Public versus private provision of liquidity: Is there a trade-off?

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A B S T R A C T

To what extent is public debt private liquidity? Much policy advice given in the aftermath of the financial crisis rests on the assumption that increasing public debt relaxes borrowing constraints of private households. This is the case for ad-hoc debt limits, which are exogenous to public policy. Instead, if debt limits are fully endogenous, as e.g. in the case of the natural borrowing limit, public debt has no impact. We assume that borrowing limits arise because of limited contract enforceability and are therefore determined as equilibrium outcomes. Using an incomplete markets economy in which households are subject to uninsurable earnings shocks, we show that public debt provides some liquidity, but less so than it would if constraints were imposed ad-hoc. We show that generating borrowing constraints as an equilibrium outcome substantially alters the answers to other important questions, such as for the welfare effects of government debt or its impact on real economic activity.

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1. Introduction

To what extent is public debt private liquidity? Put differently, to what extent does public debt relax the borrowing constraints of private households? We show that the answer to this question depends on the way these constraints are modeled.

Two cases have mainly been discussed in the literature. If households face an ad-hoc debt limit, which is exogenous to public policy, the government can, under certain assumptions, in effect fully relax the constraint by issuing bonds. This interaction between public debt and private borrowing constraints has been emphasized by Woodford (1990), Aiyagari and McGrattan (1998), Flodén (2001), Shin (2006) and Azzimonti et al. (2014), among others. The finding that public debt can relax private borrowing limits is also at the core of proposals aiming at raising government debt to offset the tightening of borrowing constraints households experienced during the financial crisis. See e.g. the recent work by Guerrieri and Lorenzoni (2011) and Eggertson and Krugman (2012).

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If instead the debt limit is given by the natural borrowing constraint, which states that households can borrow up to the present value of their future (minimum) lifetime labor income, an increase in public debt tightens the debt limit, to the extent that the increase in public debt decreases the present value of households' future lifetime labor income. As a consequence, government in effect cannot relax households' debt limit. See e.g. Eggertson and Krugman (2012).

These two specifications of the borrowing constraint are silent about the precise microfoundation that causes the borrowing limit in the first place. In reality, debt constraints are likely to arise because of agency problems (e.g. adverse selection, limited commitment) or other type of frictions (e.g. transactions costs) in credit markets.

Ignoring the specific nature of the friction when studying the impact of public policy might be problematic, as public policy may affect the size of the friction and therefore also the borrowing constraint. This point was first made by Hayashi (1985) and Yotsuzuka (1987), who discuss several agency problems and conclude that the degree to which government debt has real effects depends on the specific nature of the problem. Real effects are strongest if government debt can substitute for missing private credit. However, if the agency problem is such that government debt merely replaces private credit, Ricardian equivalence (see Barro, 1974) will continue to hold, even if there are liquidity constraints, and government debt has no real effects.

Our contribution is to study government debt in an environment in which borrowing limits emerge because private debt contracts are not enforceable. Using this environment, we aim at answering the following questions. How does public debt affect the provision of private liquidity (i.e. credit)? What does this imply for the effects of government debt on real activity, in particular the accumulation of private capital and the equilibrium prices of capital and labor? And, finally, how does the interaction between public debt and the provision of private credit influences the welfare effects of government debt?

The limited commitment environment is embedded in a production economy in which markets are incomplete, as in Aiyagari (1994). Households are subject to idiosyncratic income realizations. There is no aggregate risk, implying that government debt and private capital are perfect substitutes from the point of view of households who wish to transfer resources across periods.[2] Households can borrow and lend using an asset which pays off independent of the realization of the idiosyncratic income shock. Following Zhang (1997), Alvarez and Jermann (2000), Kehoe and Levine (2001), Krueger and Perri (2011) and Ábrahám and Cárceles-Poveda (2010), borrowers can default on their debt obligations. If they do so, they are excluded from borrowing and lending forever. Borrowing limits are set in equilibrium such that borrowers always have an incentive to repay their debt, independently of the realization of their income process. The resulting borrowing limits are tighter than the natural borrowing limit, which we define by the present value of the minimum lifetime labor income, following Aiyagari (1994), but looser than the popular ad-hoc limit of zero, which restricts private borrowing altogether. To the extent that the provision of government debt affects the incentive to default, it will also affect the borrowing limit.

Assuming market incompleteness is appealing in our context since it allows us to generate a realistic wealth distribution (see Cordoba, 2008). This is because market incompleteness limits risk-sharing opportunities. A realistic degree of wealth inequality is important for our purpose, since a large fraction of US households are in debt and therefore strongly affected by changes in the borrowing constraint. Moreover, the extremely unequal asset distribution observed in the US implies that a large fraction of the population receives income mainly from supplying labor. This, in turn, is important in order to evaluate the welfare effects of government debt arising from the changes in the equilibrium prices for capital and labor, which have a different impact on the wealth-rich and the wealth-poor (see Röhrs and Winter, 2014). Moreover, Ábrahám and Cárceles-Poveda (2010) show that if markets are incomplete, assuming limited commitment implies that borrowing limits are monotonically increasing in income, a feature that is consistent with the data.[3]

Because the equilibrium borrowing constraints are tighter than the natural debt limit, Ricardian equivalence does not hold. A higher public debt/GDP ratio therefore crowds out private capital, and the equilibrium interest rate rises. Laubach (2009) empirically documents that an increase in the government debt/GDP ratio has indeed a significant positive impact on the real interest rate in the US. A higher interest rate, in turn, makes it more attractive for debtors to renege on their obligations. By comparing stationary equilibria, we illustrate that credit limits set by private lenders are increasing in the stationary government debt/GDP ratio. Our framework therefore suggests that there is indeed a trade-off between public debt and the supply of private credit. Interestingly, this trade-off arises because changes in government debt affect aggregate prices. Hence, an additional contribution of our paper is to highlight the importance of general equilibrium effects, which are not captured by the partial equilibrium models presented in Hayashi (1985) and Yotsuzuka (1987).

Moreover, we show that the response of the equilibrium debt constraint to a change in public debt is in between the two polar cases ad-hoc debt limit on one hand and natural borrowing constraint on the other hand. More precisely, the equilibrium debt limit responds by less than the natural borrowing constraint, but more than an ad-hoc debt limit.

Our finding has important consequences for the effective bindingness of the constraint. Due to the endogenous response of the equilibrium constraint, government debt can only partially relax the debt limit for private households. It is therefore important to be explicit about the microfoundations underlying the private borrowing constraint. Reduced-form specifications such as an ad-hoc limit or the natural borrowing constraints (or an arbitrary convex combination of the two) are likely to lead to wrong conclusions regarding the link between public debt and private borrowing constraints.

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[2] Gomes et al. (2008) study an economy with aggregate risk, in which government debt and private capital are imperfect substitutes. They assume ad-hoc borrowing limits.

[3] Broer (2013) argues that an incomplete markets model in the tradition of Aiyagari (1994) is more in line with the joint distribution of income, consumption and wealth in the US, relative to a limited commitment model with complete markets.