Vacancy Rates and Effective Rents in Chicago's Office Market

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Two momentous economic events of our times have been the boom in office building construction in the late 1980s and the subsequent collapse of office rental markets in many metropolitan areas. A great deal of recent research has focused on the dynamics of the market for office space. The theory that economists typically have used in explaining the office rental market includes the assumption that office rents reflect the degree to which the market's observed vacancy rate deviates from a long-run "natural" vacancy rate. However, previous research has not considered carefully the time period over which the vacancy rate should be measured.

Furthermore, previous research has been hampered by a lack of data on *effective* office rent, which is the measured rent after adjustments are made for various *concessions* that landlords have made to tenants. Periods of "free" rent, and other concessions, have been used with greater frequency and magnitude as office markets have softened in most urban areas of the US. Because both landlords and tenants recognize the value of concessions and take these effects into account in negotiating lease terms, a meaningful study of office rent dynamics must make use of data on effective rents rather than those on simple contract rents.

This article serves two purposes. The first is to clarify the standard theory of office rents, in order to focus on market dynamics. The second purpose is to examine the relationship between rent changes and some measure of changes in vacancy through an analysis of data on effective rent in Chicago's office market.

The Standard Theory

The theory most often used in describing the operation of office markets is a variation of a theory that was first used in describing the housing market. One of its basic tenets is that vacant space in a market has economic value because it permits a short-run response to unexpected increases in demand and reduces search costs for potential tenants; therefore the market benefits from the existence of some (although not too much) unoccupied space. A view embodied in the standard theory is that in the long run there is a natural, or optimal, vacancy rate at which the costs (to office building owners) and the benefits (to potential users) of additional vacant space are equal.

A further tenet is that office rents adjust when the actual vacancy rate departs from this natural rate. As Rosen and Smith state the matter, *"Traditional economic and housing market analyses have ascribed a close connection between excess demand, as reflected in the deviation of the actual vacancy rate from some long-run normal or optimal vacancy rate, and changes in the price of rental housing services."*[1] In addition, the theory is based on a belief that the adjustment is lagged by one year; most analysts believe that there is a delay in rent's response to vacancy information. Finally, because operating expenses also affect what tenants are willing to pay, the theory treats the change in rent per unit as relating to the change in expected operating expenses per unit.

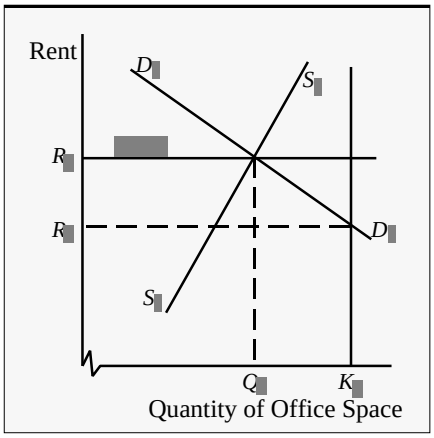
> *The results of the study suggest that a 1% rise in the vacancy rate leads to a decline in effective rents of $.88 per square foot per year.*

This traditional theory of the market can be explained diagrammatically. The market demand for office space is shown in Figure 1 as D_1D_1, and the total stock of office space is shown as fixed amount K_1. (The stock is represented as a vertical line because, in the short run, the total amount of space available cannot change significantly even if high prices motivate suppliers to create more office buildings.) The long-run marginal cost of producing office space is represented by horizontal line *LRMC*; in the long run, producers do not face increasing per-unit costs for their labor and material inputs as they supply greater quantities of office space.

Despite the fact that the total stock is K_1, suppliers offer only the amounts represented by line S_1S_1, as determined by the rent level. They do not offer the entire stock K_1 because of the aforementioned benefits of an inventory of vacant space. However, supply schedule S_1S_1 is expected to have a positive slope (quantity supplied rises with increased rent) because higher rent is associated with a higher opportunity cost of leaving space vacant. The market depicted in Figure 1 is in long-run (not just short-run) equilibrium, because at the market-clearing quantity Q_1 the market rent R_1 is equal to *LRMC*. Note that market rent R_1 exceeds the rent R_0 that would result in full occupancy if landlords chose not to hold any units vacant (i.e., if all office space available in the market, K_1, would be occupied). In effect, tenants are paying a premium of $(R_1 - R_0)$ per square foot for the privilege of having an inventory of vacant space on hand.

Now consider how the standard theory explains the market's response to a change in demand. Demand might rise because of economic growth, or because of economic changes that emphasized office-based service employment over manufacturing activity. Figure 2 represents the reaction of the market depicted in Figure 1 when demand increases to D_2D_2. Rents do not respond immediately to the change in demand; it is quantity that changes, because there is an inventory of vacant space that can be absorbed. The quantity of space occupied increases to Q_1', and the vacancy rate V falls far below the natural rate V_n.[2] Over time, however, the higher demand causes rents to increase to R_2 in response to the departure of vacancy from its natural rate,

Figure 1



in line with the expected relationship between rent and ($V - V_n$). For a given change in demand, the size of the adjustment in rent depends on the relationship between price and the amount of space demanded or supplied, represented by the slopes of the demand curve (D_1D_1 or D_2D_2) and short-run supply curve S_1S_1.

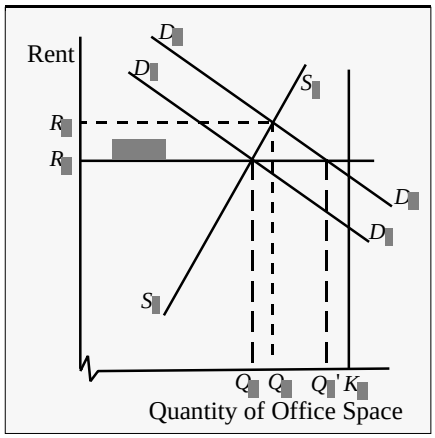
The standard theory operates in a similar fashion in response to a change on the supply side. Changes in supply in office markets cannot generally be timed to respond to current market conditions. In Figure 3 the total stock increases to K_2, perhaps because builders expect greater *future* demand for office space, and the short-run supply curve shifts to S_2S_2 as a portion of the new space is offered for use. The amount of space occupied shifts quickly to Q_1", but at that level of occupancy the vacancy rate rises above its natural rate, so rent eventually adjusts downward to a short-run (but not long-run) equilibrium at R_2'. Once again, the rent change relates to the departure of vacancy from the natural rate. Given the increase in supply, the size of the adjustment is, of course, determined by the actual relationship between price and the quantities demanded or supplied, as shown by the slopes of the demand curve and the short-run supply curve.

An Important Clarification

The standard theory is based on an assumption that the market initially is in long-run equilibrium, and therein lies a problem with using that theory to predict outcomes in actual markets. Return to Figure 2 and assume that rent has adjusted upward to R_2. Note that vacancy does not correspond to its long-run natural rate at this short-run equilibrium; it is below that optimal level. Because it can take several years for additional office buildings to be planned, financed, and constructed, it is reasonable to assume that there can be even *further* increases in demand before supply can be increased sufficiently to restore vacancy to its natural rate. A further increase in demand will reduce the vacancy rate even more and, with a time lag, cause rent to rise even more.

In this case it is the *change* in the vacancy rate (not *V*'s departure from its natural level, which already had been realized) that causes rent to rise above R_2. It was, in fact, a *change* in the vacancy rate (from its natural rate, as it happens)

Figure 2



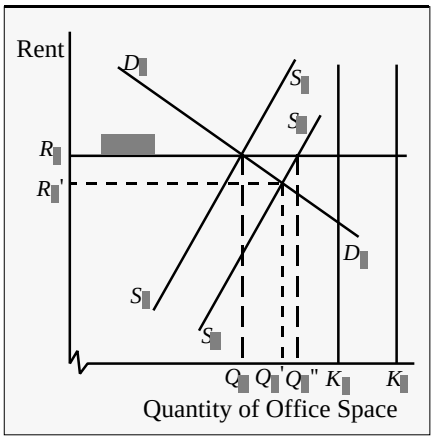
that had caused rent to increase from R_1 to R_2 in the first place. Therefore, a more general conclusion is that any change in rent results from a *change* in the vacancy rate. An extension of the analysis presented in Figure 3 would show that this more general conclusion holds for changes in supply, as well. Furthermore, this revised office rent theory embodies a belief that an eventual increase in the stock of office space, induced by the increase in demand depicted in Figure 2, will cause the vacancy rate to *increase*, and will cause rents eventually to fall to a long-run equilibrium at *LRMC*.

Estimating the Relationship

Several recent studies based on market data have examined the theorized relationship between vacancy rates and rents in the office market. Most of these studies have specified the standard view that the change in rent over a one-year period relates to the actual vacancy rate minus the natural vacancy rate (assumed to be a constant percentage for a given office market). Thus the change in rent typically has been viewed as resulting from the *level* of the vacancy rate, not to its change, and in statistical studies the vacancy rate typically has been found to have had a measurable effect on the change in rent.

The results of these studies become questionable, however, when we consider the theoretical argument, as presented above, that changing rents should relate to the *change* in the vacancy rate. Another difficulty with attempting to study office rents in recent years is the fact that true effective rents are usually not reported to those who gather the data. Indeed, in this author's experience, players in the office market tend to be quite secretive about the specific terms of leases that they negotiate. Commercial leases are very complicated documents, which can include such concession provisions as "free" rent, the landlord's payment of the tenant's cost of moving or of breaking an existing lease, or the landlord's assumption of building improvement or operating costs that otherwise would fall to the tenant. The use of these various inducements to tenants, and in turn the difference between "stated" rent and effective rent, have increased in recent years as building owners in most urban office markets have become more conciliatory. A reliable measure of

Figure 3



effective rent is thus a critical ingredient in a study of the current rent/vacancy relationship.

The best available market data on effective rents for downtown Chicago office buildings (although there are only seven years of observations) is provided in a recent study by Webb and Fisher.[3] The study contains three important ingredients. First, the authors have gathered data on actual lease contracts signed during the 1985 – 1991 period. Second, they carefully computed effective rents by adjusting for such lease features as graduations in contract rents and the various types of concessions discussed above. Third, they then completed a statistical analysis of effective rent based on building characteristics. This procedure controls for the quality of the office space, and thereby permits the estimation of year-to-year differences in effective rent for newly-leased office space of a standardized quality.

We can combine the Webb-Fisher annual effective rent estimates with downtown Chicago vacancy rate data (provided by the Building Owners and Managers Association of Chicago) in order to examine the validity of the standard theory of office markets and the revised theory suggested above. The basic data for these analyses are shown in Table 1. The table shows that the vacancy rate in downtown Chicago was a relatively low 10.76% in 1984; it increased to 14.38% in 1987, dropped to 13.50% in 1988, and climbed steadily thereafter to 16.67% in 1991. Effective rent on new leases was a relatively high $9.45 per square foot per year in 1985; it dropped sharply to $5.40 in 1987, recovered to $7.05 in 1990, and then dropped again to $5.90 in 1991.

It is clear that a relationship exists between rent and a measure of vacancy, but how is this relationship best specified? Consider first the revised theory. A simple statistical comparison of *change in effective rent* with the *change in the vacancy rate over the prior year* suggests that a 1% rise in the vacancy rate leads to a decline in effective rents of $.88 per square foot per year. Further analysis of this particular model shows that the change in the prior year's vacancy rate explains approximately 70% of the change in the effective rent level. In short, there is a very strong relationship between the change in effective rent and the change in the market's vacancy rate. It is evident that market participants negotiate lease terms after paying careful attention to changes in vacancy levels.

The Table 1 data can also be used to demonstrate why we must be cautious of the conventional view that the *change in effective rent* is determined by the *level of the (previous year's) vacancy rate*. Analysis of this theory suggests that if the prior year's actual vacancy rate was 1% above the natural rate, then we should expect a $.42 reduction in annual rent per square foot. However, the vacancy rate is shown to explain only about 5% of the change in rent, and additional tests indicate the presence of other statistical problems with the theory. In this case we can clearly reject the belief that changes in effective rents are determined by the lagged *level* of the vacancy rate.

Webb and Fisher also provide data on net *contract* rents (i.e., unadjusted for concessions) for the same office buildings and time periods, as reported to a Chicago firm that specializes in real estate market data. A comparison of *change in net contract rent* with the lagged *change in the vacancy rate* suggests that a 1% increase in the vacancy rate leads to a $.64 decline in annual contract rent per square foot. Because the contract rent does not represent the true price, it is not surprising that the result shows only a small percentage of the change in the measured rent (the contract rent) to be explained by changes in the vacancy rate. Although contract rents and effective rents would tend to show some similarity in their movements, effective rent is seen to be the more reliable figure on which to base an analysis of the office real estate market. Clearly the concessions made to tenants are sensitive to market conditions as represented by changes in the vacancy rate.

Table 1: Vacancy Rates and Rents in the Downtown Chicago Office Market

Year	Vacancy Rate	Effective Rent (per square foot)	Net Contract Rent (per square foot)
1984	10.76%	—	—
1985	13.82%	$9.45	$12.75
1986	14.32%	$6.60	$10.90
1987	14.38%	$5.40	$10.10
1988	13.50%	$5.50	$7.75
1989	13.84%	$6.05	$9.05
1990	15.72%	$7.05	$10.80
1991	16.67%	$5.90	$9.75

Sources: BOMA/Chicago, Webb and Fisher.

Conclusion

The preceding discussion shows that short-run (year-to-year) changes in office rents in downtown Chicago are strongly related to the *change* in the market vacancy rate during the previous year. A 1% rise in the vacancy rate leads to an estimated reduction in rents on newly-leased office space of $.88 per square foot per year. This result is implied by an analysis of Chicago data in the context of a revised version of the generally-accepted theory of office market dynamics. The results presented above fail to support the standard view that changes in effective rents are closely related to the *level* of the vacancy rate (relative to the natural vacancy rate), at least for the downtown Chicago office rental market during the years 1985 through 1991. Finally, the results demonstrate the importance of using effective rent rather than contract rent (net rent as stated in the lease) for the study of the dynamics of the office real estate market. ■

Footnotes

1 Rosen, K. and L. Smith. "The Price Adjustment Process for Rental Housing and the Natural Vacancy Rate." *American Economic Review* 73 (September 1983), pp. 779 - 786.

2 The natural vacancy rate V_n is computed simply as $V_n=(K_1-Q_1)/K_1$.

3 Webb, B. and J. Fisher. "Development of an Effective Rent (Lease) Index for the Chicago CBD." Working Paper, Center for Real Estate Studies, Indiana University, 1993.

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