adjustment costs are quadratic: $S\left(\frac{I_t}{I_{t-1}}\right)=\frac{\gamma}{2}\left(\frac{I_t}{I_{t-1}}-1\right)^2$, $\gamma>0$, while the production function is Cobb-Douglas: $F\left(H_t,K_t\right)=H_t^{\alpha}K_t^{1-\alpha}$, where α represents the labor share of income.

H. Parameter choice

A number of parameter values are chosen to match some stylized facts for the US economy in the post-WWII era while others are set in accordance with available US empirical estimates. The time period in the model corresponds to one quarter in the data. Table 1 summarizes the parameter choice.

As standard in the business cycle literature, the subjective discount factor, β, is equal to 0.99 and the capital depreciation rate, δ, to 0.025. The parameters in the utility functions are as follows: the coefficient of relative risk aversion, σ, is equal to 1.38 as in Smets and Wouters (2007a); and the preference parameter, ω, is set to match steady-state hours of work equal to 0.44, as in Kydland and Prescott (1991); the elasticity of substitution between the private and the public component of the deep-habit-adjusted consumption composite, σ_x, is equal to 0.5, a value in the range proposed by Pappa (2009) that implies mild complementarity; while the share of the private component in the composite, ν_x, is set to match a government share of output of 20%. While Section V. shows sensitivity of the results to different degrees of complementarity between private and public consumption, the appendix shows also the case in which public consumption does not deliver any utility to households. The production function parameter, α, is equal to 0.6, as in Christiano et al. (2013).

The consumption deep habits parameters, θ and ρ, are equal to 0.86 and 0.85, respectively, following the estimates used by Ravn et al. (2006). The parameters representing deep habits in lending relationships, θ^L and ρ^L are set equal to 0.72, and 0.85, respectively, relying on the estimates provided by Aliaga-Diaz and Olivero (2010). As the presence of deep habits in consumption and in borrowing decisions are key in enabling the DSGE model to reproduce empirical patterns, the appendix shows sensitivity analysis of the results to a wide range of values for the parameters θ, ρ, θ^L and ρ^L.

The persistence parameter of government spending shocks ρ_G, set to 0.97, and the parameter in the adjustment cost function γ, equal to 5.74, follow the estimated values of Smets and Wouters (2007a).

Following Christensen and Dib (2008), the elasticity of substitution across different varieties, η, is set in order to target a steady state gross mark-up equal to 1.20, while the elasticity of substitution in the banking sector, η^L, is set in order to match a bank spread of 0.0075 (300 basis points per year).[8] In addition to the explicitly-targeted steady-state values, the above parameter choice implies a consumption-output ratio of around 60% and a private investment-output ratio of around 20%.

[8]The price mark-up and the bank spread are not only functions of the intra-temporal elasticity of substitutions in the goods sector and in the banking sector, but they are also a function of the degrees of deep habit formation in consumption, θ, and borrowing decisions, θ^L. Given the baseline choices of θ and θ^L, the targeted levels of steady-state price mark-up and bank spread are reached by choosing $\eta\approx 8$ and $\eta^L\approx 425$, respectively.

Parameter		Value
Discount factor	β	0.99
Capital depreciation rate	δ	0.025
Risk aversion	σ	1.38
Elast. of subst. in consumption composite	σ_x	0.5
Production function parameter	α	0.6
Deep habits in consumption	θ	0.86
Consumption habit persistence	ρ	0.85
Deep habits in lending	θ^L	0.72
Pers. of lending relationships	ρ^L	0.85
Persistence of government spending	ρ_G	0.97
Elasticity of investment adjustment costs	γ	5.74
Share of private component in consumption composite	ν_x	set to target $\frac{G}{Y} = 0.20$
Preference parameter	ω	set to target $H = 0.44$
Elasticity of substitution	η	set to target $\mu = 1.20$
Elast. of subst. in banking	η^L	set to target $R^L - R^D = 0.0075$

Table 1: Parameter choice

IV. Results

This section first analyzes the effects of an expansionary government spending shock in the model presented in Section III.. It then disentangles the role of financial frictions in the transmission mechanism of the fiscal shock.

Figure 2 shows that when the economy is hit by an expansionary government spending shock, a negative wealth effect, caused by the absorption of resources by the government, makes consumption and leisure less affordable and stimulates labor supply (see e.g. Baxter and King, 1993; Cogan et al., 2010). At the same time, however, the presence of deep habits in private and government consumption causes a fall in the price mark-up. Under deep habits the mark-up is counter-cyclical due to the coexistence of two effects: an *intra-temporal effect* (or *price-elasticity effect*) and an *inter-temporal effect*. The intra-temporal effect can easily be understood by looking at the demand faced by an individual firm i:

$$AD_{it} = C_{it} + G_{it} + I_{it} = \left(\frac{P_{it}}{P_t}\right)^{-\eta} \left(X_t^c + X_t^g + I_t\right) + \theta \left(S_{it-1}^c + S_{it-1}^g\right). \qquad (40)$$

The right-hand side of the demand curve is given by the sum of a *price-elastic* term and a *price-inelastic* term. When the habit-adjusted aggregate demand $\left(X_t^c + X_t^g + I_t\right)$ rises, the "weight" of the price-elastic component of demand grows and the effective price elasticity of demand, $\tilde{\eta}_{it} \equiv -\frac{\partial AD_{it}}{\partial p_{it}} \frac{p_{it}}{AD_{it}} = \eta \left(1 - \theta \frac{\left(S_{it-1}^c + S_{it-1}^g\right)}{AD_{it}}\right)$, increases, as opposed to remaining constant and equal to η as in the standard case ($\theta = 0$). The fact that the elasticity of demand is pro-cyclical is one determinant for the price