Apartment Security: A Note on Gated Access and Rental Rates

Authors

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Abstract

The effect of gated access restrictions on garden apartment rents is empirically evaluated. Garden apartment rents are positively related to the presence of gated access constraints, although the combination of in-unit alarms with gated access is rent neutral. One-bedroom and two-bedroom units garner higher rents with the presence of gated access constraints. The research extends prior research on high-rise units indicating that 24-hour security positively impacts occupancy and gross rental income. Given that the study uses data from only one market, additional research for other cities and regions is warranted.

Introduction

There has been substantial research as to the determinants of apartment rents.[1] Most research indicates that rent is driven by complex specific and unit specific amenities, as well as location attributes and linkages. The essence of this existing research is that apartment rents are derived by the interaction of site characteristics with the broader market for residential rental space. Typically, research has focused on hedonic attributes and location attributes either individually or in combination. The present research empirically models the value of garden apartment complex security attributable to the presence of gated access restrictions.

By extending existing work by Benjamin, Sirmans and Zietz (1997) on security measures in high-rise apartments, this study provides those involved in the ownership, management and development of garden-style apartments insight into the value of gated access security measures. Garden-style apartments make up a large portion of existing apartments in many regions of the country and are the standard type of new development in many regions as well. Consequently, this research helps quantify the relationship between gated access and rental rates for a major type of multifamily product. It will also help in determining whether one should expect that gated access restrictions will become a standard apartment amenity over time.[2]

Literature Review

Much prior research has focused on the determinants of apartment performance and rents. There are at least two primary areas of interest and investigation. One based on location attributes, inclusive of economic linkages, and another attempting to determine the importance of amenities on complex occupancy and rents. The research presented here is primarily concerned with the importance of one type of amenity, security, but recognizes the linkages that affect aggregated market performance and controls for these effects.[3]

The research builds on initial works by Marks (1984) and Guntermann and Norrbin (1987) that apply hedonic modeling to residential rental performance. Guntermann and Norrbin show that from a market context amenities such as a pool have a positive effect on rent. Sirmans, Sirmans and Benjamin (1989) confirm the importance of complex and unit amenities in the determination of apartment rents and postulate that amenities are provided based on a cost/benefit analysis by owners and developers. Frew, Jud and Winkler (1990) show that atypicality can negatively impact effective unit rents. In short, hedonic modeling has been used to investigate the value of amenities, to quantify property specific management strategies such as rental concessions (Sirmans and Benjamin, 1994) and to determine the economic effect of use constraints such as prohibitions against smoking (Benjamin, Jud and Winkler, 2001).

Forming the foundation for the present investigation, apartment and complex level security in high-rise apartments was investigated by Benjamin, Sirmans and Zietz (1997). The findings from this study of high-rise complexes indicate that some forms of security, most notably 24-hour security, enhance complex occupancy and rents. The present study builds on these findings by investigating whether the presence of gated access restrictions enhances rental rates for garden-style apartments. By expanding the existing research to garden-style apartment complexes, which are typical in many regions of the country, the study provides empirical evaluation of security measures that have been incorporated into much of the apartment development activity over the last decade.

Data

The data used in this study are derived from a proprietary database maintained by Databank, Inc. of Atlanta, GA. The database provides an approximate census of apartment complexes in the Atlanta, GA Metropolitan Statistical Area (MSA). The sample data includes 434 observations of garden-style apartment complexes with 150 or more units. Complex amenity data was augmented by primary data collection via phone contact with complex managers. The time period from which the data was generated was the second quarter of 1998.

Descriptive statistics for the data used are provided in Exhibit 1. The total number of units within the 434 apartment complexes in the sample is 133,238. The average

Exhibit 1 | Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
General Characteristics				
Total s.f. (000) of complex	312.4	159.7	90.0	1677.9
Number of units in complex	307.8	163.6	150.0	1738.0
Age of complex	18.4	10.4	0.0	55.0
Occupancy (%)	94.9	3.5	80.0	100.0
Average monthly rent per unit	705.4	147.3	250.0	1281.0
Average size per unit	1029.6	173.8	549.3	1795.6
Average rent p.s.f. per month	0.69	0.16	0.37	1.23
Studio monthly rent per unit	547.99	112.2	309.0	795.0
Studio size	527.15	100.5	288.0	729.0
Studio rent p.s.f. per month	1.05	0.20	0.66	1.59
1 bedroom monthly rent per unit	620.21	120.81	350.00	1105.00
1 bedroom size	785.15	98.84	500.00	1100.00
1 bedroom rent p.s.f. per month	0.79	0.16	0.42	1.46
2 bedroom monthly rent per unit	741.92	179.47	250.00	1510.00
2 bedroom size	1111.33	137.54	635.00	1583.00
2 bedroom rent p.s.f. per month	0.67	0.14	0.10	1.31
3 bedroom monthly rent per unit	861.00	223.46	465.00	1815.00
3 bedroom size	1382.46	191.06	745.00	2360.00
3 bedroom rent p.s.f. per month	0.63	0.14	0.30	1.25
4 bedroom monthly rent per unit	855.00	195.84	590.00	1500.00
4 bedroom size	1714.28	291.28	1350.00	2228.00
4 bedroom rent p.s.f. per month	0.51	0.11	0.34	0.81
Longitude	−84.35	0.12	−84.62	−84.09
Latitude	33.85	0.12	33.52	34.13
Amenities				
Pool	0.95	0.21	0.0	1.0
Tennis courts	0.70	0.45	0.0	1.0
Unit alarm	0.33	0.47	0.0	1.0
Gated access	0.37	0.48	0.0	1.0
Fitness center	0.59	0.49	0.0	1.0
Social facility	0.67	0.47	0.0	1.0
Playground	0.51	0.50	0.0	1.0
Patio/balcony	0.93	0.25	0.0	1.0
Washer/dryer hook-up	0.89	0.30	0.0	1.0
Actual washer/dryer	0.17	0.38	0.0	1.0
Fireplace	0.56	0.49	0.0	1.0
Dishwasher	0.96	0.19	0.0	1.0
Cable	0.97	0.17	0.0	1.0
Covered parking	0.14	0.36	0.0	1.0
Garage units	0.15	0.36	0.0	1.0
Air-conditioning	0.99	0.11	0.0	1.0
Pets allowed	0.72	0.45	0.0	1.0

Note: $n = 434$.

number of units per complex is 307 with a range of 150 to 1,738. Apartment complex square footage averages 312,400 square feet while complex age averages 18.4 years with a range of 0 to 55 years. Per unit monthly rents average $705 and range from $250 to $1,281. On a per month unit type basis, studio unit rent averages $547, one-bedroom unit rent averages $620, two-bedroom unit rent averages $741, three-bedroom unit rent averages $861 and four-bedroom unit rent averages $855. Per unit size averages 1,029 square feet. On a unit type basis, studio unit size averages 527 square feet, one-bedroom unit size averages 785 square feet, two-bedroom unit size averages 1,111 square feet, three-bedroom unit size averages 1,382 square feet and four-bedroom unit size averages 1,714 square feet. Per month per unit rent per square foot averages $0.69 with a range of $0.37 to $1.23. On a unit type basis, studio per month rent per square feet averages $1.05, one-bedroom rent per square feet averages $0.79, two-bedroom rent per square feet averages $0.67, three-bedroom rent per square feet averages $0.63 and four-bedroom rent per square feet averages $0.51.

Additional apartment data includes information on complex and unit amenities. Ninety-five percent of complexes have pools and 70% have tennis facilities. Fifty-nine percent of the complexes have a fitness center, 67% have some type of social facility and 51% have playgrounds. Ninety-three percent of complexes have either balcony or patio units, 89% provide washer and dryer hook-ups, 99% have central air-conditioning, 56% have fireplace units, 96% have dishwashers and 97% have cable access. Only 17% provide actual in-unit washers and dryers. Fourteen percent of complexes offer covered parking and 15% have garage units. Pets are allowed in 72% of the complexes. With regard to security and gated access restrictions, 33% of the complexes have in-unit alarms and 37% of complexes have gated access.

Model

Although there have been various models used to investigate and model apartment rents,[4] this study, similar to Benjamin, Jud, and Winkler (2001) and others, employs a modified hedonic model. Because the research question of interest is the effect of gated access restrictions on garden apartment rental rates, market and location variables serve as control variables in this model. Complex and unit specific hedonic variables are used to quantify the rental value of security measures. The general model used is as follows:

$$Rent_i = f(M_{ij}, A_{ij}, S_{ij}), \quad (1)$$

where M_{ij} is a vector of market proxy variables, A_{ij} is a vector of complex and unit variables and S_{ij} is a vector of security variables. The model is operationalized

in a reduced form as a simple OLS model[5] as specified below using both the natural log of rent and rent as the independent variable of interest. The inclusion of the age variable captures functional obsolescence and physical depreciation and reduces the number of amenity variables in the model.

$$\begin{aligned} Log\ (Rent_i) = {} & \alpha + \beta_1 Vac_i + \beta_2 Long_i + \beta_3 Lat_i + \beta_4 UnitN_i \\ & + \beta_5 Age_i + \beta_6 Size_i + \beta_7 Fit_i + \beta_8 Soc_i + \beta_9 Play_i \\ & + \beta_{10} Cover_i + \beta_{11} Gar_i + \beta_{12} WDA_i + \beta_{13} Pet_i \\ & + \beta_{14} Al_i + \beta_{15} Gate_i + \beta_{16} GAL_i + e_i, \end{aligned} \quad (2)$$

where:

$Rent_i$ = The monthly rental rate for the *i*th unit;
Vac_i = The complex vacancy rate of the *i*th unit;
$Long_i$ = The longitude of the *i*th unit;
Lat_i = The latitude of the *i*th unit;
$UnitN_i$ = The number of units in the *i*th complex;
Age_i = The age of the *i*th unit;
$Size_i$ = The size of the *i*th unit;
Fit_i = The presence of a fitness center (1 = yes);
Soc_i = The presence of a social facility (1 = yes);
$Play_i$ = The presence of a playground (1 = yes);
$Cover_i$ = Covered parking available (1 = yes);
Gar_i = Garage units available (1 = yes);
Pet_i = The presence of pets allowed (1 = yes);
WD_i = The presence of in-unit washer and dryer hook-ups (1 = yes);
WDA_i = The presence of actual in-unit washer and dryer (1 = yes);
Al_i = Unit alarms only (1 = yes);
$Gate_i$ = Gated access only (1 = yes);
GAL_i = Unit alarms and gated access (1 = yes); and
e_i = A random error term.

The market variables include the complex vacancy rate and longitude and latitude coordinates that control for location attributes not specified in the model.[6] Because number of units has been shown to be a determinant of rent in past studies, it is included here as well. As noted, the inclusion of age as an independent variable controls for functional and physical obsolescence.[7] Unit size is included in the model and is correlated with the number of bedrooms in each unit.[8] Complex amenities modeled include the presence of social facilities, fitness facilities and a playground facility. The presence of actual in-unit washer and dryer units and the presence of washer and dryer hook-ups also are modeled. This allows for the

modeling of functional obsolescence with the hook-up variable along with possible additional rental income for providing actual washer and dryer units. Over time, apartments have become less differentiated for having washer and dryer hook-ups while property managers and investors have seen an increase in the importance of providing these appliances given their lower incremental costs versus a unit's increased marketability. The presence of garages and the presence of covered parking are included in the model. Following prior research, a variable for the allowance of pets is also included in the model. The security related variables include an alarm only variable, a gated access only variable, and a combined unit alarm and gated access variable. The base case has neither gated access nor unit alarms.[9]

In addition to an aggregated model, unit type specific regressions for one-, two- and three-bedroom unit types are run given that Wolverton, Hardin and Cheng (2000) provide evidence that marginal apartment unit rental effects differ by unit type. This permits the evaluation of attribute values across the potentially differentiated markets for one-, two- and three-bedroom units.

Results

The results for the aggregated model are provided in Exhibit 2 and are generally as expected. Both the natural log of rent and rent are modeled. The adjusted R^2 measures for the two models are within the range found in prior studies (.668 and .680, respectively). Variance inflation factors are provided with no evidence of multicollinearity problems. The complex vacancy rate variable is not statistically significant. Given the excess overall demand for residential units for the time period under study, this is not an untenable empirical result. In the four years prior to the period from which the data in this study was taken, the overall market occupancy rate was consistently around 94% even with a 10% increase in available units during the period.[10] The longitude and latitude variables are reflective of the growth pattern of the MSA from which the data is taken and follows economic growth inclusive of employment gains within the market.

The amenity and property variables are consistent for both the natural log of rent and rent models. The number of units in the complex does not impact rental rates.[11] The age variable is negative as expected and measures the functional and physical depreciation of rental units as they age. Apartment size is positive and statistically significant as would be expected. The larger apartments garner more rent. The complex amenity variables—fitness center and social facility—are positive and statistically significant. The presence of playground facilities is negative and statistically significant. This result is consistent with potential market signaling that the landlord is willing to accept more tenants per unit and is attempting to extend marketing efforts away from more traditional renters.[12] Both covered parking and garage measures are positive and statistically significant. People will pay for the right to covered parking, which reduces potential

Exhibit 2 | Aggregated Apartment Rent Model

	Log of Rent	Rent	VIF
Intercept	−9.051	−13230.25	
	(−3.099)***	(−5.391)***	
Market Variables			
Vacancy	−0.053	−26.737	1.044
	(−0.810)	(−0.486)	
Longitude	−0.072	−94.760	1.030
	(−2.295)**	(−3.578)***	
Latitude	0.263	163.834	1.260
	(7.231)***	(5.352)***	
Amenity & Property Variables			
Unit number (100)	0.004	3.361	1.162
	(1.621)	(1.488)	
Property age	−0.006	−4.349	1.619
	(−12.282)***	(−10.799)***	
Apartment size (100 s. f.)	0.053	39.000	1.038
	(38.858)***	(34.284)***	
Fitness center	0.057	40.129	1.624
	(5.581)***	(4.657)***	
Social facility	0.022	17.024	1.198
	(2.529)**	(2.256)**	
Playground	−0.070	−54.996	1.118
	(−8.310)***	(−7.773)***	
Covered parking	0.045	39.859	1.334
	(3.389)***	(3.551)***	
Garages	0.086	84.971	1.533
	(6.347)***	(7.471)***	
Washer / dryer hook-up	0.012	0.886	1.186
	(0.404)	(0.073)	
Actual washer / dryer	0.035	26.077	1.117
	(3.081)***	(2.672)***	
Pets allowed	0.083	46.384	1.283
	(6.815)***	(4.559)***	
Security Variables			
Gated access only	0.032	26.251	1.450
	(2.663)***	(2.604)***	
Unit alarm only	−0.004	−2.405	1.314
	(−0.292)	(−0.219)	
Gated and unit alarm	0.007	7.247	1.422
	(0.613)	(0.701)	
Adj. R^2	0.750	0.700	
F-Statistic	180.29	140.36	

Notes: t-Statistics are in parentheses.
*Significant at the .10 level.
**Significant at the .05 level.
***Significant at the .01 level.

automobile damage and provides comfort given the high temperatures common in Atlanta. Garages also generate a rent premium as they provide direct access to the rental unit, reduce the likelihood for automobile damage and provide additional storage space for the tenant. The presence of actual washers and dryers improves rents, but hook-ups do not. Given that the model includes location variables and age and 89% of units have hook-ups, this result is not surprising as these variables capture functional obsolescence. Allowing pets is positive and statistically significant.

With respect to the security variables of interest, the gated access only variable is positive and statistically significant. Neither the unit alarm only nor the gated and unit alarm variables are statistically significant. The unit alarm findings are consistent with prior studies. The combination unit and gated access variable indicates that an over utilization of security measures may be perceived as a negative signal by the market. In no cases do the security measures show a statistically significant negative effect.[13]

The unit type specific models are provided in Exhibit 3. Rent is initially modeled as the natural log of rent and rent on a unit and per square foot basis. The consistency of the results allows for the presentation of only the per unit natural log of rent models. The adjusted R^2 measures for the three models are similar to past investigations (.668, .680 and .701, respectively). Variance inflation factors approximate those found in Exhibit 2, which indicate no multicollinearity.[14] Once again, the complex vacancy rate variable is not statistically significant. With regard to the longitude and latitude variables, the latitude variable is statistically significant and positive in all models reflective of the exceptional economic growth in the northern part of the Atlanta MSA. The amenity and property variables are consistent with the aggregate model. The age variable is negative and statistically significant across all models. The size variable is statistically significant across the models with the magnitude of the coefficients declining over unit type. The presence of a social facility is more valued by three-bedroom unit tenants. This is consistent with a need for additional space for social activities. The playground variable is negative across unit type as found in the aggregated model. Covered parking adds value, but has limited value to the tenants of three-bedroom units. The presence of garages is valued across all unit types, but the greatest impact is on three-bedroom units. Three-bedroom units with garages provide more storage space than is typically found in an apartment and reduce a tenant's need for a self-storage unit. The washer and dryer variable is positive and statistically significant for the one-bedroom unit type. This is a convenience issue coupled with the likelihood that tenants needing more bedrooms may only need hook-ups, as they are more likely to already own these types of appliances.[15] The permitting of pets is positive across all models. This likely reflects the recouping of additional costs in the form or increased wear and tear for units with pets.

With regard to the security variables of interest, the gated access only variable is positive and statistically significant for both the one-bedroom and two-bedroom unit models. Gated accessibility does not impact three-bedroom unit rent.

Exhibit 3 | Disaggregated Apartment Rent Model by Unit Type

	Log of Rent	Log of Rent	Log of Rent
	1 Bedroom	2 Bedroom	3 Bedroom
Intercept	−3.040	−10.464	−13.718
	(−0.676)	(−2.127)**	(−2.345)**
Market Variables			
Vacancy	−0.069	−0.072	−0.007
	(−0.688)	(−0.635)	(−0.054)
Longitude	−0.007	−0.082	−0.098
	(−0.147)	(−1.558)	(−1.548)
Latitude	0.251	0.285	0.347
	(4.497)***	(4.710)***	(4.746)***
Amenity & Property Variables			
Unit number (100)	0.002	0.002	0.070
	(0.393)	(0.606)	(1.065)
Property age	−0.006	−0.006	−0.005
	(−7.518)***	(−7.971)***	(−5.025)***
Apartment size (100 s. f.)	0.041	0.039	0.026
	(6.596)***	(7.816)***	(5.559)***
Fitness center	0.054	0.059	0.081
	(3.448)***	(3.497)***	(3.845)***
Social facility	0.016	0.020	0.038
	(1.187)	(1.424)	(2.118)**
Playground	−0.065	−0.075	−0.091
	(−5.099)***	(−5.482)***	(−5.060)***
Covered parking	0.040	0.055	0.034
	(2.049)**	(2.520)**	(1.184)
Garages	0.062	0.084	0.164
	(3.155)***	(3.784)***	(5.374)***
Actual washer/dryer	0.053	0.027	0.015
	(3.141)***	(1.490)	(0.646)
Pets allowed	0.089	0.088	0.084
	(4.590)***	(4.309)***	(3.701)***
Security Variables			
Gated access only	0.039	0.045	0.010
	(2.157)**	(2.324)**	(0.429)
Unit alarm only	−0.009	0.002	0.008
	(−0.444)	(0.103)	(0.304)
Gated and unit alarm	0.016	0.005	−0.015
	(0.901)	(0.239)	(−0.580)
Adj. R^2	0.668	0.680	0.701
F-Statistic	43.12	50.45	37.36

Notes: t-Statistics are in parentheses. 1 bedroom: $n = 388$; 2 bedroom: $n = 428$; 3 bedroom: $n = 281$.

*Significant at the .10 level.

**Significant at the .05 level.

***Significant at the .01 level.

This result is consistent with both the desire of single tenants for controlled access and the necessity of households requiring three bedrooms to place less value on controlled access to the apartment complex given the limited number of these units within the Atlanta market. Three-bedroom tenants are also more likely to be inconvenienced by accessibility constraints, as the number of occupants per unit will likely be higher when compared to one- and two-bedroom units. As is the case in the aggregated model, neither the unit alarm only variable nor the gated and unit alarm variable are statistically significant. Again, none of the models manifest security measures with a statistically significant negative effect.

Conclusion

This empirical investigation extends research on apartment security measures to garden style apartment complexes. Given the importance of this type of complex in many areas of the country, the results provide both academics and practitioners guidance in evaluating gated access apartment complexes. Using data from one major apartment market, apartment complexes with gated access are shown to extract a rent premium.[16] The magnitude of the rent premium varies by unit type as one- and two-bedroom units garner this premium. As is often the case with empirical real estate research, the ability to substantially generalize these findings to additional markets will require additional research. Regional and MSA-specific characteristics may limit their applicability.

The presence of gated access constraints is likely to become more and more common as this amenity is incorporated into best practices policies. For new development, gated access is likely to become a standard feature, although the rental premium for this amenity will likely decline because it will be less important in differentiating apartment complexes as more units are developed with this amenity. In the long term, given movement in the demand and supply of residential units, one might expect a market reaction similar to that found in Benjamin, Sirmans and Zeitz (1997) where improved occupancy as opposed to improved rental income is the norm. Then the lack of gated access restriction would be a form of functional obsolescence.

The need for much additional research is apparent. As is the case in most existing apartment complex or unit-type specific research, data limitations restrict our ability to generalize these results across all markets. In a best-case scenario, complex and unit-type specific panel data can be used to extend existing research. The lifecycle of amenities via the incorporation of more functional amenities at the unit and complex levels should be an area of interest. The market participants actually capturing the economic benefits from amenity innovation could then be determined allowing for better model specification and the testing of existing theory. Given any real estate market with potential constraints on supply, the ability to generate well specified models can be improved with more data for more markets over a longer time period.

Endnotes

[1] Jud, Benjamin and Sirmans (1996) provide an extensive review of rent generation in apartments. Also see Sirmans and Benjamin (1991).

[2] It is postulated that as a new amenity becomes a standard or required amenity, the value for this amenity will fall. Ultimately, the lack of the amenity will reflect functional obsolescence. In short, over time the premium for the amenity will diminish and a discount for the lack of the amenity may be evident. In this research, gated access complexes are only found in 37% of the sample, indicating that they have yet to become a complex standard.

[3] There is a large amount of research on market performance, transportation linkages [see Gatzlaff and Smith (1993) and Benjamin and Sirmans (1997) for example] and macroeconomic influences.

[4] Two- and three-stage models of occupancy and rent have been used by Benjamin, Sirmans and Zietz (1997), Benjamin, Chinloy and Sirmans (2000) and others to reflect the endogenous relationship between occupancy and rent.

[5] Given that the initial OLS regressions derived in this study indicate that vacancy does not impact rents during the period from which data is supplied, a standard OLS model is used. During the period under investigation, the Atlanta market was experiencing exceptional employment growth with increased demand for rental units and increased rental rates. The interaction between occupancy and rent would be more reflective with panel data, which captures changes in occupancy and rent and the addition of new rental units. Two-staged OLS regressions were run, but the results did not change.

[6] The goal is to reduce locational variation. Distance measures are not used given that the research question of interest is not the linkage of complex location and related economic activity.

[7] The age variable captures functional obsolescence and physical depreciation. As might be expected, other hedonic variables that have been shown to increase rents such as the presence of dishwashers, complex pool and cable access are proxied by this variable. The age variable can be argued to be a more theoretically sound measure than specific hedonic attributes given that over time amenities become standard in newer complexes.

[8] Some past studies have used the number of bedrooms as a proxy for size. In this case, actual average unit size at the complex level is available and used. Additional unit type analysis aids in the evaluation of results.

[9] Management related variables are not included as all units require deposits and are professionally managed. Sirmans and Sirmans (1991) find that in an apartment market with greater variability in complex size, professional designations may signal better management and higher rents.

[10] See McDonald (2001) for a synthesis of the interaction between the physical real estate market and the market for space.

[11] Benjamin and Lusht (1993) show that the more units a property management firm has under management the lower the search cost and higher the rents. The data in this study is limited to large garden complexes to control for management structure issues.

[12] This is consistent with Benjamin, Chinloy and Sirmans' (2000) finding that Section 8 vouchers extend the tenant pool. It is likely that a measure of the lower quality clientele can be specified as being large family households.

[13] In-unit alarms generally require additional costs by the tenant for them to be connected with a security company. Disaggregated crime data is not available at a level sufficient to model apartment complex specific crime. A general filtering of the data appears to show that most complexes with gated access restrictions are not in areas where one would expect higher than average crime. Preliminary investigation indicates that there was also no definable demographic or racial variable associated with those complexes with gated access.

[14] The variance inflation factors are not reported to minimize the number of exhibits. The VIF results are consistent with those from the initial model shown in Exhibit 2.

[15] The payback period for the appliances is about 24-30 months.

[16] It may be necessary to confirm these findings in other markets.

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