



Learning about fiscal policy and the effects of policy uncertainty[☆]



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ABSTRACT

In this paper we ask how uncertainty about fiscal policy affects the impact of fiscal policy changes on the economy when the government tries to counteract a deep recession. The agents in our model are uncertain about the conduct of fiscal policy and act as econometricians by estimating fiscal policy rules that might change over time.

We find that assuming that agents are not instantaneously aware of the new fiscal policy regime in place leads to substantially more volatility in the short run and persistent differences in average outcomes. We highlight issues that can arise when a policymaker wants to announce a policy change. From a methodological perspective, we introduce a novel way to model learning in the face of discrete policy changes.

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1. Introduction

Motivated by the financial crisis and the subsequent recession, economists have recently placed greater emphasis on identifying uncertainty about monetary and fiscal policy as a potentially important factor determining economic outcomes, as highlighted by Baker et al. (2012). In this paper we ask how this uncertainty arises, what the exact transmission mechanism is and how this uncertainty affects equilibrium outcomes. We propose one model of fiscal policy uncertainty: an RBC model with distortionary taxation and government debt, in which agents are uncertain about the conduct of fiscal policy and act as econometricians to update their beliefs about fiscal policy every period.¹ Agents use past realizations of fiscal variables to learn what actual policy rules are in place and thus whether changes in those fiscal variables are temporary (driven by exogenous shocks) or permanent (driven by changes in the parameters of the fiscal policy rules). Uncertainty about fiscal policy is partly endogenous since the properties of the estimators of the fiscal policy rule coefficients employed by private agents change as the private sector's behavior changes. This behavior occurs because choice variables of the representative private agent enter the fiscal policy rules.

[☆] The Online Supplementary Material is available at <https://sites.google.com/site/christianmatthes/>.

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¹ We use an RBC model that is relatively simple compared to many DSGE models in use today. Nonetheless, DSGE models similar to ours are being used to quantitatively evaluate fiscal policies, see for example Leeper et al. (2010).

The task of disentangling permanent from temporary changes in fiscal policy is identified as a major source of fiscal policy uncertainty by Baker et al. (2012), who use an index of tax code expiration data to measure fiscal policy uncertainty.²

We analyze a one-time permanent change in the government spending policy rule and use Monte Carlo simulations of our model to assess how beliefs evolve and how these beliefs affect allocations. Learning leads to substantially different outcomes even though learning is quite fast: there is a substantial temporary spike in volatility under learning that is absent under full information. In addition, there are persistent average differences between the outcomes under learning and under full information. We show that investment plays a big role in creating the average differences – temporary differences in investment between the learning and full information environments have long-lasting effects via the capital stock. The uncertainty about government spending induces uncertainty about the steady state of other variables such as GDP and debt, which in turn influences uncertainty about the steady state of other fiscal policy instruments, even though the coefficients of those policy rules are tightly (and correctly) estimated. Thus, even though we only consider changing a small subset of the fiscal policy coefficients, this uncertainty creeps into other fiscal variables.³

There is substantial evidence that fiscal policy rules have changed over time: Davig and Leeper (2007) estimate policy rules for taxes in the US and find substantial time variation. Bianchi and Ilut (2015) estimate a DSGE model that allows for changes in both monetary and fiscal policy rules and again find strong evidence in favor of changes in fiscal policy rules. Given this evidence for changes in fiscal policy over time, we find it natural to study the role of learning about these changes. The aforementioned papers also find evidence in favor of changes in the volatility of policy errors. While we abstract from that possibility in our benchmark, we also study a version of the model where agents consider changes both in policy rule coefficients and the policy error variances. We are far from being the first to model fiscal policy in an environment in which agents adaptively learn about the economy. Papers such as Eusepi and Preston (2011) and Eusepi and Preston (2012) encompass both monetary and fiscal policy, but have a smaller set of fiscal policy instruments (in particular no distortionary taxation). We instead choose to focus on fiscal policy alone, leaving the interesting issue of fiscal and monetary policy interaction for future work. We do, however, have a larger set of fiscal policy instruments.⁴ Giannitsarou (2006) does feature distortionary taxation and is interested in issues similar to ours, but does not feature government debt, which we include in order to be able to view the current policy debate in the United States through the lens of our model. Mitra et al. (2013) focus on the question of anticipated versus unanticipated changes in fiscal policy when agents are learning, but they only study the case of lump-sum taxation. Gasteiger and Zhang (2014) introduce distortionary taxation in an RBC model with learning, but in their model agents know the path of fiscal policy instruments and instead have to learn about the dynamics of prices in the economy.

What sets our model apart is the way agents form their beliefs about the stance of fiscal policy. We want the agents in our model to depart from rational expectations as little as possible while simultaneously making the assumption of learning and imperfect information tractable. In contrast to the previously mentioned papers, our agents know the structure of the economy and the behavior of all agents except for the fiscal authority, whose behavior is only known up to a finite dimensional vector of policy rule parameters. Households and firms become immediately aware that policy has changed in the period in which the policy change occurs. We think it is reasonable to assume that agents realize when large policy changes like the ones considered here start, since they are announced by policymakers and much discussed in the media. The exact magnitudes of the policy change are often less clear because some of the policy changes are spread out over time and subject to budget approval or other political roadblocks (the government shutdown comes to mind). While our model is too simple to capture all this detail of the political process, we think our setup does capture the fact that agents become aware of policy changes when they happen and then continually learn about how policy has changed. We follow one common approach in the study of policy changes in rational expectations models (see, for example, Uhlig, 2010) and do not allow for anticipation effects in the periods before the actual policy change. We study scenarios in which the government reacts quickly (i.e. within one quarter) to a substantially negative, yet unanticipated, productivity shock, so anticipation effects should not be substantial.

Papers such as Eusepi and Preston (2011, 2012) instead endow the agents with substantially less knowledge of the economy – their private agents have to learn about all equilibrium relationships, while our agents are only uncertain about the policy rules. In our model, agents are uncertain not only about future fiscal policy, but also about the policy rules currently in place. Papers such as Davig et al. (2010) and Bianchi and Ilut (2015) instead model the fiscal policy rule coefficients as being governed by a discrete state Markov chain, which is observable to private agents. Thus agents in those environments know the policy rule coefficients in place in the current period. In our model, agents have to form beliefs about the policy rule coefficients in the current period.

Our approach to learning follows the approach laid out in Cogley et al. (2015), who study a model of monetary policy. Firms and households in our model estimate the coefficients of the policy rules and incorporate both these beliefs and all cross-equation restrictions coming from knowledge of the structure of the economy when making their decisions.

² They state on the associated website <http://www.policyuncertainty.com> that “temporary tax measures are a source of uncertainty for businesses and households because Congress often extends them at the last minute, undermining stability in and certainty about the tax code.”.

³ To check for robustness, we consider various assumptions about the agents’ information set and their preferences as well as an alternative change in fiscal policy. Our qualitative results remain unchanged throughout.

⁴ We also abstract from the zero lower bound on nominal interest rates. Mertens and Ravn (2015) study the set of equilibria in such a setting under adaptive expectations. Adaptive expectations are also used in a nonlinear model of fiscal and monetary policy interaction by Benhabib et al. (2014).

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