

Taxation and Saving - A Retrospective

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1. Introduction

The 1960s and 1970s saw rapid development in the field of optimal tax analysis, based on and extending a handful of much earlier and fundamental contributions such as Ramsey (1927) and Corlett and Hague (1953). This literature focused primarily on the minimization of deadweight loss arising from consumption and labor supply distortions in models of linear taxation, although an important extension was the consideration (and general rejection) of production distortions in the work of Diamond and Mirrlees (1971).

A separate line of research, on optimal nonlinear labor income taxation, commenced with Mirrlees (1971), and the two strands of the literature converged in a heavily cited paper by Atkinson and Stiglitz (1976), which developed conditions under which consumption distortions were no longer helpful in improving social welfare in the presence of an optimal nonlinear labor income tax. Although many contributions over many years followed, the research of this period largely defined the field of “static” optimal taxation – static in the sense that time did not play an explicit role in the models used.

Of course, one can introduce time into static models in the Arrow-Debreu sense of treating consumption that occurs at different dates as distinct commodities, and this approach allowed an interpretation of existing optimal tax results as applying to the taxation of savings. For example, Feldstein (1978) argued in favor of expenditure taxation over income taxation based on the Atkinson-Stiglitz (1976) results. But this is a very limited approach to dynamic analysis, for it ignores important elements of taxation over time, perhaps most notably the existence of different generations who may lack trading opportunities and who may be affected differently by a particular change in tax

policy. The paper by Atkinson and Sandmo (1980), “Welfare Implications of the Taxation of Savings,” addresses this limitation by embedding the static optimal tax analysis in the classic Diamond (1965) model of overlapping generations.¹

Atkinson and Sandmo were not the first to consider optimal taxation in an overlapping generations model; such analysis dates at least to a paper by Diamond (1973), which Atkinson and Sandmo cite. Nor was their approach as general as those found in some other papers of the time, many of which are also cited; some of these papers (e.g., Ordover and Phelps, 1979) considered nonlinear tax instruments and others (e.g., Pestieau, 1974, and Auerbach, 1979) the potential use of distortions in capital allocation in furthering the optimal-tax objective of social welfare maximization. However, the Atkinson-Sandmo analysis has an organization and clarity not necessarily typical of other contributions of the period, and in relating different results and discussing the conditions under which they hold, this paper provided a useful signpost of where the literature was at the time and a helpful guide for research. Indeed, in reading the paper one sees its anticipation of various subsequent developments in the literature.

II. Model Setup

As in the Diamond (1965) analysis, Atkinson and Sandmo consider an overlapping-generations model in which each generation lives for two periods, working in the first and consuming in both, the second of which may be thought of as a retirement period. Although providing a parsimonious framework for comparing different tax bases and evaluating the role of capital income taxation, the two-period model excludes from consideration some interesting issues taken up in the subsequent literature, such as the

¹ Other important limitations not relaxed by Atkinson and Sandmo include incomplete markets for risk and potential dynamic inconsistency in government policy choices.

potential benefits of age-based labor income taxation (Weinzierl, 2011), the role that capital income taxation might play as an imperfect proxy for age-based labor income taxation (Erosa and Gervais, 2002), and the cumulative distortions associated with capital income taxation over horizons of increasing length, which make capital income taxation unappealing in the long-run steady state under rather general conditions regarding preferences (as discussed in the well-known papers of Judd, 1985, and Chamley, 1986).

As in the original Diamond model, Atkinson and Sandmo focus on the role of national debt as a policy instrument for intergenerational redistribution, going on to consider how the availability of debt influences the design of optimal taxes. Potential tax instruments include linear taxes on labor income, capital income and consumption, as well as age-specific lump-sum taxes, and the objective is to maximize a social welfare function, taken in the main case to equal a discounted sum of utilities of individuals from different generations.²

The authors present as a key question they wish to address the relative attractiveness of income taxation and consumption (expenditure) taxation, which had been proposed by Kaldor (1955) and at the time recently revived by the Meade Committee in the United Kingdom (Institute for Fiscal Studies, 1978) and the U.S. Department of the Treasury (1977). Ironically, Atkinson and Sandmo do not actually evaluate expenditure taxation as an one of the available options. Instead, their comparison is between labor income taxation and broad-based income taxation, that is, whether capital income as well as labor income should be taxed. Their implicit equation of labor income taxation and consumption taxation can be understood directly from an

² The paper does devote some space to a consideration of the implications of alternative representations of social welfare, including how to weigh generations of different sizes. This question becomes much more complex when population growth is endogenous or uncertain. See, for example, Golosov et al. (2007).

individual's budget constraint in the two-period model, relating labor income (wL) to consumption expenditure in both periods ($p_i C_i$) and the rate of return between the periods (r), $wL = p_1 C_1 + p_2 C_2 / (1+r)$. Without bequests, inheritances or other sources of income,³ a tax on labor income is equivalent to a uniform tax on consumption. However, the timing of revenues is different under the two, and this matters within the Atkinson-Sandmo analysis when the use of national debt is restricted.

This distinction between labor income taxation and consumption taxation does receive mention in a footnote (p. 540), which notes that with constraints on intertemporal allocation "the government is no longer indifferent about the timing of receipts," but there is no further discussion in the paper on this point, which basically is that the timing difference between labor income taxation and consumption taxation can be undone through government debt adjustments if such adjustments are feasible, but otherwise not.

For example, using some of the proceeds from a labor income tax to retire debt reduces available government cash flow in the first period and increases available cash flow in the second, producing a pattern of cash flow to the government that is identical to what it would raise under a uniform consumption tax with equal present value yield. Since the taxpayer and the government are in all respects in the same positions under the two policies (a labor income tax plus debt retirement and a uniform consumption tax), the policies are economically equivalent. Another way of expressing this is that, from the government's point of view, a consumption tax embeds an implicit asset relative to a labor income tax. Thus, if government policy would be improved by changing explicit national debt, but this policy option is for some reason not available,

³ As in many other analyses of the day, Atkinson and Sandmo do not consider intergenerational linkages, which could, depending on the nature of the bequest motive, extend the planning horizon of individual agents (Barro, 1974).

the government can replicate the policy by shifting between a labor income tax and a consumption tax. One presumed reason for resorting to the use of national debt is to shift fiscal burdens among generations, and this could be accomplished through a tax reform as well. For example, instead of reducing national debt, the government could place a higher burden on existing transition generations through a shift from a labor income tax to a consumption tax that hits them with both taxes.

III. Main Results

A. Optimal Policy with Lump-sum Taxation

In a model of overlapping generations, with a representative agent in each generation, the government's distributional objective relates exclusively to the relative well-being of different generations. This gives rise to the standard intertemporal condition from growth theory known as the "modified golden rule" (Cass, 1965), in which the marginal product of capital converges to the sum of the population growth rate and the government's pure rate of discount with respect to the utility of a representative member of each future generation.

As Atkinson and Sandmo discuss, to achieve the modified golden rule growth path and maintain economic efficiency, it is sufficient that the government can impose distinct lump-sum taxes on the two generations alive at any time; uniform lump-sum taxes would be sufficient to achieve efficiency alone, but generation-specific lump-sum taxes provide the government with unrestricted flexibility regarding the distribution of resources among generations. Alternatively, a single lump-sum tax on each generation, collected in either period of life, combined with government debt would also do the trick. Here, again, one may think about a combination of tax instruments as effecting an

implicit debt policy. In this instance, increasing (decreasing) first-period taxes and decreasing (increasing) second-period taxes on the same generation by the same amount in present value is economically equivalent to issuing (redeeming) and then redeeming (issuing) national debt. Again, one could also use combinations of taxes and transfers to shift resources among generations in lieu of using explicit debt to do so. Indeed, the notion that a system of taxes and transfers simulates national debt had already been discussed in the literature, notably in Feldstein's (1974) introduction of the concept of "social security wealth" and his analysis of how individuals might treat it as an asset equivalent to national debt.

B. Optimal Policy without Lump-sum Taxation

Things become more interesting when lump-sum taxes are for some reason unavailable, a common assumption in the basic optimal-tax literature. Then, an efficient allocation is no longer generally possible, but with government debt the objectives of equity and efficiency are in a sense separable: the government should still use debt to achieve its distributional objective – the modified golden rule – and should adhere to standard, static, optimal-tax prescriptions for minimizing deadweight loss in collecting taxes from each generation.

In this setting, as in the static one, there is a free normalization regarding which of the three commodities in each generation's budget constraint (labor, first-period consumption, and second-period consumption) is subject to tax. Setting the tax on first-period consumption equal to zero means that a labor income tax and a capital income tax, which effectively taxes second-period consumption by lowering the rate of return, are all that the government needs to implement its optimal-tax system, without using consumption taxes explicitly. As in the static model, taxes on labor income and capital

income should be chosen according to the own and cross-price elasticities of labor, first-period consumption and second-period consumption. There are different, equivalent ways of expressing this result. Nowadays it is customary to observe that capital income taxes should be positive only if second-period consumption is more of a complement for leisure than first-period consumption. Atkinson and Sandmo do not mention this condition, but choose to focus on the more general issue of what different elasticities might be, and particularly on our lack of knowledge of key parameters and the sensitivity of our conclusions to parameter values.

This is one place where the particular model restrictions (e.g., one period of labor supply; two periods of consumption) matter. As already discussed, with many periods of consumption and labor supply it is unlikely that a substantially nonzero capital income tax would be optimal, if that tax were constant across periods. Thus, the authors' statement that "it is difficult to make a strong case *either* for the expenditure tax *or* for taxing interest income at the same rate as wage income" (p. 539) requires some modification, for there is a stronger case for the expenditure tax than for taxing interest income and wage income at the same rate. On the other hand, as also discussed above, a further argument for at least some capital income taxation might arise if labor tax rates could not vary with respect to age.

Over the years, there have been increasingly sophisticated arguments regarding why one might wish to tax capital income at a positive rate, if not at the same rate as labor income.⁴ Most of these arguments arise in richer models incorporating both uncertainty and within-generation heterogeneity. For example, another argument for using capital income taxes in lieu of age-based labor income taxes comes from Conesa et al. (2009), in whose model realizations of labor income diverge across individuals,

⁴ Many of these arguments are considered by Banks and Diamond (2010).

meaning that more progressive labor income taxation later in life serve, given the assumption of incomplete markets, an insurance function that would be less relevant at young ages. If such age-related progressivity cannot be implemented, then capital income taxes can serve as an imperfect substitute (because of the intertemporal distortion) by imposing an implicit tax on those with higher realizations of labor income. A related argument for taxing capital income in the presence of uncertain labor income realizations and incomplete markets for risk-sharing is that put forward by Aiyagari (1995). And the recent research falling under the description of the “new dynamic public finance” has emphasized the role of capital income taxes in relaxing incentive compatibility constraints in models with income shocks where the government wishes to redistribute resources from high-ability individuals (e.g., Golosov et al., 2003).

It is also worth noting that one reason sometimes given for taxing labor and capital income at the same rate – that it is difficult to distinguish the two types of income – does *not* apply in the case of a true expenditure tax (as opposed to a labor income tax), since neither form of income is subject to tax.

C. Optimal Policy without Lump-sum Taxation or National Debt

With neither lump-sum taxes nor national debt at its disposal, the government must confront its objectives of economic efficiency and intergenerational equity using only its array of distortionary taxes. Here, as discussed above, limits on the choice of distortionary tax instruments matter, because one could simulate national debt through variations in labor income taxation and consumption taxation. Excluding consumption taxes from the analysis and considering only labor income taxes and capital income taxes means that these taxes must be chosen with an eye toward the attainment of both efficiency and intergenerational equity.

The resulting expression leads to a striking result (see also Auerbach, 1979) in at least one special case that is discussed, namely that it is optimal to impose a positive tax on capital income in a situation where (1) preferences alone would call for a zero tax rate on capital in the model with national debt; and (2) the capital stock is lower than would be called for by the modified golden rule and achievable through the use of national debt. As Atkinson and Sandmo say, "It may seem paradoxical that where the no-tax capital stock falls short of the 'first-best' level there should be a positive tax rate on capital." (p. 543) The suggested intuition is that the capital income tax accomplishes an increase in saving, and that it is the overall impact on saving, and not the substitution effect (which discourages saving) that matters in pursuing the government's objective of increasing the rate of capital accumulation in order to push the intertemporal distribution of well-being in the desired direction.

Another way of putting this intuition is that a capital income tax has two important attributes. First, it distorts the individual's intertemporal consumption decision. Second, it is a tax on second-period consumption, and therefore on older individuals at any given point in time. With only labor and capital income taxes available, the only way to shift the fiscal burden from the young to the old is to shift from labor income taxes to capital income taxes. This involves deadweight loss, of course, but one will wish to do at least some of it (on an ongoing basis) in the name of intergenerational redistribution.

Note, though, that this result hinges critically on the assumption that the government not only lacks the ability to utilize government debt, but also that it cannot impose other, less distortionary taxes on individuals in the second period of life, in particular consumption taxes. Also, recall that it is not necessary to impose age-specific consumption taxes to simulate the effects of government debt, simply labor income taxes

and uniform consumption taxes. Since consumption taxes are otherwise equivalent to labor income taxes from any generation's perspective, they offer a potentially much more efficient solution than capital income taxes to the government's problem when national debt is unavailable.

In particular, it is clear in the Atkinson-Sandmo setup that, with consumption taxes available, capital income taxes would be used only if helpful for improving economic efficiency. Otherwise, they would be dominated as a means of achieving intergenerational redistribution, since consumption taxes could accomplish the same redistribution without increasing the deadweight loss of the tax system. Even in more complicated overlapping-generations models, where no simple expressions for optimal taxes are available, consumption taxes result in much higher long-run welfare than capital income taxes, even though both are effective in transferring resources from current to future generations (Auerbach and Kotlikoff, 1987).⁵ Given that consumption taxes certainly are available (and used by) governments, this particular lesson about the potential usefulness of capital income taxation, while quite interesting, may be less relevant for policy decisions than others in the paper.

IV. Conclusions

The literature on the optimal taxation of savings has been an active one, and has generated many important insights in recent decades. The paper by Atkinson and

⁵ As discussed by Auerbach and Kotlikoff, consumption taxes also have an additional potential efficiency gain, arising from the taxation of consumption from existing wealth. For an unannounced imposition of a consumption tax, this makes the consumption tax more efficient than the labor income tax, leaving aside the issue of intergenerational redistribution. The same intuition applies to capital income taxes in the very short run, which explains why, in the Chamley-Judd analysis discussed above, capital income taxes should start high before converging to zero. But these results raise the question of taxpayer expectations and how they are formed. The optimality of a transition from high to low capital income taxes, in particular, also confronts the issue of time consistency in government policy, since it would continually be optimal for the government to adopt such a policy.

Sandmo, in providing a succinct and informative early discussion of the topic, clarified thinking on this complex topic and helped guide subsequent research in productive directions.

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