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ABSTRACT

This study examines whether the fiscal multiplier can be negative for certain types of government spending. The key result is that the fiscal multiplier can be negative if there is a high degree of substitutability between private and government consumption and government consumption is complementary to leisure.

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1 Introduction

The ability of fiscal policy to stimulate aggregate output has recently returned to the forefront of the economic policy debate due to the large fiscal stimulus packages implemented in China, Europe and U.S. to fight the global recession. Expansionary fiscal policy is – often, but not always – seen as a good way to mitigate the negative effects of a slump in global demand and as a key factor in economic recovery.

The effectiveness of fiscal policy, however, has been a topic of heated debate between economists who believe that *temporary* fiscal expansion is *in a severe recession* an appropriate means of tackling the problem of insufficient aggregate demand and those economists who share the Treasury View. The Treasury View dates back to the 1920s and 1930s when the staff of the British Chancellor of the Exchequer opposed the ideas of Keynes.[1] According to the Treasury View:

> "each extra pound sterling of British government spending had to be financed by borrowing an extra pound from Britain's savers, which meant a pound less for Britain's firms to invest. Hence investment plus government spending was constant. So fiscal policy could never boost employment or production no matter what" DeLong (2009b, 1).

The Treasury View has been recently rediscovered by Fama (2009) and Cochrane (2009), as noted e.g. by Krugman (2009). Fama (2009) writes: "despite the existence of idle resources, [...] stimulus plans do not add to current resources in use. They just move resources from one use to another." Cochrane (2009) argues "[e]very dollar of increased government spending must correspond to one less dollar of private spending" and that "[t]he baseline question is whether the [fiscal] multiplier exceeds zero".

However, in virtually all micro-based macro models with intertemporally optimizing households, the fiscal multiplier is positive. The standard channels that imply a positive fiscal multiplier are the wealth and substitution effects of fiscal policy on the labour supply. An increase in government spending makes households poorer due to higher taxes reducing private consumption. This increases the marginal value of private consumption leading to households to substitute work for leisure.

This paper examines whether the fiscal multiplier can be zero or even negative in a micro-based macro model. The standard preferences are extended in two ways to make the substitution effect (from leisure) weaker. Firstly,

[1] See DeLong (2009a).

government consumption is assumed to be a complement or a substitute for private consumption. The earlier literature has shown that substitutability between private and government consumption reduces the fiscal multiplier.[2] Secondly, government consumption can be either a complement or a substitute for leisure. Complementarity between government consumption and leisure would mean that an increase in government spending increases the value of leisure, encouraging households to reduce heir labour supply.

The key result is that the fiscal multiplier in the present model is negative only in the special case where both the marginal rate of substitution between private and government consumption and the complementarity between government consumption and leisure are sufficiently high. The intuition behind the negative fiscal multiplier is that the substitution effect, from the labour supply to leisure, is strong enough to offset the wealth effect.

The rest of the paper is organised as follows. Section 2 presents the model. Section 3 discusses whether the fiscal multiplier can be negative. Section 4 concludes.

2 The model

In this section a simple model is set out, in order to discuss the possibility of a negative fiscal multiplier. Consider an economy with many identical households and identical firms. The utility function of a household is given by[3]

$$U = \log(C + \alpha G) - \frac{1}{1+\chi} G^{1-\rho} N^{1+\chi} + V(G). \tag{1}$$

Here C (G) denotes private (government) consumption, $\alpha \leq 1$ is a measure of the substitutability/complementarity between private and government consumption, N is the labour supply, $\chi \geq 0$ the labour supply parameter, and ρ indicates whether government consumption is a complement or substitute for labour supply. The term $V(G)$ is added to the utility function so that the marginal utility of government consumption is always non-negative.

The utility function implies that

$$\frac{\partial(\partial U/\partial C)}{\partial G} = -\alpha(C + \alpha G)^{-2}, \tag{2}$$

$$\frac{\partial(\partial U/\partial N)}{\partial G} = -(1-\rho) G^{-\rho} N^{\chi}. \tag{3}$$

[2] See Barro (1981, 1989), Finn (1998), Ganelli (2003), Heijdra and Ligthart (1997), Roche (1996) and Tervala (2008)

[3] The utility function used in Fernandez et al. (2004) is similar to the present utility function.

Equation (2) shows that if α is positive (negative) government consumption reduces (increases) the marginal utility of private consumption, implying substitutability (complementarity) between private and government consumption. Equation (3) shows that, depending on whether ρ is greater or smaller that one, government consumption is a complement or substitute for the labour supply. Alternatively, one can say that if $\rho < 1$ ($\rho > 1$), government consumption is a complement (substitute) for leisure, implying that an increase in government consumption increases (decreases) the marginal value of leisure. If $\rho = 1$, the model corresponds to the standard case, where government consumption does not affect the value of leisure.

The budget constraint is

$$PC = wN - P\tau, \tag{4}$$

where P is the price of the commodity, w is the nominal wage rate, τ denotes real lump-sum taxes. The government budget constraint is simply $\tau = G$.

The household solves a maximization problem, choosing the levels of consumption and labour supply so as to maximize utility. The resulting labour supply equation is

$$N^{\chi} = \frac{w}{P(C + \alpha G)G^{1-\rho}}. \tag{5}$$

Equation (5) shows that the labour supply depends not only on the labour supply parameter, the real wage and 'effective consumption' (defined as $C + \alpha G$), but also on ρ. The term $G^{1-\rho}$ indicates that if government consumption is a substitute (complement) for leisure, then government consumption tends to increase (reduce) the labour supply.

The production function of the firms is simply

$$Y = N. \tag{6}$$

The zero-profit condition means that the price is equal to the nominal wage,

$$P = w. \tag{7}$$

Aggregate demand in the economy is given by

$$Y = C + G. \tag{8}$$

3 The fiscal multiplier

For simplicity, the model is log-linearized around a zero government spending steady state. The four equations that determine the five variables (N, C, Y, P, W)

are the log-linearized versions of (5), (6), (7) and (8). The nominal wage is chosen as numeraire ($w = 1$).

For the log-linearized versions of the key equations, the fiscal multiplier is

$$\hat{Y} = \left(\frac{\rho - \alpha}{1 + \chi}\right) \hat{G}. \tag{9}$$

In this equation percentage deviations from the initial equilibrium are denoted by hats: $\hat{Y} = dY/Y_0$, where the zero subscript denotes the initial equilibrium value. Because initial government spending is zero, it is normalized by private consumption ($\hat{G} = dG/C_0$).

Equation (9) shows that an increase in government spending can increase or reduce output, depending on the relative magnitudes of α and ρ. If the degree of substitutability between private and government consumption is high (high α) and the degree of the complementarity between government consumption and leisure is high (low ρ), then an increase in government spending reduces output. Equation (9) also replicates the common finding in the fiscal policy literature that if $\alpha = 0$, $\rho = 1$ and $\chi = 1$, then the fiscal multiplier is 0.5.

Important channels of influence on the fiscal multiplier are the standard wealth and substitution effects. An increase in government spending renders the household poorer, due to higher taxes which reduce private consumption. This increases the marginal value of private consumption, inducing the households to substitute work for leisure. In the standard case, where $\alpha = 0$ and $\rho = 1$, the effects lead to an increase in the labour supply such that the fiscal multiplier is positive but not greater than one, unless the labour supply is perfectly inelastic ($\chi = \infty$).

If utility is a function of 'effective government consumption' (defined as αG), the strength of the substitution effect also depends on the substitutability/complementarity between private and government consumption. As emphasised by Ganelli and Tervala (2009), if the complementarity between private and government consumption is high, the fiscal multiplier can be greater than one. This is because an increase in government spending increases the marginal utility of private consumption and hence produces a stronger substitution effect.

The main point of this paper is, however, to discuss the possibility that the fiscal multiplier is negative. If private and government consumption are substitutes, then an increase in government spending reduces the marginal utility of private consumption, weakening the substitution effect. The higher the substitutability between private and government consumption, the smaller the fiscal multiplier.

If government consumption is a complement to leisure ($\rho < 1$), an increase in government spending – naturally – increases the value of leisure and so reduces the willingness of the households to supply labour. This channel is a part of the substitution effect of the labour supply and it therefore reduces the fiscal multiplier. In fact, if the substitutability between private and government consumption is a sufficiently high and government consumption is at the same time a sufficiently "good complement" (i.e. ρ is low) for leisure, then fiscal multiplier is negative. This is due to the fact that the substitution effect, from work toward leisure, more than offsets the wealth effect.

Table 1 shows the dependence of the fiscal multiplier on the interplay between α and ρ, assuming $\chi = 1$. The empirical literature seems not to be conclusive as to a plausible value of α. Kormendi (1983) and Aschauer (1985) found that it is about 0.2 in the U.S. Kwan (2006) found that in East Asia (on average) it is between 0.5 and 1. Karras (1994), on the other hand, found that private and government consumption are complements. Not knowing the appropriate value of ρ, the value is chosen somewhat arbitrarily to highlight the dependence of the fiscal multiplier on whether government consumption is a complement or substitute for leisure.

Table 1
The dependence of the fiscal multiplier on ρ and α ($\chi = 1$).

	$\alpha = -0.5$	$\alpha = 0$	$\alpha = 0.5$	$\alpha = 1$
$\rho = 0.5$	0.5	0.25	0	-0.25
$\rho = 1$	0.75	0.5	0.25	0
$\rho = 1.5$	1	0.75	0.5	0.25

4 Conclusions

The main point of this paper is to analyse the question of whether the fiscal multiplier can be negative for certain types of government spending. The paper gives a positive answer in the case that government spending is devoted to goods that are substitutes for private consumption and complements to leisure. It is, however, difficult to see how government consumption can be a perfect substitute for private consumption, in a such way that only government consumption is a complement to leisure. A limitation of this model is that taxes are non-distortionary. The introduction of distortionary taxes would strengthen a possibility of a negative fiscal multiplier.

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Aboa Centre for Economics (ACE) was founded in 1998 by the departments of economics at the Turku School of Economics, Åbo Akademi University and University of Turku. The aim of the Centre is to coordinate research and education related to economics in the three universities.

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Aboa Centre for Economics (ACE) on Turun kolmen yliopiston vuonna 1998 perustama yhteistyöelin. Sen osapuolet ovat Turun kauppakorkeakoulun kansantaloustieteen oppiaine, Åbo Akademin nationalekonomi-oppiaine ja Turun yliopiston taloustieteen laitos. ACEn toiminta-ajatuksena on koordinoida kansantaloustieteen tutkimusta ja opetusta Turun kolmessa yliopistossa.

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