



Life cycle asset allocation in the presence of housing and tax-deferred investing



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ABSTRACT

We study the dynamic consumption–portfolio problem over the life cycle, with respect to tax-deferred investing for investors who acquire housing services by either renting or owning a home. The joint existence of these two investment vehicles creates potential for tax arbitrage. Specifically, investors can deduct mortgage interest payments from taxable income, while simultaneously earning interest in tax-deferred accounts tax-free. Matching empirical evidence, our model predicts that investors with higher retirement savings choose higher loan-to-value ratios to exploit this tax arbitrage opportunity. However, many households could benefit from more effectively taking advantage of tax arbitrage.

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1. Introduction

Saving for retirement and the acquisition of a private home are among the most important financial decisions private investors face during their lifetime. At present, there are two separate strands of the literature dealing with these issues, analyzing either the impact of tax-deferred investing or the impact of owner-occupied homes on portfolio choice. In reality, private investors usually have access to both tax-deferred investments and privately owned homes. We show that combining these separate strands of research is important, as the joint existence of tax-deferred investing and homeownership has a strong influence on optimal consumption–investment decisions that extends beyond the impacts of the individual investment opportunities. Specifically, the joint existence of homeownership and tax-deferred investing enables tax arbitrage. Investors can deduct mortgage interest payments from taxable income, while simultaneously earning interest in retirement accounts tax-free. Matching empirical evidence, our model predicts that investors with higher retirement savings choose higher loan-to-value ratios to exploit this tax arbitrage opportunity. Our model predicts that an increase in the share of wealth held in a tax-sheltered retirement account by one percentage point results in an increase in the optimal loan-to-value ratio that varies with age between 0.18 and 1.37 percentage points. A comparison

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with the empirical data in the 2007 Survey of Consumer Finances (SCF hereafter) suggests that many households could benefit from more effectively exploiting the tax arbitrage opportunities the tax code offers them.

The potential for tax arbitrage also induces investors to purchase larger homes, compared to investors who cannot deduct mortgage interest payments from taxable income. As the latter have a stronger incentive to repay their mortgage quickly, they hold less equity. That is, the tax treatment of mortgage interest payments can also help explain the low empirically observed equity exposure of private investors.

Tax regulations are an important factor influencing household portfolio structure. Both the taxation of homeownership and assets in tax-deferred retirement accounts are favorable to individual investors. Under current US tax-law, profits in tax-deferred retirement accounts are tax-exempt, and interest payments on mortgages are usually deductible from personal income. Furthermore, not taxing home owners on a fair lease can be considered an additional tax-subsidy (Poterba and Sinai, 2008).¹ Gyourko and Sinai (2003) show that this tax-subsidy usually exceeds the advantage obtained from the deductibility of mortgage interest payments from other income.

Due to the differential tax treatment of assets in taxable and tax-deferred accounts, investors not only have to decide what amount to hold in which financial asset – the so-called asset allocation problem – but also in which type of account to hold these assets – the so-called asset location problem. While optimal asset allocation is discussed intensively and extensively in the literature, research on optimal asset location is a less extensively covered field of research, originating from the work of Black (1980), Tepper (1981), and Tepper and Affleck (1974). Shoven and Sialm (1998) introduce the asset location problem to household investment decisions. Shoven and Sialm (2003) analyze the impact of the tax-efficiency of mutual funds on asset location. Amromin (2003), Dammon et al. (2004), Garlappi and Huang (2006), Gomes et al. (2009), Huang (2008), and Zhou (2009) study the impact of labor income, short-selling constraints, and progressive taxation on the optimal location of assets.

Privately owned homes differ from conventional assets in several respects. One of the most important differences is the fact that privately owned homes are both consumption and investment goods. Flavin and Yamashita (2002) and Kraft and Munk (2011) show that rental markets enable a division of the utility derived from a private home into a consumption and an investment factor. Yamashita (2003) provides an empirical verification.

Grossman and Laroque (1990) analyze the impact of transaction costs associated with trading in an illiquid durable consumption good. These transaction costs result in the investor only trading in that asset, if its current level departs substantially from the desired level. Cauley et al. (2007) and Flavin and Nakagawa (2008) apply this result in the housing context. Damgaard et al. (2003) extend the analysis of Grossman and Laroque (1990) by allowing for both a durable and a non-durable consumption good.

The impact of housing investments on equity exposure is, for example, analyzed in Chetty and Szeidl (2010), Cocco (2005), Curcuru et al. (2009), Flavin and Yamashita (2011), as well as Yao and Zhang (2005, 2007). They conclude that homeownership crowds out investments in stocks. Mortgage holdings, however, tend to increase the equity exposure (Yao and Zhang, 2007). Hu (2005) provides evidence on the allocation of equity, bonds, and cash under household constraints.

The impact of private homes on consumption is analyzed, among other sources, in Campbell and Cocco (2007), Case et al. (2005), and Li and Yao (2007). While the former show a significant positive impact of homeownership on consumption, the latter study confirms this finding for the relationship between house prices and consumption. Silos (2007) examines the impact of business cycles on housing investments.

Even though both homeownership and tax-deferred investment opportunities are available to most private investors, they have to date been studied in separate strands of research. Our contribution to the literature is thus two-fold. Firstly, we show that the joint existence of homeownership and tax-deferred investing has an impact on optimal consumption–investment strategies that extends beyond the aggregated effects of models with either homeownership or tax-deferred investing. Specifically, the joint existence of homeownership and tax-deferred investing creates potential for tax arbitrage. Investors can deduct mortgage interest payments from taxable income, while simultaneously earning interest in retirement accounts tax-free. Secondly, matching empirical evidence, our model predicts that investors with higher retirement savings choose higher loan-to-value ratios in order to exploit such tax arbitrage. More specifically, our model predicts that an increase in the share of wealth held in a tax-sheltered retirement account by one percentage point results in an increase in the optimal loan-to-value ratio that varies with age between 0.18 and 1.37 percentage points. A comparison with the empirical evidence in the 2007 SCF suggests that many households could benefit from more effectively taking advantage of tax arbitrage.

This paper proceeds as follows. Section 2 introduces our model. Section 3 presents the numerical results from our model and compares them with the empirical evidence in the 2007 SCF. Section 4 concludes.

2. The optimization problem

2.1. Investment opportunity set

The investment opportunity set consists of risky equity with constant dividend rate d and a stochastic capital gain g_t^s during period t with mean μ_s and standard deviation σ_s , a risk-free one-year bond with constant pre-tax return r and a

¹ Owners letting a house and living in another one as renters, obtain lease payments which are subject to personal income tax, but pay rents which cannot be deducted from personal income.

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