Monetary and fiscal policy under deep habits

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ABSTRACT

Allowing habits to be formed at the level of individual goods – deep habits - can radically alter the fiscal policy transmission mechanism as the counter-cyclicality of mark-ups this implies can result in government spending crowding-in rather than crowding-out private consumption in the short run. We explore the robustness of this mechanism to the existence of price discrimination in the supply of goods to the public and private sectors. We then describe optimal monetary and fiscal policy in our New Keynesian economy subject to the additional externality of deep habits and explore the ability of simple policy rules to mimic fully optimal policy. We find that the presence of deep habits at empirically estimated levels can imply large externalities that significantly affect the conduct of monetary and tax policy. However, despite the rise in government spending multipliers implied by deep habits, government spending is barely used as a stabilisation tool under the optimal policy.

1. Introduction

Deep habits (see Ravn et al., 2006, 2012), which occur at the level of the individual goods, rather than total household consumption, can improve the empirical performance of standard DSGE models in various dimensions. Aside from replicating the hump-shaped response of key variables to monetary policy shocks and adding inertial behavior more generally (as do other forms of habits), they also imply, consistently with the data, countercyclical markups and the crowding in of private sector consumption following increases in government spending. The latter property raises the government spending multiplier from well below one in the benchmark New Keynesian model, to above one.[1,2] The intertemporal nature of the pricing problem for firms, which face a dynamic demand curve as a result of deep habits, further implies that the transmission mechanism of monetary policy is altered too, with monetary policy affecting pricing

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[1] An alternative, commonly used extension to the benchmark model which is designed to achieve the crowding in of private consumption is to assume a proportion of households only consume out of current income and neither borrow nor save – see Gali et al. (2007) and Bilbiie (2009). We prefer to use the deep habits device for both theoretical and empirical reasons. While the assumption that some households are credit constrained may be justifiable, precluding the possibility of saving seems less so. Moreover, Colciago (2011) argues that the mechanism through which the crowding in occurs and the number of households that must be hand-to-mouth consumers for the crowding in effect to be achieved are not consistent with the data.

[2] Recent work looking at optimal monetary and fiscal policy in sticky-price New Keynesian models (see, for example, Schmitt-Grohe and Uribe, 2004a; Benigno and Woodford, 2003) typically finds that fiscal policy should be largely devoted to ensuring fiscal solvency, while monetary policy plays a demand management role. However, such models contain the usual crowding out effects from public consumption such that the efficacy of fiscal policy as a stabilization device may be thought to necessarily be limited.

decisions directly. Finally, deep habits, which are of an external type, imply that the distortions present in the modelled economy, which effectively define the trade-offs facing the policy maker, are significantly different from those typically found in New Keynesian models. In this paper, we explore the implications for optimal monetary and fiscal stabilization policy of introducing this new distortion to policy making and the implied fundamental changes in the macroeconomic response to shocks. We now turn to motivate our exploration of the policy problem under deep habits more fully, before outlining the key results and plan of the rest of the paper.

Literature on deep habits: Empirical evidence generally finds that output, consumption and real wages increase in response to an unexpected increase in government spending, see inter alia (Fatas and Mihov, 2001; Blanchard and Perotti, 2002; Gali et al., 2007; Zubairy, 2010b, 2010c; Ravn et al., 2012). Contrary to this evidence, standard Real-Business Cycle models, for example Baxter and King (1993), and New Keynesian models, such as Fatas and Mihov (2001), find instead a crowding out effect: private consumption falls after a positive government spending shock. This result comes from the fact that after a government spending shock households face a negative wealth effect and inevitably lower their consumption and increase hours worked. The increase in labor supply also causes real wages to fall, another result at odds with the empirical evidence.

Ravn et al. (2006) show that the crowding in effect of public spending on private consumption can be induced in a standard RBC model where firms have some monopolistic power and agents' preferences contain deep habits in consumption of individual goods. Deep habits imply a downward-sloping demand function that depends on the lagged level of consumers' purchases of that specific good. Since firms take this demand function as a constraint in their optimal price-setting problem, deep habits have pronounced implications for aggregate supply. In particular, the inelastic part of the demand function due to the impact of consumers' past purchases of a specific good implies that, *ceteris paribus*, an increase in demand for the good generates an incentive for firms to lower markups. Hence, deep habits can successfully mimic the countercyclicality of firms' markups generally found in the data. Accordingly, an increase in government spending, which raises aggregate demand, leads to a decline in firms' markups. This shifts the labor demand curve outward, increasing real wages. In turn, the rise in wages induces households to substitute consumption for leisure. At plausible estimates of the degree of deep habits, this substitution effect may be strong enough to offset the negative wealth effect coming from the increase in public consumption, resulting in an equilibrium increase in private consumption, see Ravn et al. (2006, 2012) and Zubairy (2010b). When considering deep habits in an open economy context, Ravn et al. (2012) find that a two-country RBC model augmented with deep habits can not only provide a rationale for the countercyclical markup and increase in private consumption, but also for an initial depreciation in the real exchange rate following a government spending shock, a feature consistent with the empirical evidence. Moreover, deep habits share with their superficial counterpart[3] the same aggregate demand behavior, such that models featuring deep habits still retain the empirically desirable hump-shaped response of key aggregate variables after a monetary shock, see Ravn et al. (2010) and Leith et al. (2012).

Given that deep habits imply empirically appealing impulse responses to key macroeconomic shocks, it is not surprising that estimation of models with deep habits is typically preferred to their superficial counterparts. Ravn et al. (2010) introduce deep habits into a standard medium scale sticky-price/ sticky-wage model and estimate the key parameters using a limited information approach. They find that the model with deep habits provides a superior fit to the identified dynamic effects of monetary policy shocks compared with superficial habits. Moreover, the model with deep habits can account simultaneously for the persistent impact of monetary policy shocks on consumption, for the price puzzle, and inflation persistence. Similar evidence in favor of deep habits is found by Zubairy (2010a, 2010b). Lubik and Teo (2011) derive and estimate a New Keynesian Phillips curve (NKPC) in a model with deep habits and show that such habits alter the NKPC in a fundamental manner as it introduces expected and contemporaneous consumption growth, as well as the expected marginal value of future demand, as additional driving forces for inflation dynamics. Estimating the structural parameters of the model using a GMM technique, they find that the fit of the deep habits NKPC is much improved over the standard NKPC.

Motivation and plan: Aside from potentially raising the efficacy of government spending policy, as suggested by the evidence discussed above, the modelling of deep habits has further important implications for policy. Firstly, firms' current pricing decisions affect the stock of habits possessed by their customers and therefore future levels of demand for the good they produce. This intertemporal aspect to pricing decisions, on top of that implied by nominal inertia, means that monetary policy will have a direct effect on firms' pricing decisions and hence inflation. Secondly, the habits externality, whereby households do not take account of the impact of their consumption decisions on the welfare of others, implies that there is an additional distortion in the economy beyond those associated with monopolistic competition and nominal inertia. For standard estimates of the extent of habits formation, this distortion will dominate to such an extent that it implies a highly distorted economy, as in Levine et al. (2008). As a result, in an economy with deep habits, there is a potential role for fiscal stabilization policy, using government spending and/or tax instruments, alongside monetary policy, as we have moved a long-way from the special case implied by approximating an economy around an efficient steady-state.

The current paper explores the robustness of the crowding in result in the context of a New Keynesian model of optimal monetary and fiscal policy, where households possess deep habits in consumption. We also explore the ability of fiscal and monetary policy instruments to contribute to macroeconomic and fiscal stabilization in such an economy. To this end, we

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[3] Superficial habits refer to habits that are formed at the level of the household's consumption basket, rather than at the level of individual items in the basket.