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Length of residence discounts, turnover, and demand elasticity. Should long-term tenants pay less than new tenants? ☆

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Abstract

Previous academic work on rental contracts has predicted that landlords will attempt to minimize turnover costs by giving discounts to long-term tenants. If long-term tenants have less elastic demand than short-term tenants, however, landlords might prefer to give discounts to short-term tenants. A model is developed in this paper in which landlords take account of both turnover costs and demand elasticity. Evidence from a survey of apartment managers is consistent with the model and shows that length-of-residence discounts are less common than discounts on the first month's rent for new tenants.

1. Introduction

Landlords face a complex problem when they set rents. If tenants are identical, the problem is simply to determine the extent of a landlord's market power, from which optimal monopoly rent can be calculated. Since tenants

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differ in important ways, the problem is more complex than this. The academic literature on rental contract lengths generally predicts that landlords will attempt to minimize turnover costs by charging long-term renters less rent than short-term renters.[1]

A weakness in this strategy that the academic literature has not addressed is that long-term tenants are likely to have less elastic demand than short-term tenants. Long-term tenants have made significant investments in their location, including building relationships with neighbors and local businesses, knowledge of the area, and perhaps an emotional attachment to their immediate location. These tenants are unlikely to move because of a small increase in rent. A prospective tenant of an apartment complex, however, often has no particular attachment to a single location. If many properties are similar, a small difference in rent could be the deciding factor in the prospective tenant's location decision. A profit-maximizing landlord will attempt to exploit differences in demand elasticity by charging higher rent to tenants with less elastic demand.[2]

In this paper, a simple model of tenant demand is constructed and its implications are evaluated with survey data. In the model, tenants are divided into two groups, and the optimal rent charged to each group depends on relative demand elasticity and turnover costs. Section 2 describes this model, Section 3 discusses the results of a survey of apartment managers, and Section 4 concludes.

2. Model

In this section, two models are discussed, one in which landlords are able to identify which tenants have elastic demand and which have inelastic demand, and another in which landlords are unable to make this identification.

Turnover cost is important to owners of rental property and is an important part of these models. The cost of turning over an apartment unit usually includes painting, cleaning, and loss of rental income while this work takes place and a new tenant is found. The Institute of Real Estate Management, IREM (2001), reports that median painting and decorating expenses for garden-style apartments in the US are \$143 per unit, and that the average turnover rate is 61% per year, which implies that each unit turnover costs \$234 for painting and decorating. Gabriel and

[1] See Miceli and Sirmans (1999), Shear (1983), and Flath (1980). Length-of-residence discounts are also discussed in Hubert (1995), Miron (1990), Guasch and Marshall (1987), Goodman and Kawai (1985), Weinberg et al. (1981), and Follain and Malpezzi (1980).

[2] Rental price discrimination in different contexts is discussed in Benjamin and Sirmans (1992), Kondor (1995), and Benjamin et al. (1998).

Nothaft (2001) show that the average duration of vacancy after a move-out is around 1.5 months. The average cost of rent and utilities for an apartment in the US is $580 per month.[3] Painting and decorating, cleaning at $70 per turnover,[4] and forgone rent costs therefore total approximately $1174. Repair costs are not included in turnover costs, since repair of ordinary wear and tear must be performed eventually whether or not there is turnover, and the cost to repair damage other than ordinary wear and tear can often be recovered from the tenant.

Turnover costs have not been increasing as rapidly as rents. IREM (2001) reports that for all properties in their sample, rents increased by 17.6% between 1996 and 2000, while painting and decorating costs fell by 7.0%. This trend, however, is not uniform by building type or age. Older properties of all types and high-rise apartment buildings have seen painting and decorating costs rise more rapidly than rents.[5]

2.1. Landlord can identify tenant demand elasticity

A firm with any degree of market power can maximize profits through price discrimination. In other words, the firm can charge higher prices to customers with inelastic demand than to those with elastic demand. The difficulty for the firm is in distinguishing different kinds of customers, and in preventing customers with inelastic demand from misrepresenting themselves as belonging to a group with elastic demand. Suppose that apartment leases have a standard length, and that there are two types of apartment tenants: "slow movers" and "fast movers," who differ in the rate at which they renew their leases.[6] In this section, it is assumed that the landlord can, at no cost, immediately identify fast movers and slow movers and charge them different rents.

Suppose that the parameters of the demand curves of fast and slow movers can be identified by observing two points on the curves. The current rents and rental activity constitute one point, and the rent at which no new rentals would be obtained from each group constitutes another point. The former point can be immediately observed, and a landlord might estimate the latter point by surveying tenants, experimenting, or intuition.

[3] American Housing Survey for the United States 1999, United States Census Bureau, October, 2000, p. 216.

[4] This figure was obtained from an informal survey of apartment property managers and owners. The survey also found typical painting and decorating costs of $40 for paint and $175 for labor, close to the estimate of IREM (2001).

[5] Shear (1983) discusses building age and turnover costs.

[6] The terminology follows that of Miceli and Sirmans (1999).

This situation can be modeled as follows. Tenants moving into an apartment complex lease their apartment for n periods, then decide whether to renew for another n periods. Some tenants are slow movers, with a renewal rate of R_s, and other tenants are fast movers, with a renewal rate of R_f. At a monthly rent of P_s, S new slow-moving tenants will move in per month, and at a monthly rent of P_f, F new fast-moving tenants will move in per month. Turnover costs, including lost rent during vacancy and the cost of refurbishing the apartment, are equal to c. One point on each demand curve can be identified from the fact that current rents are P_s^{cur} and P_f^{cur}, and there are currently F^{cur} and S^{cur} tenants moving into the property each month. Another point on each demand curve can be identified by assuming that no new fast-moving tenants would move to the property if their rent was raised to P_f^{max} per month, and no new slow-moving tenants would move to the property if their rent was raised to P_s^{max}.

Eq. (1) shows log-linear demand curves for these two groups. Since we are identifying points where S and F are equal to zero, it is convenient to add one to S and F before taking logarithms

$$\begin{aligned} \ln(P_f) &= \alpha_f + \beta_f \ln(F+1), \\ \ln(P_s) &= \alpha_s + \beta_s \ln(S+1), \end{aligned} \tag{1}$$

where

$$\alpha_f = \ln(P_f^{max}), \quad \alpha_s = \ln(P_s^{max}), \tag{2}$$

$$\beta_f = \frac{\ln(P_f^{cur}) - \ln(P_f^{max})}{\ln(F^{cur}+1)}, \quad \beta_s = \frac{\ln(P_s^{cur}) - \ln(P_s^{max})}{\ln(S^{cur}+1)}.$$

Suppose that an apartment complex with U units has just been built. Rents for slow-movers and fast-movers are set at P_s and P_f, and S new slow-movers and F new fast-movers move in each month. The leases of the first tenants to move in expire after n periods, and R_sS slow-movers renew their leases, while R_fF fast-movers renew their leases. After another n periods some tenants will renew for the second time. Eventually the complex will have a constant population of $n(F+S)$ tenants on their first leases, $n(R_fF + R_sS)$ tenants on their second leases, $n(R_f^2F + R_s^2S)$ tenants on their third leases, and $n(R_f^{j-1}F + R_s^{j-1}S)$ tenants on their jth leases. As j approaches infinity, the population will approach $nS/(1-R_s)$ slow-movers and $nF/(1-R_f)$ fast-movers. If the population is stable, the number of move-outs will equal the number of move-ins, and turnover costs will equal $c(F+S)$. Profit for the landlord, π, will be equal to total revenue minus costs. Costs will consist of turnover costs, $c(F+S)$, and other costs, C, which are not related to F and S

$$\pi = P_s \frac{nS}{1-R_s} + P_f \frac{nF}{1-R_f} - c(F+S) - C. \tag{3}$$

The landlord will set P_s and P_f so as to maximize profits subject to the constraint that the total number of apartments rented is less than or equal to U. An example of a linear programming solution to this problem is shown in Fig. 1. Assumptions regarding turnover and move-in rates were made to match data in Goodman (1997) and IREM (2001). Goodman (1997) finds that age is a good predictor of the length of stay for apartment tenants, and his data are used as an example of a possible population of fast movers and slow movers. Thirty-one per cent of tenants over the age of 40 remain in their apartment for four or more years, while only 11% of tenants under the age of 40 remain for four or more years. If renewal rates are constant, then this implies an annual renewal rate of 68% for older tenants and 48% for younger residents, so R_s is set at 68% and R_f is set at 48%. Goodman (1997) also reports that the number of new move-ins who are under age 40 is approximately three times the number of new move-ins who are over age 40. If the apartment complex has 400 units, then these assumptions imply that S is equal to approximately 3.75 and F is equal to approximately 11.25. The landlord observes these values of S and F at a current rent of $550 per month for both fast-movers and slow-movers. The landlord believes that S and F would both reach zero if the monthly rent was raised to $1000. This implies that the demand of slow-movers is less elastic than demand of fast-movers, since the same change in prices resulted in a drop of 3.75 move-ins per month for slow-movers, but a drop of 11.25 per month for fast-movers.

Fig. 1 illustrates that if turnover costs are below $2,700, then a profit-maximizing landlord would charge slow movers higher rent than fast movers. The landlord needs both types of tenants in order to fill her apartments, but she can maximize profits by fine-tuning the mix between slow and fast movers by observing relative demand elasticities and adjusting rents accordingly.

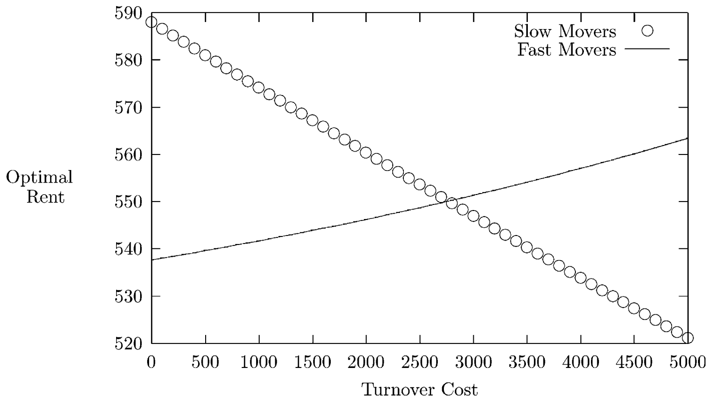

Fig. 1. Optimal rent for fast and slow movers with identification.

2.2. Landlord cannot identify tenant demand elasticity

Identification of fast and slow movers is likely to be difficult in practice. In fact, tenants themselves might not know at first whether they are fast or slow movers. In this section, it is assumed that the landlord only observes the total number of move-ins each month and the overall renewal rate. The landlord chooses two rental rates: one for the first year of occupancy, and another for tenants who renew their leases. Since a larger fraction of the renewing tenants will be slow-movers than is the case for new tenants, this pricing plan is able to discriminate between fast and slow movers, but with less accuracy than the plan presented in the previous section.

Notation in this section is as follows. I is the total number of new tenants moving into the property each period. All new tenants are charged the first year rent, P_f, during their first lease. R is the rate at which existing tenants renew their leases. R is a function of the rent tenants are charged during their second and later leases, P_s. There are n periods per lease. For a one-year lease with 12 periods per lease, n would be equal to 12.

Similar to the previous section, the population of first-year tenants at any time will be equal to nI. There will be nIR second-year tenants, nIR^2 third-year tenants, and nIR^{j-1} jth-year tenants. The total population of tenants will eventually approach $nI/(1-R)$, with nI tenants paying P_f and the remainder, $nI(R)/(1-R)$, paying P_s. If the population is stable, then the number of move-outs each month will be equal to the number of move-ins, I, so total turnover costs will be cI per month.

The demand curve for new move-ins is shown in Eqs. (4) and (5). In order to identify one point on the curve, it is assumed that no new tenants would move to the property if the rent were raised to P_f^{max} per month. Another point on the curve is identified by the fact that there are currently I new tenants moving into the property per period at a rent of P_f^{cur}. The renewal rate is currently observed to be R at a rent of P_s^{cur}. I will assume that market studies have demonstrated that the renewal rate would reach zero if P_s was raised to P_s^{max}.

$$\ln(P_f) = \delta_f + \gamma_f \ln(I+1), \tag{4}$$

$$\ln(P_s) = \delta_s + \gamma_s \ln(R+1),$$

where

$$\delta_f = \ln(P_f^{max}), \quad \delta_s = \ln(P_s^{max}) \tag{5}$$

$$\gamma_f = \frac{\ln(P_f^{cur}) - \ln(P_f^{max})}{\ln(I^{cur}+1)}, \quad \gamma_s = \frac{\ln(P_s^{cur}) - \ln(P_s^{max})}{\ln(R^{cur}+1)}.$$

Profit per period for the landlord will be:

$$\pi = P_f nI + P_s nI(\frac{R}{1-R}) - cI - C. \tag{6}$$

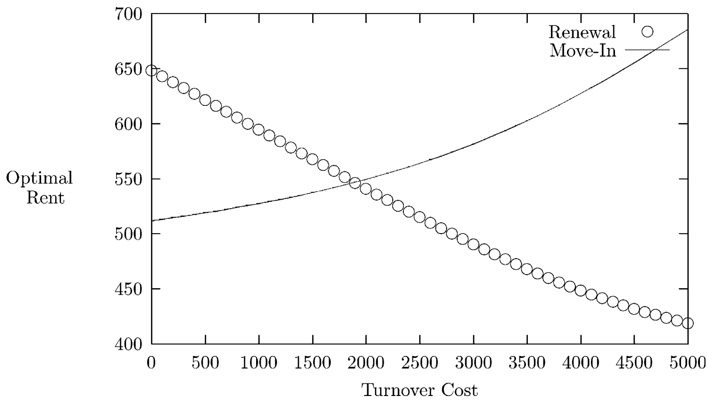

Fig. 2. Optimal rent for renewals and new move-ins.

An example of a linear programming solution to this problem is shown in Fig. 2. At a monthly rent of \$550, 15 new tenants move in each month and R is equal to 0.53. No new tenants would rent apartments if rents were raised to \$1000 per month, and no tenants would renew their leases if their rents were raised to \$1000 per month. As in the earlier example, if turnover costs are low, a profit-maximizing landlord will charge new tenants less per month than long-term tenants. In this case, if turnover costs are below \$1900, then a profit-maximizing landlord would charge higher rent for renewals than for new move-ins.[7]

This example can be modified to show the effects of different elasticities of demand. For example, if renewals and new move-ins went to zero at a monthly rent of \$700 per month, then the level of turnover costs below which a profit-maximizing landlord would charge more for renewals than new move-ins drops to \$760.

A landlord might accomplish the strategy outlined above with the common technique of a discount on the first month's rent. This pricing strategy has many advantages. New tenants might be credit-constrained, so they might prefer a large reduction in the first month's rent to smaller reductions spread throughout the lease term, even if the net present value of the reductions discounted by the market interest rate is smaller. A discount on the first month's rent also allows all tenants (after their first month) to pay the same amount, reducing confusion, reducing the shock of a large rent in-

[7] The assumptions about demand elasticity are quite different between these two examples, so the numbers are not directly comparable. In the first example, only the slow-movers have inelastic demand, while in the second example all tenants that renew their lease have inelastic demand.

crease upon lease renewal, and reducing the possibility that long-term tenants will notice rent differences between themselves and new tenants.

Upon renewal, tenants will not receive the first-month discount, so their effective rent will be higher than that of new tenants. With this rent structure, the landlord is able employ price discrimination in order to exploit the differences in tenant demand elasticity, even though she is unable to identify the elasticity of demand of a tenant at the time the tenant moves in.

3. Survey evidence

To determine whether discounts are more likely for long-term or short-term tenants, I surveyed 102 apartment complexes. The complexes were randomly chosen from metropolitan areas distributed across the United States. A property manager at each property was asked the following questions:

1. Do your long-term tenants pay the same, higher, or lower rent than new tenants?
2. Do you offer discounts on the first month's rent to new tenants?

Table 1 displays the results in ascending order of preference to long-term residents. The first line shows that 39 properties offered discounts on the first month's rent to new tenants, and no discounts to long-term residents. The second line shows 22 mixed situations, with both discounts on the first month's rent and discounts for long-term residents. All properties were not asked the amount of the discounts, but it appears that the first-month's-rent discounts tend to be larger than the length-of-residence discounts. The third line shows 24 properties with no discounts, so that long- and short-term tenants pay exactly the same rent. The fourth line shows 17 properties with no first month's rent discount and a discount for long-term residents.

Discounts for short-term residents appear to be more common than discounts for long-term residents, although both clearly exist, a result that is consistent with the model presented in the previous section.[8] The model used plausible assumptions of demand elasticities to predict a relationship between turnover costs and relative prices charged to long-term and short-term residents. The level of turnover cost that divided discounts for long-term residents and discounts for short-term residents was close to the average actual level of turnover costs, so it seems likely that we should observe both. Properties are likely to differ from each other with respect to turnover costs and demand curves, so the model suggests that the optimal

[8] Data on first-month discounts are not generally available, and this difficulty might explain why earlier studies, such as Goodman and Kawai (1985) and Follain and Malpezzi (1980) found evidence of pervasive length-of-residence discounts. Other difficulties with these studies are discussed in Guasch and Marshall (1987).

Table 1
Survey results

First-month discount, no length discount	39
First-month discount, length discount	22
No first-month discount, no length discount	24
No first-month discount, length discount	17
Total	102

strategy for some would be discounts for long-term residents, and for others would be discounts for short-term residents.

The situation is different for very short-term leases. Properties were also asked if they charged extra for month-to-month leases. Only five properties reported that they offered month-to-month leases at the same monthly rent as longer leases, and the average premium for a month-to-month lease was \$83 per month.[9] There are several possible explanations for premiums on very short leases. For example, long-term leases can reduce the variance of revenue for landlords. Also, tenants who plan to abuse a unit will likely choose a very short lease term, so that they can then move on to a fresh unit.[10]

4. Conclusion

The models presented in Section 2 predict that properties with low turnover costs will charge long-term tenants higher rent than short-term tenants, assuming that the demand of short-term tenants is more elastic than that of long-term tenants. The level of turnover cost that leads to discounts for short-term tenants is close to the actual level of turnover costs. Turnover costs vary, so we should expect to find some properties with discounts for long-term residents, and others with discounts for short-term residents. A survey of apartment complexes finds evidence that is consistent with these models. The survey finds that that discounts for short-term residents are more common than discounts for long-term residents.

[9] The importance of the length of a lease for residential property is discussed in Miceli and Sirmans (1999) and Hubert (1995). The length of commercial leases is discussed in Gertner (1990) and Benjamin et al. (1990, 1992). See Grenadier (2002) for an analysis of the term structure of real estate leases.

[10] Benjamin et al. (1998) and Flath (1980). Other possible explanations include the seasonal nature of apartment demand and the possibility that a month-to-month tenant will move at a time of the year when demand is low, the fact that many month-to-month tenants are sponsored by their employers and their demand might be less elastic than that of other tenants, and a preference on the part of tenants for non-transient neighbors.

Long-term tenants often make the case to landlords that they deserve lower rent because of their loyalty to a property, and because they have saved the landlord significant turnover costs. Some landlords do limit rent increases given to long-term tenants, and in some cases this results in long-term tenants paying rents that are significantly below market levels. It is likely that the cost of turnover is high for these landlords. For normal turnover costs, however, discounts for long-term renters may not be a profit-maximizing strategy. Most landlords appear to increase rents to market levels when tenants renew their leases, and many of those who do not do so give discounts on the first month's rent to new tenants, resulting in overall similar rent between long-term and short-term tenants. Many landlords go further than this, raising rents for existing tenants to market levels and giving discounts to new tenants. Landlords do this because they know that their existing tenants like where they live, and are unlikely to move because of a rent increase. New tenants, however, have no attachment to any particular property, and will respond to small changes in rent.

Data presented in IREM (2001) indicate that rents have risen faster than turnover costs for most properties in recent years, although the opposite is true for older properties and high-rise buildings. The models presented in Section 2 predict that if these trends continue, length-of-residence discounts will become less frequent and discounts for new residents will become more frequent. Lower moving costs and increased tenant mobility would result. Older properties and high-rise buildings, however, may increasingly offer length-of-residence discounts if turnover costs continue to rise faster than rents.

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