limit the search areas and hence the average durations of vacancies for both minority and non-minority renters. Having controlled for the above set of equilibrium duration determinants, the annual fixed effects coefficients reveal significantly longer duration of vacancy during 1990-1992 and 1994. Those results are consistent with the hypothesis that the observed duration of vacancy should rise during a period of generalized economic and rental housing market weakness. Finally, our results also indicate statistically longer average durations of rental unit vacancies in the Anaheim, Atlanta, Birmingham, Houston, Indianapolis, New Orleans, Norfolk and San Francisco MSAs, and significantly shorter average durations of vacancy in the Minneapolis, New York, Northern New Jersey, Portland and Seattle MSAs.

The results for the incidence of vacancy indicate that: (1) the average incidence series varies directly with the percentage of the population that is elderly; (2) the percentage of renter-occupied units owned by a public housing authority significantly dampens the incidence of rental vacancy, as the availability of below-market rents in public housing units works to limit their turnover; (3) the annual rate of population growth exerts a sizable and significant negative influence on the incidence of rental vacancies. These findings suggest that much of the population growth was unanticipated, and as such resulted in a tightening in rental housing market conditions and a reduction in vacancy incidence. We also find evidence of a significant decline in vacancy incidence in 1992. We interpret this result as consistent with the tightening in rental market conditions that occurred that year in the wake of some rebound in macroeconomic activity. As is well appreciated, the strengthening in demand for rental units in 1992 occurred in a market that had seen significantly damped rates of new production over preceding recession years. Finally, all things equal, several MSAs–including Anaheim, Atlanta, Birmingham, Houston, Indianapolis, New Orleans and Norfolk–had significantly higher levels of vacancy incidence during the period. As is evident in table 1, MSAs with significantly higher incidence of vacancy generally had significantly higher duration levels.

Models of Residential Rents.

Our final test involved estimating our residential rent model for a pooled cross-section and time-series sample of 29 U.S. metropolitan areas for the years 1987-1996. The rental variable was proxied by the residential rent component of the CPI for each metropolitan area deflated by that area's All Items Excluding Shelter component of the CPI. Certain models test the significance of the decomposition of the vacancy series into the incidence and duration components. Also, the empirical analysis introduces proxies for lagged rents and absorption of rental housing space, as suggested in recent work by Wheaton and Torto.[2]

Our results show that high vacancy rates significantly impede the rate of increase in real rents. Research findings also lend credence to the decomposition of the vacancy measure into its incidence and duration components. The incidence estimates are statistically significant and negative, indicating that changes in rents are more responsive to changes in incidence than to changes in duration. Estimation findings further indicate that lagged rent is highly significant in the explanation of residential rent changes.

In addition, several of the MSA-specific fixed effects coefficients are significant, reflecting the differences between New York and the other cities in the sample. For example, the estimates suggest that renters in Atlanta, Buffalo, Chicago, and Philadelphia experienced higher rates of rent increases—all things equal—than renters in other metropolitan areas. Results for Minneapolis suggest a damped rental price adjustment mechanism relative to other cities in the sample.

Finally, our research also provides new estimates of the equilibrium rental vacancy rate for rental housing, which is in the range of 4 to 4.5 percent. While this estimate may be viewed as relatively low, note that this paper utilizes a new source of information on rental vacancies computed from a notably reliable survey. Further, the estimates are supported by data from a large number of metropolitan areas spanning a relatively long time frame.

VI. Conclusion

This *Lusk Center* ***Research Brief*** reports on derivation and analytical modeling of the duration and incidence of vacancy as well as empirical assessment of their importance to the price adjustment mechanism for rental housing. Results of the analysis indicate substantial variation in those measures across MSAs and over time. Research findings indicate that the average duration of vacancy varies directly with potential tenant search costs and with MSA housing costs. Accordingly, e-commerce and other mechanisms to enhance the flow of information on available units could go some distance toward lowering search costs and improving the efficiency of rental market allocations. In contrast, the incidence of vacancy varies with measures of population age structure and mobility, the presence of public housing units, and population growth. Clearly, property turnover is damped in the presence of below-market public housing units. As with frictional unemployment, however, some portion of vacancy incidence is desirable, reflecting the voluntary moves of utility-maximizing households. Our estimation results further indicate that changes in residential rents are more responsive to vacancy incidence than to vacancy duration. This suggests that landlords, in determining rent, are more sensitive to tenant outflow (incidence) than to lease-up time (duration).

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Real Estate Research Brief

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Rental Housing Markets, the Incidence and Duration of Vacancy, and the Natural Vacancy Rate

I. Introduction

The ups and downs of rental housing markets have led policymakers, investors, and lenders to look for better ways to evaluate the risks and returns to investment in residential properties. To that end, real estate economists have drawn analogies from labor market theory to model the way prices adjust in the rental housing market. For example, labor economists have long sought to estimate the natural rate of unemployment, defined as that rate associated with long-run equilibrium in the labor market and a constant level of real wages. In a similar vein, real estate economists have defined the natural vacancy rate as that rate associated with rental market equilibrium and constant real rents. Rising real rents imply excess demand for housing and vacancy rates that are lower than their equilibrium levels, while falling real rents imply excess supply and vacancy rates that are higher than their equilibrium levels. These simple models do well in empirical studies [see, for example, Gabriel and Nothaft (1988)]; in recent years, observed vacancy rates have declined to near equilibrium levels in many metropolitan areas, suggesting higher rates of return to investors and reduced risks to multifamily lending and construction.

So far, however, researchers in real estate markets have yet to apply another useful development in the labor literature, namely, how labor market fluctuations are explained by decomposing the unemployment rate into its *incidence* and *duration* components. Indeed, the observed unemployment rate fails to indicate whether a sizable portion of the labor force experiences a short spell of unemployment (as in frictional unemployment) or whether a relatively small portion of the labor force bears a sizable portion of the unemployment burden by way of relatively long spells of (structural) unemployment. Clearly the appropriate policy response hinges importantly on the source of unemployment.

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As in the case of unemployment rates, residential vacancy rates may be decomposed into their incidence and duration components. Incidence of vacancy is the probability that a housing unit becomes vacant; for particular types of rental property, the incidence measure indicates the proportion of the stock that experiences a spell of vacancy. The duration of vacancy measure indicates how long a typical unit remains vacant. Any development that makes the incidence of vacancy higher or the duration of vacancy longer will lead to a higher vacancy rate.

Decomposition of vacancy rates into their incidence and vacancy components accordingly yields new information as to the source of the fluctuations in the overall indicator. That information is useful also because differences in these components imply different responses for real estate development and policy. For example, higher levels of vacancy incidence may reflect a voluntary turnover of stock in rental housing markets that maximizes landlord's profits and renter's preferences, whereas higher levels of vacancy duration may reflect structural mismatches between the characteristics or locations of units available for rent and the demands of potential tenants.

One reason little work has been done so far on incidence and duration of residential vacancies is that researchers lack the data for it. For example, the American Housing Survey (AHS) collects virtually no information on the incidence or duration of vacancy between rental stock survey dates, and the estimation of duration is truncated because the termination date of the vacancy is never observed.

This *Lusk Center Real Estate* ***Research Brief*** reports on a study of rental housing markets that draws on data from the Bureau of Labor Statistics (BLS) that has not previously been used for this purpose.[1] In the analysis, we compute the rate, incidence and duration of rental vacancies for major metropolitan areas (MSAs) in the United States. Our results indicate the extent to which variation in residential vacancy rates across metropolitan areas and over time is due to differences in vacancy incidence, vacancy duration, or both. In addition, we evaluate the incidence and duration measures econometrically, providing new insights into their determinants. Finally, we use the incidence and duration measures to compute new equilibrium rental vacancy rates and to evaluate the price adjustment mechanism for rental housing.

II. Incidence, Duration, and Equilibrium Vacancy Rates

Initial review of data from the BLS indicates sizable and significant variation in the incidence and the duration of rental vacancies across metropolitan areas and over the rental housing cycle. As evidenced in Table 1, over the 1987 – 1994 period, New York City rental housing markets were characterized by the lowest vacancy rates, as well as the lowest incidence and duration of vacancy estimates. Vacancy rates, incidence, and duration trended down significantly in Houston during that period; nonetheless, that metropolitan area was at the high end of all three measures. For cities in the sample, average duration estimates generally were between 1.5 to 2 months. Further, the data suggests a great deal of tenant mobility and apartment turnover; over six-month intervals approximately 30 percent of rental units experienced a vacancy spell, or, in other words, 70 percent of units remained continuously occupied. Some rental units were more susceptible to vacancy spells, probably because of local economic and demographic characteristics, as well as characteristics of the apartments themselves. Apartments that are removed from the rental stock have noticeably higher vacancy rates and duration, consistent with the notion that units withdrawn from the rental stock may be subpar and/or lack the physical or locational characteristics demanded by potential tenants.

Table One
Decomposition of Vacancy Rate into Incidence and Duration

Metropolitan Area	Time Period	Vacancy Rate	Incidence	Duration: Percent of Period	Duration: Months	Proportion Continuously Occupied	Sample Size
New York City	1/87-6/88	2.3	34.1	6.6	0.9	72.3	1070
	1/90-6/91	2.7	41.4	6.4	0.8	68.4	1245
	1/93-6/94	3.6	30.9	11.7	1.5	74.5	1231
Los Angeles-Long Beach	1/87-6/88	4.6	44.9	10.1	1.3	64.1	1146
	1/90-6/91	5.7	48.8	11.7	1.5	59.5	1336
	1/93-6/94	9.9	57.1	17.4	2.3	53.0	1490
Chicago, IL-IN-WI	1/87-6/88	5.9	41.4	14.1	1.8	64.6	1284
	1/90-6/91	7.1	43.1	16.6	2.2	61.4	1191
	1/93-6/94	7.1	40.0	17.7	2.3	64.4	1208
Washington, DC-MD-VA	1/87-6/88	3.2	42.3	7.5	1.0	64.6	531
	1/90-6/91	7.8	51.1	15.2	2.0	59.0	542
	1/93-6/94	6.6	49.7	13.2	1.7	59.9	528
Houston, TX	1/87-6/88	20.4	74.8	27.3	3.5	41.2	567
	1/90-6/91	16.8	64.1	26.2	3.4	44.9	629
	1/93-6/94	12.0	61.9	19.4	2.5	49.0	599

The analysis begins with the standard stock-flow model, where the stock of rental housing in a particular metropolitan area is assumed to be fixed in the short run but then evolves over time in response to changes in the expected rate of return to investments in rental properties. The intersection of supply and demand for rental housing services yields a level of apartment rents as well as a short-run stock of vacant units. In the model, excess demand for units—due to factors that push the observed incidence or duration of rental vacancies below their long-run equilibrium levels—should result in vacancy rates which similarly fall below their equilibrium or "natural" levels and in so doing put upward pressure on rents. The upward movement in rents should work both to depress demand from existing renters and to prompt additions to the rental housing stock; both of these adjustments should in turn enable observed vacancy rates to move in the direction of equilibrium levels. Likewise, factors that move the observed incidence or duration of vacancy to levels above their equilibrium rates should result in downward pressure on rents, diminished pace of new construction, and increased demand from existing renters. In other words, the rate of change in metropolitan rents is determined in part by the deviation in observed vacancy rates from their long-run natural or equilibrium level.

Several factors in a locality may push the observed incidence or duration of rental vacancies above or below their long-run equilibrium levels. For example, unexpected fluctuations in the local business cycle may affect both incidence and duration. The factors influencing incidence specifically include rates of population mobility and population growth, metropolitan population age structure and poverty status, presence of public housing, and the like. The factors influencing duration include those that affect the cost of or returns to rental apartment search and hence the chance of achieving a good match between potential renters and available units, such as diversity in the local rental stock.

III. Model Estimation

Factors affecting duration of vacancy.

In our analysis, equilibrium levels of vacancy duration reflect local rental market conditions. To the extent rental units are similar, potential tenants minimize search costs (and hence duration of vacancy) by taking the first available unit. We anticipate that the observed duration of vacancy will be greater in metropolitan areas with greater diversity in the rental housing stock. To empirically proxy for this diversity, we use indices of the age, size distribution, physical characteristics, and intra-metropolitan location of the stock. In general, we hypothesize that search costs and duration of vacancy vary directly with each measure of diversity.

Rent levels are represented by tenants' median housing costs for each metropolitan area. The effects of rent levels on the equilibrium duration of vacancy are unclear, a priori, because of the potentially conflicting responses of the landlord and the prospective tenant. If tenants try to minimize shelter costs per unit of housing quality, then higher rent levels suggest higher potential gains from continued housing search, thus lengthening the duration of vacancy. Landlords, on the other hand, try to maximize net rental income. The opportunity costs of vacant units rise with the prevailing level of rents. From the landlord perspective, one would expect some damping in duration of vacancy in high rent areas.

Factors affecting incidence of vacancy.

The equilibrium incidence of rental market vacancies largely should reflect the mobility of the renter population, together with changes in the size of renter populations and the availability of below-market rental units. To proxy for population mobility directly, we use the percentage of the population that moved in the prior year. Additional controls include the elderly and poverty-level percentage of all households. Household move rates rise among the oldest age cohorts, possibly due to climatic, family, or health-related concerns. Overall, mobility should be lower among lower-income households.

Population growth as derived from indigenous sources and from interregional migration should affect the equilibrium incidence of rental housing vacancy. While unanticipated population increases lead to lower short-run vacancy rates, areas characterized by a higher rate of expected population growth may have a higher equilibrium incidence of rental vacancies stemming from higher rates of new construction. A priori, it is unclear which of these conflicting influences dominate. We use the annual rate of population growth to control for this effect. Renter population and rental housing stock characteristics were obtained from the American Housing Survey metropolitan area files.

Factors affecting both duration and incidence of vacancy.

To control for deviations in nominal duration and incidence from equilibrium levels, we include MSA- and time-specific fixed effects as well as an indicator of generalized local economic and real estate market weakness. In general, we expect that both the incidence and the duration of vacancy should rise above equilibrium levels during periods of damped demand for rental units. In the analysis, MSA-specific economic cycles are proxied in the regression analysis by a categorical variable indicating the occurrence and timing of a local economic downturn. We account for intertemporal variation in the incidence and duration of vacancy by way of annual fixed effects.

As anticipated, the nominal duration and incidence series vary systematically with a vector of proxies for equilibrium levels of those series. The results for the duration of vacancy indicate that: (1) duration is significantly boosted by measures of the diversity of the rental housing stock; (2) duration is significantly reduced in areas of higher median housing costs, consistent with the notion that landlord opportunity costs of holding units in vacant status increase with levels of apartment rents; (3) duration is significantly lowered in areas characterized by higher proportions of minority households. Stratification of metropolitan housing markets by race may