Rental Concessions and Property Values

*G. Stacy Sirmans**
*C. F. Sirmans***
*John D. Benjamin****

Abstract. **This paper examines apartment rental concessions and their effect on property values through apartment rent and occupancy rates. A simultaneous equation model is used to estimate rent and occupancy equations in linear, semilog and logged form. The results show that rental concessions have a positive effect on both rent and occupancy rates. This would indicate that concessions have a positive effect on property values since higher capitalized value should follow. The results also reveal that various amenities and services provided by apartment units have significant effects on rent.**

Introduction

Landlords maximize the value of income properties by achieving an optimal trade-off between rental rates and occupancy levels, i.e., the point where marginal revenue equals marginal cost. The marginal cost equals the amount by which rent is lowered to induce higher occupancy. The marginal revenue equals the additional revenue generated by the increased occupancy. Since demand for rental space is not perfectly predictable, some vacancy may be desirable so as to satisfy unpredictable demand fluctuations. Thus, the presence of vacancies do not necessarily indicate a disequilibrium state that might warrant rent reductions. Equilibrium exists when the landlord cannot lower rent and at the same time have a more-than-offsetting reduction in vacancy costs. It is likely that this state could be achieved before rent is lowered sufficiently to induce full occupancy at all times.

Thus, in competing for tenants, landlords cannot simply lower rent; the increase in revenue resulting from the increased occupancy would be less than or equal to the amount by which rent is lowered. That is, if the landlord is operating at equilibrium, any increase in marginal revenue should be accompanied by a greater (or, at least, an equal) increase in marginal cost. This effect would prompt landlords who desire increased occupancy and revenues to seek alternatives other than lowering contract rent. One such alternative is the offering of rental concessions. A concession may appear in the form of free rent for some period, payment of moving expenses, etc. The cost of providing such a concession relative to the additional revenue generated has definite implications for the valuation of rental properties.

*Department of Insurance, Real Estate and Business Law, The Florida State University, Tallahassee, Florida 32306.
**Department of Finance, Louisiana State University, Baton Rouge, Louisiana 70803.
***Departmant of Insurance and Real Estate, The Pennsylvania State University, University Park, Pennsylvania 16802.
Date Revised—April 1990; Accepted—May 1990.

The purpose of this paper is to examine the effects of rental concessions on rent and occupancy rates and to provide some indication of the effect of concessions on property values. Information about the valuation of rental concessions would be of interest to market participants such as appraisers, equity investors and property managers including lending institutions. Landlords commonly employ rental concessions to increase occupancy and revenue. If they are successful in designing a concession that has a lower marginal cost than the marginal revenue generated by either increased occupancy and/or a higher rent, value would increase. If not, the concession becomes a real net cost to the landlord, and value is adversely affected.

Rent, Occupancy and Concessions

A rental concession may affect both rent and occupancy. If the concession represents a real net cost to the landlord, its effect on value would be the same as lowering rent. Under the income appraisal approach, the value of an income property is a function of the income accruing to the property, i.e.,

$$Value = Rent/k \tag{1}$$

where k is the appropriate capitalization rate and rent is usually measured as net operating income. When a concession is offered, equation (1) becomes

$$Value = Rent/k - Concession\ (1+k)^{-n} \tag{2}$$

where n is the period in which the concession occurs. If the concession is a net cost to the landlord (i.e., if rent is not increased by an amount equal to the cost of the concession), the value of the property declines. To avoid this decline, the concession would have to increase demand (occupancy) and/or rent at the same marginal rate as the cost of the concession.

A Numerical Example

The following example illustrates this point. Suppose, at equilibrium, the property is operated as follows:

PGI	\$6,000	12 units @ \$500 each
− *VAC*	− 1,000	2 units @ \$500 each
EGI	\$5,000	

PGI is potential gross income, *VAC* is vacancy costs, and *EGI* is effective gross income. Because the landlord is operating at equilibrium, a lower rent cannot be traded off for higher occupancy to increase total *EGI* (or else this would have already been done). Similarly, the marginal cost of lowering rent represents the reduction in rent while the marginal revenue equals the additional rental revenue generated by higher occupancy.

Now, suppose the landlord wishes to lower rent sufficiently to achieve full occupancy. *EGI* must remain the same since $mc = mr$ and the result would be:

PGI	$5,000	12 units @ $416.67 each
− *VAC*	0	
EGI	$5,000	

The marginal cost of lowering the rent is $1,000 (or $83.33 per rental unit for 12 units). The marginal revenue is the reduction in vacancy cost of $1,000. If the landlord could increase (decrease) rent and, thereby, have a less (greater) than corresponding increase (decrease) in vacancy costs (i.e., if $mr > mc$), the landlord would do so (until $mr = mc$ or the landlord ran out of units, whichever came first). A movement either way acts to increase *EGI*. At equilibrium, however, neither action would be possible. When the landlord uses a concession, the marginal cost of the concession must be less than the marginal revenue generated. In the example, the cost of the concession would have to be less than $1,000 across all units (or less than $83.33 per rental unit if full occupancy results).

Now, if the cost of the concession is $600 or $50 per unit, then the scenario would be:

PGI	$5,400	12 units @ $450 each
− *VAC*	0	
EGI	$5,400	

In this case, an economic rent of $400 accrues to the landlord (or $33.33 per rental unit over 12 units).

An even greater economic rent can be earned if the landlord designs a concession that increases occupancy while allowing net rent per unit (after the concession) to remain constant or increase. With net rent held constant, the result would be:

PGI	$6,000	12 units @ $500 each
− *VAC*	0	
EGI	$6,000	

This decision shows an effective increase in rent per unit. In fact, the increase in rent is exactly equal to the cost of the concession since the $500 per unit is net of the cost of the concession. In this case, the landlord has been successful in creating a concession by which the marginal revenue generated ($1,000, through increased occupancy) is greater than the marginal cost of the concession (zero, since rent per unit increases exactly to cover the concession cost). Thus, by giving the concession, the landlord may increase marginal revenue (by increasing occupancy) with a less-than-corresponding or possibly with no increase in marginal cost. This occurs because the landlord passes on all or part of the cost of the concession to the tenant, resulting in a constant or higher net rent (rent minus the concession).

The Interaction of Rent and Occupancy

To determine the effect of concessions in the rental market, the effect of concessions on both occupancy and rent must be examined. The expected effect on occupancy should be

positive because the primary objective of offering a concession is increased occupancy. The effect of concessions on rent per unit is unclear a priori. A negative effect on rent per unit indicates that the concession results in a lower net rent for the individual tenant (which means that the cost of the concession for the landlord is greater than the benefit received). Thus, the landlord is not successful in passing on all the cost of the concession to the tenant, and the tenant benefits (by paying a lower net rent) from the concession (even though some of the cost may be borne by the tenant). If the landlord does not benefit by the decrease in rent per unit, he/she could benefit from increased occupancy. In this case, value would not necessarily decline since the additional revenue generated by increased occupancy may equal the reduction in rent such that *EGI* remains unchanged.

If the concession has no significant effect on rent, net rent remains the same for the landlord, and the concession creates no benefit to the tenant. The landlord, however, benefits from increased occupancy and from being able to pass on the marginal cost of the concession to the tenant in the form of a higher gross rent. In short, the cost of the concession is equal to the benefit returned. If the concession has a positive effect on rent, the landlord is able to collect a higher net rent after the concession because the marginal increase in rent is greater than the marginal cost of the concession. In this case, the tenant pays a higher net rent, and the landlord benefits not only from increased occupancy but also from increased rent.

The effect of concessions on rent and occupancy can be determined by estimating a model for rent and occupancy that includes concessions. The following equation specifies rent:

$$Rent = r(Physical\ Characteristics,\ Amenities\ and\ Services,\ Location,\ Occupancy,\ Concessions) \tag{3}$$

Occupancy is a function of the following variables:

$$Occupancy = o(Rent,\ Square\ Feet,\ Complex\ Size,\ Age,\ Location,\ Concessions) \tag{4}$$

Empirical Model and Data

If rent and occupancy rates are considered endogenous and if their values are determined simultaneously, a simultaneous estimation system is appropriate.[1] To measure the effect of concessions on rent, the following equation is utilized:

$$R_i = r(P_{ij},\ A_{ij},\ S_{ij},\ L_{ij},\ C_i,\ O_i) \tag{5}$$

where

R_i = the observed gross rent for unit i;
P_{ij} = a set of j physical characteristics for unit i.
These include:
(a) square footage,
(b) complex size,
(c) the number of units of a given type (i.e., one-bedroom, two-bedroom, etc.),

(d) age,
(e) date of lease,
(f) efficiency unit, and
(g) townhouse;

A_{ij} = a set of j amenities for unit i. These include:
(a) fitness room,
(b) patio,
(c) fireplace,
(d) balcony,
(e) washer/dryer connections, and
(f) washer/dryer;

S_{ij} = a set of j services or restrictions for unit i. These include:
(a) security,
(b) pets allowed, and
(c) adults only;

L_{ij} = a set of j binary locational variables; These include:
(a) CEN 381,
(b) CEN 382, and
(c) CEN 391;

C_i = a binary variable representing the rent concession for unit i. C_i has a value of one if the landlord grants a significant rental

Exhibit 1
Summary Statistics for Baton Rouge, Louisiana Apartment Market

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
RENT	346.85	73.42	119.00	565.00
SQUARE FEET	950.89	223.65	320.00	1472.00
UNITS	34.66	34.68	1.00	348.00
COMPLEX SIZE	230.00	111.39	34.00	600.00
CONCESSIONS	0.18	0.38	0.00	1.00
AGE	9.32	6.67	0.00	22.00
DATE OF LEASE	33.52	11.78	1.00	53.00
SECURITY	0.29	0.46	0.00	1.00
PETS ALLOWED	0.85	0.36	0.00	1.00
FITNESS ROOM	0.39	0.49	0.00	1.00
ADULTS ONLY	0.15	0.36	0.00	1.00
PATIO	0.49	0.50	0.00	1.00
WASHER/DRYER	0.11	0.31	0.00	1.00
FIREPLACE	0.36	0.48	0.00	1.00
BALCONY	0.48	0.50	0.00	1.00
OCCUPANCY	0.86	0.10	0.40	1.00
W/D CONNECTIONS	0.78	0.42	0.00	1.00
EFFICIENCY	0.12	0.33	0.00	1.00
TOWNHOUSE	0.24	0.43	0.00	1.00

$n = 544$.

concession to the tenant. These concessions have values in excess of $200 and include such arrangements as one month free rent on a two-year lease, one month free on a six-month lease, one month free after twelve months (thirteen-month lease), landlord pays tenant's moving expenses, two months free after one year, and $99 rent for first month with no security deposit after six months; and

O_i = the occupancy rate for unit i as measured by the occupancy rate for the complex.

The issue of simultaneity between rent and vacancy rates has been addressed in the real estate literature (see Frew and Jud [1988]). To account for this relationship, the following equation for occupancy is specified:[2]

$$Occupancy = o(Rent, Concession, Square\ Feet, Complex\ Size, Age, Location) \quad (6)$$

The data consist of a survey of apartment complexes in Baton Rouge, Louisiana for 1987. Of the three hundred complexes surveyed, a total of 544 observations resulted.[3] Exhibit 1 provides summary statistics for the variables included in the data.

Results

The rent and occupancy equations are estimated in a two-stage least squares regression model using linear, semilog and logged equations.[4]

The Rent Equation

The results for the rent equation are given in Exhibit 2.[5] Results for the linear equation (given in column 2) show that unit size is a primary determinant of rent; square footage has a positive coefficient of 0.20. Similarly, complex size as measured by total units affects rent positively. The variable *UNITS*, which represents the number of units of a given type (e.g., one-bedroom, two-bedroom, etc.), has a negative effect on rent. This indicates that rents decline slightly for a given type unit the greater the number of units of that type.

The negative coefficient for the age of the unit, *AGE*, indicates that older units, as expected, have a more difficult time competing with newer and, possibly, more modern counterparts. The negative sign for the lease's execution date, *DATE OF LEASE*, reveals that, for the time period studied, rental rates were decreasing. At this time the petroleum-based recession was impacting the demand for rental housing.

The negative effect of occupancy on rent demonstrates that the higher the occupancy, the lower the rent. This relationship is not surprising because in a competitive market where there exists excess supply, rent would be expected to have a negative relationship with occupancy. In such a climate, one would expect to observe lower rent as a stimulus for demand or as a move for competitive advantage.

Exhibit 2
TSLS Regression results for Baton Rouge, Louisiana Apartment Market
(Dependent Variable = Rent Per Unit)

Variable	Linear Equation	Semilog Equation	Log Equation
INTERCEPT	236.16	5.23	1.87
	(6.47)*	(108.25)*	(8.91)*
SQUARE FEET	0.20	0.0006	0.52
	(30.26)*	(29.32)*	(25.48)*
COMPLEX SIZE	0.08	0.0002	0.04
	(3.68)*	(3.07)*	(2.21)*
UNITS	−0.26	−0.0007	−0.03
	(−5.73)*	(−5.11)*	(−4.12)*
AGE	−4.23	−0.01	−0.002
	(−10.75)*	(−10.48)*	(−0.59)
DATE OF LEASE	−0.63	−0.002	−0.02
	(−5.07)*	(−5.36)*	(−2.10)*
OCCUPANCY	−100.86	−0.16	−0.41
	(−2.38)*	(−1.73)*	(−1.25)
CONCESSIONS	19.47	0.05	0.09
	(4.34)*	(3.91)*	(4.75)*
FITNESS ROOM	15.58	0.04	0.13
	(2.86)*	(2.49)*	(7.96)*
W/D CONNECTION	25.97	0.07	0.13
	(4.37)*	(4.07)*	(3.55)*
WASHER/DRYER	24.40	0.06	0.08
	(3.09)*	(2.51)*	(2.15)*
FIREPLACE	19.97	0.07	0.09
	(4.49)*	(5.07)*	(5.57)*
BALCONY	11.44	0.03	0.03
	(3.32)*	(3.29)*	(2.77)*
PATIO	−14.70	−0.04	−0.001
	(−4.15)*	(−3.34)*	(−0.04)
SECURITY	12.12	0.05	0.03
	(2.47)*	(3.39)*	(1.45)*
PETS ALLOWED	21.56	0.07	0.03
	(3.72)*	(4.23)*	(1.32)*
ADULTS ONLY	22.69	0.08	0.12
	(3.81)*	(4.27)*	(4.81)*
EFFICIENCY	−18.69	−0.08	−0.08
	(−3.45)*	(−4.66)*	(−3.80)*
TOWNHOUSE	−26.85	−0.08	−0.06
	(−6.56)*	(−6.37)*	(−3.62)*
CEN 381	45.52	0.13	0.14
	(5.33)*	(5.14)*	(3.18)*
CEN 382	19.59	0.05	0.09
	(3.41)*	(2.99)*	(3.56)*
CEN 391	−11.94	−0.03	−0.01
	(−2.68)*	(−2.13)*	(−0.39)
R^2	0.84	0.83	0.76
n	544	544	544

t-statistics in parentheses
* denotes significance at 0.10 level (one-tailed test)

CONCESSIONS, the variable of primary interest, has a positive effect on rent; that is, the greater the concession, the higher that total rental income. Although on the surface it might appear that rental concessions benefit the tenant by transferring wealth from the landlord to the tenant, the results indicate the opposite: concessions actually result in higher rents on average (i.e., elasticity of demand is positive).

Several amenities show a significant impact on rent. These include *FITNESS ROOM*, *WASHER/DRYER CONNECTION*, *WASHER/DRYERS*, *FIREPLACE*, and *BALCONY*, all having positive signs. The patio variable has a negative sign, which could indicate its function as a proxy for a ground-floor apartment, a location more prone to break-ins and often more noisy when surrounded on both sides and above by apartments.

Some services and restrictions have a significant effect on rent. Providing security has a positive influence on rent. Restrictions such as *ADULTS ONLY* and *PETS ALLOWED* have positive rent effects. The positive sign on *ADULTS ONLY* indicates that tenants are willing to pay more for adult-only communities. These may be preferred by young singles and older retired persons.[6] The positive sign on *PETS ALLOWED* indicates that renters are willing to pay a premium in order to keep pets on the premises.

Two types of apartments, efficiencies and townhouses, have a negative effect on rent. In the marketplace under study, flats or single-level apartments with separate living and sleeping areas are the preferred units. In addition, three location variables have a significant impact on rent.

Results for the semilog estimation, given in column (3) of Exhibit 2, are consistent with the results of the linear model in that all variables are significant with the same signs. *SQUARE FEET* remains the primary influence on rent. The occupancy variable, again negative, confirms an inverse relationship between rent and occupancy levels. The concessions variable with a positive coefficient of 0.05 indicates that each one-unit change in concessions increases rent by 5%. Both the amenities and restriction variables and the type of unit and location variables are significant.

The results for the logged equation, given in column (4) of Exhibit 2, are generally consistent with the linear and semilog models. Again, *SQUARE FEET* is the primary influence on rent; *AGE*, *PATIO* and one location variable, however, are not significant. Although the occupancy variable is not significant, it has a negative sign consistent with the previous results. The concessions variable is significant with a positive sign.

The Occupancy Equation

The results for the two-stage estimation of the occupancy equation are shown in Exhibit 3. Column (2) gives the results for the linear equation. That rent has a negative effect on occupancy is consistent with previous results that show that lower rent would be expected in a competitive market of excess supply. Because rent is a driving force behind occupancy, higher rent would result in lower occupancy levels.

CONCESSIONS is seen to have a significant positive effect on both occupancy rates and rent. Thus, the offering of rental concessions not only results in higher rent, but also in increased occupancy levels.

Variables such as square footage and complex size have a positive effect on occupancy whereas age has a negative effect. Two location variables have a significant effect on rent.

Exhibit 3
TSLS Regression Results for Baton Rouge, Louisiana Apartment Market
(Dependent Variable = Occupancy Rate)

Variable	Linear Equation	Semilog Equation	Log Equation
INTERCEPT	0.97	1.34	−0.47
	(24.48)*	(3.11)*	(−2.40)*
RENT	−0.001	−0.284	0.036
	(−4.23)*	(−3.58)*	(0.57)
CONCESSIONS	0.06	0.09	0.07
	(5.30)*	(5.17)*	(3.66)*
SQUARE FEET	0.0001	0.0002	−0.008
	(4.11)*	(3.43)*	(−0.20)
COMPLEX SIZE	0.0001	0.0001	0.02
	(1.94)*	(1.62)*	(1.66)*
AGE	−0.0057	−0.006	0.014
	(−4.67)*	(−3.42)*	(4.84)*
CEN 381	0.120	0.148	0.101
	(6.63)*	(5.55)*	(4.30)*
CEN 382	0.015	0.030	0.034
	(1.19)	(1.54)*	(1.80)*
CEN 391	−0.006	0.001	0.018
	(−0.57)	(−0.06)	(−1.13)
CEN 392	−0.09	−0.130	0.01
	(−6.01)*	(−5.64)*	(0.37)
R^2	0.22	0.18	0.20
n	544	544	544

t-statistics in parentheses
* denotes significance at 0.10 level (one-tailed test)

The results for the semilog equation, given in column (3) of Exhibit 3, are consistent with the results of the linear model. *RENT* is significant with a negative sign; similarly, *CONCESSIONS* is again significant with a positive sign. The other variables, *SQUARE FEET*, *COMPLEX SIZE* and *AGE* are significant with consistent signs. One additional location variable is significant.

The results for the log form, shown in column (4) of Exhibit 3, are generally consistent with the previous results. *CONCESSIONS* is again significant with a positive sign. *COMPLEX SIZE* and *AGE* remain significant. Two of the location variables are significant. *RENT* and *SQUARE FEET*, however, are not significant.

Summary and Conclusions

This paper examines the effect of rental concessions on property values through rent and occupancy rates. A two-stage least squares system of equations for rent and occupancy is estimated in linear, semilog, and logged form. The results show a negative relationship between rent and occupancy rates; that is, as rent increases, occupancy levels decline. The

results also reveal that certain amenities, services and occupancy restrictions influence rent. These include fitness room, fireplace, washer/dryer, adults only and pets allowed. Physical characteristics, as well, such as square footage, complex size and age act as determinants of rent and occupancy rates.

The concessions variable has a positive effect on both rent and occupancy rates. Thus, concessions would seem to enable the landlord to collect higher average rent and to increase occupancy rates in the process. This would imply that rental concessions have a positive effect on property values.

Notes

[1]Frew and Jud [4] show a similar development of simultaneous equations for rent and occupancy for office buildings. This paper extends their analysis to include rental concessions. As Frew and Jud point out, including vacancy in the rent equation creates a proxy for the unobserved rent-adjustment mechanism and helps eliminate specification bias in the estimated coefficients of the other variable. Also, because the data contain a large number of variables that may potentially have some effect on rent and may also be collinear, the rent equation is first estimated using a backward stepwise OLS regression to determine those variables that have a significant effect on rent. Mark and Goldberg [10] and Leamer [9] provide a discussion of the appropriateness of this technique (see Leamer [9]). The resulting model is estimated in a two-stage least squares system with the occupancy and concessions equations.

[2]This specification follows Frew and Jud [4] who show that vacancy is a function of rent, age and building size.

[3]An apartment complex may have one or more observations depending on the number of apartment unit types within the complex.

[4]In recent years, the question of the corrent functional form for hedonic models has arisen in the literature (see Rosen [14], Butler [2], Halvorsen and Pollakowski [7] and Marks [11]). Butler contends that researchers have compared alternative functional forms for hedonic indexes of housing and by and large have found little basis for choosing one over the other. The advantage of the linear model is that it provides a direct estimate of the value or effect of a variable on the dependent variable. The advantage of the semilog form is that it yields the percentage change in rent that results from a one-unit increase in the particular characteristic. And, of course, the log form provides the elasticity between each independent variable and the dependent variable.

[5]In the general regressions, no multicollinearity was indicated as being present as determined by SAS variation inflation, eigen value and condition index indicators, which follows procedures outlined by Belsley, Kuh and Welch [1]. Autocorrelation and heteroscedasticity were not found to be strongly present by standard tests and residual plots. The error term appears to be normally distributed.

[6]It is noted that the adults-only rental restriction has been deemed to be unlawful by a recent U.S. Supreme Court decision.

References

[1] D. A. Belsley, E. Kuh and R. E. Welch. *Regression Diagnostics.* New York, NY: John Wiley & Sons, 1980.

[2] R. V. Butler. The Specification of Hedonic Indexes for Urban Housing. *Land Economics* 58 (February 1982), 96–108.

[3] J. R. Frew, G. D. Jud and D. T. Winkler. Atypicalities and Apartment Rent Concessions. *The Journal of Real Estate Research* 5 (Summer 1990).
[4] J. Frew and G. D. Jud. Vacancy Rates in Rent Levels in the Commercial Office Market. *The Journal of Real Estate Research* 3 (Spring 1988), 1–8.
[5] G. W. Gipe. Developing a Multiple Regression Model for Multi-Family Residential Properties. *The Real Estate Appraiser* 42 (May-June 1976), 28–33.
[6] K. L. Guntermann and S. Norrbin. Explaining the Variability in Apartment Rents. *AREUEA Journal* 15:4 (Winter 1987), 321–40.
[7] R. Halvorsen and H. O. Pollakowski. Choice of Functional Form for Hedonic Price Equations. *Journal of Urban Economics* 10 (July 1981), 37–49.
[8] A. J. Jaffe and R. G. Bussa. Using a Simple Model to Estimate Market Rents: A Case Study. *The Appraisal Journal* 45 (January-February 1975), 7–13.
[9] E. E. Leamer. *Specification Searches: Ad Hoc Inference With Non-Experimental Data.* New York: John Wiley & Sons, 1978.
[10] J. Mark and M. A. Goldberg. Multiple Regression Analysis and Mass Assessment: A Review of the Issues. *Appraisal Journal* 56 (January 1988), 89–109.
[11] D. Marks. The Effect of Rent Control on the Price of Rental Housing: An Hedonic Approach. *Land Economics* 60 (February 1984), 81–94.
[12] N. K. Miller. Residential Property Hedonic Pricing Models: A Review. In C. F. Sirmans, editor, *Research in Real Estate*, 31–56. JAI Press, 1982.
[13] Multifamily Housing Report. Department of Planning and Development Management, Lafayette, Louisiana, 1986.
[14] S. Rosen. Hedonic Prices and Implicit Markets: Product Differentiation in Price Competition. *Journal of Political Economy* 82 (February 1974), 34–55.
[15] W. M. Shenkel. The Valuation of Multiple Family Dwellings by Statistical Inference. *Real Estate Appraiser* 41 (January-February 1975), 25–36.
[16] G. S. Sirmans, C. F. Sirmans and J. D. Benjamin. Determining Apartment Rent: The Value of Amenities, Services and External Factors. *The Journal of Real Estate Research* 4 (Summer 1989), 33–44.
[17] G. S. Sirmans, S. D. Smith and C. F. Sirmans. Assumption Financing and Selling Price of Single-Family Homes. *Journal of Financial and Quantitative Analysis* 18:3 (September 1983), 307–17.
[18] C. A. Smith and M. Kroll. Utilizing Market Research to Improve Estimates of Potential Gross Income in Multi-Family Properties. *Appraisal Journal* (January 1988).
[19] ——. Utility Theory and Rent Optimization—An Investigation into Tenant Demographic Characteristics and Hedonic Responses Utilizing Cluster Analysis. Unpublished paper, 1989.
[20] H. C. Smith and J. D. Belloit. *Real Estate Appraisal*, 97–104. Dayton, Ohio: Century VII Pub. Co., second edition 1987.