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Does promoting homeownership always damage labour market performances?

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Abstract

In this paper we analyse the link between homeownership and various aggregate and individual labour market outcomes. Our aim is to investigate the likely consequences of public policies that promote homeownership. To this end, we develop a circular firm-worker matching model with Nash-bargained wage setting and free market entry. Homeowners are assumed to be less mobile than tenants and to bear higher mobility costs. Our numerical exercises show that tenants usually have lower unemployment rates and lower wage rates than homeowners. Importantly, workers' performances do not necessarily improve following an increase in the proportion of homeowners. The latter crucially depends on the relative utility enjoyed by homeowners and tenants when unemployed. In the aggregate, nevertheless, we find that the unemployment rate generally increases following an increase in the proportion of homeowners. Yet, the link between the two can be reversed if the homeowners' utility is lower than that of tenants when unemployed. Our model thus identifies a number of conditions under which Oswald's conjecture is likely to hold or not. Thus, our results do not necessarily support the view that policies fostering homeownership are adequate public policies given their potentially negative effect on the labour market.

JEL Codes: H31, J61, J64, R23
Key words: Stochastic job matching, Homeownership, Unemployment, Mobility

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1. Introduction

Over the past decades homeownership rates have increased significantly in many OECD countries. As stressed by Andrews and Caldera Sànchez (2011), only a part of this increase can be explained by changes in households' characteristics such as age, income, household structure or education. According to them, a significant part of this increase stems from the many programs and public policies that have been implemented over time to foster homeownership: subsidized loans, zero interest loans, reduced down payments, tax deductible mortgage interests, *etc.*

The rationale for subsidizing homeownership is manifold. 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, e.g., 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" or "Oswald's conjecture" suggests that higher homeownership rates may increase unemployment rates, thus partly explaining international and interregional variations in the latter.

Our paper aims at investigating Oswald's conjecture by formalizing the behavioural assumptions of his seminal contribution. Indeed, Oswald's conjecture stems from a macroeconomic empirical regularity but rests upon microeconomic behavioural assumptions (Oswald, 1996, 1999). His starting point is to reasonably assume that a loan must be contracted to buy a house. This long run financial constraint will very likely harm homeowners to a greater extent when unemployed. 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). Lower mobility inhibits search strategies and may translate into poorer match quality, thus giving rise to inefficiencies (Munch et al., 2006; Vuuren and 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 tenants over longer distances which also leads to inefficiencies due to transport congestion. More recently, Blanchflower and Oswald (2013) argue that high homeownership rates deter business formation and, consequently, job opportunities through zoning restrictions (so-called "NIMBY").

Many empirical studies have tested Oswald's conjecture using regional or cross-country data while others have tested related theoretical hypotheses (unemployment probability and duration) using micro-economic data (see Havet and Penot, 2010, for a detailed survey). No consensus has yet emerged in the literature. Macroeconomic analyses provide mixed results.[2] Most microeconomic analyses show that homeowners have lower probabil-

[2]Nickell and Layard (1999) and Belot and Van Ours (2001) find a positive and significant impact of

ities of being unemployed and have shorter spells than tenants on local labour markets.[3] Interestingly, results are mixed when reemployment requires geographic mobility. Microeconomic studies have also underlined the importance of distinguishing between mortgaged and outright homeowners (Baert et al., 2014) and the need to account for search intensity on local and distant labour markets (Morescalchi, 2014). However, most of these studies are plagued with methodological drawbacks. Indeed, many microeconometric analyses fail to account adequately for the endogeneity of homeownership and individual performances on the labour market so their conclusions need to be interpreted with caution.[4]

At the theoretical level, many microeconomic stylized search models have been developed to investigate Oswald's hypothesis (Oswald, 1997; Munch et al., 2006; Dohmen, 2005; Coulson and Fisher, 2009; Vuuren, 2016). They all consider an economy in which the labor market is split into a local and a distant component, and that only homeowners face mobility costs. Only Oswald (1997) considers the possibility that homeowners may commute between regions. Other papers implicitly assume that homeowners are constrained to their local labour market. Likewise, in most papers, save for Coulson and Fisher (2009), firms are not explicitly modeled thus omitting any effect of homeownership on job creation. Munch et al. (2006) distinguish between homeowners' performances and reservation wages on local and non-local labour markets. Finally, Vuuren (2016) takes into account the decision of workers to become homeowners and, in particular, the risk of losing their house during a lengthy spell of unemployment.

Most theoretical papers find that homeowners are more likely to be unemployed and to have longer unemployment duration except Munch et al. (2006) and Vuuren (2016) who find no link between homeownership and individual labor market performances. In Munch et al. (2006), even though homeowners are less mobile on the non-local labour market (mobility effect), their lower reservation wages for local jobs more than compensate the aforementioned negative effects so that homeowners may experiment shorter unemployment spells. At the aggregate level, Oswald (1997) and Dohmen (2005) find that higher homeownership rates always lead to higher aggregate unemployment rates due to a composition effect of unemployed workers. Munch et al. (2006) find that the correlation can be positive if the negative mobility effect dominates. Finally, Coulson and Fisher (2009) find a non monotonous correlation when taking into account firms' behaviour. Unlike Blanchflower

homeownership on unemployment rates in several OECD countries. However, when controlling for additional covariates such as lagged unemployment rate, money supply shocks and labour demand, Green and Hendershott (2001) no longer find any significant relationship for 19 OECD countries over the period 1961-1995. Coulson and Fisher (U.S., 2009) and Garcia and Hernandez (Spain, 2004) find that an increase in homeownership rates lower the unemployment rate.

[3]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.)

[4]For instance, it may be that the unemployment spells of homeowners are shorter than those of renters because they behave differently and, at the same time, workers with good job opportunities choose to become homeowners.

and Oswald (2013)'s argument, they show that higher homeownership rates stimulate firm entry (entry effect) and job opportunities so as to overcome the negative composition effect of unemployed workers on aggregate unemployment.

In our paper, we investigate whether public policies that promote homeownership are beneficial to the aggregate and individual-level labour market performances. We do so by investigating the consequences of increasing homeownership rates. To this end, we develop a stochastic job matching model *à la* Pissarides (2000) in which wage determination results from bargaining between firms and workers in the spirit of Coulson and Fisher (2009). As in previous papers, we also assume that homeowners are less mobile than tenants on distant labour markets. However, we transpose the analysis of Salop (1979) to that of workers' geographic mobility and consider a continuum of heterogeneous distant labour markets rather than a single one. Moreover, we assume that homeownership impedes mobility for two reasons: firstly by restricting job search in the economy, and secondly by carrying additional costs in case a job is located far away.

The model is parametrized and numerous simulations are conducted. In particular, we investigate how the steady-state equilibrium changes as homeowners are made progressively similar to tenants in their job search behaviour. Likewise, we study the sensitivity of the equilibrium when the utility flow of being unemployed differs significantly between them. The analysis is carried out both at the individual and aggregate levels. As in many previous models, our simulations show that tenants always outperform homeowners on the overall labour market in terms of exit rates from unemployment, while the converse holds in terms of wages. Contrary to Coulson and Fisher (2009), we do not necessarily find that workers' performances always improve following a policy that promotes homeownership. We show that the impact of promoting homeownership on job creation and aggregate labour market performance crucially depends on the value of the utility enjoyed by homeowners relative to tenants when unemployed. In our benchmark case homeowners and renters are assumed to enjoy the same flow utility when unemployed. The impact of increasing homeownership on job creation is systematically negative under this assumption. We also find that the latter relationship can be reversed when homeowners' flow utility is lower than that of tenants when unemployed. As argued by e.g. Vuuren (2016), this may occur because homeowners run the risk of losing their property during an extended unemployment spell. Thus, our results do not necessarily support the view that policies fostering homeownership are adequate public policies given their potentially negative effect on the labour market.

The paper is organized as follows. The next section presents the theoretical framework. We underline and motivate the main assumptions of the model and highlight its main properties. In Section 3, we parametrize the model and report the simulation results of exogenously increasing the share of homeowners. In section 4, we assess the robustness of the results by considering the impact of increasing homeownership rates on labour market performances for different values of the flow income enjoyed by homeowners when unemployed compared to renters. We conclude the paper in Section 5.

2. The model

We propose a theoretical framework *à la* Pissarides (2000) aimed at evaluating the impact of residential status *per se* on individual and aggregate labour market performances through its effect on geographic mobility. Our focus is on the steady-state equilibrium. Time is continuous and the economy is populated by a continuum of risk-neutral, infinitely-lived agents who share a common discount factor ρ. We assume workers and firms to be uniformly distributed along a directed circle whose circumference is normalized to unity.[5] Firms are identical save for their exogenous location on the circle; they are all endowed with a single vacancy, and when a match occurs, firms produce 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 ε is match-specific, unknown before the match occurs, and drawn from a stationary and know-by-all distribution G with support $[\varepsilon_{\min}, \varepsilon_{\max}]$.

Workers differ in their location on the circle and in their residential status. Residential status matters because finding a job takes time, the latter may be located far from one's place of residence and moving or commuting is costly. Workers' willingness to accept job offers at different locations depends on mobility costs as well as on expected gains, as presented below.

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 by $\mu_h = \mu$ and that of tenants by $\mu_r = 1 - \mu$.[6] The economy is represented by the directed circle in Figure 1. Each point on the circle corresponds to a local labour market. All local labour markets are assumed identical so that the situation at a specific point corresponds to the state of the economy.

As shown in the figure, a worker located at A has to move to accept a job offer in the distant labour market located at B, *i.e.* at a distance $d \in [0; 1]$. Tenants and homeowners may differ in two respects: (i) tenants may search on the whole circle, whereas homeowners may limit their search to a distance $d_h \leq 1$ from their current location. This is consistent with the view that tenants are generally more mobile compared to homeowners.[7] When

[5]The use of a directed circle makes the model more tractable and allows interpretations in terms of mobility rates. Furthermore, by assuming uniformly distribution of identical workers and firms, we abstract from location decisions.

[6]As our analysis focuses on the effects of homeownership policies, we simplify our model by considering exogenous tenure choices. Indeed, as Andrews and Caldera Sànchez (2011) showed, such policies bring about changes in homeownership rates without any changes in households' characteristics.

[7]Note that in Oswald (1997) and in related contributions (e.g. Dohmen, 2005, Coulson and Fischer, 2009) it is generally assumed that renters search in two markets whereas homeowners search in only one. Our assumption that d_h may be lower than 1 is in the same spirit. Section 3 of the paper provides numerical results for different values of the critical distance d_h.

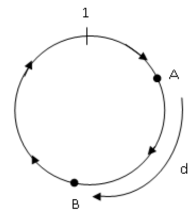

Figure 1: Our economy

$d_h = 1$, both homeowners and renters search on the whole circle; (ii) However, even when $d_h = 1$, the two types of workers are subject to different mobility costs: while tenants can move freely to any job on the circle, homeowners bear a mobility cost $C(d)$ when they accept a job situated at a distance d from their current place of residence. Such a mobility cost is assumed to be increasing with the distance $d \in [0; d_h]$ for homeowners due to search, transaction and psychological costs:[8]

$$C(d) = \begin{cases} d \text{ if } d \in [0, d_h] \\ +\infty \text{ if } d > d_h \end{cases}, \tag{1}$$

2.2. The matching function

A worker can be either employed or unemployed. Only unemployed workers are assumed to search and eventually receive job offers (no on-the-job search). As in Pissarides (2000), search is random, and vacant jobs and unemployed workers are brought together in pairs by a customary matching function. It relates the number of matches in a given sub-market/location j to the total number of job seekers and vacancies, *i.e.*

$$M_j \equiv m(n_j; v_j),$$

where n_j and v_j correspond to the number of job seekers and the number of vacancies in location j, respectively. The function is assumed to be twice continuously differentiable (C^2), increasing and concave in both its arguments, linearly homogeneous, and to satisfy the Inada and the boundary conditions: $m(0; v_j) = m(n_j; 0) = 0$ for $n_j, v_j \geq 0$. On average, a firm contacts a worker at rate M_j/n_j while a job seeker meets with a firm at rate M_j/v_j. Let $\theta_j = v_j/n_j$ be the labour market tightness in sub-market j. Linear homogeneity of the matching function allows us to write the contact rates as $M_j/v_j = q(\theta_j)$ and $M_j/n_j = \theta_j q(\theta_j)$. Contact rates, $q(\theta_j)$ and $\theta_j q(\theta_j)$, are respectively decreasing and increasing functions of θ_j.

[8]Notice that while renters may also face mobility costs, our focus is here mainly on the differential mobility cost between homeowners and renters. Therefore, we choose to normalize renters' mobility cost to zero.

As unemployed tenants are perfectly mobile and may search over the whole economy, they receive job offers from the entire circle. Thus, they encounter vacancies at rate:[9]

$$\int_{j\in[0,1]} \theta_j q(\theta_j)\mathrm{d}j = \theta q(\theta), \tag{2}$$

Unemployed homeowners, on the other hand, are less mobile than tenants and may limit their job search so that they only meet job offers located beyond a critical distance d_h. Consequently, they meet vacancies at a lower rate than tenants:[10]

$$\int_{j\in[0,d_h]} \theta_j q(\theta_j)\mathrm{d}j = d_h\theta q(\theta) \leq \theta q(\theta). \tag{3}$$

2.3. Gains to Firms and Workers

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 filling a job with a worker with residential status i, and V the PDV of a vacancy.

2.3.1. Workers

The value of being employed, $W_i(\varepsilon)$, for a type $i = h, r$ worker satisfies:

$$\rho W_i(\varepsilon) = w_i(\varepsilon) - \delta\left[W_i(\varepsilon) - U_i\right]. \tag{4}$$

The interpretation of this expression is as usual: a worker i receives a wage, $w_i(\varepsilon)$, when employed and incurs a loss equal to $W_i(\varepsilon) - U_i$ in case of job destruction which occurs at an exogenous Poisson rate δ.

The value of being unemployed for a renter, U_r satisfies:

$$\rho U_r = b + \theta q(\theta)\int_0^{\varepsilon_{\max}} \max\left[W_r(\varepsilon) - U_r, 0\right]\mathrm{d}G(\varepsilon). \tag{5}$$

When unemployed, renters receive unemployment benefits and/or enjoy unpaid leisure activity which provide them with a constant reservation utility equal to b. They search for jobs on the whole circle (*i.e.* at any distance between 0 and 1 from their current location), and may thus encounter a vacancy at rate $\theta q(\theta)$, and accept a job whenever its productivity

[9] We assume symmetry between locations/sub-markets. Matches are equiprobably distributed between job-seekers as well as among vacancies, and in each market the law of large numbers implies $n_j = n$, $v_j = v$ and $\theta_j = \theta$. Given that there are μ(resp.$1-\mu$) homeowners (renters) in the population, searching occurs in d_h (*all*) sub-markets, and that their unemployment rate is $u_h(u_r)$, we have $n = d_h\mu u_h + (1-\mu)u_r$ job seekers in each market.

[10] Again, symmetry between locations is imposed.

ε is sufficiently high to ensure that the expected gain from taking it exceeds the value of search, *i.e.* $W_r(\varepsilon) \geq U_r$.

The value of being unemployed for a homeowner, U_h, satisfies:

$$\rho U_h = b + \int_0^{d_h} \theta q(\theta) \int_0^{\varepsilon_{\max}} \max \left[W_h(\varepsilon, z) - U_h - C(z), 0 \right] \mathrm{d}G(\varepsilon)\mathrm{d}z. \tag{6}$$

Unemployed homeowners receive unemployment benefits, housing benefits or enjoy unpaid leisure activity which provide them with a constant reservation utility equal to b.[11] They search for jobs situated at a distance lower or equal to d_h from their current location, and may meet with a firm situated at a distance $z \leq d_h$ at rate $\theta q(\theta)$. The offer is then accepted only if its productivity ε is sufficiently high to ensure that the gain from taking the job $W_h(\varepsilon, z)$ exceeds the opportunity and mobility costs $U_h + C(z)$.

2.3.2. Firms

Let us denote by $J_r(\varepsilon)$ and $J_h(\varepsilon, z)$ the PDV of a job filled with, respectively, a renter and a homeowner initially located at a distance z from the job, which write as follows:

$$\rho J_r(\varepsilon) = y + \varepsilon - w_r(\varepsilon) - \delta \left[J_r(\varepsilon) - V \right]. \tag{7}$$

$$\rho J_h(\varepsilon, z) = y + \varepsilon - w_h(\varepsilon, z) - \delta \left[J_h(\varepsilon, z) - V \right]. \tag{8}$$

In each case, a job filled with a worker with residential status $i = h, r$ produces $y + \varepsilon$ units of output. Renters are paid a wage $w_r(\varepsilon)$ while homeowners are paid $w_h(\varepsilon, z)$ as their wage depends not only on their productivity but also on distance/mobility costs. Jobs can be destroyed at an exogenous Poisson rate δ, in which case the firm incurs a loss equal to $J_i - V$.

The PDV of a vacant job satisfies:

$$\begin{aligned} \rho V = -c + q(\theta) \Bigg\{ \phi \int_0^{d_h} \int_0^{\varepsilon_{\max}} \max \left[J_h(\varepsilon) - V, 0 \right] \mathrm{d}G(\varepsilon)\mathrm{d}z + \\ (1 - \phi) \int_0^{\varepsilon_{\max}} \max \left[J_r(\varepsilon) - V, 0 \right] \mathrm{d}G(\varepsilon) \Bigg\}, \end{aligned} \tag{9}$$

where $\phi = \frac{d_h \mu u_h}{d_h \mu u_h + (1-\mu) u_r}$ (*i.e.* $(1 - \phi)$) stands for the share of unemployed homeowners (renters) who are searching in d_h (all) submarkets, whereas c is the cost of holding a vacancy. At rate $q(\theta)$ the firm meets a worker, which may yield a capital gain when the productivity

[11] Notice that the value of b is assumed to be identical for both homeowners and renters. This corresponds to our benchmark case studied in section 3. However, robustness checks are performed in section 4 where this parameter is allowed to differ between homeowners and renters.

ε is sufficiently high. 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 tenant with a productivity ε, $S_r(\varepsilon)$, can be written as:

$$S_r(\varepsilon) = [J_r(\varepsilon) - V] + [W_r(\varepsilon) - U_r]. \tag{10}$$

It is equal the sum of the net gains to the firm and to the tenant for a given match.

For homeowners, the size of the surplus depends on the productivity ε but also of the mobility costs, and hence, on the distance between the firm and the applicant. Accordingly, let us define the surplus of a match with a productivity ε between a firm situated at a distance z from a homeowner, $S_h(\varepsilon, z)$, which we write as follows:

$$S_h(\varepsilon, z) = [J_h(\varepsilon, z) - V] + [W_h(\varepsilon, z) - U_h - C(z)]. \tag{11}$$

It is equal the sum of the net gains to the firm and to the homeowner for a given match, and it decreases with the mobility costs $C(z)$.

The negotiated wage results from a Nash bargaining between the firm and the worker. Assuming that free entry in the for-hire labour market drives rents from vacant jobs to zero, $V = 0$, the match surplus is shared between firms and workers according to the following sharing rules:

$$W_r(\varepsilon) - U_r = \frac{\beta}{1-\beta} J_r(\varepsilon), \tag{12}$$

for renters, and

$$W_h(\varepsilon, z) - U_h - C(z) = \frac{\beta}{1-\beta} J_h(\varepsilon, z), \tag{13}$$

for homeowners. In each case, β and $(1-\beta)$ represent the bargaining power of workers and firms, respectively.

Using equations (4), (5), (7) and (12) above, the wages for renters boils down to a simple weighted average between their outside options, determined by ρU_r, and their productivity, $y + \varepsilon$:

$$w_r(\varepsilon) = \beta(y + \varepsilon) + (1-\beta)\rho U_r. \tag{14}$$

Similarly, using equations (4), (6), (8) and (13), the wages for homeowners write:

$$w_h(\varepsilon, z) = \beta(y + \varepsilon) + (1-\beta)[\rho U_h + (\rho + \delta)C(z)]. \tag{15}$$

Again, they depend on their outside options, determined by ρU_h, and their productivity, $y + \varepsilon$. Due to the mobility costs $C(z)$, they are also increasing with distance z. Hence, homeowners receive higher wages than tenants for a given ρU.[12] However, due to their lower mobility ($d_h < 1$), homeowners have lower contact rates which lead to lower outside options than those of renters, $\rho U_h < \rho U_r$.

2.5. Decision Rules and Reservation Productivities

The firms and the workers' decision rules determine job acceptance: not all matches between firms and workers are profitable. For tenants, there exists a common reservation productivity $y+R_r$ below which neither the firm nor the worker wants the match to become effective. In other words, R_r represents the match-specific reservation productivity for which

$$S_r\left(R_r\right) = 0, \tag{16}$$

and above which the match surplus becomes positive for a tenant, *i.e.* $S_r\left(\varepsilon\right) \geqslant 0$ if and only if $\varepsilon \geqslant R_r$. Thus, a random match between a firm and an unemployed tenant becomes effective only at rate $[1 - G(R_r)]$. From the Bellman equations (4), (5), (7), and equations (10) and (16), we have:

$$R_r = \rho U_r - y. \tag{17}$$

The reservation productivity of a match between a firm and a tenant is equal to the difference between the reservation wage ρU_r and the productivity y.

For homeowners, the willingness to accept a match depends on the distance from his/her current location and the firm. As for tenants, there exists a common reservation productivity $y + R_h$ below which neither the firm nor the worker wants the match to take place. In other words, R_h represents the match-specific reservation productivity such that:

$$S_h\left(R_h, z\right) = 0. \tag{18}$$

This expression implicitly defines R_h as a function of the distance z, *i.e.* $R_h \equiv R_h(z)$ with $R_h'(z) = -\frac{\partial S_h/\partial z}{\partial S_h/\partial R_h} \geq 0$: given the mobility cost, homeowners are less willing to accept jobs as the distance from their current location increases. In other words, the rate at which matches situated at a distance z from a homeowner's current location becomes effective, $\left[1 - G(R_h(z))\right]$, is decreasing in z.

From the Bellman equations (4), (6), (8), and equations (11) and (18), we get:

$$R_h(z) = \rho U_h - y + (\rho + \delta)C(z). \tag{19}$$

Thus, the reservation productivity $R_h(z)$ is increasing in the reservation wage ρU_h, decreasing in the productivity y and increasing in distance z. Such properties are quite intuitive: a higher value of being unemployed makes workers less willing to accept matches and there-

[12] Namely, at given ρU, $w_h(\varepsilon, 0) = w_r(\varepsilon)$ Thus, $\partial w_h/\partial z > 0$ implies that $w_h(\varepsilon, z) \geq w_r(\varepsilon)$ $\forall z \in [0, d_h]$ at given ρU.

fore, the reservation product R_h goes up. Similarly, a higher distance implies a higher cost of moving and thus a lower surplus, which makes the match less attractive, and as a result, R_h increases with the distance z. Quite to the contrary, a higher productivity makes matches more attractive, and thus, R_h is decreasing in y.

2.6. Labour Market Flows

Because only matches with a sufficiently large productivity become effective, tenants exit from unemployment on average at rate:

$$q_r^w = \theta q(\theta) \left[1 - G(R_r)\right], \tag{20}$$

whereas unemployed homeowners exit from unemployment on average at rate:

$$q_h^w = \theta q(\theta) \int_0^{d_h} [1 - G(R_h(z)] \mathrm{d}z. \tag{21}$$

From these expressions, it turns out that since $d_h \leq 1$, we expect tenants to exit unemployment at a higher rate compared to homeowners, unless the homeowners' willingness to accept jobs situated at a short distance from their location compensates their lower mobility ($d_h \leq 1$). However, the comparison between the reservation productivities (17) and (19) shows that this is unlikely to occur in this context. Indeed, at given ρU, homeowners' reservation productivity is always at least equal to tenants' reservation productivity. Namely, $R_h(z)$ is strictly increasing in z while, at given ρU, $R_h(0) = R_r$, so that $R_h(z) \geq R_r$, $\forall z \in [0, d_h]$.[13]

In a steady state, the flow of type i-workers ($i = h, r$) being hired is thus equal to the flow of those who lose their job:

$$\underbrace{q_i^w \mu_i u_i}_{\text{unemployment outflow}} = \underbrace{\delta(1 - u_i)\mu_i}_{\text{unemployment inflow}}, \tag{22}$$

so that unemployment rates are constant:[14]

$$u_i = \frac{\delta}{q_i^w + \delta}. \tag{23}$$

Thus, type i -workers' unemployment rate, u_i, is decreasing in the exit rate, q_i^w, and increas-

[13]Notice that search efforts have been omitted for the sake of simplicity. One must however keep in mind that the return to search depends on a worker's critical distance d_i as well as on his/her reservation productivity, R_i. As a result, homeowners and renters may have different search intensities. This could be another channel through which homeownership may affect labour market outcomes.

[14]We assume that workers keep their residential status in case they become unemployed or decide to move.

ing in the job destruction rate, δ. Then, the aggregate unemployment rate writes simply as a weighted average of type-specific unemployment rates:

$$u = \mu u_h + (1-\mu)u_r \tag{24}$$

2.7. Job Creation

Given that free entry implies $V = 0$, the surpluses (10) and (11), the surplus sharing rules (12) and (13) and using the fact that $S_r(R_r) = 0$, we get:

$$S_r(\varepsilon) = \frac{\varepsilon - R_r}{\rho + \delta}, \tag{25}$$

and that, by the same token,

$$S_h(\varepsilon, z) = \frac{\varepsilon - R_h(z)}{\rho + \delta}. \tag{26}$$

We can derive from (9) the following free entry condition:

$$\frac{c}{(1-\beta)q(\theta)} = \phi \int_0^{d_h} \int_{R_h}^{\varepsilon_{\max}} \frac{\varepsilon - R_h(z)}{\rho + \delta} \mathrm{d}G(\varepsilon)\mathrm{d}z + (1-\phi) \int_{R_r}^{\varepsilon_{\max}} \frac{\varepsilon - R_r}{\rho + \delta} \mathrm{d}G(\varepsilon). \tag{27}$$

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 job. Given that homeowners face high mobility costs, hiring them may be less profitable for a firm than hiring a tenant.[15] In such a case, we can infer from equation (27) that firms will open fewer vacancies if homeowners are more numerous in the labour force. In addition, the lower mobility of the latter (*i.e.* due to their low d_h) reduces the arrival rate of workers for a given labour market tightness and thus also impedes job creation. Indeed, by increasing the expected duration of a vacancy, a lower arrival rate of workers increases the expected hiring cost facing the firm.

2.8. Steady State Equilibrium

The steady-state equilibrium of our economy is defined by a t-uple composed of the reservation productivities, R_r^* and $R_h^*(z)$, given by equations (17) and (19), of wages $w_r^*(\varepsilon)$ and $w_h^*(\varepsilon, z)$, resulting from the wage equations (14) and (15), of unemployment rates u_h^*, u_r^* and u^*, obtained from the flow equilibrium equation (23), and from (24), and of the labour market tightness θ^*, solving the free entry condition (27). We now turn to some numerical exercises to evaluate the main steady-state properties of our model.

[15] When homeowners and tenants get the same income flow during unemployment b, we get that $R_h(z) \geq R_r$. From equations (25) and (26), this implies $S_h(\varepsilon, z) \leq S_r(\varepsilon)$.

3. Numerical Simulations

In this section, we parametrize our model and conduct a set of simulations to investigate whether policymakers should encourage homeownership. To this end, we analyze the effects of arbitrarily increasing the rate of homeownership μ on individual and aggregate labour market performances.[16] We evaluate the steady-state impacts for three different values of the critical distance $d_h \in \{0.4; 0.7; 1\}$, which gives the degree of mobility in job search of homeowners.[17]

3.1. Parameter Values

For a start, we have to specify the functional forms of the matching function and the match-specific productivity distribution. As in Pissarides (2000), we use a Cobb-Douglas matching function, $m(n; v) = n^{\eta} v^{1-\eta}$, where $\eta \in [0, 1]$ is the matching elasticity with respect to the number of job seekers. We also assume that the match-specific productivity ε follows a uniform distribution on $[0, 1]$.

As is common in the literature (see *e.g.*, Petrongolo and Pissarides, 2001), we assume the elasticity of matching function with respect to unemployment, η, and the bargaining power of workers, β, to be equal to 0.5. We normalize the minimal productivity of a match, y, to unity. We choose the share of homeowners μ to be approximately equal to the EU-28 average in 2015, which, according to Eurostat, is close to 70%.

We parametrize our model on an annual basis and the discount rate is set to 5%. The exogenous job destruction rate is set to $\delta = 0.1$. We choose $b = 0.3$, a common value in the literature. The values of the other parameters are then chosen so as to match a typical European economy with an unemployment rate of about 10%, and an average unemployment duration close to a year when $d_h = 1$, which is arbitrarily taken as our benchmark case. Thus, the vacancy cost, c, is set to 0.55, which corresponds to approximately 36% of the average productivity of a match in our economy.[18]

Our aim is then to gauge the effects of increasing homeownership rates on labour market outcomes.[19] Before proceeding to the simulations on μ for different degrees of mobility d_h, we discuss the main steady-state effects involved by a change in these parameters in the next subsection.

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[16] We acknowledge that homeownership rates are likely endogenous. We ignore this in order to keep an already involved model tractable. In addition, our goal is to illustrate the long-term steady-state equilibria that are likely to be observed as different countries implement policies that promote homeownership.

[17] When $d_h = 1$, homeowners and tenants behave similarly and differ only with respect to the mobility costs. This corresponds to our benchmark case. When $d_h < 1$, homeowners are both less mobile and bear higher mobility costs.

[18] Given the distribution of ε and the normalization of y, the average productivity of a match is given by $y + E(\varepsilon|\varepsilon > 0) \simeq 1.5$. Note that higher or lower values of c will not affect the qualitative results of our model.

[19] As our purpose is to analyse whether increasing homeownership rates is detrimental to labour market performances, we only report comparative statics results.

Table 1: Parameter Values, Benchmark Case

Parameter	Symbols	Values
Discount rate	ρ	0.05
Matching function elasticity	η	0.5
Workers' bargaining power	β	0.5
Job destruction rate	δ	0.1
Minimal productivity of a match	y	1
Vacancy cost	c	0.55
Homeowners' reservation utility	b_h	0.3
Tenants' reservation utility	b_r	0.3

3.2. Main steady-state effects

Arbitrarily changing the proportion of homeowners, μ, will have three broad effects:[20] a composition effect, an entry effect and a competition effect. The relative strength of each will determine the net impact on labour market outcomes of promoting homeownership. Furthermore, a change in the critical distance d_h, will induce both a competition effect and an entry effect. Before we dwell into the simulation results, we discuss each effect in turn as they are key in understanding our results.

- *Composition effect:* Increasing the share of homeowners in the economy will have a purely mechanical impact on aggregate performances. Indeed, if homeowners have better (worse) labour market performances than tenants, increasing their share will improve (worsen) aggregate labour market performances (see, in particular, equations (23) and (24)).

- *Entry effect:* An increase in the proportion of the least (more) profitable workers will decrease (increase) the firms' expected gain from hiring. This will induce less (more) firms to enter the market and post vacancies. In most cases, given that the mobility costs reduce the surplus from hiring a homeowner, the latter generate a lower surplus compared to tenants. Therefore, on average, hiring a homeowner is less profitable for a firm compared to hiring a tenant, and an increase in their share will be detrimental to job creation (see equation (27)). As a result, the labour market becomes less tight (θ decreases) and workers' contact rate decreases. Consequently, unemployment durations and the probability of being unemployed increases for all

[20] In our model, such arbitrary changes can be induced by public policies that eases access to homeownership without changing the workers' location.

workers (see equations (20) and (21)) because there will be fewer job opportunities in each local labour market (and so in the economy as a whole).

Furthermore, the *entry effect* is also driven by the mobility in the job search of homeowners. Indeed, as previously stressed in section 2.7, as homeowners limit their job search, firms will be faced with lower arrival rates of workers. Consequently, the expected hiring cost will increase and the entry of new firms will diminish. Naturally, as d_h tends toward one this negative effect will vanish.

- *Competition effect:* This effect refers to the competition between job seekers and is mainly driven by the job search behaviour of unemployed workers. Renters are perfectly mobile and search on the whole economy. On the contrary, homeowners are less mobile on distant labour markets according to the value of d_h so that they search in fewer labour markets. When $d_h = 1$, homeowners and renters are equally mobile.

  When $d_h < 1$, and following an increase in homeownership rate, the number of outside job seekers in each local labour market decreases because the number of less mobile unemployed workers, the owners, increases and that of perfectly mobile ones, the renters, decreases.[21] As a consequence, the competition between unemployed workers is weaker on each local labour market which is more beneficial to unemployed renters (because of their perfect mobility). Of course, setting $d_h = 1$ eliminates this.

  When d_h increases and tends toward one, homeowners become more mobile and search in more distant labour markets thus strengthening the competition on each local labour market at the expense of tenants. Of course, this effect is maximized when $d_h = 1$.

Clearly, the relative labour market outcomes of two economies who only differ in terms of their relative share of homeowners will depend on the relative strength of the above effects, on search behaviour d_h and on the mobility costs borne by homeowners.[22] The following simulations aim at illustrating the change in the equilibrium labour market outcomes of such economies following a change in μ for various degrees of mobility on the part of homeowners, $d_h \in \{0.4, 0.7, 1\}$.

3.3. Individual Labour Market Performances

Table 2 reports the results of our benchmark numerical simulations ($\mu = 70\%, d_h = 1$) and synthesizes how an increase in μ impacts the main variables of interest for different

[21] By *outside job seeker* we mean an unemployed worker which is initially located outside of the local labour market.

[22] The labour market outcomes in Coulson and Fisher (2009) are also driven by an *entry effect* and a *composition effect*. However, their *entry effect* is always positive and a higher homeownership rate always leads new firms to enter in the market and post vacancies.

values of homeowners' degree of mobility.[23] The results are discussed in detail below, but three main points are worth emphasizing: (i) There are importance differences in terms of labour market performance between homeowners and renters, with owners experiencing higher unemployment rates for any of the values of μ and d_h considered. (ii) Differences between homeowners and tenants in terms of wages are significantly impacted by the degree of owners' mobility, d_h : homeowners are paid higher wages in our benchmark case ($d_h = 1$) but get lower wages when their mobility is reduced ($d_h = 0.7$ and $d_h = 0.4$), as this reduces their outside options in the wage bargain. (iii) Overall, labour market performances are noticeably impacted by changes in homeownership: unemployment rates increase while exit rates and wages fall following a rise in μ. The latter finding holds for any value of d_h,though the impact of a rise in μ becomes more negative as owners' mobility decreases.

The first part of Table 2 focuses on renters and owners' unemployment rates. As with most theoretical papers, we find that tenants systematically benefit from lower unemployment rates. This is true irrespective of the homeowners' degree of mobility, d_h, but differences between unemployment rates become more marked as d_h falls. This first part of the table also indicates that both renters and owners' unemployment rates increase when there are proportionally more homeowners in the economy, and that this is more notable when d_h is low. Namely, the negative *entry effect* on job opportunities is reinforced whenever owners exhibit lower mobility in their job search. This is obvious from equation (27), where on the right-hand side, the expected surplus from hiring a homeowner decreases as d_h falls. Our simulations also show that the homeowners' unemployment rate increases faster with μ when $d_h < 1$: The negative *entry effect* is reinforced by their lower mobility. Quite on the contrary, when owners are as mobile as tenants, owners and renters are only differentiated by the mobility cost of the former, so that differences in unemployment rates become less important and are less impacted by a change in homeownership rates. As a result, unemployment rates increase in broadly the same proportions in this case.

The second part of Table 2 focuses on average wage rates. It shows that homeowners outperform tenants when they are perfectly mobile in their job search, but that they get lower wages when imperfectly mobile. When $d_h = 1$, homeowners and renters have similar job opportunities, but homeowners capture part of the mobility costs in the wage setting, which increases their wage above those of tenants (see the wage equations (14) and (15)). For lower values of d_h, homeowners have lower contact rates. Their outside options in the wage bargain are fewer and this translates into lower wages relative to tenants. It is also shown that homeowners and tenants enjoy lower wage rates as the proportion of homeowners increases. Once again, this is a direct consequence of the *entry* effect. In relative terms, it turns out that wages fall in broadly the same way following a rise in μ.

Finally, the last part of Table 2 is consistent with the fact that due to their mobility

[23] In the table, ownership rates $\mu$are allowed to vary between 45% to 85%. Additional results for ownership rates varying between 0 and 1 are available upon request, but the results remain similar in qualitative terms.

Table 2: Individual performances: Impact of Increasing Ownership Rates, μ, by Tenure Status

	$\mu = 40\%$	$\mu = 55\%$	$\mu = 70\%$	$\mu = 85\%$
	Unemployment Rate: Tenants (%)			
$d_h = 1$	9.888	9.915	9.941	9.968
$d_h = .7$	9.971	10.037	10.108	10.185
$d_h = .4$	10.097	10.240	10.416	10.636
	Unemployment Rate: Homeowers (%)			
$d_h = 1$	10.158	10.185	10.212	10.239
$d_h = .7$	12.425	12.508	12.597	12.694
$d_h = .4$	17.186	17.433	17.737	18.118
	Wage Rate: Tenants			
$d_h = 1$	1.494	1.493	1.492	1.491
$d_h = .7$	1.491	1.489	1.486	1.484
$d_h = .4$	1.487	1.482	1.476	1.469
	Wage Rate: Homeowners			
$d_h = 1$	1.509	1.508	1.507	1.506
$d_h = .7$	1.003	1.001	0.999	0.997
$d_h = .4$	0.522	0.520	0.517	0.514
	Exit Rate: Tenants (%)			
$d_h = 1$	91.128	90.858	90.589	90.321
$d_h = .7$	90.284	89.629	88.929	88.181
$d_h = .4$	89.035	87.653	86.011	84.018
	Exit Rate: Homeowners (%)			
$d_h = 1$	88.449	88.187	87.925	87.664
$d_h = .7$	70.482	69.950	69.383	68.777
$d_h = .4$	48.187	47.361	46.381	45.193
	.	.	.	.

cost, homeowners accept fewer jobs on average compared to tenants : their reservation productivity is everywhere larger as explained in section 2.5. Thus, even when they are as mobile as tenants ($d_h = 1$), homeowners are less likely to exit unemployment as they accept fewer jobs on average. Note that this is an average effect: as in Munch et al. (2006), homeowners are more (less) willing to accept jobs when they are close to (far from) their current locations compared to tenants. Yet, we do not find that such a willingness compensates their lack of mobility on more distant markets.[24] Finally, Table 2 also shows that an increased share of homeowners is detrimental to everyone due to the *entry effect*, but slightly more so for homeowners due to the beneficial *competition effect* for renters.

Overall, our simulations indicate that higher homeownership rates reduce labour market performance at the individual level. Indeed, both homeowners and tenants are more likely to be unemployed, earn lower wages and experiment lower exit rates from unemployment. These negative effects result mainly from the *entry effect* and are robust to alternative values of critical distance d_h, *i.e.* such results hold irrespective of the importance of the *competition effect*.

3.4. Aggregate Labour Market Performances

We now turn to the effects of increasing homeownership on aggregate performances. The previous subsection has shown that homeowners and tenants are not necessarily better off in an economy with proportionately more homeowners. Moreover, it has also shown that tenants usually outperform homeowners save for wages when the latter are assumed to be as mobile as the former. The model is rich enough to investigate whether, and under what conditions, artificially increasing the share of (under)performing homeowners will lead to worse or better aggregate labour market outcomes.[25] The previous section has focused exclusively on the *entry* and *competition effects*. Here we consider the *composition effect* in addition to the latter two.

Table 3 reports the steady-state relationship between aggregate unemployment, average mean wage and homeownership. As previously, we consider different values of the critical distance d_h. As conjectured by Oswald, our benchmark model yields a positive relationship between unemployment and homeownership irrespective of the degree of mobility of the homeowners (*i.e.* irrespective of d_h). Thus, we are led to the same conclusion as Oswald (1997) and Dohmen (2005). However, as homeowners are gradually made as mobile as tenants, their search behaviour eventually becomes similar so that their labour market performances converge (see Table 2) and the correlation between homeownership and unemployment rates tends to taper off, although it remains positive. Not surprisingly, our simulations show that the average aggregate wage declines with homeownership when

[24]Unless homeowners enjoy a lower flow value when unemployed. See next section.

[25]We use the term *artificially* to emphasize the fact that homeownership policies encourage some workers to become homeowner without changing their jobs or their wage rate.

Table 3: Aggregate performances: Impact of Increasing Ownership Rates, μ

	$\mu = 40\%$	$\mu = 55\%$	$\mu = 70\%$	$\mu = 85\%$
	Unemployment Rate (%)			
$d_h = 1$	9.996	10.063	10.131	10.199
$d_h = .7$	10.953	11.396	11.850	12.318
$d_h = .4$	12.933	14.197	15.540	16.996
	Wage Rate			
$d_h = 1$	1.499	1.501	1.502	1.504
$d_h = .7$	1.299	1.224	1.148	1.072
$d_h = .4$	1.119	0.973	0.823	0.668

homeowners earn lower wages than tenants, *i.e.* when $d_h < 1$, and increases with homeownership when they earn higher ones, *i.e.* when $d_h = 1$. Thus, in our benchmark model, the *composition effect* performs as expected on aggregate outcomes.

4. Robustness Analysis

So far, we have considered that unemployment benefits (or housing benefits and/or utility of unpaid leisure) were the same for unemployed homeowners and tenants, *i.e.* b was assumed to be identical in the Bellman equations (5) and (6). However, to further assess the robustness of our results, and in order to determine whether Oswald's hypothesis always holds, we perform additional simulations in which we set different values of b_i for homeowners and renters (b_h and b_r, henceforth) and further assume they have the same job search behaviour ($d_h = 1$). More precisely, we consider different values of b_h for homeowners while keeping $b_r = b$, *i.e.* equal to its benchmark value. By setting $d_h = 1$ we focus on the polar case whereby homeowners and tenants have a similar job search behaviour. The unemployment utility flow b_i can vary according to the agents' status on the housing market for several reasons, and opposite effects may arise consequently.[26] Further, by setting $d_h = 1$ we net out the impact of varying the discrepancy between b_h and b_r on the equilibrium outcomes. The case $b_h < b_r$ is consistent with Oswald's argument according to which owners are always disadvantaged when unemployed due to their lower ability to adjust their housing consumption. Given that several effects may be at stake, it is preferable not to take a stand on the value of b_h relative to b_r. Thus, we choose to set:

[26] For instance, outright homeowners are not entitled to publicly provided housing benefits as opposed to tenants. On the other hand, they derive more utility from leisure than mortgaged homeowners as the latter may have to sell their property if the unemployment spell lasts too long (Vuuren, 2016). Similarly, homeowners may derive more utility from leisure but may find it more difficult to adjust their housing consumption in case of unemployment.

(i) $b_h = b_r = b$, (ii) $b_h = 0.6 > b_r$, and (iii) $b_h = 0.15 < b_r$. Case (i) corresponds to the benchmark case in which homeowners have a lower reservation wage ($\rho U_h < \rho U_r$) due to their higher mobility costs, but higher reservation productivities due to the same mobility costs ($R_h(z) > R_r$) (see equation (19)). In case (ii), homeowners have a higher reservation wage ($\rho U_h > \rho U_r$) because their higher utility flow when unemployed outweighs their mobility cost, thus yielding a higher reservation productivity ($R_h(z) > R_r$). In case (iii), homeowners have a much lower reservation wage ($\rho U_h < \rho U_r$) both because of their mobility costs and their lower utility flow when unemployed. This yields a lower reservation productivity ($R_h(z) < R_r$).

Whenever $R_h(z) < R_r$, hiring a homeowner is more profitable than hiring a tenant (see equations (25), (26) and (27)) and thus leads to a positive *entry effect*. In such a case, promoting homeownership can induce new firms to enter the market and post vacancies. Accordingly, the sign of the *composition* and *entry* effects change according to the relative values of b_h and b_r. The impact of increasing homeownership rates on individual and aggregate labour market performances are reported in Tables 4 and 5.

In case (i) (benchmark case), as explained in sections 3.3 and 3.4, the *entry effect* is always negative: increasing the share of owners reduces job creation and harms individual performances. Moreover, because tenants outperform homeowners, promoting homeownership is also harmful to aggregate performances (*composition effect*).

Case (ii) yields similar qualitative conclusions as case (i). The main difference is quantitative. Indeed, the *composition* and *entry* effects are now more pronounced than previously. Intuitively, a larger b_h compared to the benchmark case reduces the homeowners' willingness to move and hence increases their reservation productivities, thus reducing the surplus from hiring them compared to the benchmark case. Everything else follows as previously.

Finally, in case (iii) the *entry effect* is positive: promoting homeownership increases the share of more profitable workers and induce more firms to enter the market and post vacancies. Such job creation improves the individual performances of all workers. Indeed, in such a case, workers are less likely to be unemployed, they earn higher wages and they exit more easily from unemployment. Furthermore, owners outperform tenants in terms of unemployment rate and exit rate but also earn less. Due to the *composition effect* at the aggregate level, increasing the share of homeowners decreases both the average wage and the unemployment rate. Thus, when the *entry effect* is positive Oswald's conjecture does not hold.[27]

To summarize, our results show that Oswald's conjecture holds in cases (i) and (ii), *i.e.* economies with proportionately more homeowners will on average experiment larger unemployment rates, *ceteris paribus,* provided $b_h \geq b_r$. In addition, as in Coulson and

[27] Conversely, it can be shown that when homeowners are imperfectly mobile in their job search ($d_h = 0.4$, for instance), the negative impact on the arrival rate dominates and the *entry effect* becomes negative. This case is not shown for the sake of brevity. The simulation results are available upon request.

Table 4: Individual performances: Impact of Increasing Ownership Rates, μ, by Income Flow (b_h, b_r) and Tenure Status (assuming $d_h = 1$)

	$\mu = 40\%$	$\mu = 55\%$	$\mu = 70\%$	$\mu = 85\%$
	Unemployment Rate: Tenants (%)			
$b_h = b_r$	9.888	9.915	9.941	9.968
$b_h > b_r$	10.221	10.379	10.542	10.710
$b_h < b_r$	9.750	9.725	9.699	9.674
	Unemployment Rate: Homeowners (%)			
$b_h = b_r$	10.158	10.185	10.212	10.239
$b_h > b_r$	11.787	11.971	12.159	12.354
$b_h < b_r$	9.530	9.505	9.480	9.456
	Wage Rate: Tenants			
$b_h = b_r$	1.494	1.493	1.492	1.491
$b_h > b_r$	1.483	1.477	1.472	1.466
$b_h < b_r$	1.499	1.499	1.500	1.501
	Wage Rate: Homeowners			
$b_h = b_r$	1.509	1.508	1.507	1.506
$b_h > b_r$	1.559	1.555	1.550	1.546
$b_h < b_r$	1.486	1.487	1.488	1.488
	Exit Rate: Tenants (%)			
$b_h = b_r$	91.128	90.858	90.589	90.320
$b_h > b_r$	87.838	86.346	84.857	83.369
$b_h < b_r$	92.564	92.832	93.101	93.369
	Exit Rate: Homeowners (%)			
$b_h = b_r$	88.449	88.187	87.925	87.664
$b_h > b_r$	74.837	73.538	72.242	70.947
$b_h < b_r$	94.936	95.210	95.484	95.757

Table 5: Aggregate performances: Impact of Increasing Ownership Rates, μ, by Income Flow (b_h, b_r) (assuming $d_h = 1$)

	$\mu = 40\%$	$\mu = 55\%$	$\mu = 70\%$	$\mu = 85\%$
	Unemployment Rate (%)			
$b_h = b_r$	9.996	10.063	10.131	10.199
$b_h > b_r$	10.848	11.255	11.674	12.107
$b_h < b_r$	9.661	9.604	9.546	9.488
	Wage Rate			
$b_h = b_r$	1.499	1.501	1.502	1.504
$b_h > b_r$	1.513	1.520	1.527	1.534
$b_h < b_r$	1.493	1.492	1.491	1.490

Fisher (2009), we identify both an *entry* and a *composition* effect. However, whereas they always find a positive *entry* effect, in our model only when homeowners have a lower utility flow while unemployed and search similarly as tenants do we find such a positive *entry effect*.[28]

5. Conclusion

Oswald's (1997,1999) conjecture holds that the unemployment and the homeownership rates are positively related. This seminal contribution has been widely investigated both empirically and theoretically. There is no general consensus on the validity of the conjecture. Indeed, the empirical macroeconomic literature finds mixed results. On the other hand, most microeconometric analyses focus on specific predictions of the conjecture. While the assumptions are seldom supported by the data, most studies suffer important methodological drawbacks so their conclusions must be interpreted with caution.

In this paper, we investigate whether promoting homeownership is beneficial to labour market performances at the aggregate and individual levels. We develop a stochastic job matching model and assume homeowners are less mobile than tenants on distant labour markets and to exhibit a different job search behaviour. Our model shows that Oswald's conjecture is likely to hold under a variety of assumptions. Yet, there are some instances in which it may not hold. Rather, a negative relation between homeownership and unemployment rates may arise. In particular, we stress that the relationship depends on the relative utility flow enjoyed by unemployed homeowners and tenants.

[28] The difference stems both from the fact that the imperfect mobility in job search lowers the arrival rate of workers and from the mobility cost. In Coulson and Fisher (2009), the imperfect mobility of homeowners only translates into lower wage rates.

As argued by many, though, outright and mortgaged homeowners are unlikely to experiment the same utility flow when unemployed. Indeed, the former may be expected to enjoy a utility flow more akin to the one enjoyed by tenants. Likewise, tenants living in social housing may behave in a similar fashion to homeowners. Accounting for such heterogeneity would be an valuable addition to the model, though the main qualitative results would still hold.[29] More importantly, the model treats the residential status as exogenous. Future work should attempt to endogenize the tenure choice of workers. Unfortunately, doing so would require a considerably more involved, and perhaps intractable, model. The model presented in this paper, while relatively simple, nevertheless manages to unearth important conditions under which increasing the rate of homeownership may be detrimental (or not) to the labour market both in the aggregate and the individual levels.

[29]According to the English Housing Survey Headline Report 2013-2014, of the 22.6 million households in England, 7.4 million (32.7%) owned their property outright, and 6.9 million (30.5%) had a mortgage. The rest rented their homes. In the United States, the American Community Survey of 2014 report that 40.8% of housing units had a mortgage, 22.6% were owned outright, and the rest were rented.

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