



Optimal progressive capital income taxes in the infinite horizon model[☆]

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ABSTRACT

This paper analyzes optimal progressive capital income taxation in an infinite horizon model where individuals differ only through their initial wealth. We consider progressive capital income tax schedules taking a simple two-bracket form with an exemption bracket at the bottom and a single marginal tax rate above a time varying exemption threshold. Individuals are taxed until their wealth is reduced down to the exemption threshold. The fraction of individuals subject to capital income taxation vanishes to zero in the long-run in analogy to the zero long-run capital tax result of Chamley and Judd with optimal linear taxes. However, in contrast to linear taxation, optimal nonlinear capital taxation can have a drastic impact on the long-run wealth distribution. When the intertemporal elasticity of substitution is not too large and the top tail of the initial wealth distribution is infinite and thick enough, the optimal exemption threshold converges to a finite limit. As a result, the optimal tax system drives all the large fortunes down a finite level and produces a truncated long-run wealth distribution.

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1. Introduction

Most developed countries have adopted comprehensive individual income tax systems with graduated marginal tax rates in the course of their economic development process. The United States introduced the modern individual income tax in 1913, France in 1914, Japan in 1887, and the German states such as Prussia and Saxony, during the second half of the 19th century, the United Kingdom introduced a progressive super-tax on comprehensive individual income in 1909. Because of large exemption levels, these early income tax systems hit only the top of the income distribution. While tax rates were initially set at low levels, during the first half of the twentieth century, the degree of progressivity of the income tax was sharply increased and top marginal tax rates reached very high levels. In most cases, the very top rates applied only to an extremely small fraction of taxpayers. Therefore, the income tax was devised to have its strongest impact on the very top income earners. As documented by the top income studies surveyed by Atkinson et al. (2011), these top income earners derived

the vast majority of their income in the form of capital income. Therefore, the very progressive schedules set in place during the inter-war period can be seen as a progressive capital income tax precisely designed to hit the largest wealth holders, and redistribute the fortunes accumulated during the industrial revolutions of the 19th century – a time with very modest taxation of capital income. Most countries have also introduced graduated forms of estate or inheritance taxation that further increase the degree of progressivity of taxation. Such a progressive income and estate tax structure should have a strong wealth equalizing effect.¹

An important question in tax policy analysis is whether using capital income taxation to redistribute accumulated fortunes is desirable. As in most tax policy problems, there is a classical equity and efficiency trade-off: progressive capital income taxation can redistribute from the wealthy to the non-wealthy but might distort savings and consumption behavior and hence reduce wealth accumulation.² A number of studies on optimal dynamic taxation have suggested that capital taxation might have very large efficiency costs (see e.g., Lucas, 1990; Atkeson et al., 1999). As is well known, in the infinite horizon model, linear capital income taxes generate distortions increasing exponentially with

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¹ Indeed Piketty (2001b) and Piketty and Saez (2003) argue that the development of progressive taxation was one of the major causes of the decline of top capital incomes over the 20th century in France and in the United States.

² This trade-off that was at the center of the political debate on the introduction of progressive taxation in western countries. See Piketty (2001b) for a detailed account on the French case, and Brownlee (2000) for the United States.

time. The influential studies by Chamley (1986) and Judd (1985) show that, in the long-run, optimal linear capital income tax should be zero.³

This paper considers a simple departure from the standard infinite horizon model with no uncertainty of Chamley (1986) and Judd (1985). Instead of considering only time varying linear capital income taxation, we introduce a very simple form of nonlinear taxation. We consider progressive capital income tax schedules taking a two-bracket form with an exemption bracket at the bottom and a single marginal tax rate above a time varying exemption threshold. Such a tax system can be seen as a crude approximation of the actual early progressive income tax systems discussed above. To keep the model and the derivations tractable and transparent, we consider the simplest possible model with heterogeneity in initial wealth only, CRRA utility functions, exogenous and constant rate of return on capital equal to the individual discount rate, inelastic labor supply with uniform wages.⁴ Importantly, we consider only a very limited set of tax policy tools that we believe captures an important and realistic trade-off. In the very simple model we use, we rule out complete redistribution of initial wealth which would naturally be first-best as initial wealth is exogenous in our model.⁵ We obtain two main results.

First, our model retains the central long-run vanishing capital tax result as in Chamley–Judd. In our model, the fraction of individuals subject to capital income taxation vanishes to zero in the long-run so that capital income tax revenue does converge to zero in the long-run. Second, however, under a broad set of parametric assumptions, we find that progressive capital income taxation is much more effective than linear taxation to redistribute wealth. If the intertemporal elasticity of substitution (which measures the efficiency costs of capital income taxation) is small enough, even if the initial wealth distribution is unbounded, the optimal nonlinear capital income tax produces a wealth distribution that is truncated above in the long-run. Namely, no fortunes above a given threshold are left in the long-run. Therefore, large wealth owners continue to be taxed until their wealth level is reduced down to a given threshold.

The mechanism explaining why progressive taxation is desirable can be understood as follows. In the infinite horizon model, linear taxation of capital income is undesirable because it introduces a price distortion exponentially increasing with time. That is why optimal linear capital income taxation must be zero in the long-run. However, with a simple progressive tax structure with a single marginal tax rate above an exemption threshold, large wealth holders will be in the tax bracket and therefore will face a lower net-of-tax rate of return than modest wealth holders who are in the exempted bracket. As a result, the infinite horizon model predicts that large fortunes will decline until they reach the exemption level where

³ Another strand of the literature has used overlapping generations (OLG) models to study optimal capital income taxes. In general capital taxes are expected to be positive but quantitatively small in the long-run (see e.g., Feldstein, 1978; Atkinson and Sandmo, 1980; King, 1980). However, when non-linear labor income tax is allowed, under some conditions, optimal capital taxes should be zero (see Atkinson and Stiglitz, 1976; Ordober and Phelps, 1979). More importantly, in the OLG model, capital accumulation is due uniquely to life-cycle saving for retirement. This contrasts with the actual situation where an important share of wealth, especially for the rich, is due to bequests (Kotlikoff and Summers, 1981). The OLG model with no bequests therefore is not well suited to the analysis of the taxation of large fortunes. Cremer and Pestieau (2004) survey this large literature. I come back to this issue in conclusion.

⁴ We discuss how some of those assumptions affect our results and consider various extensions in Section 5.

⁵ This approach is not an exception in optimal tax theory. For example, the famous Ramsey model of commodity taxation (as well as the basic Chamley–Judd model with a representative agent) rules out lump sum taxation that would be first-best efficient. The recent New Dynamic Public Finance literature (see e.g., Kocherlakota, 2010) carefully grounds optimal dynamic taxation upon informational assumptions using the mechanism design approach. The drawback is that optimal tax structures are very complex and history dependent (see Diamond and Saez, 2011 for a discussion of the pros and cons of the mechanism design approach vs. the limited government tool set we adopt here).

taxation stops. Thus, this simple tax structure reduces all large fortunes down to the exemption level and thus effectively imposes a positive marginal tax rate only for a *finite* time period for any individual (namely until his wealth reaches the exemption threshold) and thus avoids the infinite distortion problem of the linear tax system with no exemption.⁶ The second virtue of this progressive tax structure is that the time of taxation is increasing with the initial wealth level because it takes more time to reduce a large fortune down to the exemption threshold than a more modest one. This turns out to be desirable in general for the following reason. Large wealth holders consume mostly out of their initial wealth rather than their annual stream of labor income. Therefore, the positive human wealth effect created by capital taxation on initial consumption is small relative to the income effect for large wealth holders. As a result, capital taxation leads to a lower pace of wealth decumulation for the rich, and thus they can be taxed longer at a lower efficiency cost than the poor. It is important to recognize however, that the size of behavioral responses to capital income taxation, measured by the intertemporal elasticity of substitution, matters. When this elasticity is large, it is inefficient to tax any individual, however rich, for a very long time and thus, it is preferable to let the exemption level grow without bounds as time elapses producing an unbounded long-run wealth distribution.

Naturally, the parsimonious model developed here does not capture all the relevant issues arising with capital income taxation. The present model takes as given the initial unequal wealth distribution, and ignores completely the issue of creation of new wealth. This contribution can be seen as a theory of the taxation of rentiers where the central trade-off is the following: using capital income taxation is desirable to redistribute from the rich to the poor but capital income taxation induces individuals to over-consume initially and run down their wealth levels, hence reducing the capital income tax base down the road. This basic model therefore ignores completely the issue of creation of new fortunes. New fortunes are created in general by successful entrepreneurs or spells of very high labor income. Those fortunes can then be passed down to future generations through bequests. Taxation of capital income reduces the (long-term) benefits of creating a fortune, and may thus reduce entrepreneurial effort or labor supply as well.⁷

Conversely, in models with credit constraints, Aiyagari (1995) and Chamley (2001) have shown that capital income taxation may be desirable, even in the long run as capital income taxes can redistribute from the rich who are not credit constrained toward to poor who are credit constrained. Similarly, the recent and fast growing New Dynamic Public Finance literature (see Golosov et al., 2006; Kocherlakota, 2010 for valuable recent surveys) shows that dynamic labor productivity risk leads to non-zero capital income taxes. Therefore, it is not immediately clear in which direction would the introduction of entrepreneurs tilt the results presented here. We expect, however, that the economic forces regarding the taxation of rentiers described here would still be present in this more general model.

The paper is organized as follows. Section 2 presents the model and the government objective. Section 3 considers linear taxation and provides useful preliminary results on the desirability of taxing

⁶ Piketty (2001a) (in the unpublished appendix of the working paper version) made the important and closely related point that, in the infinite horizon model, a constant capital income tax above a high threshold does not affect negatively the long-run capital stock in the economy because the reduction of large fortunes is compensated by an increase of smaller wealth holdings. This, of course, is not true with linear capital income taxation. We come back to this important point in Section 5 when we consider extensions.

⁷ Cagetti and De Nardi (2006) propose a positive analysis of capital income taxation and the wealth distribution in a dynamic and stochastic model with entrepreneurs. They do not, however, tackle the normative issue of optimal capital income taxation. Piketty and Saez (2012) propose a theory of optimal capital taxation in a model with heterogeneous tastes for bequests and hence endogenous and heterogeneous inherited wealth.

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