Documents
de travail

« **Status-seeking and economic growth:
the Barro model revisited** »

Auteurs

Thi Kim Cuong Pham

Document de Travail n° 2012 - **06**

Juin 2012

Status-seeking and economic growth: the Barro model revisited

Thi Kim Cuong Pham[*]
BETA, University of Strasbourg

29th May 2012

Abstract

This paper reexamines the Barro growth model taking into account status-seeking behavior. Agents care about both consumption and social status, which is determined by their relative consumption in society. Public capital as production input is financed by income tax or lump-sum tax. We discuss different measures to reach the optimal growth and optimal welfare in a decentralized economy and find that under some parameter conditions, there are some government sizes for which the decentralized growth is optimal, and this result does not require corrective taxation policy. We also find the superiority of income tax versus lump-sum tax from the point of view of optimal growth in a decentralized economy and of social welfare. Besides, we propose corrective tax programs with constant capital tax or subsidy and time-varying consumption tax that enable an economy to reach the first-best optimal growth. The extension to a congestion model modifies somewhat the results. We discuss conditions under which the first-best or the second-best optimal growth is attained in a decentralized economy.

Keywords: Corrective tax, endogenous growth, public expenditure, relative consumption, status-seeking.
JEL Classification: D90; H21; H50; O41

[*] BETA, University of Strasbourg, 61 avenue de la Forêt Noire, 67000 Strasbourg, France. *Email:* kim.pham@unistra.fr

1 Introduction

The role of the public sector as a determinant of economic growth in the long term was stressed in the seminal paper of Barro (1990). Public expenditure is financed by income tax or lump-sum tax and considered as an input of the production process. Unlike the Ramsey model and the simple AK model, the outcome is not Pareto optimal. Indeed, it is well shown that under income tax, the decentralized growth rate is always lower than the optimal rate. Only the second best optimal growth rate is reached under income tax while the first-best optimal growth rate may be reached under lump-sum tax in a decentralized economy when government size is growth-maximizing. Certain previous studies focus on endogenous policy in endogenous growth model with public sector (Glomm and Ravikumar (1994), Pham (2005)). For instance, Glomm and Ravikumar (1994) show that the government size chosen *via* majority vote is lower than the growth-maximizing government size. A more recent analysis of Marrero and Novales (2005) includes an unproductive component of public expenditure in the Barro model. The authors show the presence of a significant level of the wasteful public expenditure as a sufficient condition for income tax to lead to a higher growth and a higher welfare than lump-sum tax.

The goal of this paper is to reconsider the implications of government size and fiscal policy for growth and welfare considering endogenous preferences. In other words, in line with numerous analyses of relative income effects on economic growth, our study emphasizes the role of the demande side. Indeed, in investigating economic growth as well as its determinants, economists have a tendency to consider exogenous preferences defined by an absolute individual utility which depends only on individual consumption or wealth. However, numerous empirical articles such as Clark and Oswald (1996), McBride (2001), Frijters *et al* (2004), Ferrer-i-Carbonell (2005) and Clark *et al* (2008) shed light on the phenomenon of relative utility. In a discussion about welfare economics, Ng [2003] also underlines the importance of relative standing such as relative income or relative consumption as well as its effects on economic analysis. It should be noted that this idea of relative utility is already present in Adam Smith's *Theory of Moral Sentiments*. According to the Scottish economist, an individual can amass wealth not only to satisfy her basic material needs, but also to improve her relative position in society. This behavior is motivated by the desire to acquire a social status, which brings about social esteem, respect, admiration, etc. In the same line of ideas, Duesenberry (1949) stresses that it exists an effect of imitation in the consumption of individuals who belong to the same social categories. Sen (1992) mentions as well the relativity of

well-being within his famous capability approach: being poor in a rich country implies a higher degree of social privation.

Effects of relative standing such as relative income or relative consumption are examined by numerous studies. For instance, Corneo and Jeanne (2001) show in the Solow growth model that status seeking may be an engine of economic growth. Nevertheless, Rauscher (1997) shows in the Ramsey model that the quest for social status only affects transitional dynamics. As consumption externality leads to sub-optimality, optimal taxation to restore Pareto optimum is also a subject of analysis in several papers (Rauscher [1997], Fisher and Hof (2000), Wendner (2003), Liu and Turnovsky (2005), Goméz (2006), etc.). Typical findings underline the necessity of a constant capital subsidy and/or consumption tax rate which increases or decreases overtime.

In line with these studies, our paper revisits the Barro endogenous growth model by taking status-seeking behavior into account. A desire for social status leads agents to care about their relative consumption. Public capital as an input of production process is financed by income tax or lump-sum tax. *A priori*, the decentralized growth in this model with public sector moves away from the optimal rate for two reasons. First, public expenditure is present in the production process as an externality. Second, consumption externality is present in utility function. Moreover, there is also a fiscal distorsion if public expenditure is financed by income tax.

We will discuss different measures to reach the optimal growth and optimal welfare in a decentralized economy. Unlike the conventional model, i.e. without status seeking, where the decentralized growth rate under income tax is always lower than the optimal rate whatever the government size (i.e. public capital-income ratio), in our model with status seeking we can find that there are some government sizes for which decentralized growth rate is optimal, and that this result does not require corrective taxation policy. Then, we give some conditions on parameters under which the first-best optimal growth can be reached in the decentralized economy. We also compare two public financing rules : income tax and lump-sum tax, in terms of optimal growth and social welfare. It should be noted that a tax increase is used to finance a higher level of public capital, which has a direct and positive impact on growth. On the one hand, if the tax is proportional to income, i.e. distorting tax, private accumulation of capital will be discouraged as after-tax marginal product of capital is lower, and then future consumption and future growth will be affected. Consequently, positive impact on growth of the increase of public capital is partly neutralized. On the other hand, non-distorting lump-sum tax does not affect capital

accumulation, but immediately diminishes consumption. Choosing between distorting and non-distorting taxes represents a trade-off between current and future consumptions. We characterize then the government size for which the decentralized growth under lump-sum tax is optimal and compare optimal decentralized growth rates as well as social welfare under two public financing rules. The result shows the superiority of income tax under some conditions. Moreover, we propose corrective tax programs that enable to the decentralized economy to reach the first-best optimal growth. The extension to a congestion model modifies somewhat the results. We show that income tax is always preferred to lump-sum tax. In addition, the first-best or second-best optimal growth may be reached in the decentralized economy following the value of the effective intertemporal elasticity of substitution.

The remainder of the paper is organized as follows. Section 2 characterize the social planner economy as well as the decentralized economy under income and lump-sum taxes financing public capital. In section 3, we propose an analysis of the conditions allowing the optimal growth to be reached in the decentralized economy. Section 4 discusses corrective taxes programs. Section 5 extends the model to a congestion public good model and Section 6 concludes.

2   Basic framework

In an endogenous growth model with public spending, we take status-seeking behavior into account. Let us assume that the economy consists of numerous infinitely-lived identical individuals. The population size is then constant overtime and normalized to unity. Labor is exogenous and inelastic. Each individual cares about consumption (c) and social status. The intertemporal utility function derived by the individual is:

$$\int_0^\infty \left[(1-s)u\left(c\right) + sv\left(\frac{c}{\bar{c}}\right) \right] e^{-\rho t} dt \tag{1}$$

where ρ is the constant rate of time preference, $u\left(c\right)$ is the utility derived from consumption, and $v\left(\frac{c}{\bar{c}}\right)$ the status function increasing with individual's consumption and decreasing with the average consumption of society ($\bar{c}$).[1] Both functions are increasing and concave with respect to each argument. Parameter s, $s \in (0,1)$, measures the importance of individual utility from social status as compared to the importance of her utility from consumption.

---

[1]Numerous papers also define social status as a function of relative wealth, see for instance Corneo and Jeanne (1997, 2001), Long and Shimomura (2004) and Pham (2005).

In other words, s defines the weight individuals attach to social status. Its value is estimated at around 0.3 in Solnick and Hemenway (1998), Johansson-Stenman *et al.* (2002).

We assume that the individual's utility is represented by a CES utility fonction:

$$u\left(c\right) = \frac{c^{1-1/\sigma} - 1}{1 - 1/\sigma} \tag{2}$$

where σ is the constant intertemporal elasticity of substitution. Status function depends on relative consumption, $c/\bar{c}$. *Ex ante*, each individual tries to consume more than others, but since all individuals are identical, they make the same choice *ex post*, i.e. $c = \bar{c}$ at the equilibrium. We assume that $v'\left(\frac{c}{\bar{c}}\right) > 0, v''\left(\frac{c}{\bar{c}}\right) < 0$, and in addition, $v'(1)$ is constant.

Each individual produces a commodity from private capital (k) and public capital (G). Let us assume that public capital enters into the production function as a pure public good. The production function is homogeneous of degree 1 in private capital and public capital, both factors having positive and diminishing marginal product. The production function specifies then constant returns in k and G. Assuming a Cobb-Douglas form, the specification for firm i is:

$$y = f\left(k, G\right) = Ak^{1-\alpha}G^{\alpha} \tag{3}$$

where α, $\alpha \in (0, 1)$, is constant elasticity of income with respect to public capital, and A is a positive technological scale. It is well known that for this specification of preferences and production, the initial consumption level will jump to the balanced growth path where consumption, capital and production grow at the same rate.

Capital accumulation follows either the standard form

$$\dot{k} = (1 - \tau)f\left(k, G\right) - c - \delta k \tag{4}$$

if public capital is financed by income tax, or

$$\dot{k} = f\left(k, G\right) - c - \delta k - T \tag{5}$$

if public capital is financed by lump-sum tax T. Parameter δ, $\delta \in [0, 1]$, is the depreciation rate of capital.

As in Barro (1990), public capital is assumed to be a constant and positive fraction of income $G/y = \tau$ where τ represents the government size in the economy. In case of income tax, τ also represents the tax rate. The budget constraint of the public sector is balanced at each period, i.e.

$$G = \tau y \tag{6}$$

in income tax case, and

$$G = T \tag{7}$$

in lump-sum tax case.

2.1   Social planner's program

There are two types of externalities in this economy. The first one is linked to public capital. Individuals calculate their private marginal product of capital considering public capital as given. Nevertheless, as individual investment increases capital and then production, this induces an increase in public capital if the government maintains a balanced budget (constant G/y). The second externality is negative and generated by status seeking behavior. Individual consumption raises the average level of consumption and then diminishes the relative consumption of others.

In a centralized economy, the social planner directly chooses quantities of consumption, private capital and public capital to maximize the intertemporal utility of individuals while accounting for both externalities. His optimization program is written as:

$$\max_{(c,k,G)} \int_0^\infty \left[(1-s)u\left(c\right) + sv\left(\frac{c}{\bar{c}}\right) \right] e^{-\rho t} dt$$

$$\text{subject to } \begin{cases} \dot{k} = y - c - \delta k - G \\ c = \bar{c} \\ G = \tau y \\ y = f\left(k, G\right) \end{cases}$$

The social planner internalizes public capital externality by considering that $G = \tau y$ such that the social marginal product of capital are given by:

$$f_k^o = A^{\frac{1}{1-\alpha}} \tau^{\frac{\alpha}{1-\alpha}} \tag{8}$$

The optimal growth rate depends on the social marginal product of capital f_k^o:

$$\gamma^o = \sigma \left[(1-\tau) f_k^o - \rho - \delta \right] \tag{9}$$

and the social consumption-capital ratio is:

$$\left(\frac{c}{k}\right)^o = (1-\tau) A^{\frac{1}{1-\alpha}} \tau^{\frac{\alpha}{1-\alpha}} - \delta - \gamma^o \tag{10}$$

The transversality constraint is given by

$$\lim_{t\to\infty} \lambda_t e^{-\rho t} k_t = 0 \tag{11}$$

where λ is the shadow price of capital.

2.2 Decentralized economy

Let us consider now the decentralized economy where agents neglect externalities. In the case of income tax financing public capital, individual producer-consumer chooses consumption and capital accumulation to maximize utility function (2) subject to capital accumulation equation (4), given public capital G and average level of consumption $\bar{c}$. The growth rate of the decentralized economy is

$$\gamma^e = \varepsilon(s, \sigma) \left[(1 - \tau) f_k^e - \rho - \delta \right] \tag{12}$$

where

$$\varepsilon(s, \sigma) = \frac{(1 - s)cu_c + sv'(1)}{(1 - s)cu_c + \sigma sv'(1)} \sigma. \tag{13}$$

We interpret $\varepsilon(s, \sigma)$ as the effective intertemporal elasticity of substitution when accounting for status behavior while σ is the intertemporal elasticity of substitution.[2] The private marginal product of capital, f_k^e, is

$$f_k^e = (1 - \alpha) A^{\frac{1}{1-\alpha}} \tau^{\frac{\alpha}{1-\alpha}}. \tag{14}$$

Considering capital accumulation equation (4), government budget equation (6) and constant ratio $G/y = \tau$, The decentralized consumption-capital ratio is given by:

$$\left(\frac{c}{k} \right)^e = (1 - \tau) A^{\frac{1}{1-\alpha}} \tau^{\frac{\alpha}{1-\alpha}} - \delta - \gamma^e \tag{15}$$

The relationship between growth rate (γ) and government size (τ) is not monotonous. Indeed, an increase of τ has two effects on γ: a negative effect *via* income tax since the after-tax marginal product of capital diminishes and a positive effect *via* public spending since the marginal product of capital increases. We can then calculate the government size that maximizes optimal and decentralized growth rates. This value is actually equal to the elasticity of production with respect to public capital, $\hat{\tau} = \alpha$.

It should be noted that in the model without status-seeking, the growth rate under income tax is:

$$\gamma^c = \sigma \left[(1 - \tau) f_k^e - \rho - \delta \right]. \tag{16}$$

Comparing (12) and (16) we observe that a society with status-seeking behavior grows at a faster rate than a society without status-seeking if $\sigma < 1$. Indeed, $\varepsilon(s, \sigma) > \sigma$ if $\sigma < 1$ (and $\varepsilon(s, \sigma) < \sigma$ if $\sigma > 1$). In this case, the intertemporal elasticity of substitution that accounts for status behavior is higher than

---

[2] See Fisher and Hof (2000) for different forms of utility.

σ. This means that individuals are more inclined to consider consumption shift overtime, leading to a higher growth rate. Moreover, as $\varepsilon(s, \sigma)$ is increasing with status weight s in utility function, the growth rate is increasing with status weight. In other words, if we compare (12) to (9) under condition $\varepsilon(s, \sigma) > \sigma$, we remark that there may exist *ceteris paribus* one value of status weight, s^*, for which the decentralized growth is equal to the optimal growth. This finding also means that if status weight is enough strong, the pursuit of economic growth by growth-enhancing policy may generate frustration and induce a lower social welfare.[3]

Let us consider now the case of lump-sum tax financing public capital. The individuals' optimization program does not change. Individual producer-consumer chooses consumption and capital accumulation to maximize the intertemporal utility (2) subject to the capital accumulation equation (5), considering public capital G and average level of consumption $\bar{c}$ as given. We can determine the growth rate under lump-sum tax as:

$$\gamma^T = \varepsilon(s, \sigma) \left[f_k^e - \rho - \delta \right] \tag{17}$$

and the consumption-capital ratio as:

$$\left(\frac{c}{k} \right)^T = (1 - \tau) A^{\frac{1}{1-\alpha}} \tau^{\frac{\alpha}{1-\alpha}} - \delta - \gamma^T \tag{18}$$

3   Optimal growth in decentralized economy

If public capital is financed by distorting income tax, it is shown that in an economy with exogenous preferences, the decentralized growth rate is never equal to the optimal growth whatever the government size τ. Indeed, given equations (9) and (16), we note that $\gamma^c < \gamma^o, \forall \tau \in (0, 1)$ as the private marginal product of capital f_k^e is always lower than the social marginal product of capital f_k^o. This result is explained by the presence of the public capital externality. In addition, fiscal distortion enhanced by income tax has a disincentive effect on investment. This contributes to move the decentralized growth away from the optimal growth rate.

The same result may be found in the model with status-seeking behavior if the effective intertemporal elasticity of substitution $\varepsilon(s, \sigma)$ is lower than the intertemporal elasticity of substitution σ. Indeed, comparing equation (12)

---

[3]This result is in line with the finding by Corneo and Jeanne (1997) who consider a log utility function, a constant marginal status utility at the equilibrium and a Cobb-Douglas production fonction which includes the learning-by-doing effect in the spirit of Romer (1986).

with (9), we remark that the optimal growth rate under income tax is always higher than the decentralized rate whatever the government size τ:

$$\gamma^o > \gamma^e. \tag{19}$$

In the case with lump-sum tax financing public capital, this tax does not affect the after-tax private marginal product of capital, it does not affect capital accumulation but diminishes consumption immediately. Financing public expenditure through non-distorting lump-sum tax will lead to an excessive crowding-out of current consumption. The growth rate is increasing with public capital-production ratio τ and it is all the more divergent from the optimal rate that τ is higher than its optimal value α. As in the model without status-seeking, the lump-sum tax is a measure to restore the optimal growth in a decentralized economy when the government size is optimal growth-maximizing, i.e. $\hat{\tau} = \alpha$. Figure 1 illustrates this result when $\sigma \geq 1$, corresponding to the case where $\varepsilon(s, \sigma) < \sigma$.

3.1   Optimal growth under income tax

Let us consider now the case where the effective intertemporal elasticity of substitution is higher than the intertemporal elasticity of substitution, corresponding to $\sigma < 1$. In this case, the decentralized growth is higher than growth in an economy without status-seeking, and may be optimal under some conditions. Indeed, as the decentralized growth is not constant, we can calculate its limited values which are given by:

$$\lim_{c \to \infty} \gamma^e = (1 - \tau)f_k^e - \rho - \delta \quad \text{for } \sigma < 1 \tag{20}$$

$$= \sigma\left[(1 - \tau)f_k^e - \rho - \delta\right] \quad \text{for } \sigma \geq 1 \tag{21}$$

As shown in the following proposition, in the case of $\sigma < 1$ corresponding to $\varepsilon(s, \sigma) > \sigma$, it is possible to obtain an optimal growth in the decentralized economy without either production subsidy or corrective tax.

Proposition 1 *In an economy with status-seeking behavior and intertemporal elasticity of substitution lower than one where public capital is financed by income tax, under some parameter conditions, the first-best optimal growth may be reached in the decentralized economy.*

To obtain the above result, it is sufficient to compare equation (20) with (9):

$$\gamma^o = \gamma^e \Leftrightarrow (1 - \tau)\tau^{\frac{\alpha}{1-\alpha}} = \frac{(1 - \sigma)(\rho + \delta)}{(1 - \alpha - \sigma)A^{\frac{1}{1-\alpha}}} \tag{22}$$
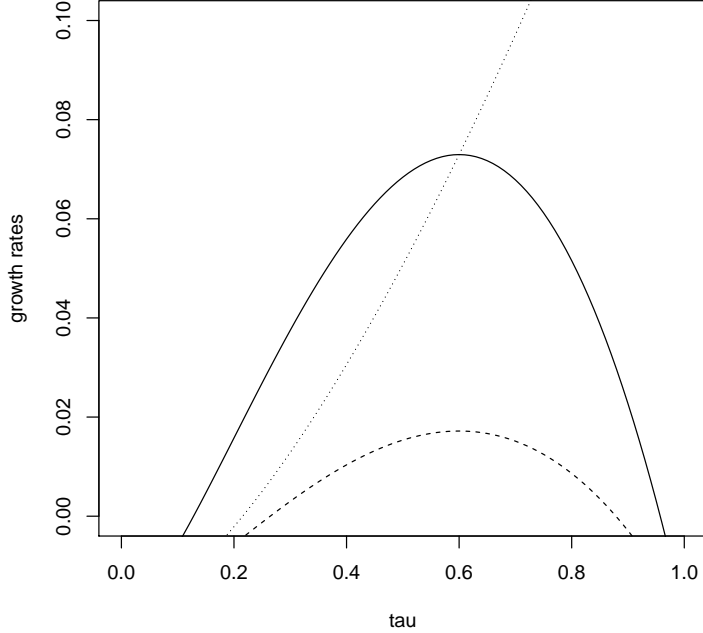
Figure 1: Growth rates as a function of government size. Note: increasing curve represents the decentralized growth under lump-sum tax, dashed concave curve represents the decentralized growth under income tax and solid concave curve represents the optimal growth. $\alpha = 0.6, \sigma = 1, \rho = 0.02, \delta = 0, A^{\frac{1}{1-\alpha}} = 0.5$. These values give $\gamma^T = \gamma^o = 0.072$ under lump-sum tax and $\gamma^e = 0.017$ under income tax, for $\hat{\tau} = \alpha$.

The function of the right hand side is independent of τ and the function of the left hand side is concave in τ, and reaches its maximum $(1 - \alpha)\alpha^{\frac{\alpha}{1-\alpha}}$ for $\hat{\tau} = \alpha$. Therefore, if parameters verify condition:

$$(1 - \alpha)\alpha^{\frac{\alpha}{1-\alpha}} = \frac{(1 - \sigma)(\rho + \delta)}{(1 - \alpha - \sigma)A^{\frac{1}{1-\alpha}}} \tag{23}$$

the decentralized growth rate is optimal for $\hat{\tau} = \alpha$. In addition, with this growth-maximizing government size, the maximum rate of the optimal growth is reached. Figure 2 illustrates the proposition 1 with specific numerical values of parameters verifying condition (23). Since condition (23) is not always verified, we can deduce that for the same growth-maximizing government size, one economy can reach the first-best optimal growth in a decentralized situation while another cannot. This depends on technology parameter, intertemporal
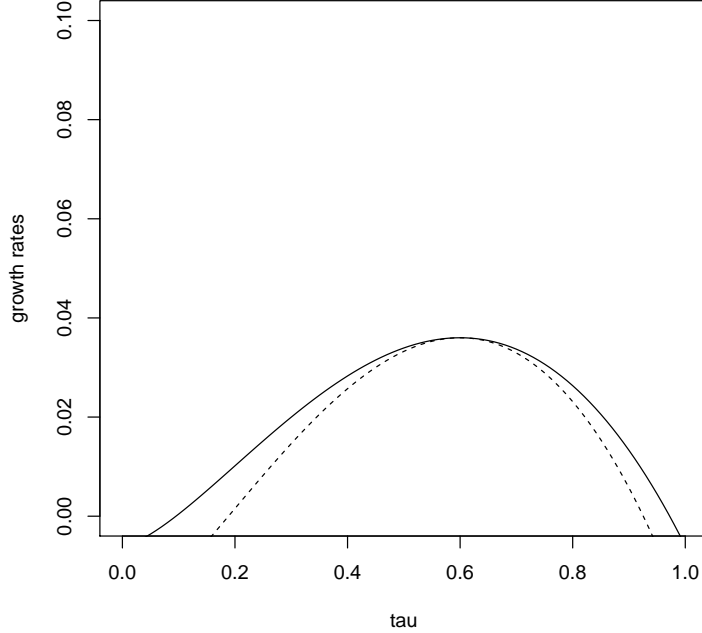
10

Figure 2: Growth rates as a function of government size. Note: dashed curve represents decentralized growth under income tax from equation (20) and solid curve represents optimal growth from equation (9). Parameter values are $\alpha = 0.6, \sigma = 0.3, \rho = 0.02, \delta = 0, A^{\frac{1}{1-\alpha}} = 0.75$. $\hat{\tau} = 0.6$ independent of parameters value and for this value, the maximum rate of the optimal growth is reached for $\gamma^e = \gamma^o = 0.036$ in the decentralized economy.

elasticity of substitution, rate of time preference, etc.

Otherwise, if parameters verify the following condition

$$(1-\alpha)\alpha^{\frac{\alpha}{1-\alpha}} > \frac{(1-\sigma)(\rho+\delta)}{(1-\alpha-\sigma)A^{\frac{1}{1-\alpha}}} \tag{24}$$

there are then two values $\hat{\tau}_1$ and $\hat{\tau}_2$ for which the decentralized growth is optimal, but not at its maximum rate. The first value of government size $\hat{\tau}_1$ is lower than α and the second $\hat{\tau}_2$ is higher than α. Figure 3 illustrates this finding with parameters verifying condition (24).

It should be noted that both government size (i.e. public capital-income ratio), $\hat{\tau}_1, \hat{\tau}_2$ give the same growth rate. Indeed, low ratio corresponds to a low public capital which is compensated by a high private capital accumulation as
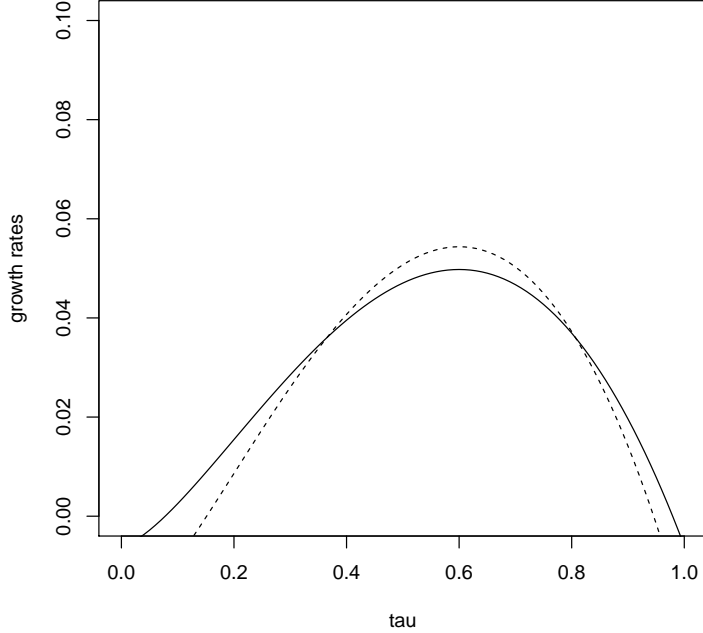
11

Figure 3: Growth rates as a function of government size. Note: dashed curve represents decentralized growth under income tax from equation (20) and solid curve represents optimal growth from equation (9). Parameter values are $\alpha = 0.6, \sigma = 0.3, \rho = 0.02, \delta = 0, A^{\frac{1}{1-\alpha}} = 1$. These values give $\hat{\tau}_1 = 0.365$ and $\hat{\tau}_2 = 0.807$, and the corresponding optimal growth rate is reached for $\gamma^e = \gamma^o = 0.036$ in the decentralized economy.

after-tax private marginal product of capital is high. On the contrary, high ratio corresponds to a high public capital but low private capital accumulation. Concerning the intertemporal utility function given by (1), it may be written under reduced form as c raises at rate γ^e and $c_t = c_o e^{\gamma^e t}$:

$$U^e = \frac{(1-s)c_o^{1-\frac{1}{\sigma}}}{(1-\frac{1}{\sigma})[\rho - (1-\frac{1}{\sigma})\gamma^e]} - \frac{1-s}{(1-\frac{1}{\sigma})\rho} + \frac{sv(1)}{\rho} \qquad (25)$$

where $\rho - (1-\frac{1}{\sigma})\gamma^e > 0$ following transversality condition. As initial consumption is a function of the initial capital, parameters and growth rate, following equation (15), we may write c_o as:

$$c_o = [(1-\tau)\tau^{\frac{\alpha}{1-\alpha}}A^{\frac{1}{1-\alpha}} - \delta - \gamma^e]k_o \qquad (26)$$

12

Replacing c_o given by (26) in (25) and substituting $(1-\tau)\tau^{\frac{\alpha}{1-\alpha}}A^{\frac{1}{1-\alpha}}$ by $\frac{\gamma^e+\rho+\delta}{1-\alpha}$ according to (14) and (20), we obtain a utility function increasing in growth rate:

$$U^e = \frac{(1-s)k_o^{1-\frac{1}{\sigma}}(\alpha\gamma^e+\rho+\delta)^{1-\frac{1}{\sigma}}}{(1-\alpha)^{1-\frac{1}{\sigma}}(1-\frac{1}{\sigma})[\rho-(1-\frac{1}{\sigma})\gamma^e]} - \frac{1-s}{(1-\frac{1}{\sigma})\rho} + \frac{sv(1)}{\rho} \qquad (27)$$

Are the two government sizes $\hat{\tau}_1$ and $\hat{\tau}_2$, even allowing an optimal growth rate, a good choice from the point of view of economic growth and welfare? Figure 2 shows that all government sizes between $\hat{\tau}_1$ and $\hat{\tau}_2$ give a higher decentralized growth rate and then a higher welfare than $\hat{\tau}_1$ and $\hat{\tau}_2$ in spite of the fact that the corresponding growth rate and household welfare are not the social planner's choice. Therefore, when parameters verify condition (24), the government size *maximizing* decentralized growth rate, $\hat{\tau} = \alpha$, is preferred in terms of growth and welfare to the government size *optimizing* decentralized growth rate $\hat{\tau}_1$ and $\hat{\tau}_2$. This government size $\hat{\tau} = \alpha$ allows then the decentralized economy to reach the second-best optimal growth.

3.2 Optimal growth under lump-sum tax

We now return to the case of lump-sum tax financing public-capital. In an economy without status-seeking, it is shown that if the government size is growth maximizing ($\hat{\tau} = \alpha$), the decentralized growth rate will be equal to the optimal rate. However, the preference for social status modifying growth rate implies that this result does not hold as shown in the following proposition.

Proposition 2 *In an economy with status-seeking behavior and an intertemporal elasticity of substitution lower than one where public capital is financed by lump-sum tax, it is impossible to reach the first-best optimal growth.*

As previously, we can calculate the limited values of the growth rate, which are given by

$$\lim_{c\to\infty}\gamma^T = f_k^e - \rho - \delta \qquad \text{for } \sigma < 1 \qquad (28)$$

$$= \sigma\left[f_k^e - \rho - \delta\right] \qquad \text{for } \sigma \geq 1 \qquad (29)$$

Comparing equation (28) with (9), we note that when $\sigma < 1$ corresponding to the case of $\varepsilon(s,\sigma) > \sigma$, the decentralized growth (higher than that of economy without status-seeking behavior) evaluated at $\hat{\tau} = \alpha$ is higher than the optimal growth evaluated at this value of τ. Therefore, unlike an economy without
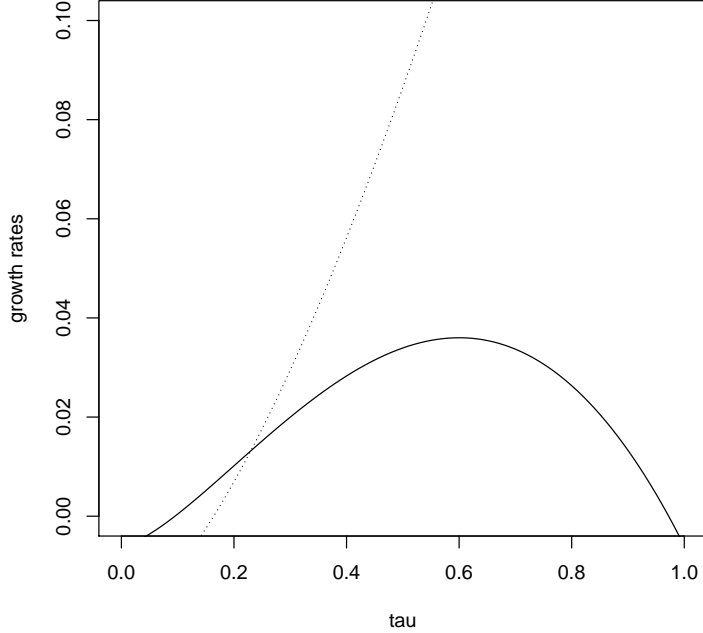
Figure 4: Growth rates as a function of government size. Note: increasing curve represents decentralized under lump-sum tax from equation (28), solid concave curve represents optimal growth from equation (9). Parameter values are $\alpha = 0.6, \sigma = 0.3, \rho = 0.02, \delta = 0, A^{\frac{1}{1-\alpha}} = 0.75$. These values give $\hat{\tau}^T = 0.229$ and the corresponding optimal decentralized growth rate is $\gamma^T = \gamma^o = 0.013$

status-seeking behavior, the lump-sum tax can not allow the maximum rate of the optimal growth to be reached.

Precisely, given equations (28) and (9), we remark that

$$\gamma^o = \gamma^T \Leftrightarrow [1 - \alpha - \sigma(1 - \tau)]\tau^{\frac{\alpha}{1-\alpha}} = \frac{(1 - \sigma)(\rho + \delta)}{A^{\frac{1}{1-\alpha}}} \qquad (30)$$

The function of the right hand side is independent of τ and the function of the left hand side is increasing with τ for all $\tau > \frac{\alpha(\sigma + \alpha - 1)}{\sigma}$. This function is equal to 0 for $\tau = 0$ and $1 - \alpha$ for $\tau = 1$. Therefore, under condition

$$1 - \alpha > \frac{(1 - \sigma)(\rho + \delta)}{A^{\frac{1}{1-\alpha}}} \qquad (31)$$

there is one value of τ, noted $\hat{\tau}^T$, for which $\gamma^o = \gamma^T$ and this value is lower than α. Figure 4 illustrates this case with the same parameter values in figure

14

2.

What is the intuition explaining the difference of τ leading to an optimal growth in the decentralized economy in both cases: with and without status-seeking? We note that in an economy without status-seeking, if public capital is financed by income tax, there are then two types of distorsions: fiscal distorsion implying a disincentive to invest and distorsion caused by public capital externality. The latter is variable, positive or negative following the value of government size τ lower or higher than α.[4] When the government size is growth-maximizing, i.e. $\hat{\tau} = \alpha$, public expenditure externality disappears, the income tax is then the only distorsion. If now we finance public capital by a lump-sum tax, fiscal distorsion as well disappears. Thus, the decentralized economy may reach the maximum rate of the optimal growth. We now return to the case with status seeking. The growth rate is determined by the production side but also by the demand side. As shown previously, when $\sigma < 1$ the decentralized growth rate is increasing with status weight and higher than the rate obtained in an economy without status-seeking. Therefore, in the case with growth-maximizing government size, the presence of status-seeking implies that the decentralized growth rate is higher than the optimal rate. This justifies that a value of τ lower than α is sufficient to allow the decentralized economy to reach optimal rate.

3.3 Income tax or lump-sum tax?

Which tax, distorting income tax or non-distorting lump-sum tax, is preferred in terms of growth? This discussion is based on propositions 1 and 2. Besides, for a benevolent government, the main objective is to maximize household welfare. It is then important to discuss the preferred tax from the point of view of welfare.

Proposition 3 *In an economy with status-seeking behavior and an intertemporal elasticity of substitution lower than one, under conditions (23) or (24) and (31), income tax financing public capital is preferred to lump-sum tax as it allows a higher optimal growth and a higher welfare to be reached in the decentralized economy.*

---

[4]If the government size $\tau = \frac{G}{y} < \alpha$, then agents should more invest. Distorsion caused by public capital externality is a under-investment. On the contrary, if $\tau = \frac{G}{y} > \alpha$, then agents should less invest. Distorsion caused by public capital externality is an over-investment. That is why under lump-sum tax when fiscal distorsion disappears, growth rate is higher than under income tax, and it is all the more higher that τ is higher than α (see figure 4).

Figure 5 compares growth rates under income, lump-sum taxes and optimal growth rate. Under condition (23), the maximum rate of optimal growth is reached in the decentralized economy under income tax with $\hat{\tau} = \alpha$ while under lump-sum tax and condition (31) a lower level of optimal growth rate is reached for a government size lower than α. In our numerical example, the optimal growth rate reached in the decentralized economy under income tax is equal to 0.036 and the one under lump-sum tax is 0.013.[5] The same result is found under conditions (24) and (31). As the decentralized growth rate curve under lump-sum tax is always above the decentralized growth rate curve under income tax, then the intersection point between the first one and the optimal rate is always lower than the intersection point between the second one and the optimal rate.

We can also evaluate the intertemporal utility function, given by (1) at the optimal growth rate under lump-sum tax in the decentralized economy:

$$U^T = \frac{(1-s)k_o^{1-\frac{1}{\sigma}} \left[(\alpha\gamma^T + \rho + \delta) - \hat{\tau}^T(\gamma^T + \rho + \delta) \right]^{1-\frac{1}{\sigma}}}{(1-\alpha)^{1-\frac{1}{\sigma}}(1-\frac{1}{\sigma})[\rho - (1-\frac{1}{\sigma})\gamma^T]} - \frac{1-s}{(1-\frac{1}{\sigma})\rho} + \frac{sv(1)}{\rho} \tag{32}$$

where $\hat{\tau}^T > 0$ is the government size for which the optimal growth is reached in the decentralized economy.

Comparing (27) to (32), we remark the presence of the term $-\hat{\tau}^T(\gamma^T + \rho + \delta)$ in U^T. This means that for the same growth rate, $U^e > U^T$. But, in our model, the optimal growth rate in the decentralized economy under income tax is higher than the optimal rate under lump-sum tax. Then, it turns out that U^e is always higher than U^T. For the numerical example illustrated in figure 5, the welfare evaluated at the optimal growth rate under income tax ($\hat{\tau} = 0.6, \gamma^e = 0.036$) is equal to 153, higher than the one evaluated at the optimal growth under lump-sum tax ($(\hat{\tau}^T = 0.229, \gamma^T = 0.013)$) given by 97.[6]

4   Corrective tax programs

As shown in the previous section, without a corrective taxation policy, the decentralized economy may obtain an optimal growth in the case of intertemporal

---

[5]In an analysis without status-seeking but with two types of public expenditure : public investment and public services having no incidence on the production function or the individual utility, Marrero and Novales (2005) show the presence of a significant level of wasteful public expenditure as a sufficient condition for income tax to lead to higher growth and welfare than lump-sum tax.

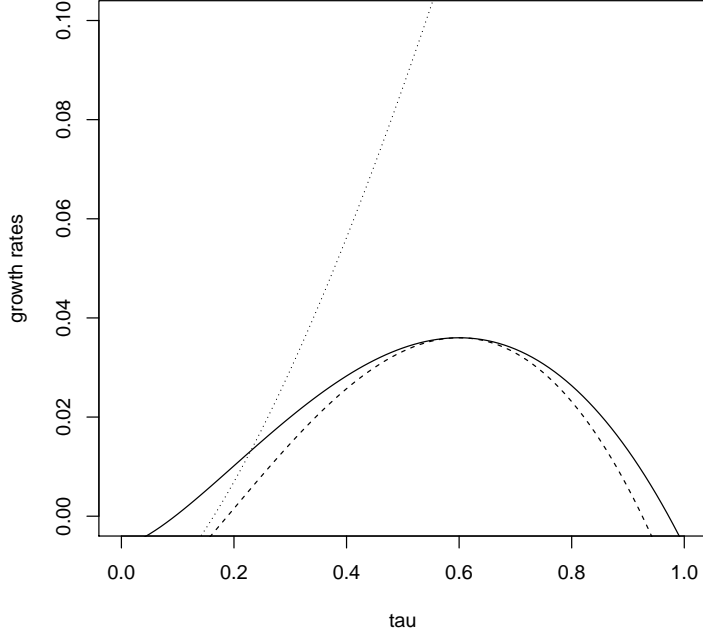[6]For other parameters, we assume that $s = 0.3, v(1) = 10, k_o = 0.001$.

Figure 5: Growth rates as a function of government size. Note: increasing curve represents decentralized under lump-sum tax, dashed concave curve represents decentralized growth under income tax and solid concave curve represents optimal growth. $\alpha = 0.6, \sigma = 0.3, \rho = 0.02, \delta = 0, A^{\frac{1}{1-\alpha}} = 0.75$. These values give $\hat{\tau}^T = 0.229$ corresponding to an optimal growth rate $\gamma^T = \gamma^o = 0.013$ under lump-sum tax and $\hat{\tau} = 0.6$ corresponding to an optimal growth rate $\gamma^e = \gamma^o = 0.036$ under income tax in the decentralized economy.

elasticity of substitution lower than one and under some parameters conditions, but this optimal rate is not necessarily the first-best when the government size is different from its optimal value α. In this section, we are interested in corrective taxation that can enable an economy to reach the first-best optimal growth rate whatever the values of parameters. We consider then consumption and capital taxes modifying individual behavior on capital accumulation and consumption. Let us denote τ_c as consumption tax rate, τ_k as capital tax, and π as transfer to guarantee balanced government budget. The individual budget constraint under income tax financing public capital becomes:

$$\dot{k} = (1 - \tau)f(k, G) - (1 + \tau_c)c - (\delta + \tau_k)k + \pi. \qquad (33)$$

17

With the growth-maximizing government size, $\hat{\tau} = \alpha$, the decentralized growth rate is given by:

$$\gamma^{et} = \varepsilon(s,\sigma)\left[(1-\alpha)^2\alpha^{\frac{\alpha}{1-\alpha}}A^{\frac{1}{1-\alpha}} - \rho - \delta - \tau_k - \frac{\dot{\tau}_c}{1+\tau_c}\right] \tag{34}$$

where $\varepsilon(s,\sigma)$ is given by equation (13), and the first-best optimal growth rate is:

$$\gamma^{ot} = \sigma\left[(1-\alpha)\alpha^{\frac{\alpha}{1-\alpha}}A^{\frac{1}{1-\alpha}} - \rho - \delta\right] \tag{35}$$

The dynamics of c and k are governed by:

$$\left(\frac{c}{k}\right)^{ot} = (1-\alpha)A^{\frac{1}{1-\alpha}}\alpha^{\frac{\alpha}{1-\alpha}} - \delta - \gamma^{ot} \tag{36}$$

$$\left(\frac{c}{k}\right)^{et} = (1-\alpha)A^{\frac{1}{1-\alpha}}\alpha^{\frac{\alpha}{1-\alpha}} - \delta - \gamma^{et} \tag{37}$$

The government budget is balanced and public capital-income ratio is constant:

$$\tau_c c + \tau_k k + \tau y \quad = \quad G + \pi \tag{38}$$

$$\tau \quad = \quad \alpha. \tag{39}$$

Proposition 4 *The importance of the optimal capital tax or subsidy and the importance of the optimal consumption tax variation decrease (increase) with status weight when the intertemporal elasticity of substitution is at least equal to one (lower than one, respectively).*

By comparing (34) to (35), we have the path of the optimal consumption-capital tax rate

$$\tau_k + \frac{\dot{\tau}_c}{1+\tau_c} = \left(1 - \alpha - \frac{\sigma}{\varepsilon(s,\sigma)}\right)(1-\alpha)\alpha^{\frac{\alpha}{1-\alpha}}A^{\frac{1}{1-\alpha}} + \left(\frac{\sigma}{\varepsilon(s,\sigma)} - 1\right)(\rho+\delta)(40)$$

The derivative of (40) with respect to weight status is

$$\frac{\partial\left(\tau_k + \frac{\dot{\tau}_c}{1+\tau_c}\right)}{\partial s} \quad = \quad \frac{\partial\varepsilon}{\partial s}\frac{\sigma}{\varepsilon^2}\left((1-\alpha)\alpha^{\frac{\alpha}{1-\alpha}}A^{\frac{1}{1-\alpha}} - \rho - \delta\right) \tag{41}$$

where

$$\frac{\partial\varepsilon(s,\sigma)}{\partial s} = \frac{c u_c v'(1)(1-\sigma)}{[(1-s)c u_c + \sigma s v'(1)]^2}\sigma \quad > \quad 0 \text{ if } \sigma < 1 \tag{42}$$

$$< \quad 0 \text{ if } \sigma > 1.$$

18

As parameters values are assumed to guarantee a positive growth rate, the term in brackets of equation (41) is positive. As shown previously, for $\sigma > 1$, thus $\epsilon(s, \sigma) < \sigma$, the optimal growth rate is always higher than the decentralized growth rate. The latter is increasing with status weight, and approaches the optimal rate when the desire for status is enough strong. That explains why the importance of the tax rate decreases when the preference for social status is enough strong. The same argument applies for $\sigma < 1$.

Thus, the fact that capital is subsided or taxed and consumption tax increases or decreases overtime depends on the value of the intertemporal elasticity of substitution, σ. From equation (40), we distinguish different scenarios: a) corrective consumption tax is constant (including 0) and capital tax is constant and strictly positive; b) corrective consumption tax is time-varying and capital tax is constant and strictly positive; c) corrective consumption tax is time-varying and there is no corrective capital tax. These scenarios are presented in the following proposition.

Proposition 5 *There exist different optimal tax programs:*

i. *When the intertemporal elasticity of substitution is at least equal to one, the path of the optimal consumption-capital tax rate converges to*

$$\tau_k = -\frac{\dot{\tau_c}}{1 + \tau_c} - (1 - \alpha)(\alpha A)^{\frac{1}{1-\alpha}} \tag{43}$$

then a) capital is subsided if consumption tax rate increases overtime, $\frac{\dot{\tau_c}}{1+\tau_c} > 0$ or weakly decreases with $\frac{\dot{\tau_c}}{1+\tau_c} > -(1-\alpha)(\alpha A)^{\frac{1}{1-\alpha}}$; or b) capital is taxed and consumption tax rate strongly decreases overtime $\frac{\dot{\tau_c}}{1+\tau_c} < -(1-\alpha)(\alpha A)^{\frac{\alpha}{1-\alpha}}$.

ii. *When the intertemporal elasticity of substitution is lower than one, the path of the optimal consumption-capital tax rate converges to:*

$$\tau_k = -\frac{\dot{\tau_c}}{1 + \tau_c} + (1 - \alpha - \sigma)\alpha^{\frac{\alpha}{1-\alpha}} A^{\frac{1}{1-\alpha}} + (\sigma - 1)(\rho + \delta) \tag{44}$$

then a) capital is subsided if $\frac{\dot{\tau_c}}{1+\tau_c} > (1-\alpha-\sigma)\alpha^{\frac{\alpha}{1-\alpha}} A^{\frac{1}{1-\alpha}} + (\sigma-1)(\rho+\delta)$; or b) capital is taxed if $\frac{\dot{\tau_c}}{1+\tau_c} < (1-\alpha-\sigma)\alpha^{\frac{\alpha}{1-\alpha}} A^{\frac{1}{1-\alpha}} + (\sigma-1)(\rho+\delta)$.

This result shows that the optimal tax program is not unique, and any combination of consumption and capital tax is possible, and this depends on the parameter values of each economy. Any combination of a tax (or subsidy)

on capital and on consumption consistent with condition (43) when $\sigma \geq 1$ and (44) when $\sigma < 1$ will correct for the status-seeking externality. However, it should be noticed that in a dynamic context, a constant consumption tax rate does not affect the growth rate because it does not affect the price of future consumption in terms of present consumption, therefore it cannot correct consumption externality. Indeed, as each consumer imposes a negative externality on other consumers, the spirit of Pigou tax proposes a consumption tax to penalize the author of this excessive consumption. However, a constant tax rate is not a good measure to obtain the optimal growth rate since it does not change the consumption profile overtime. In other words, a constant consumption tax means that the relative price of future consumption is unmodified. Consequently, the optimal growth rate is reached in a decentralized economy only if consumption tax rate is time-varying (see also Rauscher (1997), Fisher and Hof (2000), Goméz (2006), for other models of economic growth). An increasing (or decreasing) tax rate overtime means an increase (decrease) of the price of future consumption in terms of present consumption and discourages individuals to transfer present consumption to the future.[7]

A constant consumption tax rate will be not intertemporally neutral if the model includes a leisure-labor decision for consumption distorsion results in labor distorsion. Indeed, with endogenous labor supply, status-seeking will result in an excessive consumption to the detriment of leisure. It therefore generates too much labor supply. As a consequence, it is possible to tax consumption or labor income at a constant rate to reach optimal growth in the decentralized economy.[8]

Before ending this discussion, we remark that there is a degree of indeterminacy in the behavior of the optimal consumption tax as its initial value may be arbitrarily chosen. When labor supply is exogenous, a consumption tax acts like a lump-sum tax, and its initial value may be chosen to satisfy the government budget constraint (38). This arbitrariness disappears when labor supply is endogenous. In this situation, as remarked above, an optimal tax program would propose a constant consumption tax and/or a constant labor income tax.

---

[7]However, when social status is determined by relative wealth, the neutrality of constant consumption taxation in the growth rate does not hold. Chang (2006) shows that a constant consumption tax has a negative impact on the economy's overall consumption-capital ratio and hence positively affects the growth rate.

[8]See, for example, Liu and Turnovsky (2005) and Turnovsky and Monteiro (2007) for optimal taxation when labor is elastic in a Ramsey model and Romer model respectively.

5   A congestion model

This section extends the model to a congestion public good. The public good, such as highway, water system, police and fire services, is rival but not excludable. Like Barro and Sala-i-Martin (2004), we can write the production function of each producer as

$$y = Akh\left(\frac{G}{Y}\right) \tag{45}$$

where $h' > 0$ and $h'' < 0$, $h(0) = 0$, Y is aggregate income. An increase in Y, with G given, reduces the quantity of public good available to each producer and then reduces y. We assume that public good-aggregate income ratio, $\tau = \frac{G}{Y}$, is constant. For given G and Y, the individual production exhibits constant returns with respect to private capital k. As in previous sections, we normalize population size to unity, therefore aggregate income $Y = y$.

It is straightforward to write the decentralized growth rate under income tax as:

$$\gamma^{ec} = \varepsilon(s, \sigma)\left[(1-\tau)Ah(\tau) - \rho - \delta\right] \tag{46}$$

and the growth rate under lump-sum tax as

$$\gamma^{Tc} = \varepsilon(s, \sigma)\left[Ah(\tau) - \rho - \delta\right]. \tag{47}$$

where $\varepsilon(s, \sigma)$ is given by (13).

Let us turn to the social planner's problem to access the first-best optimal growth. The social planner maximizes the utility (1), given constant $\frac{G}{y} = \tau$, subject to the resource constraint

$$\dot{k} = Akh\left(\frac{G}{y}\right) - c - \delta k - G. \tag{48}$$

We may write the optimal growth rate as

$$\gamma^{oc} = \sigma\left[(1-\tau)Ah(\tau) - \rho - \delta\right]. \tag{49}$$

The government size that maximizes the decentralized growth rate under income tax and the optimal growth rate is such that

$$\frac{h'(\tilde{\tau})}{h(\tilde{\tau})} = \frac{1}{1-\tilde{\tau}} \tag{50}$$

and $\tilde{\tau} = \frac{1}{3}$ if $h(\tau) = \tau^{1/2}$.

Proposition 6 *In an economy with status-seeking behavior where congestion public good is financed by lump-sum tax or income tax,*

  i) the first-best optimal growth rate is reached by a decentralized economy under income tax with $\tilde{\tau}$ being optimally set so that $\frac{h'(\tilde{\tau})}{h(\tilde{\tau})} = \frac{1}{1-\tilde{\tau}}$ when the intertemporal elasticity of substitution is at least equal to one whereas the second-best optimal growth rate is reached when the intertemporal elasticity of substitution is lower than one.

  ii) income tax is always preferred to lump-sum tax in terms of optimal growth and social welfare;

Considering the growth rates given by equations (46), (47) and (49), we observe that if the effective elasticity of substitution $\epsilon(s,\sigma)$ converges to σ, i.e. if $\sigma \geq 1$, the decentralized growth rate under income tax will correspond to the social planner's growth rate. Concerning the lump-sum tax, it is inappropriate when the public good is subject to congestion. Indeed, individuals neglect external effects and therefore have a great incentive to expand k and y. On the contrary, the income tax reduces the after-tax marginal product of capital to $(1 - \tau)Ah(\tau)$, which is also the expression of social marginal product of capital. This explains why income tax is preferred to lump-sum tax.

For any positive growth rate, we can find the following relationship as in the model without status-seeking behavior:

$$\gamma^{Tc} > \gamma^{ec} = \gamma^{oc}. \tag{51}$$

More precisely, if the government size is optimally set, $\tilde{\tau}$ is so that $\frac{h'(\tilde{\tau})}{h(\tilde{\tau})} = \frac{1}{1-\tilde{\tau}}$, then the first-best optimal growth rate is reached in the decentralized economy under income-tax.

Consider now the case of $\sigma < 1$, $\epsilon(s,\sigma)$ converges then to 1 when c converges to infinity. The decentralized growth rates under income-tax and lump-sum tax respectively converge to:

$$\gamma^{ec} = (1 - \tau)Ah(\tau) - \rho - \delta \tag{52}$$
$$\gamma^{Tc} = Ah(\tau) - \rho - \delta. \tag{53}$$

For any positive growth rate, we can find the following relationship

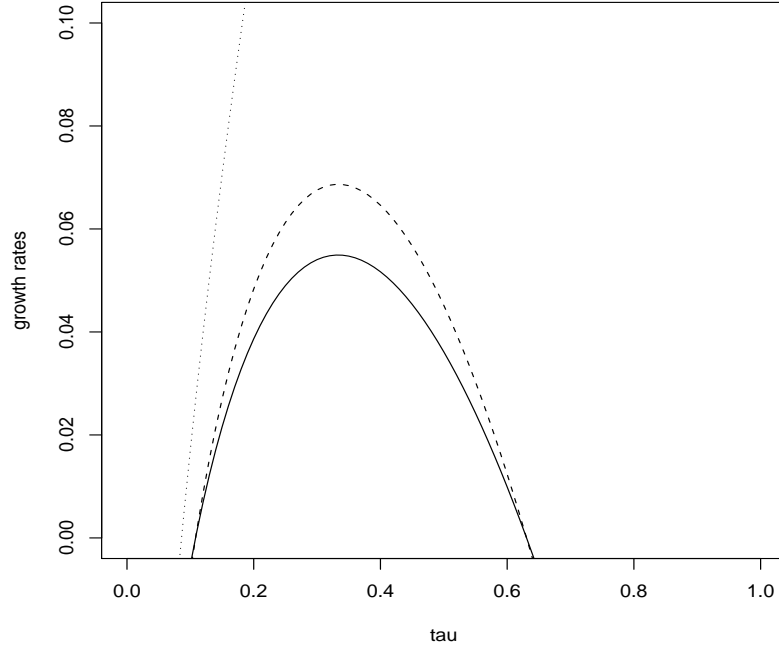$$\gamma^{Tc} > \gamma^{ec} > \gamma^{oc}. \tag{54}$$

Figure 6: Growth rates as a function of government size. The increasing curve represents the decentralized growth rate under lump-sum tax, the dashed concave curve represents the decentralized growth rate under income tax and the solid concave curve represents the optimal growth rate. Parameter values are $\sigma = 0.3, \rho = 0.02, \delta = 0.20, A = 0.75$. The corresponding maximum optimal growth rate, and the maximum decentralized growth under income-tax are $\gamma^{oc} = 0.048$, $\gamma^{ec} = 0.069$ respectively. The corresponding decentralized growth rate under lump-sum tax is $\gamma^{Tc} = 0.21$.

Both decentralized growth rates are higher than the optimal rate. Indeed, the effective intertemporal elasticity of substitution taken into account by individuals is higher than the intertemporal elasticity of substitution taken into account by the social planner, then individuals are more inclined to consider consumption shift overtime, leading to a higher growth rate. In addition, with a non-distorting lump-sum tax, individuals have a tendency to excessively invest and then the growth rate diverges from the optimal rate. In this situation, income tax is more appropriate to keep decentralized growth near to the optimal rate. Therefore, the second-best optimal growth is reached by the decentralized economy when the government size is growth-maximizing,

23

i.e. efficiency condition (50) is satisfied. Figure 6 illustrates this situation with $h(\tau) = \tau^{1/2}$.

6   Conclusions

This paper revisits the Barro's growth model by taking into account the implications of relative standing such as relative consumption on economic growth. Public capital as input of production process is financed by income or lump-sum tax. We discuss different measures to obtain optimal growth and optimal welfare in a decentralized economy. Under some conditions on parameters, the existence of some government sizes for which the decentralized growth rate is equal to the optimal rate is shown, notably the maximum value of the optimal growth rate, and this result does not require any corrective taxation policy. The result shows that for the same growth-maximizing government size, some economy can reach the first-best optimal growth rate in a decentralized situation while others cannot, this depends on parameters on technology, intertemporal elasticity of substitution, rate of time preference, etc.

We also compare two public financing rules : income and lump-sum taxes, from the point of view of optimal growth in a decentralized economy and of social welfare and find the superiority of income tax. Besides, we propose corrective tax programs with capital tax or subsidy and time-varying consumption tax that help to attain the first-best optimal growth rate in a decentralized economy. The result shows that the optimal tax program is not unique, and all combinations of consumption and capital tax are possible, and this depends on parameter values of the economy. The fact that capital is subsided or taxed and consumption tax increases or decreases overtime crucially depends on the value of the intertemporal elasticity of substitution. Moreover, status weight may evidently explain the importance of capital tax (or subsidy) rate and the importance of consumption tax variation over time. An extension to a congestion model modifies somewhat the results. We show that income tax is always preferred to lump-sum tax. In addition, the first-best or second-best optimal growth rate can be reached in the decentralized economy depending on the value of the effective intertemporal elasticity of substitution.

References

[1] Barro, R.J (1990), "Government Spending in a Simple Model of Endogenous Growth", *Journal of Political Economy*, 98, pp. S103-S125.

[2] Barro, R. J. and Sala-i-Martin X. (2004), *Economic Growth*, second edition, MIT Press.

[3] Chang W. (2006), "Relative Wealth, Consumption Taxation, and Economic Growth", *Journal of Economics*, 2, pp. 103-129.

[4] Clark A.E. and A. J. Oswald (1996), "Satisfaction and Comparison Income", *Journal of Public Economics*, 61, pp. 359-381.

[5] Clark, A., P. Frijters and M. Shields (2008), "Relative Income, Happiness and Utility: An Explanations for Easterlin Paradox and Other Puzzles", *Journal of Economic Literature*, 46, pp. 95-144.

[6] Corneo, G. and O. Jeanne (1997), "Relative Wealth Effects and the Optimality of Growth", *Economics Letters*, 54, pp. 87-92.

[7] Corneo, G. and O. Jeanne (2001), "On the Relative-Wealth Effects and Long-Run Growth", *Research in Economics*, 55, pp. 349-358.

[8] Duesenberry, J.S. (1949), *Income, Saving and the Theory of Consumer Behaviour*, Havard University Press, Cambridge (MA).

[9] Ferrer-i-Carbonell, A. (2005), "Income and Well-Being : an Empirical Analysis of the Comparison Income Effect", *Journal of Public Economics*, 89, pp. 997-1019.

[10] Fisher, W. H. and F. X. Hof (2000), "Relative Consumption, Economic Growth and Taxation", *Journal of Economics (Zeitschrift für Nationalökonomie)*, 73, pp. 241–262.

[11] Frijters, P., M. Shields and J. Haisken-Deneuw (2004), "Money Does Matter! Evidence from Increasing Real Incomes in East Germany following Reunification", *American Economic Review*, 94, pp. 730-741.

[12] Glomm G. and Ravikumar B. (1994), "Growth-Inequality Trade-offs in a Model with Public Sector R-D", *Canadian Journal of Economics*, 27, pp. 485-493.

[13] Gómez, M. (2006), "Optimal Consumption Taxation in a Model of Endogenous Growth with External Habit Formation", *Economics Letters*, 93, pp. 427-435.

[14] Johansson-Stenman, O., F. Carlsson, and D. Daruvala (2002), "Measuring Hypothetical Grandparents, Preferences for Equality and Relative Standing", *Economic Journal*, 112, pp. 362-83.

[15] Liu, W.-F . and Turnovsky, S.J (2005), "Consumption Externalities, Production Externalities and Long-Run Macroeconomic Efficiency", *Journal of Public Economics*, 89, pp. 1097-1129.

[16] Long, N.V and K. Shimomura (2004), "Relative Wealth, Status Seeking and Catching-Up", *Journal of Economic Behavior and Organization*, 53, pp. 529-542.

[17] Marrero, G.A. and A. Novales (2005), "Growth and Welfare: Distorting versus Non-Distorting Taxes", *Journal of Macroeconomics*, 27, pp.403-433.

[18] McBride, M. (2001), "Relative-Income Effects on Subjective Well-Being in the Cross-Section", *Journal of Economic Behavior and Organization*, 45, pp. 251-278.

[19] Ng, Y.K (2003), "From Preferences to Happiness: Towards a more Complete Welfare Economics", *Social Choice and Welfare*, 20, pp. 307-350.

[20] Pham, T. K. C. (2005), "Economic Growth ans Status-Seeking through Personal Wealth", *European Journal of Political Economy*, 21, pp. 407-427.

[21] Rauscher, M. (1997), "Conspicuous Consumption, Economic Growth and Taxation", *Journal of Economics (Zeitschrift für Nationalökonomie)*, 66, pp. 35-42.

[22] Solnick, S.J. and D. Hemenway (1998), " Is more always better? A Survey on Positional Concerns", *Journal of Economic Behavior and Organization*, 37, pp. 373-383.

[23] Turnovsky, S.J. and Monteiro, G. (2007), "Consumption Externalities, Production Externalities and Efficient Capital Accumulation under Time non-Separable Preferences", *European Economic Review*, 51, pp. 479-504.

[24] Wendner, R. (2003), "Status, Environmental Externality, and Optimal Tax Programs", *Economics Bulletin*, 5, pp. 1-10.

Documents de travail du BETA

——

2012–**01**   *Unanticipated vs. Anticipated Tax Reforms in a Two-Sector Open Economy*
Olivier CARDI, Romain RESTOUT, janvier 2012.

2012–**02**   *University Technology Transfer: How (in-)efficient are French universities?*
Claudia CURI, Cinzia DARAIO, Patrick LLERENA, janvier 2012.

2012–**03**   *L'autorité de la concurrence doit-elle, dans le cadre de sa fonction consultative disposer de toutes les libertés ?*
Marc DESCHAMPS, juin 2012.

2012–**04**   *Currency devaluation with dual labor market : Which perspectives for the Euro Zone?*
Amélie BARBIER-GAUCHARD, Francesco DE PALMA, Giuseppe DIANA, juin 2012.

2012–**05**   *The Routinization of Creativity: Lessons from the Case of a video-game Creative Powerhouse.*
Patrick COHENDET, Patrick LLERENA, Laurent SIMON, juin 2012.

2012–**06**   *Status-seeking and economic growth: the Barro model revisited.*
Thi Kim Cuong PHAM, juin 2012.

———————————————————————

La présente liste ne comprend que les Documents de Travail publiés à partir du 1er janvier 2012. La liste complète peut être donnée sur demande.
This list contains the Working Papers written after January 2012, 1rst. The complet list is available upon request.