

## Cornell Hotel Indices: Third Quarter 2018

# David vs. Goliath Hotels: Which Performed Better This Quarter?

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

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### EXECUTIVE SUMMARY

**H**otels in gateway cities continue to shine, rising 15.3 percent year over year compared to 2.2 percent for hotels in non-gateway cities. Hotel operating performance scaled by price is still in the black based on economic value analysis (EVA), with returns continuing to exceed borrowing costs (for debt), and with the spread widening. This suggests that deals will be easier to pencil going forward, provided the current trend continues. With the Fed expected to continue to raise interest rates, however, the implication is that the return on invested capital must continue to increase as well. Transaction volume fell on a quarter-over-quarter basis, but rose on a year-over-year basis. While our various pricing metrics point to continued positive price momentum for large and small hotels, we continue to be concerned whether rising interest rates will put a damper on this momentum. A reading of our tea leaves suggests prices will moderate for large hotels but continue to increase for smaller hotels. This is report number 28 of the index series.

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## ABOUT THE AUTHORS

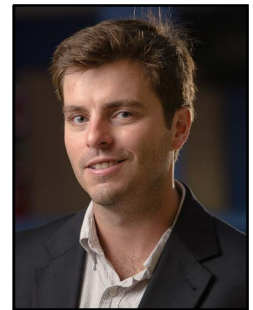
**Crocker H. Liu** is a professor of real estate at the School of Hotel Administration at Cornell where he holds the Robert A. Beck Professor of Hospitality Financial Management. He previously taught at New York University's Stern School of Business (1988-2006) and at Arizona



State University's W.P. Carey School of Business (2006-2009) where he held the McCord Chair. His research interests are focused on issues in real estate finance, particularly topics related to agency, corporate governance, organizational forms, market efficiency and valuation. Liu's research has been published in the *Review of Financial Studies*, *Journal of Financial Economics*, *Journal of Business*, *Journal of Financial and Quantitative Analysis*, *Journal of Law and Economics*, *Journal of Financial Markets*, *Journal of Corporate Finance*, *Review of Finance*, *Real Estate Economics*, *Journal of Urban Economics*, *Regional Science and Urban Economics*, *Journal of Real Estate Research*, and the *Journal of Real Estate Finance and Economics*. He is the former co-editor of *Real Estate Economics*, the leading real estate academic journal. He continues to be on the editorial board of *Real Estate Economics*. He recently joined the editorial board of *Financial Review*. 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 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. 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*, *Real Estate Economics*, and the *Journal of Real Estate Research*.



**Robert M. White, Jr., CRE**, is the founder and president of Real Capital Analytics Inc., an international research firm that publishes the Capital Trends Monthly. Real Capital Analytics provides real time data concerning the capital markets for commercial real estate and the values of commercial properties. Mr. White is a noted authority on the real estate capital markets with credits in the *Wall Street Journal*, *Barron's*, *The Economist*, *Forbes*, *New York Times*, 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. White's research has been published in the *Journal of Real Estate Finance and Economics*.



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### Disclaimer

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## Cornell Hotel Indices: Third Quarter 2018:

# David vs. Goliath Hotels: Which Performed Better This Quarter?

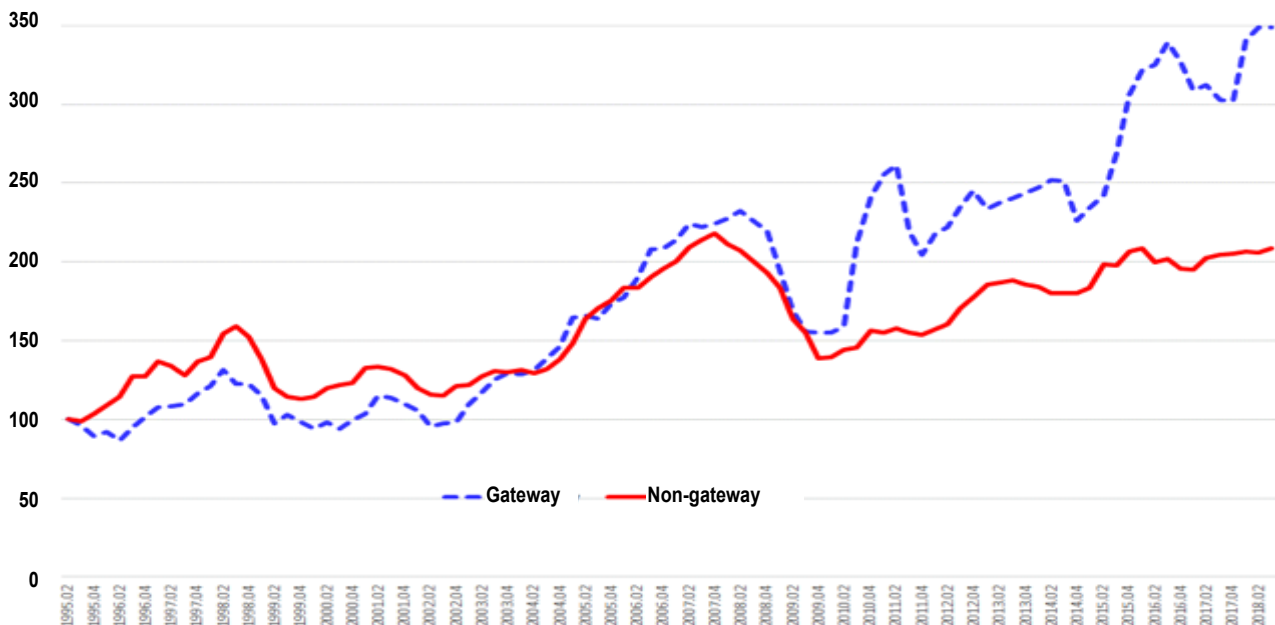
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### Analysis of Indices through Q3, 2018

**Gateway cities continue to outshine non-gateway cities.** This is shown in Exhibit 1, which depicts the relative price performance for hotels sold in gateway cities versus those in non-gateway cities. Year over year, the price of hotels in gateway cities rose 15.3 percent this period, compared to 11.6 percent in the previous period. At the same time, prices of hotels in gateway cities fell .06 percent quarter over quarter, compared to a 2.3-percent gain in the previous period. In contrast, hotel prices in non-gateway cities rose 2.15 percent year over year and increased 1.45 percent quarter over quarter, compared to a 1.47-percent year-over-year gain and a .44-percent loss in the prior period.

#### EXHIBIT 1

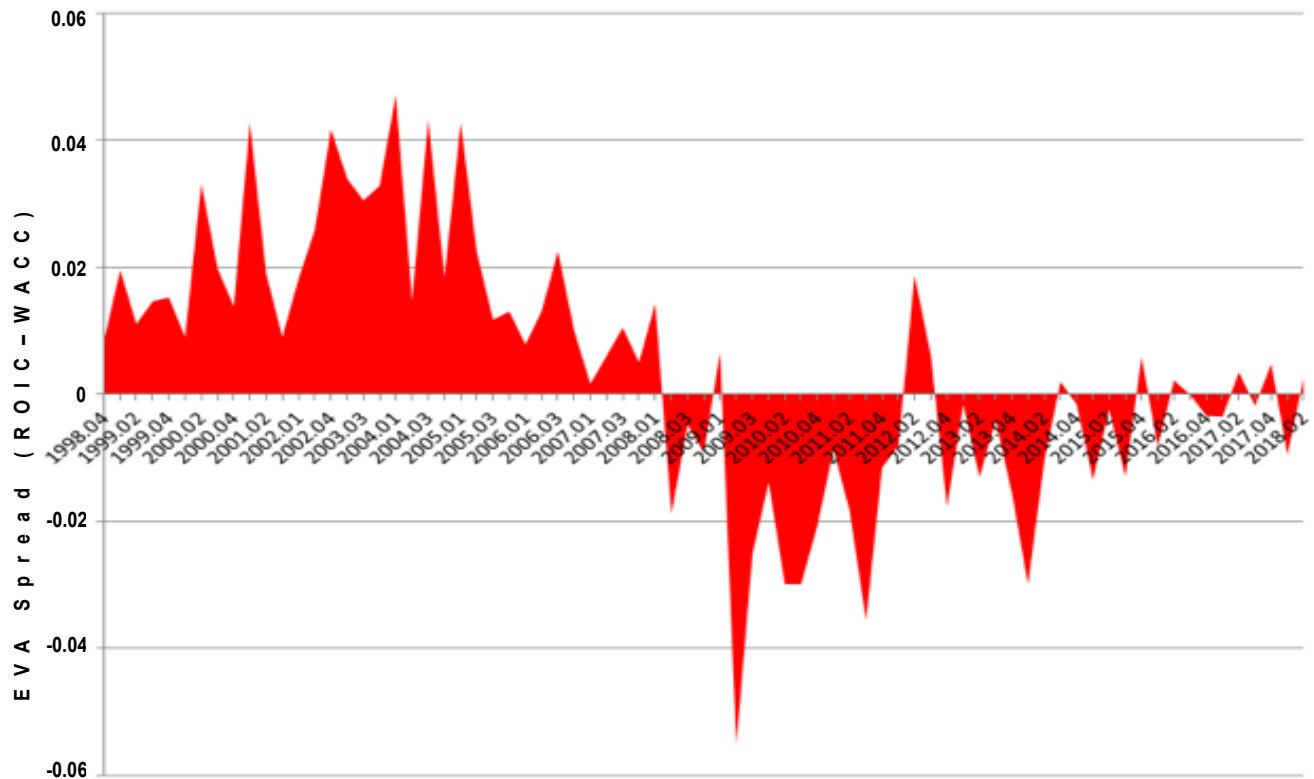
#### Hotel performance for gateway cities versus non-gateway cities



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

## EXHIBIT 2

### Economic value added (EVA) for hotels



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

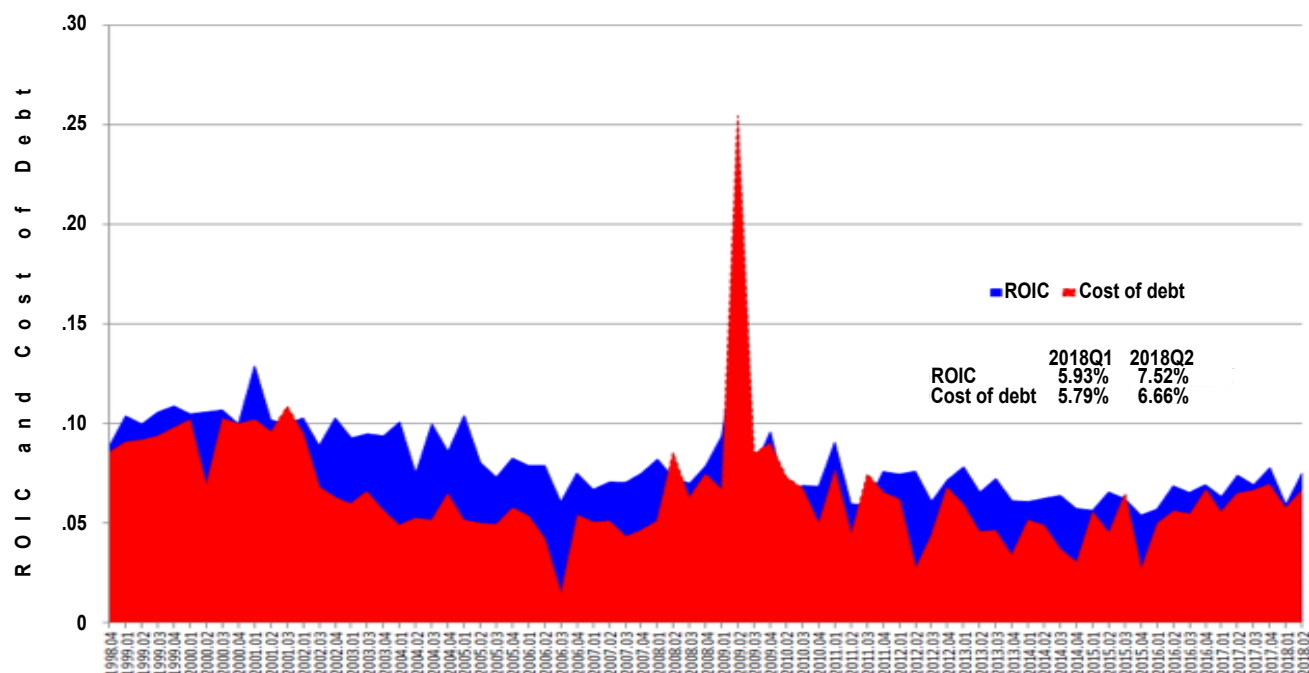
**Hotel investment based on operating performance is still in the black (breakeven).** Our Economic Value Added (EVA) indicator shown in Exhibit 2 has turned slightly positive (.003) from the prior quarter, when it stood at -.009 (effectively, -1). That said, for all practical purposes the EVA has continued to hover around zero since the second quarter of 2016. Although the cost of debt financing rose to 6.66 percent in 2018Q2 from 5.8 percent in 2018Q1, the ACLI hotel cap rate has also rose from 5.9 percent (2018Q1) to 7.5 percent (2018Q2). Thus, Exhibit 3 suggests that *positive leverage* continues to be the norm for hotel deals, and penciling feasible deals was easier to achieve as a result of a widening of the spread between the cap rate

and the cost of debt financing. Intuitively, the investor should receive a higher return than his or her borrowing cost.

**The median price of hotels rose on a quarterly basis, as well as year-over-year basis, on rising transaction volume.** The median price of hotels rose approximately 7 percent from the previous quarter (\$5.13M versus \$4.8M). However, the total volume of all hotel transactions (both large hotels and small hotels combined) fell 9.2 percent (that is, 334 transactions in Q3, versus 368 transactions in Q2), as reported in Exhibit 4. Year over year (2017Q3 versus 2018Q3), the median price of hotels rose 2.5 percent, while the volume of hotel transactions also increased 2.5 percent.

### EXHIBIT 3

#### 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 RCA commercial real estate databases. The large and small hotel indices are similar in nature and construction to the consumer price index (CPI), while the repeat sale hotel index is analogous to the retail concept of same store sales. Using a similar logic process for hotels, we compare the sales and resales of the same hotel over time for that index. All three measures provide a more accurate representation of the current hotel real estate market conditions than does reporting the average transaction prices, because the average-price index doesn't account for differences in the quality of the hotels, which also is averaged. A more detailed description of these indices is found in the first edition of this series, "Cornell Real Estate Market Indices," which is available at no charge from the Cornell Center for Real Estate and Finance. Starting with our 2018Q1 issue, we introduced the Gateway Cities Index as a new metric in our hotel analytics arsenal.<sup>1</sup> Cities that we define as gateway cities are Boston, Chicago, Honolulu, Los Angeles, Miami, New York, San Francisco, and Washington, D.C. In this issue, we present updates and revisions to our hotel indices along with commentary and supporting evidence from the real estate market.

<sup>1</sup> 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. 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.



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

Year	Quarter	Full Sample			Big				Small				Gateway				Non-Gateway		
		Median Sale Price	Observations		Median Sale Price (High Priced Hotels)	Number of Transactions (High Priced Hotels)	% Total Sales		Median Sale Price (Low Priced Hotels)	Number of Transactions (Low Priced Hotels)	% Total Sales		Median Sale Price (Gateway Hotels)	Number of Transactions (Gateway Hotels)	% Total Sales		Median Sale Price (Non-Gateway Hotels)	Transactions (Non-Gateway Hotels)	
																		% Total Sales	
1995	1	2,357,500	20				1995.01	2,357,500	20	100%	1995.01	3,400,000	7	35%	1995.01	2,100,000	13	65%	
1995	2	3,150,000	29	1995.02	15,712,500	6	20.7%	1995.02	2,670,000	23	79.3%	1995.02	3,800,000	12	41.4%	1995.02	2,906,150	17	58.6%
1995	3	2,562,500	44	1995.03	12,400,000	4	9.1%	1995.03	2,378,000	40	90.9%	1995.03	3,500,000	20	45.5%	1995.03	2,000,000	24	54.5%
1995	4	3,400,000	41	1995.04	27,750,000	10	24.4%	1995.04	2,625,000	31	75.6%	1995.04	5,075,000	14	34.1%	1995.04	3,100,000	27	65.9%
1996	1	2,500,000	39	1996.01	14,475,000	8	20.5%	1996.01	1,700,000	31	79.5%	1996.01	2,500,000	13	33.3%	1996.01	2,687,500	26	66.7%
1996	2	2,925,000	43	1996.02	29,150,000	12	27.9%	1996.02	2,500,000	31	72.1%	1996.02	3,200,000	15	34.9%	1996.02	2,730,000	28	65.1%
1996	3	6,500,000	57	1996.03	17,740,000	20	35.1%	1996.03	3,000,000	37	64.9%	1996.03	5,500,000	25	43.9%	1996.03	6,890,500	32	56.1%
1996	4	2,735,000	58	1996.04	19,000,000	17	29.3%	1996.04	2,200,000	41	70.7%	1996.04	4,650,000	27	46.6%	1996.04	2,400,000	31	53.4%
1997	1	5,053,250	74	1997.01	16,635,500	23	31.1%	1997.01	3,500,000	51	68.9%	1997.01	6,300,000	29	39.2%	1997.01	4,075,000	45	60.8%
1997	2	2,862,500	72	1997.02	17,750,000	17	23.6%	1997.02	2,150,000	55	76.4%	1997.02	2,445,000	24	33.3%	1997.02	3,047,350	48	66.7%
1997	3	3,437,500	90	1997.03	19,000,000	21	23.3%	1997.03	2,400,000	69	76.7%	1997.03	5,140,000	38	42.2%	1997.03	2,550,000	52	57.8%
1997	4	4,330,950	78	1997.04	17,000,000	27	34.6%	1997.04	2,300,000	51	65.4%	1997.04	10,435,445	27	34.6%	1997.04	3,600,000	51	65.4%
1998	1	4,698,800	92	1998.01	20,000,000	31	33.7%	1998.01	3,100,000	61	66.3%	1998.01	6,353,000	33	35.9%	1998.01	4,600,000	59	64.1%
1998	2	3,630,000	96	1998.02	23,765,000	21	21.9%	1998.02	3,000,000	75	78.1%	1998.02	3,998,240	28	29.2%	1998.02	3,575,000	68	70.8%
1998	3	2,961,059	92	1998.03	16,740,000	12	13.0%	1998.03	2,690,550	80	87.0%	1998.03	2,255,000	30	32.6%	1998.03	3,365,000	62	67.4%
1998	4	2,550,000	84	1998.04	35,000,000	15	17.9%	1998.04	2,375,000	69	82.1%	1998.04	4,225,000	30	35.7%	1998.04	2,500,000	54	64.3%
1999	1	2,425,000	88	1999.01	24,638,095	10	11.4%	1999.01	2,125,000	78	88.6%	1999.01	3,500,000	32	36.4%	1999.01	2,300,000	56	63.6%
1999	2	2,100,000	95	1999.02	67,000,000	5	5.3%	1999.02	1,950,000	90	94.7%	1999.02	2,067,500	28	29.5%	1999.02	2,100,000	67	70.5%
1999	3	2,500,000	99	1999.03	20,711,100	10	10.1%	1999.03	2,130,000	89	89.9%	1999.03	1,800,000	19	19.2%	1999.03	2,522,500	80	80.8%
1999	4	2,440,000	87	1999.04	18,190,000	14	16.1%	1999.04	2,090,000	73	83.9%	1999.04	2,210,000	23	26.4%	1999.04	2,575,000	64	73.6%
2000	1	2,400,000	110	2000.01	23,253,895	10	9.1%	2000.01	2,300,000	100	90.9%	2000.01	2,325,000	44	40.0%	2000.01	2,428,500	66	60.0%
2000	2	2,450,000	88	2000.02	14,500,000	9	10.2%	2000.02	2,275,000	79	89.8%	2000.02	2,325,000	24	27.3%	2000.02	2,450,000	64	72.7%
2000	3	2,600,000	95	2000.03	20,346,875	16	16.8%	2000.03	2,250,000	79	83.2%	2000.03	2,925,000	24	25.3%	2000.03	2,525,000	71	74.7%
2000	4	2,475,000	101	2000.04	18,050,000	14	13.9%	2000.04	2,300,000	87	86.1%	2000.04	4,500,000	26	25.7%	2000.04	2,350,000	75	74.3%
2001	1	2,970,650	104	2001.01	28,437,500	18	17.3%	2001.01	2,422,500	86	82.7%	2001.01	2,650,000	29	27.9%	2001.01	3,000,000	75	72.1%
2001	2	2,800,000	110	2001.02	23,795,000	12	10.9%	2001.02	2,687,150	98	89.1%	2001.02	5,825,000	25	22.7%	2001.02	2,684,300	85	77.3%
2001	3	2,700,000	87	2001.03	16,000,000	6	6.9%	2001.03	2,500,000	81	93.1%	2001.03	3,150,000	21	24.1%	2001.03	2,600,000	66	75.9%
2001	4	2,400,000	73	2001.04	20,500,000	5	6.8%	2001.04	2,300,000	68	93.2%	2001.04	2,800,000	17	23.3%	2001.04	2,300,000	56	76.7%
2002	1	2,125,000	70	2002.01	11,518,052	5	7.1%	2002.01	2,000,000	65	92.9%	2002.01	1,700,000	17	24.3%	2002.01	2,200,000	53	75.7%
2002	2	2,400,000	106	2002.02	18,125,000	10	9.4%	2002.02	2,287,500	96	90.6%	2002.02	3,125,000	33	31.1%	2002.02	2,300,000	73	68.9%
2002	3	2,355,400	81	2002.03	12,750,000	5	6.2%	2002.03	2,237,500	76	93.8%	2002.03	2,197,500	24	29.6%	2002.03	2,470,000	57	70.4%
2002	4	2,907,500	100	2002.04	23,500,000	16	16.0%	2002.04	2,575,000	84	84.0%	2002.04	2,907,500	34	34.0%	2002.04	2,862,500	66	66.0%
2003	1	2,530,000	94	2003.01	13,000,000	9	9.6%	2003.01	2,425,000	85	90.4%	2003.01	3,850,000	21	22.3%	2003.01	2,425,000	73	77.7%
2003	2	2,750,000	110	2003.02	18,500,000	10	9.1%	2003.02	2,509,500	100	90.9%	2003.02	3,160,000	31	28.2%	2003.02	2,600,000	79	71.8%
2003	3	3,333,000	141	2003.03	14,359,286	28	19.9%	2003.03	2,600,000	113	80.1%	2003.03	3,660,000	45	31.9%	2003.03	3,032,500	96	68.1%
2003	4	2,600,000	149	2003.04	16,375,000	18	12.1%	2003.04	2,425,000	131	87.9%	2003.04	2,950,000	35	23.5%	2003.04	2,500,000	114	76.5%
2004	1	2,925,000	166	2004.01	22,875,250	24	14.5%	2004.01	2,536,756	142	85.5%	2004.01	3,450,000	41	24.7%	2004.01	2,894,000	125	75.3%
2004	2	2,700,000	195	2004.02	16,280,000	28	14.4%	2004.02	2,450,000	167	85.6%	2004.02	4,500,000	39	20.0%	2004.02	2,540,000	156	80.0%
2004	3	3,491,122	216	2004.03	19,350,000	45	20.8%	2004.03	2,610,000	171	79.2%	2004.03	4,600,000	51	23.6%	2004.03	3,306,500	165	76.4%
2004	4	4,000,000	177	2004.04	20,475,000	47	26.6%	2004.04	3,065,500	130	73.4%	2004.04	8,850,000	36	20.3%	2004.04	3,600,000	141	79.7%

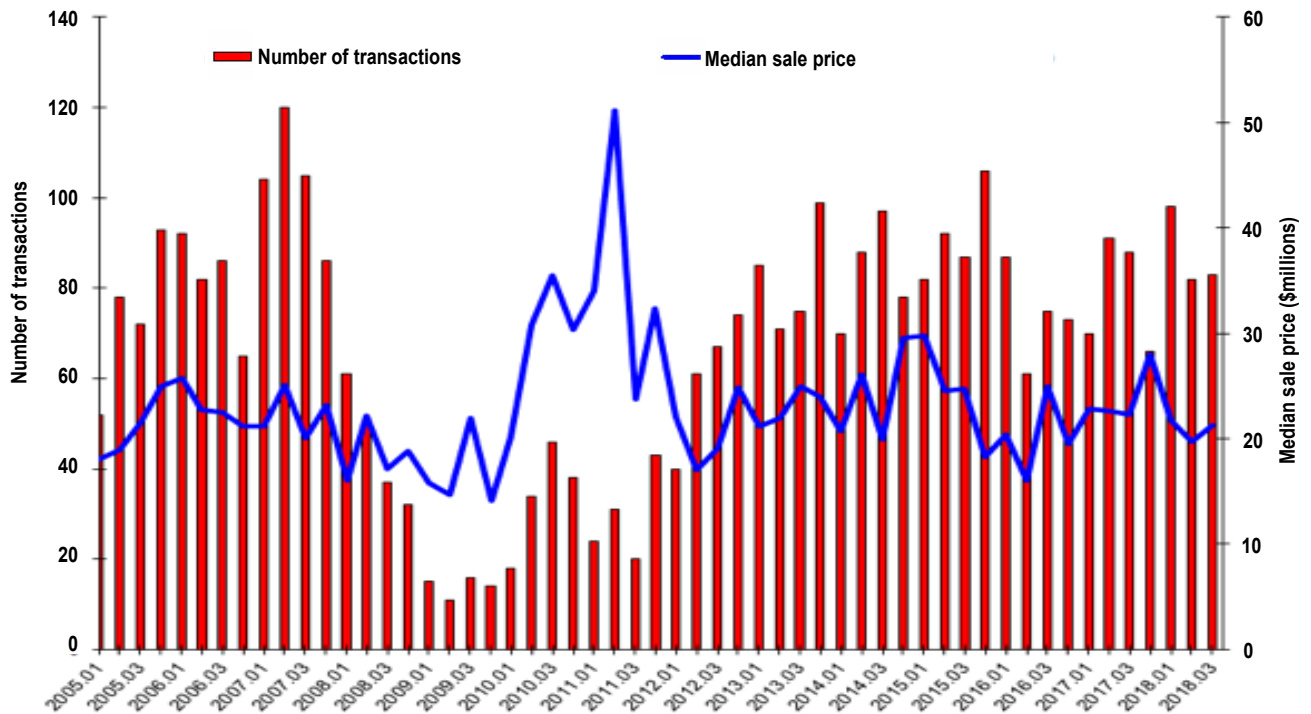


## Transaction volume (obs) and median sale price (part 2: 2005–present)

Year	Quarter	Full Sample			Big				Small				Gateway				Non-Gateway		
		Median Sale Price	Observations		Median Sale Price (High Priced Hotels)	Number of Transactions (High Priced Hotels)	% Total Sales		Median Sale Price (Low Priced Hotels)	Number of Transactions (Low Priced Hotels)	% Total Sales		Median Sale Price (Gateway Hotels)	Number of Transactions (Gateway Hotels)	% Total Sales		Median Sale Price (Non-Gateway Hotels)	Transactions (Non-Gateway Hotels)	
																		% Total Sales	
2005	1	4,330,000	231	2005.01	18,100,000	52	22.5%	2005.01	3,300,000	179	77.5%	2005.01	6,687,500	40	17.3%	2005.01	3,800,000	191	82.7%
2005	2	4,566,250	316	2005.02	18,956,812	78	24.7%	2005.02	3,255,150	238	75.3%	2005.02	6,475,000	68	21.5%	2005.02	4,385,000	248	78.5%
2005	3	4,150,000	273	2005.03	21,475,000	72	26.4%	2005.03	3,100,000	201	73.6%	2005.03	6,100,000	61	22.3%	2005.03	3,750,000	212	77.7%
2005	4	4,425,000	300	2005.04	25,000,000	93	31.0%	2005.04	3,150,000	207	69.0%	2005.04	11,200,000	65	21.7%	2005.04	4,000,000	235	78.3%
2006	1	5,300,000	301	2006.01	25,750,000	92	30.6%	2006.01	3,800,000	209	69.4%	2006.01	18,000,000	64	21.3%	2006.01	4,943,744	237	78.7%
2006	2	4,750,000	313	2006.02	22,750,000	82	26.2%	2006.02	3,500,000	231	73.8%	2006.02	6,175,000	56	17.9%	2006.02	4,500,000	257	82.1%
2006	3	5,000,000	285	2006.03	22,500,000	86	30.2%	2006.03	3,650,000	199	69.8%	2006.03	7,000,000	59	20.7%	2006.03	4,705,399	226	79.3%
2006	4	4,587,500	248	2006.04	21,200,000	65	26.2%	2006.04	3,550,000	183	73.8%	2006.04	8,093,750	56	22.6%	2006.04	4,270,000	192	77.4%
2007	1	6,155,805	286	2007.01	21,225,000	104	36.4%	2007.01	3,700,000	182	63.6%	2007.01	9,500,000	63	22.0%	2007.01	5,700,000	223	78.0%
2007	2	5,650,000	385	2007.02	25,125,000	120	31.2%	2007.02	3,750,000	265	68.8%	2007.02	9,000,000	67	17.4%	2007.02	5,450,000	318	82.6%
2007	3	5,450,000	330	2007.03	20,100,161	105	31.8%	2007.03	3,900,000	225	68.2%	2007.03	8,325,000	53	16.1%	2007.03	5,011,554	277	83.9%
2007	4	4,680,000	249	2007.04	23,250,000	86	34.5%	2007.04	3,150,000	163	65.5%	2007.04	9,375,000	36	14.5%	2007.04	4,500,000	213	85.5%
2008	1	5,000,000	255	2008.01	16,000,000	61	23.9%	2008.01	3,985,000	194	76.1%	2008.01	5,990,000	46	18.0%	2008.01	4,650,000	209	82.0%
2008	2	5,062,900	228	2008.02	22,150,000	50	21.9%	2008.02	3,890,000	178	78.1%	2008.02	8,725,000	38	16.7%	2008.02	4,800,000	190	83.3%
2008	3	4,190,500	172	2008.03	17,133,333	37	21.5%	2008.03	3,350,000	135	78.5%	2008.03	5,500,000	27	15.7%	2008.03	3,900,000	145	84.3%
2008	4	4,050,000	159	2008.04	18,850,000	32	20.1%	2008.04	3,500,000	127	79.9%	2008.04	4,972,500	27	17.0%	2008.04	3,920,000	132	83.0%
2009	1	4,150,000	81	2009.01	15,800,000	15	18.5%	2009.01	3,600,000	66	81.5%	2009.01	7,375,000	16	19.8%	2009.01	3,700,000	65	80.2%
2009	2	3,090,231	86	2009.02	14,722,500	11	12.8%	2009.02	2,864,310	75	87.2%	2009.02	5,410,250	16	18.6%	2009.02	3,000,000	70	81.4%
2009	3	3,400,000	90	2009.03	22,000,000	16	17.8%	2009.03	3,000,000	74	82.2%	2009.03	4,608,750	14	15.6%	2009.03	3,195,271	76	84.4%
2009	4	3,562,500	84	2009.04	14,100,000	14	16.7%	2009.04	3,010,250	70	83.3%	2009.04	4,520,000	12	14.3%	2009.04	3,400,000	72	85.7%
2010	1	3,900,000	89	2010.01	20,162,500	18	20.2%	2010.01	2,825,000	71	79.8%	2010.01	8,450,000	15	16.9%	2010.01	3,825,000	74	83.1%
2010	2	3,700,000	138	2010.02	30,833,449	34	24.6%	2010.02	3,000,000	104	75.4%	2010.02	15,400,000	34	24.6%	2010.02	3,100,000	104	75.4%
2010	3	4,912,500	120	2010.03	35,500,000	46	38.3%	2010.03	2,850,000	74	61.7%	2010.03	25,000,000	37	30.8%	2010.03	3,117,000	83	69.2%
2010	4	3,988,800	100	2010.04	30,353,182	38	38.0%	2010.04	2,420,000	62	62.0%	2010.04	38,500,000	23	23.0%	2010.04	3,265,000	77	77.0%
2011	1	4,200,000	85	2011.01	34,050,000	24	28.2%	2011.01	2,795,500	61	71.8%	2011.01	12,275,000	15	17.6%	2011.01	3,775,000	70	82.4%
2011	2	4,200,000	97	2011.02	51,200,000	31	32.0%	2011.02	2,250,000	66	68.0%	2011.02	15,600,000	23	23.7%	2011.02	3,175,000	74	76.3%
2011	3	3,350,000	73	2011.03	23,772,500	20	27.4%	2011.03	2,800,000	53	72.6%	2011.03	3,700,000	17	23.3%	2011.03	3,275,000	56	76.7%
2011	4	5,000,000	157	2011.04	32,400,000	43	27.4%	2011.04	3,229,250	114	72.6%	2011.04	10,950,000	34	21.7%	2011.04	4,300,000	123	78.3%
2012	1	5,233,961	131	2012.01	22,100,000	40	30.5%	2012.01	3,275,000	91	69.5%	2012.01	13,837,500	28	21.4%	2012.01	4,200,000	103	78.6%
2012	2	4,000,000	209	2012.02	17,000,000	61	29.2%	2012.02	2,779,500	148	70.8%	2012.02	15,900,000	22	10.5%	2012.02	3,700,000	187	89.5%
2012	3	7,000,000	169	2012.03	19,100,000	67	39.6%	2012.03	2,720,250	102	60.4%	2012.03	16,050,000	32	18.9%	2012.03	5,250,000	137	81.1%
2012	4	5,622,500	207	2012.04	24,866,613	74	35.7%	2012.04	3,125,000	133	64.3%	2012.04	16,174,794	39	18.8%	2012.04	5,070,000	168	81.2%
2013	1	5,999,992	239	2013.01	21,154,582	85	35.6%	2013.01	2,962,500	154	64.4%	2013.01	7,750,000	52	21.8%	2013.01	5,575,000	187	78.2%
2013	2	4,700,000	217	2013.02	22,000,000	71	32.7%	2013.02	2,500,000	146	67.3%	2013.02	16,000,000	38	17.5%	2013.02	4,200,000	179	82.5%
2013	3	5,260,855	246	2013.03	25,000,000	75	30.5%	2013.03	3,300,000	171	69.5%	2013.03	9,949,500	35	14.2%	2013.03	4,750,000	211	85.8%
2013	4	4,575,000	315	2013.04	24,000,000	99	31.4%	2013.04	2,790,000	216	68.6%	2013.04	13,750,000	56	17.8%	2013.04	4,000,000	259	82.2%
2014	1	5,625,000	228	2014.01	20,750,000	70	30.7%	2014.01	3,300,000	158	69.3%	2014.01	8,825,900	59	25.9%	2014.01	5,000,000	169	74.1%
2014	2	4,300,000	320	2014.02	26,125,000	88	27.5%	2014.02	2,818,750	232	72.5%	2014.02	11,200,000	59	18.4%	2014.02	3,700,000	261	81.6%
2014	3	5,500,000	351	2014.03	20,000,000	97	27.6%	2014.03	3,206,500	254	72.4%	2014.03	10,567,078	66	18.8%	2014.03	5,000,000	285	81.2%
2014	4	4,500,000	311	2014.04	29,625,000	78	25.1%	2014.04	3,040,000	233	74.9%	2014.04	8,200,000	73	23.5%	2014.04	3,950,000	238	76.5%
2015	1	5,752,500	254	2015.01	29,750,000	82	32.3%	2015.01	3,125,000	172	67.7%	2015.01	8,280,000	47	18.5%	2015.01	5,500,000	207	81.5%
2015	2	6,350,000	268	2015.02	34,575,000	92	34.3%	2015.02	3,250,000	176	65.7%	2015.02	18,765,000	46	17.2%	2015.02	5,612,500	222	82.8%
2015	3	5,050,000	299	2015.03	24,800,000	87	29.1%	2015.03	3,012,500	212	70.9%	2015.03	12,100,000	53	17.7%	2015.03	4,275,000	246	82.3%
2015	4	6,700,000	293	2015.04	18,264,737	106	36.2%	2015.04	3,175,000	187	63.8%	2015.04	14,500,000	51	17.4%	2015.04	5,440,000	242	82.6%
2016	1	5,600,000	293	2016.01	20,375,000	87	29.7%	2016.01	3,350,000	206	70.3%	2016.01	13,600,000	45	15.4%	2016.01	5,275,000	248	84.6%
2016	2	4,100,000	322	2016.02	16,000,000	61	18.9%	2016.02	3,300,000	261	81.1%	2016.02	11,600,000	48	14.9%	2016.02	3,725,000	274	85.1%
2016	3	4,862,500	284	2016.03	25,000,000	75	26.4%	2016.03	3,200,000	209	73.6%	2016.03	24,500,000	34	12.0%	2016.03	4,362,500	250	88.0%
2016	4	4,050,000	264	2016.04	19,480,000	73	27.7%	2016.04	2,800,000	191	72.3%	2016.04	12,955,200	29	11.0%	2016.04	3,664,706	235	89.0%
2017	1	5,300,000	256	2017.01	22,880,750	70	2												

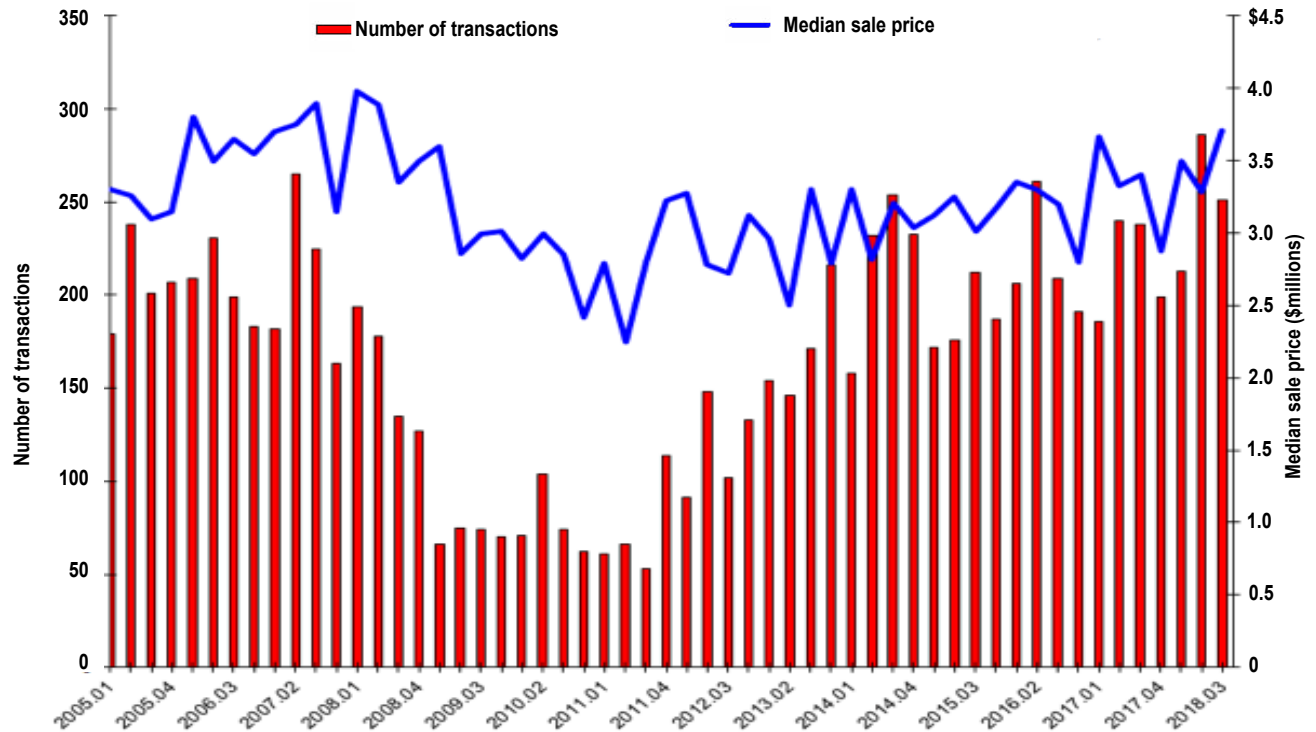
# EXHIBIT 5

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



# EXHIBIT 6

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



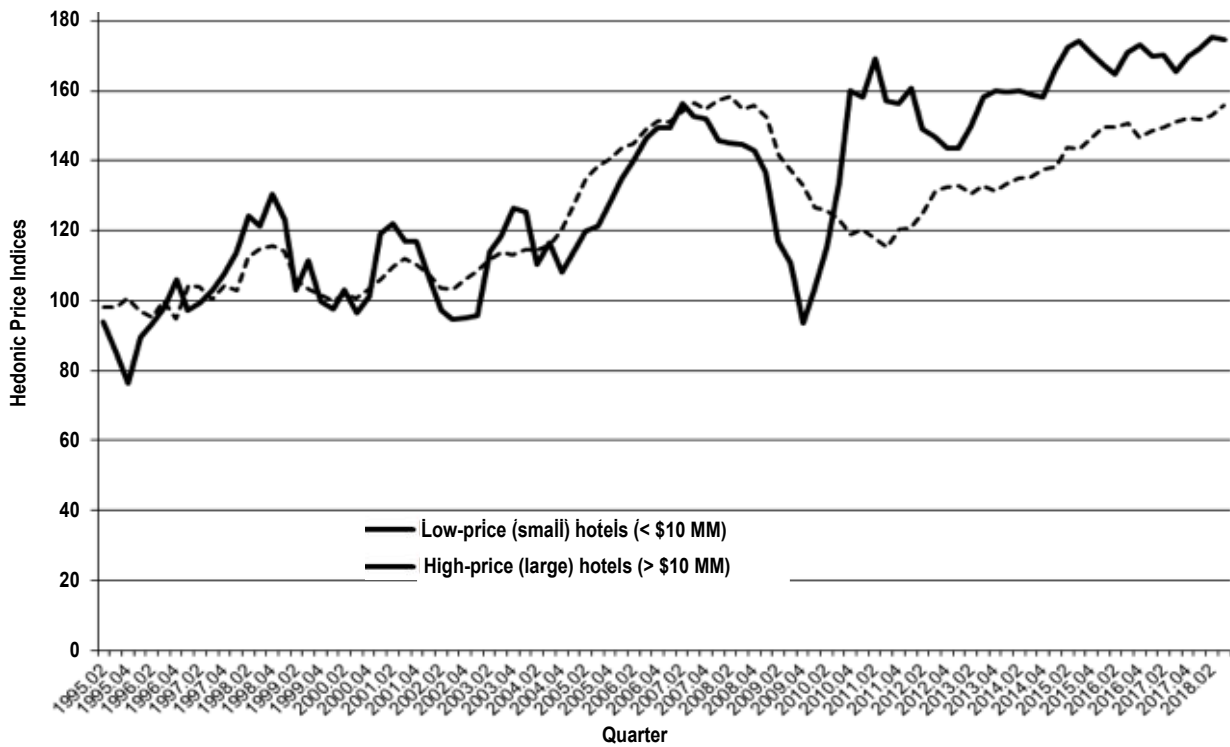


**EXHIBIT 7**
**Hotel indices through 2018, quarter 3**

YrQtr	Index Value						YrQtr	Index Value					
	Hedonic	Hedonic			RSI	RSI		Hedonic	Hedonic			RSI	RSI
	Low Priced	High Priced	Non					Low Priced	High Priced	Non		Repeat	Index Value
	Hotels	Hotels	Gateway	Gateway	Repeat	Repeat		Hotels	Hotels	Gateway	Gateway	Sales	Repeat
	(<\$10M)	(>=\$10M)	Index	Index	Sales	Index		(<\$10M)	(>=\$10M)	Index	Index	Index	Sales
1995.02	98.21	94.02	82.80	102.24	63.50	NA	2007.01	150.96	149.62	165.85	219.02	146.09	146.71
1995.03	98.18	85.60	81.73	98.15	66.61	NA	2007.02	154.01	156.26	173.30	229.04	150.47	151.23
1995.04	100.72	76.59	85.65	91.37	68.72	NA	2007.03	156.61	152.75	177.00	227.13	155.76	157.98
1996.01	96.91	89.43	90.13	93.86	70.31	NA	2007.04	154.86	151.85	180.61	229.56	156.10	159.33
1996.02	95.10	93.38	94.52	88.62	74.42	NA	2008.01	157.33	145.68	174.94	233.06	157.48	165.08
1996.03	100.11	97.80	105.22	96.78	74.24	NA	2008.02	158.51	145.20	171.46	237.91	157.14	165.26
1996.04	94.92	106.07	105.50	103.81	75.38	NA	2008.03	154.85	144.62	165.51	230.94	154.83	160.30
1997.01	104.38	97.06	113.08	110.02	87.80	NA	2008.04	155.78	142.92	159.97	224.25	158.01	165.46
1997.02	103.98	99.56	111.27	110.70	90.08	NA	2009.01	152.70	136.52	151.89	198.49	153.78	161.12
1997.03	100.51	103.11	106.14	111.82	95.55	NA	2009.02	141.75	117.14	135.76	173.18	150.87	155.62
1997.04	104.50	107.41	113.05	119.24	101.98	NA	2009.03	137.44	110.82	128.23	159.51	138.56	143.99
1998.01	102.93	113.79	115.39	123.66	98.87	NA	2009.04	133.17	93.71	114.93	158.48	123.13	128.16
1998.02	112.27	124.18	127.66	134.26	103.61	NA	2010.01	126.46	103.06	115.75	158.59	116.25	122.40
1998.03	114.92	121.48	131.70	125.51	106.15	NA	2010.02	125.80	115.18	119.18	162.55	108.08	115.61
1998.04	115.66	130.45	126.25	125.56	103.10	NA	2010.03	123.23	133.81	120.44	216.63	107.70	114.99
1999.01	114.12	123.06	114.64	117.77	96.93	NA	2010.04	118.85	160.23	129.72	246.57	111.91	117.62
1999.02	105.78	102.93	99.05	99.51	92.47	NA	2011.01	120.40	158.25	128.42	260.80	112.76	114.09
1999.03	103.38	111.65	94.87	105.30	89.94	NA	2011.02	117.81	169.10	130.91	267.50	113.29	113.18
1999.04	101.73	99.91	93.58	100.21	91.08	NA	2011.03	115.19	157.24	128.49	224.49	113.37	113.33
2000.01	100.14	97.64	94.88	96.45	95.72	97.87	2011.04	120.51	156.57	127.12	209.33	114.01	114.15
2000.02	101.64	102.97	99.23	100.59	98.53	97.87	2012.01	120.77	160.91	130.39	222.02	113.20	112.20
2000.03	100.61	96.39	100.67	96.13	98.02	93.44	2012.02	125.20	149.11	132.95	227.30	115.59	117.51
2000.04	103.33	101.39	102.33	101.97	97.83	94.06	2012.03	131.44	147.00	141.21	240.36	120.33	122.28
2001.01	106.06	118.98	109.70	105.80	97.10	92.76	2012.04	132.41	143.64	147.07	250.48	121.40	122.80
2001.02	109.98	122.03	110.31	117.89	97.31	91.78	2013.01	132.93	143.47	153.78	239.19	123.64	127.00
2001.03	112.17	116.92	109.34	116.55	98.34	95.53	2013.02	130.64	149.67	154.69	242.89	126.45	130.00
2001.04	110.35	116.91	106.12	112.09	98.14	92.05	2013.03	132.96	158.41	156.14	246.22	126.73	130.65
2002.01	107.42	106.75	99.51	107.82	98.15	94.11	2013.04	131.44	160.23	153.83	249.24	128.38	133.42
2002.02	103.48	97.07	95.76	97.27	95.44	91.73	2014.01	133.72	159.82	152.62	253.01	133.56	137.86
2002.03	103.39	94.79	95.06	99.72	95.83	89.63	2014.02	135.16	160.22	149.27	257.78	131.41	133.99
2002.04	106.19	95.04	100.21	100.64	96.19	94.68	2014.03	135.53	158.85	149.19	256.70	133.84	136.46
2003.01	108.29	95.73	101.08	111.96	97.73	94.68	2014.04	137.51	158.10	149.11	231.37	134.68	136.39
2003.02	111.79	114.08	105.44	120.10	100.54	99.09	2015.01	138.31	166.42	152.16	239.97	138.41	139.22
2003.03	113.82	118.50	108.42	128.10	101.73	102.57	2015.02	143.92	172.35	164.44	247.84	145.25	146.26
2003.04	113.28	126.40	107.93	132.35	103.40	105.09	2015.03	143.62	174.45	163.53	274.99	152.75	154.75
2004.01	114.53	125.18	108.52	131.56	103.00	106.35	2015.04	146.66	170.79	171.12	312.98	161.34	163.94
2004.02	114.65	110.38	107.16	134.14	103.58	107.28	2016.01	149.64	167.50	172.91	329.23	165.04	168.43
2004.03	115.88	116.73	109.56	141.64	107.50	111.52	2016.02	149.73	164.72	165.47	332.68	162.73	166.74
2004.04	120.21	108.03	114.30	149.24	108.33	111.02	2016.03	150.70	170.87	167.29	347.25	164.60	166.89
2005.01	127.37	113.61	122.87	168.02	112.49	114.18	2016.04	146.90	173.14	161.87	334.85	160.94	164.26
2005.02	135.10	119.72	135.94	169.54	117.76	120.85	2017.01	148.46	169.94	161.73	315.72	165.27	168.91
2005.03	138.38	121.27	141.32	167.59	122.43	125.61	2017.02	149.60	170.45	167.96	319.52	175.54	179.32
2005.04	140.47	127.53	145.20	177.09	128.21	132.08	2017.03	150.96	165.47	169.28	309.34	175.52	180.58
2006.01	143.78	134.99	152.24	181.69	133.26	137.70	2017.04	152.35	169.83	170.07	309.06	179.99	183.75
2006.02	144.96	140.19	152.12	194.87	136.78	140.69	2018.01	151.69	172.26	171.19	348.64	178.80	183.21
2006.03	148.95	146.37	157.56	212.76	138.13	141.84	2018.02	153.05	175.24	170.44	356.80	178.86	182.44
2006.04	151.62	149.58	161.85	213.63	142.75	144.49	2018.03	155.76	174.81	172.91	356.59	183.49	186.67

## EXHIBIT 8

### Hedonic hotel indices for large and small hotel transactions



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

A comparison of large hotels relative to smaller hotels on a year-over-year basis reveals that the median price of large hotels—the “Goliaths”—fell 4.4 percent on weaker volume (-5.7%), while the median price of smaller hotels—the “Davids”—rose 9 percent on higher volume (5.5%).<sup>1</sup> In contrast, the price change for hotels sold in gateway cities fell 41 percent on weaker volume (-44%). A similar although better situation exists on a quarter-over-quarter basis for large hotels, with the median sale price of large hotels rising 7 percent on weaker transaction volume (-9%). The “David” hotels kept up with the “Goliaths,” as the median sale price of smaller hotels, also rose by 7.7 percent, together with stronger volume (increase of 1%). Hotels in gateway cities experienced a decline in price (-24%) on weaker transaction volume (-45%). The only bright spot was hotels located in non-gateway cities. These

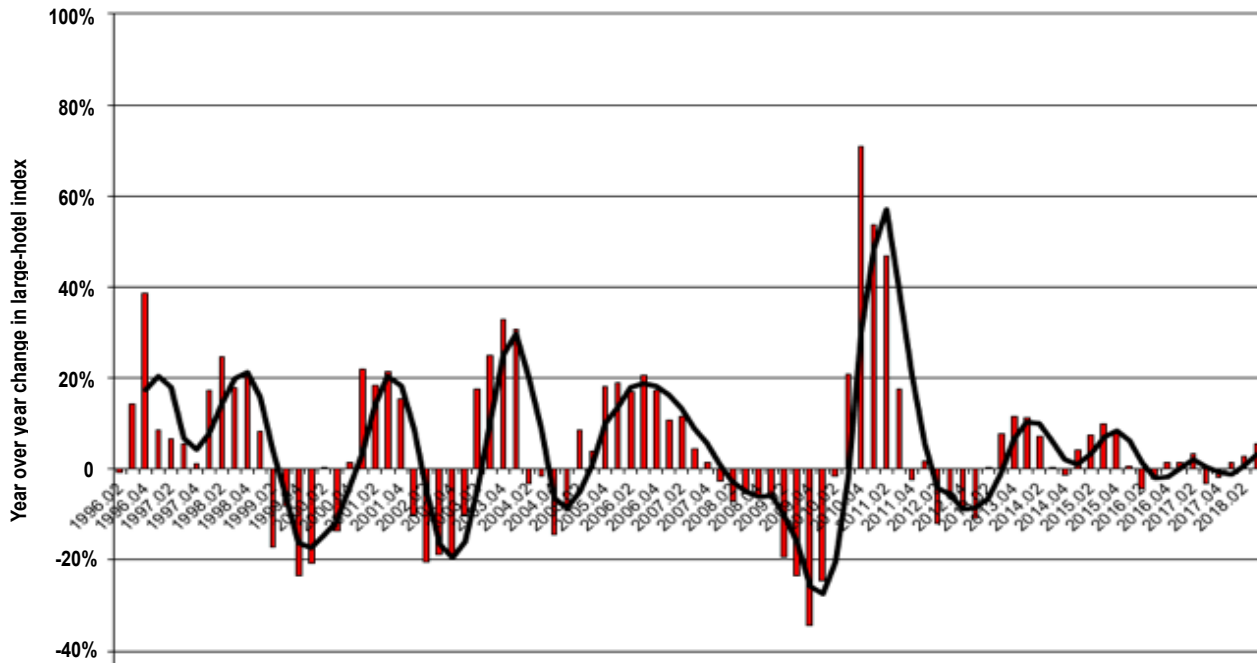
<sup>1</sup> Note that the number of transactions is limited to the sales that are included in the hedonic index. As such, it should not be construed as being the total market activity.

hotels rose 11 percent year over year on stronger volume (9%), but prices dropped 18 percent quarter over quarter on weaker volume (-5%). Exhibit 5 and Exhibit 6 show this year-over-year trend in the number of transactions for large hotels and small hotels, as well as those in gateway and non-gateway cities.

**Our moving average trendlines and our standardized unexpected price (SUP) performance metrics both point to continued positive price momentum for large and small hotels in general.** Exhibit 8, which graphs the prices reported in Exhibit 7, shows that the price of large hotels fell .24 percent this quarter, compared to a 1.7-percent increase in the previous quarter. The change in the price of smaller hotels was positive at 1.8 percent this quarter compared to just a .9-percent rise last quarter. In contrast, Exhibit 9 shows that on a year-over-year basis, large hotels rose 5.65 percent (2017Q3-2018Q3), up from a 2.81-percent increase in the prior year-over-year period (2017Q2-2018Q2). Exhibit 10 shows the same

## EXHIBIT 9

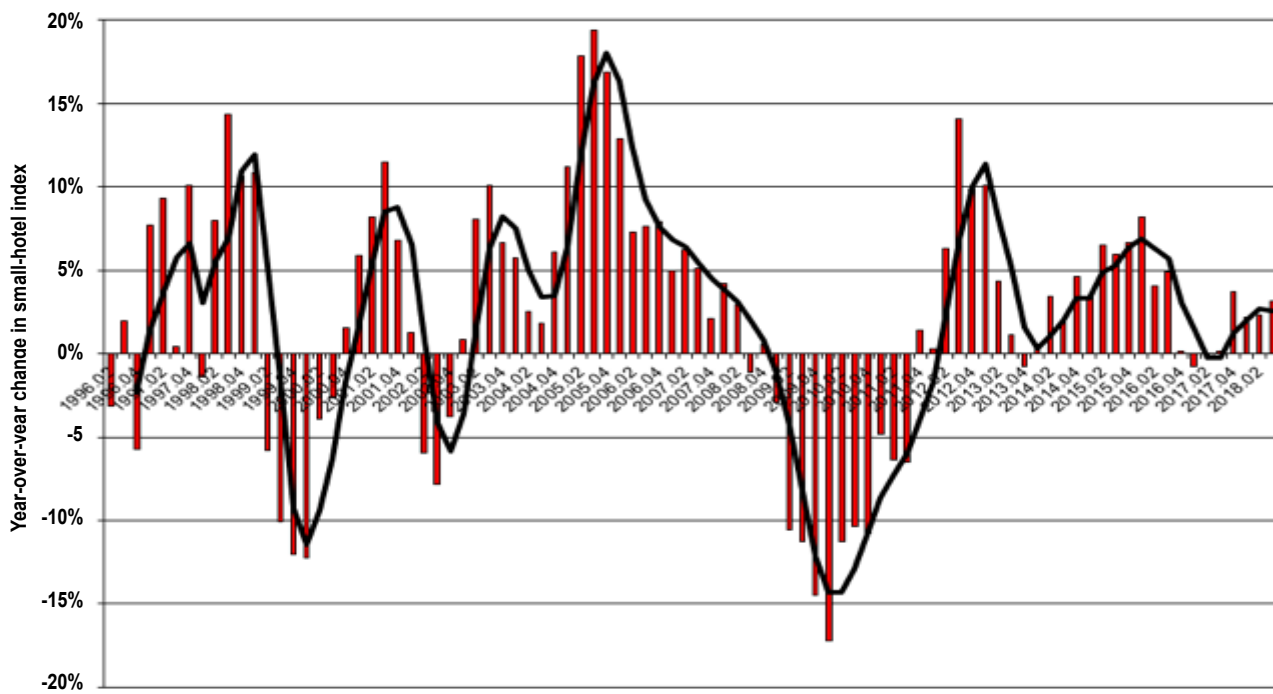
Year-over-year change in high-price (large) hotel index, with moving-average trend line



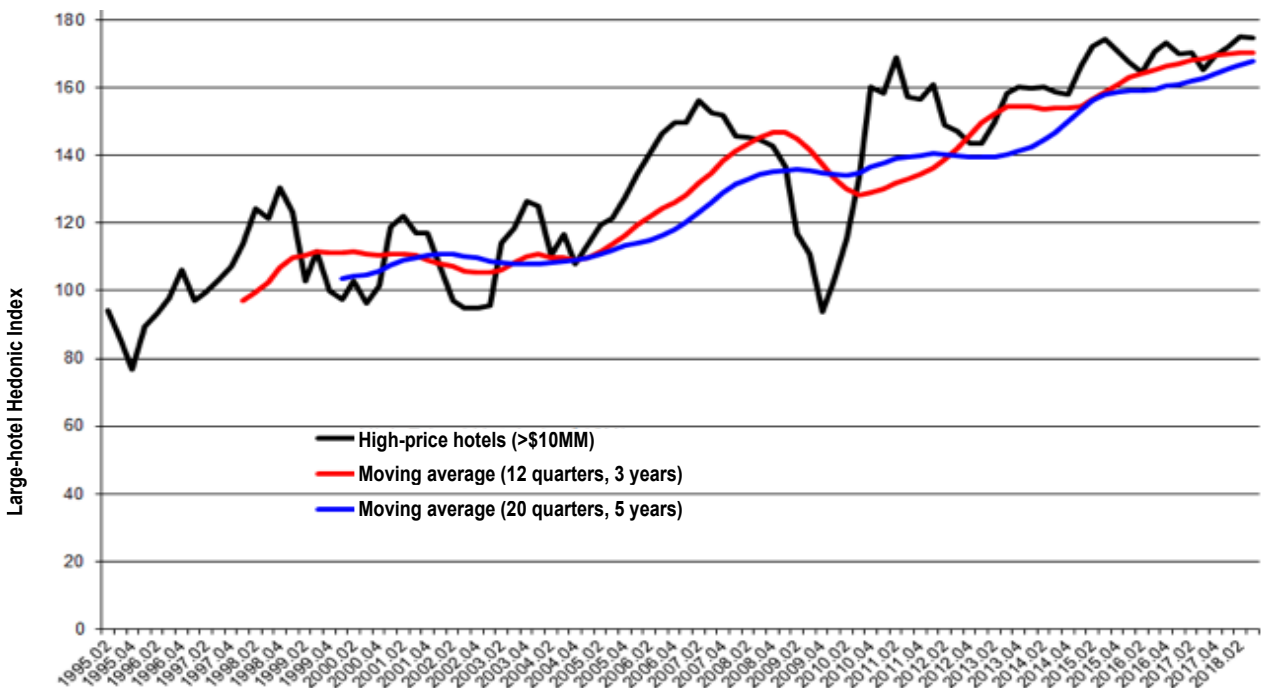
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

## EXHIBIT 10

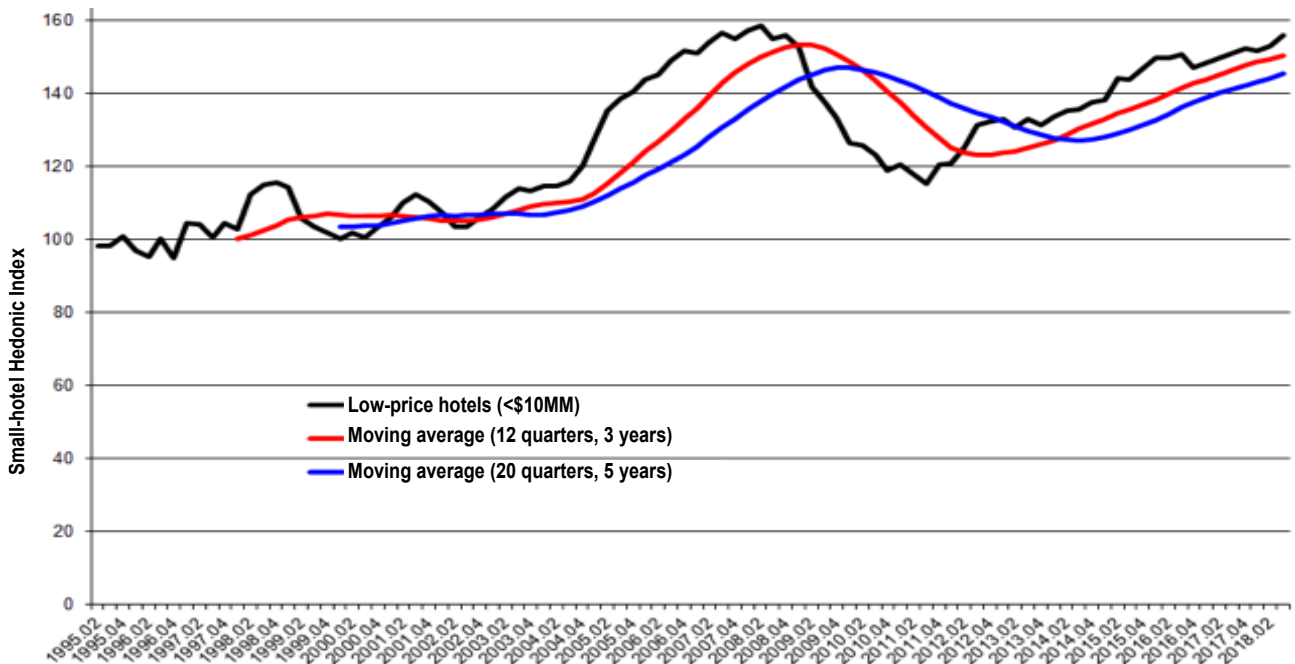
Year-over-year change in small-hotel index, with moving-average trend line



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

**EXHIBIT 11****Moving average trend line for large-hotel index**

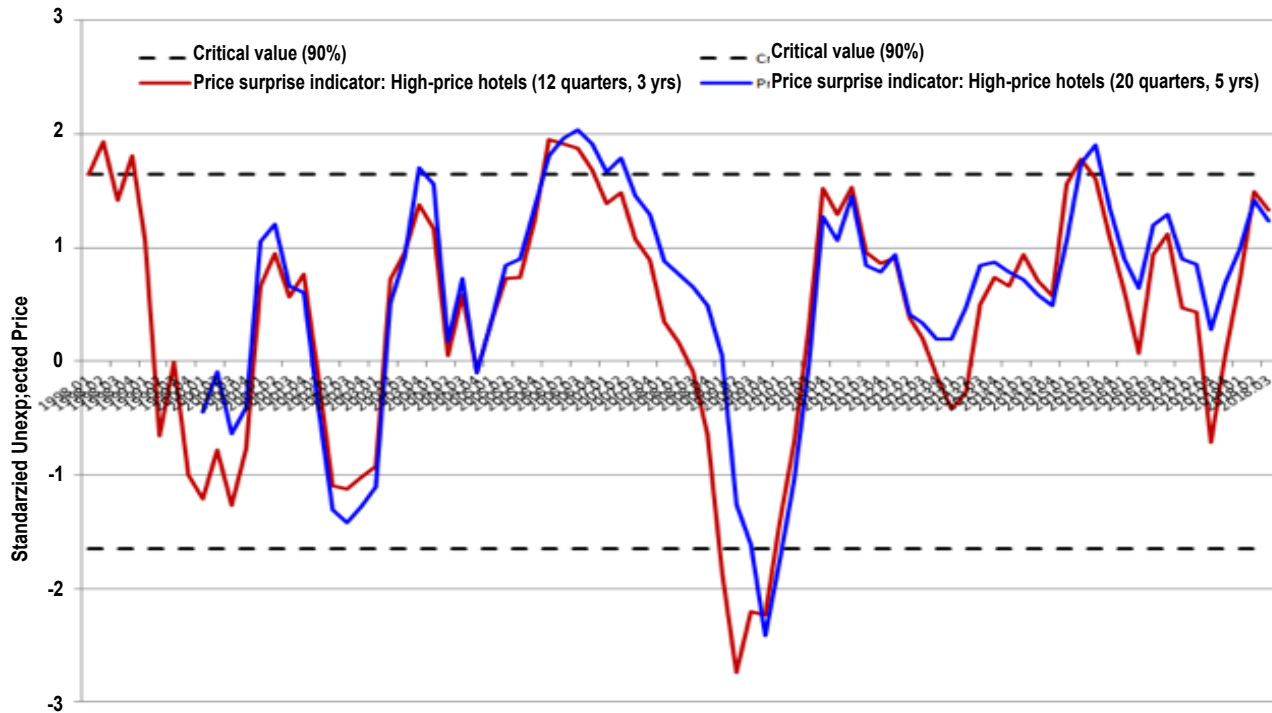
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

**EXHIBIT 12****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

comparison for smaller hotels, which rose 3.2 percent (2017Q3-2018Q3), also an increase from the 2.3-percent gain in the prior period (2017Q2-2018Q2). Thus, the price of both small hotels and large hotels increased at an accelerating rate on a year-over-year basis.

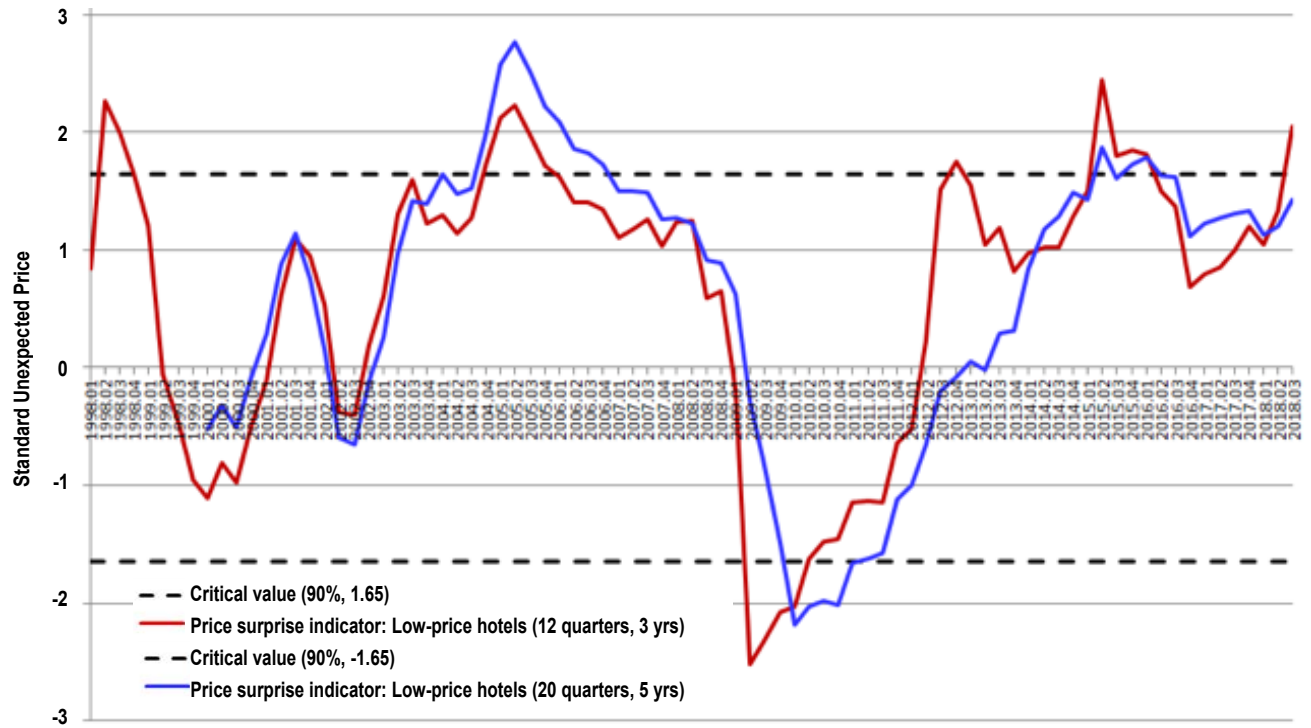
Our moving average trend lines for large hotels (in Exhibit 11) show that the price for large hotels now exceeds both its short-term and long-term moving average trend lines. Likewise, Exhibit 12 shows that the price for smaller hotels also continues to be above

both its short-term and long-term moving average trend lines. Based on our moving average indicators, positive momentum continues to persist for large and small hotels this quarter. This indicates a continued signal that hotels are still a *buy* and *hold*.

Our standardized unexpected price (SUP) metrics (in Exhibit 13) show that the price of large hotels started to turn down this quarter. In contrast, the price momentum of smaller hotels not only exhibited positive price momentum, but this momentum was

# EXHIBIT 14

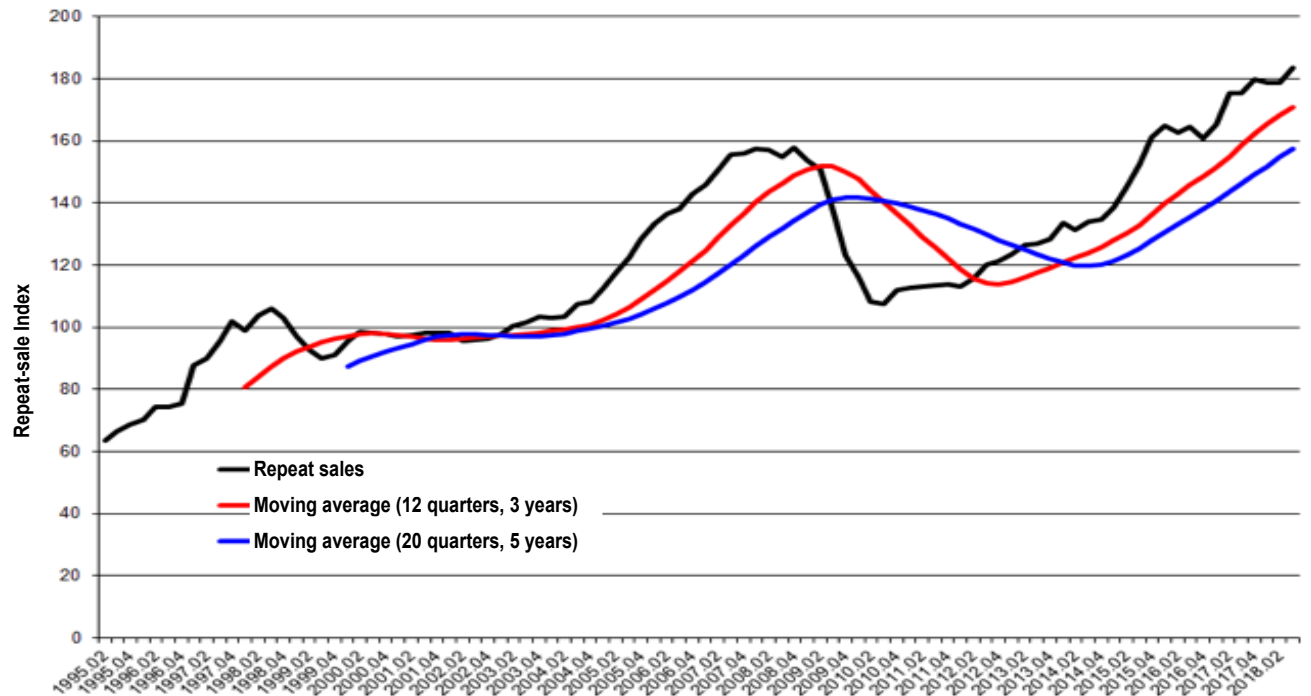
## Standardized unexpected price (SUP) for small-hotel index



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

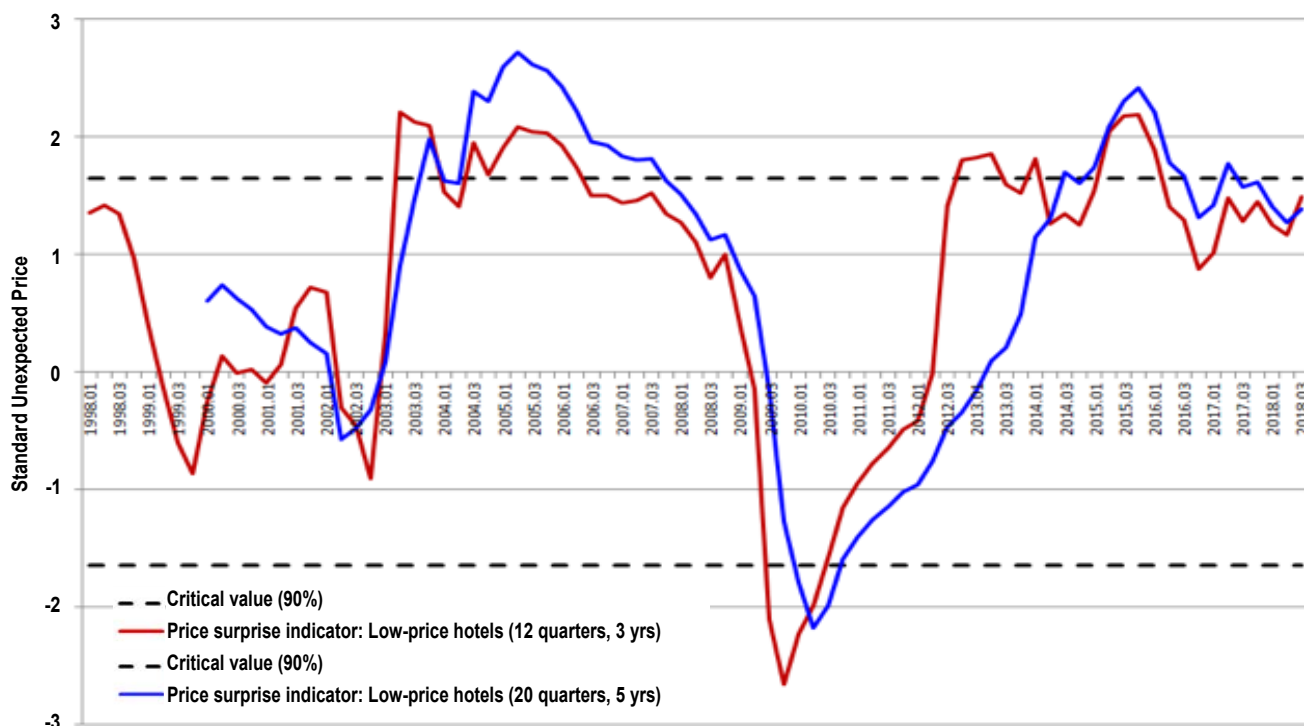
# EXHIBIT 15

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



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

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



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

statistically significant for the 3-year moving average, as depicted in Exhibit 14. Note that the moving average breaks above the upper significance band.

**Repeat sales metrics: Prices are rising at an increasing rate.** Similar to smaller hotels, our repeat sale indicator for the moving average trendline (in Exhibit 15) indicates a continuation of positive price momentum.<sup>2</sup> The price of hotels that have sold more than once (repeat sales) is still higher than its short-

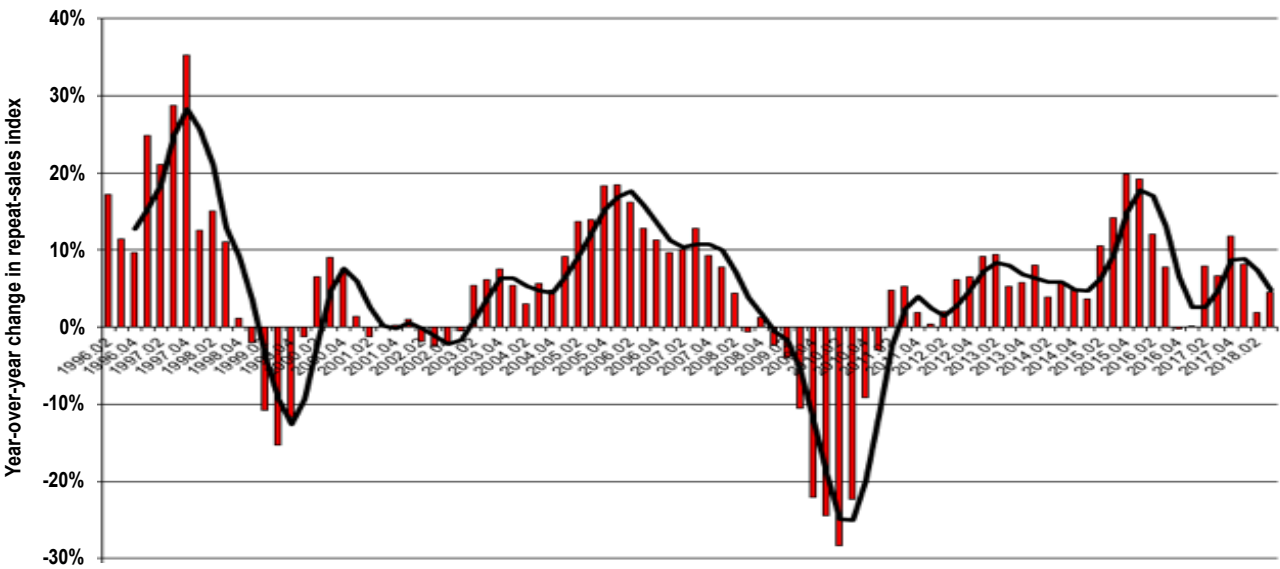
<sup>2</sup> We report two repeat sale indices. The repeat sale full sample index uses all repeat sale pairs, whereas the repeat sale index with a base of 100 at 2000Q1 uses only those sales that occurred on or after the first quarter of 2000. Thus, the 2000Q1 repeat sale index doesn't use information on sales prior to the first quarter of 2000. As such, if a hotel sold in 1995 and then sold again in 2012,

term and long-term moving average. Our SUP performance metric in Exhibit 16 indicates that prices demonstrated positive strength this quarter when they are viewed from a *standardized* price perspective. Exhibit 17 further shows that the repeat sale price index is increasing at an accelerating rate. In that regard, the repeat sale price index rose 4.54 percent year over year (2017Q3 to 2018Q3), up from 1.89 percent in the prior year over year period (i.e., 2017Q2 to 2018Q2). It also increased 2.6 percent quarter over quarter (2018Q2-2018Q3), up from .03 percent in the previous quarter (2018Q1-2018Q2).

it would be included in the repeat sale full sample index, but it would not be included in the 2000Q1 repeat sale index.

## EXHIBIT 17

### 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

**Mortgage financing volume for hotels increased year over year and also quarter over quarter.** Exhibit 18 shows that the mortgage origination volume for hotels, as reported for 2018Q2, is about 22 percent higher on a year-over-year basis (2017Q2-2018Q2), and even higher (88%) on a quarter-over-quarter basis (2018Q2 compared to 2018Q1).<sup>3</sup> Nevertheless, the maximum loan-to-value (LTV) ratio for hotels still remains at 70 percent.

**The cost of hotel debt financing has finally declined, along with the relative risk premium for hotels.** The cost of obtaining hotel debt financing, as reported by Cushman Wakefield Sonnenblick Goldman, dipped slightly this quarter for both Class A and Class B and C hotels compared to the previous quarter.<sup>4</sup> As compared to the previous quarter, Exhibit

19 shows that interest rates on Class A and Class B and C hotel deals declined. For the third quarter of 2018, interest rates were 5.24 percent for Class A hotels and 5.44 percent for Class B&C properties (as of September of 2018), compared to 5.31 percent for Class A properties and 5.51 percent for Class B&C deals in the second quarter (June 2018). However, this decline in interest rates for the quarter doesn't tell the whole story, since interest rates have increased from a year-over-year perspective in a trend that started in July 2016.<sup>5</sup> Exhibit

the American Council of Life Insurers (ACLI). The ACLI interest rate reflects what life insurers are charging for institutional sized hotel deals. Our EVA calculation is based on property specific cap rates and the associated financing terms. The CWSG interest rate is based on deals that CWSG has brokered as well as their survey of rates on hotel deals. The deals are not necessarily similar to deals that are reported by ACLI.

<sup>5</sup> The biggest advantage of year-over-year comparisons relative to quarter over quarter comparisons is that they mitigate the effect of seasonality in addition to smoothing out any volatility in quarter over quarter numbers. That said, it's a good idea to look at quarter-to-quarter as well to get the full picture.

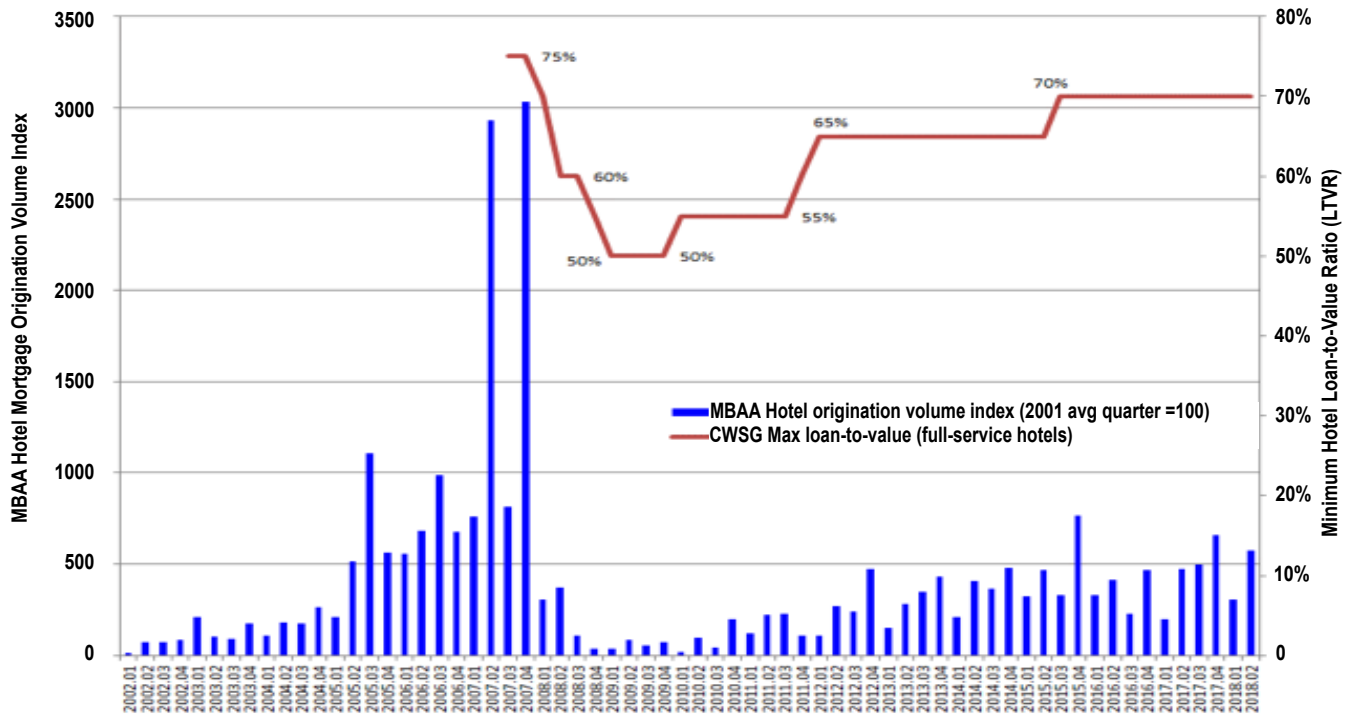
<sup>3</sup> This is the latest information reported by the Mortgage Bankers Association as of the writing of this report.

<sup>4</sup> The interest rate reported by Cushman Wakefield Sonnenblick Goldman (CWSG) differs from the interest rate used to calculate our EVA metric which is based on the interest rate reported by



# EXHIBIT 18

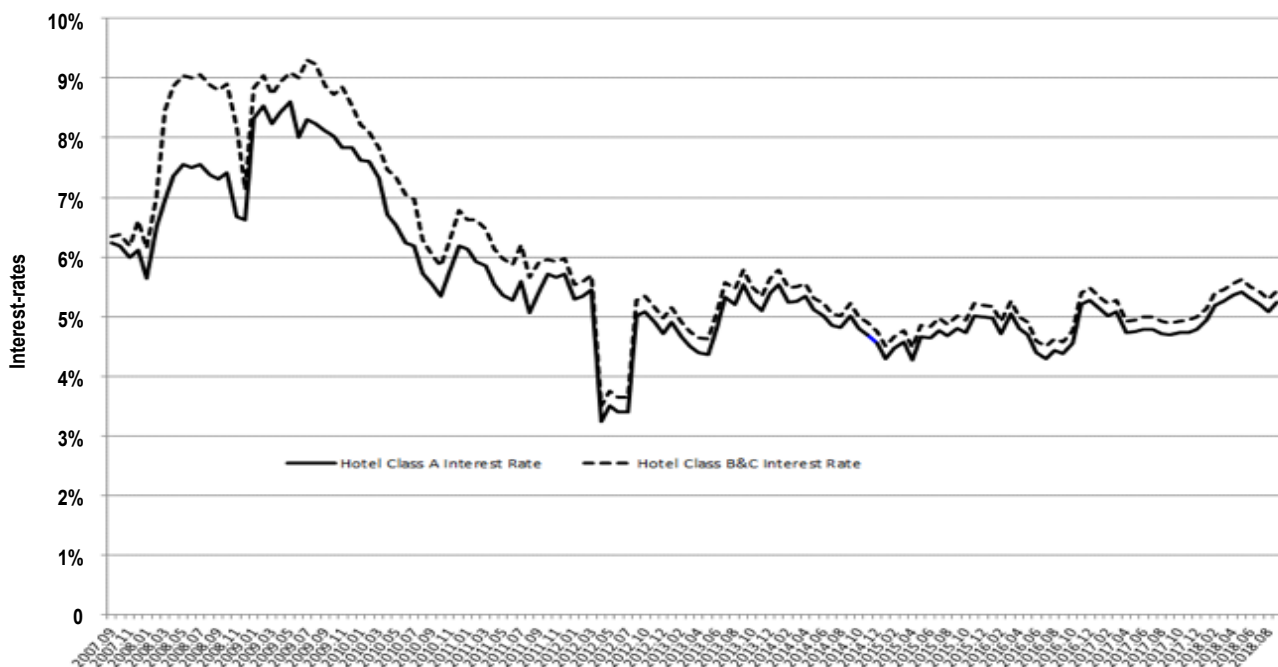
## Mortgage origination volume versus loan-to-value ratio for hotels



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

# EXHIBIT 19

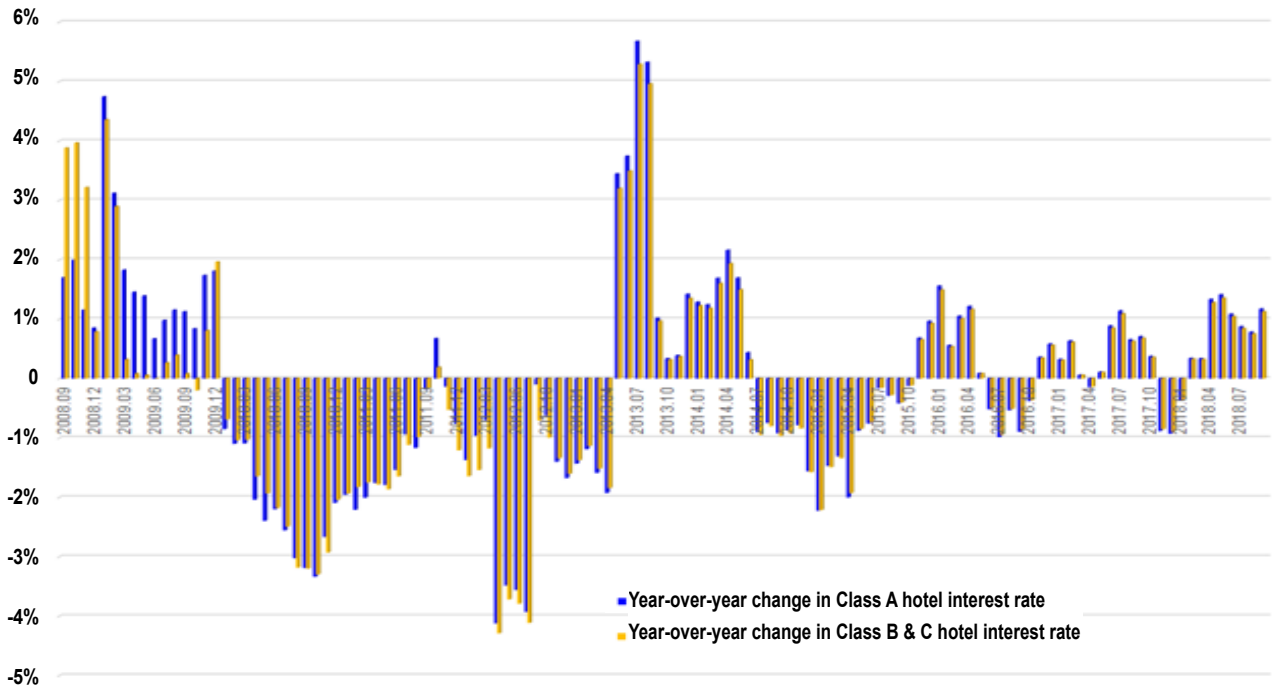
## Interest rates on Class A hotels versus Class B & C properties



Source: Cushman Wakefield Sonnenblick Goldman

## EXHIBIT 20

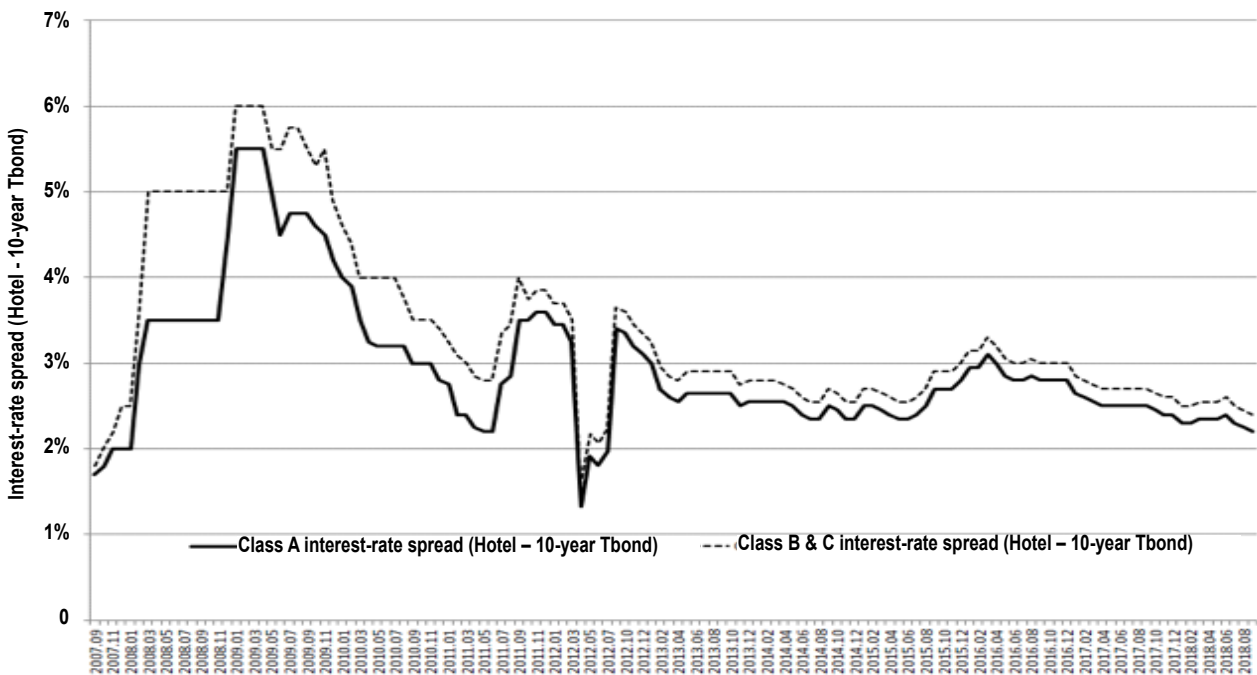
### Year-over-year change in interest rates on Class A hotels versus Class B and C properties



Source: Cushman Wakefield Sonnenblick Goldman

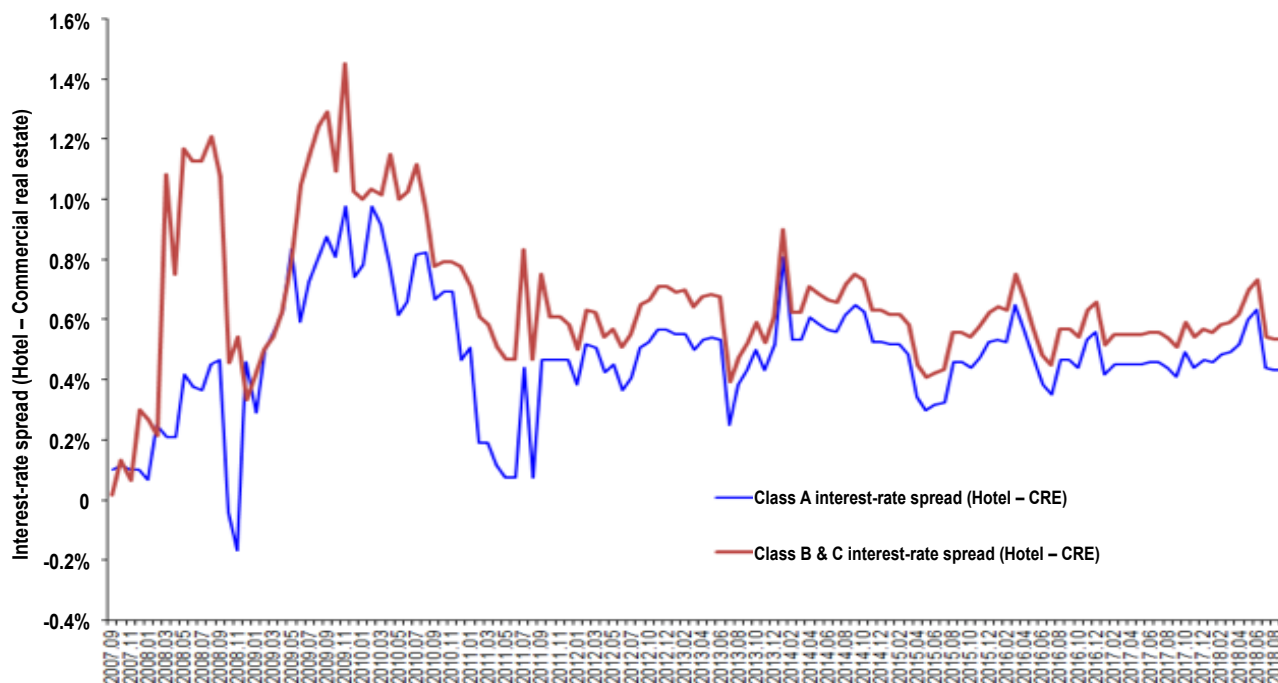
## EXHIBIT 21

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



Source: Cushman Wakefield Sonnenblick Goldman

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



Source: Cushman Wakefield Sonnenblick Goldman

20 confirms that interest rates on hotels continued to increase on a rolling year-over-year basis, rising 11.7 percent for Class A hotels and 11.25 percent for Class B and C hotels over the 2017Q3-2018Q3 period. This compares to year-over-year increases of 10.86 percent for Class A deals and 10.42 percent for Class B hotels over the 2017Q2-2018Q2 period.

Exhibit 21 and Exhibit 22 depict interest rate spreads relative to benchmarks of U.S. Treasury bonds and of commercial real estate. Exhibit 21 shows the spread of interest rates for Class A and B and C full-service hotels over the ten-year Treasury bond. On this metric, interest rate spreads have fallen 20 basis points in the third quarter for Class A, as well as Class B and C hotels, relative to the prior quarter. For the third quarter, Class A interest rate spreads were 2.2 percent, versus 2.4 percent in the second quarter, while Class B and C spreads were 2.4 percent in Q3 versus 2.6 percent in Q2. Thus, we observe that lenders' compensation for risk associated with hotel loans declined, indicating that lenders view hotels as relatively less risky relative to our last report. Exhibit 22 shows the spread between the interest rate on full service Class A hotels (as well as B&C deals) over the interest rate corresponding to non-hotel commercial real estate,

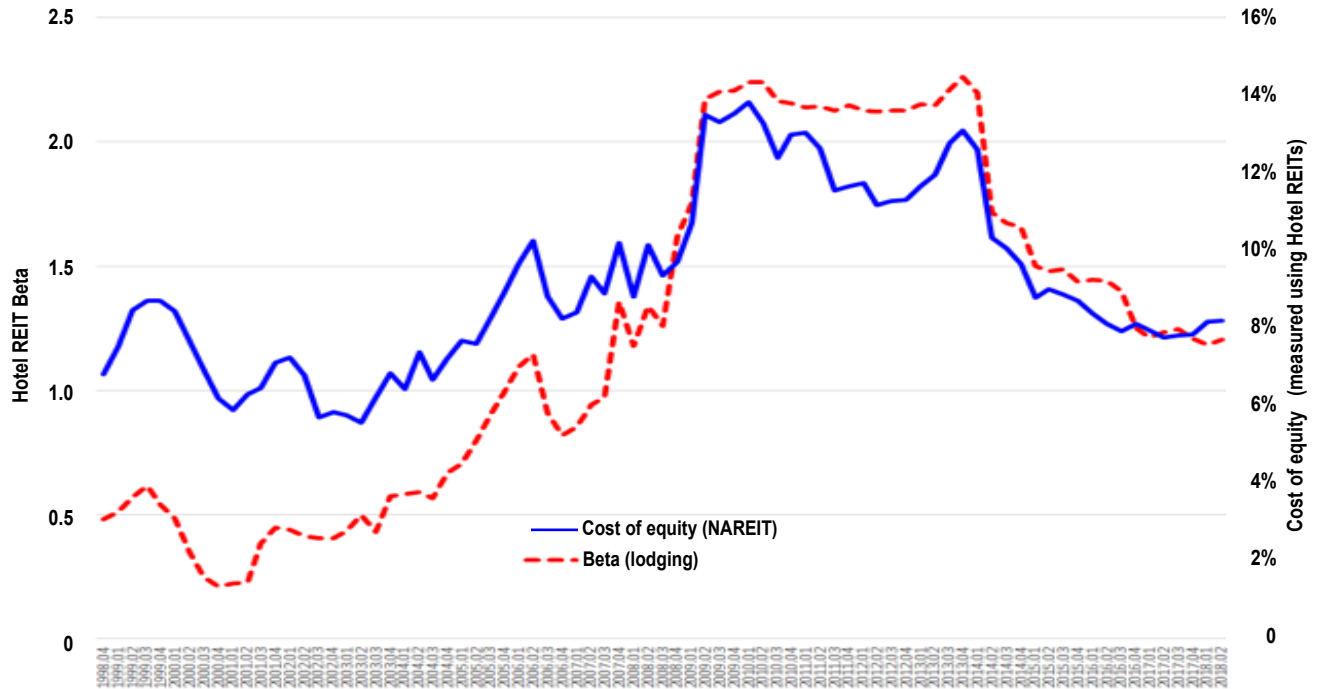
which is known as the hotel real estate premium.<sup>6</sup> The monthly hotel real estate premiums for both higher quality (Class A) and lower quality (Class B&C) hotels have experienced a reversal and started to fall this quarter after trending upwards in prior quarters. The hotel real estate premium averaged .43 percent for Class A hotels in 2018Q3 (.53 percent for B and C properties) compared to .63 percent for Class A hotels in 2018Q2 (.73 percent for B and C deals). This is a signal that the perceived default risk for hotel properties has declined this quarter relative other commercial real estate compared to the previous quarter.

**Cost of equity financing continues to rise, although the riskiness of hotels relative to other types of commercial real estate has fallen.** The cost of using equity financing for hotels as measured using the Capital Asset Pricing Model (CAPM) on hotel REIT returns continues to rise, albeit slightly, as shown in Exhibit 23. Based on the most recent figures, the cost of using equity funds is currently at 8.18 percent for 2018Q2 compared to 8.17 percent in the previous

<sup>6</sup> 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.

# EXHIBIT 23

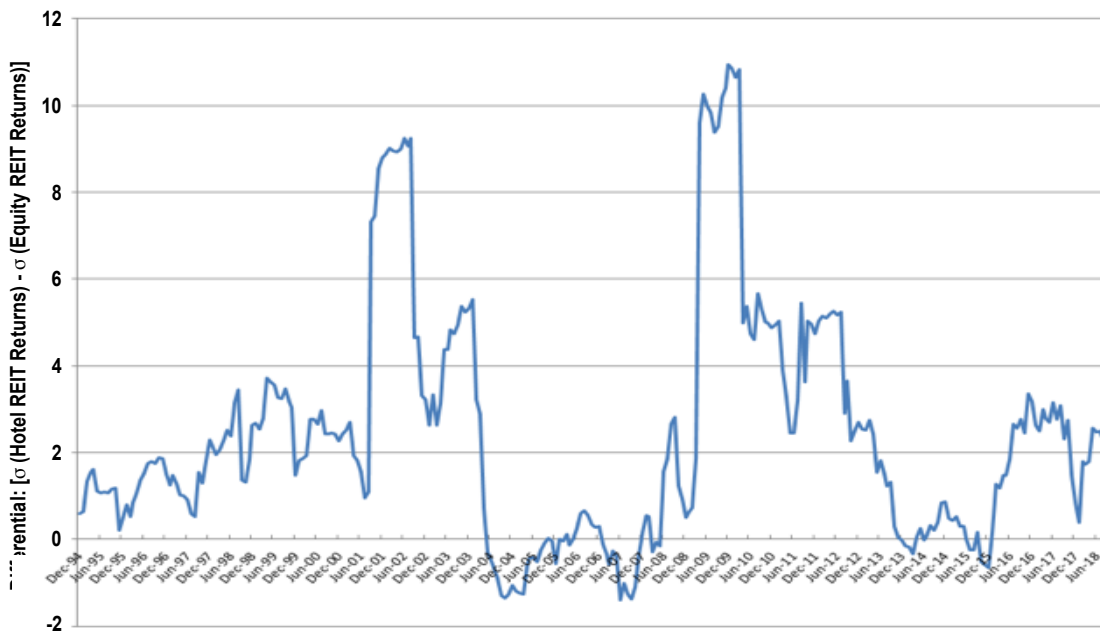
## Cost of equity financing using the Capital Asset Pricing Model and hotel REITs



Sources: Cornell Center for Real Estate and Finance, NAREIT

# EXHIBIT 24

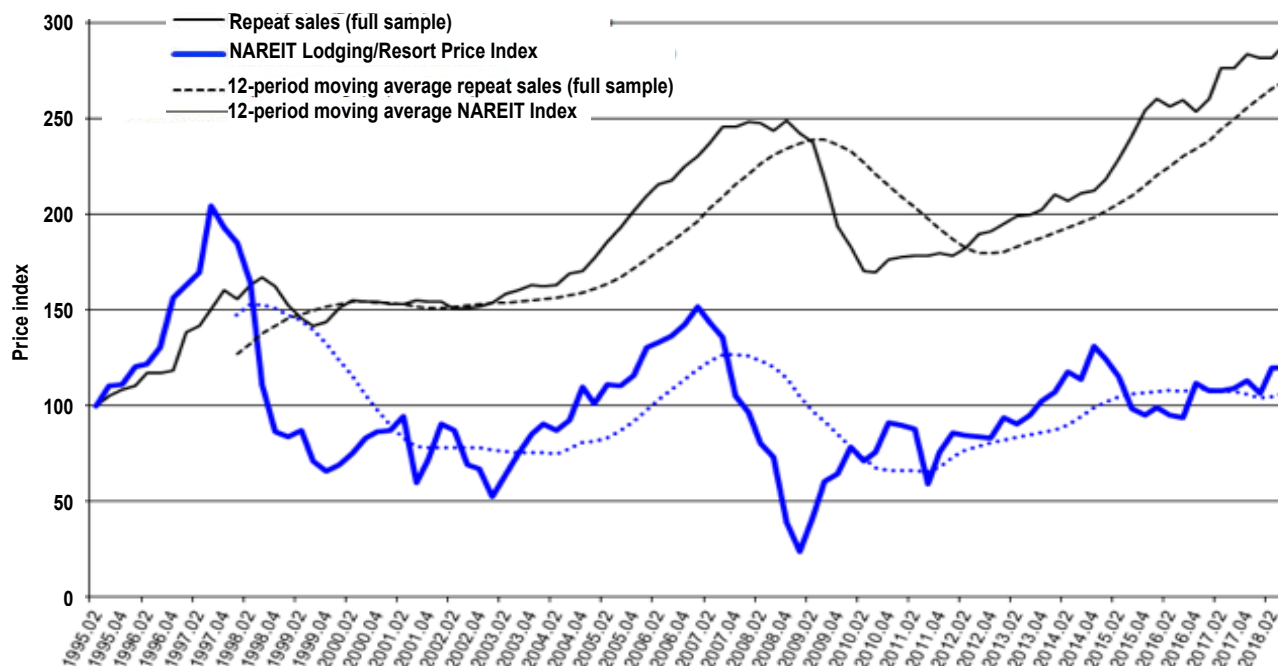
## Risk differential between hotel REITs and equity REITs



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

quarter. Once again the cost of equity capital has become relatively more expensive. In terms of *total* risk (systematic risk + risk that is unique to hotel REITs), Exhibit 24 shows that the total risk of hotel REITs fell this past quarter relative to the total risk of equity REITs as a whole.<sup>7</sup> This is consistent with Exhibit 22, which shows that the perceived default risk for hotels has decreased relative to other types of commercial real estate. The question now is, how long will this euphoria last given the continued rise in hotel interest rates on a year-over-year basis?

**Expect the price of large hotels to moderate while the price of small hotels continues to rise per the tea leaves, based on moving average trendlines.** Exhibit 25 compares the performance of the repeat sales index relative to the NAREIT Lodging/Resort Price Index. The hotel repeat sales index tends to lag the NAREIT index by at least one quarter or more.

<sup>7</sup> We calculate the total risk for hotel REITs using a 12-month rolling window of monthly return on hotel REITs.

This is consistent with 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 remained flat at zero this quarter compared to the prior quarter, while it increased 9.7 percent year-over-year. The moving average NAREIT Lodging/Resort trendline continues to indicate a positive price momentum that is increasing, although at a decelerating rate.

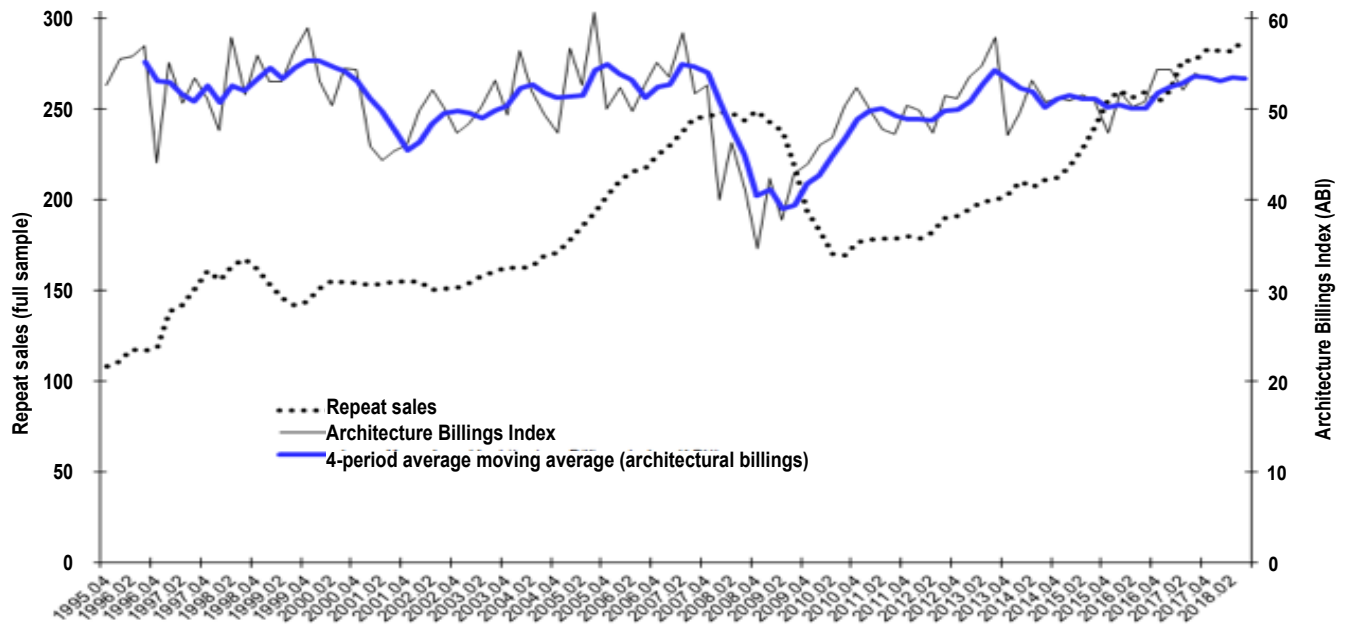
The architecture billings index (ABI) for commercial and industrial property,<sup>8</sup> which represents another forward-looking metric, continued to rise this quarter from the previous quarter, as shown in Exhibit 26 (53.6 in Q3 versus 53.4 in Q2).<sup>9</sup> The ABI metric provides confirmatory evidence that we should expect increasing price momentum. The National Association of

<sup>8</sup> [www.aia.org/practicing/economics/aia076265](http://www.aia.org/practicing/economics/aia076265)

<sup>9</sup> As of the time of this writing, only the August 2018 AIA Billings Index has been reported.

## EXHIBIT 26

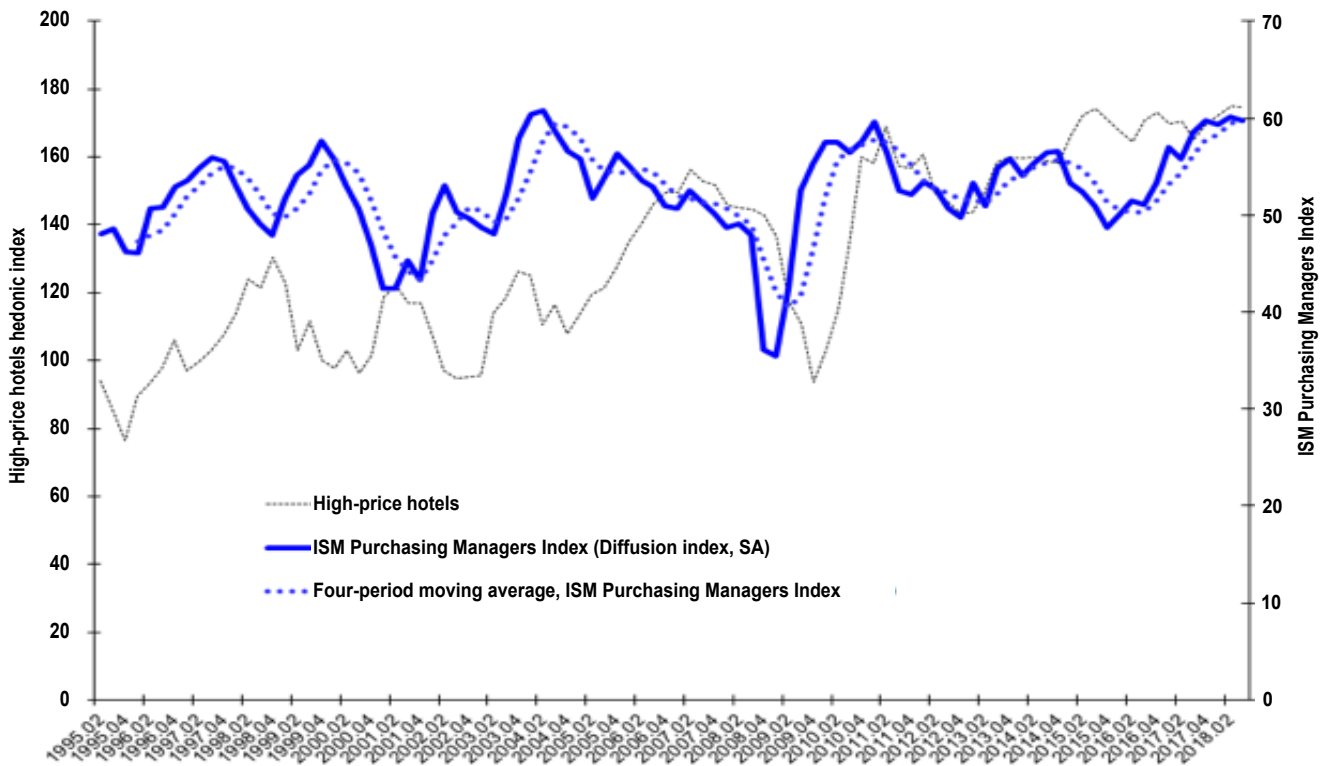
### Hotel repeat sales index versus architecture billings index



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

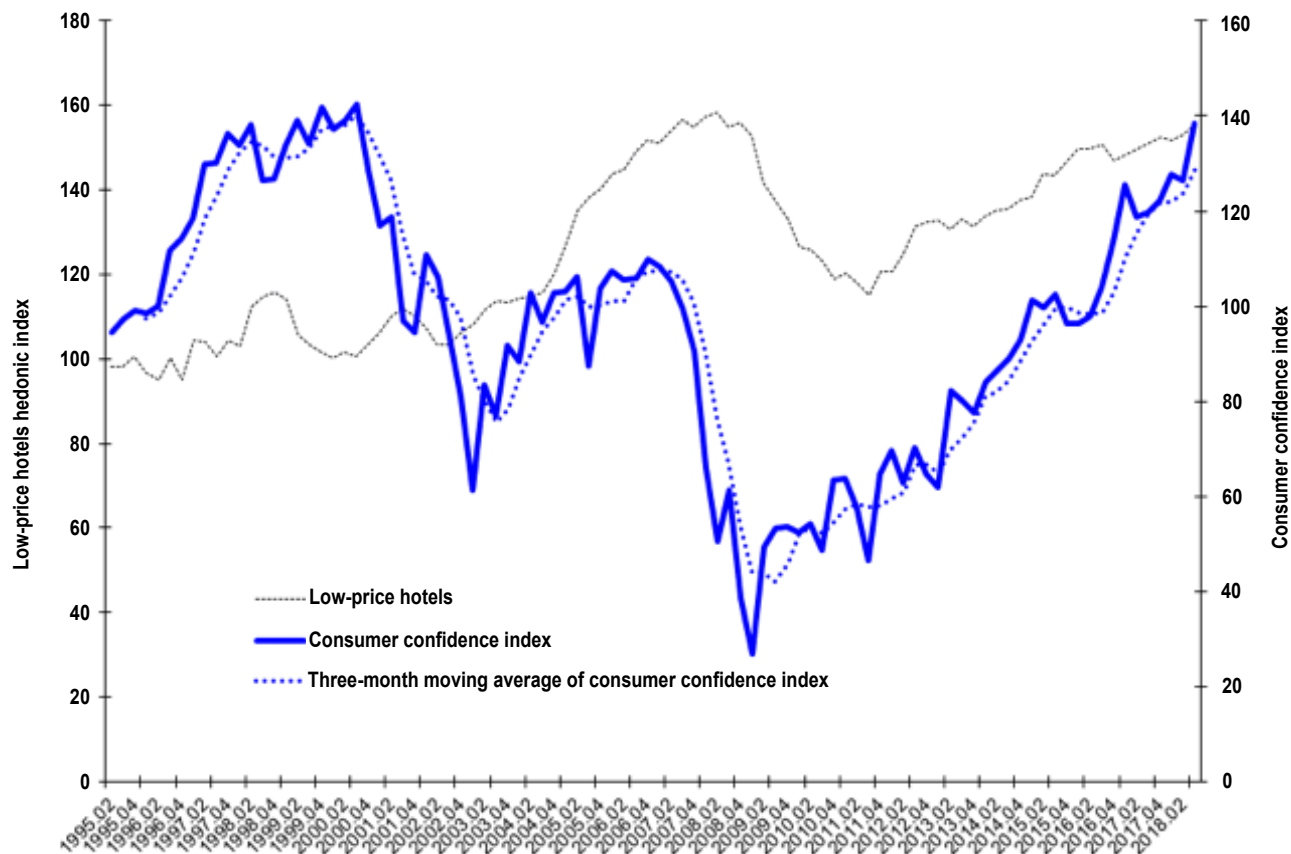
## EXHIBIT 27

### 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

Purchasing Managers (NAPM) index shown in Exhibit 27,<sup>10</sup> which is an indicator of anticipated business confidence and thus business traveler demand, continued to increase, reaching 2 percent year over year (-.7% on a quarter-over-quarter basis) compared to 7.8% in the prior year-over-year period (2017Q2-2018Q2). Based on the moving average trendline for the NAPM index, we expect the price of large hotels to moderate over the next quarter. The Consumer Confidence Index from the Conference Board graphed in Exhibit 28, which we use as a proxy for anticipated consumer demand for leisure travel and a leading indicator of the

<sup>10</sup> The ISM: Purchasing Managers' Index, (Diffusion index, SA) also known as the National Association of Purchasing Managers (NAPM) index is based on a survey of over 250 companies within twenty-one industries covering all 50 states. It not only measures the health of the manufacturing sector but is a proxy for the overall economy. It is calculated by surveying purchasing managers for data about new orders, production, employment, deliveries, and inventory, in descending order of importance. A reading over 50% indicates that manufacturing is growing, while a reading below 50% means it is shrinking.

hedonic index for low price hotels, rose 15.5 percent year over year (9.5% quarter-over-quarter), continuing its positive trend from the previous period (6.3%). We expect the price of small hotels to continue to rise next quarter based on the 4-quarter moving average of the consumer confidence index. Thus, we anticipate that "David" will continue to keep up with "Goliath." ■

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The Hotel Valuation Model (HOTVAL) has been updated 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. The spreadsheet is available for download from our [CREF website](#).

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## Appendix

### SUP: The Standardized Unexpected Price Metric

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

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

where  $SUE_Q$  = quarter Q standardized unexpected earnings,

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

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

$s_Q$  = quarter Q standard deviation of earnings estimates.

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

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

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

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

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

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

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



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**Daniel Quan**, Arthur Adler '78 and Karen

Newman Adler '78 Academic Director

**Cristina Carter**, Assistant Program Manager

**Glenn Withiam**, Contributing Editor

**Kate Walsh**, Dean, E.M. Statler Professor, School of Hotel Administration

**Center for Real Estate and Finance**

Cornell University

**Cornell SC Johnson College of Business**

School of Hotel Administration

Statler Hall

Ithaca, NY 14853

607-255-6025

[www.cref.cornell.edu](http://www.cref.cornell.edu)

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