Appendix D

Research Methods for the Performance Analysis

The initial analysis for the 10 largest (first-tier) office markets was completed for two purposes:

1. To compare first-tier CBDs to their suburbs in markets that contained almost half of the national office inventory (47 percent); and

2. To assess the differences between using the entire inventory of office space and Class A office space only.

The measures for first-quarter 2013 rents, first-quarter 2013 vacancy rates and eight-year absorption rates shown in Figures 6 and 7 were used to compare CBDs to their suburban areas for the entire inventory and for Class A office space. The results for Class A space (more homogeneous, newer inventory with larger buildings) were very close to the results for all existing office space. Although no formal statistical tests were used given the small number of observations, these similar results suggested that Class A space need not be analyzed separately. The sources were CoStar's first-quarter 2013 report for the national office market and its property analysis database, which is organized by market and submarket.

The original research design called for three comparisons in 33 second- and third-tier office markets where NAIOP members were active: 1) suburban vibrant centers to entire suburban areas, 2) suburban vibrant centers to CBDs and 3) CBDs to their surrounding suburban areas. The comparisons between vibrant centers and suburbs and between vibrant centers and CBDs generated definitive results, but the CBD-suburban comparisons were ambiguous. This initial analysis is summarized in Appendix F.

The PI therefore decided to directly compare CBDs to their suburbs in the largest office markets, those with rentable building area (RBA) of at least 60 million square feet. It also made sense to find the best examples of suburban vibrant centers across all markets in the continental U.S. and to compare each to a nearby typical suburban office park or submarket. This meant that many vibrant centers in first-tier markets would be included. Therefore, the report includes two statistical analyses of performance:

1. CBD to suburban comparisons for the 45 largest office markets with RBA over 60 million square feet; and

2. Suburban vibrant centers to comparable suburban office parks or submarkets for the best examples of suburban vibrant centers, which totaled 42.

All three analyses used the seven measures described in the "Measures" section below.

Database

To identify office properties, we used CoStar data, which provides information on commercial properties including over 10 billion square feet of office space in the U.S., to identify office properties. The database includes most urban office space and virtually all of the nation's 3.2 billion square feet of Class A space. CoStar provided access to its database through its CoStar University Program, and CoStar is cited throughout this report as the source of this data.

CoStar offers access to its data for different geographic configurations. One set is official delineations: state, county, city, ZIP code and census-defined metro areas. The other set is market driven. Market data are provided for 142 U.S. office markets, which are functional economic areas. Submarket data are available for each market area at two levels. Submarkets subdivide the office market into mutually exclusive subareas that may serve different market segments. Submarkets are grouped in larger CoStar-defined submarket clusters.

CoStar provides three functions to customize spatial delineations: "radius," "polygon" and "corridor." We used "radius" to define suburban vibrant centers and suburban office environments. These areas are circles with a radius of a half mile around an address at the center of the vibrant center (or suburban office park). In a few instances, we used the "corridor" function

when the suburban vibrant center (or suburban office park) is configured as a corridor (for example, as an area along a light-rail line that includes several stops). We used 500,000 square feet of RBA as the minimum size threshold. This threshold increased the reliability of the measures by assuring that each suburban vibrant center contained multiple office buildings; performance measures should not be based on one or two office buildings.

Geographic Areas

The research focused on three geographic areas: CBDs, suburban areas and suburban vibrant centers. CBDs are the core areas associated with downtowns, and usually are the oldest development in the region. Suburbs are the lower-density areas surrounding the CBD. All markets also contain non-CBD urban development (development that is outside the CBD but is more urban than suburban in character).

This research tested the usefulness of culling out non-CBD urban office space in first-tier markets. For example, in Chicago, all submarkets from West North Avenue above the Loop to I-55 on the South Side were removed from the suburban portion of the market. In San Francisco, all submarkets above Dale City were considered part of urban San Francisco and, again, removed from the tally of suburban office space. In these markets and in all other first-tier markets, removing non-CBD urban office space from the suburban portion of the market resulted in minor differences. Therefore, to include the entire market in the analysis, we studied CoStar-defined CBDs and the remainder of the market area (the suburban area). We consulted CoStar's research director on these geographic definitions of subareas, and he concurred with this approach, indicating that CoStar takes the same approach when producing its quarterly market reports.

In most markets, one submarket was identified as the CBD. In a few, the market area delineated by CoStar included two major CBDs. These CBDs were combined into one downtown/CBD area for that market. Some markets contain submarkets outside the major CBD that are defined specifically by CoStar as "downtown" or "CBD." These areas are relatively dense clusters of office space located within smaller cities that are part of the larger market area; for example, Long Beach in the LA market and downtown Burlington in Greensboro, North Carolina. Any submarket with this designation was not included in the suburban tally. The CBD definitions are presented in Appendix E.

Suburban vibrant centers, as discussed more fully in Appendix G, are the third type of geographic area studied. All of the vibrant centers studied are located outside CBDs and therefore part of suburban areas. The relatively small amount of office space in these centers was not pulled out of the suburban area statistics, since their small size would have minimal impact on the suburban measures.

The number of suburban vibrant centers in each of the 33 second- and third-tier markets ranges from one to three. They are listed in Appendix G. The 42 best examples of suburban vibrant centers are located in all three market tiers. These were identified as either suburban redevelopment or established town center. Both types of suburban vibrant center included some examples of transit-oriented development, as shown in Figures 15 and 16.

To summarize, CoStar divides each market into submarkets (and groupings of submarkets called submarket clusters). In most markets, one submarket (or cluster) is designated as the CBD or downtown. (In a few instances, an additional CBD or downtown may be identified.) CoStar classifies all other submarkets as suburban. Suburban vibrant centers are areas with a half-mile radius and at least 500,000 square feet of office space located in a suburban area.

Time Frame

Data were compiled for an eight-year period, from the first quarter of 2005 through 2009 and 2013. The first quarter of 2009 was the mid-point of the recent Great Recession; the first quarter of 2005 is 16 quarters (four years) earlier. The first quarter of 2013 is 16 quarters (four years) later, and was the most recent quarterly data available in June through August 2013, when the data were compiled. Over the course of the study, CoStar reported data for the second, third, and fourth quarters of 2013 as well as the first and second quarters of 2014.

Measures

CoStar measures the rentable building area (RBA) of office space, which consists of usable/rentable private space and assignable interior common areas. We compiled the following seven measures for each of the three geographic areas. (Median days vacant initially was included but ultimately was dropped from the analysis.)

1. **Asking rental rate in the first quarter of 2013.** CoStar finds the range and average quoted or asking rent for each office space and estimates the weighted average for the property and then for the market or submarket under study. Rent is the annual cost of occupancy per square foot per year converted to a full-service equivalent. Most office leases are written as full-service leases.

2. **Vacancy rate in the first quarter of 2013.** Vacancy rate is the amount of physically vacant space divided by total existing inventory, expressed as a percentage. CoStar carefully tracks relet and sublet space to determine whether space advertised as available is occupied or not.

3. **Absorption.** Absorption is the best measure of demand for office space. In this study, absorption is defined in relative terms as a rate of growth. The absorption rate is the physically occupied square footage in the first quarter of 2013 divided by the amount of space occupied in the first quarter of 2005. This ratio gives the rate of change in occupancy or absorption rate for this eight-year period. In markets with time series less than eight years, the absorption rate was scaled up to an eight-year equivalent. Thus, the measures represent an eight-year growth rate of realized space demand.

4. **Change in average rents after the Great Recession** (first-quarter 2009 to first-quarter 2013). All four change measures are shown as percentages. The difference between first-quarter 2013 rents and first-quarter 2009 rents divided by first-quarter 2009 rents is the rate of change since the Great Recession, which is centered at the first quarter of 2009.

5. **Change in average rents since 2005** (first-quarter 2005 to first-quarter 2013). The difference between first-quarter 2013 rents and first-quarter 2005 rents divided by first-quarter 2005 rents is the rate of change over the past eight years, which encompasses a full office market cycle reflecting a rise, peak, decline and slow rebound in demand and rents.

6. **Change in vacancy rate after the Great Recession** (first-quarter 2009 to first-quarter 2013). The difference between the first-quarter 2013 vacancy rate and the first-quarter 2009 vacancy rate divided by first-quarter 2009 vacancies is the rate of change since the Great Recession.

7. **Change in vacancy rate since 2005** (first quarter 2005 to first-quarter 2013). The difference between the first-quarter 2013 vacancy rate and the first-quarter 2005 vacancy rate divided by first-quarter 2005 vacancies is the rate of change in vacancies over the past eight years.

We used the CoStar submarkets database to generate results for CBDs and suburban areas. We used the radius function (described above) to generate results for each suburban vibrant center. In the analysis of 33 areas, measures for areas with two or three vibrant centers were found by calculating an average that was not weighted by the vibrant center's size (RBA). The absorption rate was found by adding occupancy in the two periods for all vibrant centers and measuring one overall absorption rate.

Difference-of-means tests were replicated for the seven performance measures listed above with different combinations of subareas. Each market represents one unit of analysis, regardless of size, and therefore has equal influence on the results.

Performance Analysis Explanation

We initially identified 45 metro areas in the 28 states with NAIOP chapters, with the exception of Hawaii. Three office markets (Detroit, Kansas City and St. Louis) were added to account for all markets with more than 100 million square feet of RBA in the first quarter of 2013. Another three (Richmond, Virginia, San Antonio and Western Michigan) were included to account for all office markets with more than 60 million square feet of RBA. Two more (Long Island and Orange County) were needed to complete the New York and Los Angeles markets, respectively. We used market data and submarket data to compile the measures for CBDs and suburban areas in these 53 markets. (See Appendix C for the complete list.) As noted, we used CoStar's radius (or corridor) function to define the suburban vibrant centers and the suburban office areas that were paired with the vibrant centers.

The first analysis used statistical tests to compare CBDs to suburban areas in the 45 markets with more than 60 million square feet of office space. This analysis answered the following question: Is downtown office space outperforming office space in the suburbs?

In the second analysis, we matched 42 examples of suburban vibrant centers, including 28 in first-tier markets, to suburban office areas to find suburban environments that were good comparisons to these vibrant centers. For each of the 21 suburban revitalized centers, we identified a suburban office park or office corridor with RBA of at least 1 million square feet as its comparable (comp). These are single-use, auto-dependent, low-density areas that could be called "plain vanilla" suburban office space. Office parks serving major institutions such as hospitals, universities or government agencies were avoided. Each office area is in the same quadrant of the market and has similar regional access to workers and households as the vibrant centers. The major difference is that these suburban locations rely on auto access via highways, whereas the vibrant centers are oriented to transit to the extent it is available in the region. The seven measures were calculated for each suburban vibrant center and suburban office park, and differences were computed for each suburban vibrant center-suburban office park pairing.

For the 21 vibrant centers that were in established towns and small cities, we used the remainder of the suburban submarkets in which they are located as the comp. For the residual area, each measure represents the difference between the measure for the entire submarket and the measure for the half-mile circle around the established town center. This approach of comparing an established center to its surrounding suburban area is the same as the approach taken in the first analysis, where the CBDs are compared to their suburban areas, which is the area that remains after extracting the CBD from the market area.

The differences computed for both groups of suburban vibrant centers were subjected to formal tests to determine their statistical significance.

The other analysis, reported in Appendix F, compared 33 second-tier and third-tier markets.