



# The general equilibrium effects of fiscal policy: Estimates for the Euro area <sup>☆</sup>

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## ABSTRACT

This paper describes a dynamic stochastic general equilibrium model featuring a fraction of non-Ricardian agents in order to estimate the effects of fiscal policy in the Euro area. The model takes into account distortionary taxation on labor and capital income and on consumption, while expenditures are broken down into purchases of goods and services, compensation of public employees and transfers to households. A newly computed quarterly data set of fiscal variables is used. Our results point to the prevalence of mild Keynesian effects of public expenditures. In particular, although innovations in fiscal policy variables tend to be rather persistent, government purchases of goods and services and compensations for public employees have small and short-lived expansionary effects on private consumption, while innovations in transfers to households show a slightly more sizeable and lasting effect. The effects are more significant on the revenue side: decreases in labor income and consumption tax rates have sizeable effects on consumption and output, while a reduction in capital income tax favors investment and output in the medium run. Finally our estimates suggest that fiscal policy variables contribute little to the cyclical variability of the main macro variables.

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## 1. Introduction

This paper reconsiders the economic effects of fiscal policy using an estimated dynamic stochastic general equilibrium model for the Euro area. We try to better understand how these effects depend on the composition of expenditures and revenues, as well as on the interaction with monetary policy.

Recent years have witnessed significant changes in the fiscal position of both the United States and the Euro area. In many circumstances the main motivation behind these shifts has been related to cyclical considerations as policy makers have tried to support economic activity through fiscal stimulus. However, most of the discretionary measures undertaken, both on the spending and on the revenue side, were backed by little consensus among economists on their short to medium run effects. This lack of consensus stems from the difficulty economists have in building models able to replicate the main empirical regularities concerning fiscal variables.

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Frictionless models with optimizing forward-looking agents, as RBC models, for example, seem to be ill-suited to study the effects of government spending. In this context, [Baxter and King \(1993\)](#) have shown that any increase in expenditures brings about – as the government intertemporal budget constraint has to be satisfied – an increase in the discounted value of future taxes. This amounts to a negative wealth effect on households that induces a decrease in their private consumption, a contemporaneous increase in labor supply and, therefore, a decrease in the marginal productivity of labor and in real wages; as in the model the steady state capital labor ratio does not change, investment will increase. These theoretical correlations do not square with the empirical evidence coming from applied research.

The debate on the empirical effects of fiscal policy shocks (in particular on the effects of government expenditure shocks on private consumption) is still unsettled. However, the disagreement mainly concerns the effects of increases in expenditures related to military buildups in the US – [Perotti \(2007\)](#) argues that the response of private consumption is positive, while [Ramey \(2008\)](#) that it is negative. For our purposes military buildups are somehow special events that do not really apply to the European case, as there is no relevant example of such events in European countries over our sample period (1980–2005). The literature on the effects of fiscal policy in “normal times” – that is abstracting from military buildups – mainly finds a moderately positive (or a non negative) response of private consumption to government expenditure shocks;<sup>1</sup> also employment and real wages tend to grow, while the response of private investment is generally negative.<sup>2</sup>

The new-Keynesian paradigm, which mainly adds real frictions and nominal rigidities to an RBC framework, displays the same wealth-effect mechanism that entails a reduction in private consumption and an expansion in labor supply following a government spending shock.<sup>3</sup> In this context, however, real wages may increase as a result of an outward shift of the labor demand induced by the expanding demand in the presence of sticky prices (with a reduction in price markups).

In order to fill the gap with the evidence, the literature has recently moved away from the representative infinitely-lived rational agent. In particular [Mankiw \(2000\)](#) has argued that a model where Ricardian and non-Ricardian agents (that cannot save or borrow and therefore consume their income period by period) coexist is better suited for fiscal policy analysis with respect to both neoclassical and overlapping generation models.<sup>4</sup> Building on this framework, [Galí, López-Salido and Vallés \(2007\)](#), henceforth GLSV, add rule-of-thumb agents to a standard new-Keynesian model. They show that both price stickiness and the presence of rule-of-thumb consumers are necessary elements in order to have a positive response of private consumption for reasonable calibrations of the parameters. “Rule-of-thumb consumers partly insulate aggregate demand from the negative wealth effects generated by the higher levels of (current and future) taxes needed to finance the fiscal expansion, while making it more sensitive to current disposable income. Sticky prices make it possible for real wages to increase (or, at least, to decline by a smaller amount) even in the face of a drop in the marginal product of labor, as the price markup may adjust sufficiently downward to absorb the resulting gap. The combined effect of a higher real wage and higher employment raises current labor income and hence stimulates the consumption of rule-of-thumb households”.<sup>5,6</sup>

In this paper we contribute to the debate on the macroeconomic effects of fiscal policy by estimating on Euro area data a DSGE model which puts the idea of GLSV into the framework of [Christiano, Eichenbaum and Evans \(2005\)](#). The latter includes a number of frictions proved to be useful for estimation purposes, as shown in particular on Euro area data by [Smets and Wouters \(2003\)](#), henceforth SW.<sup>7</sup>

We extend this framework with a relatively rich description of the fiscal policy side. In particular, for government revenues we consider and estimate fiscal policy rules defined on distortionary tax rates, while previous literature (GLSV, and [Coenen and Straub, 2005](#), henceforth CS) had essentially focused on lump-sum taxes. In order to do so, we compute quarterly average effective tax rates on labor income, capital income and consumption for the Euro area following the methodology of [Mendoza, Razin and Tesar \(1994\)](#).<sup>8</sup>

<sup>1</sup> Among others, [Perotti \(2005\)](#) provides evidence of this kind for five OECD countries (USA, Germany, UK, Canada, Australia); [Mountford and Uhlig \(2005\)](#) have similar results for the US. [Galí et al. \(2007\)](#) provide an extensive review of literature on the topic.

<sup>2</sup> On the response of employment and real wages, see [Pappa \(2005\)](#) for an analysis on US data. On the response of investment, [Alesina et al. \(2002\)](#) have shown, on a large sample of OECD countries over the period 1960–2002, the negative effect on investment of a variety of government spending shocks (in particular related to transfers to households and to the public wage bill). Also [Perotti \(2005\)](#) shows that the response of investment is negative in the US and, after 1980, in Germany.

<sup>3</sup> On this see [Goodfriend and King \(1997\)](#) and [Linnemann and Schabert \(2003\)](#).

<sup>4</sup> As [Mankiw \(2000\)](#), pg. 124, puts it “A better model would acknowledge the great heterogeneity in consumer behavior that is apparent in the data. Some people have long time horizons, as evident by the great concentration of wealth and the importance of bequests in aggregate capital accumulation. Other people have short time horizon, as evidenced by the failure of consumption-smoothing and the prevalence of households with near zero net worth.”

<sup>5</sup> GLSV pg. 260.

<sup>6</sup> As another alternative to a model with a representative infinitely-lived rational agent, [Romanov \(2003\)](#), [Sala \(2004\)](#) and [Cavallo \(2007\)](#), among others, consider agents with a finite horizon by introducing a constant probability of dying *à la la* [Blanchard \(1985\)](#). The idea is that, although higher government expenditures will increase the level of expected future taxes, agents – while fully benefiting from the expansion in expenditures – will not likely live long enough to pay their entire share of the financing. However, since the Keynesian effects of expenditures shocks depend essentially on the probability of (or share of the population) dying before paying taxes and this probability is reasonably small over the short to medium term, these models cannot replicate the positive response of private consumption to a government spending shock.

<sup>7</sup> Differently from GLSV and due to the fact that we are interested in estimating the model, we assume sticky wages. Sticky wages might be thought to work against the positive response of private consumption after a government expenditure shock, as real wages would increase less after the shock or even decrease. Our estimates confirm a more muted response of real wages, but still positive. This goes along with a lower increase in marginal costs and inflation, triggering a smaller increase in the real interest rate and a reduced impact decrease in Ricardians' consumption. Therefore, as [Furlanetto \(2006\)](#) shows in the GLSV model, sticky wages are not bound to induce a negative effect of government expenditure innovations on total private consumption.

<sup>8</sup> Appendix B provides a detailed description of the data used, including the methodology we have employed to obtain quarterly series, and some comparison between our data and alternative sources.

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