TI 2007-047/3
Tinbergen Institute Discussion Paper

Homeownership and Labour Market Behaviour: Interpreting the Evidence

Jan Rouwendal[1]
Peter Nijkamp[1,2]

[1] VU University, Amsterdam, and Tinbergen Institute;
[2] NWO, The Hague.

Tinbergen Institute
The Tinbergen Institute is the institute for economic research of the Erasmus Universiteit Rotterdam, Universiteit van Amsterdam, and Vrije Universiteit Amsterdam.

Tinbergen Institute Amsterdam
Roetersstraat 31
1018 WB Amsterdam
The Netherlands
Tel.: +31(0)20 551 3500
Fax: +31(0)20 551 3555

Tinbergen Institute Rotterdam
Burg. Oudlaan 50
3062 PA Rotterdam
The Netherlands
Tel.: +31(0)10 408 8900
Fax: +31(0)10 408 9031

Most TI discussion papers can be downloaded at http://www.tinbergen.nl.

Homeownership and labour market behaviour: interpreting the evidence

Jan Rouwendal and Peter Nijkamp
Department of Spatial Economics
VU University
De Boelelaan 1105
1081 HV Amsterdam
The Netherlands
jrouwendal@feweb.vu.nl and pnijkamp@feweb.vu.nl

This version: November 3, 2008

Keywords: Oswald's thesis, labour market search, homeownership.
JEL Classification Codes: J61, J64, R21, R23

Abstract

This paper attempt to explain for the repeated empirical finding that homeowners have shorter unemployment durations than tenants. On the basis of Oswald's hypothesis, however, researchers would expect to find longer unemployment durations for homeowners. But the search models that have been proposed to motivate this thesis have difficulties in providing an explanation for the reverse effect. The model proposed in this paper is close to the ones proposed earlier, in that it also studies search behaviour, but contains a richer set of effects of homeownership on search behaviour. In our model, homeowners may have a higher intensity of job search (and hence shorter unemployment durations) when their housing expenses are – all other things being equal, higher than those of tenants. Some studies have indeed found that the shorter unemployment durations occur especially among highly leveraged homeowners. We show that, in the Netherlands, many homeowners have higher housing costs than otherwise comparable tenants. The model developed in this paper is therefore able to explain the existing evidence of shorter unemployment durations for Dutch homeowners.

Homeownership and labour market behaviour: interpreting the evidence

This version: November 3, 2008

Keywords: Oswald's thesis, labour market search, homeownership.
JEL Classification Codes: J61, J64, R21, R23

Abstract

This paper attempt to explain for the repeated empirical finding that homeowners have shorter unemployment durations than tenants. On the basis of Oswald's hypothesis, however, researchers would expect to find longer unemployment durations for homeowners. But the search models that have been proposed to motivate this thesis have difficulties in providing an explanation for the reverse effect. The model proposed in this paper is close to the ones proposed earlier, in that it also studies search behaviour, but contains a richer set of effects of homeownership on search behaviour. In our model, homeowners may have a higher intensity of job search (and hence shorter unemployment durations) when their housing expenses are – all other things being equal, higher than those of tenants. Some studies have indeed found that the shorter unemployment durations occur especially among highly leveraged homeowners. We show that, in the Netherlands, many homeowners have higher housing costs than otherwise comparable tenants. The model developed in this paper is therefore able to explain the existing evidence of shorter unemployment durations for Dutch homeowners.

1. Introduction

Although owner-occupied housing is generally regarded as the preferred tenure type by policy makers – who stimulate it through mortgage interest deductibility, tax exemption of capital gains, and other measures – there have also been more critical voices. Among economists, the most prominent of these is probably Oswald (1996, 1999). His thesis states that there is a causal relationship between dwelling tenure choice and high unemployment. He finds that a 10 per cent increase in the rate of homeownership is associated with 2 per cent more unemployment. If this would indeed signal a causal effect, then the increase in homeownership in many European countries in the second half of the twentieth century would be an important reason behind the increase in structural unemployment. Oswald suggested that the higher transaction costs associated with moving house are the reason why exit rates from unemployment are much lower among owner-occupiers than among tenants, or at least of tenants in the private (unregulated) part of the housing market.

Oswald's thesis appears controversial in that it contradicts much of the common sense about homeowners. In most, if not all countries, homeownership increases with income, and workers with high incomes have in general more human capital and a lower risk of becoming unemployed. Moreover, credit constraints make it difficult for those without a tenured position and a non-negligible amount of wealth to borrow the money needed to purchase a decent house. Unemployed persons are unlikely to meet that requirement. However, none of this contradicts the possibility that the probability of finding a new job can be substantially lower for homeowners than for tenants who become unemployed, and that there are substantial lock-in effects associated with homeownership. Indeed, the hypothesis that the higher costs of moving for homeowners hamper residential mobility for job reasons seems *a priori* quite plausible, and the negative effect on unemployment appears to be a natural consequence. Oswald's thesis therefore directed attention towards a neglected and potentially important effect of an increase in homeownership that makes it worthwhile to be tested empirically.

It is therefore no surprise that Oswald's (1996, 1997) papers quickly triggered additional research, for instance, Pehkonen (1997) and Partridge and Rickman (1997). In their contribution to the *Handbook of Labour Economics*, Nickel and Layard (1999) considered the correlation

between unemployment and the share of homeownership for OECD countries.[1] In theit regression analyses, Controlling for other variables, they find a significant coefficient for the share of homeownership on the total unemployment rate and short-term unemployment, but not on long-term unemployment. They also find a significant coefficient for the share of homeownership on the employment to population ratio of the whole working age population and working age males, but not on working age women. The authors express some doubt as to whether these relationships are due to the mobility barrier effect proposed by Oswald, since they find no correlation between the share of homeownership and regional mobility in OECD countries.

Later studies are even less favourable to Oswald's thesis. For instance, Green and Hendershott (2001), who reconsidered Oswald's evidence for the US, find that homeownership hardly restricts the mobility of heads of households. They argue that household heads have no other choice than to move to a better region when the local labour market situation deteriorates, thus implying that, for this group, the thesis is invalid. However, when their partners become unemployed, staying in the region and hoping for better times may be preferred. A second example is Barrios García and Rodríguez Hernández (2004) who take a closer look at Spain and reach a conclusion that is the complete opposite of Oswald's earlier findings: 'Spanish provinces with ownership rates that are 10 percentage points higher have an unemployment rate that is roughly 2.2 percentage points lower.'[2] More recent studies, some of them discussed in the next section, have tested Oswald's thesis on micro-data. Sometimes these analyses confirm Oswald's thesis for small groups of owner-occupiers, but the typical result is that no evidence in favour of the thesis can be found for the majority of the workers. Repeatedly, studies have reported the opposite of Oswald's thesis: unemployment durations of homeowners that are shorter than those of tenants.

This state of affairs is puzzling. On the one hand, there is strong empirical evidence that the geographical mobility of homeowners is substantially below that of tenants. Although the conclusion that homeowners will therefore experience more difficulties in finding a job when unemployed appears to be a straightforward consequence of this finding, empirically this is not the case. As we will discuss in more detail in the next section, the existing evidence points to two potentially important aspects of this paradox. First, it has been found that homeowners with

[1] See also Nickell (1997, 1998).
[2] Barrios Garcia end Rodriguez Hernandez (2004), p. 573.

mortgages have shorter unemployment durations than others, which suggests a causal chain from high committed housing expenditures through increased pressure to find a job to higher escape rates from unemployment. Second, homeowners more often accept a job on the local labour market than tenants, and therefore appear to concentrate their search activities on other areas than tenants. The second aspect has been incorporated into theoretical search models, but until now a theoretical underpinning of the effect of mortgage debt service on unemployment durations does not seem to have been provided. It is the purpose of this paper to present a model that is able to explain these two aspects of job search behaviour of homeowners in a simple search model. We do so by developing a model in which a job seeker can direct his search efforts to the labour market in which he resides, as well as to other labour markets. A concave utility function implies that the combination of high committed housing expenditure and liquidity constraints provides a strong incentive for higher search intensity, and this may cause Oswald's thesis to fail. In this way, the model provides an explanation for the empirical evidence that found homeowners to have shorter unemployment durations than tenants if they have higher housing expenditure. Earlier research has shown that Dutch homeowners have shorter employment durations than tenants, and we provide empirical evidence that most homeowners do indeed have higher housing expenditure than tenants with otherwise comparable characteristics, as is suggested by our model.

The paper is organized as follows. In the next section we review empirical studies that investigate the validity of Oswald's thesis on micro-data. In Section 3 we propose a search model that is consistent with much of the evidence provided by these studies and discuss several features of the model. Section 4 provides empirical evidence on out-of-pocket housing expenditure of homeowners versus tenants in the Netherlands. Section 5 concludes.

2. Evidence on the Housing Tenure – Unemployment Relationship

2.1 Unemployment and homeownership at the micro level

Studies using micro-data demonstrate that unemployed persons are more reluctant to accept jobs at a greater distance from their current locations (see, for instance, Van den Berg and Gorter, 1996) and that this is particularly the case when they are owner-occupiers (see Van den Berg and Van Vuuren, 1998). Even though this provides strong *a priori* endorsement of Oswald's thesis, conclusions should not be drawn too fast. Studies focusing on unemployment durations of

homeowners and tenants have repeatedly found results that contradict Oswald's thesis. These unexpected findings are related to two aspects: high mortgage debt service and local versus non-local labour market search.

One of the first studies that examined the Oswald thesis on micro-data was carried out by Goss and Phillips (1997), who found that the duration of unemployment was *shorter* for owner-occupiers, especially when a mortgage loan was present. They suggest that homeowners with weak equity positions have lower reservation wages than tenants or outright owners with comparable labour market characteristics. Alternatively, the search intensity of such homeowners may be higher. In both cases, the proper interpretation is probably that unemployment is more inconvenient for homeowners with (large) mortgage payments, and provides a strong incentive to search for another job. Since other evidence (see, for instance, Henley, 1998) confirms that homeowners with weak equity positions have substantially lower mobility on the housing market, it appears that they manage to realize their shorter unemployment spells without accepting jobs outside their local labour market.

Flatau et al. (2003) considered the role of leverage in the duration of unemployment of homeowners in greater detail. Using Australian data, they conclude that outright owners have lower exit rates from unemployment than private tenants, as hypothesized by Oswald, especially when they are female. However, the larger group of leveraged homeowners have significantly shorter unemployment durations than private tenants, which contradicts Oswald's thesis. The authors interpret this as a result of the pressure on unemployed homeowners to meet the mortgage payment requirements. High mortgage payments thus have a similar effect to low replacement ratios. The rather striking implication of the analysis of Flatau et al. (2003) is that workers who are least mobile on the housing market (see Henley, 1998) have the shortest unemployment durations, which is an exact reversal of Oswald's thesis.

The importance of the distinction between local and non-local job search was highlighted by Munch et al. (2005), using Danish micro-data. Their findings confirm that homeownership hampers the propensity to move residence for job reasons. Acceptance of a job outside the local labour market requires a change in the residential location, and homeowners are less likely to do so because of their higher moving costs. However, the data show that homeowners have better chances of finding a job on the local labour market when becoming unemployed, and this counteracts the negative effect of immobility on the housing market. The net result of the two

effects is a negative correlation between home-ownership and unemployment duration. Again, the implication is that the group with the lowest residential mobility has the shortest unemployment duration. These findings have recently been confirmed for the Netherlands by Van Vuuren (2007).

The authors of the studies just mentioned have attempted to control for unobserved heterogeneity among workers that causes correlation between homeownership and the chance to find a new job when becoming unemployed. For instance, it is plausible that workers who have a good labour market position for reasons that cannot be observed by the researcher are more inclined to buy a house, knowing that they have better chances than others to find employment in the local labour market in the unfortunate case of becoming unemployed. The typical finding is, however, that a strong effect of homeownership on unemployment duration still remains after controlling for these effects. This suggests strongly that the intensive search efforts of the unemployed homeowners are the major determinant of their lower unemployment rate.[3] These search efforts are modelled as a willingness to accept jobs at lower wages.

2.2 Conclusion

The micro studies discussed in the previous subsection reject the Oswald thesis for some or all of the groups of workers they consider. Even though the idea that homeownership decreases mobility on the housing market is confirmed by all studies, the - at first sight very plausible - corollary that this has negative implications for unemployment duration could only be confirmed for specific subgroups of homeowners at best. Nevertheless, in spite of their lower mobility on the housing market, most homeowners have better chances to escape from a situation of unemployment than tenants. Probable explanations are that many homeowners have a strong incentive to leave unemployment because of a larger utility loss, or that they have a better labour market position. Since papers that attempt to control for the latter effect still find higher exit rates from unemployment for homeowners, the incentive effect is probably substantial.

The empirical evidence for the reverse of the Oswald effect calls for an explanation in terms of worker behaviour. However, the formulation of a theoretical underpinning of Oswald's thesis seems to have received little attention. Although the logic behind Oswald's thesis is

[3] A working paper by Brunet and Lesueur (2003) confirms this. They estimate a duration model and find that homeowners have lower exit rates from unemployment when controls for search intensity are included. The coefficients for the indicators of search intensity are highly significant.

straightforward and does not need a theoretical model to be understood, such a model may also be useful to provide clues about the possibility for the thesis to fail. Munch et al. (2006) develop a search theoretic model and show that it implies that homeowners have a reservation wage for local job offers that lies above that for tenants, whereas their reservation wage for non-local job offers is higher than that for tenants. However, Van Vuuren (2008) shows that in their model the hazard rate to leave unemployment for homeowners is always lower than that for tenants.[4] This implies that the search model developed by Munch et al. (2006) explains Oswald's thesis, but not the shorter unemployment durations of homeowners observed by these researchers.

Van Vuuren (2008) develops a model that differs from that of Munch et al. (2006) in that he assumes that homeowners receive an unemployment benefit for a limited period, whereas tenants do not exhaust the benefit. This introduces nonstationarity into the model, which makes it more difficult to handle. He also extends the model to include the decision to own a home. But this is not an unqualified success because, counterintuitively, his model predicts that if homeowners can have unemployment benefit for an indefinite period,[5] a higher arrival rate of job offers (which means: better employment opportunities) makes it less likely that a worker will become a homeowner. Since, in this case, the difference between Van Vuuren's model and that of Munch et al. iseliminated, this result probably also holds for the latter model. However, Van Vuuren shows that, with unemployment benefit exhaustion, this unexpected result disappears when the unemployment benefit is sufficiently high.

Since the two models just discussed do not consider mortgage payments, they are unable to explain the relationship between high mortgage payments and short unemployment durations that has been observed by other authors. Apparently, a theoretical model explaining this phenomenon has not been presented in the literature. In an attempt to fill this gap, in the next section we present a job search model that explicitly takes housing costs into account.

3. An Umbrella Search Model for Labour Market and Tenure Choice Interactions

In this section we develop a model in which the intensity of job search is endogenous. More specifically, we assume that searchers can affect the arrival rate of local and non-local job offers – within certain limits – by their search efforts. For instance, they may decide to direct all their

[4] See their proposition 4, p. 22. The proof requires log-concavity of the wage offer distribution.
[5] In reality unemployed workers are not in this situation, but in a stationary search model they are.

search activities to the local labour market. However, the more fundamental difference with the models just discussed is that we explicitly introduce housing costs into the model. The difference between the wage and housing costs is available for nondurable consumption, and utility is determined by this amount. The concavity of the utility function implies that higher housing costs make unemployment more of a problem. All things being equal, workers with high housing cost therefore have a stronger incentive to search when unemployed. If homeowners have higher housing costs than tenants, for instance because they are highly leveraged, the model predicts that they will increase their intensity of job search. This explains the shorter unemployment durations of homeowners with high mortgage costs that were empirically observed by Goss and Phillips (1997) and Flatau et al. (2003). In this way, the model provides a theoretical underpinning for a number of empirical findings discussed in this section.

3.1 Preliminaries

A household has a utility function $u = u'(c, o, s, m)$, whose value depends on consumption of a composite good *c*, on homeownership *o* that is equal to 1 if the household owns the home in which it lives and equal to zero otherwise, job search activities *s*, and on being a recent mover to the present residential area as indicated by the variable *m* that equals 1 if there has been a recent move and 0 otherwise. We assume that utility is additively separable in its arguments:

$$u = u(c) + A(o) - C(s) - M(m), \qquad (1)$$

with *u* an increasing concave function. The function *A* represents the benefits of homeownership: $A(o) = 0$ when *o*=0, and $A(1) = A > 0$ is therefore the utility that is associated with ownership.[6] The search cost function $C(s)$ is increasing with $C(0) = 0$. It will be further specified below, but it may be already noted here that the incorporation of these costs in the utility function implies that we do not interpret them as a monetary cost, but as a cost in terms of effort. The function *M* represents the loss in utility associated with having to get acquainted with a new geographical environment. We assume $M(1) > M(0) > 0$.

Each household has one worker, who is either employed or unemployed. Unemployment implies that income equals the unemployment benefit *b*. The budget constraint is $b = c + h(o)$, which

[6] Although it is possible to consider the demand for housing services explicitly, we have simplified the model as much as possible and concentrate only on ownership.

implies that we have: $c = b - h(o)$. Employment implies a (unique) wage *w*, and, through the budget constraint, consumption of the composite good equals $w - h(o)$.

3.2 Job search

We consider a spatial labour market that is geographically subdivided into a number of local labour markets. Workers can accept jobs in the local labour market in which they reside without having to move, but accepting a job outside this local labour market implies the necessity of moving. The utility associated with being employed is therefore different for those who have accepted a job in the local labour market (that is, without a residential move) and those who have accepted a job elsewhere. We denote the former as u_{wl}, and the latter as u_{wn}.

$$\begin{aligned} u_{wl} &= u\left(w - h(o)\right) + A(o); \\ u_{wn} &= u\left(w - h(o)\right) + A(o) - M(o). \end{aligned} \qquad (1)$$

Since there is a unique wage for each worker, there are no gains from on-the-job search, and for this reason we have suppressed the search cost term in (1).

The utility of being unemployed will be denoted as u_u and equals:

$$u_u = u(b - h(o)) + A(o) - C(s). \qquad (2)$$

We assume that the only reason for moving is acceptance of a job outside the region of residence, and for this reason the moving cost term does not appear in (1).

We distinguish between search activities in the local labour market, s_l, and elsewhere, s_n, and assume that search costs are quadratic in these two activities. We adopt the simple specification:

$$C(s) = \gamma'_l s_l^2 + \gamma'_n s_n^2, \qquad (3)$$

with $\gamma'_l \leq \gamma'_n$, implying that search outside the local labour market is at least as expensive as local search. Search activities result in job offers, and we denote the arrival rates of local and non-local (national) job offers as q_l and q_n, respectively. We assume that the arrival rates of local and national job offers are proportional to search activities with constants of proportionality α_l and α_n. We assume that search activities on the local labour market are at least as effective as search activities outside the local labour market: $\alpha_l \geq \alpha_n$.

We can now rewrite the search cost function in a reduced form as a function of the arrival rates:

$$C(q) = (\gamma'_l / \alpha_l^2) q_l^2 + (\gamma'_n / \alpha_n^2) q_n^2 . \quad (4)$$

This equation shows that the parameters γ and α play a similar role in the model. To simplify the notation, in what follows we will therefore not distinguish between them, and define $\gamma_i = \gamma'_i / \alpha_i^2, i = l, n$. The γ parameters now measure the cost of increasing the corresponding arrival rates by one unit, rather than the cost per unit of search effort. We can now rewrite (2) as:

$$u_u = u(b - h(o)) + A(o) - \gamma_l q_l^2 - \gamma_n q_n^2 . \quad (5)$$

Finally, we assume that the separation rate is equal to a constant σ for all jobs.

We are interested in the search behaviour of unemployed workers, conditional upon their homeownership status. The unemployed worker chooses his search efforts (and therefore the arrival rates of job offers) in such a way that the his lifetime utility is maximized. To find this lifetime utility, we use the asset evaluation (Bellman) equations:

$$\rho U = u_u + q_l (W_l - U) + q_n (W_n - U); \quad (6a)$$

$$\rho W_l = u_{wl} + \sigma (U - W_l); \quad (6b)$$

$$\rho W_n = u_{wn} + \sigma (U - W_n). \quad (6c)$$

In these equations, *U* denotes the value of unemployment (that is, the expected value of lifetime utility for a worker who is currently unemployed, conditional upon the values of the arrival rates); and W_l and W_n the value of accepting a job on the local labour market or elsewhere, respectively (these values have a similar interpretation to that of unemployment). For simplicity of notation, we have suppressed the arguments of the (instantaneous) utilities associated with the various states.

Solving equations (6) for *U* gives:

$$U = \frac{1}{\rho}\left[\frac{(\rho + \sigma) u_u + q_l u_{wl} + q_n u_{wn}}{\rho + \sigma + q_l + q_n}\right]. \quad (7)$$

The worker chooses his search intensities in such a way that *U* is maximized. Assuming that the optimal values of both arrival rates are positive, the first-order conditions can be written as:

$$q_l = \frac{u_{wl} - \rho U}{2\gamma_l}; \qquad q_n = \frac{u_{wn} - \rho U}{2\gamma_n}. \quad (8)$$

Equation (7) implies that ρU (the expression in square brackets) is a weighted average of u_u, u_{wl}, and u_{wn}. If $w > b$, we can be sure that $u_{wl} > u_u$, and a comparison of the two equations in (1) shows that $u_{wl} > u_{wn}$. We can therefore be sure that $u_{wl} > \rho U$, and therefore that q_l will be positive. However, our assumptions do not guarantee that

$$u_{wn} > \rho U, \tag{9}$$

and if this condition is not satisfied, it is optimal to set $q_n = 0$. It may be observed (from (1) and the previous discussion) that condition (9) is easier to satisfy when *M* is small.

When both arrival rates are positive, elaboration of equations (8) allows the derivation of the following expression:

$$q_n = \frac{\gamma_l}{\gamma_n} q_l - \frac{u_{wl} - u_{wn}}{2\gamma_n(\rho + \sigma)}. \tag{10}$$

This shows that the unemployed worker searches in such a way that the arrival rate of local job offers is larger than that of job offers from elsewhere in the economy. There are two reasons for this effect: it is at least as costly to search elsewhere $(\gamma_n \geq \gamma_n)$, and utility will be higher after accepting a job in the local labour market $(u_{wl} > u_{wn})$.

3.3 Effects of homeownership

In the model we developed above, housing enters in three ways: through housing costs *h*, the utility of ownership *A* and the cost of moving *M*. We will consider the implication of changes in the value of each of these on the optimal search strategy.

It is easiest to start with *A*, the utility premium associated with homeownership. Because of the additive character of this effect, the numerator on the left hand side of (8) will not change, and therefore the optimal search strategy will also remain unchanged. This means that tenure status in itself has no effect on the optimal search strategy.

According to Oswald's thesis, homeowners are more vulnerable to unemployment risks because of their higher moving costs. We have already noted above that higher moving costs *M* may induce a searcher to abstain from searching outside the local labour market. Let us now consider the effect of a marginal change in *M* for the optimal strategy of a searcher with positive arrival rates of local and other job offers. Making use of the envelope theorem, it is not difficult to verify from (7) and (8) that:

$$\frac{dq_l}{dM} = \frac{1}{2\gamma_l}\frac{q_n}{\rho+\sigma+q_l+q_n} > 0;$$
$$\frac{dq_n}{dM} = -\frac{1}{2\gamma_n}\frac{\rho+\sigma+q_l}{\rho+\sigma+q_l+q_n} < 0. \qquad (11)$$

The second of these equations shows that higher moving costs result in owners making less effort to find a job outside the local labour market. We refer to this conclusion as the Oswald effect. If this were the only effect of homeownership on job search, Oswald's thesis – interpreted either as saying that homeowners have longer unemployment spells, as is done in much of the microeconometric literature, or a saying that homeowners have higher unemployment rates – would be a prediction of our model.

However, the first of equations (11) shows that there is another effect of higher moving costs: it will induce a searcher to search more intensively in the local labour market (see Munch et al., 2006). The total (net) effect of the higher moving costs on the total arrival rate of job offers $d(q_l+q_n)/dM$ can be found by adding the two equations (11). Using equation (10), it is found that this effect is negative. This implies that the Oswald effect dominates the total effect of higher moving costs on the arrival rate of job offers and therefore on unemployment. This means that our model implies the main element of Oswald's thesis: although homeowners more often accept local jobs, the net effect of their higher moving costs on unemployment durations is positive. In this respect our model is similar to that developed by Munch et al. (2006).

However, it must be noted that in our model this is not necessarily the end of the story, because there is a third possibility for homeownership to affect search behaviour. If housing costs are different for owners and tenants, a change in housing tenure may result in different search behaviour. To investigate this effect, we consider the consequences of a marginal change in housing cost *h* on optimal search behaviour. Using the same procedure as for moving costs, we find:

$$\frac{dq_l}{dh} = \frac{1}{2\gamma_l}\frac{(\rho+\sigma)(u_u'-u_w')}{\rho+\sigma+q_l+q_n} > 0;$$
$$\frac{dq_n}{dh} = \frac{1}{2\gamma_n}\frac{(\rho+\sigma)(u_u'-u_w')}{\rho+\sigma+q_l+q_n} > 0. \qquad (12)$$

In these equations $u_u' = du(b-h)/dh$ and $u_w' = du(w-h)/dh$. The sign of the two total derivatives is determined because of the concavity of the function $u(c)$. Intuitively, higher

housing costs imply that the difference between the utilities associated with employment and unemployment increases, and this raises the gains from search.

If homeowners have lower housing costs than tenants, the model developed here implies that the housing-cost effect in (12) reinforces the Oswald effect, and counteracts the positive effect of higher moving costs on local job search. The net effect will be a strengthening of Oswald's thesis. However, if homeowners have higher housing costs than tenants, the Oswald effect is counteracted by the effect of the higher housing costs. The net result of the higher moving costs and the higher housing costs may be that homeowners realize higher arrival rates for local job offers, and lower arrival rates for job offers from elsewhere, whereas the net effect of homeownership on the total arrival rate of job offers is positive, as was empirically found by Munch et al. (2006).

The question whether homeowners have higher housing costs than tenants is an empirical one, and we will consider it in the next section. However, it may already be observed that the results just derived provide a possible explanation for Goss and Phillips' (1997) and Flatau et al.'s (2003) finding that homeowners with a large amount of mortgage debt (and therefore high out-of-pocket housing expenditures) have low unemployment rates in comparison with tenants and outright homeowners.

3.4 Housing tenure choice

To study housing tenure choice we compare the values of U for tenants and owners. We rewrite eq. (7) as:

$$U(o)=\frac{1}{\rho}\left[\frac{(\rho+\sigma)(u(b-h(o))-\gamma_l q_l(o)^2-\gamma_o q_o(o)^2)}{\rho+\sigma+q_l(o)+q_n(o)}+\right.$$
$$\left.\frac{q_l(o)u(w-h(o))+q_n(o)(u(w-h(o))-M(o))}{\rho+\sigma+q_l(o)+q_n(o)}+A(o)\right]. \qquad (13)$$

In this equation it has been indicated which variables depend on ownership status (o=1 for owners and o=0 for tenants). A switch from renting to owning has the following effects: housing costs h change, the cost of mobility M increases, the variable A becomes positive, and the arrival rates q_l and q_n change due to changes in the intensity of search induced by the tenure status.[7] In

[7] It is possible to solve for U by substituting (8) into (13) and solving the resulting quadratic equation. However, the resulting equation is so complicated that it is easier to use the total differential approach.

the Appendix it is shown that the signs of the corresponding partial effects on *U* can be determined if $\rho + \sigma < 2$, that is, if the sum of the discount rate and the separation rate is not too large. This seems to be a mild and, in practice, unrestrictive assumption. Making this assumption, it can be shown that housing and mobility costs affect *U* negatively, whereas *A*, the utility derived from homeownership as such, has a positive effect (see the Appendix). When the cost of owning exceeds the rent, the preference for ownership has therefore to be sufficiently high to overcome the negative effects of higher housing and mobility costs.

Consider a worker who is indifferent between the two tenure types ($U(1) = U(0)$). Since *A* is positive for owners, the sum of the first two terms in square brackets in (13) must be smaller when this worker buys a house. In the case on which we focus, this is not only caused by higher mobility in the case of acceptance of a job outside the local labour market, but also by the higher (out-of-pocket) housing costs. To see how labour market characteristics affect homeownership we now analyse the effect of changes in the separation rate and search costs on the tenure choice of this worker who is initially indifferent between owning and renting.

We start with the separation rate. Using the approach discussed in the Appendix, we find:

$$\frac{dU(o)}{d\sigma} = \frac{u(b-h(o)) - \gamma_l q_l(o)^2 - \gamma_n q_n(o)^2 + A(o) - \rho U(o)}{\rho(\rho+\sigma) + (2-(\rho+\sigma))(q_l(o)+q_n(o))}. \qquad (14)$$

This expression is negative, since the instantaneous utility of unemployment is lower than ρU. If the housing costs of homeowners are lower, $u(b-h(1)) < u(b-h(0))$, and we know that for homeowners the arrival rate of local job offers is higher. If homeowners have higher escape rates from unemployment than tenants (as in the empirically relevant case), then the denominator on the right-hand-side of (14) is larger for homeowners than for tenants, and the effect of homeownership on q_n is indeterminate. We must therefore conclude that our model does not provide clear predictions with respect to the effect of the separation rate on homeownership decisions: it may well be negative, but we cannot exclude situations in which it is positive.

Now consider the effect of higher local search costs. Using the same approach, we find:

$$\frac{dU(o)}{d\gamma_l} = -\frac{(2-(\rho+\sigma))q_l(o)^2}{\rho(\rho+\sigma) + (2-(\rho+\sigma))(q_l(o)+q_n(o))}. \qquad (15)$$

This effect is clearly negative. For homeowners the arrival rate of local job offers is higher than for tenants, so the numerator is larger for owners. However, the denominator is also larger when the total escape rate from unemployment is higher for owners, which implies that the total effect

of higher search costs on homeownership is indeterminate. But the effect of higher search costs outside the local labour market is unambiguously positive for homeownership when the total escape rate from unemployment is higher for homeowners.

The indeterminateness of the effect of general labour market circumstances on the attractiveness of homeownership is related to the three different and counteractive effects that homeownership has in our model (i.e. apart from a positive immediate effect on utility, there are negative effects on housing costs and the cost of mobility) and their influences on the search intensity of unemployed workers and subsequently on the arrival rate of (local; and non-local) job offers.

Finally, we note that in this model the attractiveness of homeownership depends on the labour market status of the worker. This implies that it is optimal for an unemployed tenant to switch to ownership after having accepted a job. In our opinion this is an attractive feature of the model. However, since such behaviour is not of primary interest for the purposes of the present paper we will not analyse it here.

3.5 Discussion

In this subsection we discuss several concerns that can be raised with the model just developed. As we have shown, the assumption that housing expenditure is fixed and larger for homeowners than for tenants plays a crucial role for the conclusion that homeowners have shorter unemployment durations than tenants. A first concern is that one may object that workers have the possibility to adjust their housing consumption when they become unemployed. However, empirical research for the US has shown that more than 90% of the workers who become unemployed remain in the same house until they find another job (Gruber, 1998). This is probably because of the large transaction costs involved in moving house. It appears, therefore, that workers who become unemployed usually consider housing expenditure as fixed. The consequences of such committed expenditure for behaviour have been considered by Chetty in a series of papers. In Chetty (2004), he develops a structural search model for unemployed workers in the presence of such committed expenditure and finds that it makes households substantially more risk averse to small shocks, that is, shocks that do nut induce a change in the committed

expenditure. This increased risk aversion has consequences for search behaviour in the case of unemployment.[8]

A second concern is that we assume that all workers are hand-to-mouth consumers who do not save. Although the bulk of the literature on labour market search assumes – as we did - that consumers spend their whole income in the period in which they earn, the life-cycle hypothesis of consumption and savings behaviour suggests that workers attempt to smooth consumption so as to maximize utility. Recently, Lentz and Tranaes (2005) have studied a search model in which consumers are allowed to save. Some aspects of their model are similar to ours. For instance, they assume a utility function that is additively separable in consumption and search, although they do not consider housing costs explicitly. An important result of their model (for the purposes of the present discussion) is that consumers never completely smooth consumption: conditional on wealth, consumption when employed is always strictly greater than when unemployed. In an empirical application of the model, Card et al. (2007) conclude that actual consumers are closer to rule-of-thumb consumers who spend their income completely in each period than to consumers who perfectly smooth consumption. In particular, they find that 'the representative job searcher in our data is 70% of the way between the permanent income benchmark and credit constrained behaviour in terms of sensitivity to cash-on-hand'. We can therefore conclude that a model in which consumption equals income minus committed expenditure, as we developed above, is an approximation of reality that appears to be as good as one that allows for perfect consumption smoothing.

A third concern with the model presented above may be that, because of agency problems, renting a house should, in general, be expected to be more expensive than owning a house with comparable characteristics. This implies that one should expect to observe lower housing costs for homeowners, whereas in our model Oswald's thesis can only fail if homeowners have higher housing costs. Our response to this argument is that it refers to the user cost of housing, whereas actual out of pocket expenditures on housing may be much higher for leveraged homeowners. The reason is that most mortgage loans are self-amortizing which implies that monthly payments include a substantial repayment component. The repayment part of mortgage expenditure is not

[8] Chetty uses a nonstationary search model, and does not measure the effect of differences in committed (housing) expenditure on unemployment durations.

part of the user cost and may well cause out-of-pocket housing expenditure to exceed the rent of a comparable dwelling.[9]

Another possible concern we mention here is that we have concentrated on the non-monetary aspects of moving costs and job search. The reason is that, in practice, (potential) employers usually reimburse the monetary expenses made by applicants for job openings (especially travel costs), and, if a worker has to move house, his new employer usually pays part of the monetary costs involved. Most of the remaining costs are non-monetary: the time involved in application procedures, and the disutility associated with searching a suitable neighbourhood in a different region and getting settled there.

Given its limitations, the model developed in the present section offers a possible explanation for the empirical observation that, despite their lower geographical mobility homeowners have on average lower unemployment durations than tenants. The model is consistent with Oswald's thesis, in that it predicts that the higher moving costs associated with home ownership in themselves result in a lower search intensity and therefore a longer expected duration of unemployment for homeowners. However, when housing costs of homeowners are higher than those of tenants, this is no longer necessarily the case. This sheds light on the empirical result of Goss and Phillips (1997) and Flatau et al. (2003) that highly leveraged homeowners have lower unemployment rates and shorter unemployment duration than outright owners and tenants. The mechanism through which homeowners end unemployment sooner in our model is that their marginal utility of non-housing consumption is higher than that of otherwise comparable tenants. In combination with the concavity of the utility function, this provides a larger incentive to search.

In the next section we will consider the empirical question whether homeowners do indeed have indeed larger out-of-pocket housing costs than tenants.

4. Empirical Evidence on Housing Expenditure from the Netherlands

4.1 Out-of-pocket housing costs of owners and tenants

[9] It may be added that the most popular mortgage type in the Netherlands – to which our empirical work refers – is an investment mortgage in which the homeowner saves for repayment through a life insurance. This means that out-of-pocket housing expenditure is at least equal to interest payment on the complete loan.

The model we developed in the previous section is able to explain the shorter average duration of unemployment of homeowners, whose geographical mobility is low compared with that of tenants, if their out-of pocket housing expenditures are higher than those of tenants. Recent empirical evidence about the employment durations of homeowners and tenants in the Netherlands is provided in Van Vuuren (2008). He finds that homeowners have shorter average unemployment durations than tenants. This is consistent with the model presented in Section 3 if Dutch homeowners have higher housing cost than tenants. The main purpose of this section is to consider whether this is the case. We use the Dutch Housing Needs Survey (abbreviated in Dutch as WBO) for the year 2002. It provides information about the housing situation and a large number of related variables concerning 60,000 Dutch households.

The Netherlands is an interesting case to consider since the tax treatment of housing expenditure reinforces the effect of housing expenditure on search efforts that is central to the model developed above. For homeowners there is unlimited deductibility of mortgage interest paid, which implies a larger gain (tax benefit) when the marginal tax rate is higher. Since the marginal tax rate depends on income, becoming unemployed implies higher out-of-pocket expenditure for homeowners. For tenants there is a means-tested benefit that has the opposite effect. This housing allowance enables low-income households to rent decent housing. A lower income implies a larger allowance for the same house. The housing allowance system thus mitigates the effect of becoming unemployed on renter's non-housing consumption. These two effects reinforce the difference in incentives for job search between tenants and owners that plays a crucial role in our model.

The WBO database reports the net housing costs of owners and tenants. The net housing costs of owners takes into account the mortgage interest deductibility. The net housing cost of tenants takes into account the rent allowance. We consider only households in which at least one adult participates in the labour market. Labour market participation means that the person earns a wage or receives unemployment benefit.

Average out-of-pocket housing expenditure of homeowners is €98 per month higher than for tenants in households where no adults are unemployed. Controlling for income lowers this figure to €66 which is still not negligible.[10] However, there are good reasons to expect that the

[10] We use gross household income as our control variable to avoid noise associated with the effect of mortgage deductibility on net income.

difference is larger among particular subgroups, especially young homeowners. House prices have increased considerably in the Netherlands in the 1990s, and have remained at a high level since then, and young homeowners are likely to be relatively recent buyers who have had to borrow most of the money for financing their house purchase. We therefore extend the model with age and the cross-effect of age and homeownership. The coefficient for homeownership now increases to €409 per month and the coefficient for the cross effect is equal to -€7.4 per month per year of age. This means that a 30 year old homeowner has net out-of-pocket housing expenditure that is on average €188 per month higher than a renter of the same age. However, this effect decreases with age and for homeowners of 56 years and older net housing expenditure is on average lower than that of tenants. After introducing additional controls for education, province, and dual earners these results hardly change, as is documented in Table 1.

Table 1 Net housing expenditure of owners and tenants

	(1)	(2)	(3)	(4)
Owner	98.4 (*2.4*)	65.9 (*2.4*)	409 (*6.9*)	401 (*6.9*)
Gross household income		0.019 (*.0004*)	0.017 (*.0004*)	0.011 (*.0004*)
Age			0.266 (*.09*)	0.539 (*.09*)
Age*owner			-7.38 (*.14*)	-7.44 (*.14*)
Controls for education, province, number of earners	*No*	*No*	*No*	*Yes*
Constant	332 (*1.8*)	288 (*2.0*)	280 (*5.1*)	214 (*7.8*)
n	62,248	62,248	62,248	62,248
R^2	0.03	0.06	0.13	0.18

Dependent variable: net monthly housing expenditure.

4.2 Discussion

As already mentioned, evidence for a relationship between short unemployment durations and high mortgage payment has been provided by Goss and Phillips (1997) for the UK, and by Flatau et al. (2003) for Australia. In a recent paper, Chetty (2008) finds that the unemployment durations of US workers are more sensitive to the value of the unemployment benefit when they have a mortgage. He interprets this as indicating that workers with a mortgage are often liquidity

constrained and therefore close to the hand-to-mouth consumers we modelled in Section 3. There seems to be considerable evidence, therefore, that, notwithstanding their lower geographical mobility, homeowners with mortgages are able to shorten their unemployment durations considerably in comparison with tenants and outright owners.

Although we have attributed this phenomenon as being due to the higher marginal utility of consumption of liquidity constrained unemployed workers with large committed housing expenses, it may be noted that psychological effects may reinforce this mechanism. Taylor et al. (2006) provide evidence of significant psychological costs (in terms of mental health) associated with housing payment problems and payment arrears.

5. Conclusion

In this paper we have provided a model that explains the paradoxical finding that homeowners have shorter unemployment durations than tenants on the basis of higher out-of-pocket housing costs and a higher marginal utility of owners. The model we developed is consistent with Oswald's thesis when housing costs of homeowners are lower than those of tenants as is the case for outright owners. The model predicts a negative effect of the higher moving cost of homeowners on labour market mobility, as is generally found in empirical work. The main point of the paper is, however, that it is also able to explain the surprising fact that, while homeownership does substantially hamper geographical mobility, its net effect on unemployment durations is to shorten them, at least for the important group of homeowners with a substantial mortgage.

The analysis of the present paper thus sheds new light on the relationship between the labour market and the housing market. Analysis of the connection between these two markets tends to stress that the functioning of one market puts constraints on that of the other. This results in frictions that might take the form of long commutes, traffic congestion, and suboptimal allocation of workers to jobs. However, the model developed in this paper suggests that there may well be aspects of the functioning of one market that stimulate, rather than hamper, that of the other market.

References

Barrios García, J.A. and J.E. Rodríguez Hernández (2004), User Cost Changes, Unemployment and Home-ownership: Evidence from Spain. *Urban Studies*, vol. 41, pp. 563-578.

Brunet, C. and J.-Y. Lesueur (2003), Do Homeowners Stay Unemployed Longer? A French Microeconometric Study. CNRS/GATE working paper.

Card, D., R. Chetty and A. Weber (2007) Cash-on-Hand and Competing Models of Intertemporal Behavior: New Evidence from the Labor Market. *Quarterly Journal of Economics*, **122**, 1511-1560.

Chetty, R. (2004) Consumption Commitments, Unemployment Durations and Local Risk Aversion. NBER working paper 10211.

Chetty, R. (2008) Moral Hazard vs Liquidity and Optimal Unemployment Insurance. *Journal of Political Economy*, **116**, 173-234.

Flatau, P., M. Forbes, P.H. Hendershott and G. Wood (2003), Homeownership and Unemployment: The Roles of Leverage and Public Housing. NBER working paper 10021

Goss, E.P., and J.M. Phillips (1997), The Impact of Home Ownership on the Duration of Unemployment, *Review of Regional Studies*, vol. 27, no. 1, pp. 9-27.

Green, R. and P. Hendershott (2001), Homeownership and Unemployment in the US, *Urban Studies*, vol. 38, pp. 1501-1520.

Gruber, J. (1998) Unemployment Insurance, Consumption Smoothing, and Private Insurance: Evidence from PSID and CEX. *Research in Employment Policy*, **1**, 3-31.

Henley, A. (1998), Residential Mobility, Housing Equity and the Labour Market, *The Economic Journal*, vol. 108, 1998, pp. 414-427.

Lentz, R. and T, Tranæs (2005) Job Search and Savings: Wealth Effects and Duration Dependence. *Journal of Labor Economics*, **23**, 467-489.

Munch, J.R., M. Rosholm and M. Svarer (2005), Are Home Owners Really More Unemployed?, Department of Economics, University of Aarhus, working paper.

Munch, J.R., M. Rosholm and M. Svarer (2006), Home Ownership, Job Duration and Wages CAM working paper 2006-08.

Nickell, S.J. (1997), Unemployment and Labor market Rigidities: Europe versus North America. *Journal of Economic Perspectives*, vol. 11, pp. 55-74.

Nickel, S.J. (1998), Unemployment: Questions and some Answers. *Economic Journal*, vol. 108, pp. 802-816.

Nickell, S.J. and R. Layard (1999), Labour Market Institutions and Economic Performance. In: A. Ashenfelter and D. Card (eds.) *Handbook of Labor Economics*, vol. 3, North Holland, Amsterdam, pp. 3030-3084.

Oswald, A.J. (1996), A Conjecture on the Explanation for High Unemployment in the Industrialized Nations: Part I. working paper.

Oswald, A. (1997), Thoughts on Nairu, *Journal of Economic Perspectives*, vol. 11, no. 1, pp. 227-228.

Oswald, A. J. (1999), The Housing market and Europe's Unemployment: A Non-Technical Paper. Working paper.

Partridge, M.D. and D.S. Rickman (1997), The Dispersion of US State Unemployment Rates: The Role of Market and Non-Market Equilibrium Factors, *Regional Studies*, vol. 31, pp. 593-606.

Pehkonen, J. (1997), Unemployment and Homeownership, *Applied Economic Letters*, vol. 6, pp. 263-265.

Taylor, M.P., D.J. Pevalin and J. Todd (2006) The Psychological Cost of Unsustainable Housing Commitments. ISER working paper 08.

Van den Berg, G.J. and C. Gorter (1996), Job Search and Commuting Time, *Journal of Business Economics and Statistics*, vol. 15, pp. 269-281

Van den Berg, G.J. and A. van Vuuren (1998), Job Search and the Non-Monetary Cost of Moving to a New Residence, Unpublished working paper, Free University

Van Vuuren, A. (2008) The Relationship Between Expectations of Labor Market Status, Homeownership and the Duration of Unemployment. Working paper, VU Amsterdam.

Vlist, A.J. van der (2001), *Residential Mobility and Commuting*, Tinbergen Institute, Amsterdam

Appendix

To derive comparative static results we rewrite (13) as:

$$U = \frac{1}{\rho}\frac{N}{D} \tag{A1}$$

with:

$D = \rho + \sigma + q_l + q_n$.

The definition of N is self-explanatory. For notational simplicity we suppressed the reference to tenure status. We should take into account that both N and D are functions of U because they depend on the arrival rates (see eq. (8)). We can compute the effect of a arbitrary parameter θ on U on the basis of the total differential:

$$\begin{aligned} dU &= \frac{1}{\rho}\frac{1}{D^2}\left(\left(\frac{\partial N}{\partial \theta}d\theta + \frac{\partial N}{\partial U}dU\right)D - \left(\frac{\partial D}{\partial \theta}d\theta + \frac{\partial D}{\partial U}dU\right)N\right) \\ &= \frac{1}{\rho}\frac{1}{D}\left(\left(\frac{\partial N}{\partial \theta}d\theta + \frac{\partial N}{\partial U}dU\right) - \left(\frac{\partial D}{\partial \theta}d\theta + \frac{\partial D}{\partial U}dU\right)\rho U\right). \end{aligned} \tag{A2}$$

Solving this equation gives:

$$\frac{dU}{d\theta} = \frac{\frac{\partial N}{\partial \theta} - \rho U\frac{\partial D}{\partial \theta}}{\rho D - \frac{\partial N}{\partial U} + \rho U\frac{\partial D}{\partial U}}. \tag{A3}$$

After some tedious algebra we find:

$$\rho D - \frac{\partial N}{\partial U} + \rho U\frac{\partial D}{\partial U} = \rho(\rho + \sigma) + \rho(2 - (\rho + \sigma))(q_l + q_n). \tag{A4}$$

This expression is positive if $\rho + \sigma < 2$, which we assume. This means that the sign of the effect of θ on U is determined by the sign of the numerator on the right-hand side of (A3). Using this result, and the assumption just made, it is not too difficult to verify that:

$$\frac{dU}{dh} < 0, \frac{dU}{dM} < 0, \frac{dU}{dA} > 0. \tag{A5}$$