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Should the US streamline its tax system? Analysis on an endogenous growth model

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ABSTRACT

We evaluate the growth and welfare effects of budget-neutral reforms in the US tax system. Large gains in welfare and growth could result from adopting a consumption-based tax system. In contrast, significant welfare and growth losses would follow after implementing an income tax-based reform. Eliminating double taxation of firms' profits would yield non-negligible welfare and growth gains.

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1. Introduction

Tax systems are complex and include different rates for different taxes as well as double taxation on capital gains. The discussion on the issue of taxation on factor income is determined by normative views of society and in the USA it is also at the center of the policy debate between republicans and democrats. While republicans argue that capital is double taxed and ask for a null taxation of capital, democrats argue that capital should be more heavily taxed to decrease inequality (see, e.g., Berlau and Kovacs, 2012). The Economist, on the February 2012 edition,[2] has asked well-reputed economists "How should governments tax capital?" Scott Summer, Hall Varian, Brad deLong, Tom Gallagher, David Li and Gilles Saint-Paul wrote about capital taxation and taxation reforms. All those economists seem to agree that increasing taxes or double tax capital income may deter growth and welfare. Some, as Varian and Gallager clearly advocate a consumption-based tax reform while Summer assumes that capital taxation is inefficient and that it represents a sort of 'double taxation' of labor income. There are also completely opposite opinions that argue that investment income is simply not earned so it should be taxed.[3] A discussion about streamlining the US fiscal system, by adopting a consumption-based tax or alleviating double taxation of capital gains, including potential effects on growth, can also be found in Lowrey and Kocieniewski (2012).[4] In fact, in 2003, G. W. Bush already purposed to reduce substantially the double taxation of corporate-source income by eliminating investor-level taxes on dividends paid from earnings on which corporate tax has been paid. However, the congress approved a quite modified version of the proposed (Hubbard, 2005).

Strulik (2003), Naito (2006) and Peretto (2007) recognize the importance of studying the implications of taxation on economic growth. Strulik (2003) analyzes this relationship through the finance-growth channel while Naito (2006) compares the effects of tariff reform with tax reform in an open economy framework. Brita et al. (2012) analyzes the effects of streamlining the VAT system in a general equilibrium framework. Peretto (2007) studies the effect of different tax reforms in a growth model and concludes that subsidizing R&D, eliminating corporate taxes or reducing consumption or labor taxes would be welfare-improving and the endogenous increase in the tax on dividends necessary to balance the budget has a positive effect on growth. However, Peretto (2007) does not present any quantitative exercise as we do. There are recent attempts to evaluate quantitatively welfare effects of policies in endogenous growth models. Grossmann et al. (2010, 2013) evaluate welfare effects of policies that usually are not neutral to the deficit. Gómez and Sequeira (2013) examine the growth and welfare effects of budget-neutral subsidy policies, finding significant welfare

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[2] Available online at http://www.economist.com/economics/by-invitation/questions/how-should-governments-tax-capital.
[3] See e.g. http://www.wheresrobinhood.com/capital-gains-tax.htm.
[4] Available online at http://www.nytimes.com/2012/12/01/business/a-simpler-tax-code-for-stronger-growth-in-the-long-run.html.

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effects of increasing subsidies to R&D and implementing optimal subsidies policies. However none of the previous articles study the growth and welfare effects of streamlining the tax system, namely of taxing only consumption, of taxing only income, or eliminating double taxation on capital income and, additionally, maintaining a balanced government budget. We fill this gap. To this end, we use the endogenous growth model with elastic labor supply developed by Gómez and Sequeira (2013). Given our focus on the revenue side, we allow for the double taxation of profits at the corporate and the personal levels that are present in the US tax system. Thus we enrich the tax code to introduce a tax on dividends, as well as a tax on capital gains, and implement several new tax-reform budget-neutral experiments. Thus, our contribution is quantitative. Our focus on policy-reforms that do not influence deficits guarantee the practical interest of our experiments. This quantitative evaluation has obvious policy interest as it may indicate to politicians the way of streamlining tax systems without harming the government deficits. The next Section presents the model and briefly describes equilibrium, transitional dynamics and calibration. Section 3 presents the main growth and welfare results from tax reforms, including a sensitivity analysis subsection, and Section 4 concludes.

2. The model

We use the endogenous growth model with physical capital, human capital and R&D, and elastic labor supply devised by Gómez and Sequeira (2013), which is enlarged to introduce taxes on dividends and capital gains. Thus, we will make a brief description of the model and refer to Gómez and Sequeira (2013) for further details.

The economy is inhabited by a constant population of identical representative agents. For simplicity, population is normalized to one, so we may read all variables as per capita values. The representative agent has 1 unit of time each period, which can be allocated to goods production, u_Y, R&D, u_n, education, u_H, or leisure, u_L:

$$1 = u_Y + u_n + u_H + u_L. \tag{1}$$

There are three production sectors in the economy: a competitive final-good sector, a monopolistic intermediate-goods sector, and a competitive R&D sector.

2.1. Firms

The final good is produced according to

$$Y = D^{\beta}(u_Y H)^{1-\beta} n^{\eta}, \quad 0<\beta<1, \quad \eta>0. \tag{2}$$

Here, H is human capital, $u_Y H$ is effective labor devoted to the final good production, n denotes the number of available varieties of intermediate goods x_i, and D is an index of intermediate capital goods

$$D = n\left[\frac{1}{n}\int_0^n x_i^{\alpha} di\right]^{1/\alpha}. \tag{3}$$

Thus, the parameter η captures the specialization gains in final good production,[5] β is the share of physical capital and $1-\beta$ is the share of human capital.

The firm rents effective labor at a wage rate w and intermediate inputs—at the price p_i—to maximize its profits

$$\max_{\{x_i\}_{i=0}^n, u_Y H} \Pi_Y \equiv (1-\tau_c)\left[D^{\beta}(u_Y H)^{1-\beta} n^{\eta} - w u_Y H - \int_0^n p_i x_i di\right],$$

where τ_c is a flat-rate tax on corporate profits. This yields

$$w = (1-\beta)Y/(u_Y H), \tag{4}$$

$$x_i = \frac{1}{n}\left(\frac{\beta Y}{D^{\alpha} p_i}\right)^{1/(1-\alpha)}, \tag{5}$$

and profits are zero.

Each intermediate input x_i is produced by a monopolist who owns an infinitely-lived patent for its design, purchased at a price v. One unit of the intermediate good can be produced with 1 unit of physical capital, so $K = \int_0^n x_i di$. The government subsidizes the firm's capital costs at a rate s_K. The monopolist solves the problem

$$\max_{p_i} \Pi_i \equiv (1-\tau_c)[p_i - (1-s_K)(r+\delta_K)]x_i = (1-\tau_c)\pi_i, \tag{6}$$

where r is the interest rate and δ_K is the rate of depreciation of capital. Each firm will produce the same quantity of intermediates $x = x_i = K/n$, and

$$p = p_i = \beta Y/K. \tag{7}$$

$$r = \alpha\beta Y/[(1-s_K)K] - \delta_K, \tag{8}$$

so the (before-tax) profit is

$$\pi = \pi_i = (1-\alpha)\beta Y/n. \tag{9}$$

Using that $D = nx = K$, production of the final good can be rewritten as

$$Y = K^{\beta}(u_Y H)^{1-\beta} n^{\eta}. \tag{10}$$

New blueprints in the R&D sector are generated according to the Jones and Williams (2000) technology:

$$(1+\zeta)\dot{n} = \bar{\epsilon}(u_n H) = \epsilon\left(\overline{u_n H}\right)^{\gamma-1} n^{\phi}(u_n H), \quad \epsilon>0, \zeta>0, 0<\gamma\le 1, \phi<1, \tag{11}$$

where $\bar{\epsilon} = \epsilon\left(\overline{u_n H}\right)^{\gamma-1} n^{\phi}$, which is taken as given by the firm. Here, $\overline{u_n H}$ is the average effective time devoted to innovation, so there could be duplication externalities—when $\gamma < 1$—, and ϕ measures spillovers in R&D.[6] At each point in time $(1+\zeta)\dot{n}$ new varieties are generated, but $\zeta\dot{n}$ represents an upgrade of existing ones, which are then replaced by the new ones. Thus, ζ measures the creative destruction effect (e.g., Jones and Williams, 2000). The government subsidizes R&D costs at a rate s_R. The representative firm in the R&D sector maximizes its profits

$$\max_{u_n H} \Pi_n \equiv (1-\tau_c)\left[\upsilon(1+\zeta)\dot{n} - (1-s_R)w u_n H\right]$$
$$= (1-\tau_c)[\upsilon\,\bar{\epsilon}(u_n H) - (1-s_R)w u_n H],$$

where υ is the value of an innovation. The first-order condition entails that

$$(1-s_R)w = \upsilon\bar{\epsilon} = \upsilon\epsilon\left(\overline{u_n H}\right)^{\gamma-1} n^{\phi}, \tag{12}$$

so there are zero profits.

[5] As Alvarez-Pelaez and Groth (2005, p. 439) say, it is "the degree to which society benefits from specializing production in an increasing number of branches".

[6] Empirical evidence of R&D spillovers and duplication externalities due to overlap of research is provided, e.g., by Jones (1995), Porter and Stern (2000) and Pessoa (2005).

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