

National and Metro Predictors of Commercial Real Estate Development

January 2009

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January 2009

**Prepared for and Funded by
the NAIOP Research Foundation**

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NAIOP, the Commercial Real Estate Development Association, is the leading organization for developers, owners and related professionals in office, industrial and mixed-use real estate. NAIOP comprises 17,500 members in North America. NAIOP advances responsible commercial real estate development and advocates for effective public policy. For more information, visit www.naiop.org visit www.naiop.org.

The NAIOP Research Foundation was established in 2000 as a 501(c)(3) organization to support the work of individuals and organizations engaged in real estate development, investment and operations. The Foundation's core purpose is to provide these individuals and organizations with the highest level of research information on how real properties, especially office, industrial and mixed-use properties, impact and benefit communities throughout North America. The initial funding for the Research Foundation was underwritten by NAIOP and its Founding Governors with an endowment fund established to fund future research. For more information, visit www.naiopr.org.

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National Executive Summary

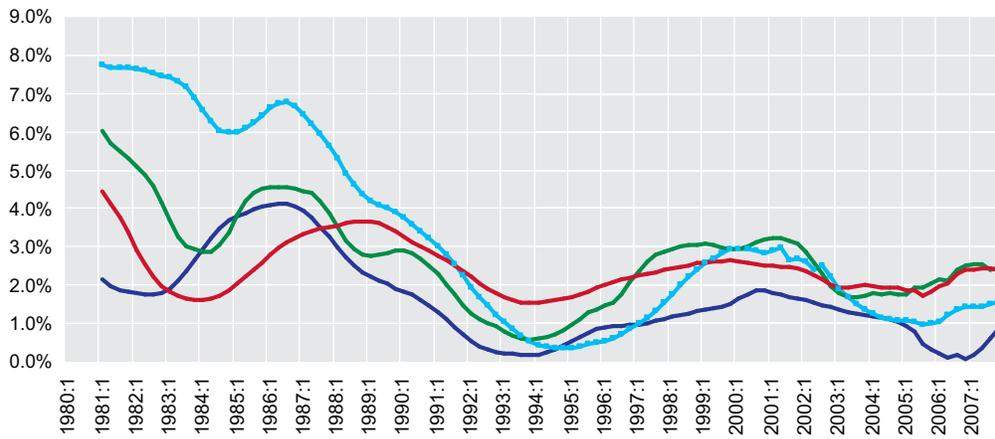
Real estate industry professionals know that real estate development logically comes from demand for space in the marketplace. But is there a specific economic tool for predicting commercial real estate development in the four major commercial property types – office, warehouse, retail and apartments – at the national level? Our study examined this question and provides key macro economic variables that historically drive demand for real estate.

Economic data was collected from various government and private sources and has provided a relatively broad sampling of more than 50 available economic variables that might logically predict commercial real estate development. Construction completions were used in this study as the best indicator of new development put into service. The study identifies completions as the annual percentage change in total stock available for each of the property types. By using these variables rather than construction starts or permits, a better representation of completed development and therefore competitive stock in the marketplace is obtained. Data is also “lagged” to simulate the economic variable occurring before the actual project being completed a number of quarters in the future, signaling that the variable helped stimulate the project’s starting a certain number of quarters earlier. We assume that developers will project the economic conditions that should be in place when their project is finished, as that is the environment their project will have to compete in for tenants upon completion.



Exhibit 1 shows Office stock growth has been cyclical, growing at an annual rate as high as 8 percent in the early 1980s to as low as 0.25 percent in the early 1990s. Warehouse stock has grown from a high of 6 percent to a low of 0.5 percent; retail stock's growth range has been 4.5 percent to 1.5 percent; and apartments' growth range has been 4.2 percent to 0.1 percent. Theoretically these cyclical growth patterns for the property types follow major economic cycles, and this research tests these relationships.

Exhibit 1
Annual Percentage Change in Total Stock

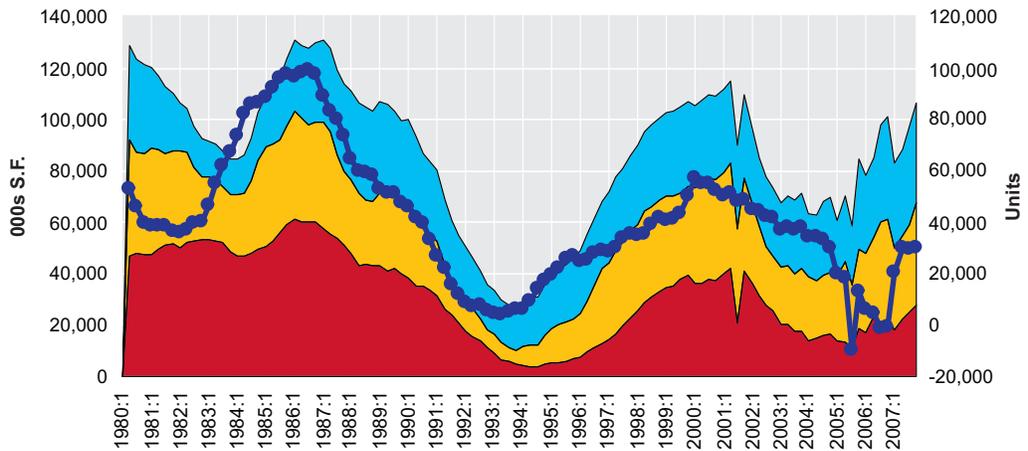


Source: Property and Portfolio Research



Exhibit 2 compares aggregate commercial completions in actual square feet (office, warehouse and retail) and units (apartment) during the time period 1980 to 2007. Although there are slight differences in the timing of each property type reaching a cyclical peak or bottom, it is clear that the property types do have similar cyclical patterns.

Exhibit 2
Quarterly Commercial Completions



Source: Property and Portfolio Research

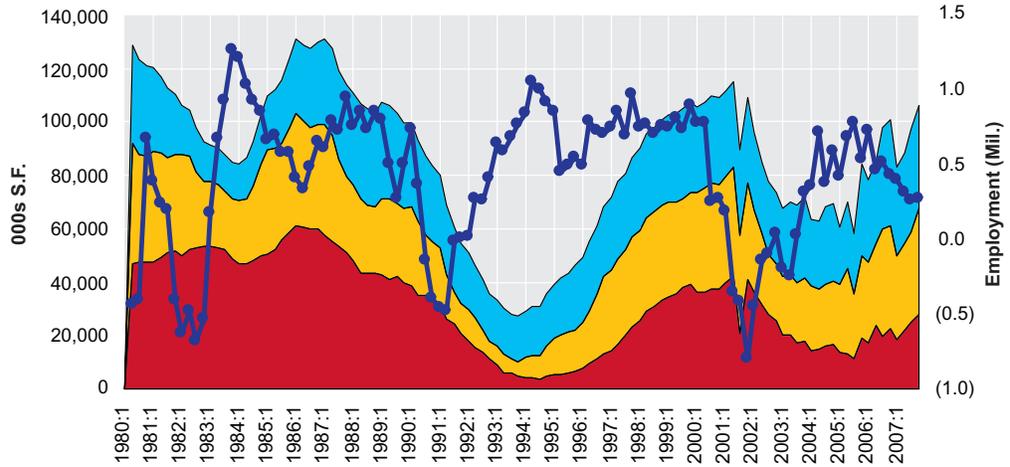


Economic Indicators That Foreshadow Commercial Construction

The economic variables studied in this report yield varying results in their ability to predict development of commercial properties. Through both visual and statistical analysis of the relationships between economic indicators and commercial stock growth, it is likely that some of the economic indicators in this study will provide good insight into the future development of commercial properties. Our visual analysis of real estate completions showed the cyclical nature of development, with all four property types' completions peaking in 1986-1987 and 2001, and bottoming between 1993-1994 and 2005. We also found that peaks and bottoms in completions tended to happen earlier in apartment and warehouse than in office and retail, which could be due to a shorter development time for apartment and warehouse completion. It does appear that developers are reacting to positive economic indicators in unison in all four property types.

Exhibit 3 shows that the peaks and troughs for the economic indicator employment growth (non-farm) consistently occur before the peaks and troughs for completions of the three commercial property types. **Although not having a consistent lag time between peaks and bottoms in each cycle, employment growth appears to lead to increases in completions of the three property types two to four years later.** Visually, this provides some insight into the research question of this study, "Are there economic indicators that precede commercial real estate development?" Exhibit 3 shows that there is a relationship between the addition of new jobs and development of new space. Since real estate development takes more than one year to complete on a typical commercial property, it appears that the start of development happens during periods of strong employment growth (job additions) while the completion of the projects sometimes occur during periods of less favorable employment conditions. Many economic variables are analyzed to determine if other variables also help to explain development starts and new completions in the future.

Exhibit 3
Commercial Completions and Employment Growth



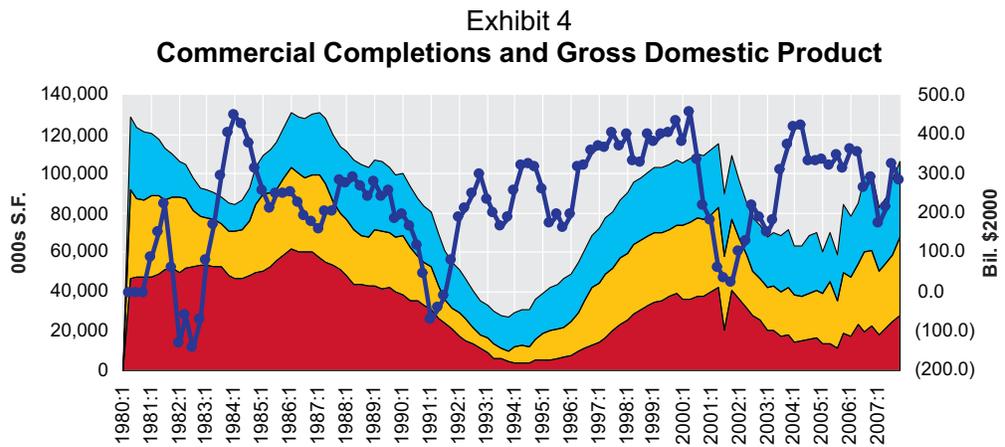
Source: Property and Portfolio Research, BLS



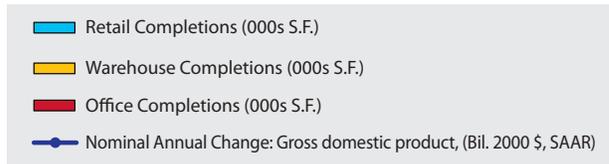
Note: Annual change indicates the actual # change in the economic indicator, in this case, employees.



Exhibit 4 shows that Gross Domestic Product (GDP) and commercial completions appear to have a strong relationship, with positive GDP change leading completions by two to four years, indicating development starts most likely occur around the time GDP growth is strong or expected to be strong. Again, this relationship is logical and used to justify new development by real estate developers.



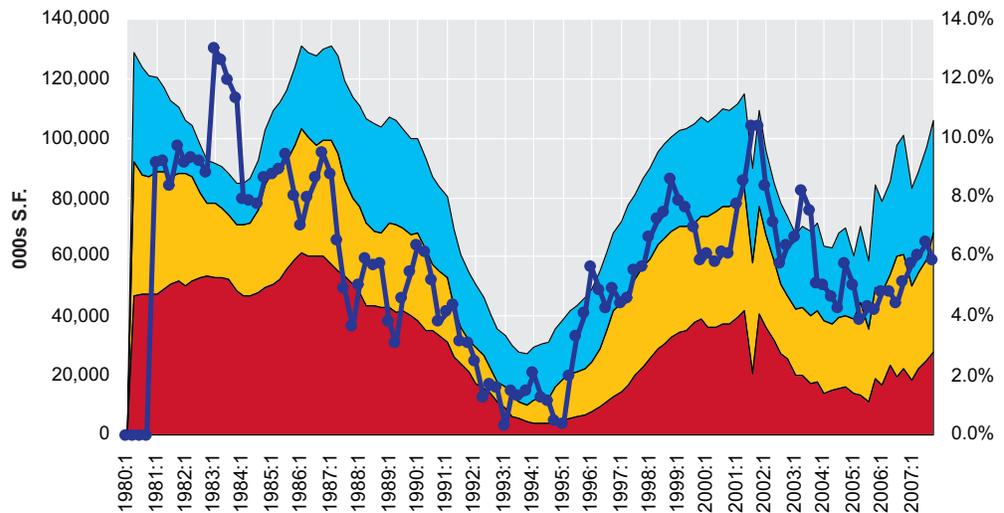
Source: Property and Portfolio Research, BEA



Note: Nominal change indicates the actual # change in the economic indicator, in this case, GDP in U.S. dollars.

Exhibit 5 shows that change in money stock, “M2,” appears to have a remarkably similar cycle to that of real estate completions. Money stock appears to be more in step with commercial property completions than commercial starts. While this may be an indicator of some other economic forces at play, for this study, it appears that change in money stock may not be a leading indicator of development, but a coincident indicator of commercial stock growth.

Exhibit 5
Commercial Completions and Money Stock



Source: Property and Portfolio Research, Federal Reserve

- Retail Completions (000s S.F.)
- Warehouse Completions (000s S.F.)
- Office Completions (000s S.F.)
- Annual Percent Change: Money Stock: M2, (SA Billions \$)

Note: Money stock is a measure of money within an economy at a specific point in time. M2 is the second broadest measure of money stock, and includes physical currency (M0), demand deposits (i.e. checking accounts, M1), and time deposits, savings deposits, and non-institutional money market deposits (M2). M2 is used to measure the amount of money in circulation in the economy, and is a key economic indicator used to forecast inflation.



Conclusion

Office development is best predicted by change in:

- money stock;
- employment in financial activities;
- commercial and industrial loans;
- inflation (excluding food and energy).

*These variables were good predictors of changes in office stock **two years** in the future. The office model predicts that office stock growth should grow at approximately 2.5 percent in 2009.*

Warehouse development is best predicted by change in:

- total population;
- money stock;
- inflation (including food and energy);
- office-using employment.

*These variables provided good predictions of warehouse stock growth **four quarters** in the future.*

Retail development is best predicted by change in:

- real estate loans;
- employment growth in trade, transportation and utilities;
- employment growth in financial activities.

*These variables predicted retail stock growth **eight quarters** in the future.*

Apartment development is best predicted by change in:

- total population;
- GDP growth;
- real estate loans;
- money stock.

*These variables predicted apartment stock change **four quarters** in the future. However, it should be noted that new growth is likely to return as the subprime crisis works its way out of the residential market.*

MSA Executive Summary

There are more than 360 Metropolitan Statistical Areas (MSA) in the U.S. and more than 50 that are large enough to attract institutional investor interest. This MSA study could create more than 200 models for the four major property types if 50 MSAs were studied. Instead, the study grouped MSAs by similar economic base industries (industries that drive the cities economic growth, such as the manufacturing sector driving Detroit, Mich., while the finance industry drives New York). The MSA study analyzed whether the available local economic indicators are highly correlated with the local development growth for city groups over time.

The dominant economic base industries in any given MSA may influence the degree of correlation (how closely two or more time-series trend together) between the economic indicators and commercial stock growth. Each MSA has its own unique attributes that should be analyzed when doing a development forecast. Some economic variables lead new supply in certain cities while others seem to move in concert with new supply. It may be that the space must be completed before the employees can be hired and that is why employment growth does not lead real estate supply growth.

Our hypothesis is that the economic indicators that are best at predicting commercial real estate development will be slightly different for each MSA, but that the several indicators that were significant in this study are a good starting point for developing metropolitan level models of commercial real estate growth. The analysis of MSAs with the same economic base industries yielded some insight into the drivers of commercial stock growth across these MSAs.

- Overall, **employment growth** in the various economic base industries yielded the highest correlations with office and warehouse stock growth, and less so with apartment and retail stock growth.
- Of the five strongest economic indicators, the local population age group of **people between the ages of 25 to 34** yielded the high correlations with commercial stock growth (mainly office, warehouse and apartment) across all MSAs.
- In some cases **gross metro product**, GMP – GDP for a specific MSA – and **population growth** also yielded high correlations, indicating that these economic indicators may be leading or coincident indicators of new commercial stock growth in many MSAs.



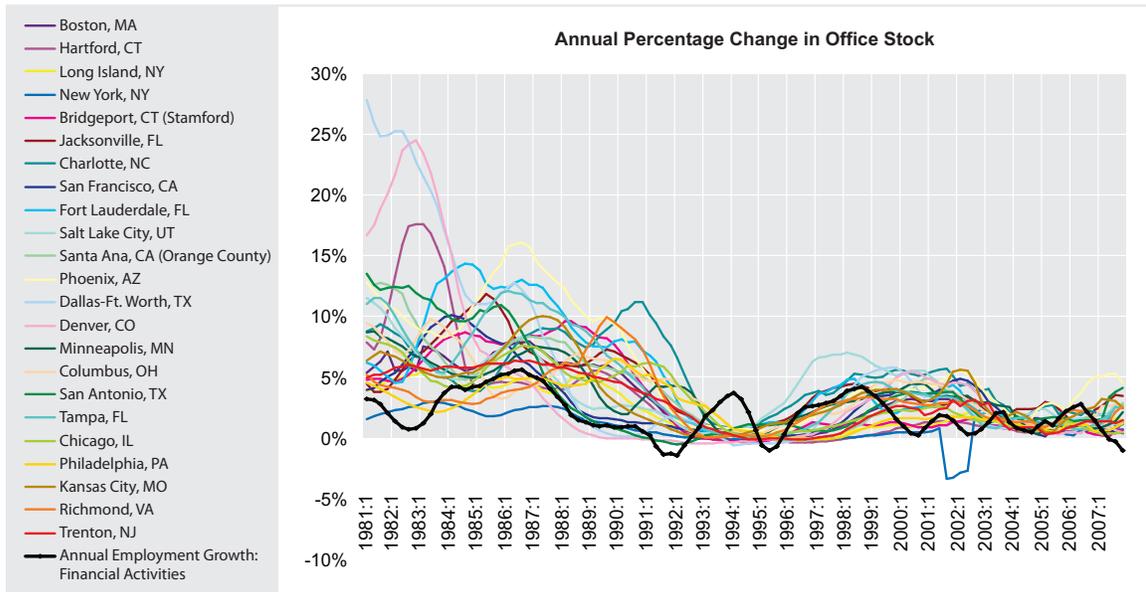
Location Quotient Analysis

Dominant economic base industries were determined using location quotient analysis. An MSA's location quotient in a particular industry is calculated by taking the percentage of total MSA employment concentrated in one industry and dividing it by the percentage of national employment concentrated in the same industry. For example, if employment in financial activities for the U.S. was 10 percent of total employment, and New York City had 15 percent of total employment concentrated in financial activities, New York City would have a location quotient of 1.5 in financial activities.

Location Quotient = MSA percentage of total employment in an industry sector / National percentage of total employment in an industry sector.

For the purposes of this study, if an MSA had a location quotient of 1.2 or greater (thus a 20 percent higher industry employment concentration than the U.S. average) in a given industry, it was considered an economic base industry. Dominant Economic Base industry groups are shown in Exhibits 1 through 8. Note that the purpose of all graphs below is not to clearly identify each MSA's stock growth, but to visually display the overall trend of the stock growth in MSAs within an economic base industry. MSAs are listed in each graph in descending order of location quotient, with the highest location quotient MSAs in each base industry listed first in each graph's legend.

Exhibit 1 Financial Activities MSAs

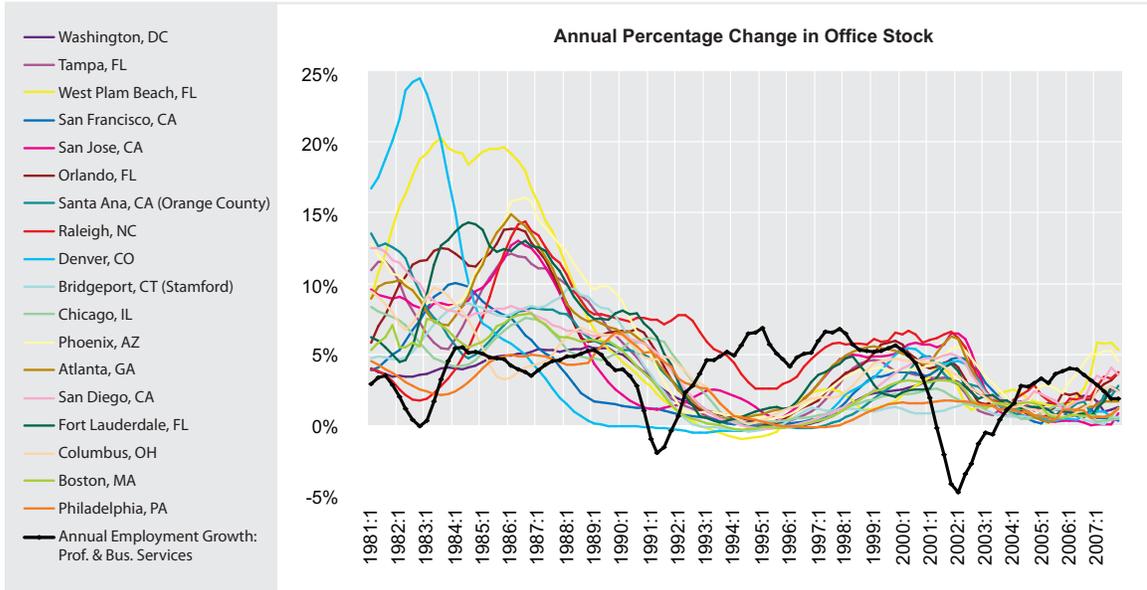


Source: Property and Portfolio Research

Exhibit 1 shows that annual percentage change in office stock for cities with financial activities as an economic base industry have generally trended together since the mid 1980s. Declining financial activities employment from 1986 to 1992 seems to lead or be concurrent with a majority of the cities decline in development growth in the second half of the 1980s and a bottom in 1994. The employment growth from mid 1995 to 1999 also appears to lead or be concurrent with stock growth, indicating that employment growth in this sector has tracked in similar cycles to office development in these cities.



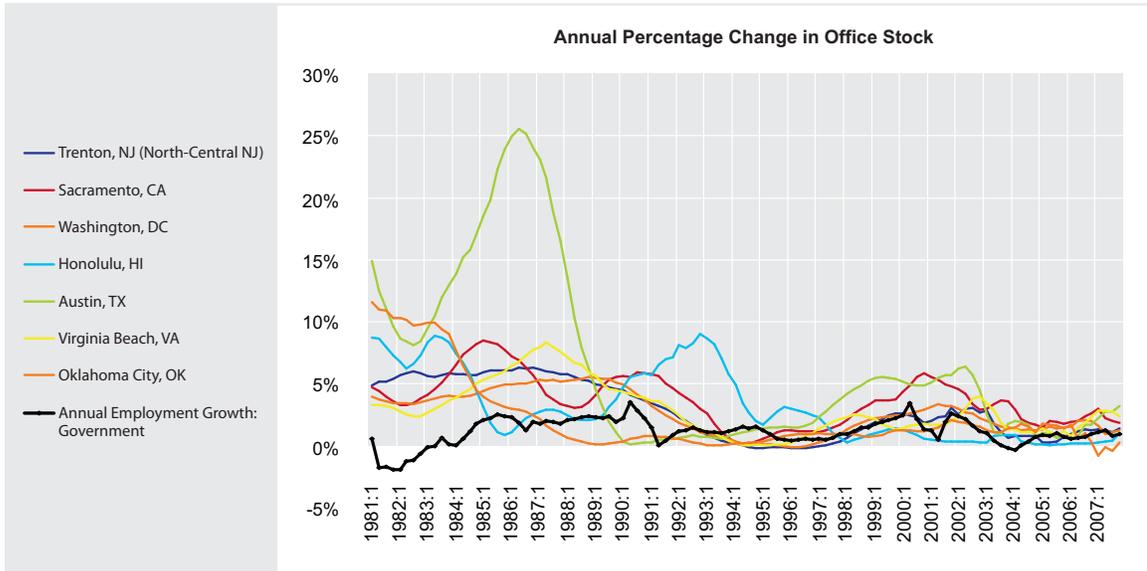
Exhibit 2 Professional and Business Services MSAs



Source: Property and Portfolio Research

Exhibit 2 shows that space growth across professional and business economic base MSAs have been mostly trending together since the mid 1980s. A peak in professional and business services employment growth in 1998 is shown to precede peaks in many of the metros shown above in 2000 and 2001, indicating a possibility that growth in this industry may partially explain office development in these cities.

Exhibit 3 Government MSAs

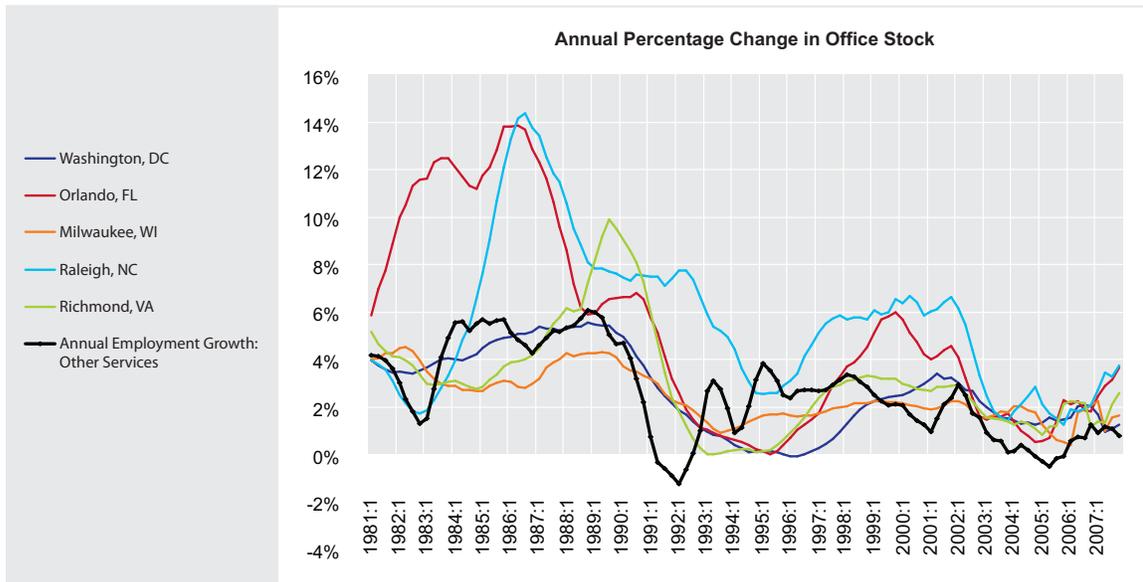


Source: Property and Portfolio Research

Exhibit 3 shows that government economic base MSAs appear to start trending together in the early 1990s, but their peaks and valleys of supply growth appear to happen in different years that may be as much as four years apart. Government employment does not appear to drive office development, as it may not use a substantial amount of rental office space.



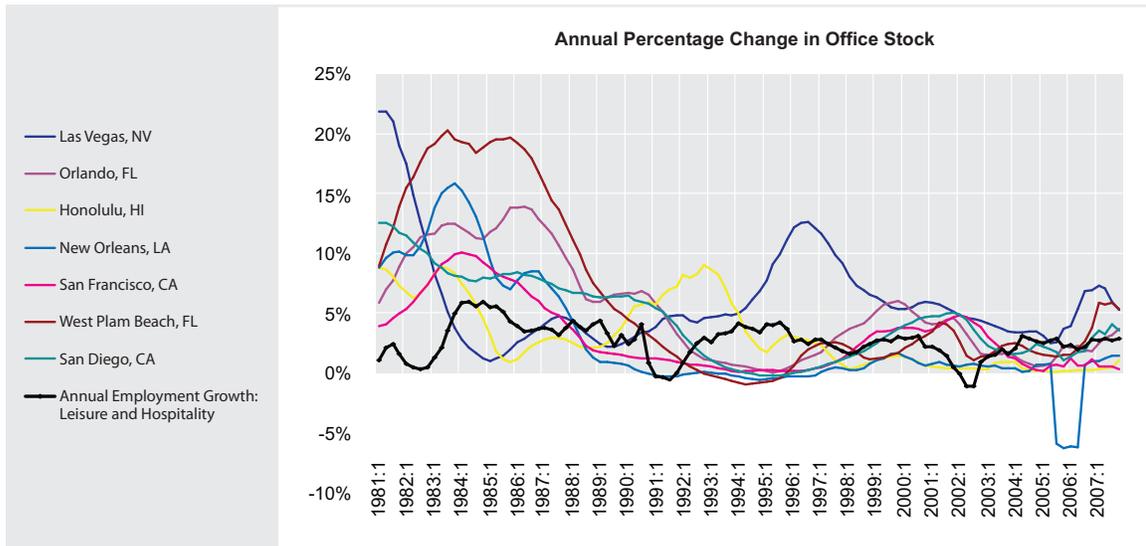
Exhibit 4 Other Employment MSAs



Source: Property and Portfolio Research

Exhibit 4 shows the “other employment” or catch-all economic base MSA group. While the cyclical patterns of development supply growth are similar, the peak and trough timing and lengths seem to be quite different. The employment growth line appears to lead at certain times, lag at other times and move concurrently at some times.

Exhibit 5 Leisure and Hospitality MSAs

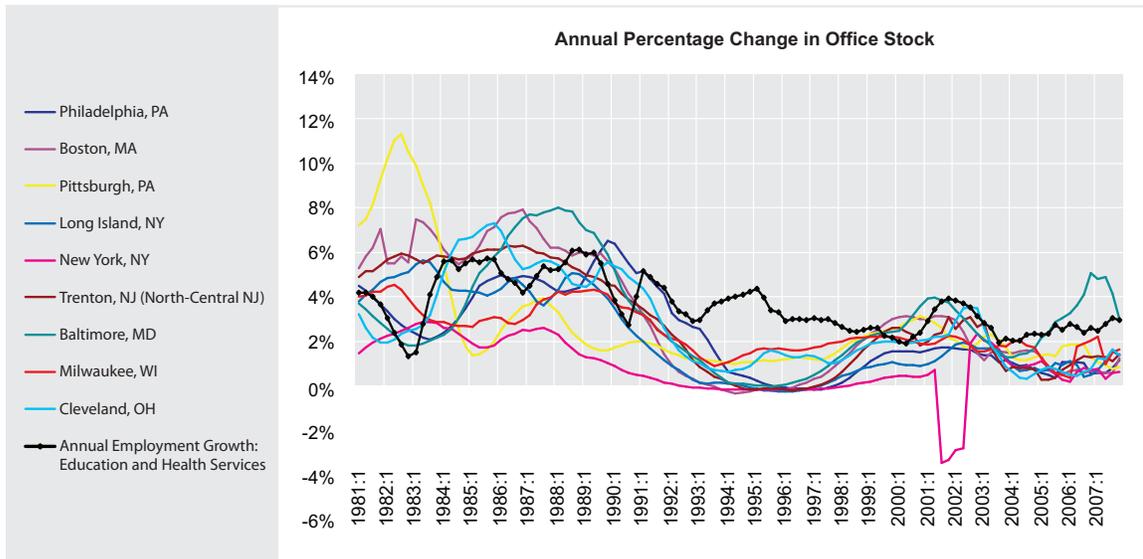


Source: Property and Portfolio Research

Exhibit 5 shows the leisure and hospitality dominant MSAs have cyclical patterns of supply growth that are similar in only four of the seven cities. The employment growth line appears to be correlated with supply only from 2000 to 2005.



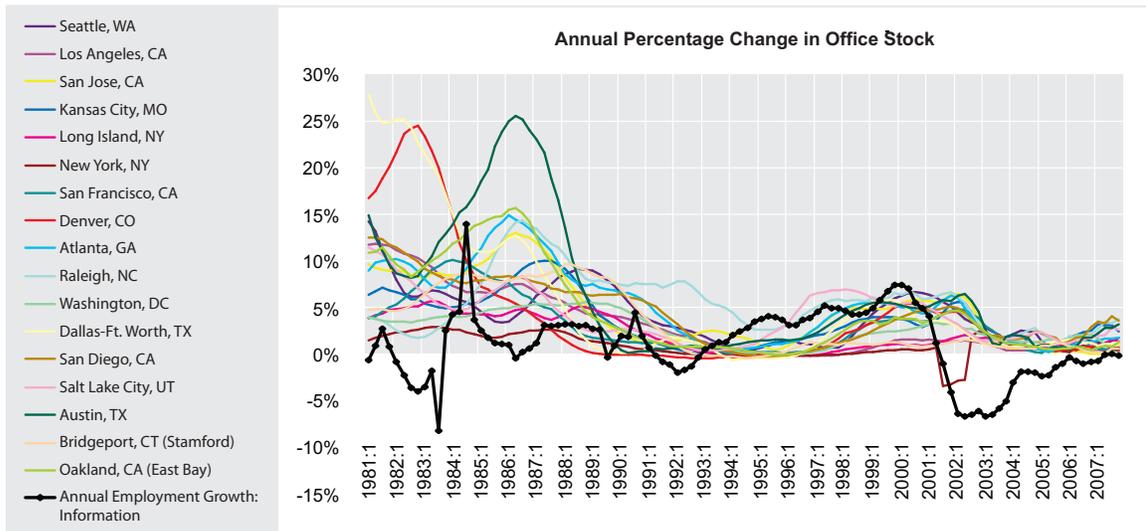
Exhibit 6 Education and Health Services MSAs



Source: Property and Portfolio Research

Exhibit 6 analyzes health and education services MSA employment growth. It shows some relationship with office stock growth in the mid 1980s and early 2000s, with less cyclical correlation in other time periods. High growth of four to six percent in health and education and health services from 1984 through 1989 coincided with high stock growth in the same period. Significant slowing of office stock growth from 1993 through 1998 contrasted moderate employment growth of two to four percent in education and health services employment growth. Since 2000, employment growth in this industry has trended more closely with office stock growth.

Exhibit 7 Information MSAs

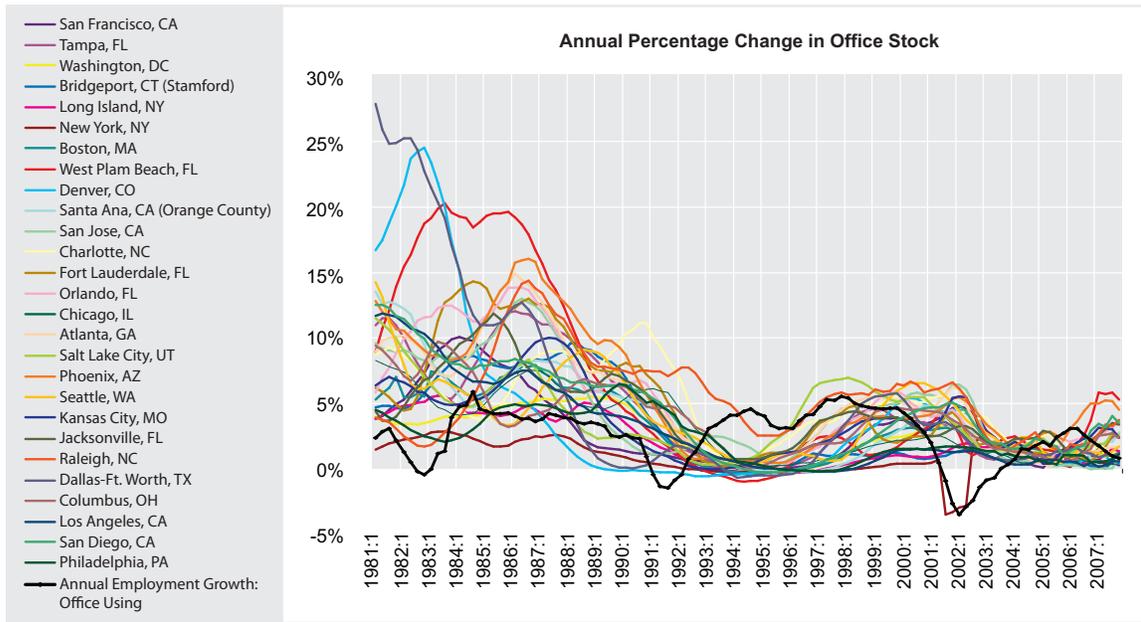


Source: Property and Portfolio Research

Exhibit 7 shows that the information dominant MSAs' development growth has cycled relatively closely since the mid-1990s. However, the information employment growth line does appear to lead development growth since the early 1990s, but with different lead times in different cycles. The increase in information employment from 1993 (the first positive year) to 2000 seems to precede the supply growth from a 1996 bottom to the 2002 peak. The decline in information employment from 2000 to 2002 preceded the decline in six cities by one to two years. While the growth in information employment has been continuously negative since 2000, supply has increased since 2006 in many of the cities, thus there has been little connection in the past few years.



Exhibit 8 Office-Using Employment MSAs



Source: Property and Portfolio Research

Exhibit 8 shows that office-using employment cities' development growth has cycled together very closely since the mid 1980s. In addition, the national office using employment category does appear to cycle in a similar pattern, but at a three to four year preceding lag versus a two- year lag.

Economic Base Industry Stock Growth Correlations

Exhibit 9 shows the average correlation of stock growth in the four property types across MSAs with similar economic base industries. This analysis is helpful in determining if development in MSAs with the same economic base industry trend together, and if certain industries have commercial stock growth that is more highly correlated than others.

Three key points in Exhibit 9 are:

- Natural resources and mining economic base MSAs have the highest average correlation in commercial stock growth from 1980 to 2008, with professional and business services MSAs are second.
- Warehouse stock growth also has the highest average correlation amongst MSAs with professional and business services as an economic base industry.
- Stock growth in apartments is most highly correlated among MSAs with professional and business services economic bases, followed by trade, transportation and utilities.

Exhibit 9
Correlation Analysis

Average Stock Growth Correlation: All MSAs				
Economic Base Industry	Office	Warehouse	Retail	Apartment
Government	0.519	0.291	0.242	0.401
Leisure and Hospitality	0.559	0.548	0.312	0.243
Education and Health Services	0.661	0.310	0.483	0.520
Professional and Business Services	0.744	0.605	0.472	0.666
Financial Activities	0.688	0.487	0.334	0.591
Information	0.675	0.531	0.349	0.560
Trade, Transportation and Utilities	0.330	0.367	0.327	0.627
Manufacturing	0.582	0.092	0.451	0.475
Construction	0.490	0.505	0.341	0.515
Natural Resources and Mining	0.906	0.595	0.549	0.561
Average Correlation by Property Type	0.615	0.433	0.386	0.516

Note: Correlations presented in the table above are the average correlations of stock growth in a property type of all MSAs within an economic base industry. Correlation is a statistical measure of how two series trend together, in this case, over time. Correlations range from 0 (perfectly uncorrelated) to 1 (perfectly correlated). **The higher the average correlation, the more stock growth of MSAs within the same base industry trend together.**



Conclusion

Fifty-four MSAs were grouped together by the major employment “economic base” industries of the U.S. using NAICS employment codes and location quotient analysis. The logic is that major economic base industry’s employment growth should drive demand for office space. In most cases, correlations were below 50 percent at the eight quarter lag, but the graphical charting showed that there were some cyclical patterns for the city groupings with various degrees of pattern correlations and lags. The early 1980s seemed to be a time of little correlation between cities for stock growth; however, by 1990, cyclical patterns seem to have emerged for most groups. An analysis of each of the 54 individual MSAs with numerous variables and multiple leads and lags may yield the best results, but is beyond the scope of this paper.

Monitoring changes in these variables may help developers determine the best times to build new space in the future. Only after assessing all MSAs individually and all the economic indicators available at the local level for each city could a complete picture of what drives real estate development in each MSA be seen.

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