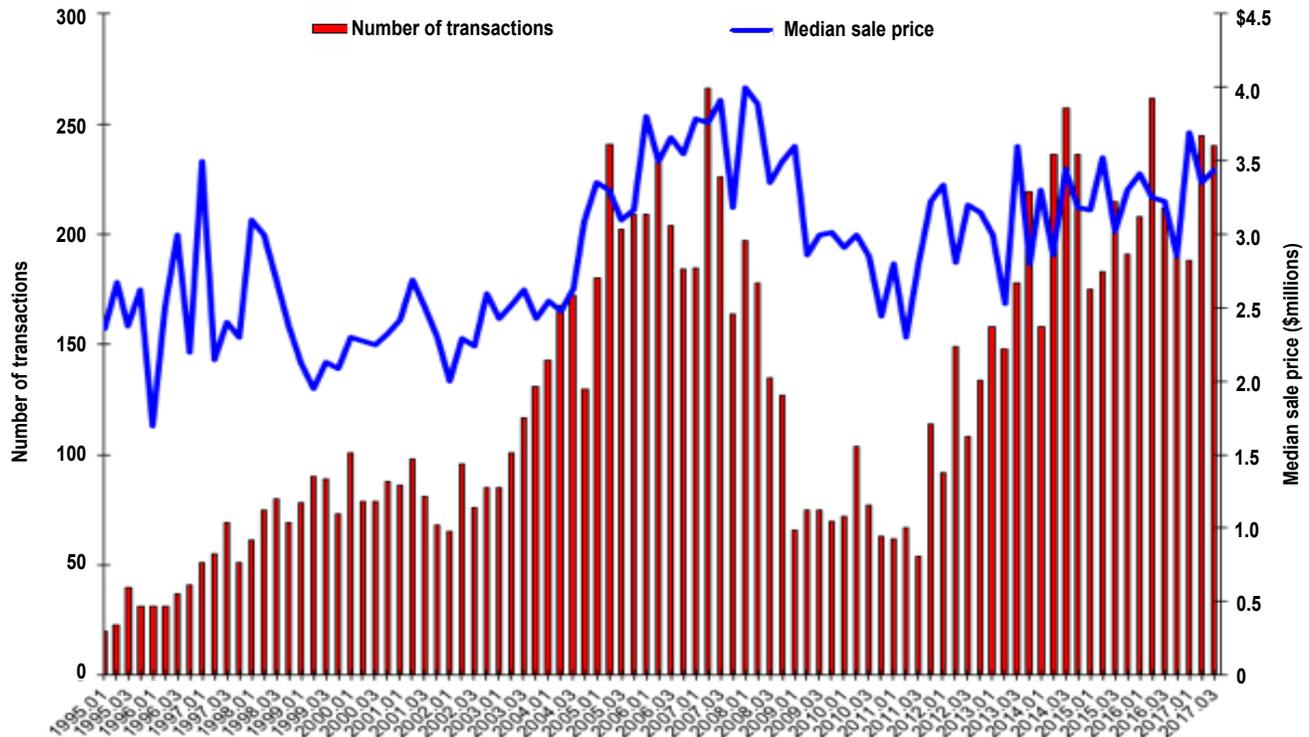
Median sale price and number of sales for high-price hotels (sale prices of \$10 million or more)



Sources: CoStar, Real Capital Analytics

EXHIBIT 5

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



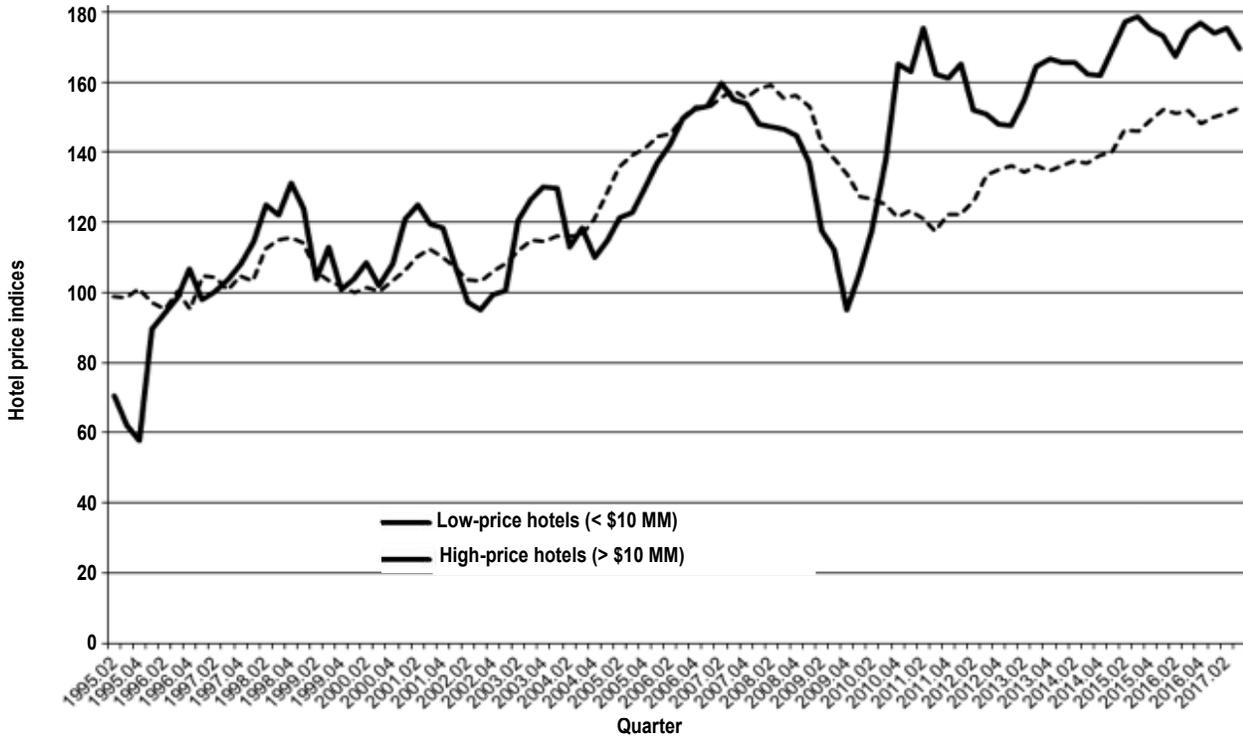
Sources: CoStar, Real Capital Analytics

EXHIBIT 6

Hotel indices through 2017, quarter 2

YrQtr	Index Value				YrQtr	Index Value			
	Hedonic	Hedonic	RSI	RSI		Hedonic	Hedonic	RSI	RSI
	Low Priced Hotels (<\$10M)	High Priced Hotels (>=\$10M)	Repeat Sales Index	Index Value Repeat Sales		Low Priced Hotels (<\$10M)	High Priced Hotels (>=\$10M)	Repeat Sales Index	Index Value Repeat Sales
1995.02	98.838022	70.511684	65.62802		2006.03	150.16221	149.30434	136.463	151.185
1995.03	98.583546	62.311263	68.80144		2006.04	152.88621	152.26652	141.067	157.7766
1995.04	101.03098	57.611844	70.26142		2007.01	152.65104	153.23751	143.734	158.402
1996.01	97.126123	89.616909	72.41481		2007.02	155.6575	159.69249	147.296	165.9421
1996.02	95.258144	93.830555	75.72659		2007.03	157.51187	154.97465	152.859	172.568
1996.03	100.25949	98.305096	75.11754		2007.04	155.6571	153.85259	152.44	168.2506
1996.04	95.102543	106.70723	74.27975		2008.01	158.1023	147.97273	153.8	182.0404
1997.01	104.61781	97.931018	88.70089		2008.02	159.23459	147.31714	152.832	167.5375
1997.02	104.27181	100.30641	91.21221		2008.03	155.38229	146.49131	150.493	161.0762
1997.03	100.74497	103.89853	96.55371		2008.04	156.15595	144.54799	152.644	170.7624
1997.04	104.66703	108.17798	103.037		2009.01	152.88717	136.95257	148.131	151.0542
1998.01	103.10151	114.4842	98.83674		2009.02	141.8322	117.80273	147.362	151.5209
1998.02	112.26066	124.97356	103.7573		2009.03	137.94395	112.35201	131.955	100.1753
1998.03	114.86751	122.01455	106.7465		2009.04	133.60415	94.951125	118.159	107.2932
1998.04	115.60174	131.19218	103.7978		2010.01	127.32254	105.39216	112.128	117.3516
1999.01	114.0562	123.84115	96.66384		2010.02	126.72875	117.60654	103.208	114.9663
1999.02	105.85352	103.82057	91.23635		2010.03	125.27382	137.85701	106.336	109.1382
1999.03	103.43834	112.99146	88.80367		2010.04	121.67158	165.14213	111.599	127.5094
1999.04	101.78747	100.98268	90.87791		2011.01	123.26153	163.06006	112.248	125.7373
2000.01	99.839559	103.79863	96.18498	100	2011.02	121.0199	175.4266	113.032	114.7092
2000.02	101.33548	108.69029	98.93479	104.6785	2011.03	117.60054	162.09648	113.202	107.9038
2000.03	100.26952	102.08116	97.90212	90.32616	2011.04	122.22889	161.04761	112.578	122.3942
2000.04	103.30265	108.2321	96.18264	96.38169	2012.01	122.1955	165.31112	112.871	118.6755
2001.01	106.32998	120.90675	95.49723	100.7835	2012.02	126.37322	151.94511	114.417	135.3936
2001.02	110.23084	124.85234	95.60192	103.9489	2012.03	133.73933	150.87644	119.188	124.6036
2001.03	112.4595	119.40164	95.54327	97.64858	2012.04	135.00273	147.87324	120.888	131.2781
2001.04	110.31762	118.26695	95.98513	96.22908	2013.01	136.24342	147.48382	123.544	129.7892
2002.01	107.40699	107.45891	94.86143	108.5633	2013.02	134.30072	154.47522	126.674	139.5112
2002.02	103.45957	97.229921	92.73059	88.94154	2013.03	136.20562	164.40344	128.427	138.6511
2002.03	103.41082	94.87337	93.8113	95.49949	2013.04	134.78853	166.49591	128.408	143.5906
2002.04	106.09843	99.331767	93.93536	103.5283	2014.01	136.08062	165.41303	133.773	160.6968
2003.01	108.21375	100.40839	96.47313	105.6745	2014.02	137.63116	165.6574	131.709	136.6119
2003.02	112.0903	120.65957	98.41597	108.1957	2014.03	136.93036	162.31861	131.82	141.0708
2003.03	115.07634	126.59376	99.95903	108.9644	2014.04	139.08176	161.88845	134.584	145.9179
2003.04	114.63654	130.16706	101.8377	113.6291	2015.01	140.22753	169.56936	137.75	166.9483
2004.01	116.02408	129.9079	100.2699	107.1912	2015.02	146.46862	177.37205	144.645	165.8104
2004.02	116.00684	113.02023	101.1474	110.6987	2015.03	146.14388	178.72264	152.994	173.4755
2004.03	116.38978	118.44054	105.3328	127.8765	2015.04	149.25673	175.11547	160.015	176.3042
2004.04	120.79288	109.91285	106.2181	113.1001	2016.01	152.10549	173.03442	163.408	186.2811
2005.01	127.9883	114.79255	111.4097	128.8734	2016.02	150.92686	167.29445	159.486	151.9709
2005.02	135.93084	121.3423	116.367	131.9435	2016.03	151.89353	174.42993	161.071	179.5607
2005.03	139.16918	122.7567	120.4767	146.7701	2016.04	148.29493	176.90202	158.08	166.5349
2005.04	141.41345	129.67949	126.4859	139.4268	2017.01	149.95758	173.88435	162.13	200.4794
2006.01	144.49251	136.92772	131.5027	145.614	2017.02	151.28954	175.38554	173.103	197.419
2006.02	145.38241	142.06045	135.9341	153.4544	2017.03	152.61298	169.61707	173.145	180.911

Hedonic hotel indices for large and small hotel transactions



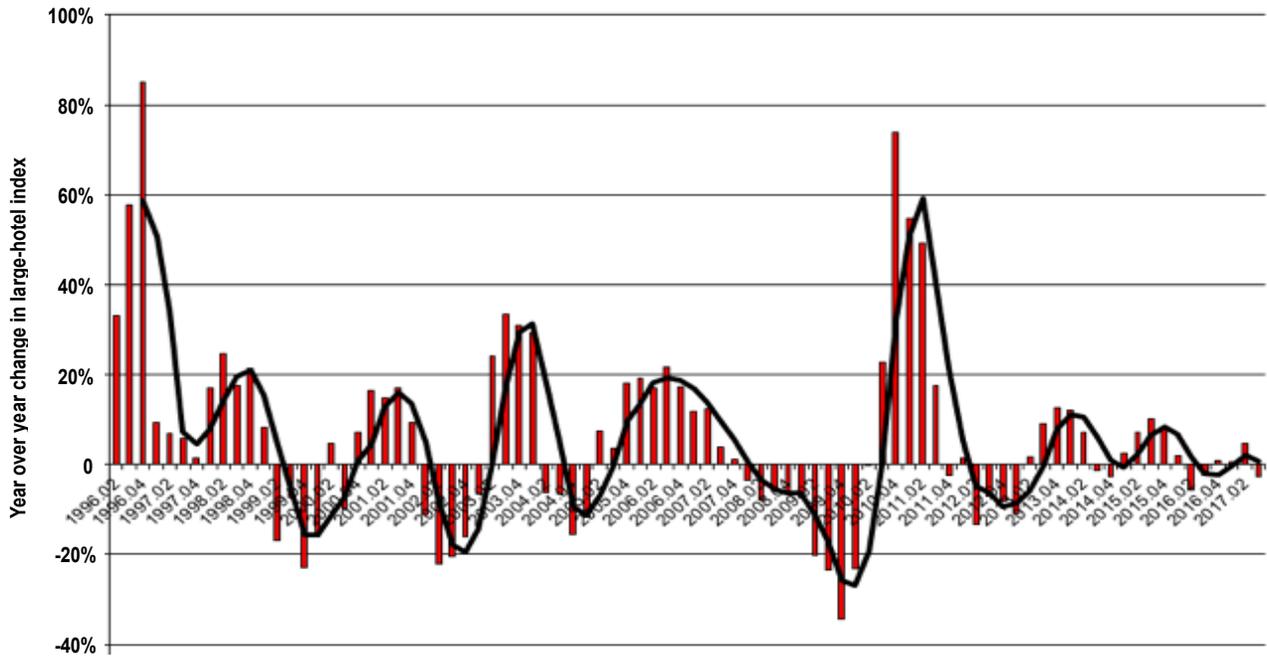
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

year-over-year trend in the number of transactions for large hotels and small hotels.

Our moving average trend lines and standardized unexpected price (SUP) performance metrics point to positive price momentum of small hotels with large hotels losing ground. As shown in Exhibit 7 (which graphs the prices reported in Exhibit 6), the quarter-over-quarter price of large hotels fell 3.3 percent, while the price of small hotels rose approximately 1 percent. Prices for large hotels dropped 2.76 percent year over year, as shown in Exhibit 8, while prices for small hotels eked out a .47-percent year-over-year gain (Exhibit 9).

EXHIBIT 8

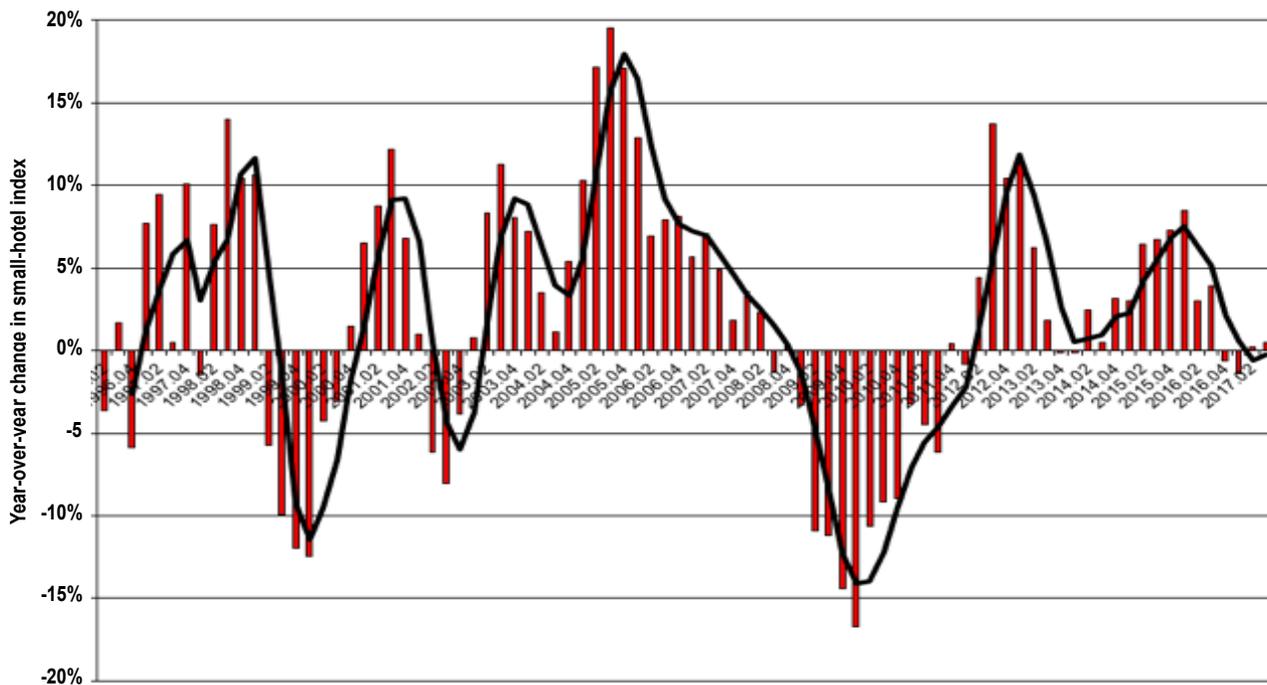
Year-over-year change in high-price (large) hotel index, with moving-average trend line



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

EXHIBIT 9

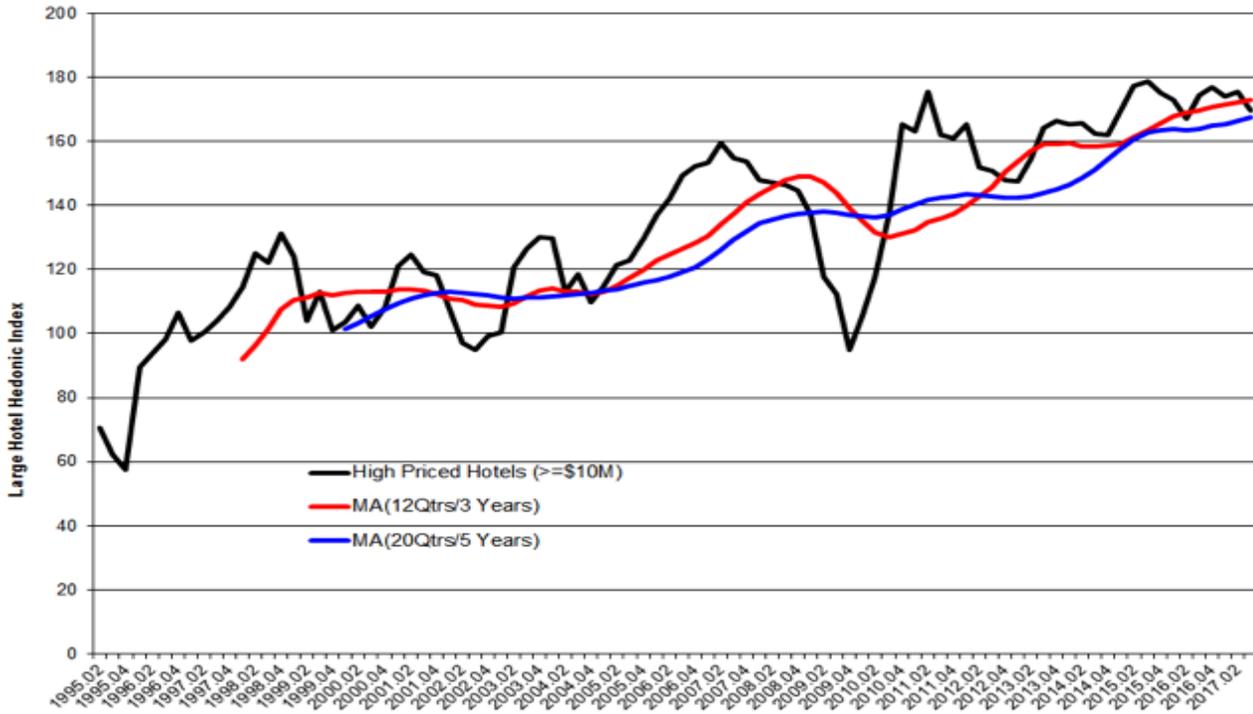
Year-over-year change in small-hotel index, with moving-average trend line



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

EXHIBIT 10

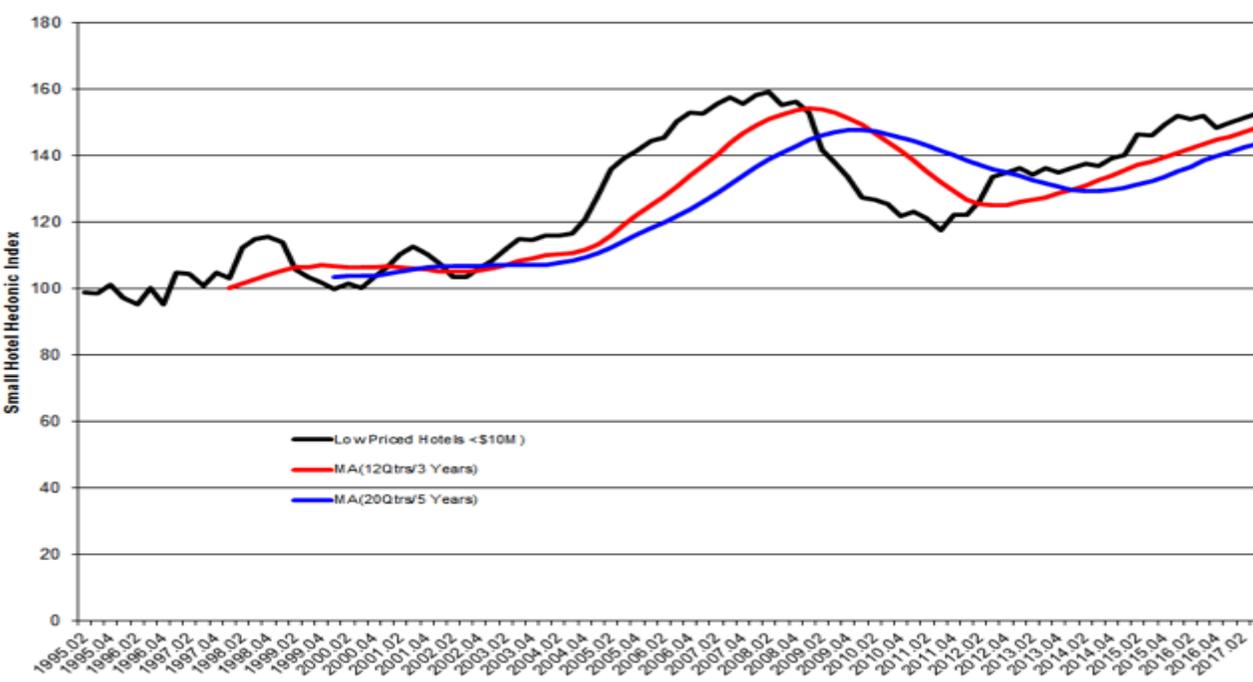
Moving average trend line for large-hotel index



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

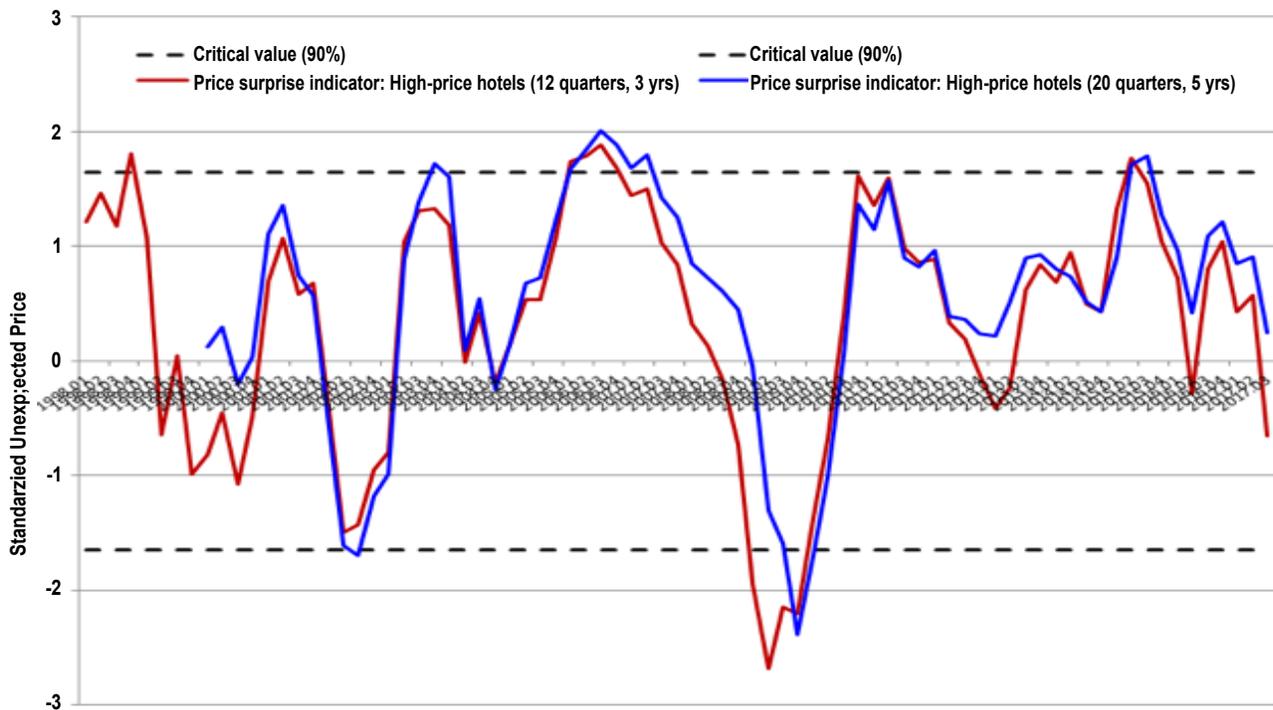
EXHIBIT 11

Moving average trend line for small-hotel index



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

Standardized unexpected price (SUP) for high-price hotel index



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

Our moving average trend lines for large hotels, found in Exhibit 10, show that the price for large hotels has crossed below the short-term moving average trend line and has almost approached the long-term moving average trend line. This is a signal that there has been a reversal in price momentum for large hotels, meaning that positive price momentum has come to an end for large hotels. Exhibit 11, however, shows that the price for small hotels continues to be above both its short-term and long-term moving average trend lines, indicating continued positive momentum for smaller hotels this quarter.

Our Standardized Unexpected Price (SUP) metrics displayed in Exhibit 12 show that the price of large hotels has reverted to its standardized mean of zero. In contrast, the price of small hotels has

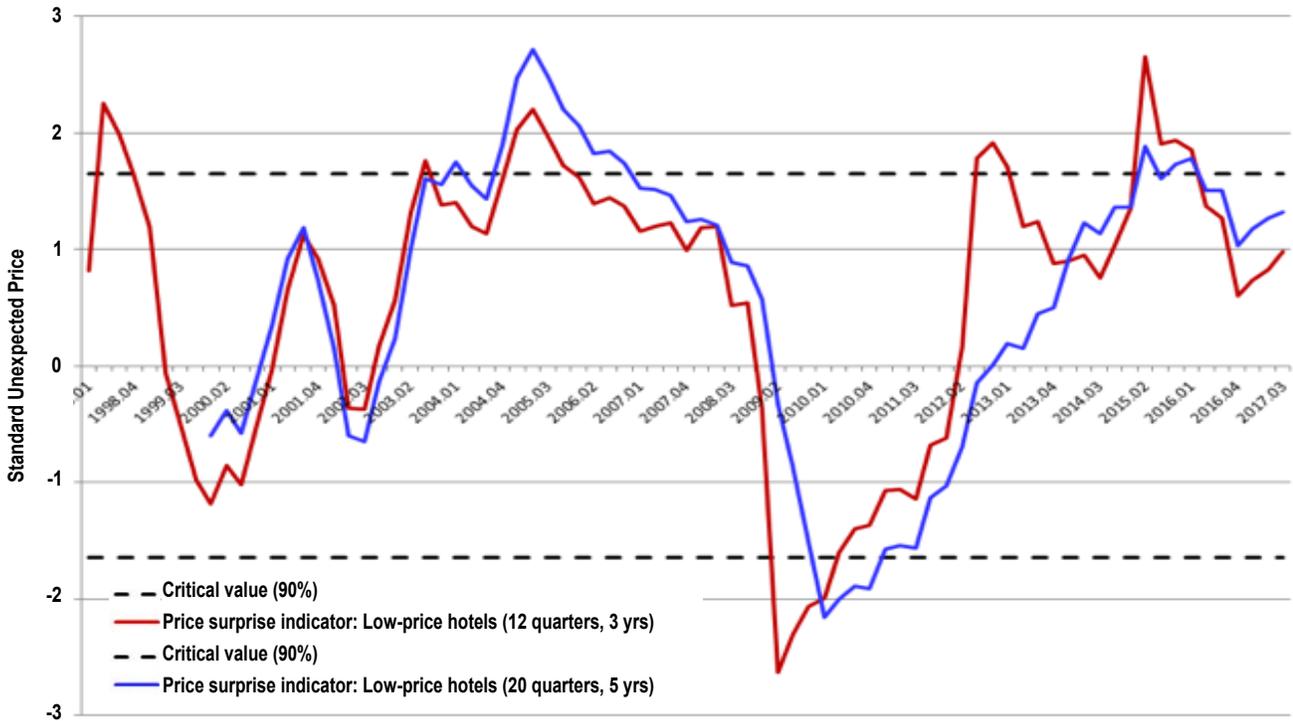
continued its positive price momentum, as depicted in Exhibit 13.

Repeat sales metrics tell a similar story: Barely positive price momentum for hotels. Similar to small hotels, our repeat sale indicator for the moving average trend line in Exhibit 14 indicates a continuation of positive price momentum.² However, this positive momentum is no longer statistically significant, as the SUP

² 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. Thus, the smaller 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, that is, repeat sale full sample index but it would not be included in the smaller repeat sale index.

EXHIBIT 13

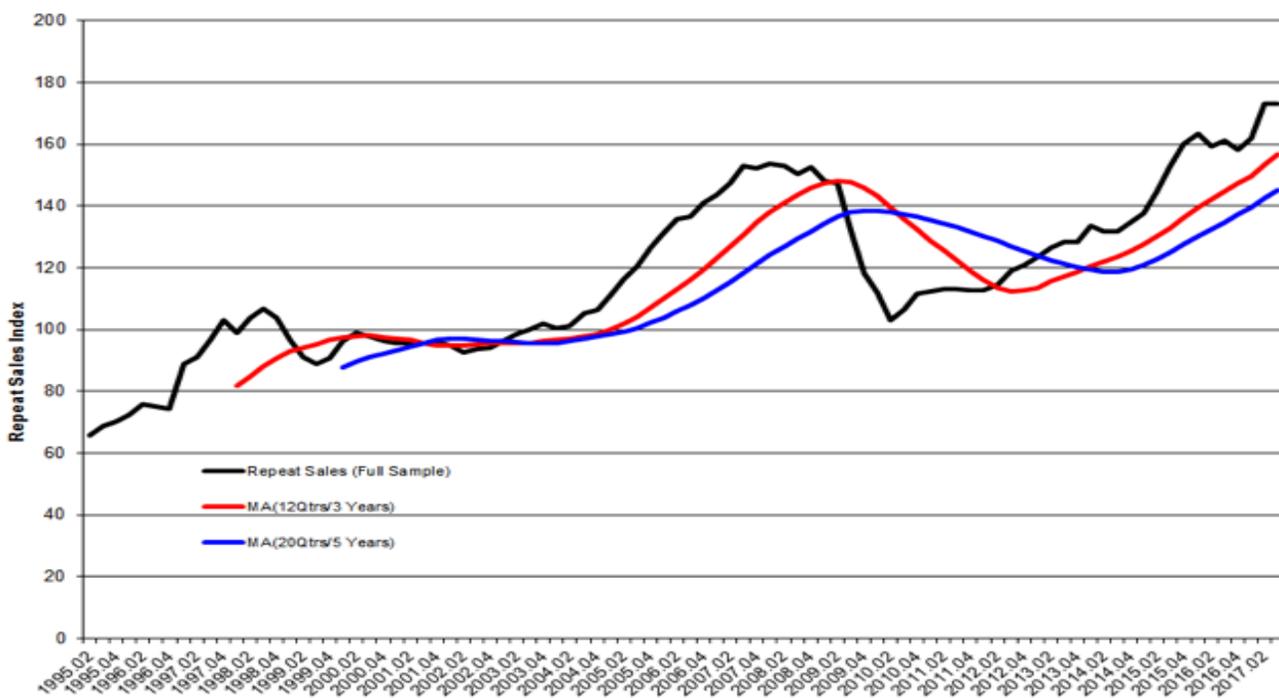
Standardized unexpected price (SUP) for small-hotel index



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

EXHIBIT 14

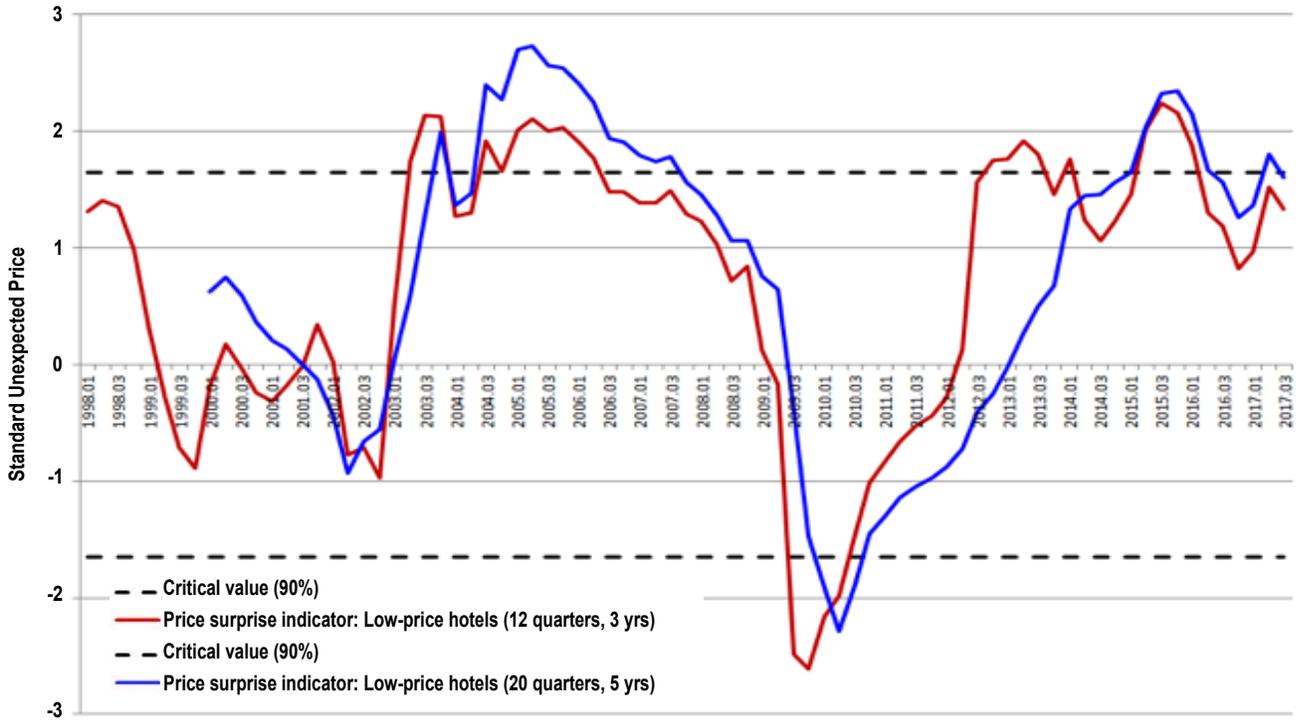
Moving average trend line for repeat sale-hotel index



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

EXHIBIT 15

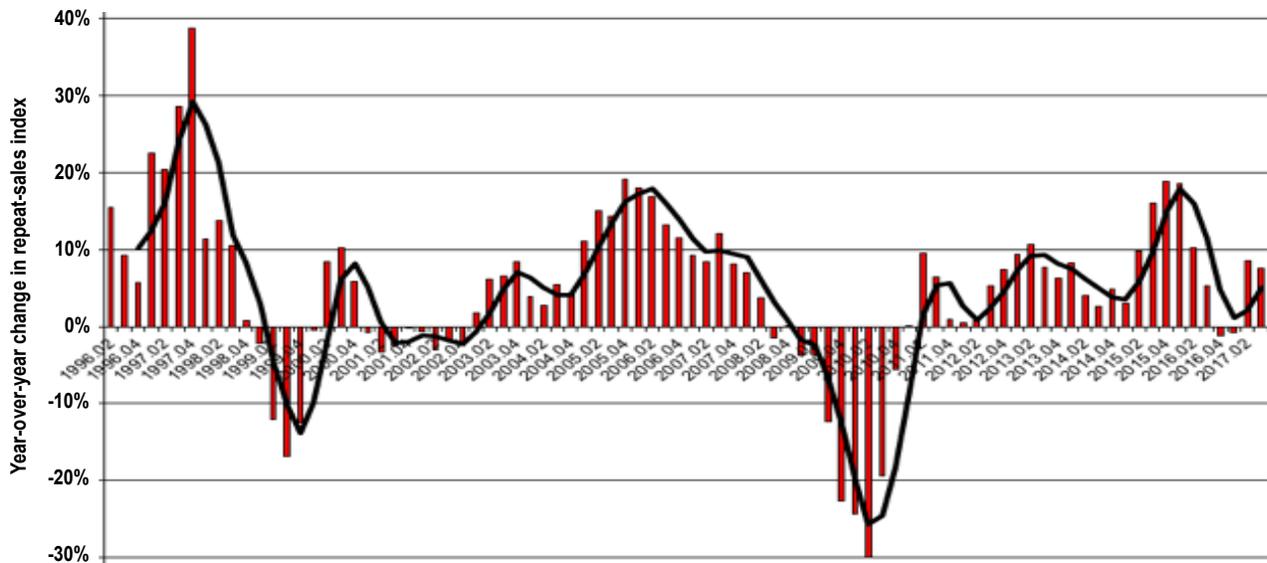
Standardized Unexpected Price (SUP) for hotel repeat sale index



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

EXHIBIT 16

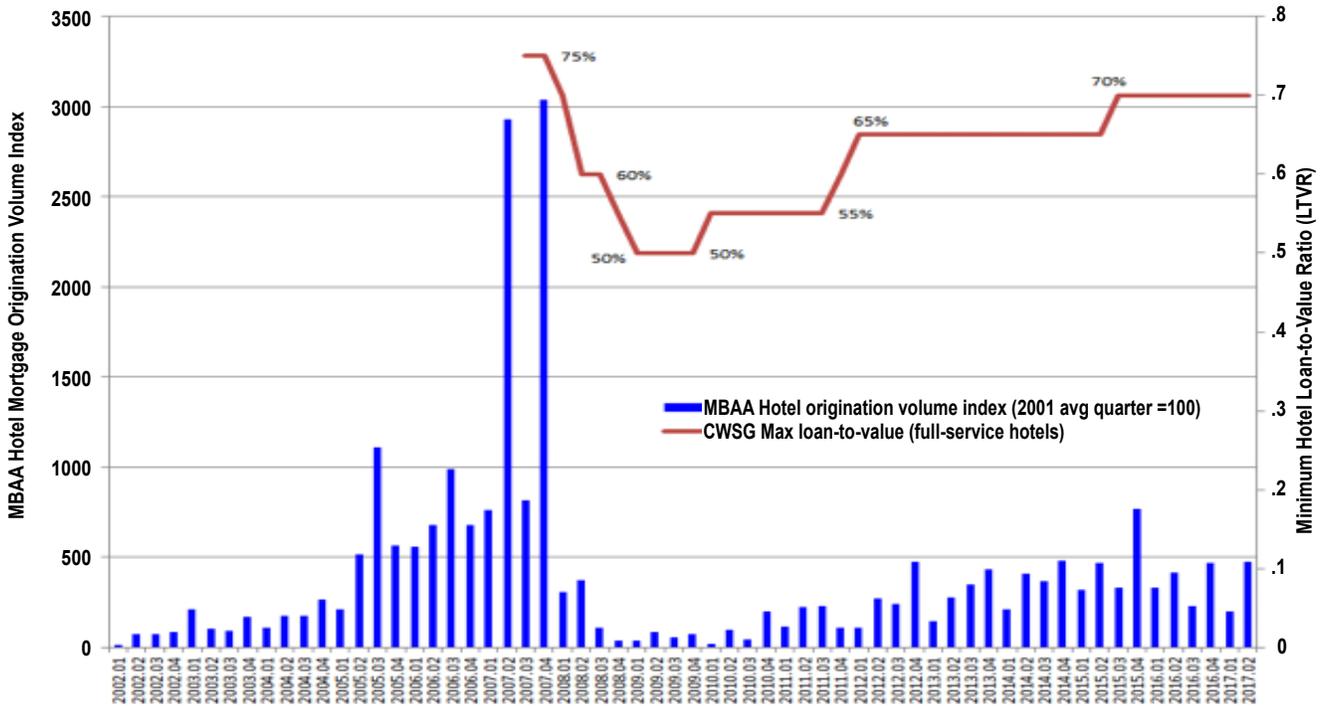
Year-over-year change in repeat-sale index, with moving-average trend line



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

EXHIBIT 17

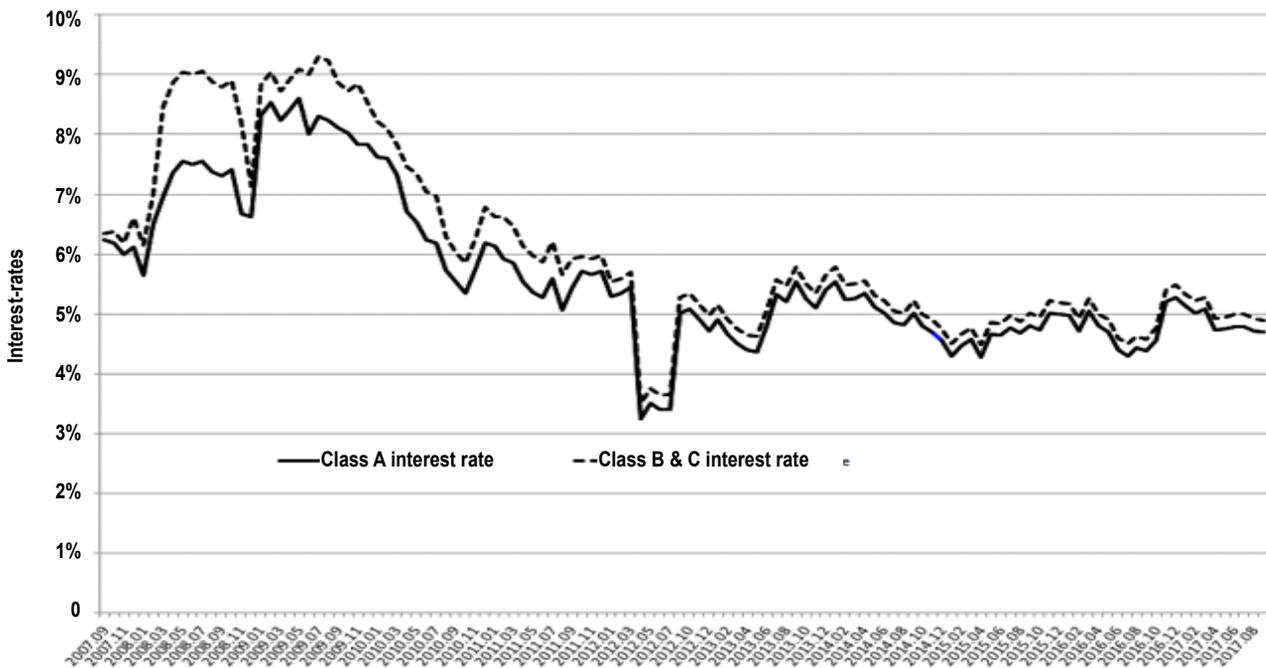
Mortgage origination volume versus loan-to-value ratio for hotels



Sources: Cornell Center for Real Estate and Finance, Mortgage Bankers Association

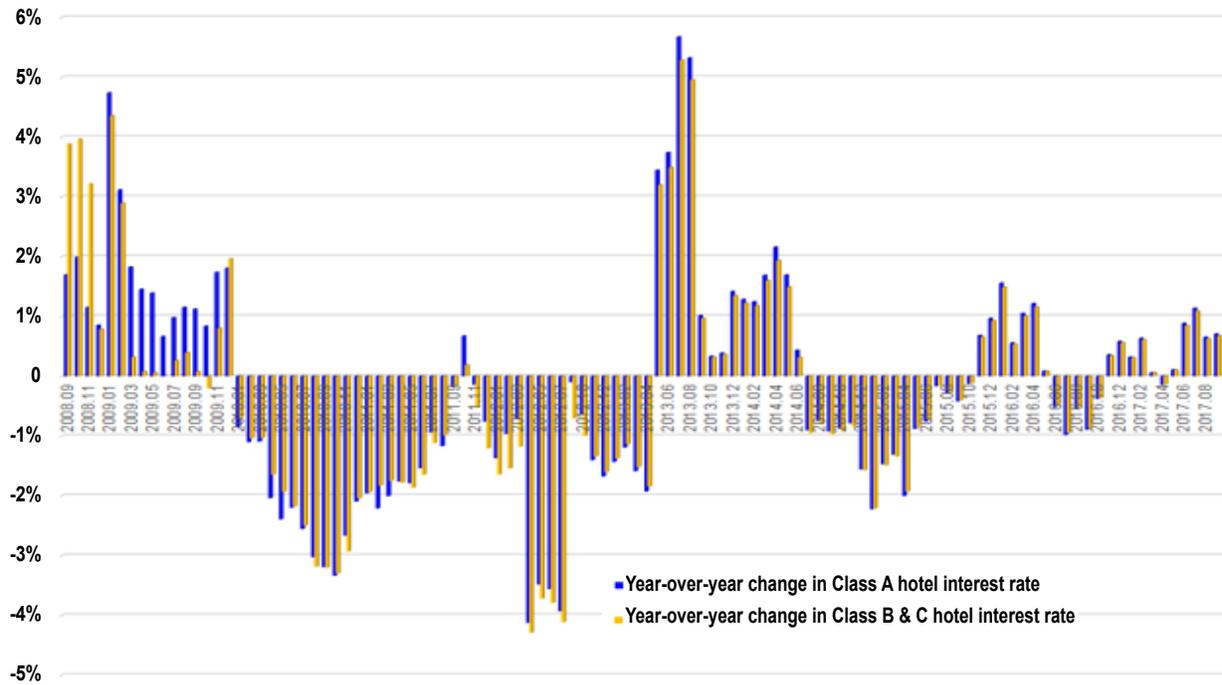
EXHIBIT 18

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



Source: Cushman Wakefield Sonnenblick Goldman

Year-over-year change in interest rates on Class A hotels versus Class B and C properties

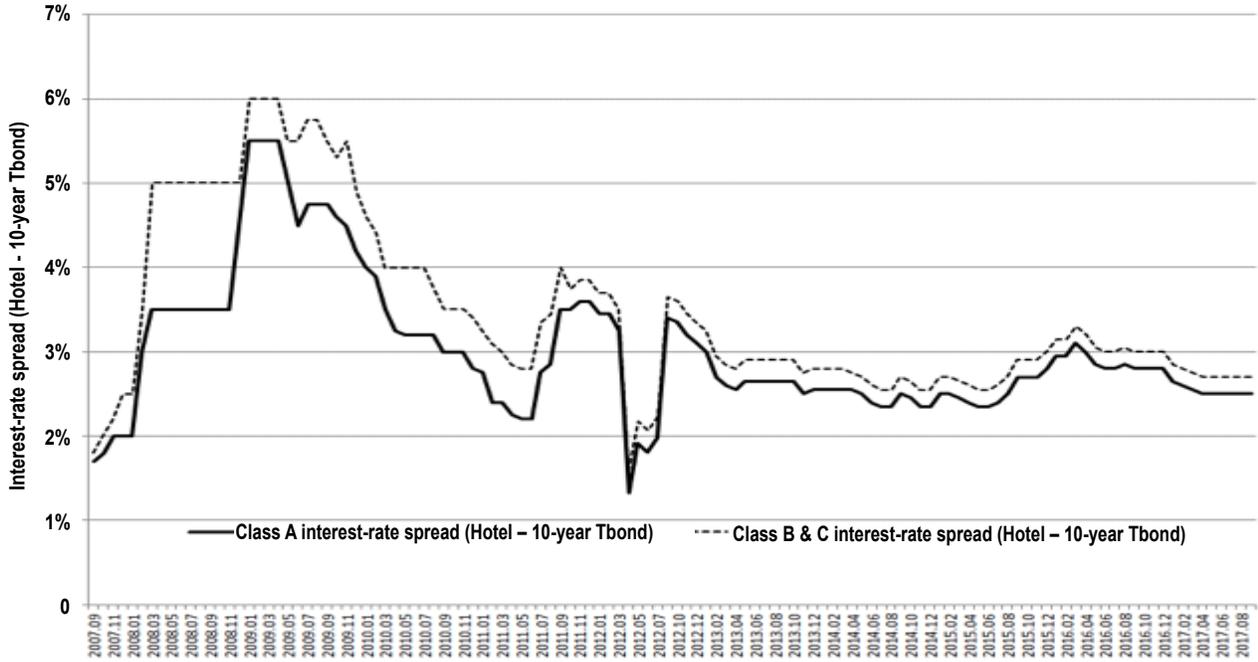


Source: Cushman Wakefield Sonnenblick Goldman

performance metric indicates in Exhibit 15. Exhibit 16 further shows that the repeat sale price index increased 7.5 percent year over year, but was relatively flat at .02 percent quarter over quarter.

Mortgage financing volume for hotels has finally increased, both year over

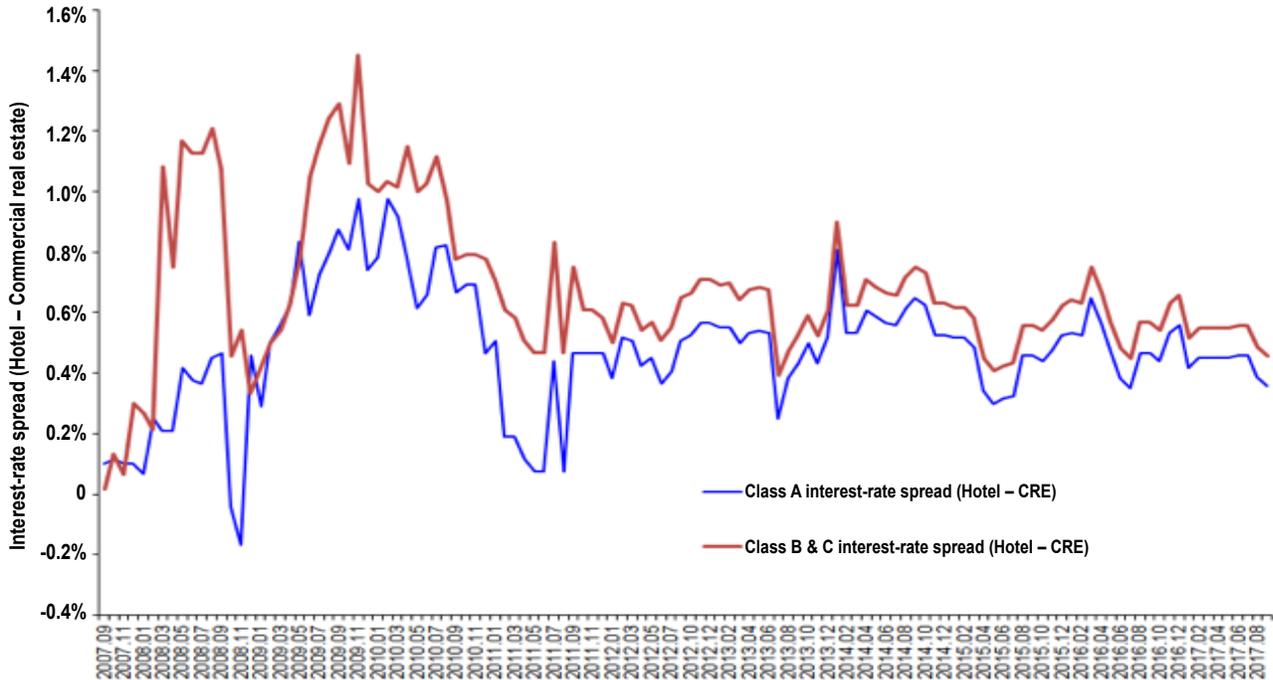
Interest-rate spreads of hotels versus U.S. Treasury ten-year bonds



Source: Cushman Wakefield Sonnenblick Goldman

Rate spreads have remained relatively constant against the ten-year treasury bond and against non-hotel commercial property, as shown in Exhibit 20 and Exhibit 21. With regard to the ten-year bond, Exhibit 20 shows that the quarter-over-quarter spread between Class A interest rates on full service hotels over the ten-year Treasury bond has held at 2.5 percent, while the spread for B and C properties remains at 2.7 percent in the current quarter relative to the prior quarter. Broadly speaking, based on the spread between hotel financing and non-hotel commercial financing, we see that lenders compensation for risk associated with hotel loans has remained virtually un-

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



Source: Cushman Wakefield Sonnenblick Goldman

changed since around February 2013. Exhibit 21 shows this relative stability in the hotel premium, which is the spread between the interest rate on Class A or on Class B and C full-service hotels over the interest rate corresponding to non-hotel commercial real estate.⁵ The monthly hotel real estate premiums for both higher quality (Class A) and lower quality (Class B&C) hotels have declined in this quarter, compared to the previous quarter. The hotel real estate premium averaged .36 percent in the third quarter of 2017 compared to .46 percent for Class A in the current quarter. The premium for Class B and C properties was .46 percent in 2017Q3, versus .56 percent in 2017Q2. This is a signal that the perceived default risk for hotel properties has fallen relative other commercial real estate. That is, lenders view hotel properties as being relatively less risky than before, as compared to other commercial real estate (such as office, retail, industrial, and apartment properties).

Cost of equity financing has remained relatively flat; expect to see lower interest rates and looser or

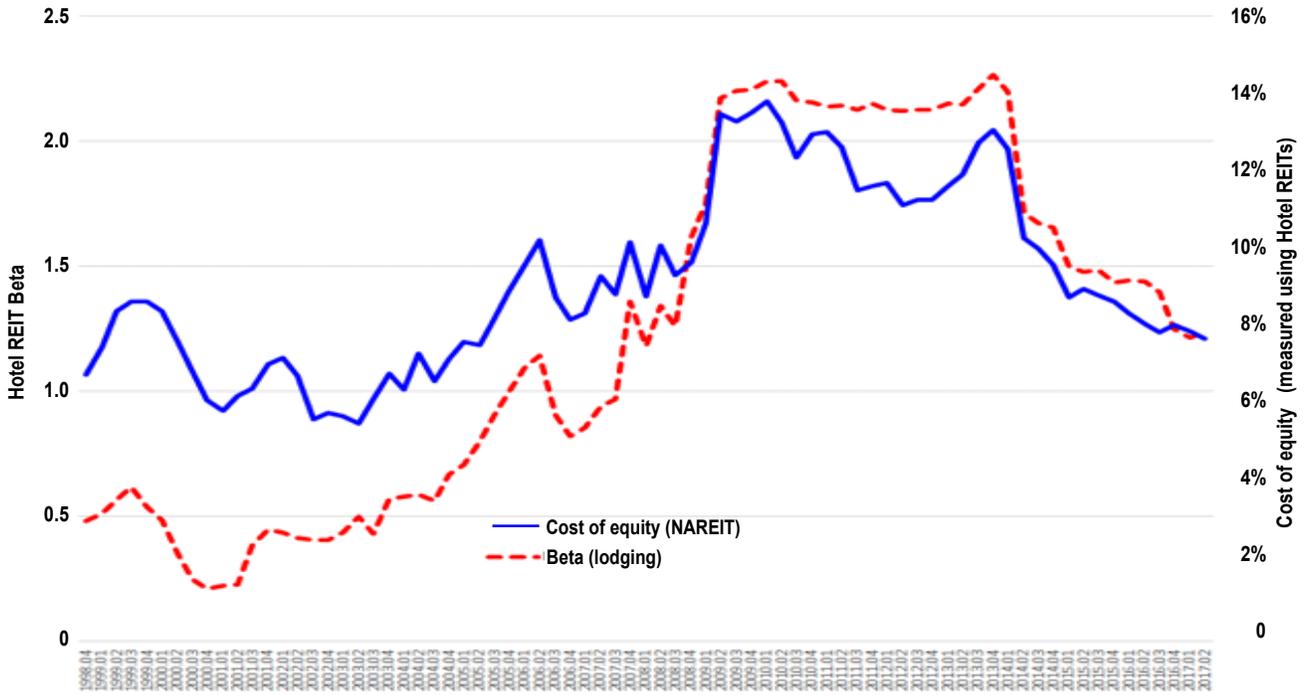
⁵ The interest rate on hotel properties is generally higher than that for apartment, industrial, office, and retail properties in part because hotels' cash flow is commonly more volatile than that of other commercial properties.

similar lending standards for hotel financing relative to other commercial real estate in the near future.

The cost of using equity financing for hotels, as measured using the Capital Asset Pricing Model (CAPM) on hotel REIT returns (shown in Exhibit 22), has likewise remained relatively flat, with a six-basis-point (bps) increase over previous quarter. The cost of using equity funds stands at 7.81 percent for 2017Q3 compared to 7.75 percent in the previous quarter. Overall, the cost of equity has become relatively lower since 2013Q4, falling from 13.1 percent in 2013Q4 to roughly 7.8 percent over the 2017Q2–2017Q3 period. In terms of *total risk* (systematic risk + risk that is specific to hotel REITs), Exhibit 23 shows that the total risk of hotel REITs (calculated as a 12-month rolling window of monthly REIT returns) has started to decline relative to the total risk of equity REITs as a whole. This is consistent with the reduction of the hotel premium shown in Exhibit 21, which indicates that the perceived default risk for hotels has declined relative to other types of commercial real estate. If this trend continues, expect lenders to either loosen or maintain current lending standards for hotels given that the volatility of stocks is a useful predictor of perceived default risk for hotels.

EXHIBIT 22

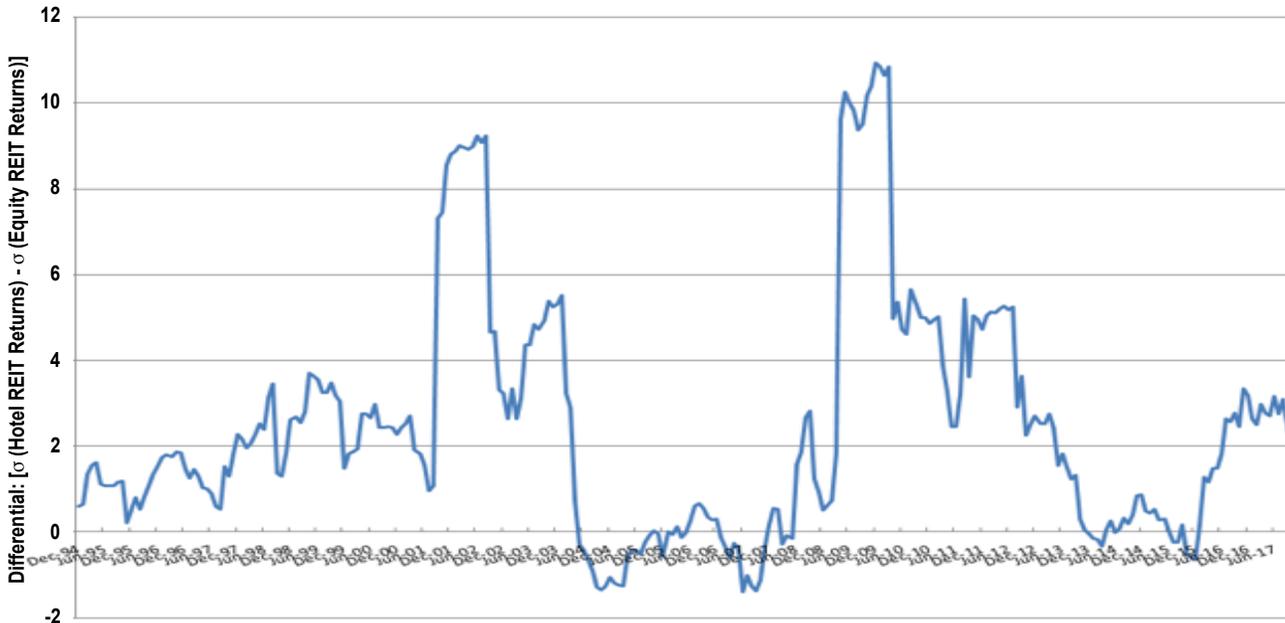
Cost of equity financing using the Capital Asset Pricing Model and hotel REITs



Sources: Cornell Center for Real Estate and Finance, NAREIT

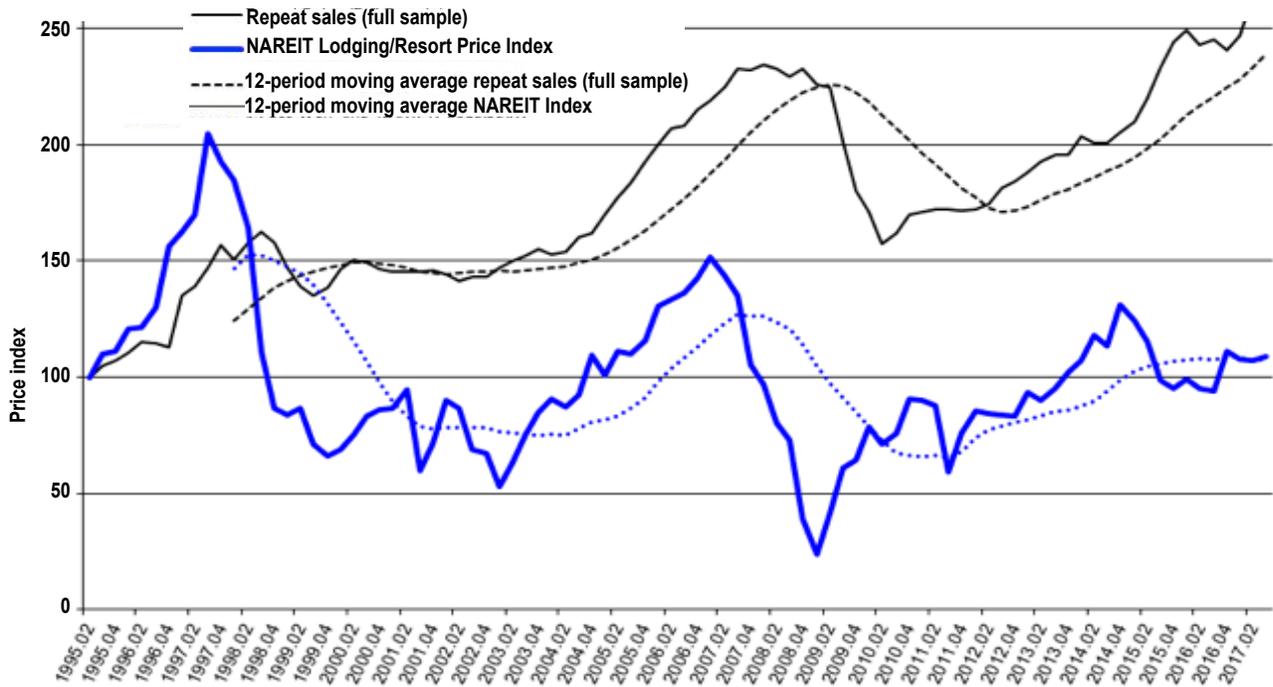
EXHIBIT 23

Risk differential between hotel REITs and equity REITs



Sources: Cornell Center for Real Estate and Finance, NAREIT

Hotel repeat sales index versus NAREIT lodging/resort price index



Sources: Cornell Center for Real Estate and Finance, NAREIT

Expect the price of large hotels and small hotels to rise per the tea leaves, based on moving average trend lines. Exhibit 24 compares the performance of the repeat sales index relative to the NAREIT Lodging/Resort Price Index. The repeat sales index tends to lag the NAREIT index by at least one quarter or more. This is consistent with prior academic studies which find that securitized real estate is leading indicator of underlying real estate performance, since the stock market is forward looking or efficient. Looking ahead, the NAREIT lodging index rose 1.5 percent this quarter compared to the prior quarter (and 16 percent year over year), with the moving average trend line indicating a continuing positive momentum.

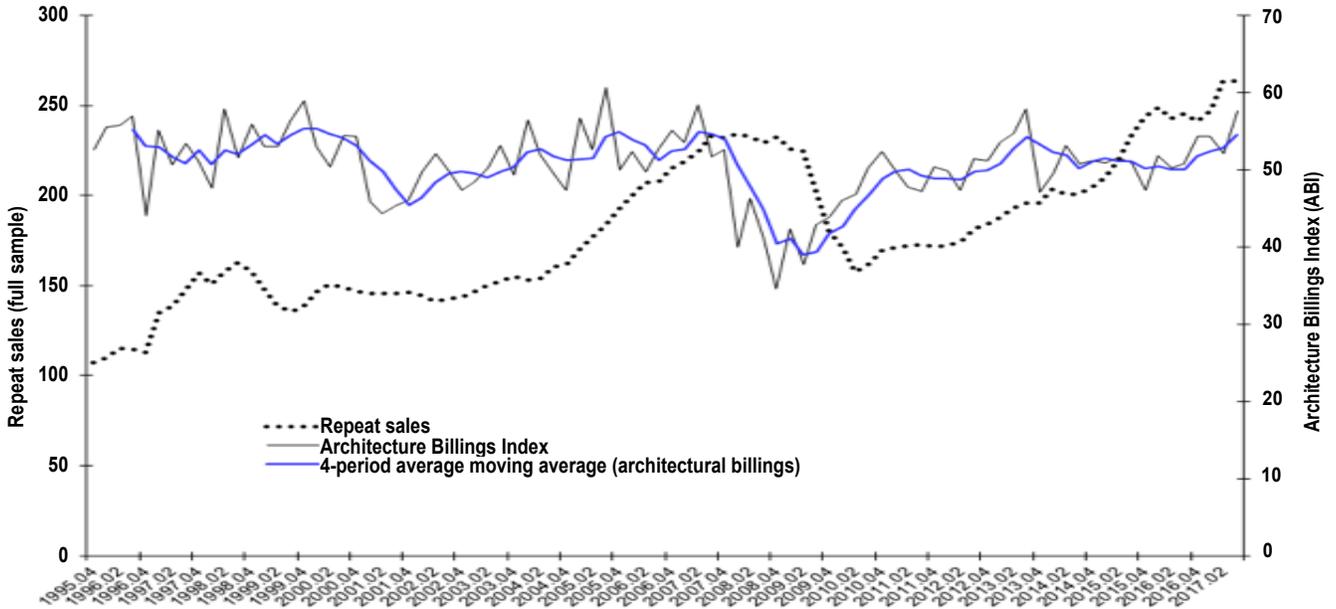
The architecture billings index (ABI) for commercial and industrial property, which represents another

forward looking metric, also rose this quarter from the previous quarter, as shown in Exhibit 25 (57.6 versus 52.1).⁶ The ABI continues to trend upwards, based on its moving average trend line. As a result, we expect continued positive momentum for hotel prices over the next quarter. The National Association of Purchasing Managers (NAPM) index shown in Exhibit 26, which is an indicator of anticipated business confidence and thus business traveler demand, increased almost 15 percent year over year (5 percent on a quarter-over-quarter basis). Based on the moving average trend line for the NAPM index, we expect the

⁶ As of the time of this writing, only the August 2017 AIA Billings Index has been reported. See: www.aia.org/practicing/economics/aia076265

EXHIBIT 25

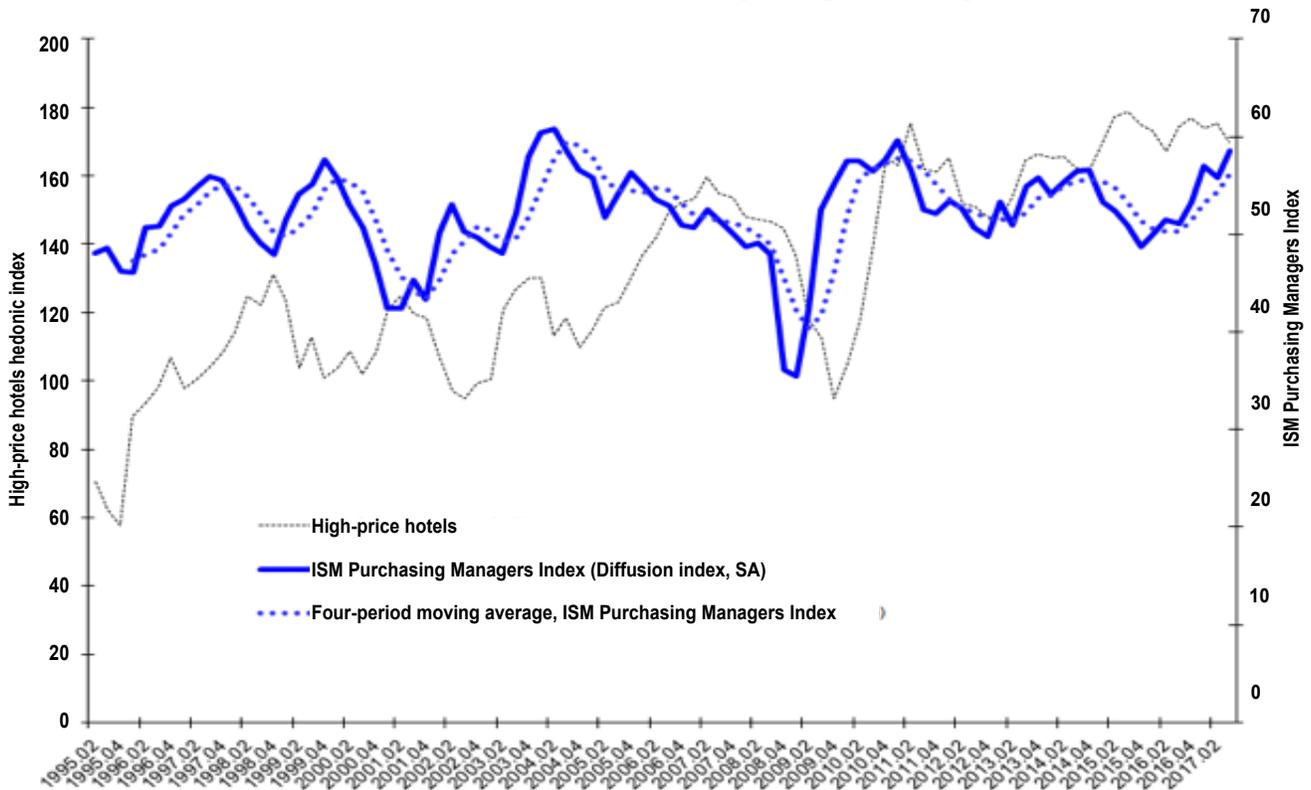
Hotel repeat sales index versus architecture billings index



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

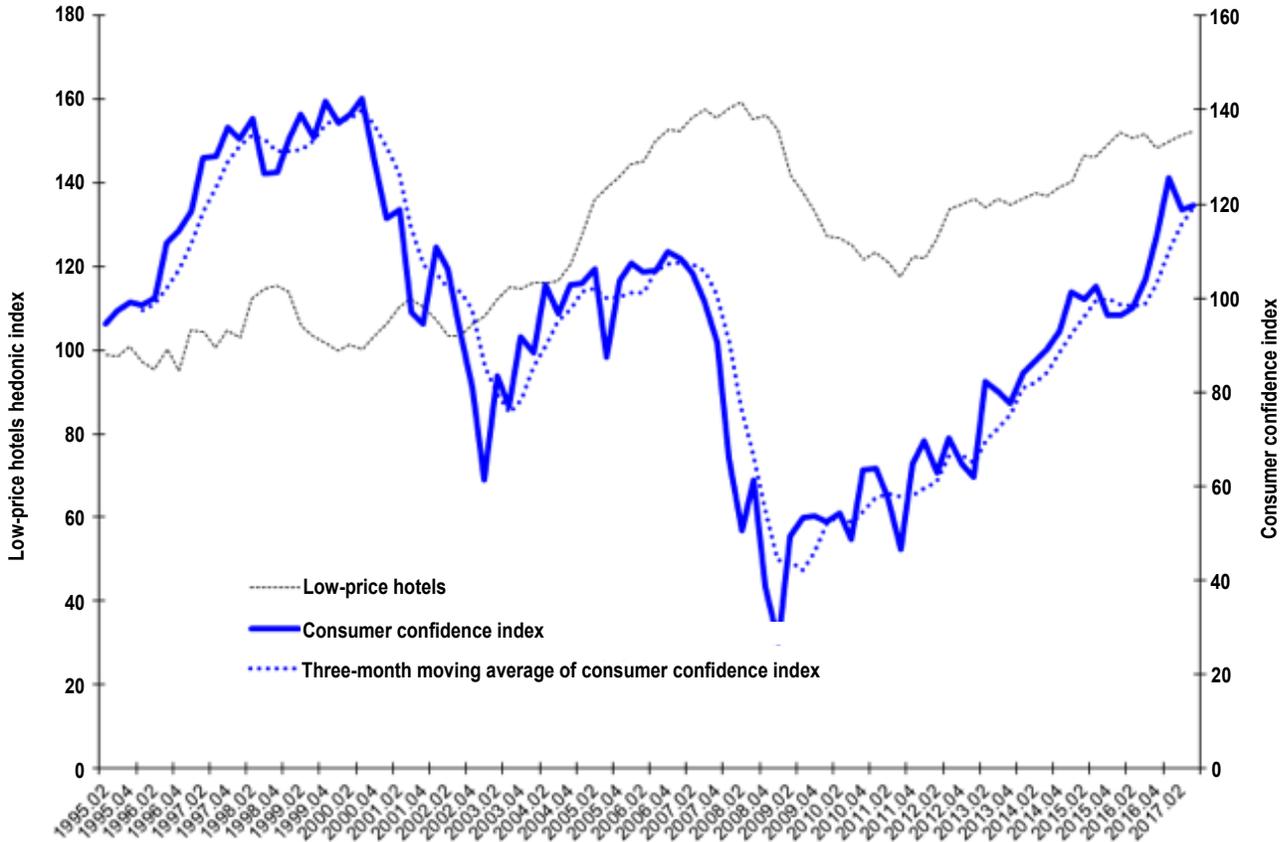
EXHIBIT 26

Business confidence index (National Association of Purchasing Managers) and high-price hotel index



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

Consumer confidence index and low-price hotel index



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

price of large hotels to continue to rise over the next quarter.⁷

The Consumer Confidence Index (CCI) from the Conference Board, graphed in Exhibit 27, 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 15 percent year over year (.8% quarter over quarter), continuing its positive trend from the previous period. We expect the price of small hotels to rise in the next quarter based on the CCI's four-quarter moving average. ■

⁷ The ISM: Purchasing Managers' Index, (Diffusion index, SA) also known as the National Association of Purchasing Managers (NAPM) index is based on a survey of over 250 companies within twenty-one industries covering all 50 states. It not only measures the health of the manufacturing sector but is a proxy for the overall economy. It is calculated by surveying purchasing managers for data about new orders, production, employment, deliveries, and inventory, in descending order of importance. A reading over 50% indicates that manufacturing is growing, while a reading below 50% means it is shrinking.

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, both of which are available for download from our [CREF website](#).

Appendix

SUP: The Standardized Unexpected Price Metric

The standardized unexpected price metric (SUP) is similar to the standardized unexpected earnings (SUE) indicator used to determine whether earnings surprises are statistically significant. An earnings surprise occurs when the firm's reported earnings per share deviates from the street estimate or the analysts' consensus forecast. To determine whether an earnings surprise is statistically significant, analysts use the following formula:

$$SUE_Q = (A_Q - m_Q)/s_Q$$

where SUE_Q = quarter Q standardized unexpected earnings,

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

m_Q = quarter Q consensus earnings per share forecasted by analysts in quarter Q-1, and

s_Q = quarter Q standard deviation of earnings estimates.

From statistics, the SUE_Q is normally distributed with a mean of zero and a standard deviation of one ($\sim N(0,1)$). This calculation shows an earnings surprise when earnings are statistically significant, when SUE_Q exceeds either ± 1.645 (90% significant) or ± 1.96 (95% significant). The earnings surprise is positive when $SUE_Q > 1.645$, which is statistically significant at the 90% level assuming a two-tailed distribution. Similarly, if $SUE_Q < -1.645$ then earnings are negative, which is statistically significant at the 90% level. Intuitively, SUE measures the earnings surprise in terms of the number of standard deviations above or below the consensus earnings estimate.

From our perspective, using this measure complements our visual analysis of the movement of hotel prices relative to their three-year and five-year moving average (μ). What is missing in the visual analysis is whether prices diverge significantly from the moving average in statistical terms. In other words, we wish to determine whether the current price diverges at least one standard deviation from μ , the historical average price. The question we wish to answer is whether price is reverting to (or diverging from) the historical mean. More specifically, the question is whether this is price mean reverting.

To implement this model in our current context, we use the three- or five-year moving average as our measure of μ and the rolling three- or five-year standard deviation as our measure of σ . Following is an example of how to calculate the SUP metric using high price hotels with regard to their three-year moving average. To calculate the three-year moving average from quarterly data we sum 12 quarters of data then divide by 12:

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

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

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

SUP data and σ calculation for high-price hotels (12 quarters/3 years)				
Quarter	High-price hotels μ	Moving average	σ	Price surprise indicator (SUP)
1995.02	70.60			
1995.03	63.11			
1995.04	58.11			
1996.01	90.54			
1996.02	95.24			
1996.03	99.70			
1996.04	108.38			
1997.01	99.66			
1997.02	101.62			
1997.03	105.34			
1997.04	109.53			
1998.01	115.78	93.13	18.99	1.19
1998.02	126.74	97.81	19.83	1.46

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