

# Is Retail Development Success Related to Housing Density?

Retail Square Footage per Capita and Other Benchmarks

## Background

If you have seen the movie *Gold*, produced by and featuring Matthew McConaughey, or *The Big Short*, based on the novel written by Michael Lewis, then you may recall a similar nugget of truth in both. That message can be summarized as “take a long hard look into the data, form your own objective opinion, and make decisions from there.” This theme is especially important in today’s world that is filled with abundant information, catchy headlines, and endless “click-bait” designed to capture our attention for a fleeting moment.

We need to apply the same principle in response to the rapidly evolving state of the retail real estate market. It is a widely-held belief that there is “too much” retail. So, by observing how much existing retail there is in select urban geographies we can establish an upper limit to gauge what a normal amount of retail inventory should look like.

Recent retail news headlines have been consistently negative. They are filled with department store closures and bankruptcy filings. The magnitude of these bankruptcies and the shift in consumer shopping preferences towards e-commerce signifies that the retail real estate category is in a period of transformation. In this article, retail benchmarks are estimated by looking at a variety of straight-forward statistics. If nothing else, some of these relationships will reaffirm what we already know, and the correlation between others may provide some previously unknown insights.



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## Northern CA, Bay Area Counties

The nine-county Bay Area is a well-connected geography that is large enough to make inferences from and diverse enough to apply to other areas throughout the country. The relationship between retail square footage and population density (number of people per square mile), retail square footage and purchasing power per square mile, and retail square footage per housing density (number of households per square mile) is shown in the following tables and charts.

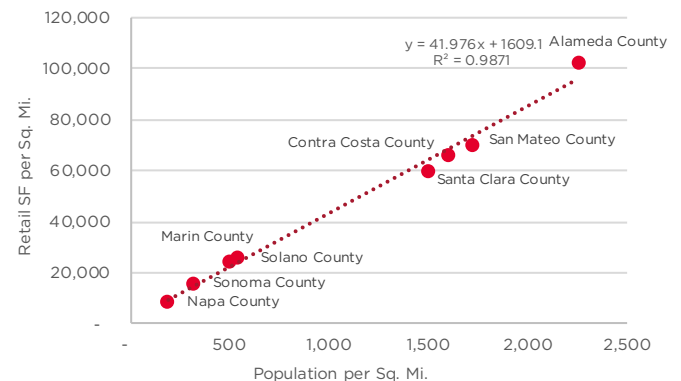
San Francisco County is removed from Charts 1.1 to 1.3 since it distorts the presentation. It is an outlier with nearly 10 times greater population, income, and household density than the second most dense county in the bay area. However, it is interesting to note that if San Francisco County is included in the data set, then the same linear relationship is observed. This is surprising because one would expect economies of scale to have an impact and the relationship to decay; that is, for the relationship to be non-linear or logarithmic. This relationship is shown in Chart 1.4.

### INTERESTING THINGS TO NOTE:

- Excluding San Francisco, total retail square footage per capita in the eight counties ranges from 40.0 to 50.0 square feet per person. The best fit (from linear regression) indicates a relationship of 42.0 square feet per person. San Francisco County indicates 57.7 square feet of retail per capita. This amount is above the range of the other eight-counties and can likely be attributed to San Francisco being a major tourist destination.
- Excluding San Francisco, the range based on purchasing power is 1,134 to 1,998 square feet per \$1 million. The best fit (from linear regression of the eight counties) indicates a relationship of 1,198 square feet per \$1 million. San Francisco County indicates 1,477 square feet per \$1 million. This is within the range of the other eight counties. This result is unexpected given the above average amount of retail square footage per capita.
- Excluding San Francisco, the range for the entire nine counties is 120 to 146 square feet per household. The best fit (from linear regression of the eight counties) indicates a relationship of 126 square feet per household. San Francisco County indicates 142 square feet per household. This amount is near the high end of the range, which we should expect given the other statics presented.

CHART 1.1

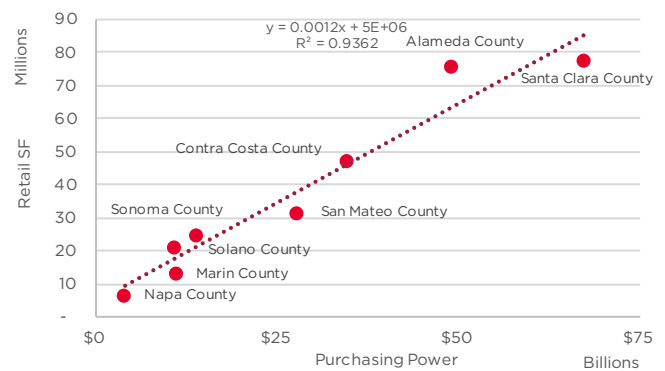
### RETAIL DENSITY AS A FUNCTION OF POPULATION DENSITY (BAY AREA LESS SAN FRANCISCO)



Source: U.S. Census and CoStar Analytics

CHART 1.2

### RETAIL AREA AS A FUNCTION OF PURCHASING POWER (BAY AREA LESS SAN FRANCISCO)



Source: U.S. Census and CoStar Analytics

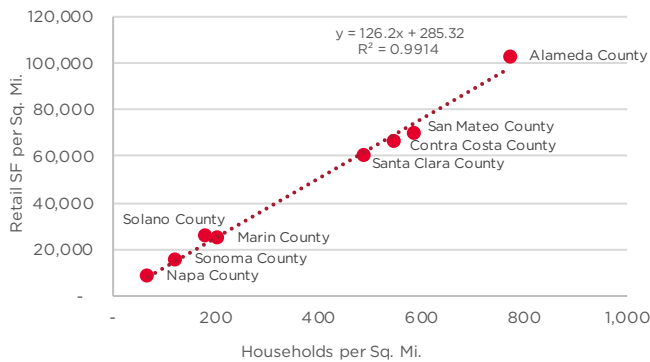
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CHART 1.3

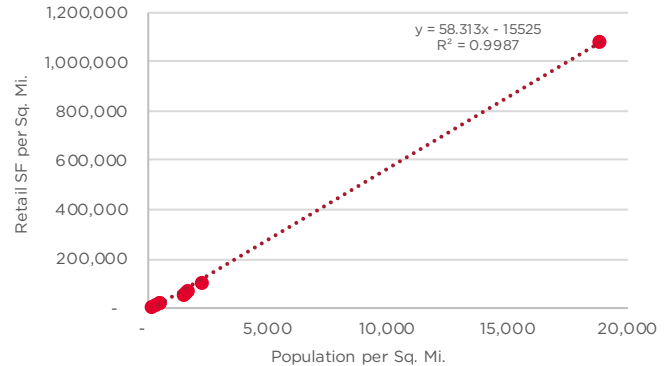
## RETAIL DENSITY AS A FUNCTION OF HOUSING DENSITY (BAY AREA LESS SAN FRANCISCO)



Source: U.S. Census and CoStar Analytics

CHART 1.4

## POPULATION DENSITY VS. RETAIL DENSITY (BAY AREA)



Source: U.S. Census and CoStar Analytics

TABLE 1.1

## STATISTICAL DATA

GEOGRAPHY	POPULATION	HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	PURCHASING POWER (PP)*	TOTAL RETAIL (SQUARE FEET)	LAND AREA (SQUARE MILES)
<b>Northern CA, Bay Area Counties</b>						
Alameda County	1,663,190	569,070	\$85,743	\$48,793,769,010	75,964,273	739.02
Contra Costa County	1,147,439	389,597	\$88,456	\$34,462,192,232	47,589,294	715.94
Marin County	260,955	104,846	\$104,703	\$10,977,690,738	13,049,103	520.31
Napa County	140,973	49,044	\$79,637	\$3,905,717,028	6,454,427	748.36
San Francisco County	884,363	358,772	\$96,265	\$34,537,186,580	51,024,521	46.87
San Mateo County	771,410	261,796	\$105,667	\$27,663,197,932	31,363,368	448.41
Santa Clara County	1,938,153	630,451	\$106,761	\$67,307,579,211	77,554,561	1,290.10
Solano County	445,458	147,352	\$72,950	\$10,749,328,400	21,475,883	821.77
Sonoma County	504,217	190,058	\$71,769	\$13,640,272,602	25,015,870	1,575.85
Min	140,973	49,044	\$71,769	\$3,905,717,028	6,454,427	46.87
Max	1,938,153	630,451	\$106,761	\$67,307,579,211	77,554,561	1,575.85
Average	861,795	300,110	\$90,217	\$28,004,103,748	38,832,367	767.40

Source: U.S. Census Quick Facts and CoStar Analytics – 2019 All Retail Property Types

\* Formula: Product of households and household income



# Is Retail Development Success Related to Housing Density?

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TABLE 1.2

PER UNIT INDICATIONS							
GEOGRAPHY	RETAIL SQ FT PER CAPITA	RETAIL SQ FT PER HOUSEHOLD	RETAIL SQ FT PER \$1M OF PP	POPULATION PER SQUARE MILE	PP PER SQUARE MILE	HOUSEHOLDS PER SQUARE MILE	RETAIL SQ FT PER SQUARE MILE
<b>Northern CA, Bay Area Counties</b>							
Alameda County	45.67	133.49	1,557	2,251	\$66,024,964	770	102,791
Contra Costa County	41.47	122.15	1,381	1,603	\$48,135,587	544	66,471
Marin County	50.01	124.46	1,189	502	\$21,098,366	202	25,079
Napa County	45.78	131.60	1,653	188	\$5,219,035	66	8,625
San Francisco County	57.70	142.22	1,477	18,868	\$736,871,913	7,655	1,088,639
San Mateo County	40.66	119.80	1,134	1,720	\$61,691,751	584	69,944
Santa Clara County	40.01	123.01	1,152	1,502	\$52,172,374	489	60,115
Solano County	48.21	145.75	1,998	542	\$13,080,702	179	26,134
Sonoma County	49.61	131.62	1,834	320	\$8,655,819	121	15,875
Min	40.01	119.80	1,134	188	\$5,219,035	66	8,625
Max	57.70	145.75	1,998	18,868	\$736,871,913	7,655	1,088,639
Average	46.57	130.46	1,486	3,055	\$112,550,057	1,179	162,630

Source: U.S. Census Quick Facts and CoStar Analytics - 2019 All Retail Property Types



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## Southern CA Counties

As we would expect, the same trend is observed throughout the six Southern California counties surveyed. The amount of retail space is highly correlated with population, purchasing power (or household incomes), and number of households.

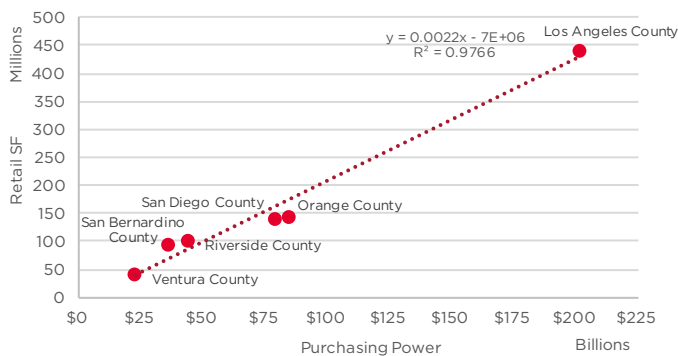
The per unit ranges are tighter in the Southern California counties than in the Bay Area counties. The Southern California counties are also larger, in geography and population.

### INTERESTING THINGS TO NOTE:

- Total retail per capita ranges from 42 to 49 square feet per person. The best fit (from linear regression) indicates a relationship of 45 square feet of retail per person.
- The range based on purchasing power is 1,714 to 2,627 square feet per \$1 million of purchasing power. The best fit (from linear regression) indicates a relationship of 2,157 square feet per \$1 million.
- The amount of retail per household ranges from 126 to 155 square feet per household. The best fit (from linear regression) indicates a relationship of 139 square feet per household.

CHART 2.2

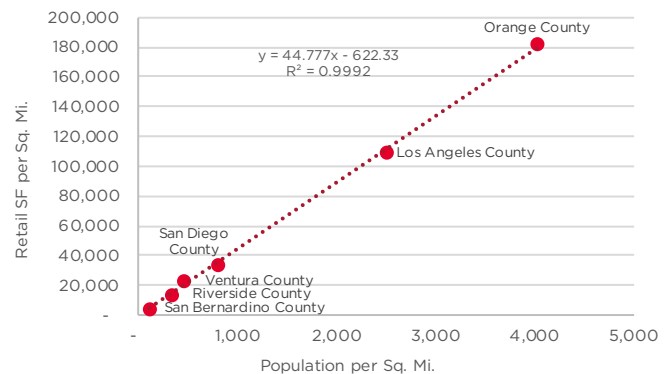
### RETAIL AREA AS A FUNCTION OF PURCHASING POWER (SOUTHERN CALIFORNIA COUNTIES)



Source: U.S. Census and CoStar Analytics

CHART 2.1

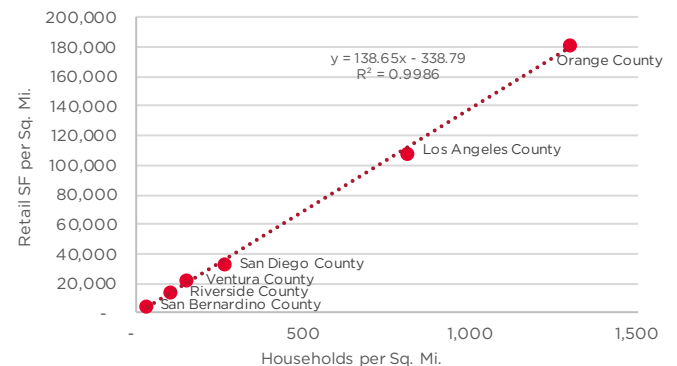
### RETAIL DENSITY AS A FUNCTION OF POPULATION DENSITY (SOUTHERN CALIFORNIA COUNTIES)



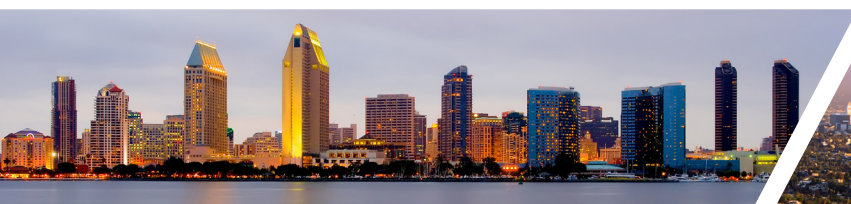
Source: U.S. Census and CoStar Analytics

CHART 2.3

### RETAIL DENSITY AS A FUNCTION OF HOUSING DENSITY (SOUTHERN CALIFORNIA COUNTIES)



Source: U.S. Census and CoStar Analytics





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TABLE 2.1

STATISTICAL DATA						
GEOGRAPHY	POPULATION	HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	PURCHASING POWER (PP)*	TOTAL RETAIL (SQUARE FEET)	LAND AREA (SQUARE MILES)
<b>Southern CA Counties</b>						
Los Angeles County	10,163,507	3,295,198	\$61,015	\$201,056,505,970	440,944,503	4,057.88
Orange County	3,190,400	1,024,976	\$81,851	\$83,895,310,576	143,793,358	790.57
Riverside County	2,423,266	711,724	\$60,807	\$43,277,801,268	101,020,683	7,206.48
San Bernardino County	2,157,404	623,642	\$57,156	\$35,644,882,152	93,643,287	20,056.94
San Diego County	3,337,685	1,111,739	\$70,588	\$78,475,432,532	140,460,290	4,206.63
Ventura County	854,223	270,046	\$81,972	\$22,136,210,712	41,730,399	1,843.13
Min	854,223	270,046	\$57,156	\$22,136,210,712	41,730,399	790.57
Max	10,163,507	3,295,198	\$81,972	\$201,056,505,970	440,944,503	20,056.94
Average	3,687,748	1,172,888	\$68,898	\$77,414,357,202	160,265,420	6,360.27

Source: U.S. Census Quick Facts and CoStar Analytics – 2019 All Retail Property Types

\* Formula: Product of households and household income

TABLE 2.2

PER UNIT INDICATIONS							
GEOGRAPHY	RETAIL SQ FT PER CAPITA	RETAIL SQ FT PER HOUSEHOLD	RETAIL SQ FT PER \$1M OF PP	POPULATION PER SQUARE MILE	PP PER SQUARE MILE	HOUSEHOLDS PER SQUARE MILE	RETAIL SQ FT PER SQUARE MILE
<b>Southern CA Counties</b>							
Los Angeles County	43.39	133.81	2,193	2,505	\$49,547,179	812	108,664
Orange County	45.07	140.29	1,714	4,036	\$106,120,028	1,297	181,886
Riverside County	41.69	141.94	2,334	336	\$6,005,401	99	14,018
San Bernardino County	43.41	150.16	2,627	108	\$1,777,184	31	4,669
San Diego County	42.08	126.34	1,790	793	\$18,655,178	264	33,390
Ventura County	48.85	154.53	1,885	463	\$12,010,119	147	22,641
Min	41.69	126.34	1,714	108	\$1,777,184	31	4,669
Max	48.85	154.53	2,627	4,036	\$106,120,028	1,297	181,886
Average	44.08	141.18	2,091	1,373	\$32,352,515	442	60,878

Source: U.S. Census Quick Facts and CoStar Analytics – 2019 All Retail Property Types

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## New York City – Five Boroughs

New York City is the largest and densest city in the country, by a very large margin. The state of New York was founded in 1776 while California was founded in 1850. So, it is instructive to look to New York to see where these younger California geographies may be heading. Compared to the California geographies, New York has a different climate; it is the center of American finance, has a more robust public transit system, is built taller due to less earthquake risk, and has a different economic base. These are just a few differences, and they are significant. In terms of the statistics that are the focus of this article, we can see just how dense New York is compared to Southern California and the Bay Area. The totals or averages for the areas surveyed are shown in the following table.



TABLE 3.1

TOTALS/AVERAGES						
GEOGRAPHY	POPULATION	HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	PURCHASING POWER (PP)*	TOTAL RETAIL (SQUARE FEET)	LAND AREA (SQUARE MILES)
Northern CA, Bay Area Counties	7,756,158	2,700,986	\$90,217	\$252,036,933,733	349,491,300	6,907
Southern CA Counties	22,126,485	7,037,325	\$68,898	\$464,486,143,210	961,592,520	38,162
Los Angeles County	10,163,507	3,295,198	\$61,015	\$201,056,505,970	440,944,503	4,058
New York City – Five Boroughs	8,622,698	3,142,405	\$57,782	\$181,574,445,710	272,520,180	303

Source: U.S. Census Quick Facts and CoStar Analytics – 2019 All Retail Property Types

\* Formula: Product of households and household income

In the 303 square miles that comprise New York City, there are more people than there are in the entire Bay Area. Los Angeles County is slightly larger than New York City in terms of total population (18%) and households (5%), but it is spread out over 4,058 square miles of land area or 13 times that of New York City. The most noticeable effect of housing and population density can be seen by comparing total retail square feet. Los Angeles County has 62% more retail area than New York City, but only moderately more population, housing, and purchasing power. This strongly suggests that density is a key factor in determining the amount of supportable retail.

As population density and household density continues to increase in Los Angeles and the Bay Area, we should expect retail ratios to trend toward those exhibited in New York City. A table of coefficients for the various relationships will be presented in the conclusion.

The per unit ranges in New York City are wider than those in Southern California and the Bay Area. The large commuter

population, existing infrastructure, population density, and economic industries are some reasons that contribute to these discrepancies.

### INTERESTING THINGS TO NOTE:

- Total retail per capita ranges from 22 to 37 square feet per person. The best fit (from linear regression) indicates a relationship of 34 square feet per person.
- The range based on purchasing power is 917 to 1,923 square feet per \$1 million of purchasing power. The best fit (from linear regression) indicates a relationship of 1,146 square feet per \$1 million. The amount of retail area as a function of purchasing power is not a good predictor with a correlation factor of 0.61.
- The amount of retail per household ranges from 66 to 106 square feet per household. The best fit (from linear regression) indicates a relationship of 70 square feet per household.

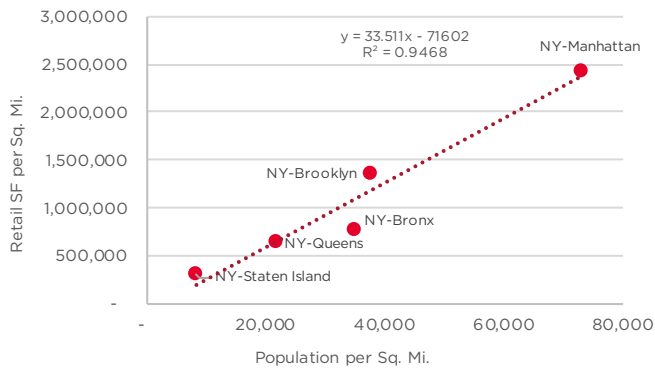
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CHART 3.1

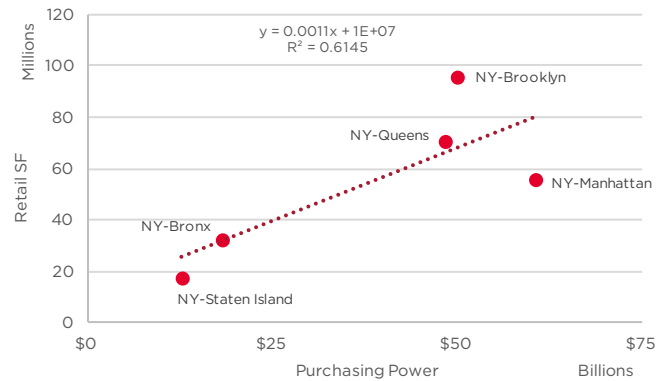
**RETAIL DENSITY AS A FUNCTION OF POPULATION DENSITY  
(NEW YORK CITY - FIVE BOROUGHES)**



Source: U.S. Census and CoStar Analytics

CHART 3.2

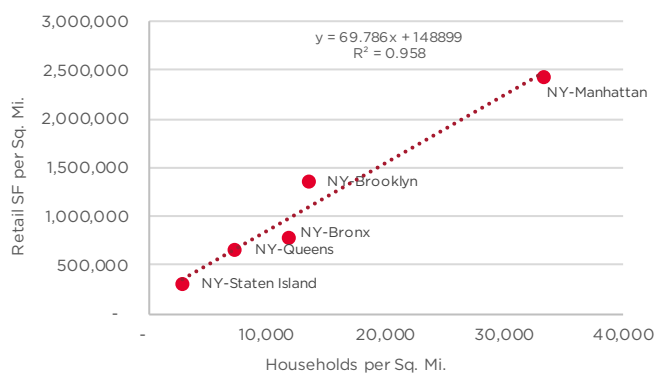
**RETAIL AREA AS A FUNCTION OF PURCHASING POWER  
(NEW YORK CITY - FIVE BOROUGHES)**



Source: U.S. Census and CoStar Analytics

CHART 3.3

**RETAIL DENSITY AS A FUNCTION OF HOUSING DENSITY  
(NEW YORK CITY - FIVE BOROUGHES)**



Source: U.S. Census and CoStar Analytics





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TABLE 2.1

STATISTICAL DATA						
GEOGRAPHY	POPULATION	HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	PURCHASING POWER (PP)*	TOTAL RETAIL (SQUARE FEET)	LAND AREA (SQUARE MILES)
<b>New York City – Five Boroughs</b>						
Combined	8,622,698	3,142,405	\$57,782	\$181,574,445,710	272,520,180	302.65
NY – Bronx	1,471,160	495,356	\$36,593	\$18,126,562,108	32,646,139	42.10
NY – Brooklyn	2,648,771	944,650	\$52,782	\$49,860,516,300	95,861,219	70.82
NY – Manhattan	1,664,727	758,345	\$79,781	\$60,501,522,445	55,450,890	22.83
NY – Queens	2,358,582	777,904	\$62,008	\$48,236,271,232	70,946,825	108.53
NY – Staten Island	479,458	166,150	\$76,244	\$12,667,940,600	17,615,107	58.37
Min	479,458	166,150	\$36,593	\$12,667,940,600	17,615,107	22.83
Max	2,648,771	944,650	\$79,781	\$60,501,522,445	95,861,219	108.53
Average	1,724,540	628,481	\$61,482	\$37,878,562,537	54,504,036	60.53

Source: U.S. Census Quick Facts and CoStar Analytics – 2019 All Retail Property Types

\* Formula: Product of households and household income

TABLE 2.2

PER UNIT INDICATIONS							
GEOGRAPHY	RETAIL SQ FT PER CAPITA	RETAIL SQ FT PER HOUSEHOLD	RETAIL SQ FT PER \$1M OF PP	POPULATION PER SQUARE MILE	PP PER SQUARE MILE	HOUSEHOLDS PER SQUARE MILE	RETAIL SQ FT PER SQUARE MILE
<b>New York City – Five Boroughs</b>							
Combined	31.60	86.72	1,501	28,491	\$599,948,606	10,383	900,447
NY – Bronx	22.19	65.90	1,801	34,944	\$430,559,670	11,766	775,443
NY – Brooklyn	36.19	101.48	1,923	37,401	\$704,045,698	13,339	1,353,590
NY – Manhattan	33.31	73.12	917	72,918	\$2,650,088,587	33,217	2,428,861
NY – Queens	30.08	91.20	1,471	21,732	\$444,451,039	7,168	653,707
NY – Staten Island	36.74	106.02	1,391	8,214	\$217,028,278	2,846	301,784
Min	22.19	65.90	917	8,214	\$217,028,278	2,846	301,784
Max	36.74	106.02	1,923	72,918	\$2,650,088,587	33,217	2,428,861
Average	31.70	87.55	1,500	35,042	\$889,234,654	13,667	1,102,677

Source: U.S. Census Quick Facts and CoStar Analytics – 2019 All Retail Property Types

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## Conclusion

This empirical analysis is a powerful benchmark. It is simple to understand, easy to aggregate, and the implication is straightforward. The urban markets surveyed currently support about 22 to 58 feet of retail per person, or 66 to 155 feet of retail per household. This information was taken at the county level, but as a rule of thumb it should stand up when applied to large submarkets and large cities. A three-mile radius is too narrow of a geography to apply this benchmark. Of course, if we examine a premier location, especially those with high levels of tourism, then these benchmarks do not apply. In those areas without compelling stories and above average ratios, expect persistent weakness in the retail sector and repurposing of existing properties.

Across the three areas surveyed, household density is the best indicator of supportable retail area. As the population and number of households increases there should be an increase in retail area demanded, but as density increases the ratio should decline. All of the areas surveyed are presented in the following table and are organized by increasing household density.

TABLE 4.1

RETAIL PER HOUSEHOLD ACROSS ALL AREAS					
SUBAREA	RETAIL SQUARE FEET	TOTAL HOUSEHOLDS	LAND AREA (SQUARE MILES)	HOUSEHOLDS PER SQUARE MILE OF LAND	RETAIL SQUARE FEET PER HOUSEHOLDS
San Bernardino County	93,643,287	623,642	20,057	31	150
Napa County	6,454,427	49,044	748	66	132
Riverside County	101,020,683	711,724	7,206	99	142
Sonoma County	25,015,870	190,058	1,576	121	132
Ventura County	41,730,399	270,046	1,843	147	155
Solano County	21,475,883	147,352	822	179	146
Marin County	13,049,103	104,846	520	202	124
San Diego County	140,460,290	1,111,739	4,207	264	126
Santa Clara County	77,554,561	630,451	1,290	489	123
Contra Costa County	47,589,294	389,597	716	544	122
San Mateo County	31,363,368	261,796	448	584	120
Alameda County	75,964,273	569,070	739	770	133
Los Angeles County	440,944,503	3,295,198	4,058	812	134
Orange County	143,793,358	1,024,976	791	1,297	140
NY - Staten Island	17,615,107	166,150	58	2,846	106
NY - Queens	70,946,825	777,904	109	7,168	91
San Francisco County	51,024,521	358,772	47	7,655	142
NY - Bronx	32,646,139	495,356	42	11,766	66
NY - Brooklyn	95,861,219	944,650	71	13,339	101
NY - Manhattan	55,450,890	758,345	23	33,217	73

Source: U.S. Census Quick Facts and CoStar Analytics - 2019 All Retail Property Types



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The geography with the lowest housing density (San Bernardino County) has 31 households per square mile and 150 square feet of retail per household. The area with the highest housing density (Manhattan) has 33,217 households per square mile and supports 73 square feet of retail per household. At the extreme

end, household density increases by a factor of over 1,000, but the amount of retail per household only halves.

A summary of all the ratios described in this article are summarized in the following table.

TABLE 4.2

SUMMARY				
GEOGRAPHY	MIN	MAX	AVERAGE	BEST FIT
<b>Northern CA, Bay Area Counties</b>				
Retail SF per Capita	40	50	47	42
Retail SF per \$1M of PP	1,134	1,998	1,486	1,198
Retail SF per Household	120	146	130	126
<b>Southern CA Counties</b>				
Retail SF per Capita	42	49	44	45
Retail SF per \$1M of PP	1,714	2,627	2,091	2,157
Retail SF per Household	126	155	141	139
<b>New York City – Five Boroughs</b>				
Retail SF per Capita	22	37	32	34
Retail SF per \$1M of PP	917	1,923	1,500	800
Retail SF per Household	66	106	88	70

Source: US Census Quick Facts, Costar Analytics – 2019

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