

Supply Constrained Markets

BY DAVID LYNN, PH.D., CRE; BOHDY HEDGCOCK; JEFF ORGANISCIAK

CONSTRAINTS ON NEW SUPPLY in a given market reduce an owner's competition for tenants, which typically leads to higher occupancy, higher rent levels and faster rent growth. Supply constraints can stem from several sources and vary across both markets and time. This article discusses several aspects of supply constraints, including their origin and economics, and introduces a way of measuring this feature across property sectors and metropolitan areas.

DEFINING SUPPLY CONSTRAINTS

Supply constraints are broadly defined as limitations on the ability to deliver new development. These constraints generally fall into three categories, though some overlap among the categories is common.

Legal: Primarily zoning and land use regulations which restrict the location, quantity and/or pace of new development.

Geographic: Physical limitations such as waterways, steep slopes and soil conditions, which limit the location and/or quantity of new development. This category may also include the impact of existing development at a scale and density that limits available sites ripe for redevelopment.

Political: Local opposition to development which is not codified through local regulations but which nonetheless constrains development potential.

In addition to the above types of supply constraints, economic factors may also limit development feasibility. For example, the limited availability or high costs of construction lending are currently serving as a supply constraint, even in markets that are not typically associated with limited development opportunities. These types of constraints are generally temporary and adjust with the larger real estate market, however, and cannot, therefore, be counted on over the mid- to long-term to impact the overall supply dynamics.

ECONOMICS OF SUPPLY CONSTRAINTS

The ability of a market to increase supply in the face of rising demand varies across metro areas. If supply cannot be added to meet additional demand, then prices (rents, and eventually capital values) will rise accordingly. Figure 1

About the Authors



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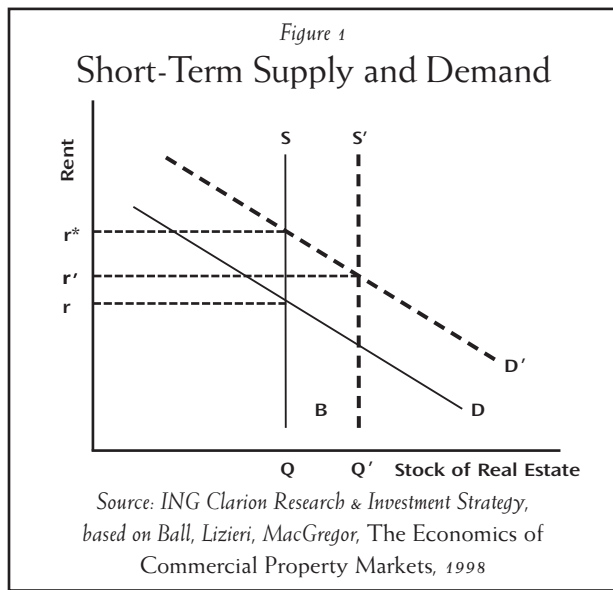
Hedgcock holds a master's degree in Real Estate Finance from New York University, a master's degree in urban planning from the University of Colorado, and a bachelor's degree from Southwestern University.



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illustrates the effect that supply constraints can have on market rents. With supply/demand equilibrium at the intersection of the S and D lines, the market clears at a rent, *r*. In the short term, the supply curve (S) is vertical, as supply is fixed and completely inelastic. If demand for real estate increases, the demand curve shifts from D to D', causing rents to shift from *r* to *r**. On the other hand, if an amount of new supply, B, is added to the market, the supply curve will be pushed from S to S' and the market will clear at new rent level, *r*'. The amount of new supply that can be added directly impacts the corresponding change in rents. Therefore, markets with constrained supply should have greater rent growth during demand surges and a higher rent level given equal demand relative to markets with excess supply.



MEASURING SUPPLY CONSTRAINTS

In economic theory, the *price elasticity of supply* (PES) is a measurement used to calculate a market's supply responsiveness to a change in price. It is defined as the absolute value of the Percentage Change in Quantity divided by the Percentage Change in Price over a given time period:

$$\frac{\% \text{ Change in Quantity}}{\% \text{ Change in Price}} = \text{Price Elasticity of Supply}$$

While not perfect, PES is a useful proxy for supply constraints. One can apply this concept to measure the

PES for different property sectors and across metro areas. If the ratio is equal to one, there is a balance between supply and price, such that for every percent increase in price there is an equal percentage increase in new space. A ratio greater than one indicates elastic supply, where the quantity supplied increases by more than the percentage change in price. A ratio of less than one indicates a market that is inelastic (a value of zero would indicate a completely inelastic market), where the new quantity supplied does not keep up with percentage changes in price. A lower ratio generally indicates less elasticity, and therefore more supply constrained markets.

COMPARING PROPERTY SECTORS

The price elasticity of supply was calculated across 50 metro areas for three of the four core property types over the five-year period from 2004–2008 (Figure 2). Because real estate development entails time to plan, permit and build, supply is very inelastic in the short term (i.e. the supply lag). As expected, the five-year PES for all property sectors is below one, indicating a degree of inelasticity over this period. Office has the lowest PES while Industrial has the highest. These results are consistent with empirical observation, reflecting the longer construction process for office properties relative to the other property types.¹

Figure 2
National Property Sector Supply Constraints (2004-2008)

Sector	Supply Increase	Rent Increase	PES
Office	7.4%	16.0%	0.46
Retail	9.1%	14.7%	0.62
Industrial	9.4%	11.3%	0.83

Source: ING Clarion Research & Investment Strategy, CBRE-Econometric Advisors, data represents cumulative change from end 2003Q4 to end 2008Q4

OFFICE

Extending this analysis to metro-level comparisons, Figure 3 shows the top five and bottom five office markets by price elasticity of supply. A complete ranking of the office markets tracked and their PES is included in

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Figure 3

Top Five and Bottom Five Supply Constrained Office Markets (2004-2008)

Rank	Metro	Supply Increase	Rent Increase	PES	2008 Vacancy	Supply Constraint Value
1	New York	1.9%	26.9%	0.07	6.8	0.24
2	San Francisco	4.1%	60.7%	0.07	10.6	0.37
3	Long Island	5.5%	20.0%	0.27	9.7	0.40
4	Stamford	4.2%	14.7%	0.28	10.8	0.44
5	Los Angeles	3.3%	34.7%	0.09	12.8	0.45
46	Fort Worth	10.3%	-2.4%	4.28	13.6	1.80
47	Jacksonville	15.7%	4.1%	3.81	18.8	1.82
48	Edison	2.9%	-0.7%	4.36	20.8	2.06
49	Indianapolis	10.0%	1.7%	5.87	15.8	2.37
50	Minneapolis	1.6%	0.1%	12.58	15.4	4.48

Source: ING Clarion Research & Investment Strategy, CBRE-EA

Figure 4

Top Five and Bottom Five Supply Constrained Industrial Markets (2004-2008)

Rank	Metro	Supply Increase	Rent Increase	PES	2008 Vacancy	Supply Constraint Value
1	San Francisco	0.2%	33.3%	0.01	7.4	0.32
2	Orange County	1.9%	33.5%	0.06	7.4	0.35
3	Los Angeles	5.6%	31.6%	0.18	6.6	0.40
4	San Jose	0.7%	33.8%	0.02	9.6	0.42
5	New York	1.2%	19.4%	0.06	9.4	0.44
46	Riverside	39.1%	29.8%	1.31	14.5	1.52
47	Columbus	10.4%	6.6%	1.59	15.9	1.77
48	Atlanta	11.8%	5.0%	2.38	15.6	2.30
49	Chicago	13.4%	5.2%	2.58	14.8	2.40
50	Fort Worth	9.6%	1.1%	8.52	12.1	6.37

Source: ING Clarion Research & Investment Strategy, CBRE-EA

Figure 9. A slightly different methodology was used for metro rankings compared to national property sector rankings that took the 2008 vacancy rate into account. After removing outliers, both the PES value and the 2008 vacancy rate for each metro were scaled to the 50 market average.² Then, these two values were averaged to arrive at a value used in the rankings (Supply Constraint Value). The vacancy rate was taken into consideration in order to control for markets with above-average vacancy rates, which generally would not be considered supply constrained. The results for the office sector generally confirm common perceptions about supply constraints, as New York, San Francisco and Los Angeles appear among the most supply constrained in these rankings, while Fort Worth and Jacksonville are found near the bottom.

INDUSTRIAL

The industrial sector is characterized by relatively short construction periods and the ability to adjust supply pipelines quickly in the face of falling or rising demand. In addition, because industrial development is often located in peripheral locations, the concept of supply constraints is often considered less applicable. Nonetheless, an analysis of the PES of industrial markets also returns more or less expected results. The markets near the top of the rankings, including San Francisco, San Jose and Orange County, saw relatively limited amounts of new construction from 2004–2008, despite steep price increases. The markets near the bottom of the rankings, conversely, have seen large amounts of new supply and relatively small increases in rents (Figure 4). The Los Angeles market, which is often

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referred to as one of the more supply-constrained of the industrial markets, ranks eighth in PES, but third overall. The full rankings are included in Figure 10.

RETAIL

Using the PES for the retail sector presents some additional challenges. Data providers typically focus upon the neighborhood and community shopping center segment of the retail sector. As such, the supply numbers do not account for the development of regional and super-regional malls. In addition, much of the retail development completed during our study period (2004–2008) was in fast-growing markets, developed to serve new residential communities. More than 45 percent of the new construction over the five-year period was concentrated in just ten metro areas, led by Phoenix, Atlanta, Chicago, Riverside, and Houston. Four of the five markets with the lowest PES had extremely high rent growth—19.1 percent or higher—over the five-year period. Raleigh, for example, tops the PES rankings due to an extremely sharp spike in rents, despite a 9.0 percent increase in new supply over the same period. Long Island, on the other hand, added less than 160,000 square feet of new space so, even with a decline in rents, ended up in the top five ranking. Markets at the top of the combined rankings had both low PES values and low vacancy rates. The top supply constrained markets generally had vacancy rates well below 6 percent in 2008, when the average was 10.4 percent. The least supply constrained retail markets had high vacancy rates that were well above average. The full rankings are included in Figure 11.

BENEFITS OF SUPPLY CONSTRAINTS

We believe that the dynamics of real estate supply greatly influence real estate investment returns. Markets where supply is constrained generally tend to have higher rent levels, greater rent growth and higher capital values. Figures 6–8 shows a comparison of the PES and the capital appreciation for the office, industrial and retail sectors, as measured by the NCREIF Index. The resulting trend line shows an inverse relationship between price elasticity and capital growth in all three sectors. The correlation between both series is negative for all three sectors, with Office having the strongest negative correlation of -0.53, Industrial with -0.29 and Retail with -0.11. In other words, those markets with a higher level of supply constraints have generated stronger capital appreciation over the study period.

In conclusion, as real estate markets begin to recover nationwide, we expect supply constrained markets to be among the first to show rent growth and capital value increases. Perhaps more importantly, these markets should also be better able to maintain capital values over a longer period. Therefore, an investment strategy focusing on supply constrained markets could potentially provide more durable income and stronger capital appreciation. ■

ENDNOTES

1. The apartment sector was not included in the property sector analysis because the impact of the condo conversion boom, which resulted in a declining apartment supply in many markets, skewed the results significantly. The hotel sector was also excluded due to the idiosyncratic nature of hotels as operationally intensive assets.
2. Each metro's PES and Vacancy rate was divided by the average, resulting in scaled values.

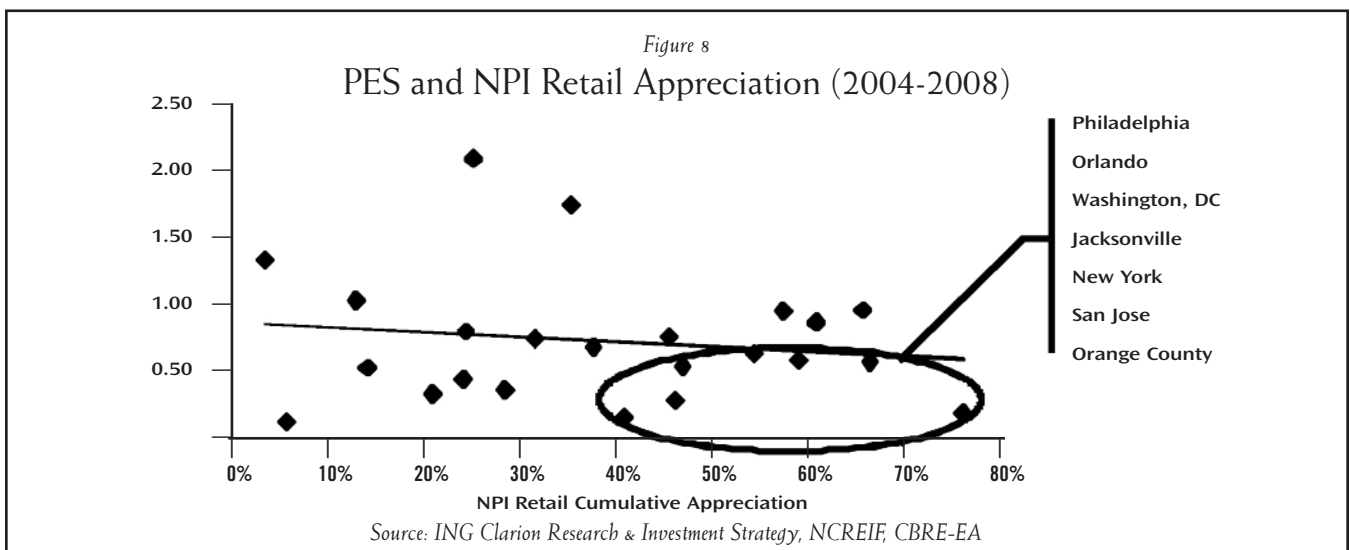
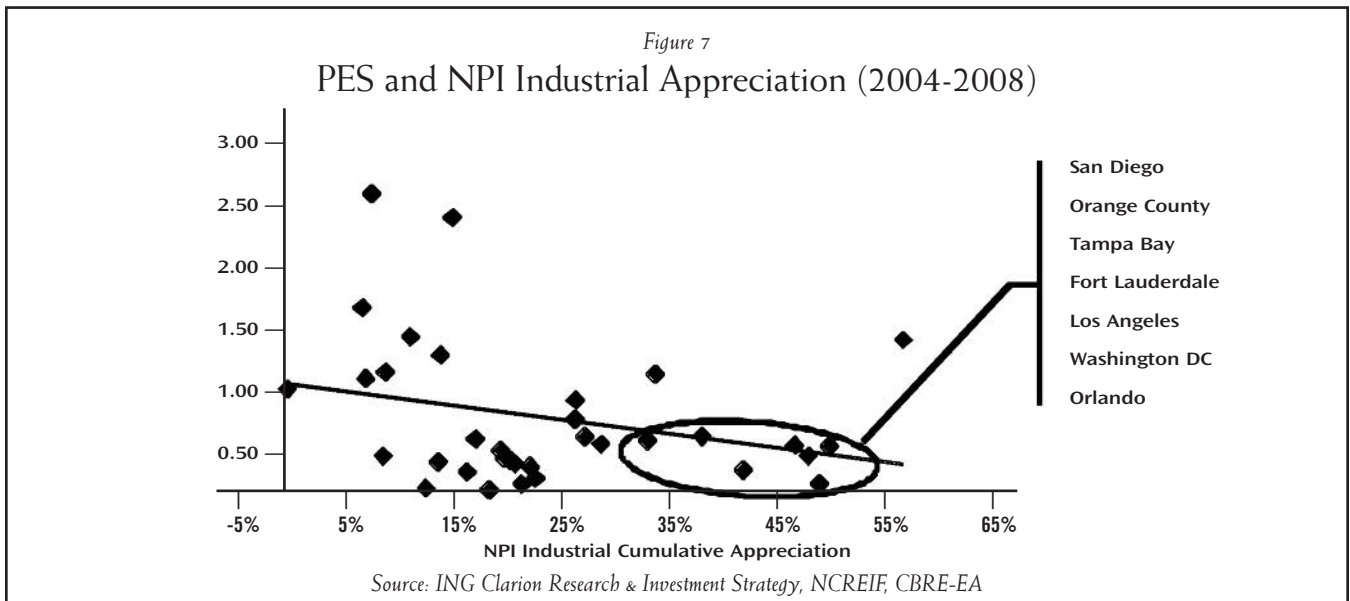
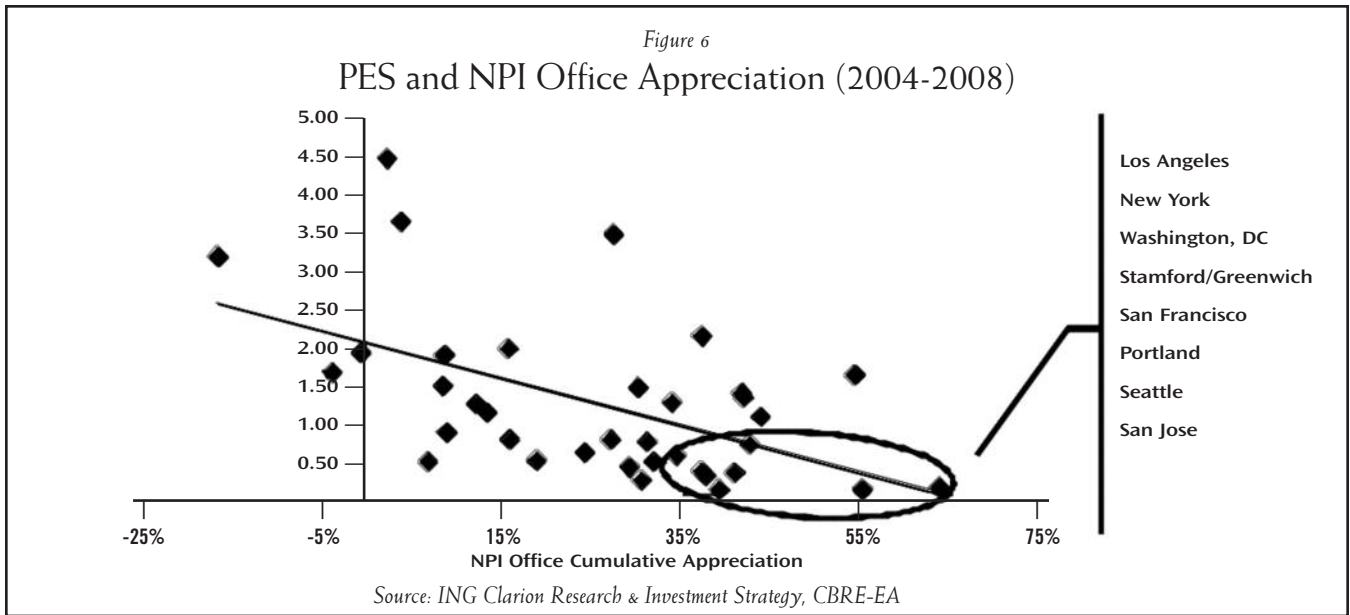
Figure 5

Top Five and Bottom Five Supply Constrained Retail Markets (2004-2008)

Rank	Metro	Supply Increase	Rent Increase	PES	2008 Vacancy	Supply Constraint Value
1	Orange County	3.0%	19.1%	0.16	4.9	0.27
2	San Jose	3.2%	10.9%	0.29	4.5	0.29
3	Long Island	0.6%	-3.6%	0.18	5.5	0.31
4	Los Angeles	5.2%	15.4%	0.34	6.1	0.38
5	San Francisco	2.2%	-2.3%	0.99	3.5	0.41
46	Trenton	6.3%	-11.1%	0.57	17	0.96
47	Detroit	6.1%	13.2%	0.46	17.9	0.97
48	Columbus	11.7%	8.6%	1.37	16.7	1.14
49	Denver	10.3%	-0.2%	41.82	12	1.16
50	Dallas	8.6%	4.0%	2.16	15.5	1.27

Source: ING Clarion Research & Investment Strategy, CBRE-EA

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Figure 9
Office PES Rankings

Rank	Metro	Supply Increase	Rent Increase	PES	2008 Vacancy	Supply Constraint Value
1	New York	1.9%	26.9%	0.07	6.8	0.24
2	San Francisco	4.1%	60.7%	0.07	10.6	0.37
3	Long Island	5.5%	20.0%	0.27	9.7	0.40
4	Stamford	4.2%	14.7%	0.28	10.8	0.44
5	Los Angeles	3.3%	34.7%	0.09	12.8	0.45
6	Seattle	8.4%	27.8%	0.30	11.4	0.47
7	Portland	3.9%	15.9%	0.25	12.1	0.47
8	Denver	5.1%	27.0%	0.19	16.3	0.59
9	Washington, DC	13.6%	20.9%	0.65	12.2	0.60
10	Miami	12.7%	29.8%	0.43	14.4	0.61
11	Newark	2.0%	4.6%	0.43	14.8	0.62
12	Sum of Markets*	8.4%	16.3%	0.52	14	0.62
13	Oakland	3.6%	8.1%	0.44	14.7	0.62
14	Philadelphia	8.5%	12.0%	0.71	12.8	0.64
15	Hartford	0.4%	2.3%	0.18	18.2	0.65
16	Memphis	3.8%	8.8%	0.44	16.2	0.67
17	Orange County	9.1%	25.3%	0.36	17.3	0.68
18	Salt Lake City	18.4%	21.2%	0.86	13.4	0.71
19	San Jose	8.5%	16.7%	0.51	17.7	0.74
20	Chicago	5.6%	6.9%	0.81	15.2	0.75
21	Cleveland	3.3%	-3.6%	0.91	14.8	0.77
22	Houston	7.5%	5.7%	1.32	12.3	0.82
23	Tampa	14.5%	21.2%	0.69	18.8	0.83
24	Boston	5.0%	3.3%	1.55	11	0.85
25	Charlotte	13.2%	9.5%	1.39	12.7	0.85
26	West Palm Beach	20.7%	29.0%	0.72	20	0.88
27	Riverside	35.2%	44.1%	0.80	19.4	0.89
28	Fort Lauderdale	14.9%	11.8%	1.26	15.2	0.89
29	Atlanta	7.8%	7.3%	1.07	17.4	0.91
30	Kansas City	6.8%	4.3%	1.58	14.4	0.97
31	San Diego	20.7%	17.3%	1.19	18.2	0.97
32	Nashville	14.5%	7.7%	1.89	12.4	1.00
33	Raleigh	20.0%	11.1%	1.81	13.6	1.02
34	Sacramento	15.6%	11.0%	1.41	17.6	1.02
35	Cincinnati	10.9%	7.3%	1.48	17	1.02
36	Tucson	13.8%	8.1%	1.70	15.2	1.03
37	Baltimore	22.3%	12.1%	1.84	13.9	1.03
38	Dallas	6.8%	-5.7%	1.18	20.3	1.04
39	Phoenix	31.4%	31.1%	1.01	22.5	1.05
40	Las Vegas	52.4%	33.1%	1.58	17.4	1.07
41	Austin	18.7%	9.1%	2.06	17.5	1.22
42	Detroit	4.8%	-2.4%	1.98	22.1	1.35
43	Columbus	7.5%	2.4%	3.08	16	1.50
44	Orlando	28.8%	8.5%	3.38	15.5	1.57
45	St. Louis	5.9%	1.7%	3.54	14	1.58
46	Fort Worth	10.3%	-2.4%	4.28	13.6	1.80
47	Jacksonville	15.7%	4.1%	3.81	18.8	1.82
48	Edison	2.9%	-0.7%	4.36	20.8	2.06
49	Indianapolis	10.0%	1.7%	5.87	15.8	2.37
50	Minneapolis	1.6%	0.1%	12.58	15.4	4.48

Source: ING Clarion Research & Investment Strategy, CBRE Econometric Advisors, data from 2003Q4 through 2008Q4.

* Sum of Markets represents the sum of all markets in the CBRE Econometric Advisors coverage list, which includes additional metro areas not covered by ING Clarion Research & Investment Strategy.

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Figure 10
Industrial PES Rankings

Rank	Metro	Supply Increase	Rent Increase	PES	2008 Vacancy	Supply Constraint Value
1	San Francisco	0.2%	33.3%	0.01	7.4	0.32
2	Orange County	1.9%	33.5%	0.06	7.4	0.35
3	Los Angeles	5.6%	31.6%	0.18	6.6	0.40
4	San Jose	0.7%	33.8%	0.02	9.6	0.42
5	New York	1.2%	19.4%	0.06	9.4	0.44
6	Tucson	14.7%	67.6%	0.22	7.5	0.47
7	Kansas City	4.3%	26.0%	0.16	8.5	0.48
8	Oakland	1.3%	11.1%	0.12	9.4	0.48
9	Long Island	1.3%	7.3%	0.18	9	0.51
10	Miami	5.7%	27.5%	0.21	10	0.57
11	Minneapolis	2.5%	8.0%	0.31	8.8	0.59
12	Salt Lake City	7.6%	16.3%	0.47	6.6	0.60
13	Houston	9.4%	20.8%	0.45	6.9	0.60
14	West Palm Beach	7.3%	36.8%	0.20	11	0.61
15	Newark	1.7%	7.0%	0.24	10.8	0.62
16	Charlotte	4.3%	12.4%	0.35	9	0.62
17	Portland	6.8%	16.9%	0.41	8.1	0.62
18	Tampa	6.3%	20.4%	0.31	10	0.64
19	Hartford	1.3%	5.1%	0.25	11.1	0.65
20	Sacramento	4.8%	30.4%	0.16	12.9	0.66
21	Denver	6.0%	22.7%	0.27	11.2	0.66
22	Fort Lauderdale	9.5%	24.1%	0.39	9.8	0.69
23	Philadelphia	3.3%	13.0%	0.25	12.7	0.71
24	Austin	8.5%	29.8%	0.29	12.3	0.72
25	Orlando	15.2%	34.7%	0.44	10.8	0.76
26	San Diego	11.2%	29.0%	0.39	12	0.78
27	Las Vegas	26.0%	39.9%	0.65	8.1	0.79
28	Seattle	10.5%	17.0%	0.62	9	0.81
29	Jacksonville	12.6%	39.9%	0.32	14.2	0.82
30	Cincinnati	6.7%	13.3%	0.51	11.7	0.85
31	Washington, DC	8.2%	17.3%	0.48	12.7	0.87
32	Stamford	3.1%	16.3%	0.19	18.2	0.90
33	Boston	3.9%	8.9%	0.44	16	0.98
34	Nashville	14.8%	23.6%	0.63	14	1.03
35	Cleveland	4.0%	6.0%	0.66	13.8	1.04
36	Sum of Markets*	8.9%	10.9%	0.81	11.8	1.06
37	Raleigh	5.7%	8.3%	0.69	14.4	1.09
38	Indianapolis	15.2%	15.6%	0.97	10.4	1.11
39	Detroit	3.3%	-9.3%	0.35	22.5	1.20
40	St. Louis	7.4%	7.2%	1.03	11.9	1.21
41	Baltimore	6.8%	8.7%	0.79	16.4	1.24
42	Edison	10.4%	8.8%	1.18	12.4	1.34
43	Phoenix	16.2%	16.0%	1.02	15.9	1.38
44	Memphis	13.9%	15.7%	0.88	18.9	1.41
45	Dallas	11.9%	8.9%	1.33	13.2	1.48
46	Riverside	39.1%	29.8%	1.31	14.5	1.52
47	Columbus	10.4%	6.6%	1.59	15.9	1.77
48	Atlanta	11.8%	5.0%	2.38	15.6	2.30
49	Chicago	13.4%	5.2%	2.58	14.8	2.40
50	Fort Worth	9.6%	1.1%	8.52	12.1	6.37

Source: ING Clarion Research & Investment Strategy, CBRE Econometric Advisors, data from 2003Q4 through 2008Q4.

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Figure 11
Retail Rankings

Rank	Metro	Supply Increase	Rent Increase	PES	2008 Vacancy	Supply Constraint Value
1	Orange County	3.0%	19.1%	0.16	4.9	0.27
2	San Jose	3.2%	10.9%	0.29	4.5	0.29
3	Long Island	0.6%	-3.6%	0.18	5.5	0.31
4	Los Angeles	5.2%	15.4%	0.34	6.1	0.38
5	San Francisco	2.2%	-2.3%	0.99	3.5	0.41
6	Newark	5.4%	12.7%	0.43	7.5	0.47
7	Raleigh	9.0%	72.8%	0.12	9.1	0.47
8	Tampa	6.1%	20.3%	0.30	8.7	0.49
9	Nashville	15.4%	19.5%	0.79	6.8	0.52
10	San Diego	6.4%	10.6%	0.60	7.9	0.53
11	Philadelphia	4.5%	24.0%	0.19	10.2	0.54
12	Seattle	7.4%	16.3%	0.45	9.1	0.55
13	Orlando	10.3%	17.7%	0.58	8.6	0.56
14	Washington, DC	7.5%	8.5%	0.88	7.1	0.56
15	Baltimore	7.3%	9.3%	0.79	7.7	0.56
16	Minneapolis	6.3%	8.8%	0.72	8.1	0.57
17	West Palm Beach	4.6%	11.1%	0.41	9.8	0.57
18	New York	6.5%	11.7%	0.55	9.2	0.58
19	Las Vegas	23.6%	20.2%	1.17	6.1	0.58
20	Fort Lauderdale	10.9%	28.9%	0.38	10.2	0.58
21	Edison	4.7%	-7.3%	0.64	8.9	0.58
22	Riverside	18.3%	39.2%	0.47	10.6	0.62
23	Portland	12.7%	14.3%	0.89	8.9	0.65
24	Sum of Markets*	9.1%	14.7%	0.62	10.4	0.65
25	St. Louis	7.2%	26.3%	0.27	12.8	0.68
26	Charlotte	17.3%	23.8%	0.73	10.7	0.69
27	Salt Lake City	11.8%	-2.6%	4.59	7.2	0.69
28	Jacksonville	10.2%	15.7%	0.65	11.3	0.70
29	Tucson	12.8%	25.8%	0.50	12.3	0.71
30	Miami	8.4%	4.7%	1.80	5.8	0.72
31	Wilmington	10.5%	24.8%	0.42	12.8	0.72
32	Austin	14.5%	13.7%	1.06	10.2	0.75
33	Oakland	8.2%	-0.5%	17.27	7.8	0.75
34	Phoenix	19.3%	23.4%	0.82	11.5	0.76
35	Sacramento	21.9%	28.4%	0.77	11.9	0.76
36	Cleveland	5.5%	25.0%	0.22	14.9	0.77
37	Chicago	8.5%	12.2%	0.70	12.5	0.77
38	Boston	7.5%	1.0%	7.81	8.1	0.78
39	Atlanta	13.3%	24.4%	0.55	13.7	0.79
40	Providence	3.1%	-8.2%	0.38	15.2	0.82
41	Houston	10.4%	10.6%	0.98	13.5	0.89
42	Kansas City	12.7%	13.4%	0.95	13.7	0.89
43	Cincinnati	8.4%	-8.2%	1.03	13.4	0.90
44	Indianapolis	10.4%	11.8%	0.87	15.2	0.95
45	Fort Worth	12.6%	17.3%	0.73	16	0.95
46	Trenton	6.3%	-11.1%	0.57	17	0.96
47	Detroit	6.1%	13.2%	0.46	17.9	0.97
48	Columbus	11.7%	8.6%	1.37	16.7	1.14
49	Denver	10.3%	-0.2%	41.82	12	1.16
50	Dallas	8.6%	4.0%	2.16	15.5	1.27

Source: ING Clarion Research & Investment Strategy, CBRE Econometric Advisors, data from 2003Q4 through 2008Q4.

* Sum of Markets represents the sum of all markets in the CBRE Econometric Advisors coverage list, which includes additional metro areas not covered by ING Clarion Research & Investment Strategy