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Efficiency rents: A new theory of the natural vacancy rate for rental housing

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ABSTRACT

This paper adapts the theory of efficiency wages to explain the natural vacancy rate in rental housing markets. A positive vacancy rate provides landlords an incentive to invest in maintenance because if they fail to do so, some tenants will leave and the unit will sit vacant for a finite period of time. The resulting foregone rent will penalize landlords' failure to maintain. Habitability laws, which have been enacted by states since the 1960s, provide a non-market penalty which lessens the need for market enforcement. Variation in these laws by state offers an opportunity to test the theory.

1. Introduction

Economists studying the rental housing market often argue that there exists a "natural" vacancy rate that, like the natural unemployment rate, persists because of imperfections in the price adjustment process. Theoretical explanations for this phenomenon have primarily focused on renter search costs, which prevent the instantaneous adjustment of rents (Read, 1991; Wheaton, 1990; Guasch and Marshall, 1985).[2] Similar arguments have been used to explain the existence of involuntary unemployment in the labor market.

An alternative strand of literature in the labor market context, however, has emerged to offer a different kind of explanation for equilibrium unemployment. These so-called "efficiency-wage" models of the labor market contend that wages remain above the market-clearing level because cuts in wages would result in higher costs and/or lower worker productivity (Akerlof and Yellen, 1986). In one version of this argument, Shapiro and Stiglitz (1984) argue that equilibrium unemployment gives workers an incentive to work hard because if they are caught shirking and are fired, they will not immediately be able to find another job and hence will suffer a financial penalty.

This paper adapts the Shapiro–Stiglitz model to the rental housing context by suggesting that an equilibrium vacancy rate similarly imposes costs on landlords who fail to maintain their units in a habitable state. The reason is that, if a sitting tenant detects the under maintenance and vacates the unit, the offending landlord will not immediately find a replacement tenant and will therefore forego the rental income for a finite period of time. We do not propose this "efficiency-rent" theory as a replacement for search-cost explanations of equilibrium vacancies (any more than efficiency wage models are meant to supplant labor search models), but rather as a complement to it.

The paper is organized as follows. Section 2 lays out the model and derives the principal results, assuming homogeneous housing units. Section 3 then extends the analysis to

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[2] For empirical analyses of the natural vacancy rate, see Eubank and Sirmans (1979), Rosen and Smith (1983), and Gabriel and Nothaft (2001).

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account for differences in housing quality. Finally, Section 4 concludes.

2. The model

The model to be developed in this section is a straightforward adaption of the Shapiro and Stiglitz (1984) model to the rental housing context. Suppose there are N landlords, each of whom offers a single unit for rent.[3] If the landlord succeeds in renting out his unit during a given period, he earns a market-determined rent of R, whereas if the unit remains vacant, he earns nothing. In each period that the unit is occupied, the landlord must decide whether or not to invest in maintenance at a cost of m. The function of maintenance is to maintain a certain level of housing quality by offsetting the usual wear and tear associated depreciation.[4]

At the end of each period, sitting tenants will vacate their units for exogenous reasons (e.g., job relocation) with probability a, regardless of whether or not the landlord invested in maintenance. In addition, a tenant will vacate with probability b if the landlord did not invest in maintenance.[5] This reflects the reaction of tenants who value a certain level of housing quality and are willing (or able) to move when the landlords fails to maintain that level. The overall probability that a sitting tenant will vacate her unit is therefore a if the landlord invests in maintenance, and $a + b$ if he does not.

The possibility of losing a tenant, with the resulting foregone rent, is one means of ensuring landlord maintenance, but there may also be legal sanctions. Changes in landlord–tenant laws during the mid-twentieth century imposed on landlords a legal duty to maintain their buildings in a "habitable" condition.[6] Failure to do so generally results in some sort of monetary sanction in the form of damages (possibly through withholding of rent) and/or fines. To capture the disciplinary function of these habitability laws, we assume that landlords who fail to invest in maintenance in a given period, in addition to possibly losing their tenants, face an expected financial liability of L.[7]

In any given period, the landlord either has a tenant or he does not. If he has a tenant, he decides whether or not to invest in maintenance.[8] In a steady-state equilibrium, a landlord will either always or never find it optimal to invest, depending on which offers the higher present value of profits. Thus, define Π_m to be the present value of the landlord's expected profits if he always invests, and define Π_0 to be the corresponding expression for the landlord if he never invests. Also, define Π_v to be the present value of expected profits for a landlord with a vacant unit (to be derived below).

Given the above assumptions, we can write

$$\Pi_m = R - m + \frac{1}{1+r}[a\Pi_v + (1-a)\Pi_m], \tag{1}$$

and

$$\Pi_0 = R - L + \frac{1}{1+r}[(a+b)\Pi_v + (1-a-b)\Pi_0], \tag{2}$$

where r is the interest rate (or rate of time preference). The condition for a landlord to find it profitable to invest in maintenance is $\Pi_m \geq \Pi_0$[9] which, using Eq. (1) and (2), implies

$$R \geq \frac{(a+b+r)}{b}m - \frac{a+r}{b}L + \frac{r}{1+r}\Pi_v. \tag{3}$$

This condition, which we assume must hold in equilibrium, puts a lower bound on the equilibrium rent.

To derive an expression for Π_v, the present value of profits from a vacant unit, we assume that the landlord expects to find a tenant for the next period with probability z, which he takes as given, but which will be determined in equilibrium. We further assume that the landlord must invest in maintenance of the vacant unit in order to have a chance of attracting a tenant—that is, landlords who do not maintain will face zero demand for their units.[10] Given that Eq. (3) holds (implying that landlords with tenants will invest in maintenance), the present value of profit from a vacant unit is

$$\Pi_v = -m + \frac{1}{1+r}[z\Pi_m + (1-z)\Pi_v]. \tag{4}$$

Solving this equation simultaneously with Eq. (1) yields the reduced form expressions[11]

$$\Pi_m = \frac{(1+r)(r+z)}{r(a+r+z)}R - \frac{1+r}{r}m, \tag{5}$$

$$\Pi_v = \frac{(1+r)z}{r(a+r+z)}R - \frac{1+r}{r}m. \tag{6}$$

Substituting Eq. (6) into Eq. (3) yields the reduced form condition for the landlord to invest in maintenance:

[3] This assumption, which follows Shapiro and Stiglitz (1984), is made purely for simplicity. It will be clear below that allowing a positively sloped supply curve for housing units does not affect the basic conclusions.

[4] We ignore the impact of tenant maintenance in offsetting depreciation (see Miceli, 1992), as well as the possibility of excessive tenant utilization resulting from the rental externality (Henderson and Ioannides, 1983).

[5] The parameter b may therefore be interpreted either as the probability that tenants detect the landlord's lack of maintenance, or the ease with which they can vacate. In either case, the assumption that a and b are constants, along with the other assumptions of the model, ensure that it has a stationary structure.

[6] See, for example, *Pines v. Perrsion*, 14 Wis. 2d 590, 111 N.W.2d 404 (1961); and *Javins v. First National Realty Corp.* 138 U.S. App. D.C. 369, 423 F.2d 1071, cert. denied, 400 U.S. 925 (1970). Also see the discussion in Hirsch (1988, Chapter 3) and Rabin (1984).

[7] We define L to be the expected per-period liability for failing to maintain. This reflects the on-going legal obligation of landlords to maintain their units in a habitable state. In other words, the duty to maintain is not one-time, but must be continually met in the same way that manufacturers of dangerous products face an on-going threat of liability for product-related accidents.

[8] For simplicity, we follow Shapiro and Stiglitz (1984) and assume that maintenance is a dichotomous variable. The results would be qualitatively similar, but the model more complicated, if maintenance were a continuous variable.

[9] We assume that, when indifferent, the landlord invests.

[10] We relax this assumption below in the context of allowing variation in housing quality (see Section 3).

[11] We assume that in equilibrium, $\Pi_v \geqslant 0$, for otherwise landlords will withhold their units from the market. This condition will be satisfied if the equilibrium rent is large enough.