Homeownership and Labour Market Outcomes: Micro versus Macro Performances

Preliminary and incomplete

Julie Beugnot\textsuperscript{a}, Guy Lacroix\textsuperscript{b}, Olivier Charlot\textsuperscript{c}

\textsuperscript{a}CIRPÉE, Department of Economics, Université Laval Québec, Qc, CANADA
\textsuperscript{b}Department of economics, Université Laval, CIRPÉE and CIRANO.
\textsuperscript{c}Université Cergy-Pontoise

Abstract

In this paper, we investigate Oswald’s hypothesis and seek to determine the conditions under which a higher homeownership rate increases aggregate unemployment rate. For this purpose, we develop a matching model à la Pissarides (2000) in which homeowners’ labour market outcomes are lower than those of renters due to mobility constraints. Based on numerical simulations, we analyze both macroeconomic and microeconomic labour market outcomes following an increase in homeownership rate. We show that (i) Oswald’s hypothesis does not always hold, and that this depends crucially on the importance of mobility costs; (ii) while higher homeownership may damage macroeconomic labour market performances, individual performances always improve following an increase in homeownership.

Keywords: stochastic job matching, Oswald’s hypothesis, homeownership, mobility cost, unemployment

\textit{JEL Codes: J41, J61, J64, E24}

\textit{Email addresses: Julie.Beugnot@ecn.ulaval.ca, corresponding author (Julie Beugnot), guy.lacroix@ecn.ulaval.ca (Guy Lacroix), olivier.charlot@u-cergy.fr (Olivier Charlot)}
1. Introduction

Over the last twenty years, homeownership has increased by as much as 10% on average in OECD countries. This increase partly stems from the many programs and policies that have been implemented over the years to foster access to first-time buyers: subsidized loans, zero interest loans, lower down payments, tax deductible mortgage interests, etc.

The rationale for subsidizing homeownership is manyfold. Positive externalities in the form of increased health and fertility, lower crime rates, and increased community involvement are often associated with a higher rate of homeownership [see eg Dietz and Haurin (2003) for a summary of the literature]. Yet, another strand of the literature has emphasized its potentially negative effects on the labour market. What is now conventionally referred to as “Oswald’s hypothesis” suggests that higher homeownership rates increase unemployment rates. Therefore, variations in homeownership rates are a potentially important explanatory factor of international and interregional variations in unemployment rates.

While based on macroeconomic empirical evidence, Oswald’s conjecture is based upon microeconomic behavioural assumptions (Oswald, 1996, 1999). He first assumes that a loan must be contracted to buy a house. This long run financial constraint will very likely affect the homeowner’s behaviour relative to a tenant’s, as the latter does not face such a constraint. Second, because the sale or the purchase of a property entails very large transaction costs, owning a house certainly impairs geographic mobility on distant labour markets. The lower mobility of homeowners has been widely confirmed in the empirical literature [Smith et al. (1988) Hammnett (1991), South and Deane (1993), Rohe and Stewart (1996), Henley (1998), Gobillon (2001)]. Lower mobility inhibits search strategies and may translate into poorer match quality, thus giving rise to inefficiencies [Munch et al. (2006), van Vuuren and van Leuvensteijn (2007)]. In this particular case, lower mobility may translate into homeowners earning lower wage rates. Oswald also argues that homeowners are more willing to commute than renters over longer distances which also leads to inefficiencies in the economy due to transport congestion.

Several empirical studies have tested Oswald’s hypothesis on macroeconomic and microeconomic data (see Havet and Penot (2010) for a detailed survey). No consensus as yet emerged from the literature as macroeconomic evidence is mixed whereas microeconomic studies more clearly refute Oswald’s hypothesis. Nickell and Layard (1999) and Belot and Van Ours (2001) find a positive and significant impact of homeownership on unemployment rates in several OECD countries. However, when controlling for additional covariates variables (as lagged unemployment rate, money supply shocks or labour demand), Green and Hendershott (2001) no longer find any significant relationship for 19 OECD countries over the period 1961-1995. Coulson and Fisher (2009) (U.S.) and Garcia and Hernandez (2004) (Spain) find that an increase in homeownership rate lowers the unemployment rate. Empirical studies with microeconomic data mainly focus on the impact of workers’ residential status on the probability of being unemployed or on unemployment duration. Most papers show that homeowners have lower
probabilities of being unemployed and have shorter spells than renters on local labour markets.\footnote{Nearly all empirical studies on the probability of unemployment reject Oswald’s arguments, whereas those on unemployment duration generate more controversial results [see Havet and Penot (2010) for details].} Interestingly, results are mixed when reemployment requires mobility. The microeconomic studies have also underlined the importance of distinguishing between mortgaged and outright homeowners and the search behaviour on local and distant labour markets. However, all these studies suffer from some methodological drawbacks (bias of aggregation, endogeneity of the residential tenure, etc.) so their conclusions need to be interpreted cautiously.

At the theoretical level, microeconomic stylized job search models have been developed to test Oswald’s hypothesis [Oswald (1997); Munch et al. (2006); Dohmen (2005), Coulson and Fisher (2009)]. They all consider an economy within which local and distant labour markets coexist and in which homeowners face mobility costs. In most papers, save Coulson and Fisher (2009), expected wage offers are exogenously drawn from a given distribution or are assumed constant and identical between workers. Coulson and Fisher (2009), on the other hand, consider wage bargaining and firm entry to take into account the likely effect of homeownership on job creation. Moreover, only Oswald (1997) considers the possibility that homeowners may commute between regions. All find that homeowners are more likely to be unemployed than renters except Munch et al. (2006) who distinguish between homeowners’ performances and reservation wages on local and distant labour markets. Oswald (1997) and Dohmen (2005) find that a higher homeownership rate always leads to a higher aggregate unemployment rate (with higher wages in Oswald). Munch et al. (2006) find that the homeownership effect is ambiguous. In their model, Oswald’s hypothesis is verified only in the event there are many more job offers on distant labour markets and if there exists a significant gap between renters and owners’ reservation wages. In their model with wage bargaining, Coulson and Fisher (2009) show that the correlation between homeownership and aggregate unemployment may be non monotonous and that wages vary inversely to unemployment.

Most of the literature is thus concerned either with the effects of higher rates of homeownership on aggregate labour market outcomes or, at a microeconomic level, with the impact of housing tenure on individual labour market performances. As in Coulson and Fisher (2009), our paper distinguish itself from the previous literature in that we investigate both macroeconomic and microeconomic labour market performances following an increase in the aggregate homeownership rate. Furthermore, we also allow the housing market efficiency to affect the mobility of homeowners. Our model is set up so that the effects of homeownership and housing market efficiency may interact and complement each other on labour market outcomes.

For this purpose, we develop a stochastic job matching model à la Pissarides (2000) in which wage determination results from bargaining between firms and workers. As stressed by Coulson and Fisher (2009), this theoretical framework allows to take into account the effect of homeownership on firms’ behaviour. Furthermore, our model is close to that of Munch et al. (2006) by considering mobility both on the local and the distant labour markets. As in previous work, we assume that homeowners are less
mobile than tenants on distant labour markets due to mobility costs. Then, our numerical simulations lead us to conclude that owners’ performances on labour market are always worse than those of renters and that the former are more willing to commute. Following an increase in homeownership rate, we show that the aggregate unemployment rate worsens in most cases but that housing market efficiency can outdo this to the point of invalidating Oswald’s hypothesis. However, we show that individual performances always improve following an increase in homeownership, whereas, at the macroeconomic level, our model does not necessarily predict a monotonous relationship between unemployment and homeownership. Indeed, in an economy with a higher homeownership rate, renters and homeowners are always less often unemployed and earn higher wages.

2. The model

We build an equilibrium unemployment framework à la Pissarides (2000) to analyze the impact of residential status and that of higher homeowners on individual and aggregate labour market outcomes. Our focus is on steady states. Time is continuous, and the economy populated by a continuum of risk-neutral, infinitely-lived agents endowed with a common discount factor $\rho$. We assume workers and firms to be homogenously distributed along a circle whose circumference can be normalized to unity. Firms are identical in all respects apart from their location on the circle; they are all endowed with a single vacancy, and when a match occurs, the firm produces with a fixed coefficient technology, requiring one worker to produce $y + \varepsilon$ units of output. In this setup $y$ is common to all firms, while $\varepsilon$ is match-specific, drawn from a stationary and known-by-all distribution $G$ with support $[0; +\infty[$.

Workers differ in their location on the circle and in their residential status. Residential status matters because finding a job takes time, and workers may find jobs that are not necessarily close to their place of residence. Workers’ willingness to accept job offers located in different places depends on the importance of mobility costs, as on their expected gains.

2.1. Residential status and mobility cost

Workers are constrained in their search by virtue of their residential status which entails different mobility costs. Each worker can either be a homeowner, $h$, or a renter, $r$. The exogenous share of homeowners is denoted $\mu$ and that of tenants by $1 - \mu$.

We assume that the economy is represented by a circle with a circumference normalized to one around which firms and workers are uniformly located. On each point of the circle there is a local labor market, and all labor markets are assumed identical so that the situation in one of them gives the state of the economy.

A worker who accepts a job offer located at a distance $d \in [0; 1]$ from his/her location has to move to hold the job. This move involves a cost which differs between homeowners and renters. For simplicity, we assume that only homeowners have to bear a mobility cost. Renters are perfectly mobile and can move freely to any job on the circle. The mobility cost of homeowners is a function of the
state of the housing market, $\lambda$, and the distance, $d$, between their location and that of the job:

$$Cm(d) = \frac{d}{\lambda}, \quad (1)$$

where $\lambda \in [0; 1]$ represents an efficiency index of the housing market. The housing market gets more efficient as $\lambda$ approaches one. In other words, a high $\lambda$ reflects low frictions on the housing market so that it will be easier and less costly for homeowners to sell or buy their house following a move. As Ruppert and Wasmer (2009) showed, there exists an inverse relation between regulation and frictions on the housing market. As a consequence, more regulation implies here higher mobility costs for homeowners and thus housing policies can affect workers’ behaviour and overall labour market outcomes. Equation (1) shows that mobility cost is increases with the distance between workers and job locations because of increasing moving expenses.2

2.2. Unemployment, vacancies and matching frictions

A worker can be either employed or unemployed. Only unemployed workers search actively and receive job offers (no on-the-job search). Search is random, and vacant jobs and unemployed workers are brought together in pairs by the customary matching function which relates the number of hires in the market to the total number of job seekers and vacancies, i.e.

$$M \equiv m(u; v),$$

where $u$ and $v$ correspond respectively to the number of job seekers and the number of vacancies. The function $m$ is twice continuously differentiable, increasing and concave in both its arguments, linearly homogeneous, and satisfies the Inada conditions and the boundary conditions: $m(0; v) = m(u; 0) = 0$ for $u, v \geq 0$. On average, a firm contacts a worker at rate $M/u$ while a job seeker meets with a firm at rate $M/v$. Let $\theta = v/u$ be the labour market tightness. Linear homogeneity of the matching function allows us to write those contact rates as $M/v = q(\theta)$ and $M/u = \theta q(\theta)$. Contact rates, $q(\theta)$ and $\theta q(\theta)$, are respectively decreasing and increasing functions of $\theta$.

The total number of job seekers in the economy, $u$, consists of unemployed homeowners, $u_h$, and unemployed renters, $u_r$:

$$u = u_h + u_r. \quad (2)$$

As unemployed renters can move without cost, they receive job offers from the whole circle ($d_r = 1$). Thus, they meet vacancies at rate:

$$\int_{j \in [0, 1]} \theta_j q(\theta_j) dj = \theta q(\theta). \quad (3)$$

Unemployed homeowners, on the other hand, bear a mobility cost too high to search and meet job

---

2Due to the effect of the distance between workers and jobs locations on the mobility cost, we can consider $Cm(d)$ not only as moving expenses but also as a commuting costs.
offers located beyond a critical distance \( \bar{d} \in [0, 1] \). Consequently, they meet vacancies at a lower rate than renters:

\[
\int_{j \in [0, \bar{d}]} \theta_j q(\theta_j) dz = \bar{d} \theta q(\theta) \leq \theta q(\theta).
\]  

(4)

This critical distance, \( \bar{d} \leq 1 \), varies according to the mobility cost and corresponds to the distance from which an unemployed homeowner prefers to stay unemployed instead of moving to a new job.

2.3. Firms and Workers’ gains

Asset values can be defined as follows. Let \( W_i \) and \( U_i \) be the present discounted value (PDV) of the expected income stream of an employed and an unemployed worker with residential status \( i = h, r \), respectively. Similarly, let \( J_i \) be the PDV of the expected profit from holding a job filled with a worker with residential status \( i \), and \( V \) the PDV of a vacancy.

2.3.1. Workers

The value of being respectively employed and unemployed for a type \( i = h, r \) worker satisfy

\[
\rho W_i(\varepsilon) = w_i(\varepsilon) - \delta [W_i(\varepsilon) - U_i].
\]  

(5)

\[
\rho U_i = b_i + d_i \theta q(\theta) \int_0^{+\infty} \max [W_i(\varepsilon) - U_i, 0] dG(\varepsilon).
\]  

(6)

A worker \( i \) receives a wage, \( w_i(\varepsilon) \), when employed and a constant benefit \( b_i \) when unemployed. In case of job destruction that occurs at exogenous Poisson rate \( \delta \), the worker incurs a capital loss equal to \( W_i(\varepsilon) - U_i \).

Job seekers get job offers at a rate \( d_i \theta q(\theta)^3 \) that depends on their residential status, and accept a job if it yields a positive expected capital gain.

While searching, the unemployed has a reservation utility level, \( b_i \), that corresponds to unemployment benefits, housing benefits or unpaid leisure activity. Mortgage-free homeowners are not eligible to housing benefits. However, they derive more utility from their house than mortgaged one as the latter risk becoming "underwater" if the unemployment spell lasts too long. We thus reasonably assume that \( b_h < b_r \). As a consequence, even in case of perfect mobility (\( d_h = d_r = 1 \)) unemployed homeowners have a lower permanent income than unemployed renters. This assumption is consistent with Oswald’s argument according to which owners are always disadvantaged when unemployed due to the difficulty to adjust their housing consumption.

2.3.2. Firms

The PDV of a filled job satisfies

\[
\rho J_i(\varepsilon) = y + \varepsilon - w_i(\varepsilon) - \delta [J_i(\varepsilon) - V].
\]  

(7)

---

\(^3\)Keep in mind that \( d_r = 1 \) and \( d_h = \bar{d} \).
A job filled with a worker with residential status $i$ produces $y + \varepsilon$ and pays a wage $w_i(\varepsilon)$. The job can be destroyed at an exogenous rate $\delta$, in which case the firm incurs a capital loss equal to $J_i(\varepsilon) - V$.

The PDV of a vacancy satisfies

$$
\rho V = -c + q(\theta) \left\{ \phi \int_{0}^{+\infty} \max [J_h(\varepsilon) - V, 0] dG(\varepsilon) + (1 - \phi) \int_{0}^{+\infty} \max [J_r(\varepsilon) - V, 0] dG(\varepsilon) \right\}, \tag{8}
$$

where $\phi$ stands for the share of unemployed who are homeowners, and is given by $\phi = \frac{u_h}{u}$. Thus, the permanent profit of a vacant job is equal to the expected gain from hiring which occurs at rate $q(\theta)$ minus the cost of keeping the job vacant. As matching is random, the firm can either hire a homeowner or a tenant, so that the gain from hiring is a weighted average, the weights depending on the respective shares of homeowners and tenants in the pool of job seekers.

2.4. Surpluses and Nash bargaining

The surplus of a match between a firm and a worker $i$ with a productivity $\varepsilon$ can be written as

$$
S_i(\varepsilon) = [J_i(\varepsilon) - V] + [W_i(\varepsilon) - U_i]. \tag{9}
$$

It is equal the sum of the net gains to the firm and to the worker $i$ for a given match. In equilibrium, the free entry condition of firms in the labour market drives rents from vacant jobs to zero, $V = 0$. Indeed, firms exploit all the new job profit opportunities and enter in the search market to open vacancies until the expected profit of hiring equal to its cost, i.e. until all rents are exhausted. Consequently, the surplus of a match can be rewritten as

$$
S_i(\varepsilon) = J_i(\varepsilon) + [W_i(\varepsilon) - U_i]. \tag{10}
$$

The negotiated wage results from a Nash bargaining between the firm and the worker. The match surplus is shared between them to satisfy the following sharing rule:

$$
W_i(\varepsilon) - U_i = \frac{\beta}{(1 - \beta)} J_i(\varepsilon), \tag{11}
$$

where $\beta$ and $(1 - \beta)$ represents respectively the bargaining power of workers and firms.

2.5. Decision Rules

Two decision rules drive job acceptance and determine the reservation productivity on the local labour market and the distance up to which homeowners are willing to move to enter in an other local labour market.

Not all matches between firms and workers are profitable. Indeed, there exists a common reservation productivity $y + R_i$ below which neither the firm nor the worker $i$ wants the match to become effective. In other words, $R_i$ represents the match-specific reservation productivity from which the match surplus
becomes positive $S_i(R_i) \geq 0$. Thus, in each local labour market, the reservation productivity $R_i$ below which a match is rejected results from

$$S_i(R_i) = 0. \quad (12)$$

By analogy to Ruppert and Wasmer (2009), $R_i$ also reflects the willingness to commute by each worker.\(^4\) The smaller $R_i$ is, the more a worker is willing to commute to stay in his local labour market.

The critical distance $\bar{d}$ above which homeowners are better off staying unemployed rather than accepting to move and bear the mobility cost is such that:

$$C_m(\bar{d}) = \int_{R_i}^{+\infty} W_h(\varepsilon) dG(\varepsilon) - U_h. \quad (13)$$

### 3. Equilibrium

In this section, we derive the equilibrium equations of our economy. In this economy, the steady state is given by the 8-tuple $(u^*_h, u^*_r, \theta^*, R^*_h, R^*_r, w^*_h(\varepsilon), w^*_r(\varepsilon), \bar{d}^*)$ which is solution to the following equations: reservation productivity equations, wage curves, labour market flow equations, job creation curve, critical distance equation.

#### 3.1. Reservation productivity

A random meeting between a firm and a worker becomes effective if and only if the match-specific productivity is such that $\varepsilon \geq R_i$, which occurs with a probability $[1 - G(R_i)]$. According to the Bellman equations and equations (10) and (12), we have

$$R_i = \rho U_i - y. \quad (14)$$

Thus, the reservation productivity of a match between a firm and a worker $i$ is equal to the difference between the permanent income of the worker in case of unemployment and the minimum productivity of a match (i.e. when $\varepsilon = 0$). As unemployed homeowners’ utility is lower they are more willing to accept low productive matches, $R_h \leq R_r$, and higher commute to stay in their local labour market. Moreover, according to equations (10) and (14), we have

$$S_i(\varepsilon) = \frac{y + \varepsilon - \rho U_i}{\rho + \delta}. \quad (15)$$

Thus, the lower the unemployed worker’s utility is, the larger the surplus of the match. Likewise, the higher the reservation productivity of a worker is, the lower the match surplus. As a consequence, for a given specific match productivity level $\varepsilon > R_r$, we can expect that hiring a homeowner will be more profitable for a firm than employing a renter.

---

\(^4\) Indeed, we can consider $R_i$ as the inverse of the commuting distance that a worker is willing to undertake.
3.2. Wages

Given the free entry condition $V = 0$, equations (7), (6) and (11), the wages are given by

$$w_i(\varepsilon) = \beta (y + \varepsilon) + (1 - \beta) \rho U_i$$

where $i = h, r$. As $\rho U_h \leq \rho U_r$, equation (16) implies that a homeowner will earn a lower wage than a renter.

3.3. Job creation curve

Given the free entry condition $V = 0$, equation (8), the surplus sharing rule (11), and expression of the reservation productivity $R_i$ implied by (14) and that of the surplus (15) we can derive from (8) the following job creation curve:

$$\frac{c}{(1 - \beta) q(\theta)} = \phi \int_{R_h}^{+\infty} \varepsilon - R_h \rho + \delta dG(\varepsilon) + (1 - \phi) \int_{R_r}^{+\infty} \varepsilon - R_r \rho + \delta dG(\varepsilon).$$

This expression corresponds to a marginal condition of labour demand. Indeed, new jobs are posted until the expected cost of a vacancy equals the expected gain from a filled one.

3.4. Labour market flows

Because only matches with a productivity $\varepsilon \geq R_i$ become effective, which occurs with a probability $P(\varepsilon \geq R_i) = [1 - G(R_i)]$, the exit rates from unemployment are

$$q'_{w_i} = d_i \theta q(\theta) [1 - G(R_i)].$$

From these expressions, it turns out that unemployment hazards depend on labour demand ($\theta$), on the job seekers’ mobility costs ($d_i$), and on their willingness to commute within a local labour market ($R_i$). Since $d_r = 1$, we expect renters to have a higher unemployment exit rate unless the homeowners’ willingness to commute (low $R_h$) compensates their lack of mobility on the non local labour markets ($\bar{d} < 1$).

In a steady state, unemployment rates are constant. As a consequence, the flow of homeowners being hired is equal to the flow of those who lose their job\(^5\):

$$\bar{d} \theta q(\theta) [1 - G(R_h)] u_h = \delta (\mu - u_h),$$

so that

$$u_h = \frac{\mu}{\bar{q}_h w + \delta}.$$  

Homeowners’ unemployment rate is decreasing in $q'_{w_h}$ and increasing in $\delta$.

\(^5\)We assume that workers keep their residential status in case they become unemployed or decide to move.
Likewise, the flow of renters who are hired is equal to the flow of those who lose their job:

\[ [1 - G(R_r)] \theta q(\theta) u_r = (1 - \mu - u_r) \delta, \]

so that

\[ u_r = (1 - \mu) \frac{\delta}{q^{\nu} + \delta}. \]

Renters’ unemployment rates decreases with the exit rate from unemployment \( q^{\nu}_w \) and increases with the job destruction rate \( \delta \).

### 3.5. Critical distance

According to equations (13) and (1) and the surplus expression (10), we have

\[
\bar{d} = \lambda \left[ \beta \int_{R_h}^{+\infty} S_h(\varepsilon) dG(\varepsilon) - U_h G(R_h) \right] \leq 1 \tag{21}
\]

\[
\bar{d} = \lambda \{ \beta [1 - G(R_h)] E[S_h(\varepsilon) | \varepsilon \geq R_h] - U_h G(R_h) \}.
\]

where \( G(R_h) \) gives the probability that \( \varepsilon < R_h \). The critical distance at which homeowners will reject all job offers is decreasing in housing market regulation. Moreover, homeowners will be less willing to move when expected gains from a suitable match are weak independently to the labour market frictions.

### 4. Homeownership effects

In this section, we calibrate our model using realistic parameter values and run numerical simulations to investigate the properties of our economy. To that end, we run a comparative statics analysis to highlight the effects of arbitrarily increasing the rate of homeownership and that of housing market regulations on labour market performances. We first analyze the effects on individual performances and then on aggregate variables. Lastly, we interpret and discuss our findings.

#### 4.1. Calibration

For a start, we have to specify the functional forms for the matching function and the match-specific productivity distribution. As in Pissarides (2000), we use a Cobb-Douglas matching function, \( m(u; \nu) = u^\eta \nu^{1-\eta} \), where \( \eta \in [0, 1] \) is the matching elasticity with respect to unemployment. In empirical literature, wage distributions are commonly characterized by a log-normal distribution. Recall that wages are derived from a Nash bargaining rule in which surplus sharing is proportional to the bargaining power of each party. We thus assume that the match-specific productivity \( \varepsilon \) also follows a lognormal distribution \( \log N(0, 1) \) on the interval \([0, +\infty)\).

We define the time period of the model to be one year and set the discount rate factor to 0.95 which corresponds to a 5% annual interest rate. As in common in the literature (see e.g. Petrongolo and

\[^6\text{See the appendix for details about the simulated model.}\]
Pissarides, 2001) we set the value of the elasticity of matching function with respect to unemployment, \( \eta \), as well as that of worker bargaining power, \( \beta \), equal to 0.5 to internalize search externalities (Hosios condition). We set the exogenous separation rate to \( \delta = 0.33 \), which roughly corresponds to an average job life of 3 years. We normalize the minimal productivity of a match, \( y \), to one. The vacancy cost, \( c \), is set to 0.6, which more or less corresponds to 25% of the average productivity of a match in our economy.\(^7\) We calibrate reservation utilities of homeowners and renters so that \( b_h \) is equal to 60% of \( b_r \) and choose the value \( b_h = 0.9 \) and \( b_r = 1.5 \). Consequently, even in homeowners were assumed to be perfectly mobile, their permanent income when unemployed would still be lower.\(^8\)

We solve the model for different values of \( \mu \in ]0;1[ \) and \( \lambda \in [0.5;1] \) in order to gauge the likely effect of housing market efficiency/regulation, \( \lambda \), on labour market outcomes when homeownership rate, \( \mu \), increases. Low values of \( \lambda \) increase mobility costs, whereas values near one reduce mobility costs to moving expenses.

### Table 1: Parameters Values

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount rate</td>
<td>( \rho ) 0.95</td>
</tr>
<tr>
<td>Matching function elasticity</td>
<td>( \eta ) 0.5</td>
</tr>
<tr>
<td>Workers’ bargaining power</td>
<td>( \beta ) 0.5</td>
</tr>
<tr>
<td>Job destruction rate</td>
<td>( \delta ) 0.33</td>
</tr>
<tr>
<td>Minimal productivity of a match</td>
<td>( y ) 1</td>
</tr>
<tr>
<td>Vacancy cost</td>
<td>( c ) 0.6</td>
</tr>
<tr>
<td>Homeowners’ reservation utility</td>
<td>( b_h ) 0.9</td>
</tr>
<tr>
<td>Renters’ reservation utility</td>
<td>( b_r ) 1.5</td>
</tr>
</tbody>
</table>

### 4.2. Individual labour market performances

In this section, we analyze the effect of homeownership and housing market efficiency on individual performances. Figures 1 to 4 depict the performances of homeowners (subfigures a) and renters (subfigures b), and the gap between them (subfigures c) when both homeownership rate and housing market efficiency increase.

Homeowners always have worse performances than renters; i.e. higher probability to be unemployed (Figure 1c), lower wages (Figure 2c) and lower unemployment exit rates (Figure 3c). According to figure 4c, we can also conclude that homeowners commute much more than renters to stay in their local labour market. Thus, our model replicates the main arguments of Oswald (1999).

However, our simulations indicate that higher homeownership rates have performance enhancing effects at the individual level. Indeed, both homeowners and renters are less out of work, earn higher

\(^7\)Given the distribution of \( \epsilon \) and the normalization of \( y \), the average productivity of a match is given by \( y + E(\epsilon|\epsilon > 0) \approx 2.65 \). Note that higher or lower values of \( c \) will not affect the qualitative results of our model.

\(^8\)Note that the levels of \( b_h \) and \( b_r \) have no influence on the qualitative results, only the gap matter as we later explain.
wages and find more easily a job when the share of homeowners is greater. Moreover, when homeownership increases, both homeowners and renters are less willing to commute. That last finding is also similar to that of Oswald according to which higher homeownership increases commuting cost.

Higher housing market efficiency has different effects on individual performances that depend upon the residential status of the worker. Indeed, more efficient housing market improves homeowners’ performances but worsen those of renters. This stems from the competition between renters and homeowners on distant labour markets. Indeed, by lowering mobility cost, a more efficient housing market makes distant job offers more acceptable to homeowners and increases their job opportunities. As a result, renters compete with more job seekers.

Our simulations also show that a higher rate of homeownership reduces the gap between the unemployment rates, unemployment exit rates and reservation productivities but increase the wage inequality. Homeowners are generally better off as opposed to tenants.

Figure 1: Unemployment rate

Figure 2: Average Wages
Figure 3: Unemployment exit rate

Figure 4: Reservation Productivity
4.3. Aggregate labour market performances

We now turn to the effects of homeownership and housing market efficiency on aggregate performances. All findings are reported in the Figure 5. The effects on the average aggregate wage (figure 5b), the labour market tightness (figure 5c) and the critical distance (figure 5d) are monotone, whereas higher homeownership effects on unemployment rate (figure 5a) can be reversed depending on the housing market efficiency level.

The aggregate unemployment rate increases following an increase in homeownership rate when the housing market efficiency is low, i.e. when the mobility cost is high. On the other hand, as the housing market efficiency increases, the relation between the rate of homeowners and the aggregate unemployment rate flattens out. Eventually, as the efficiency index nears one, the relationship becomes inverted. Indeed, as figure 5a shows, the correlation between unemployment rate and homeownership rate becomes negative as soon as $\lambda > 0.8$ in our numerical setting.

Figure 5b shows that the aggregate average wage is always weaker when the share of homeowners in the economy is higher. This results from the fact that homeowners have much lower average wages than renters. Consequently, when their share increases, the aggregate wage decreases. As in Coulson and Fisher (2009), this results from a composition effect. However, because the housing market efficiency has a positive effect on homeowners’ wage greater than its negative effect on renters’ wage (see figure 2c), the aggregate average wage increases when the housing market becomes more efficient.

The labour market tightness, which gives the ratio between job vacancies and job seekers, is strongly increasing in the share of homeowners. Consequently, as the unemployment rate increases for low values of $\lambda$, we can conclude that the behavior of labour market tightness is mainly driven by job creation (i.e. more opened vacancies) in our economy. As in Coulson and Fisher (2009), this results from a entry effect.\footnote{We detail the interpretation and consequences of this effect on our economy in the next section.}

The critical distance reported in the figure 5d can be interpreted in our model as the share of homeowners who are willing to move to another labour market, i.e. a mobility rate. As expected, the housing market efficiency increases this mobility rate because of lower mobility costs. However, the effect of a higher homeownership rate is less obvious. When the share of homeowners increases, the competition on each local labour market from outside job seekers is less strong due to the decreasing share of perfectly mobile renters. We call this effect the competition effect. As a consequence, homeowners can find a profitable job on their local labour market more easily so that their unemployment exit rate increases as was shown on figure 3a. In addition, they need to be less mobile on distant labour markets to find a job so that the critical distance decreases. However, as we can see on the figure 5d, this decline in mobility rate is higher when mobility costs are lower. This comes from the fact that the competition effect is increased when homeowners are more mobile. Indeed, when the mobility cost is high, outside job seekers are mainly renters. However, when the mobility cost is weak, outside job seekers are renters and some homeowners from other labour markets.\footnote{Their share in outside job seekers is much higher than mobility cost is weaker.} As a consequence, on each
Figure 5: Aggregate performances
labour market the competition from outside job seekers is much weaker when the mobility cost is low due to the improvement of other homeowners’ job opportunities on their local labour market.

4.4. Discussion

Our model generates three distinct effects on the overall performance of the economy: a composition effect, an entry effect and a competition effect. An increase in the homeownership rate involves the three effects and its global impact on unemployment rates will depend on the relative weight of each. Conversely, the impact of a more efficient housing market is only driven by the competition effect.

The composition effect damages aggregate performances. Indeed, as we show in the previous subsection, homeowners always have lower labour market outcomes than renters. Consequently, an increase in the share of homeowners decreases the aggregate average wage and increases the aggregate unemployment rate.

The entry effect has a positive impact on individual labour market outcomes. As equation (10) suggests, employing homeowners is more profitable for firms (the resulting surplus is higher for a given match-specific productivity). Consequently, a higher homeownership rate increases the expected profit of firms and induces new firms to enter in the market to post new vacancies (see equation (17)) so that the labour market tightness raises. Therefore, workers’ contact rate increases and their performances are enhanced.

The competition effect can have an inverse impact according to its origin. When the share of homeowners increases, the competition in each local labour market from outside mobile job seekers, which are mainly renters, decreases. As a consequence, homeowners have more job opportunities so they can afford to be less mobile (on both local and distant labour markets) to find a profitable job. Therefore, their reservation productivity raises and the critical distance decreases. Remaining renters also have better labour market performances for the same reasons. When the housing market becomes more efficient, the share of mobile homeowners increases due to lower mobility costs which improve their labour market outcomes. However, this damages renters’ labour market outcomes because the competition on each labour market is stronger. As a result, their performances worsens. In summary, the competition effect resulting from housing market efficiency always has a positive impact on homeowners’ performances and a negative one on those of renters so that it narrows the gap between them (see subfigures 1c to 4c).

The composition effect impacts only aggregate variables whereas the entry and competition effects affect individual outcomes. According to our numerical simulations, the composition effect is always stronger than other two on aggregate wages. Conversely, the entry effect always outweighs the composition effect for the labour market tightness. Concerning aggregate unemployment rate, the composition effect is stronger than the entry effect only when mobility costs are high. Indeed, when the housing market becomes more efficient, the entry effect outweighs the composition one due to a stronger competition effect driven by higher mobility rates. As a consequence, the positive correlation between homeownership and unemployment rate no longer holds when the gap between workers’ performances is reduced. Therefore, although all of Oswald’s assumptions are verified, his conjecture
is not always valid. Our findings suggest that even if homeowners perform less well than renters, it is
the competition between them on distant labour markets which matters. Thus, higher homeownership
may deteriorate unemployment rate not because of underperforming owners but because of the lack of
competition between them and tenants on distant labour markets.

5. Conclusion

In this paper, we examine the relationship between homeownership and housing market efficiency
on labour market performances. Our results show that even if the correlation between homeownership
and aggregate performances may be negative, individuals are always better off in an economy in which
homeownership is promoted. Furthermore, we show that Oswald’s conjecture about aggregate unem-
ployment may be invalid if competition on distant labour markets between homeowners and renters is
strong enough. In our economy, such a competition level can be achieved with low enough mobility
costs. Thus, the main problem does not seem to be homeownership per se, but the homeowners’
low mobility that arises due high transaction costs. Thus our findings suggest that policies that fos-
ter homeownership should be accompanied by a deregulation of the housing market, thereby lowering
mobility costs are reaping the benefits associated with higher rates of homeowners.

We reckon that the choice of residential status is exogenous in our economy. In addition, the
housing market is introduced so as to impose mobility costs. Future work should attempt to enlarge
housing market effects by endogenizing the tenure choices of workers.
References


Appendix A: Simulated equilibrium equations

At the steady state, the equilibrium of our economy is determined by a system of 8 equations (equations 1A to 8A) with 8 unknowns \((u_h, u_r, \theta, R_h, R_r, \bar{w}_h, \bar{w}_r, \bar{d})\).

We assume a log normal distribution for \(\varepsilon\) defined on the interval \([0, +\infty]\) with \(G(\varepsilon)\) the cumulative density function and \(g(\varepsilon) = \frac{dG(\varepsilon)}{d\varepsilon}\) the density function. Due to numerical convergence concerns, we truncate the distribution at a superior born \(\varepsilon_{\text{max}}\) large enough so that we have \(G(\varepsilon_{\text{max}}) \rightarrow 1\). As a consequence, we have\(^{11}\):

\[
P(\varepsilon_{\text{max}} \geq \varepsilon \geq R_h) = \int_{R_h}^{\varepsilon_{\text{max}}} \frac{g(\varepsilon)d\varepsilon}{G(\varepsilon_{\text{max}})} = \frac{G(\varepsilon_{\text{max}}) - G(R_h)}{G(\varepsilon_{\text{max}})} = 1 - \frac{G(R_h)}{G(\varepsilon_{\text{max}})} \rightarrow 1 - G(R_h)
\]

In what follows, the simulated model is presented given that exogenous truncation.

The flows equations of unemployment rates are:

\[
u_h = \mu \delta \frac{\partial q(\theta)}{\partial \theta} \frac{\bar{d}}{[1 - G(R_h)/G(\varepsilon_{\text{max}})] + \delta}
\]

\(^{11}\)When the inferior born is endogenously determined by our model. In the contrary, we have:

\[
\int_{R_{i,t}}^{\varepsilon_{\text{max}}} g(\varepsilon)d\varepsilon = \frac{G(\varepsilon_{\text{max}}) - G(R_{i,t})}{G(\varepsilon_{\text{max}}) - G(R_{i,t})} = 1
\]
\[ u_r = (1 - \mu) \frac{\delta}{\theta q(\theta)[1 - G(R_r)/G(\epsilon_{\text{max}})] + \delta} \]  
(2A)

where \( \theta q(\theta) = q^{1-\eta} \).

The reservation productivity of homeowners is given by:

\[ R_h = \rho U_h - y = b - y + \beta \frac{\theta q(\theta)}{\rho + \delta} \int_{R_h}^{\epsilon_{\text{max}}} (\epsilon - R_h) \frac{dG(\epsilon)}{G(\epsilon_{\text{max}})} \]  
(3A)

and following an integration by parts we have:

\[ R_h = b_h - y + \beta \frac{\theta q(\theta)}{\rho + \delta} \left[ (\epsilon_{\text{max}} - R_h) - \int_{R_h}^{\epsilon_{\text{max}}} G(\epsilon) \frac{d\epsilon}{G(\epsilon_{\text{max}})} \right] \]

In the same way, we have for the following reservation productivity of renters:

\[ R_r = \rho U_r - y = b - y + \beta \frac{\theta q(\theta)}{\rho + \delta} \int_{R_r}^{\epsilon_{\text{max}}} (\epsilon - R_r) \frac{dG(\epsilon)}{G(\epsilon_{\text{max}})} \]  
(4A)

\[ R_r = b_r - y + \beta \frac{\theta q(\theta)}{\rho + \delta} \left[ (\epsilon_{\text{max}} - R_r) - \int_{R_r}^{\epsilon_{\text{max}}} G(\epsilon) \frac{d\epsilon}{G(\epsilon_{\text{max}})} \right] \]

According to the expressions of surplus, the job creation curve is given by:

\[ \frac{c(\rho + \delta)}{(1 - \beta)q(\theta)} = \phi \int_{R_h}^{\epsilon_{\text{max}}} (\epsilon - R_h) dG(\epsilon) + (1 - \phi) \int_{R_r}^{\epsilon_{\text{max}}} (\epsilon - R_r) dG(\epsilon) \]  
(5A)

\[ \frac{c(\rho + \delta)}{(1 - \beta)q(\theta)} = \phi_t \left[ (\epsilon_{\text{max}} - R_h) - \int_{R_h}^{\epsilon_{\text{max}}} G(\epsilon) d\epsilon \right] + (1 - \phi_t) \left[ (\epsilon_{\text{max}} - R_r) - \int_{R_r}^{\epsilon_{\text{max}}} G(\epsilon) d\epsilon \right] \]

where \( q(\theta) = A\theta^{1-\eta}, \phi = \frac{u_h}{u_h + u_r}, 1 - \phi_t = \frac{u_r}{u_h + u_r} \).

The average wage of homeowners \( \bar{w}_h \) is given by:

\[ E \left[ w_h(\epsilon) \mid \epsilon \geq R_h \right] = \int_{R_h}^{\epsilon_{\text{max}}} w_h(\epsilon) \frac{dG(\epsilon)}{G(\epsilon_{\text{max}}) - G(R_h)} \]  
(6A)

\[ = \int_{R_h}^{\epsilon_{\text{max}}} \left[ \beta (y + \epsilon) + (1 - \beta)\rho U_h \right] \frac{dG(\epsilon)}{G(\epsilon_{\text{max}}) - G(R_h)} \]

which gives after an integration by parts:

\[ E \left[ w_h(\epsilon) \mid \epsilon \geq R_h \right] = \beta y + (1 - \beta)\rho U_h + \beta \left[ \frac{\epsilon_{\text{max}}G(\epsilon_{\text{max}}) - R_h G(R_h) - \int_{R_h}^{\epsilon_{\text{max}}} G(\epsilon) d\epsilon}{G(\epsilon_{\text{max}}) - G(R_h)} \right] \]

In the same way, the average wage of renters \( \bar{w}_r \) is given by:
\[ E \left[ w_r(\epsilon) \mid \epsilon_{\text{max}} \geq \epsilon \geq R_r \right] = \int_{R_r}^{\epsilon_{\text{max}}} w_r(\epsilon) \frac{dG(\epsilon)}{G(\epsilon_{\text{max}}) - G(R)} \]

\[ = \beta y + (1 - \beta)\rho U_r + \beta \left[ \frac{\epsilon_{\text{max}} G(\epsilon_{\text{max}}) - R_r G(R) - \int_{R}^{\epsilon_{\text{max}}} G(\epsilon) d\epsilon}{G(\epsilon_{\text{max}}) - G(R)} \right] \]

with

\[ \rho U_h = b_h + \beta \theta q(\theta) \left[ (\epsilon_{\text{max}} - R_{h, t}) - \int_{R_h} G(\epsilon) d\epsilon \right] \]

\[ \rho U_r = b_r + \beta \theta q(\theta) \left[ (\epsilon_{\text{max}} - R_r) - \int_{R_r} G(\epsilon) d\epsilon \right] \]

Critical distance:

\[ \tilde{d} = \lambda \left\{ \frac{\beta}{\rho + \delta} \int_{R_h}^{\epsilon_{\text{max}}} (\epsilon - R_h) \frac{dG(\epsilon)}{G(\epsilon_{\text{max}})} - G(R_h) U_h \right\} \]

\[ = \lambda \left\{ \frac{\beta}{\rho + \delta} \left[ (\epsilon_{\text{max}} - R_h) - \int_{R_h}^{\epsilon_{\text{max}}} G(\epsilon) d\epsilon \right] - G(R_h) U_h \right\} \]