Ecological Economics 88 (2013) 32–40

Contents lists available at SciVerse ScienceDirect

Ecological Economics

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

Analysis

# Endogenous fiscal policies, environmental quality, and status-seeking behavior ☆

Phu Nguyen-Van [a,b,c,*], Thi Kim Cuong Pham [a,b]

[a] BETA-CNRS, Université de Strasbourg, France
[b] FERDI, France
[c] VCREME, Vietnam

ARTICLE INFO

*Article history:*
Received 7 October 2011
Received in revised form 12 October 2012
Accepted 23 October 2012
Available online 15 February 2013

*JEL classification:*
D9
H31
O41
Q58

*Keywords:*
Endogenous policy
Endogenous growth
Environmental quality
Status-seeking
Public expenditure
Wagner's law

ABSTRACT

This paper analyzes endogenous fiscal policy in an endogenous growth model where agents care about social status and environmental quality. The quest for a higher status is assimilated to a preference for capital wealth. The government uses income tax to finance infrastructure and environmental protection. We find that accounting for preferences for social status and environmental quality may lead to an allocation of tax revenue in favor of a cleanup effort to the detriment of infrastructure. Economic growth is not necessarily and negatively affected by this allocation as it is partly explained by an excessive accumulation of capital wealth due to the quest of status. Status seeking can however harm economic growth and environmental quality when its motive is important enough. Finally, we show that economic growth may be consistent with environmental preservation but is not necessarily welfare-improving as in the case of absence of status-seeking behavior.



## 1. Introduction

The relationship between growth and environment has been extensively explored in the literature. The emergence of endogenous growth theories in the last two decades has provided a novel framework to address the sustainability issue and especially the role of public policy in improving environmental quality. In this respect, the works of Jones and Manuelli (2001), and Economides and Philippopoulos (2008) are particularly appealing. These authors pleaded for environmental protection policy, which was also recommended by Arrow et al. (1995), and underlined that policy choice is a source of cross-country heterogeneity in terms of economic performance and environmental quality. Economides and Philippopoulos (2008) studied a second-best optimal policy in an endogenous growth model with a renewable ressource. The latter is depleted by economic activity but can be maintained by a cleanup policy. The government chooses the tax rate and the allocation of tax revenue between infrastructure spending and cleanup effort by maximizing individual welfare. Their results show that the more representative individual cares about the environment, the more growth-enhancing policies should be chosen. In other words, only growing economies can afford to improve environmental quality.

However, these works used the traditional approach on economic growth, which emphasizes the supply-side of the economy and assumes that individual preferences are exogenous and independent of social interactions. Accounting for the relative position of individuals in society would lead to consider alternative economic models, including particularly those with endogenous preferences and relative utility. Several recent research studies showed that individuals care about their relative positions in society and recommend a broader use of these models in environmental studies (see, e.g., Brekke and Howarth, 2002; van den Bergh et al., 2000; Welsch, 2009, and Wendner, 2003). Empirical evidence supporting relative utility can be found in numerous works on subjective well-being (Clark and Oswald, 1996; Ferrer-i-Carbonell, 2005; Kapteyn et al., 1997, among others). Most of them found that an individual's utility depends not only on her income but also on a reference income.[1]

The conjecture of relative utility dates back to *The Theory of Moral Sentiments* by Smith (1759) and *The Theory of the Leisure Class* by Veblen (1899), and was emphasized by Duesenberry (1949). The latter

☆ Helpful comments from an editor and anonymous referees of this journal are gratefully acknowledged. We are also thankful to Rodolphe Dos Santos Ferreira, Frédéric Dufourt, Michael Rauscher, and participants of several seminars for their useful comments and discussions. All errors are ours.

* Corresponding author at: BETA-CNRS, Université de Strasbourg, 61 avenue de la Forêt Noire, F-67085 Strasbourg Cedex, France. Tel.: +33 3 68 85 20 39; fax: +33 3 68 85 20 70.
*E-mail address:* nguyen-van@unistra.fr (P. Nguyen-Van).

[1] See, e.g., Clark et al. (2008) and Pham (2008) for status-seeking implications in economic analysis.

0921-8009/$ – see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.ecolecon.2012.10.021

author highlighted a *comparison effect* in the consumption between individuals (see also Alonso-Carrera et al., 2008; Rauscher, 1997; Tournemaine and Tsoukis, 2010). Capital wealth-enhanced social status was incorporated in numerous growth models (Chang, 2006; Corneo and Jeanne, 2001a,b; Long and Shimomura, 2004; Pham, 2005; Stark, 2006; Tournemaine and Tsoukis, 2008, etc.). This literature emphasizes the role of the demand side in the growth process, implying that status-seeking behavior leads to a higher growth rate.

Endogenizing individual preferences can help in avoiding the consequences of making wrong decisions in valuing environmental externalities and designing public policy (Gowdy, 2004). Indeed, status-seeking behavior may have an impact on the level and the structure of optimal tax. For example, the quest for a higher social status raises capital wealth accumulation (recognized as a measure of social status) to the detriment of current consumption and total public expenditure chosen by agents. However, if individuals care about environmental quality, the cleanup effort will be higher because production degrades the environment. Moreover, consumption and wealth-enhanced status may induce an excessive consumption and an excessive accumulation of capital wealth, and then an environmental degradation (Ng and Wang, 1993). This will result in a more aggressive environmental policy than in the case without status effects (Brekke and Howarth, 2002; Howarth, 1996, etc.). In line with this research, by studying the Pigovian tax program in an OLG model with consumption that harms the environment, Wendner (2003) concluded that a higher desire for consumption-based status raises the optimal tax rate on consumption and reduces that on capital income. In Brekke and Howarth (2002, chapter 9), the assumption that social status is measured by relative capital wealth gives rise to a long-run growth path with an excessive capital accumulation and may lead firms to employ polluting technologies which will, in turn, cause an excessive pollution in the short-run. Moreover, it was shown that the optimal tax on consumption is set to zero, and capital is taxed at a rate equal to the individual marginal willingness to pay in order to annihilate the status externality related to capital accumulation.

Our paper aims to study how individual behavior impacts public decision on environmental protection and infrastructure spending in an endogenous growth model. As in Economides and Philippopoulos (2008), we consider that income tax (financing public program) and the allocation of tax revenue between cleanup activity and infrastructure are welfare-maximizing. Our study differs from this work as we provide an analysis of impacts of endogenous individual preferences on the choice of income tax rate and on the allocation of tax revenue between infrastructure spending and cleanup effort. In particular, we assume that agents care about consumption, environmental quality, and social status. The latter is defined in terms of relative capital wealth. Furthermore, our paper differs from Brekke and Howarth (2002) and Brekke et al. (2003) by an endogenous growth structure.

Our paper adds some new results to the existing literature (Brekke and Howarth, 2002; Brekke et al., 2003; Economides and Philippopoulos, 2008, etc.). Firstly, we find that environmental quality may be considered as a 'luxury good' and that the status-seeking behavior may constitute a justification for environmental expenditure, which could be a valid explanation of Wagner's law (following which the ratio of government expenditure to GDP is positively related to GDP per capita). Secondly, we show that accounting for preferences for social status and environmental quality may bring out an allocation of tax revenue in favor of the cleanup effort to the detriment of infrastructure. This choice is not necessarily harmful for economic growth as the latter is only partly explained by a high capital wealth accumulation due to the quest for status. Nevertheless, status concern may be harmful for economic growth and environmental quality when its motive is important enough. Finally, we show that economic growth is consistent with environmental preservation but it is not necessarily welfare-improving as in the case of absence of status-seeking behavior.

The paper is organized as follows. Section 2 presents the model. Section 3 discusses the intertemporal political–economic equilibrium where the fiscal policy is chosen from a two-step decision process: firstly given public policy, the representative individual determines her consumption and her private capital, the representative firm chooses its production, and secondly the altruist government determines the allocation of tax revenue that maximizes the individual's utility subject to private decisions. Section 4 presents the impacts of status and environmental concerns on fiscal policy, growth, and the relationship between growth and welfare. Section 5 concludes.

## 2. The Model

We assume that the economy has a continuum of infinitely-lived identical individuals uniformly distributed in [0,1]. Competitive firms produce a consumption good from three inputs: private capital, public capital, and labor. This production degrades environmental quality, which has an externality effect on the individual's utility. As in Kempf and Rossignol (2007) and Economides and Philippopoulos (2008), we assume that the government uses income tax to finance public capital and environmental protection.

### 2.1. Individuals' Preferences

Each individual has an initial endowment of capital, $k_0>0$, and is supposed to supply one unit of labor at each period. Her preferences for consumption, environmental quality, and social status are represented by the following intertemporal utility function:

$$U(c_t,k_t,K_t,E_t)=\sum_{t=0}^{\infty}\beta^t\left[(1-s_K-s_E)\ln c_t+s_E\ln E_t+s_K\ln\frac{k_t}{K_t^{\theta}}\right] \quad (1)$$

where $0<\beta<1$, $0<\theta<1$. The first term of the instantaneous utility function expresses the satisfaction from consumption $c_t$, the second from environmental quality $E_t$, and the last from status seeking $k_t/K_t^{\theta}$. Parameter $\theta$ can be interpreted as the degree of the individual's social interaction (Jellal and Rajhi, 2003).

As underlined previously, status-seeking behavior, which is a way of modeling endogenous preferences, enables us to avoid consequences of making wrong public decisions. In our model, status is expressed in terms of relative wealth ($k_t/K_t^{\theta}$) and the associated coefficient ($s_K$) represents the relative importance attributed by the individual to her status in society. When $s_K=0$, the utility function has a classical form (i.e. utility is absolute) which implies that individual preferences only depend on consumption and environmental quality as described in Economides and Philippopoulos (2008). Utility is known as relative when $s_K>0$ and $\theta>0$. We assume that $s_K+s_E\in[0,1)$ to avoid extreme configurations where consumption is not important at all and only social status and environmental quality ensure the individual's survival ($s_K+s_E=1$).[2]

### 2.2. Environmental Quality

As in Acemoglu et al. (2012), environmental quality evolves according to

$$E_{t+1}=E_t+aG_{Et}-by_t,\quad a,b>0 \quad (2)$$

where $by_t$ is environmental degradation relative to production at $t$, $aG_{Et}$ corresponds to environmental improvement from public pollution abatement. The effectiveness of environmental policy is expressed by the exogenous parameter $a>0$. $E_t$ is a public good indicating an index of environmental quality, e.g. soil quality, air quality, groundwater, or some biodiversity index. The initial level of environmental quality is $E_0\geq 0$. Like John et al. (1995) and Acemoglu et al. (2012), environmental

[2] The result remains unchanged when using the utility function of the form $s_C\ln c_t+s_E\ln E_t+s_K\ln(k_t/K_t^{\theta})$ with $s_C+s_K+s_E\neq 1$.