serie ad

Search frictions, housing prices and growth

Gaetano Lisi

WP-AD 2019-02

Ivie

Working papers

Working papers

Working papers

La edición y difusión de los documentos de trabajo del Ivie es una actividad subvencionada por la Generalitat Valenciana, Conselleria de Hacienda y Modelo Económico, en el marco del convenio de colaboración para la promoción y consolidación de las actividades de investigación económica básica y aplicada del Ivie.

The editing and dissemination process of Ivie working papers is funded by the Valencian Regional Government's Ministry for Finance and the Economic Model, through the cooperation agreement signed between both institutions to promote and consolidate the Ivie's basic and applied economic research activities.

La Serie AD es continuadora de la labor iniciada por el Departamento de Fundamentos de Análisis Económico de la Universidad de Alicante en su colección "A DISCUSIÓN" y difunde trabajos de marcado contenido teórico. Esta serie es coordinada por Carmen Herrero.

The AD series, coordinated by Carmen Herrero, is a continuation of the work initiated by the Department of Economic Analysis of the Universidad de Alicante in its collection "A DISCUSIÓN", providing and distributing papers marked by their theoretical content.

Todos los documentos de trabajo están disponibles de forma gratuita en la web del Ivie http://www.ivie.es, así como las instrucciones para los autores que desean publicar en nuestras series.

Working papers can be downloaded free of charge from the Ivie website http://www.ivie.es, as well as the instructions for authors who are interested in publishing in our series.

Versión: julio 2019 / Version: July 2019

Edita / Published by:
Instituto Valenciano de Investigaciones Económicas, S.A.
C/ Guardia Civil, 22 esc. 2 1º - 46020 Valencia (Spain)

DOI: http://dx.medra.org/10.12842/WPAD-2019-02

WP-AD 2019-02

Search frictions, housing prices and growth

Gaetano Lisi*

Abstract

Rising house prices have a positive impact on real GDP through the consumption effect and the construction of new houses (housing investment). Basically, the strength of this positive effect relies on a large share of homeowners (especially regarding the consumption effect). At the same time, however, a greater share of homeowners could encourage unemployment (the so-called "Oswald hypothesis"), thus damaging economic growth. This theoretical paper includes the link between housing tenure and job-search intensity in the relation between housing prices and growth. The main finding of this work is that homeownership may either reinforce or resize the effect of housing prices on economic growth.

Keywords: housing prices, new construction, growth, homeownership, search frictions.

JEL classification numbers: O18, R11, R21, R31, R32, J64.

* Department of Economics and Law, University of Cassino and Southern Lazio, via S. Angelo, Campus Folcara, I-03043 Cassino, FR, Italy. E-mail: gaetano.lisi@unicas.it.

1. Introduction and literature review

Housing is an important component of homeowners' wealth and, thus, housing prices have a substantial impact on GDP (see, e.g., Saks, 2005; Miller et al., 2011).[1] Indeed, there is a consensus among economists and policy makers that house prices play an important role in fueling the growth or decline of the economy (Miller et al., 2011). In the UK, in fact, the recessions of 1980, 1990 and 2007 occurred during a period of falling house prices (Pettinger, 2017).[2] Also, the strong housing market during the crash of the stock market in 2001 might have helped save the US economy from a more serious recession and recent cooling of the housing market has triggered a recession since December 2007 (Miller et al., 2011).

First of all, rising house prices encourage consumer spending; whereas, a sharp drop in house prices adversely affects consumer spending. Precisely, the literature distinguishes between the "wealth effect" the "collateral effect". The "wealth effect" refers to changes in "desired" consumption due to house price changes, while the "collateral effect" refers to changes in "actual" consumption due to house price changes (Miller et al., 2011).[3] Empirical findings support the positive effect of house prices on consumption, both at household level and at the aggregate level (See Miller et al., 2011, and the references therein).[4]

While consumption is certainly important, it is not the key variable that formally defines economic expansions and recessions. The first paper that focuses on the effect of house prices on economic production instead of consumption is Miller et al. (2011). Miller et al. (2011) provide strong evidence that house price changes have long term effects on Gross Metropolitan Product (GMP) growth and these effects vary over time.[5] Also, they try to distinguish between the wealth effect and the collateral effect at the aggregate level, since these effects work through different channels and, thus, have distinctive policy implications. For instance, if a fall in house prices leads to an economic recession due to the collateral effect instead of the wealth effect, the monetary authority might want to stimulate the economy by relaxing borrowing constraints. However, if an economic recession is caused by

[1] For example, in 2002, households in the United States spent 19.2% of average annual expenditures on housing (Saks, 2005).

[2] Indeed, in 2008, falling house prices also occurred at the same time as deepest recession since the 1930s (Pettinger, 2017).

[3] Unexpected house price appreciation would increase the expected lifetime wealth of homeowners and, in turn, the increase in lifetime wealth would increase their desired consumption. It follows that a change in house prices does not affect desired consumption if it is fully expected. Instead, a change in house prices affects actual consumption if households are financially constrained, so that their actual consumption is lower than their desired consumption. Under these conditions, an increase in house prices can relax homeowners' financial constraints and increase their actual consumption, since housing wealth is easy to collateralize.

[4] An exception is Phang (2004). Using macro data from Singapore, Phang (2004) finds no evidence that an increase in house price have either wealth or collateral effects on consumption.

[5] This paper controls for all unobserved common factors that affect both house prices and economic production, so that estimators are not biased.

the wealth effect instead of the collateral effect, this means that households reduce their desired consumption because they feel poorer not because they are more financially constrained. Hence, a policy that aims at easing the credit availability may not help stimulate the economy. Eventually, Miller et al. (2011) find that the collateral effect is about three times stronger than the wealth effect.

The related literature also identifies a positive relationship between bank lending and housing prices in the long term (see, e.g., Borio and Lowe, 2002; Davis and Zhu, 2004). When house prices are rising, banks feel more confident in increasing bank lending and reducing their reserve ratio, since they will see a rise in the value of their assets and may gain money, should homes become repossessed for nonpayment of mortgages. The long housing boom of 1995-2007 was one factor that encouraged bank lending to increase (Pettinger, 2017).[6]

As a result, bank credit influences both real estate investment and regional economic growth. Indeed, bank credit is a major method of real estate financing throughout the whole process of housing construction and sales (Ren, 2016) and real estate sector contributes to the growth of an economic system by participating in the formation of GDP.[7] The construction sector is quite volatile and a period of rising house prices is likely to encourage housing investment and building of new homes (Pettinger, 2017).

Housing investment can significantly affect the GDP (Ofori and Han, 2003; Gauger and Snyder, 2003). Really, residential investment causes, but is not caused by GDP, while non-residential investment does not cause, but is caused by GDP. Thus, housing investment leads and other types of investment lag the business cycle (Green, 1997). Also, construction of new housing plays a crucial role in both employment growth and output growth: residential construction influences overall output directly, construction and manufacturing employment rises with housing starts, and indirectly through the multiplier effect, as new home buyers tend to purchase other consumer durables when they buy their house (see Mayer and Somerville, 2000). Housing investment (including new construction), therefore, contributes to the economic growth of a region (Benito, 2006; Davis and Zhu, 2004). It follows that the effect of real estate investment on regional economic growth is lower in the presence of tighter credit constraints (Ren, 2016). In a tightening credit constraint environment, there will

[6] Of course, an analogous but inverse reasoning can be made in the case of falling house prices that will tend to cause a fall in bank lending

[7] Real estate services and new construction are among the most important components of the Gross Domestic Product in Europe, with a weight that ranges between 18% and 19% and a European average of 18.5 percent (see the report by Scenari Immobiliari, 2018).

be a decline in both business loans (enterprises tend to cut back their investment) and consumer loans, thus reducing the output of the whole society (Ludvigson, 1999).[8]

Housing supply also has another important impact on labor markets. Labour migration (migration of workers from an area to another) is one of the primary mechanisms through which metropolitan areas adjust to changes in local economic conditions (see, e.g., Blanchard and Katz 1992; Saks, 2005). Because housing markets influence migration (areas with lower housing prices will attract more migrants), an increase in labor demand will translate into more employment growth in places where it is relatively simple to build new houses, namely in places with relatively few barriers to construction (Saks, 2005). Precisely, the elasticity of housing supply is the key factor in determining how labor markets adjust to changes in local economic conditions (Saks, 2005). In places where residential construction responds to new demand without difficulty, workers will move into the area with little change in housing prices. In contrast, if new construction is constrained by housing supply regulations, an increase in housing demand will lead mostly to higher housing prices. As high housing prices discourage further migration, firms experiencing an increase in product demand will be deprived of an important source of additional labor (Saks, 2005). Housing supply regulations have a substantial impact on housing dynamics. By raising the marginal cost of construction, land use restrictions and other government regulations lower the elasticity of housing supply. As a result, housing prices are higher in places where the housing supply is more constrained. Furthermore, high housing prices may mean that only rich people can afford to move into an area and that poorer people are forced out, leading to higher income inequality within the area (Gyourko et al., 2006). However, the costs of housing supply regulations will be underestimated if the effects on the labor market are not taken into account (Saks, 2005). Consider, the immediate impact of an increase in labour demand, namely, an increase in wages. Higher wages cause workers to migrate into that area. This increase in population creates additional demand for housing, thus rising housing prices. The response of housing prices and employment depend on the elasticity of housing supply: a large amount of government regulations lead to a higher housing prices, and a lower level of employment. Instead, areas with less constraints on the supply of new housing will experience lower housing prices and a higher level of employment (Saks, 2005). By preventing workers from

[8] Bank credit funds' support for real estate includes two aspects: real estate development loans and personal housing mortgage loans. Real estate development loans represent bank loans to real estate development enterprises used for long-term projects. In the case of personal housing mortgage loans, residents treat their own houses as collaterals, borrow money from the bank to pay a certain proportion of the total housing amount and partially to repay the principal and interest in accordance within the prescribed time limit. This kind of loan is mainly used for solving the problem of insufficient funds. Ren (2016) finds that both real estate development loans and personal mortgage loans have strong effects on housing prices.

moving to areas where the marginal product of labour is highest, government regulations (constraints on the supply of new housing) lead to an inefficient allocation of workers across locations, thus leading to a lower level of total output. Empirically, Saks (2005) shows clearly that in some parts of the United States, employment growth can be severely limited by constraints on residential construction.

This important literature on housing supply and employment growth, however, neglects another important strand of literature that links the housing and professional choices, namely the field of literature known as the "Oswald hypothesis". Concisely, Oswald (1996, 1999) and Blanchflower and Oswald (2013) suggest that the increase in homeownership is a major reason for the (future) rise in unemployment. Using micro data on the United States, Blanchflower and Oswald (2013) find that a higher homeownership rate is associated with: (i) lower levels of labour mobility, (ii) longer commuting times, and (iii) fewer new businesses. More importantly, an increase in the homeownership rate leads to a large rise in unemployment rate in the future, namely, the negative effect occurs with delay, thus explaining why this topic has attracted little attention from scholars. These results are consistent with the view that the housing market can generate important externalities upon the labour market. Similar conclusions are reached by Laamanen (2013) for the country of Finland.[9]

From a theoretical point of view, the different home moving and housing costs of homeowners and tenants are usually used to explain their different economic outcomes in the labour market (see, e.g., Dohmen 2005; Munch et al. 2006, 2008; Rouwendal and Nijkamp, 2010). In general, homeowners have higher costs of moving than renters (due to transaction costs to sell and/or buy their home), but lower housing costs. The higher moving costs of homeowners decrease their search intensity for non-local jobs and increase their search intensity for local jobs. Homeowners, therefore, should be less willing to accept jobs outside their local labour market. Eventually, this could hamper job mobility.

Eventually, two are the main contributions of this paper. It introduces the role of homeownership in the relation between house prices and economic growth and includes everything in a framework with search and matching frictions. As in the labor market, indeed, the existence of search and matching frictions is one of the most important distinctive features of the housing market. This is the reason why the search and matching approach is largely

[9] However, there is a discrepancy in the empirical results obtained at the macroeconomic and microeconomic levels. At the country level, as suggested by Oswald, there is a fairly clear empirical evidence of a positive correlation between homeownership and unemployment rates; instead, at the individual level, studies using micro data suggest that homeowners have, in general, better labour market outcomes. This is the so-called "Oswald puzzle". For a comprehensive survey, see Havet and Penot 2010 and the references therein.

used also in the housing market (for an excellent review of search benefit in the housing market, see Seiler et al., 2015).[10]

As regards the continuation of this paper, the next section outlines the theoretical model, while Section 3 summarizes and concludes the work.

2. The model

To sum up, briefly, the salient facts of the previous paragraphs, a rise in house prices has a positive effect on consumption and investment. In turn, this increases both aggregate demand and real GDP.[11] Furthermore, rising house prices have a positive impact on the construction of new houses. Since real estate sector, including new construction, contributes to the growth of an economic system, there will be a further increase in real GDP. Similarly, a fall in house prices is likely to lead to lower economic growth, because of the negative effects on consumption, investment and new housing supply.

Before introducing these theoretical arguments into the model, we present the labor and housing markets with search and matching frictions.

2.1 The labor market with search and matching frictions

In a market with search and matching frictions a key role is played by:

1) The ratio between vacancies (v) and seekers (u),

$$\theta \equiv \frac{v}{s}$$

where u are the job-seekers in this case (usually, the unemployed);

2) The matching function,

$$M = f(v, u)$$

that defines the number of "matches" (i.e. trades, contracts) M formed per unit of time as a function of vacancies and seekers. The matching function is non-negative, increasing and concave in both arguments ("inputs") and has constant returns to scale (CRS). The CRS assumption is empirically realistic (see Petrongolo e Pissarides, 2001) and theoretically very useful, since the market size does not affect the equilibrium (in short, the rates of v, u, M coincide with the level of the variables).

[10] Trading frictions are evident in the housing market, as it takes weeks or months to buy or sell a house (see, e.g., Caplin and Leahy, 2011; Rocheteau and Weill, 2011). Search-and-matching frictions arise because finding a good trading partner takes time. This is especially true in housing markets, since they are characterised by a strong heterogeneity of both goods and people. Hence, search-and-matching process provides a realistic description of the market functioning, namely the costly and time-consuming process through which buyers and sellers are brought together.

[11] Also, there may also be a multiplier effect, namely, the increase in real GDP could be bigger than the initial increase in aggregate demand resulting from an increase in both consumption and investment.

The meeting between the parties takes time because of heterogeneity (of both vacancies and seekers), search costs and asymmetric information, first of all. All these key features are implicitly included in the matching function, which is, in fact, "is a modelling device that captures the implications of the costly trading process without the need to make the heterogeneities and other features that give rise to it explicit." (Pissarides, 2000, Chapter 1, p. 4). Thus, the presence of search-and-matching frictions leads to a lower matching rate, per unit of time, given the same number of vacancies and seekers, i.e. $M < min(v, u)$.

In addition, this framework allows to highlight the presence of externalities: an increase in θ (which is equivalent to an excess of labor demand) makes more difficult to fill a vacancy for a firm (*negative congestion externality*), while it makes more simple to find a job for a job-seeker (*positive thick market externality*). An analogous but inverse reasoning applies to a decrease in θ (which is equivalent to an excess of labor supply): *negative congestion externality* for a job-seeker and *positive thick market externality* for a firm. It follows that the rate to which a job-seekers find a job is increasing and concave in θ, i.e. $g(\theta) \equiv \frac{M}{u} = \frac{m(v,u)}{u} = m(\theta, 1)$, with $\frac{dg(\theta)}{d\theta} > 0$ and $\frac{d^2g(\theta)}{d\theta^2} < 0$; whereas, the rate to which a vacancy is filled is decreasing at decreasing rates in θ, i.e. $q(\theta) \equiv \frac{M}{v} = \frac{m(v,s)}{v} = m(1, \theta^{-1})$, with $\frac{dq(\theta)}{d\theta} < 0$ and $\frac{d^2q(\theta)}{d\theta^2} > 0$.[12]

2.2 Equilibrium and unemployment dynamics

In equilibrium the value of a filled job (V^J) must be positive and equal to both the present value of the revenue stream that it generates and the expected cost of recruitment:

$$\frac{y - w(\theta)}{(r + x)} = V^J = \frac{\mu}{q(\theta)} \quad (1)$$

the left hand side of equation (1) is the net labor productivity (the labor productivity y less the wage w) discounted at the exogenous rate $(r + x)$, where r is the interest rate and x is the job destruction rate (the rate at which a filled job becomes a vacancy); whereas, the right hand side of equation (1) is the expected cost of recruitment, where μ is the recruitment cost (a cost flow) and $\frac{1}{q(\theta)}$ is the expected duration of a vacancy, namely the inverse function of the probability of filling a vacancy.

Intuitively, the wage is increasing in θ, since an increase in the probability of finding a job improves the outside options of workers, thus increasing their bargaining power. Hence, the left hand side of equation (1) is positive (since the net labor productivity must be positive)

[12] Precisely, $q(\theta)$ and $g(\theta)$ are "instantaneous" probabilities, viz.: $\lim_{\theta \to 0} q(\theta) = \lim_{\theta \to \infty} g(\theta) \to \infty$; $\lim_{\theta \to \infty} q(\theta) = \lim_{\theta \to 0} g(\theta) \to 0$.

but decreasing in θ, while the right hand side of equation (1) is increasing in θ, given the properties of $q(\theta)$. Precisely, $\lim_{\theta\to 0}\frac{\mu}{q(\theta)}=0$ and $\lim_{\theta\to\infty}\frac{\mu}{q(\theta)}=\infty$. As a result, an unique equilibrium value of θ and wage is obtained by equation (1).

The steady-state equilibrium unemployment rate is obtained by equating the flows in and out from employment, since in steady state the change in the unemployment rate from one period to another is zero:[13]

$$u_i \cdot g(\theta) = x \cdot (1-u_i)$$

where $u_i \cdot g(\theta)$ are the "inflows", i.e. the unemployed (u_i) that find a job at the rate $g(\theta)$; whereas, $x \cdot (1-u_i)$ are the "outflows", i.e. the share of active jobs $(1-u_i)$ destroyed at the rate x. Considering a local labour market, the steady-state equilibrium unemployment rate can be specified in the following way:

$$u_i = \frac{x_i}{x_i + g(\theta)} \tag{2}$$

where subscript i denotes the local labor market. It follows that the job destruction rate x_i refers to a specific local labor market; whereas, the probability of finding a job $g(\theta)$ is an aggregate probability, since also the unemployed workers residing in other labor markets can search for a job in the local labor market. As a result, the places of work affect unemployment rate via the job destruction rate. Furthermore, a market with more inflows will also have more outflows. Precisely, a static labor market will be characterized by a low x_i and a low $g(\theta)$; whereas, a more dynamic labor market will be characterized by a high x_i and a high $g(\theta)$. In the first market, it will be more difficult to find a job but employed workers have less probability to become unemployed; the reverse is true for a more dynamic labor market.

2.3 The housing market with search and matching frictions

Similarly to the labour market, by defining ϑ the ratio between vacant houses (h) and home-seekers (b), we get the matching rates in the housing market, viz.: $g(\vartheta)$, with $\frac{dg(\vartheta)}{d\vartheta}>0$ and $\frac{d^2g(\vartheta)}{d\vartheta^2}<0$, that is the probability of finding (buying or renting) a home, and, $q(\vartheta)$, with $\frac{dq(\theta)}{d\theta}<0$ and $\frac{d^2q(\theta)}{d\theta^2}>0$, that is the probability of filling (temporarily or permanently) a house. In this case, an increase in θ is equivalent to an excess of housing supply, while a decrease in θ is equivalent to an excess of housing demand. In addition to this, we assume that vacant houses depend positively on new construction, $h=f(NC)$ with $\frac{dh}{dNC}>0$.

It is straightforward to show that an unique equilibrium value of both market tightness

[13] As usual in matching-type models, the analysis is restricted to the stationary state in which the values of the variables are not subject to further changes over time.

and market price (house price) also exists in the housing market. Intuitively, vacancies (and, thus, ϑ) are increasing in house price. This positive relationship is very intuitive, since if the house price increases, in the long-run more vacant houses will be on the market. At the limit, when the house price tends to zero, there will be no vacant houses on the market; whereas, the house price is positive but decreasing in ϑ, since an increase in the probability of finding a home improves the outside options of home-seekers, thus increasing their bargaining power.

2.4 Dynamics in the housing market

Homelessness is irrelevant in the housing market, since home-seekers are not homeless but people that search a new or better housing arrangements (e.g. tenants, young people living with their parents, roommates who want to live alone and people to which the lease expires). Also, homelessness is not equivalent to unemployment. Therefore, in order to close the model, we assume that the total number of house (H) is exogenous and equal to the sum of vacant houses and home-seekers (people that already own one house and that search a new or better housing arrangements). Hence,

$$H = h + b \xrightarrow{yields} h = H - b$$
$$\vartheta = \frac{(H-b)}{b} \xrightarrow{yields} \begin{cases} b = \frac{H}{1+\vartheta} \\ h = H \cdot \vartheta \end{cases} \tag{3}$$

Note that the evolution of vacant houses over time t gives the definition of ϑ, namely the ratio between vacant houses (h) and home-seekers (b),

$$\frac{dh}{dt} = (H - h) \cdot g(\vartheta) - h \cdot q(\vartheta)$$

where $(H - h) \cdot g(\vartheta)$ is the share of home-seekers that find a home. Coherently, therefore, in the steady state we obtain the definition of ϑ in the housing market:[14]

$$(H - h) \cdot g(\vartheta) = h \cdot q(\vartheta) \xrightarrow{yields} \vartheta = \frac{h}{b}$$

Interestingly, since home-seekers already hold a house, in the homeownership market $(H - h) \cdot g(\vartheta) = b \cdot g(\vartheta)$ could be seen as the share of buyers that become sellers. Likewise, for sellers that own $h = 2$ houses, $h \cdot q(\vartheta)$ could be seen as the share of sellers that become buyers. Indeed, buyers today are potential sellers tomorrow (Leung, Leong and Wong, 2006), and most houses are bought by those who already own one, and most houses are sold by those wanting to buy another house (Janssen et al., 1994).

2.5 Introducing new housing supply and regional growth into the model

First of all, the rate of regional economic growth (g) can be formalized as follows:

[14] Since $g(\vartheta) = \vartheta \cdot q(\vartheta)$ given the hypothesis of constant returns to scale (CRS) in the matching function.

$$\gamma = \gamma(P, NC, G) \tag{4}$$

with $\frac{\partial \gamma}{\partial P} > 0$, $\frac{\partial \gamma}{\partial NC} > 0$ and $\frac{\partial \gamma}{\partial G} > 0$, where P is the housing prices, NC are new constructions and G are the well-known main determinants affecting economic growth (such as natural resources, human and physical capital, technological progress, social infrastructures).[15]

An alternative but similar specification to equation (3) is the following:

$$\gamma = \gamma(NC, G) \tag{4a}$$

$$NC = NC(P, K) \tag{5}$$

with $\frac{\partial NC}{\partial P} > 0$, $\frac{\partial NC}{\partial K} < 0$ and where K is the construction cost that also depends on government regulations. Precisely, the higher government regulations, the larger the construction cost. It follows that the supply of new housing is lower in the presence of tighter government regulations (Saks, 2005). As in the four-quadrant model (DiPasquale and Wheaton, 1992), therefore, the share of new houses depends on the price of those goods relative to the cost of replacing or constructing them, namely, there will be a positive stock of new construction until the price is higher than the cost of replacing or constructing. Note that in equation (4a) P does not have a direct effect on γ but acts by means of NC.

In truth, however, new construction depends on prices changes (Mayer and Somerville, 2000):[16]

$$NC = NC(\Delta P, \Delta K) \tag{5a}$$

where Δ denotes a change in the variable. Finally, in order to take into account the key role of credit market, we introduce into equation (5a) a parameter of credit constraint on real estate development loans, viz.:

$$NC = \rho \cdot NC(\Delta P, \Delta K) \tag{5b}$$

where $0 < \rho < 1$ denotes credit constraints, while $\rho > 1$ denotes a credit policy of investment aid that spurs (*ceteris paribus*) real estate development loans and thus new construction.

---

[15] The popular definition of "social infrastructure" à la Hall and Jones (1999) is *"institutions and policies that align private and social returns"*. In this very broad definition (Romer, 2006), it worth to distinguish between good social infrastructures (that are characterized by socially productive activities, such as entrepreneurial activities) and poor social infrastructures (that are, instead, characterized by socially unproductive activities, such as rent-seeking activities).

[16] Usually, housing supply studies estimate the aggregate supply curve for new residences, modeling housing starts as a function of the level of house prices and various cost shifters (see, e.g., Poterba, 1984, 1991; Topel and Rosen 1988; DiPasquale and Wheaton, 1994). However, housing starts are a flow variable, representing the change in the stock of housing, net of removals. Thus, the demand for new construction should be a function of other flow variables; whereas, the level of house prices refers to stock variables, since they equilibrate the total quantity of housing with the total demand for residential space (Mayer and Somerville, 2000). Indeed, Mayer and Somerville (2000) show that the relationship between housing starts and the change in house prices is much more consistent, while the use of price levels to explain housing starts has limits.

2.6 Market reply to economic shocks

As previously reported , through labor migration (movement of workers from one region to another) housing supply adjusts to changes in local economic conditions (Blanchard and Katz 1992; Saks, 2005). Intuitively, an increase in employment in a given area should attract workers from other areas, thus stimulating (new) housing supply. An analogous but inverse reasoning applies in the case of a decrease in employment. Nevertheless, the elasticity of housing supply influences the migration of workers, thus altering the effect of a positive shock in the labor market (Saks, 2005).

By using the search-and-matching framework previously described, it is possible to derive the (overall) impact of an economic shock in the labor and housing markets. Suppose a positive shock in the labor market, for instance, an increase in labor productivity that increases the value of a filled job for a firm. In turn, an increase in the value of a filled job for a firm in equation (1) increases market tightness:

$$[q(\theta)]^{-1} = \frac{y - w(\theta)}{(r+x)\cdot\mu} \tag{1a}$$

since $\frac{\partial [q(\theta)]^{-1}}{\partial y} > 0$ and $\frac{\partial \theta}{\partial y} > 0$, thus decreasing unemployment, since $\frac{\partial g(\theta)}{\partial \theta} > 0$ and thus $\frac{\partial u}{\partial g(\theta)} > 0$ from equation (2). Indeed, if profits increase, firms post more job vacancies and thus the probability of finding a job is higher. Therefore, given the negative relationship between vacancies and unemployment, i.e. equation (2), known as the Beveridge curve (*BC*), the ratio between job vacancies and job-seekers (θ), rotates anticlockwise in the "unemployment–vacancies" space (see Figure 1), thus producing positive outcomes in the labour market (an increase in v and a reduction in u).

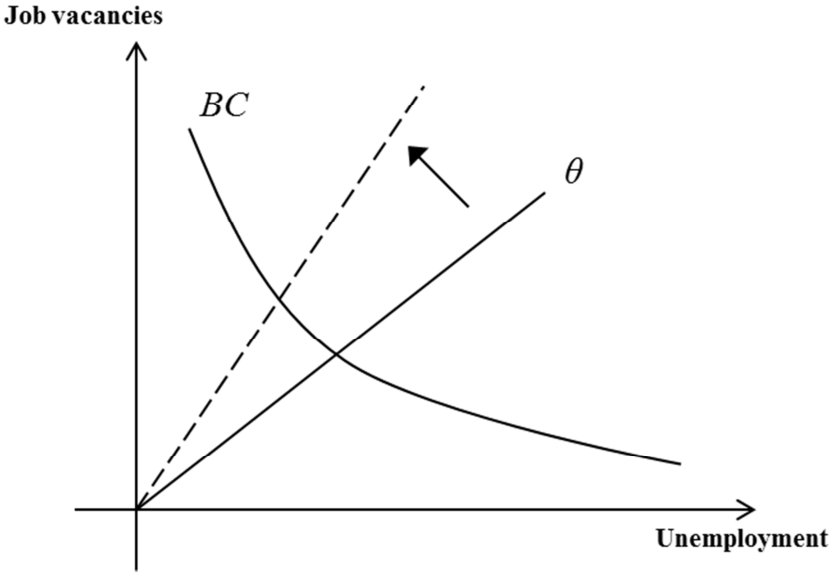

Figure 1. Economic shock in the labor market

In an economic system, this is likely to increase labor migration: workers move into an area with better labor market opportunities. In the housing market, therefore, the share of home-seekers (b) increases, thus reducing the probability of finding a home. As a result, the house price rises, since a decrease in the probability of finding a home decreases the bargaining power of home-seekers (recall that $\frac{\partial g(\vartheta)}{\partial \vartheta} > 0$ and housing market tightness $\vartheta \equiv \frac{h}{b}$ is decreasing in the share of home-seekers b). Afterwards, an increase in house price P increases new construction (NC) and vacant houses (h). Eventually, this "double" effect of P on ϑ (vacant houses depend positively on new construction) overcomes that of b. Therefore, a positive shock in the labour market increases both housing prices and the ratio between vacant houses and home-seekers (see Figure 2).

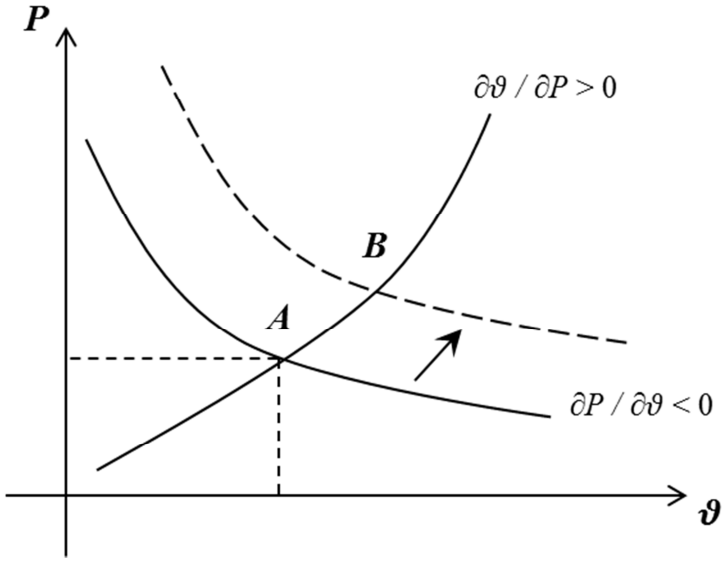

Figure 2. Economic shock in the housing market

As in the models of urban growth theory (see, e.g., Capozza and Helsley, 1989; Mayer and Somerville, 2000) at the new equilibrium, the city increases in size to accommodate the new residents (specifically, the growth in population is accommodated by an expansion of the city through the new construction) and average house prices are constant, but at a new higher level.

The explicit distinction between homeownership market (sellers) and rental market (landlords) does not change the results of the analysis, since in equilibrium the owner must be indifferent between posting a vacancy in the rental market and posting a vacancy in the homeownership market. Thus, an increase in sale prices should push up rents. Otherwise, it introduces a further effect into the developed model that reinforces the previous ones. Precisely, an increase in sale prices reduces the value of a vacant house in the rental market. Hence, many landlords may choose to sell their houses rather than offer rental units, thus

increasing vacant houses and market frictions in the homeownership market (as shown in Figure 2).

This result is obtained under the hypothesis of both a given construction cost (regulation on housing supply) and a given regime of credit constraint on real estate development loans. Of course, the higher K and/or the lower ρ, the lower the increase in new construction. At the limit, with $K > P$ and/or ρ is very small, new construction does not occur. It follows that regional growth is higher in an economic system with a more elastic housing supply, since a lower housing supply regulation and a credit policy of investment aid spur both new construction and labour migration, thus stimulating employment growth in that area.

Really, if vacancy creation in the housing market is more inelastic, namely housing market tightness (ϑ) changes little compared to price changes, the shift from point A to B (in Figure 2) will result in a higher house price and a lower number of vacant houses, i.e. the equilibrium point will lie on the top left in Figure 2. Instead, if vacancy creation in the housing market is more elastic, the shift from point A to B (in Figure 2) will result in a lower house price and a higher number of vacant houses, namely the equilibrium point will lie on the bottom right in Figure 2. Note that this is the same mechanism that – in the model developed by Saks (2005) – alters the effect of a positive shock in the labour market, since higher regulations discourage new housing supply and higher housing prices discourage workers migration.

In addition to that, a decrease in unemployment (as in Figure 1) could imply an increase in the local population through the hiring of unemployed workers residing elsewhere. It follows that a positive (and intuitive) relation between (better) labour market outcomes and population growth emerge from the model. In the future, however, an increase in the local population could have a negative impact on (future) labour market outcomes. First of all, an increase in the number of job-seekers that reduces, *ceteris paribus*, the vacancy-unemployment ratio and thus the probability of finding a job. Intuitively, this change (final negative effect) is necessary to ensure a steady state equilibrium where the migration of workers comes to an end.

Intuitively, a change in the location of the workplace could imply a change in the housing tenure, thus generating a change in the housing cost, namely a cost of moving to another house (the costs of a new rental contract or sale/purchase of a dwelling). In general, homeowners have higher costs of moving than renters (due to transaction costs to sell and/or buy their home), but lower housing costs (Dohmen 2005; Munch et al. 2006, 2008; Rouwendal and Nijkamp, 2010). As a result, an individual will be more reluctant to accept a

job in another place if this implies the transition from owner to tenant. This empirical result is due to the so-called "intrinsic preference for homeownership", namely, individuals are willing to pay more to own a particular set of housing characteristics, such as a house, rather than paying rent (see Linneman and Voith 1991; Heston and Nakamura 2009). Of course, the reverse is also true, in the sense that a tenant will be more willing to accept a job in another place if this implies a good change in both housing tenure (from tenancy to homeownership) and employment status (from unemployed to employed). Eventually, therefore, a greater share of homeowners implies a lower search intensity for non-local jobs and a higher search intensity for local jobs.

By introducing a parameter of search effort (e) in the matching function (as in Pissarides, Chpater 5, p.125, 2000), it is straightforward to show that the matching rates in the labour market positively depends on the aggregate job search effort, viz.:

$$M = f(v, e \cdot u)$$

where e is the search effort's market average of job seekers. Thus, the higher the aggregate job search effort, the higher the matching rate and the lower the unemployment rate:

$$\frac{\partial M}{\partial e} > 0 \xrightarrow{yields} \frac{\partial g(\theta)}{\partial M} > 0 \xrightarrow{yields} \frac{\partial u}{\partial g(\theta)} < 0$$

Finally, the change in employment affects economic growth. By introducing the time element (t), in fact, the rate of regional growth can be specified in the following way:

$$\gamma_{i,t} = \frac{\{y_{i,t} \cdot [(1-u_{i,t}) \cdot L_{i,t}]\}}{\{y_{i,t-1} \cdot [(1-u_{i,t-1}) \cdot L_{i,t-1}]\}} - 1 \qquad (4b)$$

where y is the average productivity of labour, $(1-u)$ is the employment rate and L is the labour force. Hence, for a given labour productivity and labour force, the higher the job destruction rate (worse local labour market conditions, such as a high death rate or a low birth rate of firms), the lower the rate of regional growth and the higher the unemployment rate; whereas, the higher the aggregate job search effort, the higher the rate of regional growth and the higher the employment rate.

Consequently, a large share of job seekers that are homeowners hampers labour market outcomes (the "Oswald hypothesis") only if the average labour productivity of local jobs is lower than that of non-local jobs. Consider, for the sake of simplicity, an economy composed by two local labour markets: a local labour market named "A" with an average labour productivity y_A and a local labour market named "B" with an average labour productivity y_B. Suppose that in "A" there is very large share of homeowners but $y_A < y_B$. In this case, *ceteris paribus*, the low job mobility of homeowners will be negative for the overall economy.

Note that the "natural" extension of the model to the homeowners with mortgage

payments does not change the main result of this analysis, since a mortgage agreement is a more stringent constraint relative to a rental contract. In some cases, a rental contract does not even exist (the shadow economy, in fact, could concern tenancy but not homeownership).

3. Conclusions

In general, a rise in house prices creates an increase in wealth for householders. Through the wealth effect and the collateral effect, this can create a significant increase in consumer spending. Also, given the positive long-run relationship between loans and housing prices, the banks can lend more on the basis of the increased price of the house, thus relaxing credit constraints and increasing housing investment. As a result, householders will be more confident about spending and borrowing, while firms tend to increase their investment and production when they face less stringent credit constraints. This is likely to cause an increase in both aggregate demand (consumption and investment) and real GDP, thus leading to a higher rate of economic growth. Furthermore, rising house prices have a positive impact on the construction of new houses. Since real estate sector, including new construction, contributes to the growth of an economic system, there will be a further increase in real GDP. Precisely, the elasticity of housing supply (new construction) is a key factor in determining how labor markets adjust to changes in local economic conditions. Similarly, a fall in house prices is likely to lead to lower economic growth, because of the negative effects on consumption, investment and new housing supply.

Basically, the strength of the positive effect of rising housing prices on economic growth relies on the presence of a large share of outright homeowners (especially regarding the consumption effect). However, a greater share of homeowners could encourage unemployment, thus damaging economic growth. Indeed, another important strand of literature, known as the “Oswald hypothesis”, suggest that the increase in homeownership is a major reason for the (future) rise in unemployment.

This theoretical paper, therefore, introduces the role of homeownership (housing tenure) in the relation between house prices and economic growth and includes everything in a framework with search and matching frictions. As in the labor market, in fact, the existence of search and matching frictions is one of the most important distinctive features of the housing market.

The main finding of this work is that homeownership may either reinforce or resize the effect of housing prices on economic growth. Precisely, if the average labour productivity of local jobs is lower than that of non-local jobs, homeownership resizes the positive effect of

rising housing prices on economic growth; instead, if the average labour productivity of local jobs is higher than that of non-local jobs, homeownership reinforces the positive effect of rising housing prices on economic growth.

References

Benito A. (2006). The down-payment constraint and UK housing market: does the theory fit the facts?, Journal of Housing Economics, 15, 1, 1-20.

Blanchard O., and Katz L. (1992). Regional Evolutions, Brookings Papers on Economic Activity 1992(1), 1-75.

Blanchflower D.G., and Oswald A.J. (2013). Does High Home-Ownership Impair the Labor Market? NBER Working Paper No. 19079.

Borio C., and Lowe P. (2002). Asset prices, financial and monetary stability: Exploring the nexus, Bank for International Settlements, Basel, Switzerland, BIS Working Paper(114). URL http://ideas.repec.org/p/bis/biswps/114.html.

Caplin A., and Leahy J. (2011). Trading Frictions and House Price Dynamics. Journal of Money, Credit and Banking, 43, s2, 283–303.

Capozza D. R., and Helsley R. W. (1990). The stochastic city, Journal of Urban Economics, 28, 187-203.

Cheng P., Lin Z., Liu Y., and Seiler M. J. (2015). The Benefit of Search in Housing Markets, Journal of Real Estate Research, 37, 4, 597-621.

Davis E. P., and Zhu H. (2004). Bank lending and commercial property cycles: some cross-country evidence. Journal of International Money and Finance, 30(1), 1-21.

DiPasquale D., and Wheaton W. C. (1994). Housing market dynamics and the future of housing prices, Journal of Urban Economics, 35, 1-28.

DiPasquale D., and Wheaton W.C. (1992). The Markets for Real Estate Assets and Space: A Conceptual Framework. Real Estate Economics, 20, 1, 181-97.

Dohmen T.J. (2005). Housing, mobility and unemployment. Regional Science and Urban Economics, 35, 3, 305–325.

Gauger J., and Snyder T. C. (2003). Residential fixed investment and the macroeconomy: has deregulation altered key relationships?, Journal of Real Estate Finance and Economics, 27, 3, 335-354.

Green R. K. (1997). Follow the Leader: How Changes in Residential and Non-residential Investment Predict Changes in GDP, Real Estate Economics, 25, 2, 253-270.

Gyourko J., Mayer C., and Sinai T. (2006). Superstar Cities, NBER Working Paper No. 12355, July.

Hall R. E., and Jones C.I. (1999). Why do some countries produce so much more output per worker than others? The Quarterly Journal of Economics, 114, 1, 83-116.

Havet N., and Penot A. (2010). Does Homeownership Harm Labour Market Performances? A Survey. Working Paper No. 1012, GATE Lyon-St Etienne.

Heston A., and Nakamura A.O. (2009). Questions about the equivalence of market rents and user costs for owner occupied housing. Journal of Housing Economics, 18, 3, 273–279.

Janssen J., Kruijt B., and Needham B. (1994). The Honeycomb Cycle in Real Estate. Journal of Real Estate Research, 9, 2, 237-252.

Laamanen J.-P. (2013). Home ownership and the labour market: Evidence from rental housing market deregulation. Tampere Economic Working Paper, 89.

Leung C.K.Y., Leong Y.C.F., and Wong S.K. (2006). Housing Price Dispersion: An Empirical Investigation. The Journal of Real Estate Finance and Economics, 32, 3,

357-385.
Linneman P., and Voith R. (1991). Housing Price Functions and Ownership Capitalization Rates. Journal of Urban Economics, 30, 1, 100-111.
Ludvigson S. (1999). Consumption and credit: a model of time-varying liquidity constraints, Review of Economics and Statistics, 81, 3, 434-447.
Mayer J. C., and Somerville C. T. (2000). Residential Construction: Using the Urban Growth Model to Estimate Housing Supply, Journal of Urban Economics, 48, 85-109.
Miller N., Peng L., and Sklarz M. (2011). House Prices and Economic Growth, Journal of Real Estate Finance and Economics, 42(4), pages 522-541.
Munch R.J., Rosholm M., and Svarer M. (2006). Are homeowners really more unemployed? The Economic Journal, 116, 991–1013.
Munch R.J., Rosholm M., and Svarer M. (2008). Home ownership, job duration and wages. Journal of Urban Economics, 63, 130–145.
Ofori G., and Han S. S. (2003). Testing hypotheses on construction and development using data on China's provinces, 1990–2000, Habitat International, 27, 1, 37-62.
Oswald A.J. (1996). A conjecture on the explanation for high unemployment in the industrialized nations: Part 1. University of Warwick Economic Research Paper No. 475.
Oswald A.J. (1999). The housing market and Europe's unemployment: A non-technical paper. Unpublished, University of Warwick.
Petrongolo B., and Pissarides C.A. (2001). Looking into the Black Box: A Survey of the Matching Function. Journal of Economic Literature, 39, 2, 390-431.
Pettinger T. (2017). How the Housing Market Affects the Economy, July 26, Economics Help (www.economicshelp.org).
Phang, S.-Y. (2004). House prices and aggregate consumption: do they move together? Evidence from Singapore. Journal of Housing Economics, 13, 101–119.
Pissarides C. A. (2000). Equilibrium Unemployment Theory (2nd edition), MIT Press Books.
Poterba J. M. (1984). Tax subsidies to owner occupied housing: An asset market approach, Quarterly Journal of Economics, 99, 729-752.
Poterba J. M. (1991). House price dynamics: The role of tax policy and demography, Brookings Papers on Economic Activity, 2, 143-183.
Ren Q. (2016). Economic Growth, Housing Markets and Credit, Social System Research, Ritsumeikan University, 33-04, 87-108.
Rocheteau, G. and Weill, P.O. (2011). Liquidity in frictional asset markets. Journal of Money, Credit and Banking, 43, s2, 261-282.
Romer D. (2006) Advanced Macroeconomics, McGraw Hill (3rd edition).
Rouwendal J., and Nijkamp P. (2010). Homeownership and labour market behavior: Interpreting the evidence. Environment and Planning A, 42, 419-433.
Saks R. E. (2005). Job Creation and Housing Construction: Constraints on Metropolitan Area Employment Growth, Finance and Economics Discussion Series, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, Washington, D.C. (September 22).
Scenari Immobiliari (2018). I servizi immobiliari in Italia e in Europa (Real estate services in Italy and in Europe).
Topel R., and Rosen S. (1988). Housing investment in the United States, Journal of Political Economy, 96, 718-740.

Ivie

Guardia Civil, 22 - Esc. 2, 1º
46020 Valencia - Spain
Phone: +34 963 190 050
Fax: +34 963 190 055

Website: www.ivie.es
E-mail: publicaciones@ivie.es