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Skill-biased technological change and homeownership



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ABSTRACT

In the United States, the residential housing market went through important changes over the period from the 1970s to the mid-1990s. Although the aggregate homeownership rate was relatively stable during that period, the distribution of homeownership rates by age changed in remarkable ways. While younger households saw substantial declines in homeownership rates, the opposite happened for older households. In this paper, we argue that the skill-biased technological change (SBTC) that began during the 1970s has been an important factor behind the observed change in the distribution of homeownership rates by age. We build a life cycle model in which skills are accumulated on-the-job through experience: learning by doing. Early in life, households have lower levels of skills and therefore lower earnings. SBTC increases the returns to skill, widening the wage gap between young and old ages. As a consequence, it takes more time for young households to become homeowners given frictions in financial markets (e.g. downpayment requirements) and housing markets (e.g. large and indivisible houses), in line with consumption smoothing behavior. On the other hand, older households that could not afford a house before may now become homeowners, given higher returns to skill. Our analysis confirms this conjecture, namely, that SBTC shifts the distribution of homeownership from the young to the old.

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1. Introduction

In the United States, the residential housing market went through important changes over the period from the 1970s to the mid-1990s. Although the aggregate homeownership rate was relatively constant during that period, the distribution of homeownership rates by age changed in remarkable ways. Younger households experienced substantial declines in homeownership rates, whereas older households experienced an increase in homeownership rates. In this paper, we argue that the skill-biased technological change (SBTC) which occurred during the same period has been an important factor behind the observed change in the distribution of homeownership rates by age. We present a general equilibrium model that clarifies the proposed mechanism and carefully calibrate it to assess whether, and to which extent, SBTC can account for the observed changes in homeownership profiles.

The link between the age-profile of homeownership and SBTC goes through the profile of earnings by age. It has been extensively documented that the U.S. experience premium, defined as the return to labor market experience, increased substantially from the 1970s to the 1990s.¹ This increase in the experience premium, together with the accompanying increase in education and occupation premia, have often been viewed as evidence of a latent SBTC which affected all

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E-mail address: ecarcelespov@gmail.com (E. Carceles-Poveda).¹ The term 'experience premium' refers to measures that estimate the wage gap between experienced-old workers and inexperienced-young workers. See [Heathcote et al. \(2010\)](#) for a documentation of the evolution of the experience premium.

dimensions of skill.² In particular, it is argued that (i) the increase in relative returns to experience and (ii) the fact that experience is accumulated over the life cycle generates a steepening in life-cycle earnings profiles, widening the wage gap between young and old ages. In this paper, we follow this literature, and in particular [Guvenen and Kuruscu \(2009, 2012\)](#), in considering SBTC as the driving factor for the observed increase in experience premia, and the accompanying steepening of the age-profile of earnings.

Given a steepening of earnings' profiles by age, a steepening of homeownership profiles by age follows for two reasons. First, a steeper profile of earnings implies a steeper consumption profile for an individual. To the extent that owned houses are larger than rented ones, this implies a bigger gap between ownership when young and ownership when old. Second, consumption smoothing behavior leads young households to accumulate less savings early in the life-cycle. Given that buying a house requires a significant downpayment, lower savings early in the life cycle make it harder for young households to buy a house. Note that, these mechanisms implicitly assume frictions in the owned housing market (large indivisible houses) as well as frictions in financial markets (incomplete markets). Both of them result in a steeper homeownership profile. Depending on what happens to average household lifetime income, this mechanism has the potential to explain simultaneously the decrease in homeownership for the young and the concurrent increase for the old.

The two aspects described above, SBTC in labor markets and frictions in the housing and financial markets, are brought together in our theoretical economy. More concretely, we construct a general equilibrium, life-cycle model with housing and skill accumulation. Each household brings both raw labor (health, strength, etc.) and human capital (skills) to the labor market and earns separate wages for each type of labor. Skills accumulate exogenously, as a result of the accumulation of work experience (learning-by-doing). SBTC increases the demand for skilled labor and, as a result, benefits older, more experienced workers who possess more skills. On the housing side, we allow households to decide whether to own or rent. Crucially, we introduce financial market frictions in the form of a downpayment requirement and no unsecured borrowing. In addition, owned houses are lumpy and there is a minimum size of house an individual can buy.

Using this framework, we examine the response of households to SBTC, which is modelled as an exogenous increase in the demand for skills. This impulse increases the relative price (wage) of skills to raw labor, thus increasing the wage gap between young and old ages, since households have lower levels of skills early in life. As a result, households face a steeper profile of earnings and experience faster consumption growth over the life cycle. Importantly, earnings are lower at the early stage of life which, because of incomplete markets, translates to both lower consumption and lower savings. The first means that they are less likely to desire large enough housing services to be able to own a house. The second means that it will take them longer to accumulate sufficient savings for a downpayment. Older households on the other hand see an increase in their earnings and this makes them willing to live in a large enough house to be able to own. In conclusion, our numerical results confirm the conjecture above, namely that SBTC shifted the distribution of homeownership from the young to the old. Overall, the model can account for 90% of the total decrease in homeownership for the younger generations (20–44 year old) and for 46% of the total increase in homeownership of the older generations (60–79 year old).

In addition to SBTC, our benchmark calibration takes into account the decrease in mortality rates observed in the US between the 1970s and the 1990s. To separate the effects of mortality from those of SBTC, we have also considered an alternative calibration where these mortality changes are shut down. Mortality changes bring the model closer to the data in terms of the aggregate homeownership rate, which was approximately constant during the period of study. Mortality does not significantly affect the steepness of the homeownership profiles, which implies that SBTC is its cause in our model.

In our model, household decisions regarding homeownership over the life cycle depend on earnings profiles and interest rates. In addition to making earnings profiles steeper, SBTC also leads to an increase in interest rates through a general equilibrium effect. As a robustness check, we conduct sensitivity analysis with respect to that general equilibrium effect. With interest rates kept fixed (i.e. in partial equilibrium), the steepening of homeownership profiles is slightly less. That is, the general equilibrium effect brings the model predictions closer to the data but only slightly so. The magnitude of the general equilibrium effect through r will, in principle, depend on the specification of the production function. We argue that alternative specifications, including versions that allow for capital experience complementarity, will lead to quantitatively similar effects as long as the capital income share remains stable after SBTC in the model, as it does in the data.

Our paper is closely related to a growing literature on housing and homeownership. [Gervais \(2002\)](#) and [Nakajima \(2010\)](#) are interested in the effects of taxation on aggregate homeownership. [Yang \(2009\)](#) and [Díaz and Luengo-Prado \(2010\)](#) investigate how housing affects the life cycle properties of consumption and wealth respectively. In a series of papers, [Chambers et al. \(2009, 2011\)](#) provide explanations for the significant changes in aggregate homeownership both in the 1940s and in the late 1990s. None of these papers focus on the profile of homeownership by age. This task is taken up by [Fisher and Gervais \(2011\)](#), who focus on the decrease in ownership amongst younger households only. Their paper is the one that is most closely related to ours. Their explanation is based on two factors: increased idiosyncratic risk and a trend towards later marriage. They argue forcefully that there is a clear empirical relation between marriage and homeownership, but they also point out that homeownership fell even for young married households so that there must be additional factors at play. Focusing on the young, they identify the main additional factor to be increased idiosyncratic risk. We provide another important factor, namely the steepening of age profiles of earnings that resulted from SBTC. Interestingly, this steepening can simultaneously cause a decrease in homeownership for the young and an increase in homeownership for the

² See [Hornstein et al. \(2004\)](#) and [Katz and Autor \(1999\)](#) and the references therein. The latter also discusses alternative theories.

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