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First Quarter 2018: Introducing Our Gateway Cities Index

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First Quarter 2018: Introducing Our Gateway Cities Index

Abstract

Hotels in gateway cities have outperformed hotels in non-gateway cities, with hotels in gateway locations rising 10 percent in the past year, compared to 6 percent for those 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).
- Transaction volume strengthened both on a quarter-over-quarter and year-over-year basis.
- While our various pricing metrics point to continued positive price momentum for larger hotels at the expense of smaller hotels, we are concerned whether rising interest rates will put a damper on this momentum. A reading of our tea leaves suggests prices will continue to increase, but at a decelerating rate. This is report number 26 of the index series.

Supplemental File: Hotel Valuation Model (HOTVAL) We provide this user friendly hotel valuation model in an excel spreadsheet entitled HOTVAL Toolkit as a complement to this report which is available for download from http://scholarship.sha.cornell.edu/creftools/1/

Keywords

Cornell Hotel Indices, economic value analysis (EVA), hotel prices, hedonic hotel index, gateway cities

Disciplines

Real Estate

Comments

Required Publisher Statement

Cornell Hotel Indices: First Quarter 2018:

Introducing Our Gateway Cities Index

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

EXECUTIVE SUMMARY

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- 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).
- Transaction volume strengthened both on a quarter-over-quarter and year-over-year basis.
- While our various pricing metrics point to continued positive price momentum for larger hotels at the expense of smaller hotels, we are concerned whether rising interest rates will put a damper on this momentum. A reading of our tea leaves suggests prices will continue to increase, but at a decelerating rate. This is report number 26 of the index series.

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 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*, *Real Estate Economics* and the *Journal of Real Estate Research*.

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

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Cornell Hotel Indices: First Quarter 2018:

Introducing Our Gateway Cities Index

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

Analysis of Indices through Q1, 2018

Starting with this issue, we add the Gateway Cities Index as a new metric to our hotel analytics arsenal. Cities that we define as gateway cities include Boston, Chicago, Honolulu, Los Angeles, Miami, New York, San Francisco, and Washington, D.C.[1] A hotel study finds that a significant driver of hotel property prices is whether a hotel is located in a gateway city.[2] The presumption is that hotels (and other real estate) in gateway cities exceed other cities as IRR generators in part due to a generally stronger economic climate as a result of higher barriers to entry, tighter supply, or relatively stronger performance in terms of revenue per available room than other top cities that are not gateways. Exhibit 1 (on the next page) shows the relative price performance for hotels sold in gateway cities versus those in non-gateway cities. Surprisingly, the graph shows that non-gateway cities outperformed gateway cities in terms of price momentum up to the fourth quarter of 2004, after which hotels in both types of cities experienced similar price performance. Subsequent to the financial crisis, hotels in gateway cities have outperformed hotels in non-gateway cities. Year over year, the price of hotels in gateway cities rose 10 percent—and almost 13 percent quarter over quarter—while the year-over-year price increase for the non-gateway properties was 6 percent (and the quarter-over-quarter rise was just .6%) based on our hedonic indices.

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[1] For a general discussion on what constitutes a gateway city, please see Corgel, J.B. (2012), What Is a Gateway City?: A Hotel Market Perspective, Center for Real Estate and Finance Reports, Cornell University School of Hotel Administration (https://scholarship.sha.cornell.edu/cgi/viewcontent.cgi?article=1007&context=crefpubs).

[2] Corgel, J. B., Liu, C., & White, R. M. (2015). Determinants of hotel property prices. Journal of Real Estate Finance and Economics, 51, 415-439.
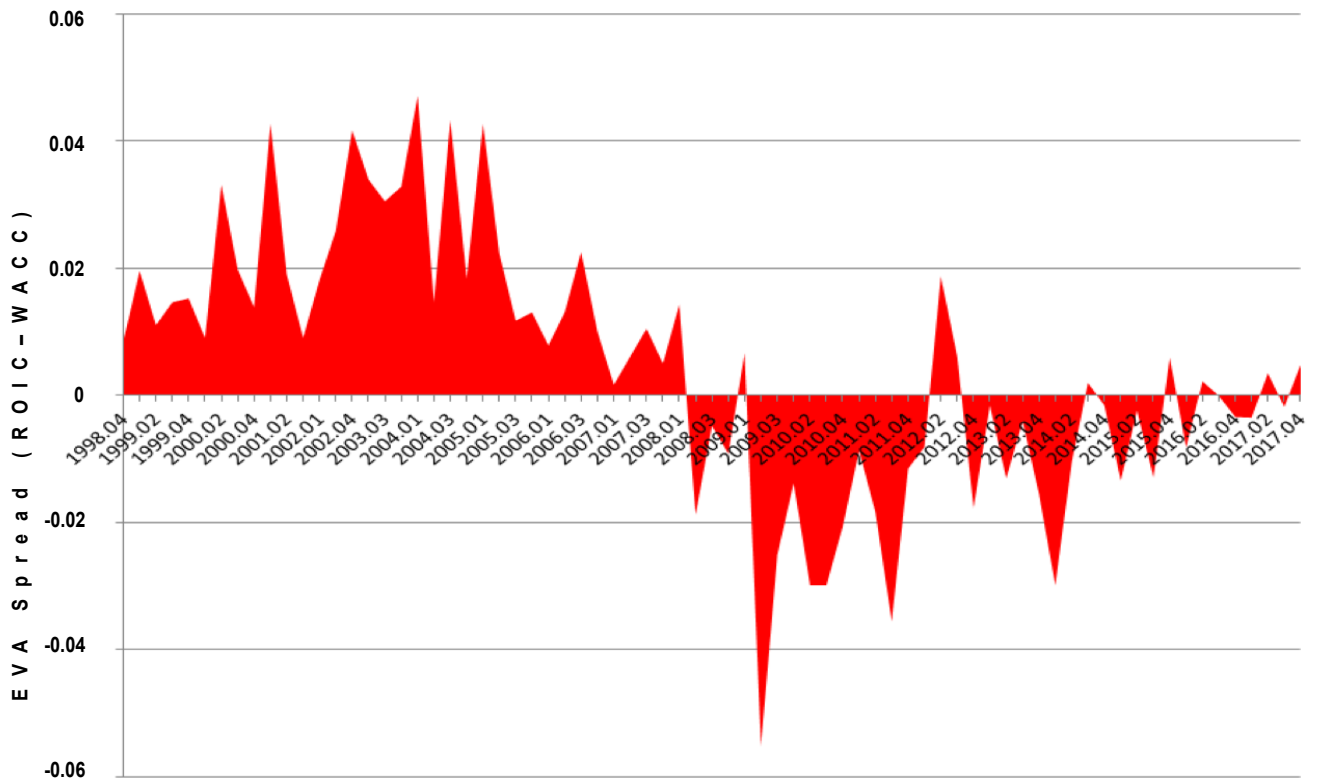
EXHIBIT 1

Hotel performance for gateway cities versus non-gateway cities
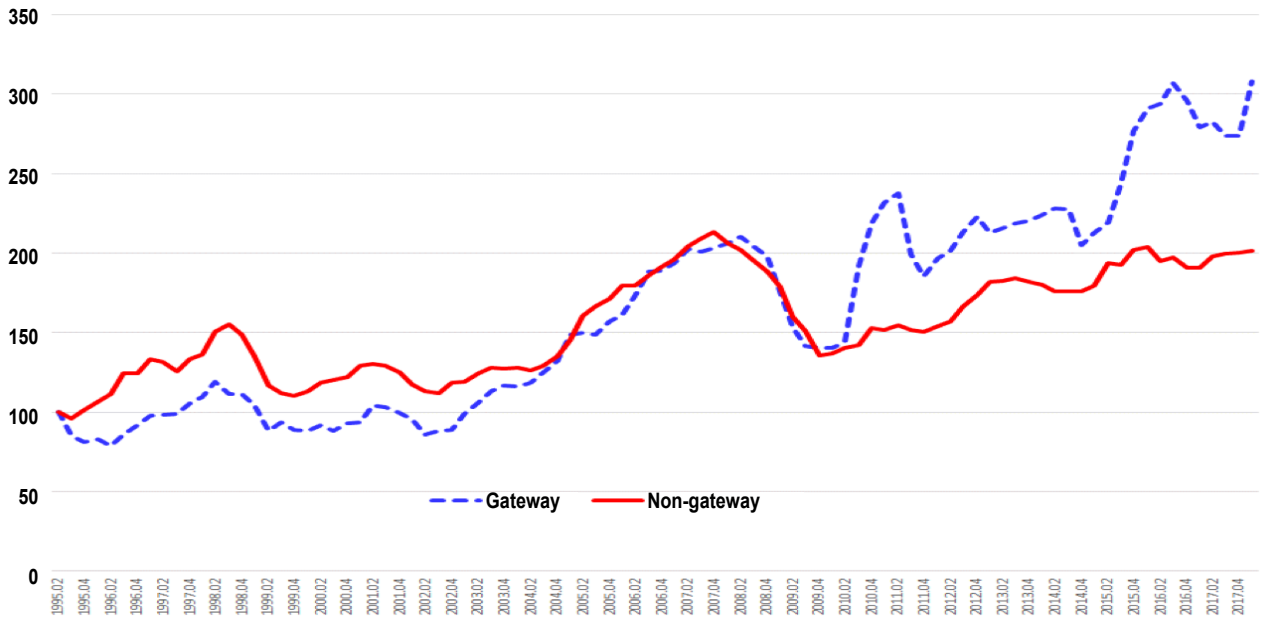
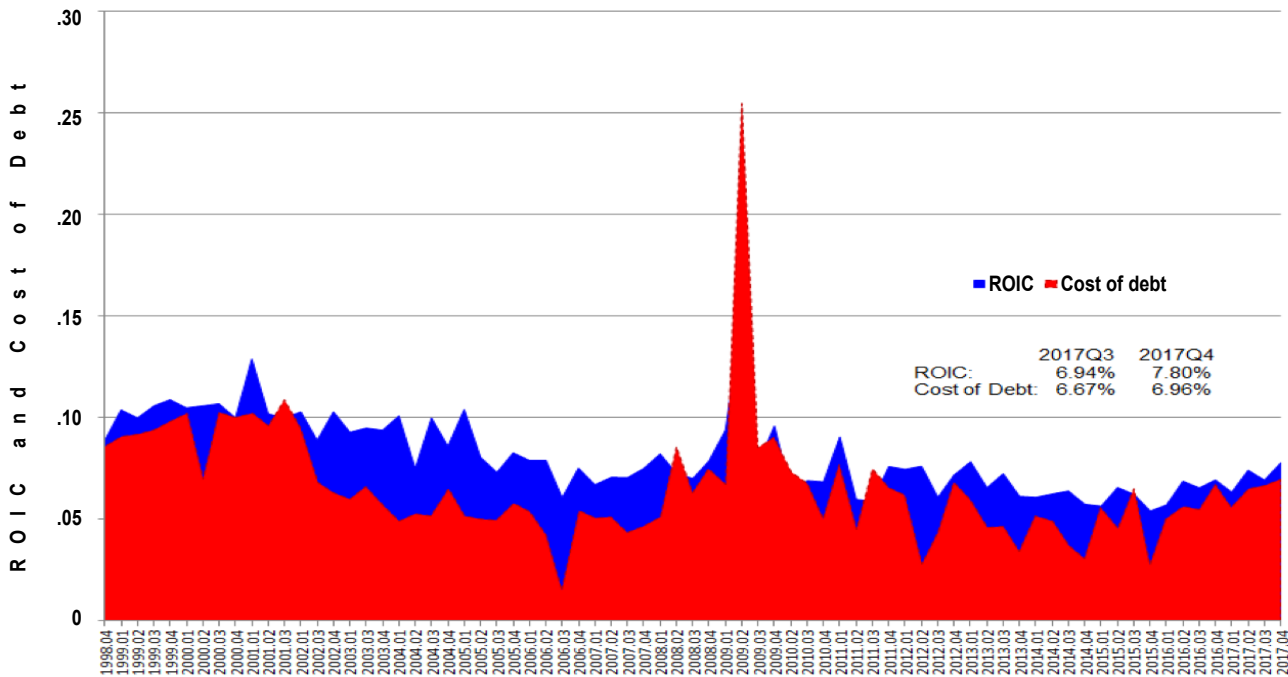Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

EXHIBIT 2

Economic value added (EVA) for hotels

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

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 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.

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 (.005), although for all practical purposes it has hovered around zero since the second quarter of 2016. While the cost of debt financing continues to rise—from 6.67 percent in 2017Q3 to 6.96 percent in 2017Q4, the ACLI hotel cap rate has also increased—from 6.94 percent (2017Q3) to 7.80 percent (2017Q4). Thus, Exhibit 3 suggests that *positive leverage* continues to be the norm for hotel deals. In summary, these two exhibits signal a continuing positive market trend.

HOTEL VALUATION MODEL (HOTVAL) HAS BEEN UPDATED.

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

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

		Full Sample		Big					Small				Gateway				Non-Gateway		
Year	Quarter	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	2357500	20	.	.			1995.01	2357500	20	100.00%	1995.01	3400000	7	35.00%	1995.01	2100000	13	65.00%
1995	2	3150000	29	1995.02	15712500	6	20.69%	1995.02	2670000	23	79.31%	1995.02	3800000	12	41.38%	1995.02	2906150	17	58.62%
1995	3	2562500	44	1995.03	12400000	4	9.09%	1995.03	2378000	40	90.91%	1995.03	3500000	20	45.45%	1995.03	2000000	24	54.55%
1995	4	3400000	41	1995.04	27750000	10	24.39%	1995.04	2625000	31	75.61%	1995.04	5075000	14	34.15%	1995.04	3100000	27	65.85%
1996	1	2500000	39	1996.01	14475000	8	20.51%	1996.01	1700000	31	79.49%	1996.01	2500000	13	33.33%	1996.01	2687500	26	66.67%
1996	2	2925000	43	1996.02	29150000	12	27.91%	1996.02	2500000	31	72.09%	1996.02	3200000	15	34.88%	1996.02	2730000	28	65.12%
1996	3	6500000	57	1996.03	17740000	20	35.09%	1996.03	3000000	37	64.91%	1996.03	5500000	25	43.86%	1996.03	6890500	32	56.14%
1996	4	2735000	58	1996.04	19000000	17	29.31%	1996.04	2200000	41	70.69%	1996.04	4650000	27	46.55%	1996.04	2400000	31	53.45%
1997	1	5053250	74	1997.01	16635500	23	31.08%	1997.01	3500000	51	68.92%	1997.01	6300000	29	39.19%	1997.01	4075000	45	60.81%
1997	2	2862500	72	1997.02	17750000	17	23.61%	1997.02	2150000	55	76.39%	1997.02	2445000	24	33.33%	1997.02	3047350	48	66.67%
1997	3	3437500	90	1997.03	19000000	21	23.33%	1997.03	2400000	69	76.67%	1997.03	5140000	38	42.22%	1997.03	2550000	52	57.78%
1997	4	4330950	78	1997.04	17000000	27	34.62%	1997.04	2300000	51	65.38%	1997.04	10435445	27	34.62%	1997.04	3600000	51	65.38%
1998	1	4698800	92	1998.01	20000000	31	33.70%	1998.01	3100000	61	66.30%	1998.01	6353000	33	35.87%	1998.01	4600000	59	64.13%
1998	2	3630000	96	1998.02	23765000	21	21.88%	1998.02	3000000	75	78.13%	1998.02	3998239.5	28	29.17%	1998.02	3575000	68	70.83%
1998	3	2961059	92	1998.03	16740000	12	13.04%	1998.03	2690550	80	86.96%	1998.03	2255000	30	32.61%	1998.03	3365000	62	67.39%
1998	4	2550000	84	1998.04	35000000	15	17.86%	1998.04	2375000	69	82.14%	1998.04	4225000	30	35.71%	1998.04	2500000	54	64.29%
1999	1	2425000	88	1999.01	24638095	10	11.36%	1999.01	2125000	78	88.64%	1999.01	3500000	32	36.36%	1999.01	2300000	56	63.64%
1999	2	2100000	95	1999.02	67000000	5	5.26%	1999.02	1950000	90	94.74%	1999.02	2067500	28	29.47%	1999.02	2100000	67	70.53%
1999	3	2500000	99	1999.03	20711100	10	10.10%	1999.03	2130000	89	89.90%	1999.03	1800000	19	19.19%	1999.03	2522500	80	80.81%
1999	4	2440000	87	1999.04	18190000	14	16.09%	1999.04	2090000	73	83.91%	1999.04	2210000	23	26.44%	1999.04	2575000	64	73.56%
2000	1	2400000	110	2000.01	23500000	9	8.18%	2000.01	2300000	101	91.82%	2000.01	2325000	44	40.00%	2000.01	2428500	66	60.00%
2000	2	2450000	88	2000.02	14500000	9	10.23%	2000.02	2275000	79	89.77%	2000.02	2325000	24	27.27%	2000.02	2450000	64	72.73%
2000	3	2600000	95	2000.03	20346875	16	16.84%	2000.03	2250000	79	83.16%	2000.03	2925000	24	25.26%	2000.03	2525000	71	74.74%
2000	4	2475000	101	2000.04	20000000	13	12.87%	2000.04	2325000	88	87.13%	2000.04	4500000	26	25.74%	2000.04	2350000	75	74.26%
2001	1	2970650	104	2001.01	28437500	18	17.31%	2001.01	2422500	86	82.69%	2001.01	2650000	29	27.88%	2001.01	3000000	75	72.12%
2001	2	2800000	110	2001.02	23795000	12	10.91%	2001.02	2687150	98	89.09%	2001.02	5825000	25	22.73%	2001.02	2684300	85	77.27%
2001	3	2700000	87	2001.03	16000000	6	6.90%	2001.03	2500000	81	93.10%	2001.03	3150000	21	24.14%	2001.03	2600000	66	75.86%
2001	4	2400000	73	2001.04	20500000	5	6.85%	2001.04	2300000	68	93.15%	2001.04	2800000	17	23.29%	2001.04	2300000	56	76.71%
2002	1	2125000	70	2002.01	11518052	5	7.14%	2002.01	2000000	65	92.86%	2002.01	1700000	17	24.29%	2002.01	2200000	53	75.71%
2002	2	2400000	106	2002.02	18125000	10	9.43%	2002.02	2287500	96	90.57%	2002.02	3125000	33	31.13%	2002.02	2300000	73	68.87%
2002	3	2355400	81	2002.03	12750000	5	6.17%	2002.03	2237500	76	93.83%	2002.03	2197500	24	29.63%	2002.03	2470000	57	70.37%
2002	4	2907500	100	2002.04	24000000	15	15.00%	2002.04	2600000	85	85.00%	2002.04	2907500	34	34.00%	2002.04	2862500	66	66.00%
2003	1	2530000	94	2003.01	13000000	9	9.57%	2003.01	2425000	85	90.43%	2003.01	3850000	21	22.34%	2003.01	2425000	73	77.66%
2003	2	2750000	110	2003.02	19000000	9	8.18%	2003.02	2519000	101	91.82%	2003.02	3160000	31	28.18%	2003.02	2600000	79	71.82%
2003	3	3333000	141	2003.03	18500000	24	17.02%	2003.03	2625000	117	82.98%	2003.03	3660000	45	31.91%	2003.03	3032500	96	68.09%
2003	4	2600000	149	2003.04	16375000	18	12.08%	2003.04	2425000	131	87.92%	2003.04	2950000	35	23.49%	2003.04	2500000	114	76.51%
2004	1	2925000	166	2004.01	23050000	23	13.86%	2004.01	2550000	143	86.14%	2004.01	3450000	41	24.70%	2004.01	2894000	125	75.30%
2004	2	2700000	195	2004.02	16700000	27	13.85%	2004.02	2475000	168	86.15%	2004.02	4500000	39	20.00%	2004.02	2540000	156	80.00%
2004	3	3491122	216	2004.03	19675000	44	20.37%	2004.03	2630000	172	79.63%	2004.03	4600000	51	23.61%	2004.03	3306500	165	76.39%
2004	4	4000000	177	2004.04	20475000	47	26.55%	2004.04	3085500	130	73.45%	2004.04	8850000	36	20.34%	2004.04	3600000	141	79.66%

The median price of hotels rose this quarter on stronger transaction volume, with prices also up on a year-over-year basis. The median price of hotels increased 23 percent from the previous quarter ($4.5M versus $5.55M), and the total volume of all hotel transactions (both large hotels and small hotels combined) increased 22 percent (recording 265 transactions in the fourth quarter of 2017 and 312 transactions in 2018, quarter one), as reported in Exhibit 4. Year over year (2017Q1 versus 2018Q1), the median price of hotels rose by approximately 4.7 percent, while the volume of hotel transactions increased 22 percent. A compari-son of large hotels relative to small hotels on a year-over-year basis reveals that the median price of large hotels fell 2.2 percent, albeit on stronger volume (40%), while the median price of smaller hotels also declined 2.5 percent on higher volume (15.4%).[3] In contrast, the price change for hotels sold in gateway cities was relatively flat (.2%) on higher volume (43%). A similar situation exists on a quarter-over-quarter basis for

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[3] 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.

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

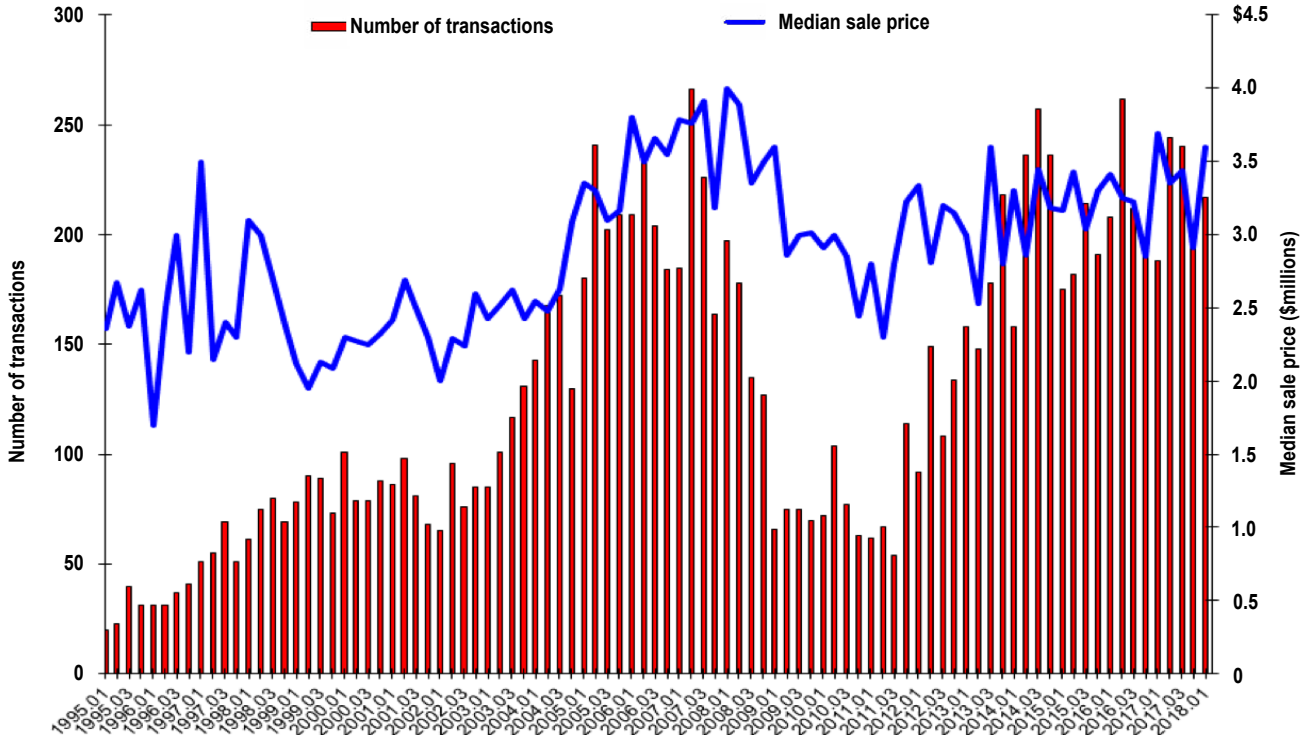|	Big				Small				Gateway				Non-Gateway		
	Median Sale Price (High Priced Hotels)	Number of Transactions (High Priced Hotels)	% Total Sales		Median Sale Price (Low Priced Hotels)	Number of Transactions (Low Priced Hotels)	% Total Sales		Median Sale Price (Gateway Hotels)	Number of Transactions (Gateway Hotels)	% Total Sales		Median Sale Price (Non-Gateway Hotels)	Transactions (Non-Gateway Hotels)	% Total Sales
2005.01	18200000	51	22.08%	2005.01	3350000	180	77.92%	2005.01	6687500	40	17.32%	2005.01	3800000	191	82.68%
2005.02	19316925	75	23.73%	2005.02	3300000	241	76.27%	2005.02	6475000	68	21.52%	2005.02	4385000	248	78.48%
2005.03	21750000	71	26.01%	2005.03	3100000	202	73.99%	2005.03	6100000	61	22.34%	2005.03	3750000	212	77.66%
2005.04	25000000	91	30.33%	2005.04	3170000	209	69.67%	2005.04	11200000	65	21.67%	2005.04	4000000	235	78.33%
2006.01	25750000	92	30.56%	2006.01	3800000	209	69.44%	2006.01	18000000	64	21.26%	2006.01	4943744	237	78.74%
2006.02	23500000	81	25.80%	2006.02	3500000	233	74.20%	2006.02	6175000	56	17.83%	2006.02	4500000	258	82.17%
2006.03	24000000	81	28.42%	2006.03	3657500	204	71.58%	2006.03	7000000	59	20.70%	2006.03	4705399	226	79.30%
2006.04	21600000	64	25.81%	2006.04	3550000	184	74.19%	2006.04	8093750	56	22.58%	2006.04	4270000	192	77.42%
2007.01	22000000	101	35.31%	2007.01	3789500	185	64.69%	2007.01	9500000	63	22.03%	2007.01	5700000	223	77.97%
2007.02	25250000	119	30.91%	2007.02	3760000	266	69.09%	2007.02	9000000	67	17.40%	2007.02	5450000	318	82.60%
2007.03	20175080.5	104	31.52%	2007.03	3911750	226	68.48%	2007.03	8325000	53	16.06%	2007.03	5011554	277	83.94%
2007.04	24000000	85	34.14%	2007.04	3184000	164	65.86%	2007.04	9375000	36	14.46%	2007.04	4500000	213	85.54%
2008.01	17420000	58	22.75%	2008.01	4000000	197	77.25%	2008.01	5990000	46	18.04%	2008.01	4650000	209	81.96%
2008.02	22150000	50	21.93%	2008.02	3890000	178	78.07%	2008.02	8725000	38	16.67%	2008.02	4800000	190	83.33%
2008.03	17133333	37	21.51%	2008.03	3350000	135	78.49%	2008.03	5500000	27	15.70%	2008.03	3900000	145	84.30%
2008.04	18850000	32	20.13%	2008.04	3500000	127	79.87%	2008.04	4972500	27	16.98%	2008.04	3920000	132	83.02%
2009.01	15800000	15	18.52%	2009.01	3600000	66	81.48%	2009.01	7375000	16	19.75%	2009.01	3700000	65	80.25%
2009.02	14722500	11	12.79%	2009.02	2864310	75	87.21%	2009.02	5410250	16	18.60%	2009.02	3000000	70	81.40%
2009.03	27000000	15	16.67%	2009.03	3000000	75	83.33%	2009.03	4608750	14	15.56%	2009.03	3195270.5	76	84.44%
2009.04	14100000	14	16.67%	2009.04	3010250	70	83.33%	2009.04	4520000	12	14.29%	2009.04	3400000	72	85.71%
2010.01	20325000	17	19.10%	2010.01	2912500	72	80.90%	2010.01	8450000	15	16.85%	2010.01	3825000	74	83.15%
2010.02	30833449	34	24.64%	2010.02	3000000	104	75.36%	2010.02	15400000	34	24.64%	2010.02	3100000	104	75.36%
2010.03	39000000	43	35.83%	2010.03	2850000	77	64.17%	2010.03	25000000	37	30.83%	2010.03	3117000	83	69.17%
2010.04	30500000	37	37.00%	2010.04	2440000	63	63.00%	2010.04	38500000	23	23.00%	2010.04	3265000	77	77.00%
2011.01	36600000	23	27.06%	2011.01	2797750	62	72.94%	2011.01	12275000	15	17.65%	2011.01	3775000	70	82.35%
2011.02	53350000	30	30.93%	2011.02	2300000	67	69.07%	2011.02	15600000	23	23.71%	2011.02	3175000	74	76.29%
2011.03	25250000	19	26.03%	2011.03	2800000	54	73.97%	2011.03	3700000	17	23.29%	2011.03	3275000	56	76.71%
2011.04	32400000	43	27.39%	2011.04	3229250	114	72.61%	2011.04	10950000	34	21.66%	2011.04	4300000	123	78.34%
2012.01	22100000	39	29.77%	2012.01	3337500	92	70.23%	2012.01	13837500	28	21.37%	2012.01	4200000	103	78.63%
2012.02	17600000	60	28.71%	2012.02	2809000	149	71.29%	2012.02	15900000	22	10.53%	2012.02	3700000	187	89.47%
2012.03	20000000	61	36.09%	2012.03	3202000	108	63.91%	2012.03	16050000	32	18.93%	2012.03	5250000	137	81.07%
2012.04	28600000	75	35.89%	2012.04	3150000	134	64.11%	2012.04	16300000	41	19.62%	2012.04	5070000	168	80.38%
2013.01	21502125.5	82	34.17%	2013.01	3000000	158	65.83%	2013.01	7750000	52	21.67%	2013.01	5785000	188	78.33%
2013.02	23000000	69	31.80%	2013.02	2525000	148	68.20%	2013.02	16000000	38	17.51%	2013.02	4200000	179	82.49%
2013.03	28200000	68	27.64%	2013.03	3600000	178	72.36%	2013.03	9949500	35	14.23%	2013.03	4750000	211	85.77%
2013.04	24800000	97	30.79%	2013.04	2800000	218	69.21%	2013.04	13750000	56	17.78%	2013.04	4000000	259	82.22%
2014.01	20750000	70	30.70%	2014.01	3300000	158	69.30%	2014.01	8825000	59	25.88%	2014.01	5000000	169	74.12%
2014.02	27000000	85	26.48%	2014.02	2860000	236	73.52%	2014.02	11200000	59	18.38%	2014.02	3725000	262	81.62%
2014.03	20000000	94	26.78%	2014.03	3450000	257	73.22%	2014.03	10567077.5	66	18.80%	2014.03	5000000	285	81.20%
2014.04	31000000	75	24.12%	2014.04	3185000	236	75.88%	2014.04	8200000	73	23.47%	2014.04	3950000	238	76.53%
2005.01	18200000	51	22.08%	2005.01	3350000	180	77.92%	2005.01	6687500	40	17.32%	2005.01	3800000	191	82.68%
2005.02	19316925	75	23.73%	2005.02	3300000	241	76.27%	2005.02	6475000	68	21.52%	2005.02	4385000	248	78.48%
2005.03	21750000	71	26.01%	2005.03	3100000	202	73.99%	2005.03	6100000	61	22.34%	2005.03	3750000	212	77.66%
2005.04	25000000	91	30.33%	2005.04	3170000	209	69.67%	2005.04	11200000	65	21.67%	2005.04	4000000	235	78.33%
2006.01	25750000	92	30.56%	2006.01	3800000	209	69.44%	2006.01	18000000	64	21.26%	2006.01	4943744	237	78.74%
2006.02	23500000	81	25.80%	2006.02	3500000	233	74.20%	2006.02	6175000	56	17.83%	2006.02	4500000	258	82.17%
2006.03	24000000	81	28.42%	2006.03	3657500	204	71.58%	2006.03	7000000	59	20.70%	2006.03	4705399	226	79.30%
2006.04	21600000	64	25.81%	2006.04	3550000	184	74.19%	2006.04	8093750	56	22.58%	2006.04	4270000	192	77.42%
2007.01	22000000	101	35.31%	2007.01	3789500	185	64.69%	2007.01	9500000	63	22.03%	2007.01	5700000	223	77.97%
2007.02	25250000	119	30.91%	2007.02	3760000	266	69.09%	2007.02	9000000	67	17.40%	2007.02	5450000	318	82.60%
2007.03	20175080.5	104	31.52%	2007.03	3911750	226	68.48%	2007.03	8325000	53	16.06%	2007.03	5011554	277	83.94%
2007.04	24000000	85	34.14%	2007.04	3184000	164	65.86%	2007.04	9375000	36	14.46%	2007.04	4500000	213	85.54%
2015.01	30000000	80	31.37%	2015.01	3162100	175	68.63%	2015.01	8280000	47	18.43%	2015.01	5450000	208	81.57%
2015.02	28250000	86	32.09%	2015.02	3432500	182	67.91%	2015.02	18765000	46	17.16%	2015.02	5612500	222	82.84%
2015.03	25000000	85	28.43%	2015.03	3037500	214	71.57%	2015.03	12100000	53	17.73%	2015.03	4275000	246	82.27%
2015.04	19750000	102	34.81%	2015.04	3300000	191	65.19%	2015.04	14500000	51	17.41%	2015.04	5440000	242	82.59%
2016.01	21437500	86	29.25%	2016.01	3415000	208	70.75%	2016.01	13600000	45	15.31%	2016.01	5300000	249	84.69%
2016.02	16000000	61	18.89%	2016.02	3250000	262	81.11%	2016.02	11600000	48	14.86%	2016.02	3700000	275	85.14%
2016.03	25000000	73	25.61%	2016.03	3225000	212	74.39%	2016.03	24500000	34	11.93%	2016.03	4325000	251	88.07%
2016.04	22000000	69	26.14%	2016.04	2850000	195	73.86%	2016.04	12955200	29	10.98%	2016.04	3664706	235	89.02%
2017.01	24030750	68	26.56%	2017.01	3693112	188	73.44%	2017.01	14726254	28	10.94%	2017.01	5000000	228	89.06%
2017.02	25000000	89	26.73%	2017.02	3356250	244	73.27%	2017.02	16450000	37	11.11%	2017.02	4462500	296	88.89%
2017.03	23250000	87	26.61%	2017.03	3440500	240	73.39%	2017.03	22500000	39	11.93%	2017.03	4512500	288	88.07%
2017.04	29000000	65	24.53%	2017.04	2912500	200	75.47%	2017.04	12208000	26	9.81%	2017.04	4250000	239	90.19%
2018.01	23500000	95	30.45%	2018.01	3600000	217	69.55%	2018.01	14750000	40	12.82%	2018.01	5000000	272	87.18%

EXHIBIT 5

Median sale price and number of sales for high-price (large) hotels (sale prices of $10 million or more)
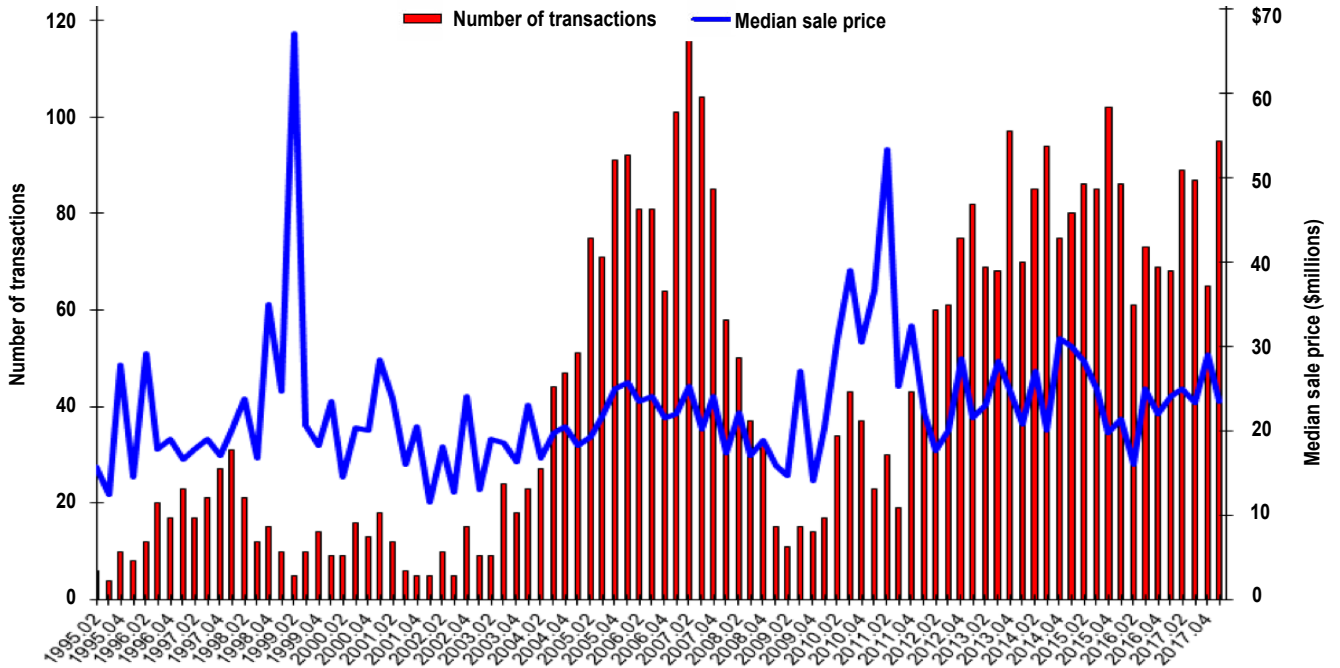
Sources: CoStar, Real Capital Analytics

EXHIBIT 6

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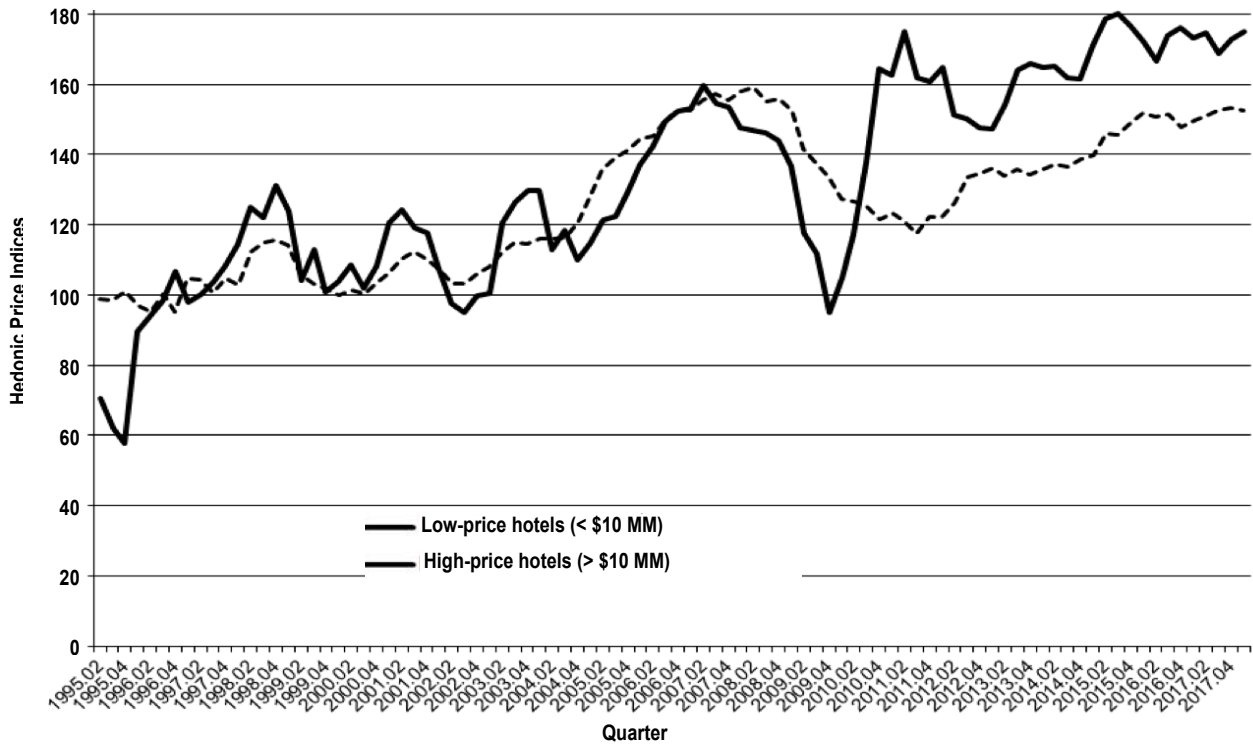

Sources: CoStar, Real Capital Analytics

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EXHIBIT 7

Hotel indices through 2018, quarter 1

	Index Value							Index Value					
	Hedonic Low Priced Hotels	Hedonic High Priced Hotels		Non-	RSI Repeat Sales Index	RSI Index Value Repeat Sales		Hedonic Low Priced Hotels	Hedonic High Priced Hotels		Non-	RSI Repeat Sales Index	RSI Index Value Repeat Sales
YrQtr	(<$10M)	(>=$10M)	Gateway	Gateway	Sales Index	Sales	YrQtr	(<$10M)	(>=$10M)	Gateway	Gateway	Index	Sales
1995.02	98.79	70.51	113.19	84.80	66.15		2006.04	152.72	152.21	214.28	162.09	141.76	158.14
1995.03	98.49	62.21	96.15	81.40	69.14		2007.01	152.49	153.11	219.50	166.11	144.62	159.00
1995.04	100.95	57.67	91.51	85.81	71.40		2007.02	155.52	159.52	229.47	173.49	148.49	166.74
1996.01	97.08	89.62	94.03	90.22	73.50		2007.03	157.41	154.73	227.57	177.19	154.16	171.57
1996.02	95.21	93.79	88.90	94.59	76.87		2007.04	155.64	153.61	229.95	180.82	153.26	165.35
1996.03	100.21	98.32	97.17	105.33	76.33		2008.01	158.03	147.70	233.29	175.13	154.04	178.25
1996.04	95.06	106.56	104.14	105.62	74.86		2008.02	159.02	147.02	238.19	171.59	152.72	166.50
1997.01	104.56	97.80	110.45	113.26	89.31		2008.03	155.23	146.24	231.18	165.61	150.46	160.50
1997.02	104.20	100.22	111.05	111.50	92.41		2008.04	155.96	144.15	224.38	160.01	153.57	172.92
1997.03	100.68	103.74	112.11	106.31	97.75		2009.01	152.50	136.78	198.94	151.89	150.00	153.47
1997.04	104.63	108.02	119.58	113.21	104.20		2009.02	141.59	117.51	173.61	135.78	149.26	150.92
1998.01	103.06	114.35	124.00	115.56	99.99		2009.03	137.72	111.99	159.99	128.24	135.27	106.94
1998.02	112.29	124.82	134.71	127.66	104.27		2009.04	133.51	95.03	158.80	115.01	120.94	107.68
1998.03	114.92	121.96	125.88	131.68	107.25		2010.01	127.38	105.08	158.74	115.86	114.31	116.97
1998.04	115.64	131.16	125.87	126.22	104.63		2010.02	126.75	117.31	162.88	119.31	105.47	115.09
1999.01	114.08	123.97	118.03	114.56	97.34		2010.03	125.25	137.61	217.17	120.57	107.16	108.80
1999.02	105.83	104.04	99.72	99.05	91.92		2010.04	121.62	164.58	247.75	129.86	112.06	126.46
1999.03	103.41	113.00	105.57	94.87	89.54		2011.01	123.21	162.63	262.17	128.61	112.42	123.90
1999.04	101.76	101.00	100.41	93.59	91.00		2011.02	121.02	175.13	268.98	131.13	113.12	114.38
2000.01	99.84	103.69	99.96	95.99	96.37	100.00	2011.03	117.54	161.71	225.70	128.72	113.26	107.52
2000.02	101.32	108.53	104.05	100.35	99.09	104.12	2011.04	122.13	160.67	210.24	127.36	112.82	122.21
2000.03	100.27	101.94	99.61	101.77	98.02	89.86	2012.01	122.13	164.88	222.86	130.58	113.30	118.24
2000.04	103.29	108.19	105.47	103.42	97.24	99.81	2012.02	126.35	151.47	228.23	133.13	115.44	137.14
2001.01	106.31	120.78	105.98	109.70	96.57	99.90	2012.03	133.70	150.28	241.69	141.38	120.08	123.65
2001.02	110.23	124.27	118.24	110.29	96.69	103.41	2012.04	134.83	147.61	252.58	147.22	121.62	130.11
2001.03	112.44	119.05	116.83	109.32	96.68	97.30	2013.01	136.01	147.29	241.07	154.07	123.94	127.85
2001.04	110.28	117.83	112.33	106.09	96.42	95.90	2013.02	133.91	154.16	244.45	154.99	126.64	139.39
2002.01	107.35	107.33	107.92	99.45	95.42	108.18	2013.03	135.78	164.21	247.58	156.43	128.28	136.60
2002.02	103.41	97.53	97.22	95.72	93.24	88.48	2013.04	134.34	165.97	249.82	154.11	128.62	143.15
2002.03	103.34	95.16	99.60	95.04	94.69	97.54	2014.01	135.59	164.83	253.60	152.72	133.81	157.58
2002.04	106.04	99.68	100.54	100.26	94.73	102.89	2014.02	137.11	165.16	258.40	149.29	131.59	136.10
2003.01	108.14	100.46	111.89	101.13	97.86	108.91	2014.03	136.47	161.78	257.30	149.20	131.75	139.36
2003.02	112.03	120.47	120.02	105.49	99.79	107.56	2014.04	138.65	161.39	231.87	149.08	134.03	143.89
2003.03	115.04	126.34	128.06	108.50	100.93	108.54	2015.01	139.78	170.93	240.56	152.12	137.57	165.12
2003.04	114.61	129.90	132.28	107.96	102.88	113.01	2015.02	145.99	178.62	248.55	164.45	143.90	162.50
2004.01	115.98	129.71	131.49	108.56	100.65	106.95	2015.03	145.78	179.97	275.49	163.56	151.79	169.89
2004.02	115.94	113.11	134.13	107.22	101.55	110.09	2015.04	148.89	176.31	313.47	171.17	159.00	174.90
2004.03	116.31	118.58	141.64	109.61	105.57	127.75	2016.01	151.80	172.14	329.57	173.03	162.46	184.85
2004.04	120.64	109.93	149.39	114.35	106.53	112.91	2016.02	150.66	166.75	332.75	165.39	159.07	151.10
2005.01	127.87	114.76	168.35	122.93	111.76	128.13	2016.03	151.51	173.81	347.45	167.19	161.36	178.67
2005.02	135.77	121.24	169.94	135.96	116.93	132.39	2016.04	147.95	176.10	335.14	161.74	158.57	165.84
2005.03	139.05	122.61	168.15	141.34	121.40	146.95	2017.01	149.61	173.35	316.28	161.57	162.73	199.34
2005.04	141.36	129.61	177.77	145.28	127.20	138.04	2017.02	151.09	174.56	320.27	167.87	173.80	196.31
2006.01	144.49	136.91	182.54	152.36	132.34	145.33	2017.03	152.41	168.99	310.31	169.14	173.84	179.91
2006.02	145.42	142.09	195.66	152.39	136.59	152.74	2017.04	153.13	172.68	309.96	169.91	177.11	177.57
2006.03	150.11	149.33	213.47	157.85	136.78	149.50	2018.01	152.50	175.14	349.19	170.90	173.37	193.89

EXHIBIT 8

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

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

large hotels, with the median sale price of large hotels declining 19 percent on stronger transaction volume (46%). However, the median sale price of smaller hotels and of hotels in gateway cities experienced a rise in price (24 percent for small hotel deals, and 21 percent for those in gateway locations) on stronger transaction volume (8.5 percent for small hotels, and 54 percent for gateway sales). Exhibit 5 and Exhibit 6 show year-over-year price changes for large hotels and small hotels, together with the number of sales.

Our moving average trendlines point to positive price momentum for large and small hotels. In contrast, Standardized Unexpected Price (SUP) performance metrics point to positive price momentum for larger hotels only, with smaller hotels losing ground. Exhibit 8, which graphs the prices reported in Exhibit 7, shows that the price of large hotels rose 1.4 percent, while the change in the price of smaller hotels was imperceptible at best (-.4%) on a quarter-over-quarter basis. Exhibit 9 and Exhibit 10 reveal that on a year-

EXHIBIT 9

Year-over-year change in high-price (large) hotel index, with moving-average trend line
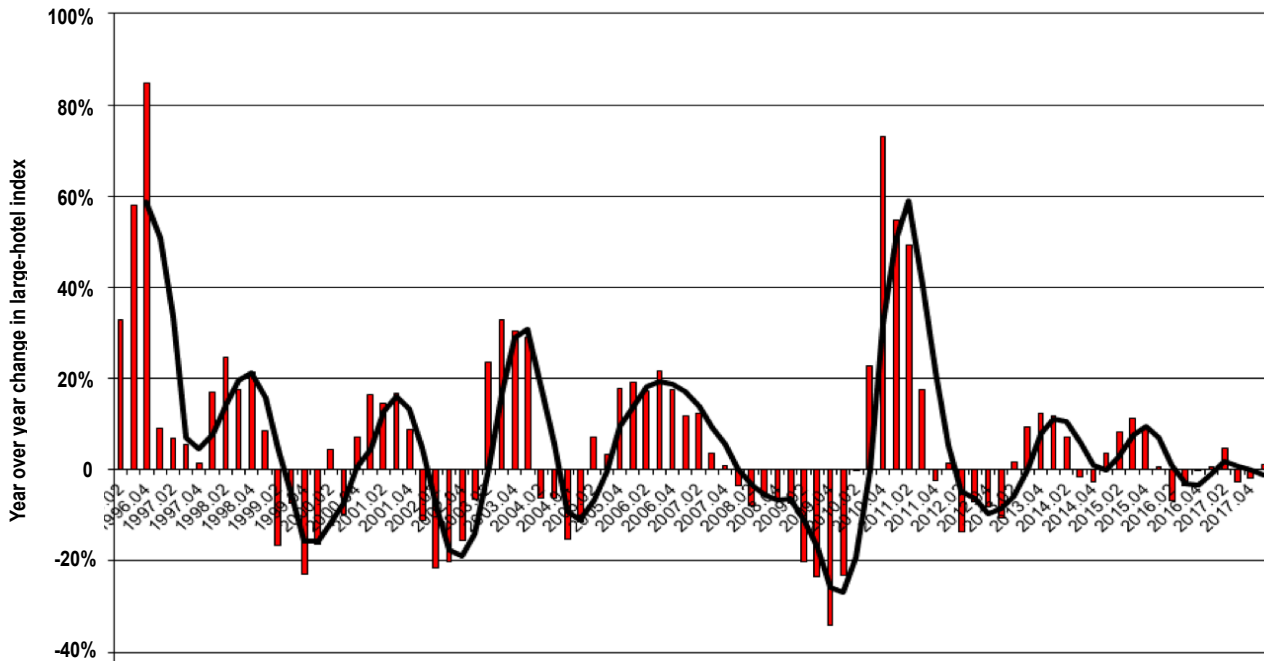
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

EXHIBIT 10

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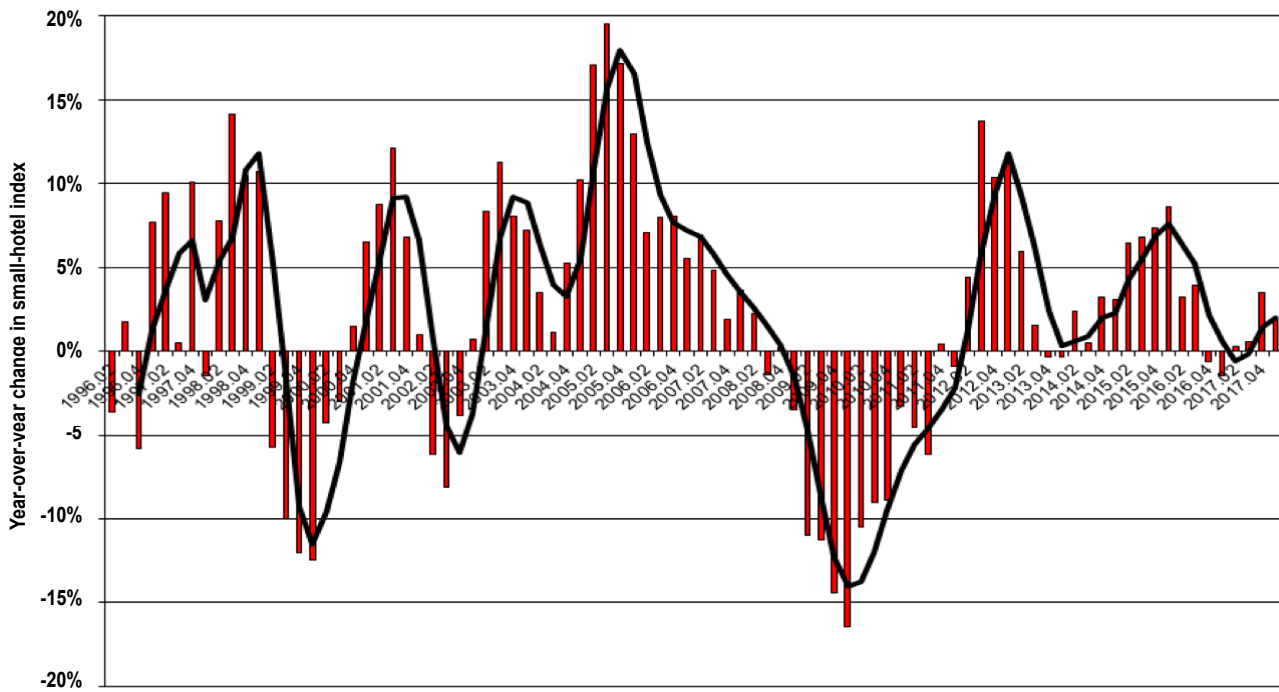
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

Moving average trend line for large-hotel index
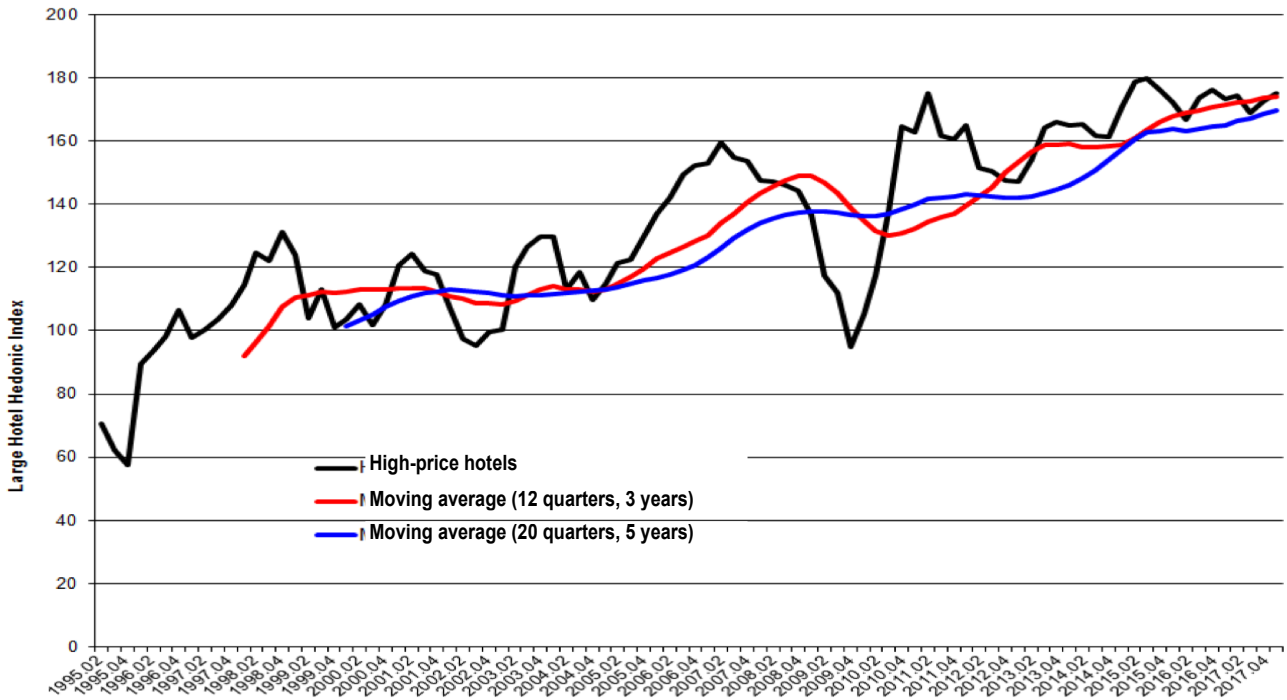
High-price hotels
Moving average (12 quarters, 3 years)
Moving average (20 quarters, 5 years)

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

Moving average trend line for small-hotel index
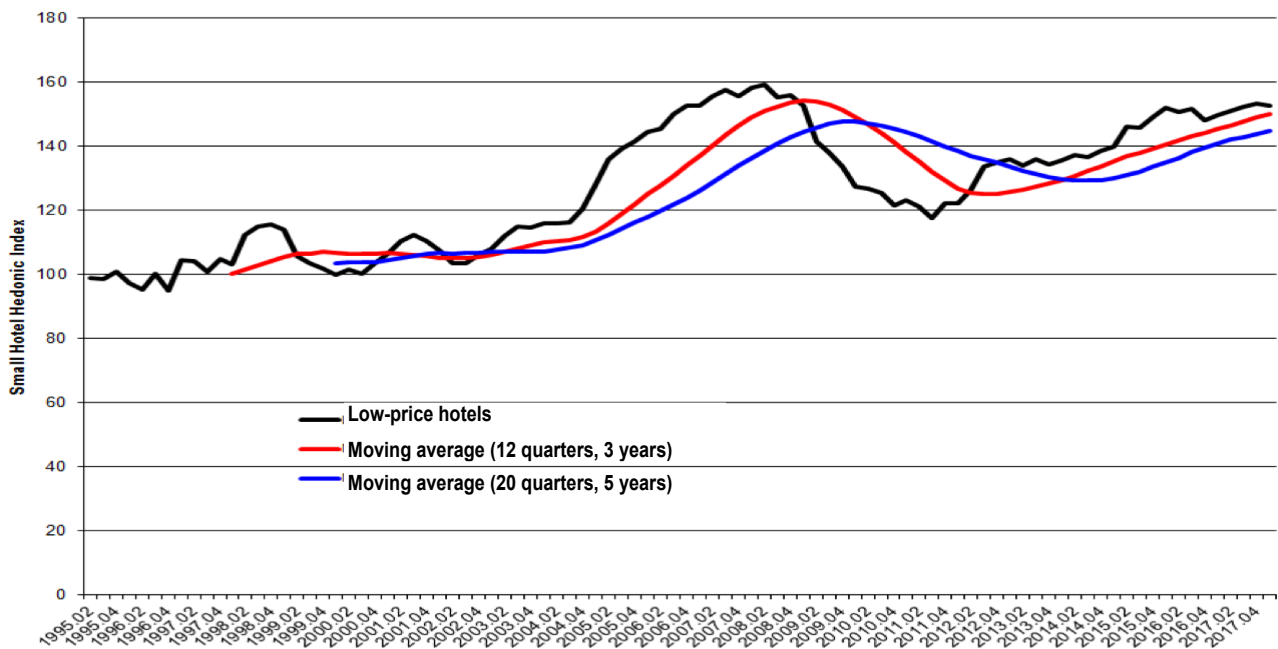
Low-price hotels
Moving average (12 quarters, 3 years)
Moving average (20 quarters, 5 years)

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

EXHIBIT 13

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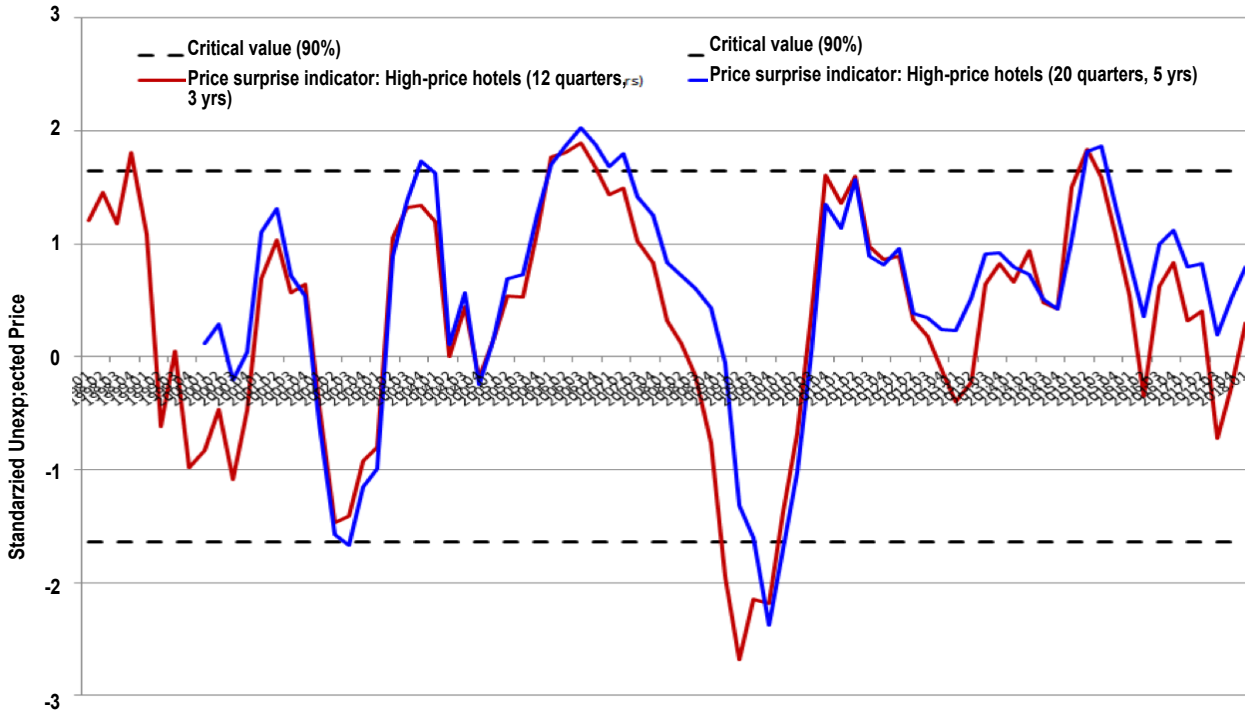
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

over-year basis, large hotels experienced a 1-percent increase in price, while smaller hotels rose 2 percent.

Our moving average trend lines for large hotels in Exhibit 11 show that the price for large hotels is now at around (although slightly higher than) the short-term moving average trend line and is still above the long-term moving average trend line. This situation continues to signal that positive price momentum is similar to its short-term moving average price metric. Exhibit 12 shows that even though the price for smaller hotels

has declined slightly, it continues to be above both its short-term and long-term moving average trend lines. This indicates that positive momentum continues to persist for smaller hotels this quarter.

Our SUP metrics, displayed in Exhibit 13, show that the price of large hotels has continued its positive momentum from its standardized mean of zero, although this rise is still statistically insignificant. In contrast, the price momentum of smaller hotels has turned downwards, as depicted in Exhibit 14.

EXHIBIT 14

Standardized unexpected price (SUP) for small-hotel index
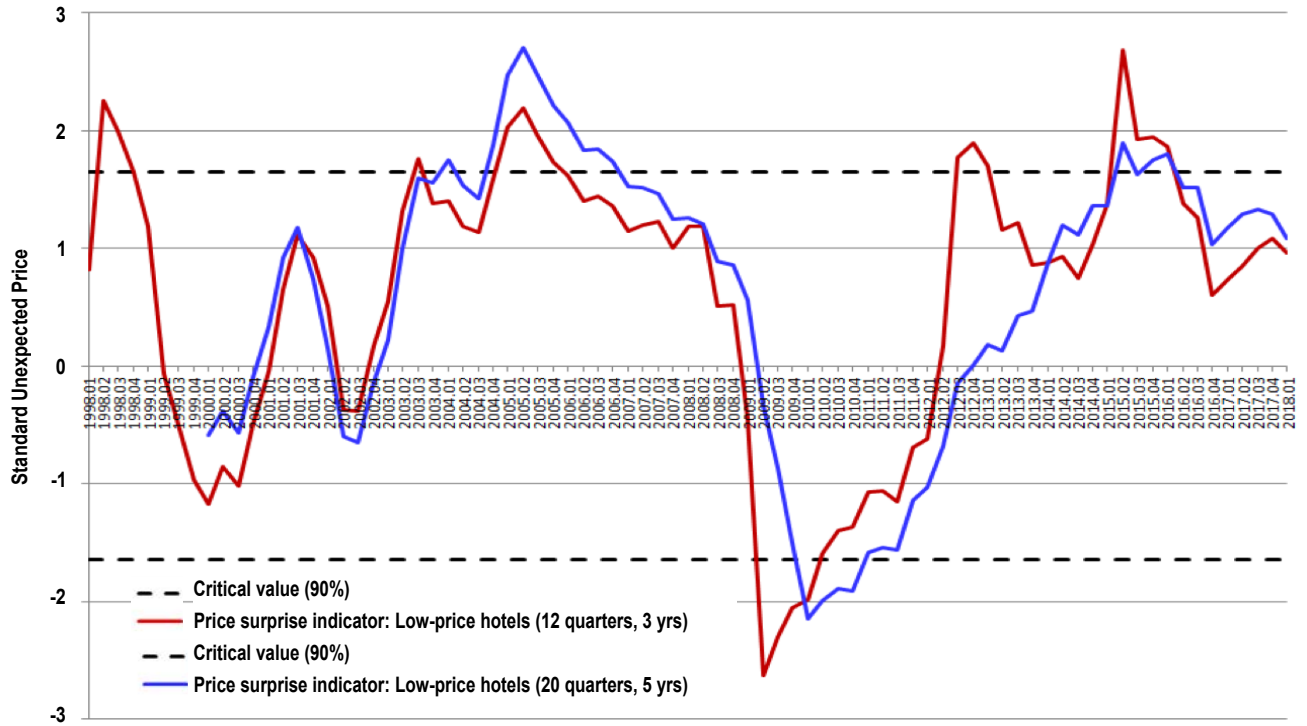
- - - Critical value (90%)
—— Price surprise indicator: Low-price hotels (12 quarters, 3 yrs)
- - - Critical value (90%)
—— Price surprise indicator: Low-price hotels (20 quarters, 5 yrs)

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

EXHIBIT 15

Moving average trend line for repeat sale-hotel index
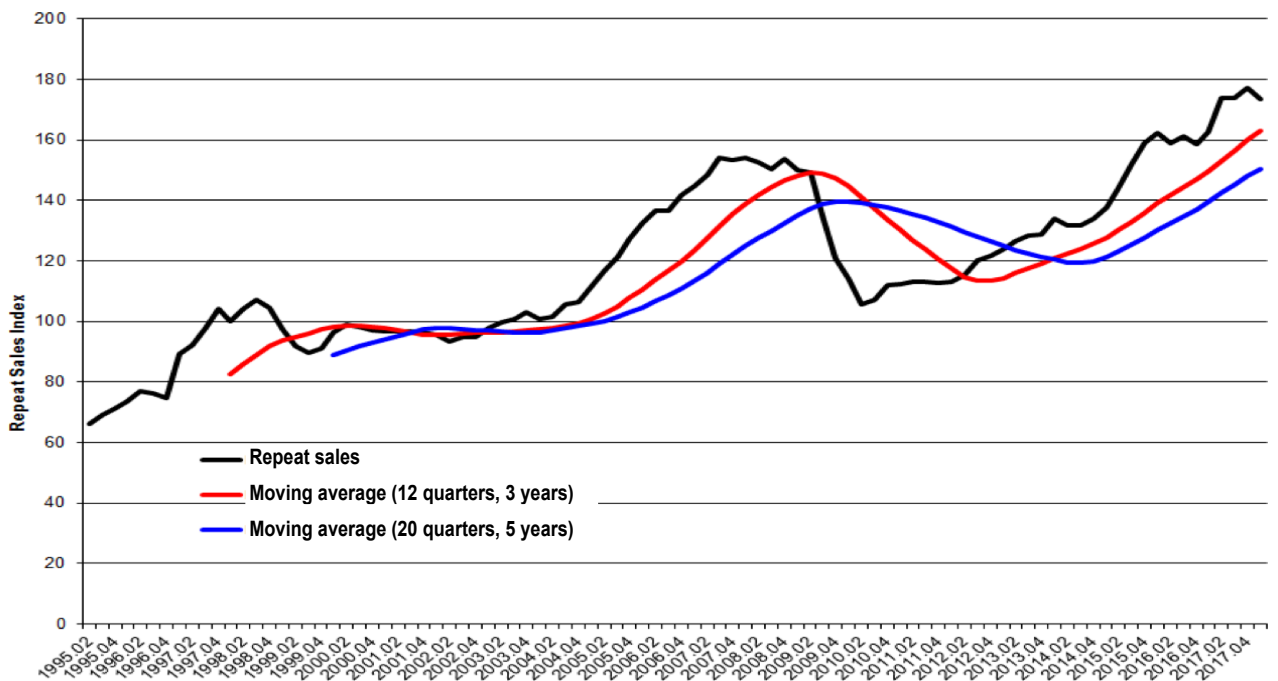
—— Repeat sales
—— Moving average (12 quarters, 3 years)
—— Moving average (20 quarters, 5 years)

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

EXHIBIT 16

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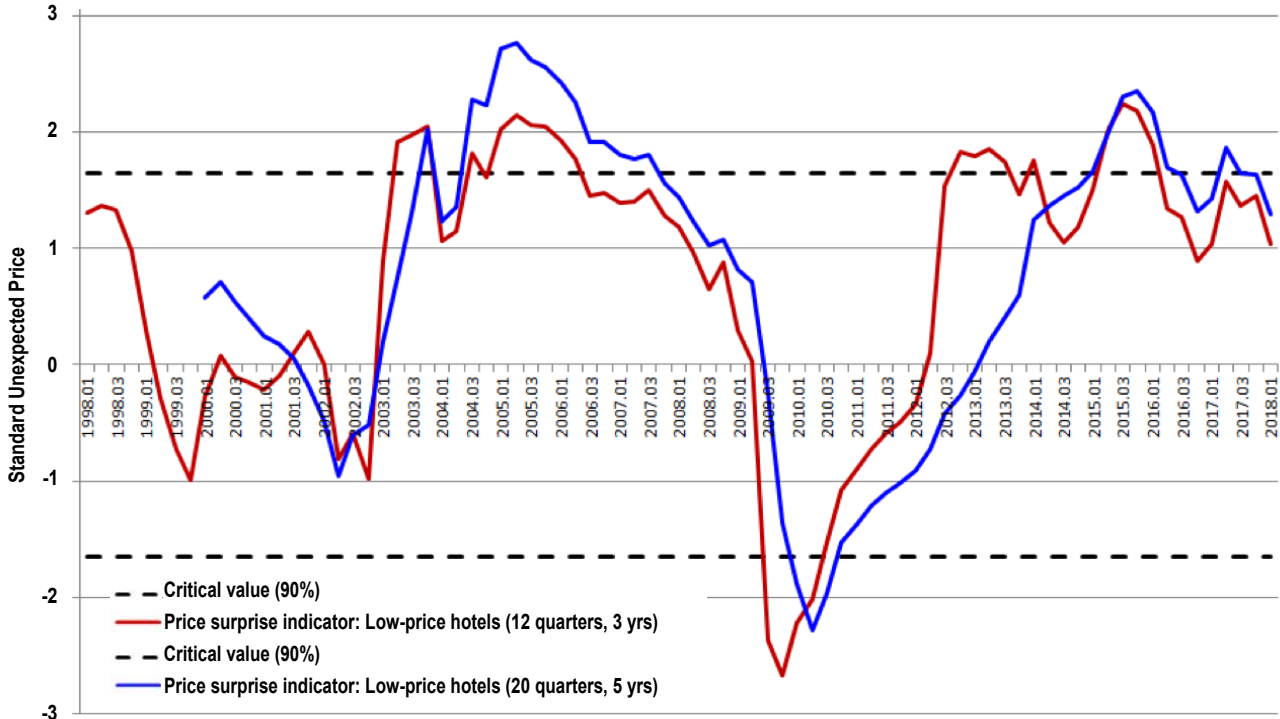
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

Repeat sales metrics tell a similar story: Prices are rising at a decelerating rate. Similar to small hotels, our repeat sale indicator for the moving average trendline in Exhibit 15 indicates a continuation of the positive price momentum.[4] Even though the price has

declined slightly this period, the price of hotels that have sold more than once is still above both the short- and long-term moving averages. Our SUP performance metric in Exhibit 16 indicates that prices have lost some of their positive strength and are no longer statistically significant. Exhibit 17 further shows that

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[4] 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 repeat sale index based on 2000Q1 doesn't use information on sales prior to that 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 (i.e., repeat sale full sample index), but it would not be included in the latter repeat sale index.

EXHIBIT 17

Year-over-year change in repeat-sale index, with moving-average trend line
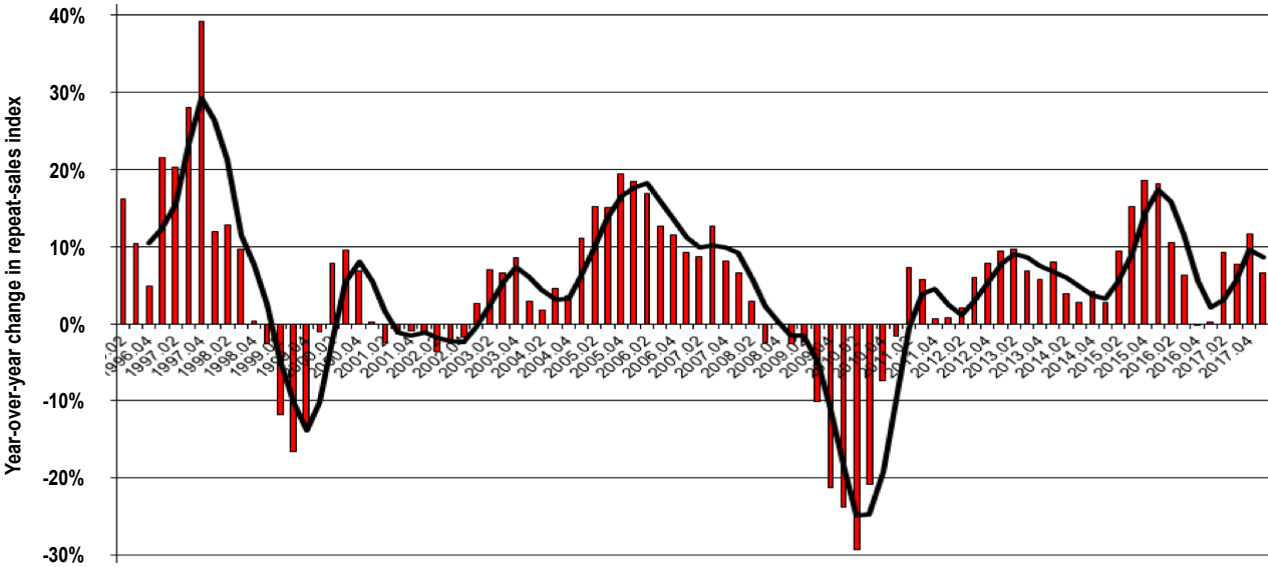
Sources: Cornell Center for Real Estate and Finance, CoStar, Real Capital Analytics

the repeat sale price index is increasing at a deceler-ating rate. The repeat sale price index increased 6.5 percent year over year (2017Q1 to 2018Q1), compared to an 11.7-percent year-over-year increase previously recorded (2016Q4 to 2017Q4). It also decreased 2 per-cent quarter over quarter.

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 2017Q4, is about 40 percent higher than in the previous year (2016Q4).[5] Hotel loan originations were also up 31 percent on a quarter-over-quarter basis (2017Q4 compared to 2017Q3). The loan-to-value (LTV) ratio for hotels continued to remain at 70 percent.

The cost of hotel debt financing has increased, along with the relative risk premium for hotels. The cost of obtaining hotel debt financing, as reported by Cushman Wakefield Sonnenblick Goldman, has risen for both Class A and Class B&C hotels compared to the previous quarter and has continued to trend upward since July 2016.[6] Exhibit 19 shows that interest rates on Class A and Class B&C hotel deals have risen relative to the previous quarter. In particular, inter-est rates were 5.25 percent for Class A deals and 5.45

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

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

EXHIBIT 18

Mortgage origination volume versus loan-to-value ratio for hotels
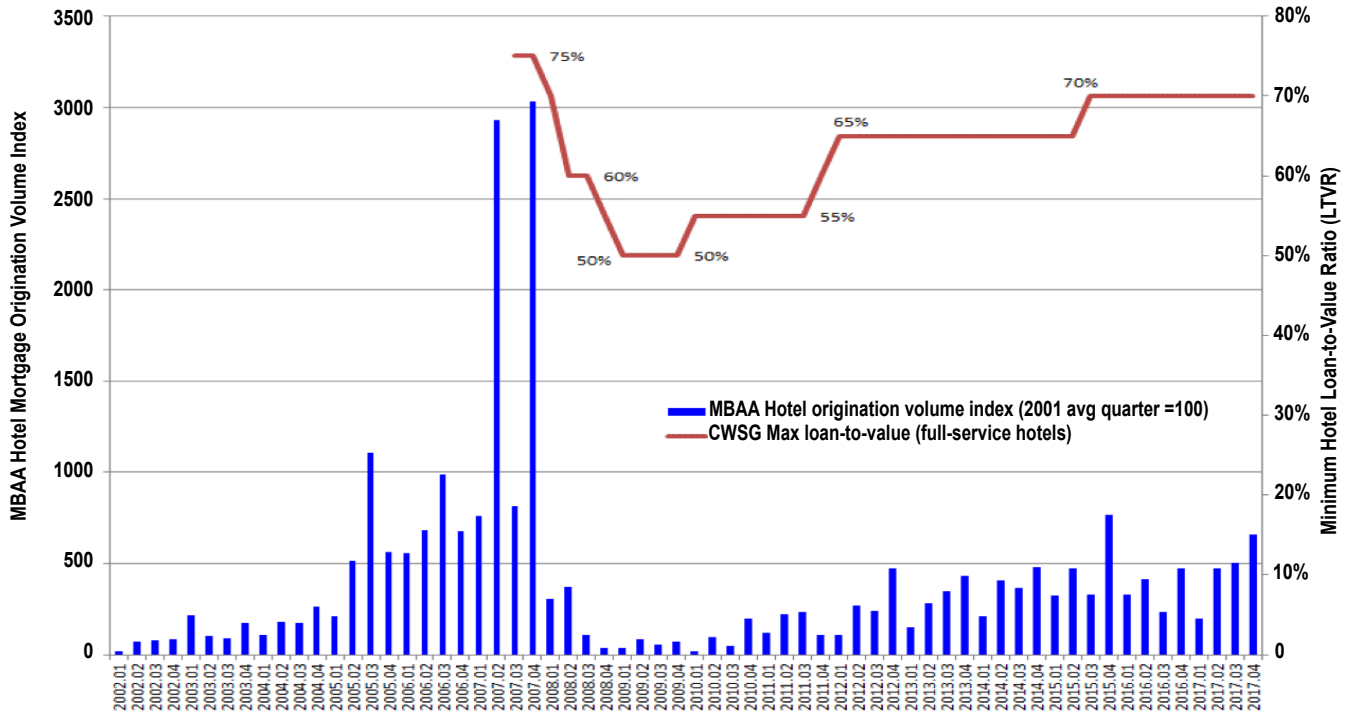
Sources: Cornell Center for Real Estate and Finance, Mortgage Bankers Association

EXHIBIT 19

Interest rates on Class A hotels versus Class B & C properties
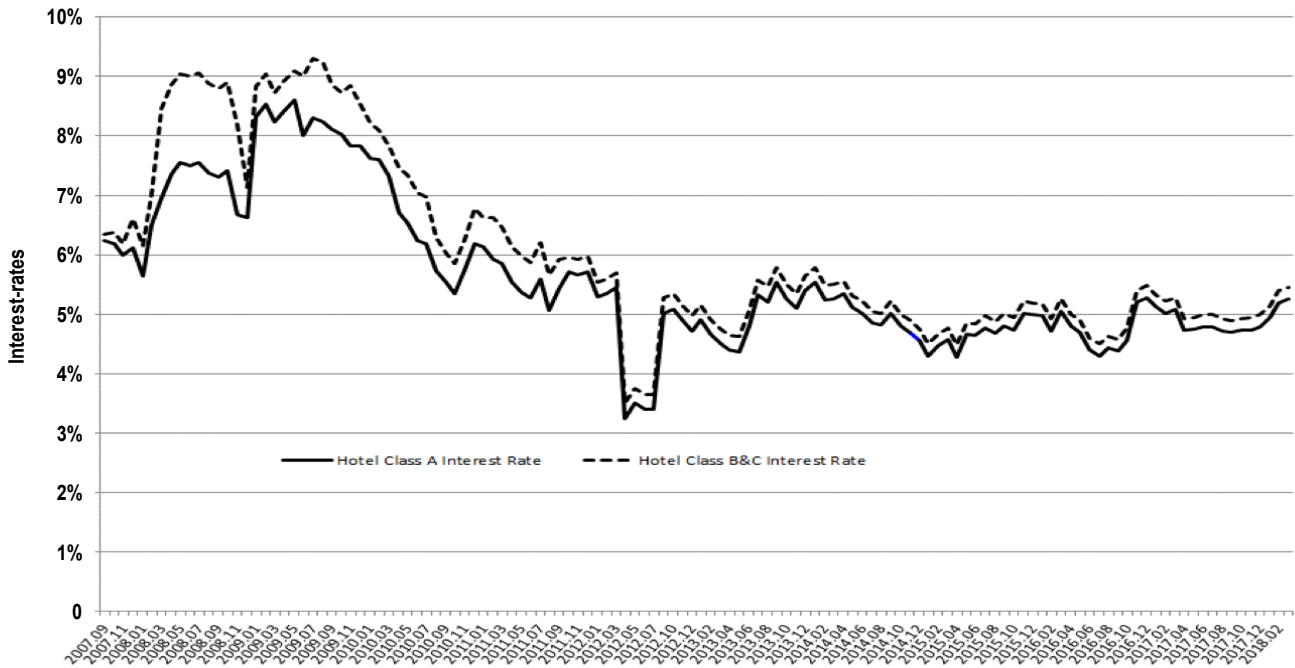
Source: Cushman Wakefield Sonnenblick Goldman

EXHIBIT 20

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

Year-over-year change in Class A hotel interest rate
Year-over-year change in Class B & C hotel interest rate
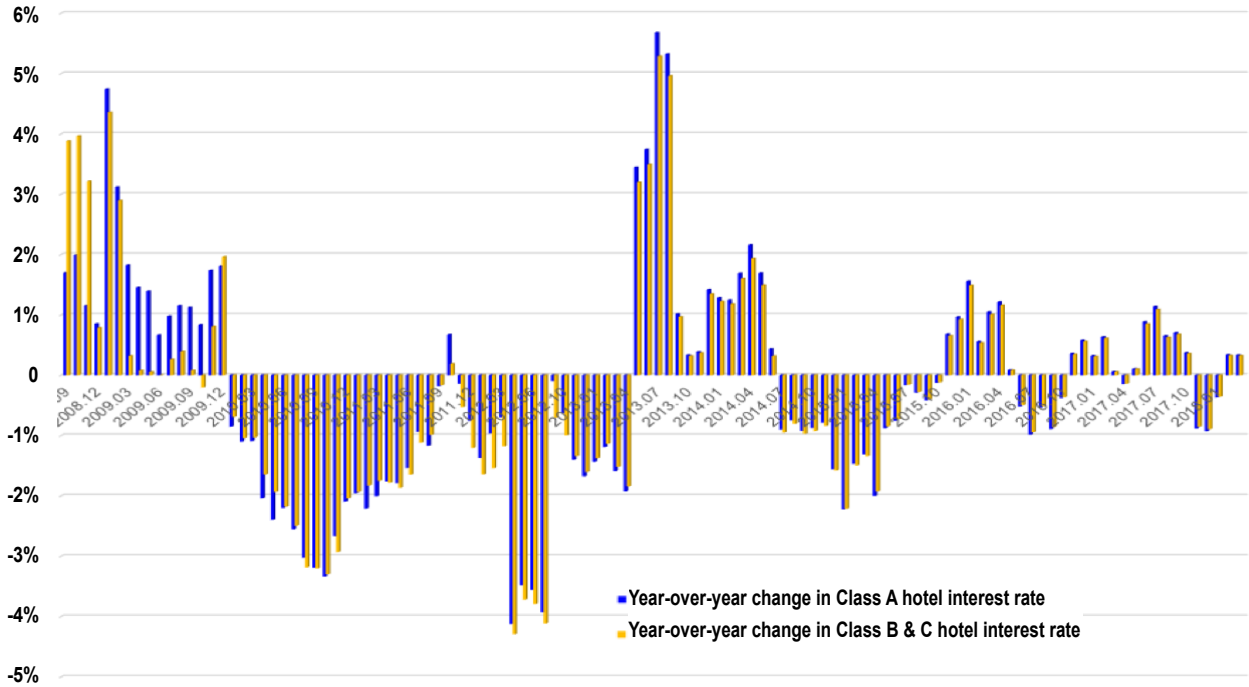
Source: Cushman Wakefield Sonnenblick Goldman

EXHIBIT 21

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

Class A interest-rate spread (Hotel – 10-year Tbond)   Class B & C interest-rate spread (Hotel – 10-year Tbond)

Source: Cushman Wakefield Sonnenblick Goldman

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EXHIBIT 22
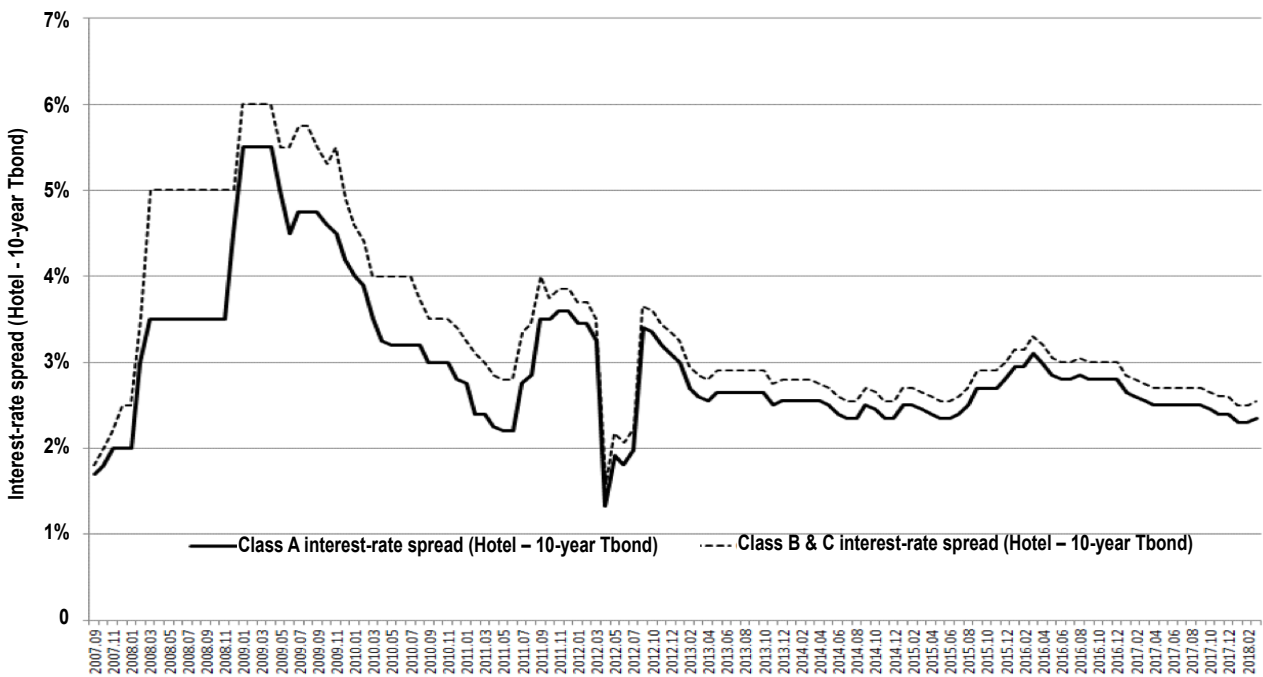
Interest-rate spreads of hotels versus non-hotel commercial real estate
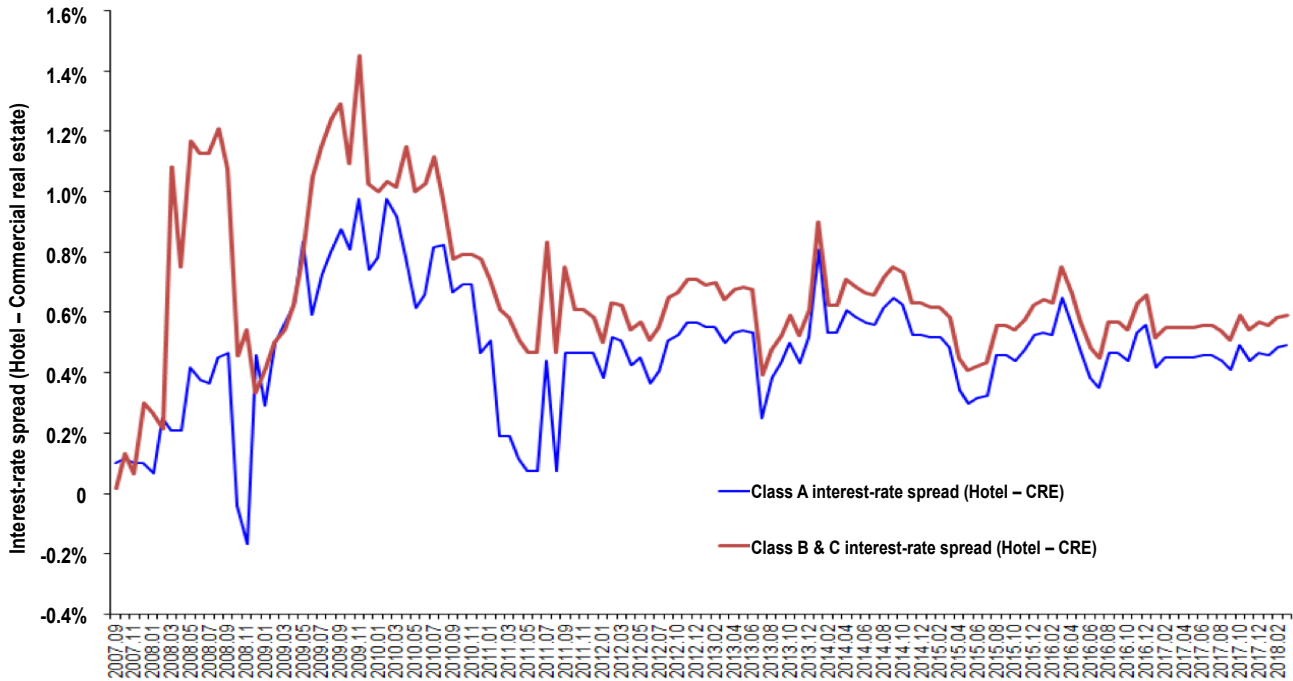
Source: Cushman Wakefield Sonnenblick Goldman

percent for Class B&C properties in the first quarter of 2018 (ending in March), compared to 4.79 percent for Class A properties and 5 percent for Class B&C deals in the previous quarter (ending in December 2017). Exhibit 20 confirms that interest rates on hotels have increased recently when viewed from a rolling year-over-year basis (3.35% for Class A hotels and 3.22% for Class B hotels).

Exhibit 21 and Exhibit 22 depict interest rate spreads relative to different benchmarks. Exhibit 21 shows the spread between Class A interest rates on full-service hotels over the ten-year Treasury bond (as well as the spread for B&C hotels). On this metric, interest rate spreads have declined 5 basis points for both types of property in the current quarter relative to the prior quarter. For Class A properties, the interest rate spread was 2.35 percent in the previous quarter versus 2.3 percent in the current quarter; for Class B hotels, those figures are 2.55 percent versus 2.5 percent. Lenders' compensation for risk associated with hotel loans has continued to decline, indicating that lenders view hotels as relatively less risky than at the time of our last report. Exhibit 22 shows the spread between the interest rate on Class A (and Class B&C)

full-service hotels over the interest rate corresponding to non-hotel commercial real estate, which has been dubbed the hotel real estate premium.[7] The monthly hotel real estate premiums for both higher quality (Class A) and lower quality (Class B&C) hotels have risen over the current quarter. For Class A hotels, the hotel real estate premium averaged .49 percent in the current quarter (2018Q1), compared to .47 percent in the previous quarter (2017Q4). For Class B&C properties, those figures are .59 percent in 2018Q1 and .57 percent in 2017Q4. This is a signal that the perceived default risk for hotel properties has increased slightly relative to other commercial real estate (i.e., office, retail, industrial, and apartments) compared to the previous quarter.

Cost of equity financing has remained relatively flat; expect to see higher interest rates and tighter 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

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[7] 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
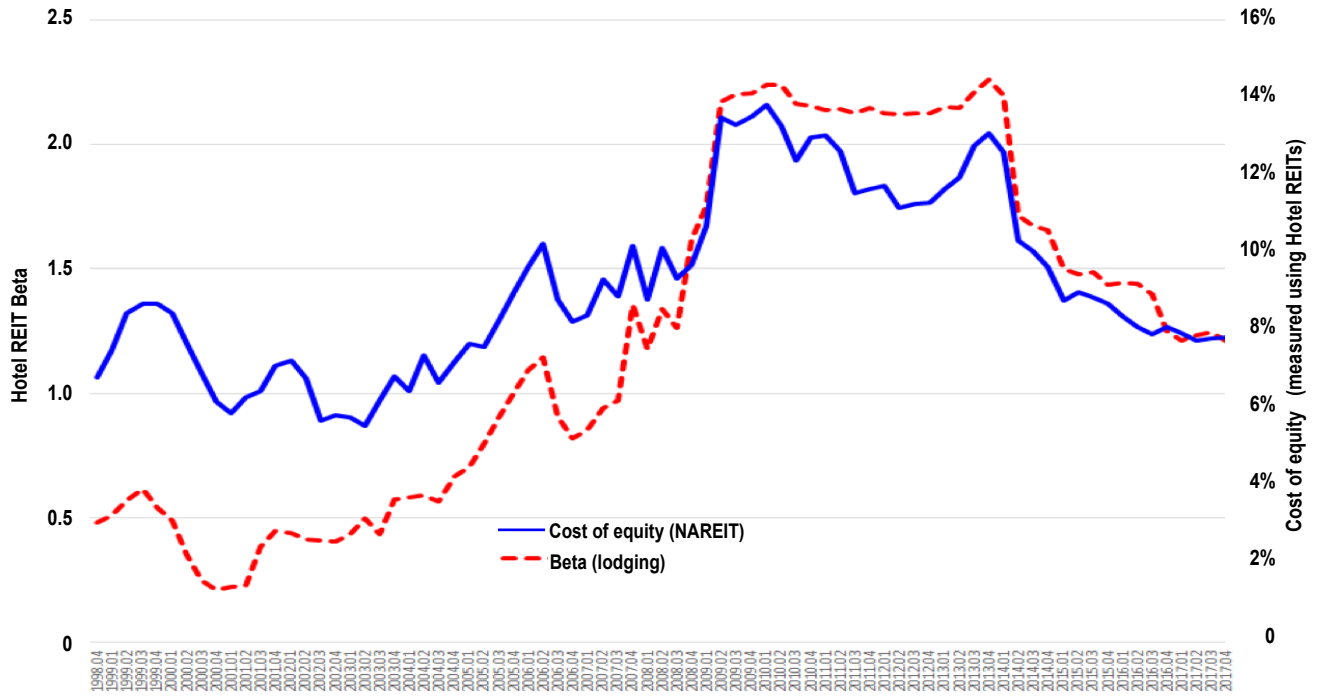
Sources: Cornell Center for Real Estate and Finance, NAREIT

EXHIBIT 24

Risk differential between hotel REITs and equity REITs
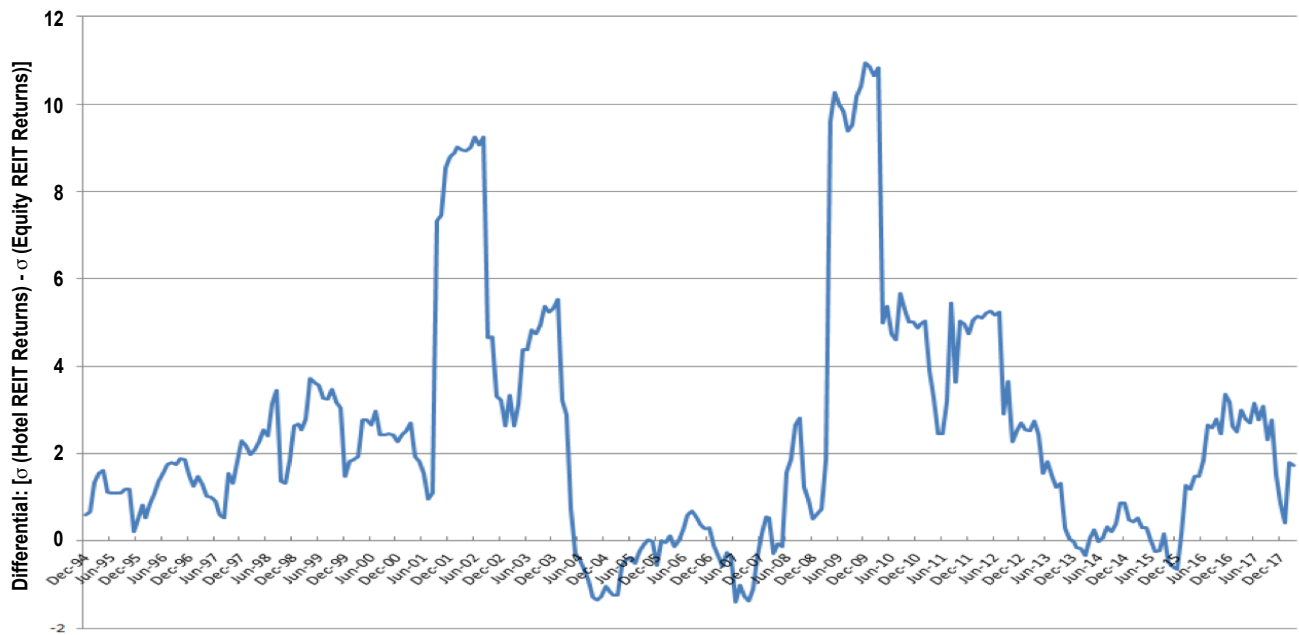
Sources: Cornell Center for Real Estate and Finance, NAREIT

EXHIBIT 25

Hotel repeat sales index versus NAREIT lodging/resort price index

Legend:
- Repeat sales (full sample)
- **NAREIT Lodging/Resort Price Index**
- - - - 12-period moving average repeat sales (full sample)
- ———— 12-period moving average NAREIT Index
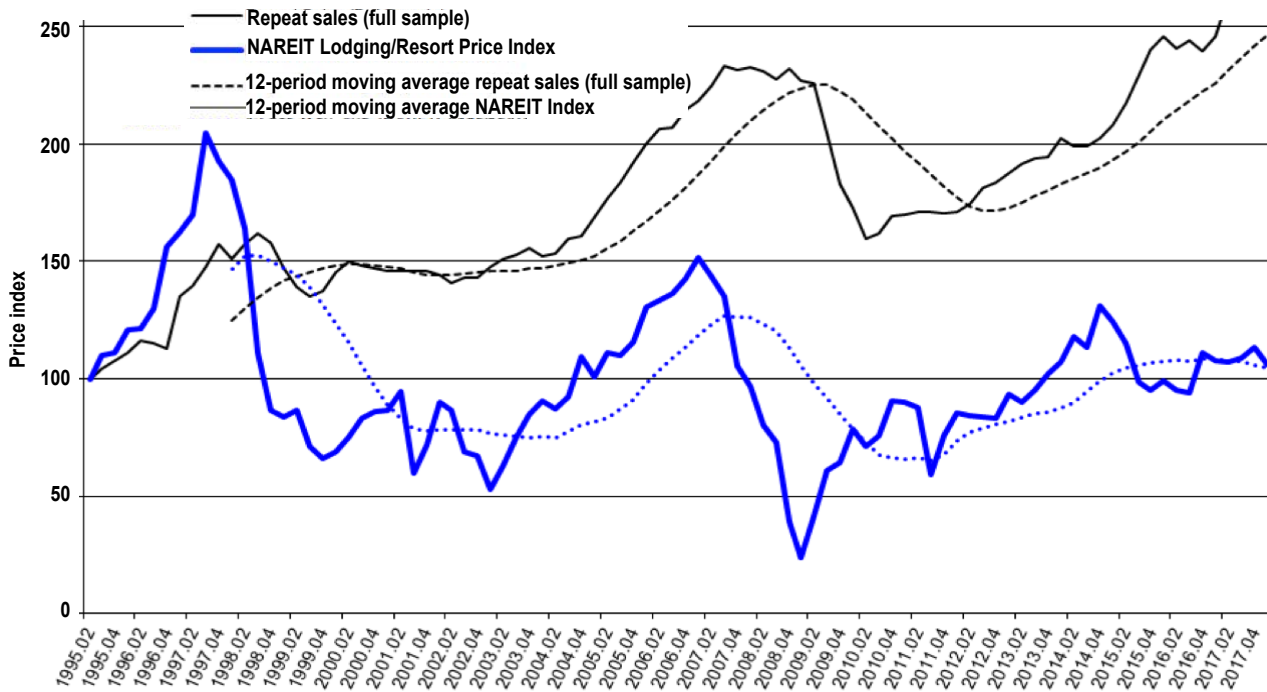
Sources: Cornell Center for Real Estate and Finance, NAREIT

using the Capital Asset Pricing Model (CAPM) on hotel REIT returns has continued to remain relatively flat, as shown in Exhibit 23, with a 3-basis-point (bps) increase over previous quarter. So, the cost of using equity funds stood at 7.84 percent for 2017Q4, compared to 7.81 percent in the previous quarter. The cost of equity has become relatively lower since 2013Q4, falling from 13.1 percent (2013Q4) to roughly 7.84 percent. In terms of *total* risk (systematic risk plus risk that is unique to hotel REITs), Exhibit 24 shows that the total risk of hotel REITs rose this past quarter relative to the total risk of equity REITs as a whole.[8] This is consistent with Exhibit 22, which shows that the per-

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

ceived default risk for hotels has increased relative to other types of commercial real estate. Expect lenders to tighten lending standards for hotels, given that the volatility of stocks is a useful predictor of perceived default risk for hotels.

Expect the price of large hotels and small hotels 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 repeat sales index tends to lag the NAREIT index by at least one quarter or more. This is consistent with academic studies that have found that securitized real estate is a leading indicator of underlying real estate performance, since the stock market is forward looking or efficient. Looking ahead, the NAREIT lodging index fell 6.3 percent this quar-

EXHIBIT 26

Hotel repeat sales index versus architecture billings index
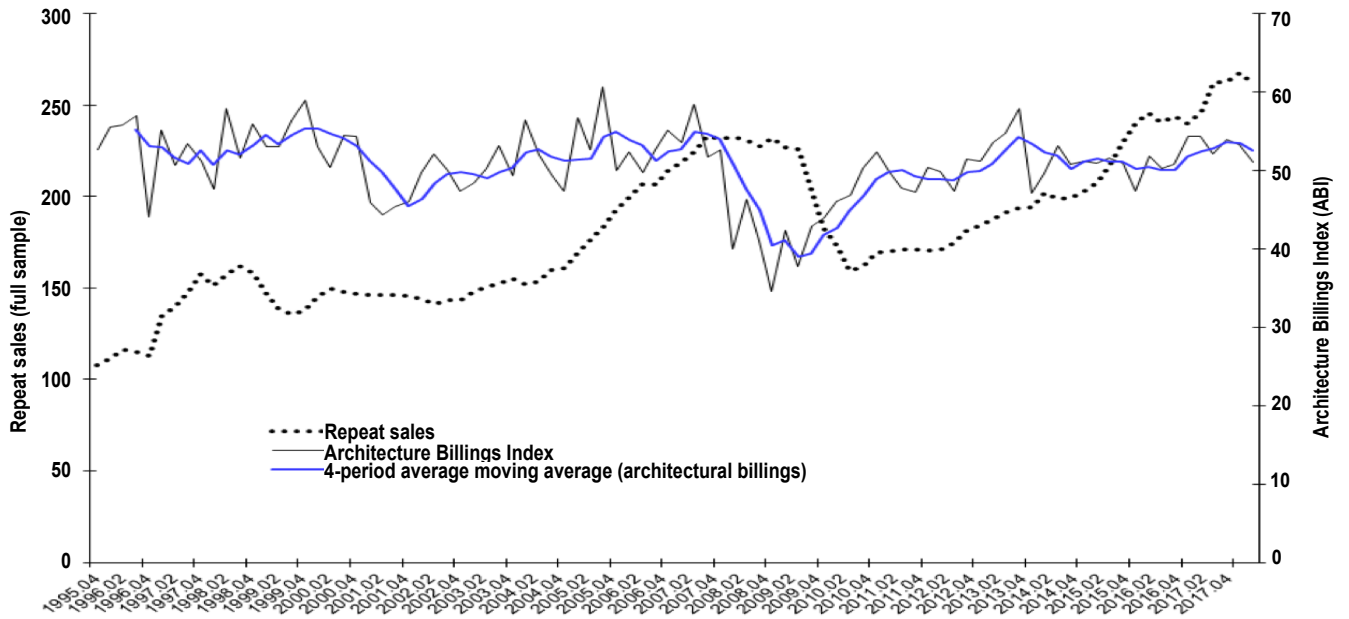
Sources: Cornell Center for Real Estate and Finance, American Institute of Architects

EXHIBIT 27

Business confidence index (National Association of Purchasing Managers) and high-price hotel index
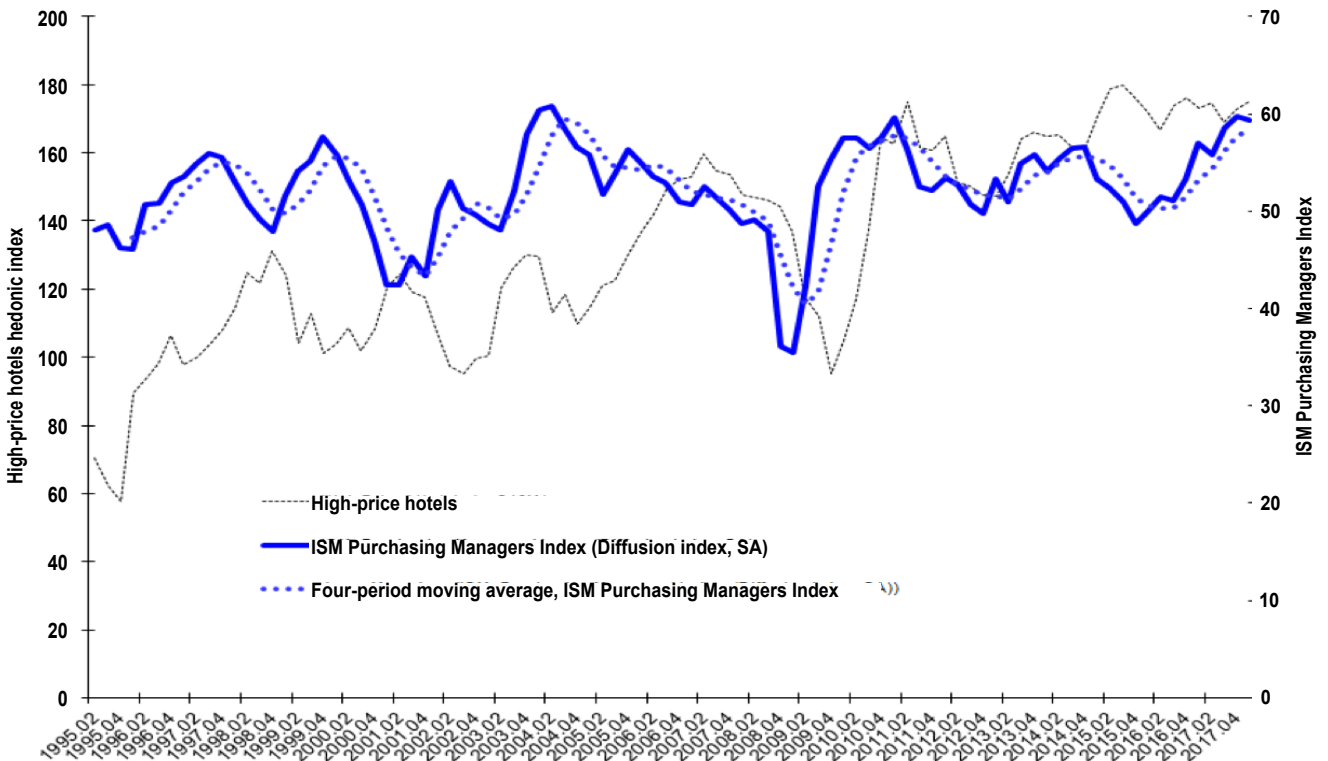
Sources: Cornell Center for Real Estate and Finance, Institute for Supply Management (ISM)

Exhibit 28

Consumer confidence index and low-price hotel index
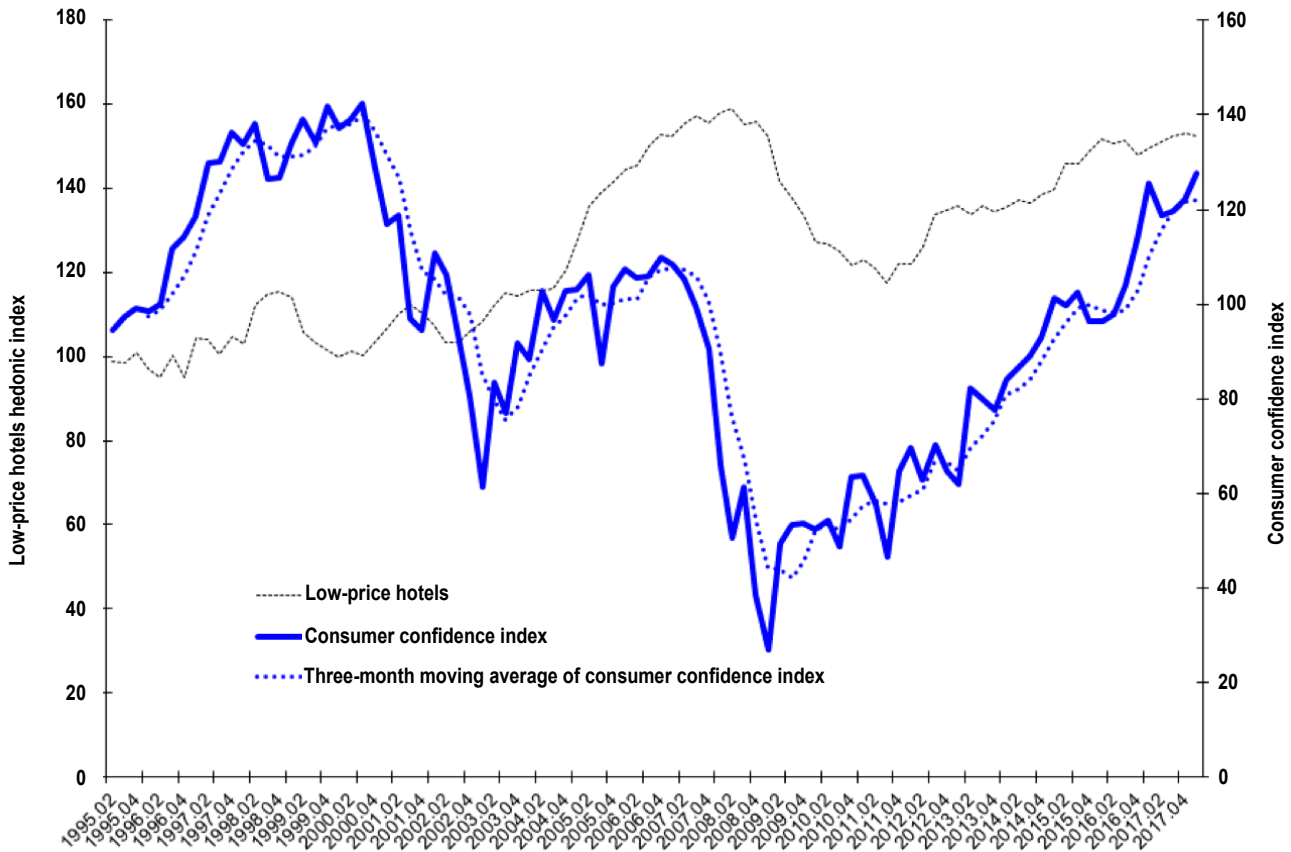
Sources: Cornell Center for Real Estate and Finance, Conference Board

ter (and dropped 1.7% this year) compared to both the prior quarter and year, with the moving average trendline indicating a negative price momentum.

The architecture billings index (ABI) for commercial and industrial property,[9] which represents another forward-looking metric, continued to fall this quarter from the previous quarter, as shown in Exhibit 26 (51 versus 53.3).[10] The ABI metric provides confirmatory evidence that we should expect declining price momentum. The National Association of Purchasing Managers (NAPM) index shown in Exhibit 27, which is an indicator of anticipated business confidence and thus business traveler demand,[11] continued to increase

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

[10] As of the time of this writing, only the November 2017 AIA Billings Index has been reported.

[11] 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

to 4 percent year over year (but dropped .7 percent on a quarter-over-quarter basis). Based on the moving average trendline for the NAPM index, we expect the price of large hotels to continue to rise over the next quarter. Similarly, 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 hedonic index for low price hotels, rose 1.7 percent year over year (4.6% quarter over quarter), continuing its positive trend from the previous period. We thus expect the price of small hotels to rise next quarter based on the four-quarter Consumer Confidence Index moving average. ■

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.

Appendix

SUP: The Standardized Unexpected Price Metric

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

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

where SUE_Q = quarter Q standardized unexpected earnings,

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

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

 s_Q = quarter Q standard deviation of earnings estimates.

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

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

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

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

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

Standard Deviation (σ) = 18.99

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

CREF Advisory Board