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Propriété immobilière et marché du travail : distinguer effets de composition et d'externalité

Résumé

Alors que le taux de propriétaires et le taux de chômage sont positivement corrélés (Oswald, 1996), le statut de propriétaire est associé à une meilleure situation sur le marché du travail. Nous examinons ce paradoxe dans le cas français, en distinguant un effet de composition d'une externalité négative. D'une part, les propriétaires étant individuellement moins exposés au risque de chômage que les locataires, un taux de propriétaires plus élevé se traduit mécaniquement par un taux de chômage réduit. D'autre part, un taux de propriétaires plus élevé pourrait engendrer des frictions réduisant l'appariement sur le marché du travail. À partir du recensement utilisé sur longue période (1968-2011), nous menons des estimations aux niveaux à la fois individuel et agrégé, puis interprétons les résultats dans le cadre d'un modèle d'appariement sur le marché du travail illustrant ces effets de composition et d'externalité négative. Dans le cas français, le second effet l'emporte sur le premier et le taux de propriétaires est positivement corrélé au taux de chômage. Ainsi, une hausse de 10 points du taux de propriétaires local serait associée à des frictions augmentant d'environ 1 point le taux de chômage.

Mots-clés : propriété immobilière, marché du travail local, externalité, effet de composition

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Homeownership and labor market outcomes: disentangling externality and composition effects

Abstract

While homeownership and unemployment rates are positively related (Oswald, 1996), owners generally have better labor market outcomes. This paper addresses this paradox, disentangling a composition effect and a negative externality. On the one hand, if owners are less likely to be unemployed than renters, a higher homeownership rate should mechanically translate into a lower unemployment rate through a composition effect. On the other hand, extended homeownership may generate a negative externality in the form of frictions impeding matching on the labor market. We carry out estimations at the individual and aggregate levels, using the French Census on a large time span (1968-2011) and interpret the results within a job matching model featuring a composition effect and a negative externality. In the French case, the latter outweighs the former and the homeownership rate is positively correlated with the unemployment rate. Finally, a 10 points rise in the local homeownership rate would be associated to frictions increasing unemployment by around 1 point.

Keywords: homeownership, local labor market, externality, composition effect

Classification JEL : J21, J31, J64, R21

Introduction

Fluctuating around 10 percents in France since the mid-1980s, the high unemployment rate is one of the main concerns of public authorities. Besides structural reforms devoted to directly alleviate labor market frictions, housing market policies are increasingly considered as a way to stimulate workers' geographical and professional mobility.[1] Since suggestive evidence by Oswald (1996), a positive link between the homeownership rate and the unemployment rate has been found for a wide range of countries, geographical scales and time periods.[2] Yet, individual level approaches converge towards better labor outcomes for homeowners (see review in Table 1).

This paper addresses this paradox between these macro- and micro-economic analyses. Specifically, in the positive correlation between homeownership and unemployment rates, we disentangle a composition effect and a potential negative externality. Indeed, on the one hand, if owners are less likely to be unemployed than renters, a higher homeownership rate should mechanically translate into a lower unemployment rate through a composition effect. Yet, on the other hand, extended homeownership may generate a negative externality impeding matching on the labor market, such as suggested by Blanchflower and Oswald (2013). Finally, aggregate outcomes are likely to result from both effects. Here, estimations at different levels rely on the same Census data on a large time span (1968-2011) favoring a micro-macro comparative analysis of long run evolutions. In addition, we illustrate within a matching model how aggregate outcomes change with composition effect and negative externality intensities. In the French case, we show here that the negative externality outweighs the composition effect and the homeownership rate is positively correlated with the unemployment rate. We show that conclusions of previous papers at the individual or at the aggregate scale are not incompatible, as long as we assume such a negative externality.

First, homeownership and unemployment rates are analyzed with a panel of employment areas using French Censuses between 1968 and 2011.[3] In cross-section, the correlation between these rates is negative, reflecting strong geographical heterogeneities (Figure 1). Yet,

[1] France Stratégie notably suggested a progressive reallocation of the transfer tax to the property tax to stimulate homeowners' mobility (Schaff and Ben Jelloul, 2010).

[2] See also Havet and Penot (2010) for a survey.

[3] An employment area is defined as a geographic space where most of active individuals live and work, and where firms can find most of their necessary workforce to fill vacant positions. This notion provides a territory partition adapted to studies on local labor markets.

for a specific employment area over time, variations in the unemployment rate–filtered from the national time trend and from heterogeneities between employment areas– are positively related to variations in the homeownership rate.

Second, we use the same data at the individual level and regress the employment status on the homeownership status and the homeownership rate in the employment area. In each specification, the unemployment risk is around 6 points lower for owners than for renters. Controlling for heterogeneities at the employment area level, we estimate that a 10 points rise in the local homeownership rate would be associated with higher unemployment risks by around 1 point. These results are robust to alternative estimation periods and specifications–including social housing features and local economic activity–and do not vanish when we try to control for the simultaneity bias between unemployment and the residential status. In order to provide a broader description of labor market adjustments, we derive similar estimates on the EU-SILC survey dataset, using the administrative gross wage as the outcome variable. Similarly to our results for unemployment, we find that owners have higher wages than renters, but the homeownership rate is negatively correlated with the wage.

Finally, we develop a matching model featuring renters and owners in order to illustrate how a composition effect and a negative externality may drive labor market adjustments. First, we assume that extended homeownership in an employment area triggers a negative externality in the form of residential mobility frictions, preventing unemployed households to locate in this area nearby job offers. Second, we assume that owners have a lower exit rate from employment than renters and thus a greater value from employment. Even if a higher homeownership rate raises the unemployment rate of each type of agent, the sign of the correlation between the aggregate homeownership and unemployment rates depends on which one of the two mechanisms–negative externality or composition effect–has the upper hand. Furthermore, this simple model is consistent with our empirical results.

Related literature. For the US, Oswald (1996) measures that, all else being equal, a 10 points increase in the homeownership rate is associated to a 2 points increase in the unemployment rate. For European countries, a simple comparison across the 1990s and 2000s suggest that countries split into two groups (Figure 4 in Appendix): countries with homeownership rates below 51% during the 1990s have an unemployment rate between 4% and 6% during the 2010s; on the contrary, countries with homeownership rates above 64%

in the 1990s have unemployment rates between 8% and 10% during the 2010s. Beyond this descriptive outlook, further econometric evidence at the aggregate level confirms U.S. results by Oswald (1996) for a wide range of countries and time periods, as long as the time dimension is taken into account on top of geographical cross-sections (Panel A Table 1).

Trying to explain the positive correlation between the homeownership rate and the unemployment rate, an early literature assumed that homeowners were at higher risk of unemployment and that the aggregate observation would be the result of a composition effect (Dohmen, 2005). Indeed, job search and acceptance could be thought as hindered for homeowners by specific costs when moving out, such as fiscal fees if the dwelling is sold, or taxes on rental income if it is rented. However, empirical microeconomic research tends to discard this result (see Panel B of Table 1), so raising a paradox between micro and macro scales and invalidating earlier expectations. On top of endogeneity, homeowners may have better employment outcomes for different reasons: they might have a preference for professional stability (Munch et al., 2006), need to maintain a regular reimbursement of mortgages (Flatau et al., 2003; Laamanen, 2013) or even anticipate higher job search costs when unemployed. A composition effect would then induce a negative correlation between homeownership and unemployment rates.

Estimating both a positive relation between homeownership and unemployment rates and a negative one between homeownership and unemployment status, the present paper is related to another potential explanation: homeowners' lack of residential mobility may generate a negative externality on the labor market. Oswald (1998) suggest that immobile homeowners prevent unemployed households to locate in their area in order to find a job.[4] Blanchflower and Oswald (2013) note that areas where the proportion of homeowners is high are characterized by a lower labor mobility and conclude that immobile housing markets might generate negative externalities on workers and firms. This work is further related to empirical "spatial mismatch" approaches, where low residential mobility and distance impedes the matching of workers' skills with available jobs. Spatial mismatch and workers immobility reduce workers' access to information about new jobs, therefore lowering job search and the exit rate from unemployment (L'Horty and Sari, 2015; Wasmer and Zenou, 2006; Manning and Petrongolo, 2011). Our paper thoroughly introduces in the regressions

[4]On a different aspect, he further notices that a high proportion of homeowners who commute might generate transport congestion affecting all workers.

Table 1 – Elasticities in the literature

	Area	Time period	Method	du/dh	Elasticity
Panel A - Aggregate data					
		Dynamic			
Oswald (1996)	OECD countries	1960-1990	OLS	0.20	
	U.S. states	1986-1995	OLS	$0.21^{\dagger}$	$2^{\dagger}$
Pehkonen (1999)	Finnish districts		OLS	$0.1 - 0.2$	
Nickell (1998)	20 OECD countries	1983-1994	GLS-RE		$0.79^{\star}$
Belot and Van Ours (2001)	18 OECD countries	1960-1994	OLS-FE	0.19	
Nickell et al. (2005)	19 OECD countries	1961-1995	GLS-FE	NS	
Green and Hendershott (2001)	U.S. states	1970-1990	OLS-FE	0.18	
Blanchflower and Oswald (2013)	U.S. states	1985-2011	OLS-FE		$1.7^{\dagger}$
		Static/spatial			
Garcia and Hernandez (2004)	Spanish provinces	1991	3SLS	-0.22	
Coulson and Fisher (2009)	U.S. MSA		OLS IV	-0.11	
Sari (2015)	French empl. areas	2006	OLS	-0.044	
			SAR	-0.048	
Panel B - Individual data					
	Data	Time period	Method	Homeowner status ‡	Homeowner-ship rate ‡
		Unemployment			
Coulson and Fisher (2002)	CPS	2000	Probit	-0.23	
	PSID	1993	Probit	-0.42	
Arulampalam et al. (2000)	British BHPS	1991-1995	Probit RE	-0.46	
Flatau et al. (2003)	Australian SIHC	1993-1997	Probit IV	-0.24/-0.19	
Coulson and Fisher (2009)	CPS	1990	Probit IV	-0.49	0.0072
Laamanen (2013)	Finnish IDS	1990-1992	Probit IV	-0.04	9.50
		Wages			
Coulson and Fisher (2009)	CPS	1990	OLS IV	-0.36	0.0047
Munch et al. (2008)	Danish registers	1993-2001	Duration	0.06	

Note: †: these macro parameters correspond to long-run estimates. ‡: as theses parameters stem from different econometric models, their values are not comparable. $\star$: computed from the semi-elasticity and the average of the homeownership rates provided by the author. NS : non-significant.

the homeownership rate at the employment area level to encompass these spatial mismatches likely to be influenced by common housing structural factors.

We build on Coulson and Fisher (2009), who included the local homeownership rate in individual estimations using the US Census in 1990 in an attempt to reconcile aggregate and individual mechanisms characterizing the interaction between the labor and housing markets. They rely on two models to explain their empirical findings, assume that homeowners have a lower utility from unemployment. They find that homeowners are characterized by both a lower unemployment probability and lower wages than renters. However, this second finding is rejected by the data (Munch et al., 2008).

Other previous theoretical approaches include Beugnot et al. (2014) who find that homeownership is theoretically associated to a higher equilibrium unemployment rate and a lower

wage for homeowners. Munch et al. (2006) assume a lower residential mobility for owners and predict that they are either more unemployed and have higher wages, or that they are less unemployed and have lower wages. Our model is consistent with our empirical findings and formalizes within a single framework the early motivations for considering the homeowership rate as a relevant proxy for housing market tensions (Oswald, 1996, 1998).

The rest of this paper is organized as follows. Section 1 presents the data we use and our identification strategy. Section 2 gathers the main results and robustness issues at the aggregate and individual scale. Section 3 develops a matching model to interpret our empirical estimates in light of a composition effect and a negative externality. Finally, Section 3.3 concludes.

1 Empirical strategy

1.1 Data

Saphir. The analysis relies on several editions of large surveys complementary to Census between 1968 and 2011, gathered and harmonized within the Saphir database. Each edition generally covers one fourth of the population. It has the advantage of providing around forty variables about individuals, households and dwellings over a long time span. There are seven editions (1968, 1975, 1982, 1990, 1999, 2006 and 2011) with 12 to 20 millions of observations. We are then able to grasp homeownership and unemployment changes far before they stabilized in the mid-1980s (Figure 1). This database is thus chosen notably because it offers a long-time span necessary to address structural factors affecting the labor market. It also has cross-sectional depth allowing for the control of employment area heterogeneities and clustered standard errors at this specific level. The main variables of interest taken from this database are the professional and residential status. The homeownership rate is computed as the share of homeowners among adult individuals while the unemployment rate is the ratio of unemployed in the labor force.[5] Socio-demographic information can be used, such as age, education, eventual former country of residence.[6] Thanks to the city of residence, we also add the size of the urban area through additional geographical information. The field is restricted to metropolitan France, excluding Corsica. Finally, for individual estimates, we focus on working age heads of households between 18 and 64.

[5]These rates, and all estimations, are carried out with survey sampling weights.

[6]Yet, education is not provided for levels higher than high school in 1968 and 1975.

1.2 Identification

Estimations will be carried out both at the aggregate and individual levels using the same dataset, which favors direct comparability. In particular, the spatial and temporal depth of the sample will allow to include both year and employment area fixed effects, which are required to filter out national unemployment trends and constant spatial heterogeneities. The aggregate equation is:

$$Y_{jt} = \Delta_j + \Delta_t + \gamma X_{jt} + Z_{jt}^{'}\Theta + V_{jt} \tag{1}$$

where Y_{jt} is the unemployment rate in employment area j and year t; X_{jt} is the homeownership rate in employment area j and year t; Z_{jt} denotes rates for various socio-demographic characteristics; Δ_j and Δ_t are respectively employment area and year fixed effects; and V_{jt} are residuals.

The individual level equation is:

$$y_{ijt} = \delta_j + \delta_t + \alpha x_{ijt} + \beta X_{jt} + z_{ijt}^{'}\theta + \upsilon_{jt} + \varepsilon_i \tag{2}$$

where y_{ijt} is the unemployment status of an individual i living in employment area j and year t; x_{ijt} is a binary variable indicating whether i is a homeowner or a renter; X_{jt} is the homeownership rate in employment area j; z_{ijt} denotes individual characteristics; δ_j and δ_t are respectively employment area and year fixed effects; and υ_{jt} are residuals.

Including both individual and local residential status features is particularly interesting in our framework.[7] The inclusion of the individual residential status is a way to test if, as found in the micro-econometric literature, homeowners are less likely to be unemployed than renters on the labor market, in which case $\alpha < 0$. Averaging Equation (2) over individuals by employment areas, we have:

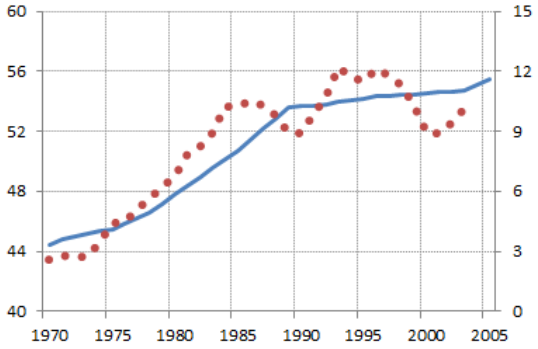
$$Y_{jt} = \Delta_j + \Delta_t + (\alpha + \beta) X_{jt} + Z_{jt}^{'}\theta + \upsilon_{jt} \tag{3}$$

The aggregate average effect of the homeownership rate is captured by $\alpha + \beta$, which should be equal to the coefficient γ in Equation (1). Thus, once we control through α for the composition of the population in terms of residential status, parameter β on the local homeownership rate captures the incidence of the potentially negative externality on labor market variables. Therefore, we expect $\beta > 0$ and $\gamma < \beta$.

[7] This framework is similar to Acemoglu and Angrist (2001) which analyzed the positive externality effects of education.

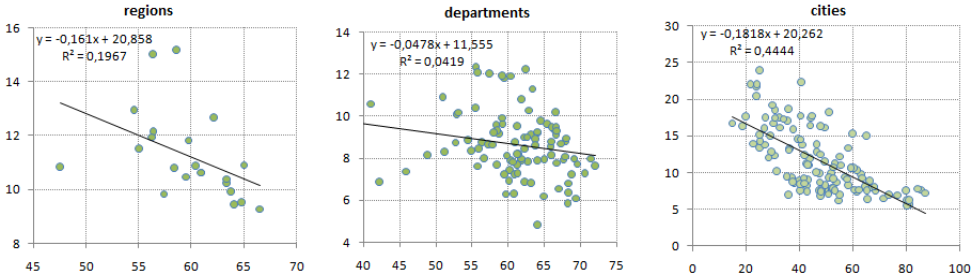
Figure 1 – Time and cross-sectional patterns

Panel A - Evolutions of the homeownership (blue line, left axis) and unemployment (red dotted line, right axis) rates in France since the 1970s



Sources: Bonnet et al. (2011), Insee.

Panel B - Cross-section correlations between the homeownership and unemployment rates for different area sizes, 2009



Source: Insee "statistiques locales". Homeownership rates are on the horizontal axis. Cities for the right panel are only within the departments Val-de-Marne, Hauts-de-Seine and Seine-Saint-Denis.

2 Empirical evidence

2.1 Aggregate data

In France, a long-term positive correlation can be observed between the homeownership rate and the unemployment rate (Figure 1, Panel A). The homeownership rate increased from 43% to 55% between 1970 and 2006 while the unemployment rate increased from 3% to 10% over the same time period. In the mid-1980s notably, there is a break in the trends of both variables. However, cross-section comparisons at different geographic scales (regions, departments or cities) rather suggest a negative correlation between the homeownership rate and the unemployment rate (Figure 1, Panel B). Generally, areas with more favorable economic

situations fit the intuitive outcomes of better financial positions going along with higher homeownership and employment rates. Thus, time and cross-section statistics indicate different economic mechanisms which have to be taken into account for an overall consideration of potential effects of homeownership: national time trend and local economic conditions. Yet, these general statistics are uninformative with respect to any eventual remaining effect when time and space are controlled for.

We estimate the correlation between local homeownership and local unemployment on French employment areas over the 1968 - 2011 period, controlling for age, education and potential foreign initial residence (similarly to Blanchflower and Oswald, 2013). Individuals are split in three age categories (15-24, 25-49, 50 and more). For education, data lack precision above high school achievement, in particular in 1968 and 1975, so that education controls are restricted to the fraction of high school graduates and the fraction of people without any diploma. The potential foreign initial residence is some equivalent of ethnic controls used by Blanchflower and Oswald (2013) and Coulson and Fisher (2009) relying on U.S. data. It is introduced through the share of individuals coming from North Africa and the fraction of other foreigners as in Fougère et al. (2009). All ratios are then used with logarithms.

Table 2 shows different specifications for this estimation. An OLS regression of the unemployment rate on the homeownership rate displays a positive coefficient (Column 1). Yet, these two rates have increased substantially over the sample period and the positive effect come from a common trend affecting all geographic entities. Column 2 further includes time fixed effects.[8] The correlation between the two rate becomes negative, which is consistent with local cross-section insights displayed in Figure 1. Column 3 adds geographic fixed effects and the sign of the coefficient for homeownership rate gets back positive, reflecting strong geographical heterogeneities. The estimate remains around 0.40 when including controls (Column 4) and slightly increases up to 0.50 when taking into account unemployment rate autoregressivity (Column 5). As in Blanchflower and Oswald (2013), causality inference is not intended here, and estimates should only be taken as indications.

Table 3 displays three additional specifications to test the significance of the correlation between the unemployment and homeownership rates. First, Column 1 replicates the main

[8]Time fixed effects (not reported here) are consistent with observed macroeconomic trends.

Table 2 – Panel main regressions on aggregate data, variables in logs

Unemployment rate	**(1) e.a. levels**	**(2) e.a. levels**	**(3) e.a. levels**	**(4) e.a. levels**	**(5) e.a. levels**
Homeownership rate	4.82***	-0.490***	0.398***	0.421***	0.501***
	(0.031)	(0.055)	(0.091)	(0.096)	(0.092)
Unemployment rate (*t-1*)					0.197***
					(0.016)
Age 19-24				0.148***	0.114**
				(0.050)	(0.047)
Age 25-49				2.040***	1.603***
				(0.350)	(0.337)
Age 50+				0.523***	0.438***
				(0.121)	(0.117)
High school graduates				0.282***	0.217***
				(0.046)	(0.016)
No diploma				0.117***	0.140***
				(0.044)	(0.043)
North Africa				-0.001	-0.001
				(0.008)	(0.008)
Other foreign countries				-0,018*	-0,010
				(0.009)	(0.010)
Time fixed effects	no	yes	yes	yes	yes
Space fixed effects	no	no	yes	yes	yes
Observations	1824	1824	1824	1824	1824

Sources: Insee Census, Saphir database, 1968-2011. France, excluded Corsica and overseas territories. "*t-1*" does not refer the preceding year but to the preceding census. "e.a." stands for employment areas. Ratios are computed with Saphir weights.

estimation of Table 2 (Column 4), but includes the lagged rather than the current homeownership rate. Second, Column 2 consider variables in differences rather than levels. Third, Column 3 measures rates as the department level rather than at the employment areas' one. In each case, the coefficient is significantly positive and in the same order of magnitude as in the baseline estimation.[9]

2.2 Individual data

In this section, the effect of the homeownership rate is estimated at the individual level using the same Census data as in the previous section. To better isolate the effect of the

[9]In addition, although the sample period number is six and quite low, which impedes any reasonable cointegration test and to derive any satisfying conclusion from a panel error correction model, we test whether introducing residuals from the levels equation in Table 2 Column 4 within the difference equation in Table 3 Column 2 would affect this estimation. This is not the case (the homeownership rate coefficient remains highly significant at 0.68), while the estimate is consistent with the presence of feedback from deviations to the levels equation. The corresponding coefficient is quite strong at -0.93, but data in the Census sample are at the very low frequency (seven years). It means that the approximate convergence time is around 7-8 years, which is a value that quarterly models with more usual coefficients between 0 and -0.10 can also generate.

Table 3 – Panel robustness regressions on aggregate data, variables in logs

Unemployment rate	**(1) e.a. levels**	**(2) e.a. diff.**	**(3) dep. levels**
Homeownership rate		0.784***	0.627***
		(0.141)	(0.153)
Homeownership rate (*t-1*)	0.130*		
	(0.070)		
Unemployment rate (*t-1*)			0.262***
			(0.026)
Time fixed effects	yes	yes	yes
Spatial fixed effects	yes	no	yes
Controls	yes	yes	yes
Observations	1824	1520	576

Source: Insee Census, Saphir database, 1968-2001. Field: metropolitan France except Corsica. Note: "*t-1*" does not indicate the previous year but the previous census. "e.a." stands for employment areas, "dep." for departments, and "diff." for differences.

homeownership rate, the individual level allows controlling for residential status in particular. For the sake of symmetry with respect to the aggregate approach, estimations are conducted on employment areas, including fixed effects and similar socio-demographic controls, are displayed in Table 4.

Table 4 – Main regressions on individual data, 1968-2011

Unemployment	**(1)**	**(2)**	**(3)**	**(4)**
Homeownership status	-0.067***	-0.066***	-0.067***	-0.059***
	(0.003)	(0.003)	(0.003)	(0.003)
Homeownership rate	0.137***	-0.004	0.128***	0.112***
	(0.036)	(0.009)	(0.019)	(0.018)
Age				-0.000
				(0.000)
High school graduates				0.032***
				(0.001)
No diploma				0.069***
				(0.002)
North Africa				0.064***
				(0.002)
Other foreign countries				0.016***
				(0.001)
Intercept	0.028	0.038***	-0.004	-0.076***
	(0.020)	(0.005)	(0.008)	(0.008)
Time fixed effects	no	yes	yes	yes
Space fixed effects	no	no	yes	yes
Observations	5.21 M	5.21 M	5.21 M	5.21 M

Note: Insee Census, Saphir database, 1968-2011. France, excluding Corsica and overseas territories. Additional controls include three urban area size categories. "e.a." stands for employment areas. The sample consists in active heads of households between 18 and 64. Standard errors are clustered at the employment area / year level. For education, the control group consists in individuals with a diploma higher than a high school degree.

The coefficient of the residential status is always negative, and remains remarkably stable across specifications. This is consistent with a large microeconomic literature, reviewed by Havet and Penot (2010). Simultaneity is a first major driver, since employed individuals have more financial resources to purchase their homes. Second, unobserved heterogeneity, out of a preference for both professional and residential stability for instance (Munch et al., 2006), could be a strong explanation behind this recurrent negative correlation in the literature and our results. Beyond, causal mechanisms can also be invoked as secondary drivers: homeowners may have a mortgage to reimburse, increasing the burden of unemployment (Flatau et al., 2003; Laamanen, 2013), or would expect to have higher job search costs while being unemployed. More recently, Sodini et al. (2016) exploit a Swedish privatization reform of municipally-owned apartment buildings, which randomly assigned the homeownership status to some renters. This framework being appropriate to overcome the issue of unobserved heterogeneity, they show that the access to homeownership causes households to work more.

The coefficient of the homeownership rate changes sign when adding time fixed effects (Column 2) and then employment area ones (Column 3), in a similar way as in aggregate estimates. In column (1), the simplest estimate provides a positive coefficient at 0.137, which becomes insignificant when adding time fixed effects in Column (2) and gets back significantly positive when also adding employment area fixed effects. Employment area fixed effects influence results to a large extent, and both individual and aggregate specifications are quite symmetric in that respect.[10]

Controlling for the composition in terms of residential status, individuals are more likely to be unemployed in employment areas where the homeownership rate is high, which could be associated to a negative externality. The sum of these two parameters $\alpha + \beta$ captures the aggregate effect of homeownership on unemployment (Equation 2). Once we control for employment area fixed effects, this total effect is equal to 0.05. Overall, the negative externality stemming from the aggregate homeownership rate takes over the composition effect associated to the residential status. Controlling for the latter, and introducing socio-demographic variables, a 10 points increase in the homeownership rate is related to a 1.1 points increase in the unemployment rate (Column 4).

Interactions between labor and housing market may not be independent from social

[10]These results are not affected by the way the homeownership rate is computed, using total adult or active population as a basis (see Table 5 Column (5)).

housing. Column (2) of Table 5 takes this concern into account. Households living in the public rental market could also be less mobile than private renters because of lower rents and have lower labor market outcomes. In that respect, we introduce this additional residential status at the individual level. In addition, the social housing rate of the employment area is relevant to grasp major aspects of local housing markets. Thus, we introduce also the social housing rate in the main specification (4) of Table 4. Yet, the sample period has to be restricted to 1990-2011 because of the unavailability of the corresponding information before 1982, and to its poor quality for this edition. Specification (4) is applied for this time frame in the Column (1) of Table 5, with stable results. In Column (2), the introduction of the social housing status is consistent with individuals in this situation being more likely to be unemployed than private renters. The change in the reference group (private renters) reduces slightly the effect observed for the homeownership status. The social housing rate happens to have no significant effect on individual unemployment.

Table 5 – Panel robustness regressions on individual data

Unemployment	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Homeownership status	-0.082***	-0.071***	-0.089***	-0.088***	-0.059***	-0.304***
	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)	(0.023)
Homeownership rate	0.196***	0.186***	0.146***	0.195***		0.344***
	(0.027)	(0.028)	(0.049)	(0.051)		(0.049)
Social housing status		0.033***				
		(0.005)				
Social housing rate		-0.030				
		(0.032)				
Business tax rate				0.133***		
				(0.009)		
Homeownership rate (alt.)					0.114***	
					(0.021)	
Time fixed effects	yes	yes	yes	yes	yes	yes
Spatial fixed effects	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes
Property tax instrument	no	no	no	no	no	yes
Observations	3.56 M	3.56 M	2.07 M	2.07 M	5.21 M	2.07 M
Period	1990-2011	1990-2011	2006-2011	2006-2011	1968-2001	2006-2011

Note: Insee Census, Saphir database, 1968-2011. France, excluding Corsica and overseas territories. Additional controls include three urban area size categories. "e.a." stands for employment areas. The sample consists in active heads of households between 18 and 64. Standard errors are clustered at the employment area / year level. For education, the control group consists in individuals with a diploma higher than a high school degree. The alternative homeownership rate used in Column (5) is computed using total active rather than adult population as a basis.

A second robustness test deals with local labor demand and firm implantation. Areas with higher economic activity may have both more owners and less unemployed people.

The use of employment area fixed effects addresses this issue to a large extent. We further investigate it using the business tax rate as an additional control variable. A higher tax rate might deter firms from locating in the employment area, therefore reducing labor demand and raising unemployment. Column (4) display results including business tax rates, which are available at the city level in 2006 and 2011. The significantly positive coefficient confirms that areas with lower tax levels are more likely to attract businesses and jobs. Including this indicator of local economic activity does not change the effects of the residential status and of the homeownership rate.

Previous estimations should be interpreted as correlations between homeownership and unemployment. Indeed, the relation between these two variables is affected by a simultaneity bias. As mentioned by Flatau et al. (2003) or Coulson and Fisher (2009), it is presumably easier for an employed worker than for an unemployed one to become a homeowner.[11] As this endogeneity issue may induce an overestimation of the composition effect, we instrument the homeownership status.

The municipal property tax rate appears as a suitable instrument for two reasons. First, it enters the budget constraint of home-buyers and should thus be correlated with the residential status. Second, tax revenue are not devoted to social expenditures, so that we do not expect the property tax to be correlated with the employment status (more details are provided in Appendix). Furthermore, this choice is in line with Coulson and Fisher (2009), who rely on the "state marginal tax rate as applied to the mortgage interest deduction" as an instrument for homeownership.

As a caveat, this instrument is at the municipal level while the residential status is at the individual level. Therefore, part of the effect we highlight might still result from unobserved heterogeneity we cannot control for, inducing an endogeneity bias between the residential status and labor market outcomes.[12] Column (6) of Table 5 show the results of the instrumented estimation. The sign and significance of the coefficients remain unchanged, but they are bigger than in the OLS estimation.

In order to have a better intuition of mechanisms underlying the estimates on unemploy-

[11] First, an unemployed worker considering to buy a dwelling might face stronger credit constraints, both due to his financial and professional situation. Second, most of them might just delay house purchase plans until they find a new job, potentially far from their current location.

[12] For instance, people who are strongly risk averse might prefer both residential and professional stability, and consequently be more often employed and homeowners.

ment, we focus on labor market equilibrium and look at the links between homeownership and wages. To that purpose, we rely on the French editions of the EU-SILC, a survey on income and living conditions. This dataset offers the advantage of collecting administrative gross wages, but its short time scale and its small size make it impossible to include employment area fixed effects. Table 6 shows the estimates. We restrict our sample to employed wage-earners. Column (1) of Table 6 replicates Column (2) of Table 4 introducing the logarithm of the gross wage as the outcome. Homeowners have higher wages than renters, but a locally higher homeownership rate is associated to a lower individual wage.[13] In the next section, we show that this correlation can be interpreted as a consequence of the negative externality exerted by owners on the labor market. The second column of Table 6 shows that instrumenting for the homeownership status does not qualitatively affect the results, but changes their intensity.

Table 6 – Wage regressions

Gross wage	**(1)** OLS	**(2)** IV
Homeownership status	0.218^{***}	0.731^{***}
	(0.012)	(0.147)
Homeownership rate	-0.221^{***}	-0.596^{***}
	(0.069)	(0.127)
Observations	13,818	13,818

Source: SILC (2004-2013 pooled). Note: Estimations on households interviewed for the first time, where the head of the household is currently employed in salaried activities, between 18 and 64 years old. Controls : age, squared age, sex, degree, matrimonial status, size of the urban area, the number of children and year dummies. Standard errors are in parenthesis. *** stands for significance at 1%, ** at 5% and * at 10%.

Table 7 displays the main specifications for owners and renters separately. OLS estimations show that the correlation between the homeownership rate and the unemployment risk is only observable for renters and does not seem to concern owners. The labor market externality raised by homeowners may specifically affect the rental market. Moreover, the presence of a clear effect of the homeownership rate among renters suggests that coefficients from previous estimates are not likely to be the outcome of any spurious interactions between the residential status and its mean at the employment area level. The negative effect of the homeownership rate on wages seems to mostly go through homeowners, who would easily

[13] In Table 4, employment area fixed effects are necessary to highlight the positive correlation between the homeownership rate and individual unemployment. When the wage is the outcome, the negative correlation between the homeownership rate and unemployment is strongly significant, even without adding local fixed effects.

accept wage moderation in order to keep their job and pay their mortgage. The specifications have to be taken with caution because of the strong endogeneity of the residential status aforementioned. As a complement, the last two columns of Table 7 show a two-stage estimation with the Heckman correction, in the same way as Coulson and Fisher (2009). Results are very similar to the OLS estimation but less definite. In particular, the incidence of the homeownership rate would go through both groups.

Table 7 – Separated effects of the homeownership rate on unemployment risk and gross wages for owners and renters

	OLS		Heckman	
	Renters	Owners	Renters	Owners
Unemployment	0.156***	0.009	0.117**	0.037*
	(0.052)	(0.009)	(0.056)	(0.022)
Observations	2.77 M	2.43 M	15,569	15,569
Wage	-0.109	-0.345***	-0.343***	-1.148***
	(0.110)	(0.088)	(0.121)	(0.096)
Observations	5,807	8,011	13,249	13,249

Source: SILC (2004-2013 pooled). Note: Estimations on households interviewed for the first time, where the head of the household is currently employed in salaried activities, between 18 and 64 years old. Controls : age, squared age, sex, degree, matrimonial status, size of the urban area, the number of children and year dummies. Standard errors are in parenthesis. *** stands for significance at 1%, ** at 5% and * at 10%.

Finally, elasticities from individual estimates are consistent with those from the aggregate ones. Controlling for employment area fixed effects, at the aggregate level, the elasticity of the unemployment rate with respect to the homeownership rate is 0.40 (Table 2 Column 3). A 10 points increase in the homeownership rate is so related to a 0.66 points rise in the unemployment rate.[14] Similar estimation on individual data provides a close coefficient (for instance, from Table 4 Column 3, $10 \times (0.128 - 0.067) = 0.61$).

Thus, once we control for spatial heterogeneities and for the residential status composition effect, a 10 points increase in the local homeownership rate implies a 1.1 to 2 points rise in the local unemployment rate (Tables 4 and 5). This effect, which is slightly lower but close to the result of Oswald (1996), is interpreted here as the consequence of a negative externality related to owners' housing behavior.

[14] In order to switch from the elasticity to the partial derivative, we divide roughly by 6.

3 Interpretation

This section develops a conceptual framework to illustrate how the coexistence of a negative externality and a composition effect both related to the presence of owners might provide a rationale for our empirical results.

3.1 Discussion

In this section, we develop a matching model featuring renters and homeowners to illustrate how a composition effect and a negative externality stemming from extended homeownership may lead to these estimates. Employment areas disparities are ruled out from this framework. In particular, the negative impact of the homeownership rate on unemployment is not incompatible with a better achievement of owners on the labor market. It formally depicts how a composition effect and a negative externality could coexist, all else being equal at the employment area level or, using previous notations, how coefficients α, β and γ can be articulated with simple and rational economic mechanisms.

Our main hypothesis is that the local share of homeowners gives rise to housing frictions, which might have a detrimental effect on the labor market. Oswald (1997) developed this argument as one of the early explanations for the positive correlation between the homeownership and unemployment rates.[15] In areas where the homeownership rate is high, it might be harder for unemployed workers (homeowners or renters) to find a dwelling nearby job offers, due to the lower residential mobility of homeowners. Indeed, as stated by Davies and Huff (1972), efficient job search happen in a small area close to the place of residence. As a consequence, job seekers might have a hard time accessing information about job offers and, even if they do, it might not be interesting for them to accept this offer due to the long commuting times it would imply. The main point of this argument is that homeowners are not themselves more prone to be unemployed, but instead generate a housing friction responsible for a lower job-finding rate affecting all workers, independently from their residential status.

This housing friction takes the form of a job finding rate being affected by a multiplicative factor depending on the homeownership rate. This general specification is not micro-funded but is convenient to illustrate the way a negative externality might affect labor market

[15] For instance, Oswald (1998) in a seminal work evoked that: "[P]art of the difficulty is not that unemployed people are themselves the homeowners; it is that unemployed men and women cannot move into the right places. High homeownership levels block young people's ability to enter an area to find job."

clearing. Such an assumption also avoids relating this externality to direct specificities or preferences of individual renters and owners. This formalization is very close to Wasmer and Zenou (2006) who assume that job search efficiency is a decreasing function of the distance to job opportunities, due to a harder access to information about job openings.[16]

The second hypothesis states that owners have a lower exit rate from employment than renters. Table 8 present monthly job-finding and separation rates, computed using the monthly employment status in the SILC survey.[17] While renters and owners have very similar job-finding rates, separation rates of the former are significantly higher each year. This finding is consistent with a large empirical literature which estimated that homeownership reduces the transition rate from employment to unemployment (van Leuvensteijn and de Graaff (2007), van Leuvensteijn and Koning (2004), Munch et al. (2008)). Therefore, we assume that the exogenous separation rate s_i is higher for renters: $s_h < s_r$. This way, we do not have to assume that owners and renters derive different utilities from leisure. Furthermore, this is consistent with the idea that owners have stronger preferences for keeping their job than renters or have a loan to reimburse and can not afford to be unemployed.

Table 8 – Monthly job-finding rate and separation rate by residential status (in %)

	Job-finding rate			**Separation rate**		
Year	**Renters (%)**	**Owners (%)**	**Diff.**	**Renters (%)**	**Owners (%)**	**Diff.**
2006	5.83	4.94	8.9^{-3}	0.59	0.16	4.3^{-3}**
2008	6.03	6.27	-2.3^{-3}	0.52	0.12	3.9^{-3}**
2011	8.24	7.39	8.4^{-3}	0.84	0.19	6.4^{-3}**

Note: SILC surveys 2004-2011. Monthly job-finding (separation) rates are computed as a flux of workers entering (exiting) the labor force each month over the stock of unemployed (employed) worker this month. ** refers to a difference statistically significant at 5%.

Finally, we assume that wages are negotiated through Nash bargaining between workers and firms. As described by Coulson and Fisher (2009), wage bargaining or wage posting provides very different dynamics for employment and wages for renters and homeowners. For instance, wage posting consists in Coulson and Fisher (2009) in firms creating vacancies with a wage equal to either the renters' or the homeowners' reservation wage, and in unemployed

[16] Alternatively, we could have supposed that a higher share of homeowners increases congestion, traffic jams and thus imposes on employed workers a transportation cost proportional to the homeownership rate. The effect on unemployment would be similar to our findings, but not the effect on individual wages. Indeed, workers would take into account this cost during the wage bargaining process and ask for higher wages when the homeownership rate is higher, which is in contradiction with our empirical estimates.

[17] While SRCV is an annual survey, unemployment status is reported for each of the previous twelve months.

workers arriving to a vacant job either accepting its posted wage or rejecting this wage and continuing search. In the more traditional wage bargaining approach, when firm and workers match, the wage is settled by Nash bargaining. Here, we are not interested primarily to discuss wage dynamics through our model in the absence of strong evidence about wages, thus we follow the standard Nash bargaining setup for the sake of simplicity.

3.2 Theoretical framework

The economy is made of two types of agents, homeowners and renters, indexed by $i \in \{h, r\}$. The share of homeowners is given by λ and the share of renters by $1 - \lambda$. We assume that unemployed workers always have to move house in order to start a new job and that moving house is costless. $p(\lambda)$ denotes the probability for an unemployed worker to move house nearby job offers. It is independent from the residential status and decreases with the homeownership rate λ, such that $p(0) = 1$ and $p(1) = 0$. By the law of large numbers, $p(\lambda)$ is also the share of the population able to move house. Without housing market frictions, this share would be equal to 1.

Firms post v vacancies and $p(\lambda)u$ unemployed workers are able to compete for them. The number of matches between unemployed workers and vacancies is given by a matching function $m(p(\lambda)u, v)$ with constant returns to scale. Labor market tightness is defined as the ratio of vacancies over the efficient units of search: $\theta \equiv v/[p(\lambda)u]$. The job-finding rate conditional on the ability of the worker to move house is defined as the number of matches per efficient units of search: $f(\theta) \equiv m[p(\lambda)u, v]/(p(\lambda)u) = m(1, \theta)$ and the vacancy filling rate as the number of matches per vacancy: $q(\theta) \equiv m[p(\lambda)u, v]/v = m(1/\theta, 1)$.

Both kind of workers are risk-neutral, have the same productivity z and earn the same unemployment benefits b when unemployed. When employed, workers earn a wage w_i and lose their job with probability s_i. In this case, they receive unemployment benefits b and find a new job with probability $p(\lambda)f(\theta)$. For a type i worker, the present values of employment $V_{e,i}$ and of unemployment $V_{u,i}$ are respectively given by: $rV_{e,i} = w_i - s_i\left(V_{e,i} - V_{u,i}\right)$ and $rV_{u,i} = b + p(\lambda)f(\theta)\left(V_{e,i} - V_{u,i}\right)$.

Firms produce with constant returns to scale. In order to produce, they have to post a vacancy and to hire a worker. The present value of a filled job held by a type i worker is given by: $rJ_{e,i} = z - w_i - s_i J_{e,i}$. This value is decreasing in s_i since a worker who stays longer in a firm is a more profitable investment. Consequently, homeowners are more valuable than

renters for firms. In a free entry economy, the cost of a vacancy is equal to its expected return: $c = q(\theta)\left(\frac{\lambda u_h}{u} J_{e,h} + \frac{(1-\lambda)u_r}{u} J_{e,r}\right)$. Solving for these equations, we find the labor demand:

$$\frac{c}{q(\theta)} = \lambda \frac{u_h}{u} \frac{z - w_h}{r + s_h} + (1-\lambda) \frac{u_r}{u} \frac{z - w_r}{r + s_r} \tag{4}$$

Renters and owners have the same bargaining power χ and negotiate their wage with firms in order to maximize the surplus: $J_{e,i}^{1-\chi} (V_{e,i} - V_{u,i})^{\chi}$. The resulting wage of a worker i is the weighted sum of productivity and reservation value, weighted by the bargaining powers of the worker and the firm respectively:[18]

$$w_i = \chi z + (1-\chi) r V_{u,i} = \frac{(r + s_i)\left[(1-\chi)b + \chi z\right] + \chi p(\lambda) f(\theta) z}{r + s_i + \chi p(\lambda) f(\theta)} \tag{5}$$

Renters and homeowners have different separation rates such that: $s_h < s_r$. Their respective unemployment rates are u_h and u_r and the aggregate unemployment rate is $u = \lambda u_h + (1-\lambda) u_r$.

The unemployment rate u_i is set according to the following Beveridge curve:

$$u_i = \frac{s_i}{s_i + p(\lambda) f(\theta)} \tag{6}$$

As the job separation rate is lower for homeowners, they have longer employment spells and a lower probability of unemployment.

The equilibrium is a set of five endogenous variables : $u_h, u_r, w_h, w_r, \theta$, solutions of the five following equations : the Beveridge curves for homeowners and renters (Equations (6)), the wage curves for both agents (Equations (5)) and the firms' labor demand (Equation (4)).

Derivation of the aggregate unemployment rate $u = \lambda u_h + (1-\lambda) u_r$ with respect to the homeownership rate sheds light on the incidence of the composition effect and of the negative externality:

$$\frac{\partial u}{\partial \lambda} = \underbrace{(u_h - u_r)}_{<0 \text{ (composition effect)}} + \underbrace{\lambda \frac{\partial u_h}{\partial \lambda} + (1-\lambda) \frac{\partial u_r}{\partial \lambda}}_{>0 \text{ (negative externality)}} \tag{7}$$

Through the *composition effect*: an increase in the homeownership rate mechanically reduces the aggregate unemployment rate, since the unemployment rate is lower for owners. Through the *negative externality*: due to housing frictions, an increase in the homeownership rate

[18] The average wage of the economy is given by: $w = \left[\lambda(1-u_h)w_h + (1-\lambda)(1-u_r)w_r\right] / (1-u)$.

reduces the probability for an unemployed worker to find a new job and therefore raises the length of the unemployment spell for both types of agents. Following an increase in the homeownership rate, the aggregate unemployment rate may either decrease or increase depending on which one of these two effects is dominant.

Finally, note that in this setup, the homeownership rate λ is exogenously adjusted, labor productivity z and the vacancy cost c are constant. Indeed, there are no spatial heterogeneities in this model. Therefore, this framework is suitable to illustrate previous estimations, highlighting the effect of the homeownership rate with employment area fixed effects. The composition effect we mention is specifically related to the local structure in terms of residential status and not generally to heterogeneities between employment areas.

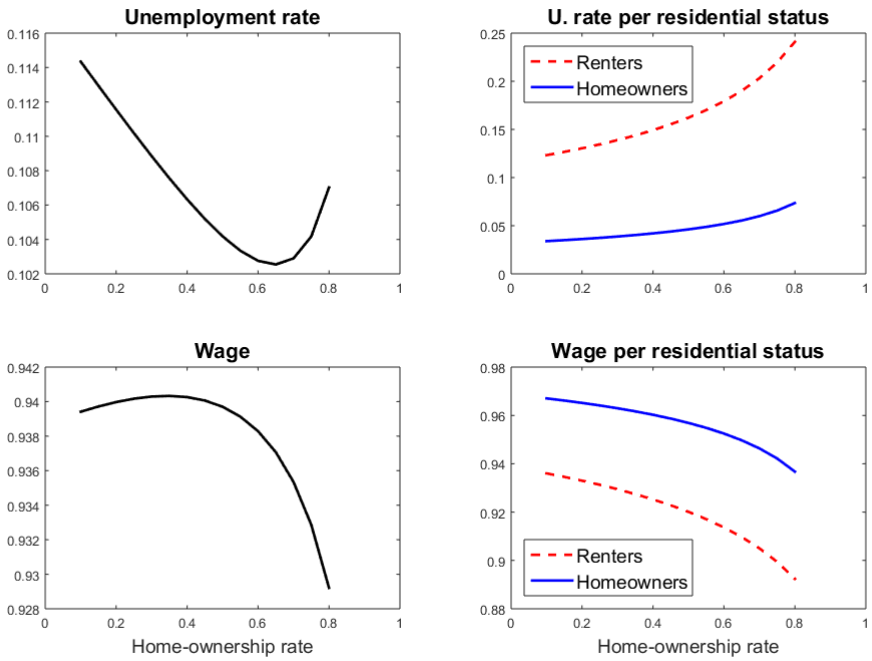
3.3 Simulations

Figure 2 displays the evolution of unemployment and wages, both at the aggregate level (on the left) and for each type of agent (on the right) as a function of the homeownership rate.[19] For both types of agents, unemployment increases with the homeownership rate. Indeed, housing frictions generated by the lower residential mobility of owners reduce the probability for an unemployed worker to locate nearby job offers and therefore increases his unemployment spell. This negative externality illustrated by Equation 7 can be expressed as the sum of the slopes of the two curves in this upper right panel, weighted by the proportion of renters and owners. This interpretation is in line with the coefficient $\beta > 0$ in the empirical section. In line with Duguet et al. (2010), the negative impact of the homeownership rate on the labor market goes through lower unemployment-to-work transitions when housing frictions are stronger. As a consequence, it is harder for firms to hire workers, so that they post less vacancies. Labor demand tightens, and the drop in the job-finding rate dampens the outside option of both workers, leading them to prefer wage reductions rather than being unemployed.

Within the employment area, the sign of the correlation between the unemployment and homeownership rates depends on the relative intensity of the composition effect and the aggregate externality (upper left panel of Figure 2). Indeed, based on the assumption we made regarding separation rates, for any given level of the homeownership rate, renters are more unemployed than owners. A rise in the local homeownership rate increases the proportion of

[19] This matching model is calibrated on French data (cf. Appendix for more details).

Figure 2 – Unemployment and wage, aggregate and by residential status



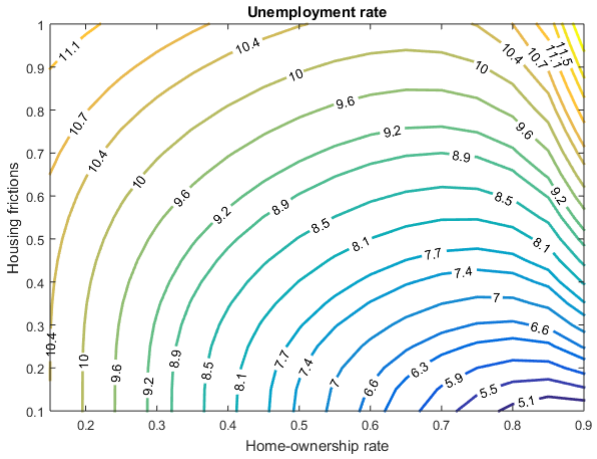
Note: In order to illustrate the incidence of the negative externality, we take $\mu = 1$. For an homeownership rate of 60 %, this means that the probability to move house near by job offers is 40%. The x-axis is the homeownership rate λ. With a lower μ, the negative externality is weaker. The homeownership rate has still a negative impact on employment and wages, but aggregate unemployment is a decreasing function of the homeownership rate.

owners, which reduces the aggregate unemployment rate according to a composition effect. The size of the negative externality depends on the intensity of housing frictions $p(\lambda)$.

Figure 3 shows how the unemployment curve evolves for different intensities of housing frictions: with higher frictions, the point where the negative externality dominates gets lower. Thus, our model indicate that there is no absolute rule for the link between aggregate homeownership and unemployment rates.

A positive correlation between homeownership and unemployment rates depends on three factors: the respective unemployment situation of renters and owners, the potential housing market friction intensity and the level of the homeownership rate as for any calibration, the negative externality increases relatively to the composition effect when the homeownership rate increases. From an empirical point of view, having both a positive coefficient for the homeownership rate at the individual level β and at the aggregate one γ reinforces the plausibility of the existence of negative externality.

Figure 3 – Unemployment rate as a function of housing frictions and homeownership rate



In the end, this simple matching model makes it possible to reconcile our macro and micro findings. Renters are more subject to unemployment than owners. A higher homeownership rate may increase the unemployment rate for both renters and owners, due to a negative externality, but the resulting impact on the aggregate unemployment rate depends on the relative intensity of the externality and the composition effect. Implications for wages are in line with empirical estimations. Owners negotiate higher wages than renters because they have a greater value for the firm. Agents accept wage moderation when housing frictions are stronger, with a undetermined incidence on the average wage depending on the size of composition effects.

Conclusion

In this paper, we address potential spillovers from the housing to the labor market. Homeownership and unemployment are related positively at the aggregate level, but negatively at the individual one. Yet, filtering out composition effects and employment areas heterogeneities, we show that a negative externality could exist and be even stronger than only a macroeconomic approach would suggest. Further research could investigate microeconomic rationales for such a potential negative externality.

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Appendix

Tax instruments

In France, the property tax is payed by homeowners. Its tax basis depends on cadastral rental values, the potential annual revenues from renting a dwelling, estimated by the national fiscal administration from the housing characteristics and to references dating back to 1970. Municipalities set their tax rates once the cadastral values are communicated by national authorities.

Property taxes have the drawback of not being at the individual level, but could be thought as suitable instruments for three reasons. First, they influence residential status choices in the corresponding city. The property tax is regularly considered as a determinant of the user cost of housing capital, which describes homeowners' marginal cost of purchasing additional housing services (Poterba and Sinaï, 2008). Second, we expect property tax rates to have no effect on the individual employment status. Property tax revenues are used to finance local expenditures, which are mostly dedicated to amenities. In 2010, more than 80 % of the local social expenditures are provided by the department (Maguain and Clément, 2012), while those provided at the city level are mainly devoted to the fight against social exclusion and, to a lesser extent, to financing nurseries. Property tax revenues may not be related to temporary unemployment. Third, besides the classical features of instrumental variables, property tax rates have two interesting characteristics : they are available at a very detailed level compared to the homeownership rate (there are approximately 36,500 cities and 300 employment areas in France), limiting spurious spatial correlations. Moreover, local tax rates are characterized by a strong spatial and temporal variability.[20]

Model derivation

Beveridge curve. We consider population i (either renters or owners). Each unemployed worker of u_i has a probability $p(\lambda)f(\theta)$ to find a new job, which is equal to his probability $p(\lambda)$ to move house times his probability $f(\theta)$ to find a job conditional on moving house. Each employed worker of $1-u_i$ looses his job with probability s_i. Therefore, the law-of-motion of unemployment is given by:

$$u_i = u_i\left(1-p(\lambda)f(\theta)\right)+(1-u_i)s_i$$

Solving this equation for u_i, we find the Beveridge curve (6).

$$u_i = \frac{s_i}{s_i+p(\lambda)f(\theta)}. \tag{8}$$

As the job separation rate is lower for homeowners, they have longer employment spells and a lower probability of unemployment.

Labor demand. A firm without workers has to pay a cost c is order to post a vacancy. Then, she will meet a worker with probability $q(\theta)$: with probability $\lambda u_h/u$ the worker is a homeowner and the firm gets a value $J_{e,h}$, while with probability $(1-\lambda)u_r/u$ the worker is a renter and the firm gets a value $J_{e,r}$. With probability $1-q(\theta)$, she meets no workers. Thus, the value of this firm J_u might be expressed as:

$$J_u = -c+q(\theta)\left[\lambda\frac{u_h}{u}J_{e,h}+(1-\lambda)\frac{u_r}{u}J_{e,r}\right]+\left(1-q(\theta)\right)J_u$$

In a free entry economy, firms enter production until $J_u = 0$.

$$\frac{c}{q(\theta)} = \lambda\frac{u_h}{u}J_{e,h}+(1-\lambda)\frac{u_r}{u}J_{e,r}$$

[20] We expect more precisely the spatial–rather than time–variability to identify our effects. Indeed, strong housing frictions imply that evolutions in these tax rates might not impact individual location decisions, due to transfer duty. The owner could become a renter and rent his own house, but then he would pay the income tax on the rent he earns.

Replacing for $J_{e,h}$ and $J_{e,r}$ using the value of a filled job held by a type i worker, we find the Equation (4) for labor demand:

$$\frac{c}{q(\theta)} = \lambda \frac{u_h}{u} \frac{z - w_h}{r + s_h} + (1 - \lambda) \frac{u_r}{u} \frac{z - w_r}{r + s_r} \tag{9}$$

Wage. From a match with a type i worker, the firm gets $J_{e,i} - J_u = J_{e,i}$ and the worker $V_{e,i} - V_{u,i}$. Standard Nash Bargaining implies that the wage is jointly determined by the worker and the firm in order to maximize $J_{e,i}^{\chi} \left(V_{e,i} - V_{u,i}\right)^{1-\chi}$. The first-order condition is:

$$(1 - \chi) \frac{\partial J_{e,i}}{\partial w} \frac{1}{J_{e,i}} + \chi \frac{\partial \left(V_{e,i} - V_{u,i}\right)}{\partial w} \frac{1}{V_{e,i} - V_{u,i}} = 0 \tag{10}$$

The value of the firm might be expressed as : $J_{e,i} = (z - w_i)/(r + s_i)$. From the value of employment, we have:

$$V_{e,i} = \frac{w_i + s_i V_{u,i}}{r + s_i}$$
$$V_{e,i} - V_{u,i} = \frac{w_i - r V_{u,i}}{r + s_i}$$

Therefore, $\partial J_{e,i}/\partial w = -1/(r + s_i)$ and $\partial \left(V_{e,i} - V_{u,i}\right)/\partial w = 1/(r + s_i)$. Replacing for $J_{e,i}, V_{e,i} - V_{u,i}$, for their partial derivatives in Equation (10) and rearranging, we find:

$$w_i = \chi z + (1 - \chi) r V_u \tag{11}$$

Replacing for $V_{e,i} - V_{u,i}$ is the present-value of an unemployed worker, we have: $r V_{u,i} = b + p(\lambda) f(\theta) \frac{w_i - r V_{u,i}}{r + s_i}$ and we write:

$$r V_{u,i} = \frac{(r + s_i) b + p(\lambda) f(\theta) w_i}{r + s_i + p(\lambda) f(\theta)}$$

Replacing in equation (11) and rearranging, we find the whole expression of Equation (5):

$$w_i = \frac{(r + s_i) \left[(1 - \chi) b + \chi z\right] + \chi p(\lambda) f(\theta) z}{r + s_i + \chi p(\lambda) f(\theta)} \tag{12}$$

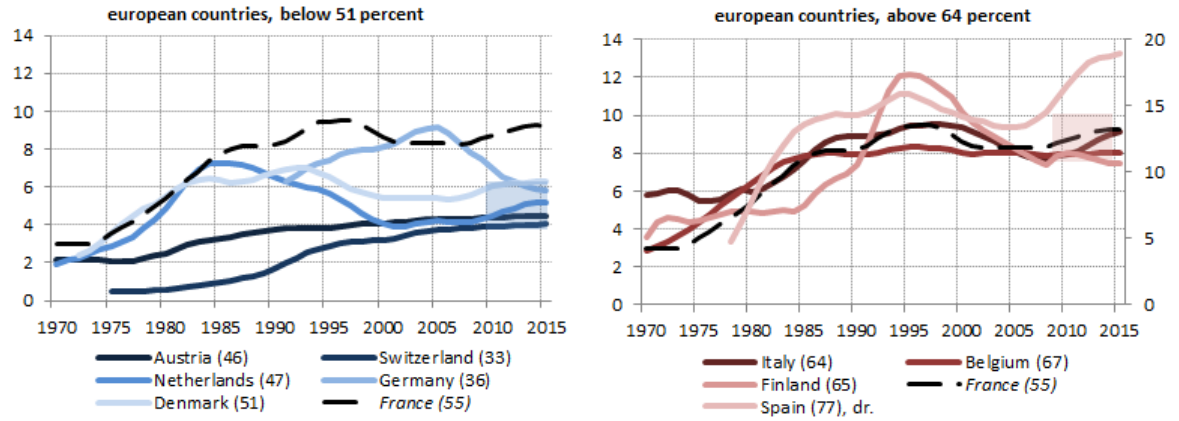
□

Calibration

This model is calibrated monthly to match the French economy. The matching function is Cobb-Douglas $m = m_0 \left(p(\lambda) u\right)^{\kappa} v^{1-\kappa}$, where the elasticity of matches to unemployment κ is set to 0.5. Probability to move house is $p(\lambda) = 1 - \lambda^{\frac{1}{\mu}}$, where μ takes into account the magnitude of the negative externality on the housing market[21]. The Hosios condition $\chi = \kappa$ insures an efficient surplus sharing between the firm and the worker. Monthly separation rates s_h and s_r are respectively equal to 0.25% and 1%, following Table 8. b is equal to 0.53 so that b/w is equal to 55%, which is the French replacement rate according to statutory requirements. m_0 is set to 0.061 in order to match the unemployment rates of homeowners and renters, which are respectively 3.2% and 11.7% in our SILC sample between 2004 and 2013. The monthly interest rate r is set to 0.0033, the vacancy posting cost c to 0.85 and productivity z is normalized to 1. Calibration is made with $\mu = 0.2$ and, consistently with our data, with a homeownership rate of 53%. This implies low housing market frictions, as the probability to find a house nearby job-offers is 96%.

[21] When $\mu \to 0$ there is no housing friction on the labor market and when $\mu \to \infty$, housing frictions are so high that it is impossible for unemployed workers to find a new job.

Figure 4 – NAIRU for European countries for 1970-2014,
low homeownership rates (left) and high ones (right)



Source: OCDE. Note: Indicated homeownership rates are taken from Andrews and Sanchez (2011) for the 1990s.

Table 9 – IV estimations on EU-SILC

	Unemployment	Wage
	First stage	
Property tax	-0.565***	-0.489***
	(0.048)	(0.051)
	Second stage	
Homeowner status	-0.243***	0.731***
	(0.049)	(0.147)
Homeownership rate	0.110**	-0.596***
	(0.045)	(0.127)
Observations	15,569	13,818

Note: EU-SILC (2004-2013 pooled). Note: Estimations on households interviewed for the first time, where the head of the household is currently employed in salaried activities, between 18 and 64 years old. Controls : age, squared age, sex, degree, matrimonial status, size of the urban area, the number of children and year dummies. Standard errors are in parenthesis. *** stands for significance at 1%, ** at 5% and * at 10%.

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