



Tax avoidance, human capital accumulation and economic growth[☆]

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ABSTRACT

Human capital accumulation may negatively affect economic growth by increasing tax avoidance and reducing effective tax rates and productive public investment. This paper analyzes how the endogenous feedback between human capital accumulation and tax avoidance affects economic growth and macroeconomic dynamics. Our findings show that this interaction produces remarkable growth and welfare effects.

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1. Introduction

Tax evasion and tax avoidance phenomena are present in all economies.¹ Although both imply reducing the taxpayers' tax bill, tax evasion is an illegal activity, while the behavior of tax avoidance is legal. Tax avoidance includes not only the use of strategies that allow for the legal minimization of taxes (for instance to increase the pension savings to use the tax relief), but also for the search of strategies to exploit deficiencies or ambiguities in the law (known as aggressive tax planning strategies). For this reason, sometimes the line that separates both phenomena is a very fine one, and the economic literature usually denotes both terms jointly as tax "non-compliance".

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¹ In US, for the period 1976–1992, the nominal tax gap, generated by non-compliance, increases from \$ 22.7 billion to \$95.3 billion [see Andreoni et al. (1998)]. In New Zealand, Giles (1999) estimated that over the period 1968–94, the total tax gap was in the order of 6.4% to 10.2% of total tax liability. More recent estimations for the shadow economy are in Schneider (2005), although a significant proportion of income is unreported for reasons other than taxation.

However, it is important to analyze both avoidance and evasion separately, not only for the legal and moral issues, but more so for economic reasons. Since the returns of tax evasion and tax avoidance are of a different nature, they must be introduced in an economic model in a different way. The return from tax evasion is contingent, because it is subject to possible auditing. However, the return from tax avoidance is riskless since there is no chance of its being penalized. The fact that one is contingent and the other is not in itself constitutes a great difference between them. Furthermore, the effects that some variables (for instance, education) have on both behaviors could even be opposite.

The effect of human capital on tax avoidance is clear. Avoiding taxes requires some skills that are achieved at a certain level of educational. Thus, the reported results for the relationship between the taxpayer's educational level and the avoidance and aggressive tax planning behavior are doubtless. Auerbach et al. (2002) tested that tax avoidance increases over time because taxpayers have learned successful techniques to shelter gains from taxes. Fox and Luna (2005) find that the number of limited liability companies relates positively to the percentage of the population with bachelor degrees. Murphy (2006) finds that the taxpayers involved in aggressive tax planning are considerably more educated than taxpayers from the general population.² However, when tax evasion behavior is analyzed the obtained results are not always conclusive. Some papers find that

² One can also consider that higher your income is, the higher are your possibilities to pay someone to tell you how to avoid taxes. This issue does not invalidate our statement when education is positively related to income.

more education reduces the preference to cheat [see Kinsey and Grasmich (1993) and Hite (1997)]. However, others have found mixed results. That is, education could either increase or reduce tax evasion [see Jackson and Milliron (1986)].

Therefore, with this empirical evidence, to introduce the role of human capital in analyzing how non-compliance affects economic growth we should explicitly separate tax avoidance from tax evasion. As far as we know, no previous paper analyzes the effect of tax avoidance on economic growth. In fact, only a few papers have analyzed the role that non-compliance tax plays on economic growth. The main conclusion obtained by the literature is that the relation between tax evasion and economic growth is ambiguous, and depends mainly on the degree of productivity of public goods.³

Computing the actual dimension of tax avoidance is difficult, but some papers have highlighted its relevance. Thus, Oxfam (2000) has computed that the cost of corporate tax avoidance in developing countries is around \$50 billion annually. Murphy (2002) also shows that during the 1990s, an estimated \$4 billion in tax revenue was lost as a result of 42,000 Australians becoming involved in aggressive mass market tax schemes. Moreover, Braithwaite (2003) relates that a multitude of strategies that seek to exploit deficiencies in the law are continuously being devised each year. Therefore, tax avoidance is an important issue that deserves to be considered.

This paper analyzes how tax avoidance affects economic growth, by introducing the role of human capital accumulation. It is well known that human capital accumulation is an important source of economic growth because it increases the efficiency units of labor. However, there is also other mechanism through which human capital may reduce economic growth. Our hypothesis is that the causality between tax avoidance and human capital accumulation goes in both directions. Tax avoidance significantly reduces government revenues and therefore affects the level of public expenditure. In an economy where human capital accumulation depends on public expenditure, it is also clear that tax avoidance affects the stock of human capital.

The aim of this paper is to analyze how the endogenous feedback between human capital accumulation and tax avoidance affects economic growth and macroeconomic dynamics. To do this, we introduce endogenous tax avoidance in an endogenous economic growth model with human and public capital accumulation. The analysis will show that the interaction between human capital accumulation and tax avoidance may produce remarkable growth and welfare effects. Moreover, it will show how these two effects have in general opposite sign. Avoidance can either increase or reduce economic growth depending on both the value of the legal tax rate and the intensity of the tax avoidance.

The paper is organized as follows. Section 2 presents the economic model. Section 3 defines the balanced growth equilibrium of the economy. Section 4 numerically characterizes how human capital accumulation, fiscal policy and avoidance affect growth and welfare. Finally, Section 5 summarizes and discusses the main findings of the analysis, and prospects future research.

2. The economy

We consider an infinite horizon, continuous time, endogenous growth model with accumulation of private and public capital. In particular, we extend the one-sector growth model with productive public investment introduced by Barro (1990). We introduce two main modifications. First, instead of considering public expenditure we consider public capital as in Futagami et al. (1993). Second, we assume the effective tax rate as being endogenous due to tax avoidance.

Our economy consists of competitive firms, a representative household and the government. We assume that the unique good of this economy is produced by means of a production function that uses private and public capital as inputs. We consider a broad definition of private capital to include physical and human capital. For simplicity in the exposition, from now on we will refer to human capital to denote this broad stock of capital. We consider a Cobb–Douglas production function, so that output is given by

$$y_t = Ah_t^\beta g_t^{1-\beta}, \tag{2.1}$$

with $\beta \in (0,1)$ and where A is the constant total factor productivity; h_t is the per capita stock of human capital; and g_t is the per capita stock of public capital. Observe that the production function exhibits private diminishing returns to human capital, and social constant returns to scale. This implies that the competitive firms operate with strictly positive profits.⁴ Profit maximization implies that the rental price of human capital equals its marginal productivity:

$$w_t = \beta Ah_t^{\beta-1} g_t^{1-\beta}, \tag{2.2}$$

and profits are given by

$$\pi_t = (1-\beta)Ah_t^\beta g_t^{1-\beta}. \tag{2.3}$$

Output y_t can either be used for consumption c_t , producing new human capital or public investment I_t . Hence, the stock of human capital evolves as

$$\dot{h}_t = y_t - c_t - I_t - \delta h_t, \tag{2.4}$$

where $\delta \in (0,1)$ is the depreciation rate of human capital stock.

The household preferences are represented by the discounted lifetime utility:

$$U_t = \int_0^\infty \left(\frac{c_t^{1-\sigma} - 1}{1-\sigma} \right) e^{-\rho t} dt, \tag{2.5}$$

where $\rho > 0$ is the constant subjective rate of time preference, and $\sigma > 0$ denotes the inverse of the constant elasticity of intertemporal substitution. Household is endowed with private capital that inelastically supplies to firms and, moreover, she also owns the shares of firms. She allocates her after-tax income to consumption and investment in human capital. By following Slemrod (2001),⁵ we consider that household can reduce the income subject to tax by avoiding an amount m_t of income at the cost ψ_t . Since there is no evidence on the determinants of the avoidance cost, we consider the following functional form based on Slemrod (2001):

$$\psi_t = \left(\frac{1}{2b} \right) \left(\frac{\tau m_t}{w_t h_t + \pi_t} \right) m_t e^{\frac{\bar{y}_t}{\pi_t}}, \tag{2.6}$$

where $b \in (0,1)$ determines the intensity of avoidance, $\tau \in (0,1)$ is the statutory tax rate on total income, and \bar{y}_t is the average output in the economy. The cost per unit of avoidance is an increasing function of the relative reduction in the tax bill $\frac{\tau m_t}{w_t h_t + \pi_t}$. In order to capture the effect of development on the avoidance opportunities, we also consider that the cost negatively depends on the ratio from human capital to average output.⁶ Given a level of human capital, economic development makes avoidance

⁴ We can also interpret profits as the return of a fixed input. For instance, we can consider that the production function uses raw labor as an input that is exogenously supplied by the household. In this case we could follow Mankiw et al. (1992) to assume that labor and human capital cannot be disentangled, but they exhibit different marginal productivities.

⁵ See also related papers of Cowell (1990) and Mayshar (1991).

⁶ As is shown below, these assumption on the avoidance costs guarantee that the rate of tax avoidance is an increasing and concave function of the ratio from human capital to output, which seems to be a reasonable assumption.

³ See Roubini and Sala-i-Martin (1995), Caballe and Panades (1997), Ho and Yang (2002), Chen (2003), Eichhorn (2004a, 2004b), Dzhumashev and Gahramanov (2010, 2011) and Cerqueti and Coppier (2011). Note that all of these papers analyze tax non-compliance or tax evasion, but not explicitly tax avoidance.

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