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Household leveraging and deleveraging [☆]

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ABSTRACT

U.S. households' debt skyrocketed between 2000 and 2007, and has been falling since. This leveraging (and deleveraging) cycle cannot be accounted for by the relaxation, and subsequent tightening, of collateral requirements in mortgage markets observed during the same period. We base this conclusion on a quantitative dynamic general equilibrium model calibrated using macroeconomic aggregates and microeconomic data from the Survey of Consumer Finances. From the perspective of the model, the credit cycle is more likely due to factors that impacted house prices more directly, thus affecting the availability of credit through a change in collateral values. In either case, the macroeconomic consequences of leveraging and deleveraging are relatively minor, because the responses of borrowers and lenders roughly wash out in the aggregate. These results suggest that household debt overhang alone cannot account for the slow recovery from the Great Recession.

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1. Introduction

The evolution of U.S. households' debt since the turn of the XXI century has been remarkable. As shown in Fig. 1.1, the ratio of mortgage debt to GDP rose by about 30 percentage points between 2000 and the beginning of the financial crisis, three times more than in the previous episode of credit expansion in the 1980s. Since then, this ratio has fallen by about 10 percentage points, orders of magnitudes more than at any time since the Great Depression. Here, and in the rest of the paper, we focus on mortgage debt because it represents about 70 percent of total household liabilities in the United States, but the picture would look very similar if we used a more comprehensive measure of household debt.

This unprecedented leveraging cycle has attracted a great deal of attention, contributing to bring the connection between household debt and the macroeconomy front and center in the public and academic debates (e.g. Eggertsson and Krugman, 2012; Guerrieri and Lorenzoni, 2012; Midrigan and Philippon, 2011; Mian and Sufi, 2009, 2011; Mian et al., 2012; IMF, 2012; and McKinsey Global Institute, 2011). In particular, Eggertsson and Krugman (2012, EK hereafter) and

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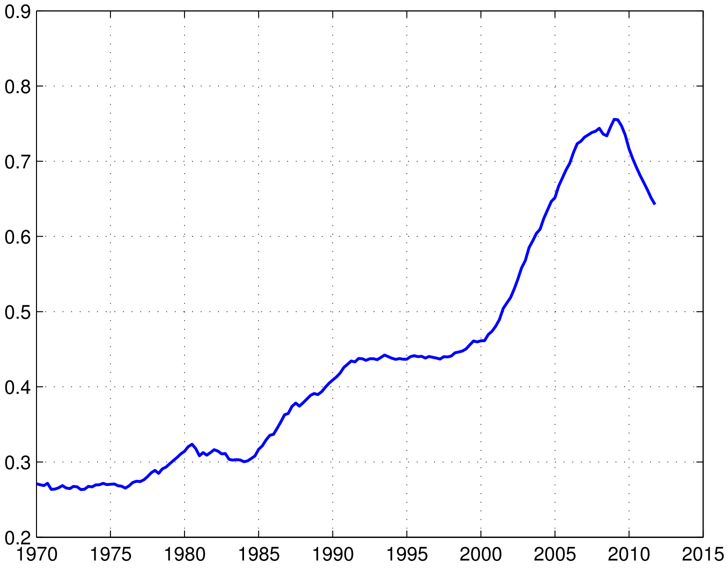

Fig. 1.1. Mortgages-to-GDP ratio. Mortgages are defined as home mortgages from the balance sheet of U.S. households and nonprofit organizations (Flow of Funds, Table B.100, line 33, unique identifier Z1/Z1/FL153165105.Q). They include loans made under home equity lines of credit and home equity loans secured by junior liens.

Guerrieri and Lorenzoni (2012, GL hereafter) have modeled the idea that a negative shock to consumers' ability to borrow pushed the U.S. economy against the zero lower bound, exacerbating the Great Recession and delaying the recovery from it.

This paper adds to this debate a quantitative perspective on the causes and consequences of the exceptional leveraging cycle documented in Fig. 1.1. It does so in the context of a general equilibrium model consistent with many empirical features of the U.S. economy. Its main finding is that household deleveraging *in isolation* is not a strong enough force to account for the slow recovery from the Great Recession.

The model has three key ingredients. First, heterogeneity in households' desire to save generates borrowing and lending, and hence a role for debt. Since household debt in the U.S. is held primarily in the form of mortgages, the second key feature of the model is a collateral constraint that limits debt to a fraction of home values. As a consequence, house prices play a crucial role in the dynamics of household debt, a connection that is evident in the data, but which is missing from the more stylized models of EK and GL. To highlight the link between these two variables, Fig. 1.2 displays the historical evolution of house prices and of the ratio between mortgages and the value of real estate. The massive boom in home values that started in the late 1990s was matched by an increase in debt of similar magnitude, so that the mortgage-to-real estate ratio (or debt-to-collateral ratio) remained roughly stable until 2006. When house prices collapsed, this ratio spiked, since lenders cannot force the repayment of outstanding mortgages, even if the value of the real estate collateralizing them falls. This downward "stickiness" of mortgage debt is necessary to match the observed jump in the mortgage-to-real estate ratio, and it is the third key ingredient of the model.

Both micro and macro data inform the model's calibration. The Survey of Consumer Finances (SCF) disciplines the degree of heterogeneity among households, while the Flow of Funds provides information on debt and real estate values. For this calibration exercise, we match the model's steady state to the period of relative stability of the 1990s, because the subsequent swings in debt and house prices are most naturally interpreted as large deviations from such a steady state. The alternative strategy of calibrating to a pre-bust steady state around 2006, which is common in the literature, seems hard to justify in light of the pictures above. An advantage of our calibration approach is that it calls for a comprehensive view of the recent credit cycle, encompassing both its leveraging and deleveraging phases.

Our standard macroeconomic model, extended to incorporate borrowing and lending, is a laboratory to study the quantitative importance of the mechanisms connecting household debt and aggregate outcomes highlighted by the theoretical literature on deleveraging, and in particular by EK. Within this broad objective, this paper focuses on the implications of two main potential drivers of the leveraging cycle: a change in credit limits, for given house values, and a change in house values, for a given credit limit. This distinction appears in the model because houses collateralize borrowing, as they do in the data.

This distinction is also relevant because it captures the two main narratives of the credit boom and bust of the 2000s. These two stories have potentially very different implications for our understanding of the root causes of the Great Recession and for the policies that might avoid a repeat of a similar experience. According to the first narrative, the exogenous force behind the explosion of debt and its subsequent fall was a "credit liberalization" cycle—an overall loosening of credit standards that allowed more borrowing against unchanged collateral values, followed by an abrupt retrenchment during the financial crisis (e.g. Mian and Sufi, 2009; Favara and Imbs, 2011). The second story sees the boom and bust in house prices,

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