Economics Letters 112 (2011) 273–276

Contents lists available at ScienceDirect

Economics Letters

journal homepage: www.elsevier.com/locate/ecolet

Externality in labor supply and government spending☆

Patrick Fève [a,b,*], Julien Matheron [b], Jean-Guillaume Sahuc [c]

[a] Toulouse School of Economics (GREMAQ, IDEI, and IUF), France

[b] Banque de France, France

[c] EDHEC Business School, France

ARTICLE INFO

Article history:
Received 19 January 2010
Received in revised form
11 May 2011
Accepted 23 May 2011
Available online 31 May 2011

JEL classification:
E32
E63

Keywords:
Externality
Labor supply
Government spending multiplier
Government size

ABSTRACT

Standard business cycle models face difficulties generating (i) government spending multipliers exceeding unity and (ii) stabilizing effects of government size. Using a simple model with externality in labor supply, we show that a sufficient degree of complementarity between aggregate and private labor supplies is key to reproducing these stylized facts.

1. Introduction

Recent empirical studies (i) have shown that the government spending multiplier exceeds unity and (ii) have pointed to long-lasting and positive effects of a positive increase in government spending on private consumption (see Blanchard and Perotti, 2002; Galí et al., 2007, among others). In addition, Galí (1994), Fatás and Mihov (2001), and Andrés et al. (2008) find, in a cross section of industrialized countries, that the larger the government size, the smaller aggregate private volatility.

Standard business cycle models face difficulties in reproducing these facts, especially when it comes to private consumption (see Galí et al., 2007; Andrés et al., 2008).[1] Recently, some papers have proposed modifying the utility function in order to reconcile standard theory and empirical evidence. For example, Linnemann and Schabert (2004) and Ganelli and Tervala (2009) have shown that Edgeworth complementarity between private and public consumptions can reproduce the positive response of private consumption after an increase in government spending.

To address the two aforementioned quantitative issues, the present paper offers an alternative mechanism based on *an externality in labor supply*. First, we determine conditions on the externality size that allow us to reproduce both a multiplier exceeding unity and a positive response of private consumption after a permanent increase in government spending. Second, we obtain conditions on the externality that imply a decrease in the volatility of output and private consumption when the government size increases. Our main result is that, when individual labor supply decisions display a sufficient amount of complementarity with aggregate supply, the model is able to reproduce both empirical facts.

Labor supply externalities have received much attention in the business cycle literature.[2] Benhabib and Farmer (2000) and Weder (2004) consider a labor supply externality in a dynamic stochastic general equilibrium setup.[3] Pintea (2006) introduces a leisure

☆ We would like to thank M. Dupaigne, F. Portier, and an anonymous referee for helpful comments and suggestions. The views expressed herein are those of the authors and should not be interpreted as reflecting those of the Banque de France.

* Corresponding address: Toulouse School of Economics (GREMAQ, IDEI, and IUF), Manufacture des Tabacs, Aile J.J. Laffont, bât. F, 21 Allée de Brienne, 31000 Toulouse, France. Tel.: +33 5 61 12 85 75; fax: +33 5 61 22 55 63.

E-mail address: patrick.feve@univ-tlse1.fr (P. Fève).

[1] When the labor supply is sufficiently elastic, a standard Real Business Cycle model can generate a multiplier that exceeds unity (see Aiyagari et al., 1992; Baxter and King, 1993), but the response of private consumption remains negative.

[2] The empirical individual-data literature also provides strong evidence about complementarity in labor supply. See Woitiez and Kapteyn (1998) and Hamermesh (2002).

[3] These papers concentrate on the dynamic implications of labor supplies externalities in models with production externalities. As shown in Weder (2004), an

0165-1765/$ – see front matter © 2011 Elsevier B.V. All rights reserved.
doi:10.1016/j.econlet.2011.05.013

externality in the neoclassical growth model and shows that the transition paths are sensitive to the presence of complementarity between individual and aggregate labor supply. Gomez (2008) and Azariadis et al. (2008) investigate such a specification in endogenous growth models. In particular, Azariadis et al. (2008) show how incorporating even a small leisure externality can be of great help to explain the difference between hours worked in the US and in Continental Europe. The basic idea is that leisure complementarities magnify the difference in taxes between the two regions (see also Alesina et al., 2006). The present paper offers yet another piece of evidence on the usefulness of this non-standard representation of preferences.

The paper is organized as follows. Section 2 presents the model. Section 3 discusses the value of the public spending multiplier and the response of private consumption after a permanent positive increase in government spending. Section 4 considers the stabilizing effect of government size on output and private consumption. Section 5 offers concluding remarks.

2. The model

The utility function of the representative household is given by

$$\log(c_t) - \frac{\chi_o}{1+\chi}\left(\frac{n_t}{\bar{n}_t^{\phi}}\right)^{1+\chi}, \tag{1}$$

where c_t, n_t, and $\bar{n}_t$ denote the individual consumption, the individual labor supply, and the average labor supply in the economy, respectively. The parameter $\chi \geq 0$ is the inverse of the Frishian elasticity of labor supply, $\chi_o \geq 0$ is a scale parameter, and ϕ measures the external effect of other households' labor on individual utility. When $\phi \neq 0$, aggregate labor supply influences individual labor supply decisions. In particular, if $\phi < 0$, aggregate labor supply substitutes for individual decisions. In contrast, $\phi > 0$ implies complementarity. In what follows, we investigate the case when $\phi \leq 1$.

The representative household seeks to maximize (1) subject f to the following budget constraint:

$$c_t \leq w_t n_t - \tau_t,$$

where w_t is the real wage and τ_t is a lump-sum tax.

The representative firm produces a homogeneous final good y_t using labor as the sole input, according to the constant returns-to-scale technology $y_t = a_t n_t$, where a_t is a technology shock. Profit maximization equalizes the marginal productivity of labor y_t/n_t to its real cost $w_t \equiv a_t$. Government spending is entirely financed by taxes, $g_t = \tau_t$. The market clearing condition on the goods market is

$$y_t = c_t + g_t.$$

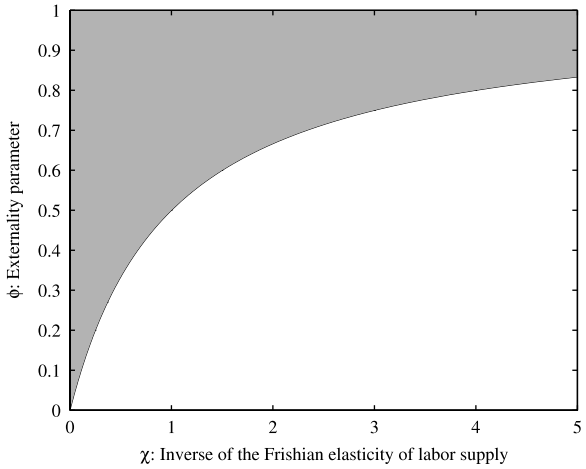
The first-order conditions associated with households' and firms' optimization problems together with equilibrium conditions on each market define the equilibrium of this prototypical economy:

$$\chi_o \left(\frac{y_t}{a_t}\right)^{\chi-\phi(1+\chi)} = \frac{a_t}{y_t - g_t}.$$

3. The effect of a permanent increase in government spending

In this section, we focus on the responses of output and consumption to a permanent change in government spending. Loglinearizing the model, we obtain the following equations:

externality in labor supply is not sufficient in itself to generate real indeterminacy, but it allows one to reduce the degree of other market imperfections needed to generate sunspot equilibria.



Note: The gray area corresponds to a government spending multiplier greater than one.

Fig. 1. Area for government spending multipliers larger than one.

$$\hat{y}_t = \frac{(1-\gamma)(1+(\chi-\phi(1+\chi)))}{1+(1-\gamma)(\chi-\phi(1+\chi))}\hat{a}_t + \frac{\gamma}{1+(1-\gamma)(\chi-\phi(1+\chi))}\hat{g}_t,$$

and

$$\hat{c}_t = \frac{1+(\chi-\phi(1+\chi))}{1+(1-\gamma)(\chi-\phi(1+\chi))}\hat{a}_t - \frac{\gamma(\chi-\phi(1+\chi))}{1+(1-\gamma)(\chi-\phi(1+\chi))}\hat{g}_t,$$

where a hat denotes the relative deviation from steady state. The parameter $\gamma \in (0, 1)$ is the steady-state share of government spending in output. The elasticities of output and consumption to government spending are then given by

$$\eta_{y,g} = \frac{\gamma}{1+(1-\gamma)(\chi-\phi(1+\chi))} \quad \text{and}$$

$$\eta_{c,g} = \frac{\gamma(\phi(1+\chi)-\chi)}{1+(1-\gamma)(\chi-\phi(1+\chi))}.$$

From these equations we deduce three results.

Result 1. *The government spending multiplier, defined as $\eta_{y,g}/\gamma$, is positive.*

Result 2. *A permanent increase in government spending increases private consumption if $\phi > \phi^\star \equiv \chi/(1+\chi)$.*

Result 3. *The government spending multiplier exceeds unity if and only if $\phi > \phi^\star$.*

These results mean that the externality size (as measured by ϕ) should be sufficiently large compared to the labor supply elasticity. Notice that the threshold value $\phi^\star$ is an increasing function of χ. In the limit, when the individual labor supply is inelastic ($\chi \to \infty$), we have $\phi^\star \to 1$. Fig. 1 highlights this property, and reports the frontier from which the government spending multiplier exceeds unity as a function of ϕ and χ. For example, if the inverse of the Frishian elasticity of labor supply equals 2, a necessary condition for government spending multipliers larger than one is that ϕ exceeds 2/3.

What are the mechanisms at work to generate these effects on output and private consumption? Suppose that government spending increases permanently. Then, private agents face a negative income effect, because taxes will also increase. Facing this decrease in disposable income, each individual agent increases its labor supply. It follows that aggregate labor supply shifts up.