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CESifo Working Paper No. 3617
Category 1: Public Finance
October 2011

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Abstract

We investigate optimal taxation of lifetime income with and without an emigration option during old age. The government sets the rates of deferred taxation and of possibly reduced taxation of interest. If agents are immobile, the optimal policy consists in full deferral of income taxes on savings and a full taxation of interest. Mobility of the old calls for lower degrees of deferral and reduced taxation of interest. However, the optimum never entails full immediate taxation of savings in combination with full tax exemption on capital income.

JEL-Code: H210, H240, H260.

Keywords: deferred taxation, income tax, savings, migration.

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October 17, 2011

1 Introduction

Over the past decades, a considerable accumulation of wealth has occurred in many industrialized economies, both via bequests and savings. This has led to rising numbers of old wealthy individuals, many of them being in good health and internationally mobile. Due to the increased mobility of the elderly, national governments find it more difficult to tax their capital income. At the same time, the rapid ageing of societies and the rising share of the old in the population in combination with a perceived inability of the government to save suggests to shift the tax burden from working age to old age to some extent. The tendency of policy reforms towards deferred taxation of savings clearly exemplifies this trend: contributions to public or private pension plans, and also accrued interest are tax-exempt, while pensions are taxed in full. This policy replaces the traditional alternative to make contributions out of taxed income, where only the return share, the excess of expected pension over contributions, is subjected to taxation. A potential drawback of deferred taxation rests in the possibility that people may emigrate in order to avoid taxation of savings at all. While for public pension plans this problem may be solved by taxation at source, it seems substantial for private savings plans.

Our contribution investigates how the possibility to emigrate during retirement affects the optimal intertemporal income tax policy. The policy space consists in determining the degree of deferred taxation of savings and the rate at which capital income is taxed. The standard wage tax rate will be adjusted so as to satisfy the government budget constraint. The government needs to finance a fixed expenditure per capita to serve both domestic and emigrated citizens. Such exportable benefits arise from a number of publicly provided goods, like pensions or health insurance benefits.

If there is no migration option, the optimal lifetime income taxation entails full deferral of taxation of saving and taxation of interest at the ordinary wage income rate. This result turns out because the economy under consideration is characterized by underinvestment relative to the Golden Rule. Taxation of the old minimizes implicit intergenerational transfers from the young to the old, which enhances welfare. Allowing the elderly to emigrate upon retirement changes the picture. The exit option induces pressure to reduce taxes paid by the old. Still, regardless of the strength of the migration incentive, the optimal policy never displays full exemption of capital income from taxation in combination with immediate taxation of savings.

In a more realistic setting, the share of interest taxation is fixed, like in a dual income tax. It is a plausible scenario that international agreements on the rate of interest taxation are achieved, while the share of deferred taxation of saving underlies national discretion. For such a situation, an optimal policy may, depending on the rate of interest taxation, involve full immediate taxation of savings, full deferral, or an interior solution.

Our contribution is related to the literature on optimal taxation of interest and saving (see the surveys by Bradford, 2000, Auerbach and Hines, 2002, Bernheim, 2002, Banks and Diamond, 2010). For the former, the standard result of Chamley (1986) and Judd (1985) states that interest should remain untaxed to avoid heavy distortions of relative prices over a long time horizon. This result has been qualified to some extent in other environments, stressing the possibility to move the economy closer to the Golden Rule (Cremer et al., 2003) or to tax accidental bequests (Blumkin and Sadka, 2004). Deferred taxation of savings has been advocated to move the income tax system closer to an expenditure tax since Fisher and Fisher (1942) and Kaldor (1955). The key ideas behind deferred taxation lie in reducing distortions through lower marginal payroll taxes (Atkinson and Sandmo, 1980, Burbridge, 2004) and in strengthening incentives for human capital accumulation (Grochulski and Piskorski, 2010).

The remainder of the paper is organized as follows. After describing the model in Section 2, the reference result for the economy without mobility is established in Section 3. Relaxing the immobility asumption, Section 4 discusses the impacts of an emigration option for the old on the optimal tax policy. The concluding Section 5 summarizes the main findings and indicates directions for future research.

2 The basic model

We consider a standard overlapping-generations model of a stationary economy without population growth. At the outset, all individuals are identical. They live for two periods: their working age when they are young (indexed by y) and their retirement period when they are old (indexed by o). Cohort sizes are normalized to unity.

Utility is separable in private consumption over the life-cycle and consumption of a publicly provided private good, where the provision level is fixed at g per old individual or, equivalently, $g/2$ per adult. To keep the analysis tractable, we assume that utility from private consumption is logarithmic:

$$U_t = U(c_t^y, c_{t+1}^o) = \ln c_t^y + \delta \ln c_{t+1}^o, \tag{1}$$

where c_t^y and c_{t+1}^o denote, respectively, consumption during youth in period t and during old age in period $t+1$, and parameter $\delta \in (0,1)$ measures time preference. Imposing additive separability and fixing g, we can neglect utility from consumption of the publicly provided good.

When young, each individual inelastically supplies one unit of labor and earns gross wage income w_t. Considering a stationary small open economy, the wage w and the interest rate r do not change over time, $w_t = w$, $r_t = r$. As the individual is retired during old age, consumption has to be financed out of savings, s. Consumption levels over the life-cycle are given by

$$\begin{aligned} c_t^y &= (w - s_t)(1-\tau_t) - \tau_t (1-\alpha) s_t & (2) \\ &= w(1-\tau_t) - s_t(1-\alpha\tau_t), \\ c_{t+1}^o &= s_t(1+r) - \tau_{t+1} s_t (\alpha + \beta r). & (3) \end{aligned}$$

Here, τ_t is the standard rate of the income tax in period t. A share $\alpha \in [0,1]$ of savings is subject to deferred taxation, the remainder $(1-\alpha)$ is taxed immediately. Parameter $\beta \in [0,1]$ measures the share of capital income that is taxed. Hence, $\beta\tau$ is the effective tax rate on interest. As we are focusing on steady states, time indices are dropped in the following whenever this does not lead to confusion.

For general utility functions, the first-order condition determining optimal saving reads

$$\frac{\partial U/\partial c^o}{\partial U/\partial c^y} = \frac{1-\alpha\tau}{1+r-(\alpha+\beta r)\tau}. \tag{4}$$

Taxation does not distort savings if the marginal rate of substitution between present and future consumption is unaffected by taxation, i.e., if it equals $1/(1-r)$. This neutrality property holds if and only if $\alpha = \beta$, that is, whenever the share of deferred taxation is equal to the share of taxed income from interest. Specifically, if interest is taxed in full, neutrality requires to entirely defer taxation of savings. By contrast, if interest remains untaxed, neutrality can only be attained by taxing savings immediately.

For the logarithmic specification, savings depend on the current tax and deferral rate, but neither on the interest rate nor on tax parameters in old age. Straightforward calculus yields optimal savings

$$s = \frac{\delta}{(1+\delta)} \frac{1-\tau}{1-\alpha\tau} w := S(\tau, \alpha) \tag{5}$$

and consumption levels

$$\begin{aligned} c^y &= w(1-\tau) - s(1-\alpha\tau) = \frac{1}{1+\delta} w(1-\tau) := C^y(\tau), & (6) \\ c^o &= s\left[(1+r) - \tau\left(\alpha + \beta r\right)\right] \\ &= \frac{\delta\left[1 + r - \tau\left(\alpha + \beta r\right)\right]}{1+\delta} \frac{1-\tau}{1-\alpha\tau} w := C^o(\tau, \beta, \alpha). & (7) \end{aligned}$$

If $\alpha = \beta$ holds, equation (7) boils down to

$$c^o = \frac{\delta(1+r)}{1+\delta} w(1-\tau). \tag{8}$$

3 Optimal taxation when people are immobile

If people stay in the country regardless of the tax policy, the per-capita budget equation of the government is

$$g \leq \tau\left[w - s_t + (1-\alpha)s_t + \alpha s_{t-1} + \beta r s_{t-1}\right]. \tag{9}$$

The first terms are related to the tax liabilities of the young working age population, and the final terms refer to the taxes paid by the elderly. In a steady state, we have $s_t = s_{t-1}$, both given by (5), allowing to rewrite the budget constraint as

$$\begin{aligned} g &\leq \tau\left[w + \beta r s\right] & (10) \\ &= \tau w \left[1 + \beta r \frac{1-\tau}{1-\alpha\tau} \frac{\delta}{1+\delta}\right] := G(\tau, \beta, \alpha). \end{aligned}$$

By choice of the tax parameters α, β, and τ and subject to the constraint that tax revenue in every period suffices to finance the publicly provided good, the government aims at maximizing social welfare. In our framework, welfare is represented by the lifetime utility of a representative individual. Imposing that g is not too high, feasible solutions to this optimization problem always exist. Proposition 1 summarizes the optimal policy in this scenario:

Proposition 1 *The optimal tax structure entails full deferral of taxation of savings and taxation of interest at the ordinary rate:*

$$\alpha = \beta = 1, \quad \textit{and} \quad \tau = \frac{g}{w\left(1 + \frac{r\delta}{1+\delta}\right)}.$$

Proof. See Appendix A. □

The intuition behind Proposition 1 is familiar. In the absence of population growth, a positive interest rate $r > 0$ implies that the economy is characterized by underinvestment relative to the Golden Rule. A social optimum is then reached with full deferral of taxation of savings and maximum taxation of interest. If taxes on interest were not constrained by $\beta \leq 1$, even higher tax rates would be chosen.

Note that the financing scheme is tantamount to intergenerational redistribution. With underinvestment, utility in a steady state is maximized by keeping transfers from the young to the old as small as possible, or by making transfers from the old to the young as large as possible. This is achieved by imposing higher taxes on the old and by reducing taxes for the young through both deferring taxation of savings and taxing interest in full. The financing scheme described in Proposition 1 minimizes young-to-old redistribution.

4 Optimal taxation when the old can emigrate

Now suppose that an emigration option exists during old age: at the date of retirement, individuals can move abroad. Emigration is associated with a psychological migration cost m that varies across individuals. In the population under consideration, m is distributed according to some density $f(m)$ and cumulative distribution $F(m)$ with $f(m) > 0$ on $(-\infty, \infty)$. The psychological cost is a pure utility loss and does not enter the budget equation of an individual. Using a direct resource cost of moving would not change the picture qualitatively. The assumption on the migration cost distribution ensures that there are both stayers and migrants irrespective of the tax policy.

We assume that emigrants do not have to pay deferred taxes on the principal s, neither in their home country nor in their host country. However, their capital income will be taxed by their new host country at rate $\hat{\tau}$.

Although emigration reduces the tax base in the home country, we assume that the expenditure level g for the publicly provided good has to be maintained. Such a scenario is particularly relevant in social insurance when benefits (pensions, long-term care etc.) can be claimed from abroad, as it is the case in the EU. Similar results are obtained when emigration decreases the benefit per capita less than proportionally. While such a scenario may be considered as somewhat more realistic, it would involve also a more complicated analysis whithout gaining additional insights.

If the share of emigrants is γ, where γ might be endogenous, the government budget constraint becomes

$$g \geq \tau \left[w - \alpha s_t + (1 - \gamma) s_{t-1} \left(\alpha + \beta r \right) \right]. \tag{11}$$

The difference to (9) consists in the fact that the emigrated elderly do not pay taxes in their home country.

Migration decisions are based on a comparison of consumption levels. Old age consumption of an emigrant abroad equals

$$\widehat{c}_t^o = s_{t-1} \left[1 + r - \widehat{\tau} r \right]. \tag{12}$$

When staying at home, she would consume

$$c_t^o = s_{t-1} \left[1 + r - \tau \left(\alpha + \beta r \right) \right]. \tag{13}$$

Migration will occur if and only if the difference in consumption levels exceeds the migration cost, that is, if $\ln \widehat{c}_t^o - m \geq \ln c_t^o$, or

$$m \leq \overline{m}(\tau, \beta, \alpha) := \ln \frac{1 + r - \hat{\tau} r}{1 + r - \tau(\alpha + \beta r)}. \tag{14}$$

This threshold level of migration cost is independent of both the savings level and the wage rate. The fraction of emigrants is given by

$$\gamma = F(\overline{m}(\tau, \beta, \alpha)). \tag{15}$$

The impact of policy choices on migration decisions is, thus, captured by

$$\frac{\partial \gamma}{\partial x} = f(\bar{m}) \frac{\partial \bar{m}}{\partial x} \tag{16}$$

for $x = \alpha, \beta, \tau$. In particular, the higher the degree of tax deferral, the tax rate on interest, or the general tax rate, the higher is the threshold migration cost, and the more elderly emigrate:

$$\frac{\partial \overline{m}}{\partial \beta} = \frac{r\tau}{1 + r - \tau(\alpha + \beta r)} > 0, \tag{17}$$

$$\frac{\partial \overline{m}}{\partial \alpha} = \frac{\tau}{1 + r - \tau(\alpha + \beta r)} > 0, \tag{18}$$

$$\frac{\partial \overline{m}}{\partial \tau} = \frac{\alpha + \beta r}{1 + r - \tau(\alpha + \beta r)} > 0. \tag{19}$$

Since with our specification of the utility function the rate of return is irrelevant for savings, optimal saving is independent of whether or not the individual will emigrate or stay. Optimal saving and first-period consumption are still given by (5) and (6).

Social welfare is measured by the sum of residents' and emigrants' utilities, net of migration costs:

$$\begin{aligned} W = & \ln\left[\frac{1}{1+\delta} w(1-\tau)\right] \\ & + (1-\gamma)\delta \ln\left[\frac{\delta\left[(1+r) - \tau\left(\alpha + \beta r\right)\right]}{1+\delta} \frac{1-\tau}{1-\alpha\tau} w_t\right] \\ & + \gamma\delta \ln\left[\frac{\delta\left[(1+r) - \hat{\tau}\hat{\beta}r\right]}{1+\delta} \frac{1-\tau}{1-\alpha\tau} w_t\right] - \int_0^{\overline{m}(\tau,\alpha,\beta)} m f(m) dm \end{aligned} \tag{20}$$

Without emigration ($\gamma = 0$), this coincides with the lifetime utility of a representative individual. Keeping the emigrants in the welfare function is conceptionally justified by considering the same reference group irrespective of the extent of migration. From a policy perspective, this treatment seems appropriate in an environment where citizens who move abroad retain their voting rights.

Collecting all constant terms in Ω, we can write social welfare as:

$$\begin{aligned}
W &= \Omega + (1+\delta)\ln(1-\tau) - \delta\ln(1-\alpha\tau) \qquad (21)\\
&\quad +\delta\left[(1-\gamma)\ln(1+r-\tau(\alpha+\beta r)) + \gamma\ln(1+r-\hat{\tau}r)\right]\\
&\quad -\int_0^{\overline{m}(\tau,\alpha,\beta)} mf(m)dm\\
&= \Omega + (1+\delta)\ln(1-\tau) - \delta\ln(1-\alpha\tau)\\
&\quad +\delta\left[\ln(1+r-\tau(\alpha+\beta r)) + \gamma\overline{m}(\tau,\alpha,\beta)\right] - \delta\int_0^{\overline{m}(\tau,\alpha,\beta)} mf(m)dm\\
&\equiv W(\tau,\alpha,\beta).
\end{aligned}$$

Ignoring the repercussions through the government's budget constraint, welfare is higher the lower the tax rate on interest, the larger the degree of tax deferral, and the lower the standard tax rate:

$$\begin{aligned}
\frac{\partial W}{\partial \beta} &= -\frac{\delta r\tau}{1+r-\tau(\alpha+\beta r)} + \delta\frac{\partial\gamma}{\partial\beta}\bar{m} + \delta\gamma\frac{\partial\bar{m}}{\partial\beta} - \delta f(\bar{m})\overline{m}\frac{\partial\bar{m}}{\partial\beta} \qquad (22)\\
&= -\frac{\delta(1-\gamma)r\tau}{1+r-\tau(\alpha+\beta r)} < 0,\\
\frac{\partial W}{\partial \alpha} &= \frac{\delta\tau}{1-\alpha\tau} - \frac{\delta\tau(1-\gamma)}{1+r-\tau(\alpha+\beta r)} \qquad (23)\\
&= \frac{\delta\tau}{1-\alpha\tau}\left[1 - \frac{(1-\gamma)(1-\alpha\tau)}{1+r-\tau(\alpha+\beta r)}\right] > 0,\\
\frac{\partial W}{\partial \tau} &= -\frac{1+\delta}{1-\tau} + \frac{\alpha\delta}{1-\alpha\tau} - \frac{\delta(\alpha+\beta r)}{1+r-\tau(\alpha+\beta r)} + \delta\overline{m}\frac{\partial\gamma}{\partial\tau} \qquad (24)\\
&\quad +\delta\gamma\frac{\partial\overline{m}}{\partial\tau} - \delta\frac{\partial\overline{m}}{\partial\tau}\overline{m}f(\overline{m})\\
&= -\frac{\delta(1-\alpha)+(1-\alpha\tau)}{(1-\alpha\tau)(1-\tau)} + \frac{\alpha+\beta r}{r\tau}\cdot\frac{\partial W}{\partial\beta} < 0.
\end{aligned}$$

Increasing the tax burden β on interest reduces consumption of stayers in old age. Furthermore, some individuals are induced to migrate, changing the composition of stayers and migrants, and increasing aggregate migration costs. As the marginal migrant is indifferent between staying and migrating, all effects associated with migration add up to zero.

Increasing the share of deferred taxation α leaves consumption during working age unaffected and increases savings and consumption of both stayers and migrants. As before, reducing transfers from the young to the old increases lifetime income in a steady state since there is underinvestment. Moreover, more individuals are going to migrate, increasing aggregate migration costs.

Finally, a higher tax rate reduces all consumption levels and thus also social welfare. Again the effects associated with the resulting increase in migration cancel out.

Plugging in savings, the government budget constraint reads:

$$\begin{aligned} g &= \tau w \left[1 - \frac{\delta}{1+\delta} \frac{1-\tau}{1-\alpha\tau} (\gamma\alpha - (1-\gamma)\beta r)\right] \\ : &= G(\tau, \alpha, \beta) \end{aligned} \tag{25}$$

The impact of the three tax parameters on government revenue can be derived as

$$\frac{\partial G}{\partial \beta} = -\tau w \frac{\delta}{1+\delta} \frac{1-\tau}{1-\alpha\tau} \left[\frac{\partial \gamma}{\partial \beta}(\alpha + \beta r) - (1-\gamma) r\right], \tag{26}$$

$$\begin{aligned} \frac{\partial G}{\partial \alpha} &= -\tau w \frac{\delta}{1+\delta} \frac{1-\tau}{(1-\alpha\tau)^2} \left[\frac{\partial \gamma}{\partial \alpha}(\alpha + \beta r)(1-\alpha\tau)\right. \\ &\quad \left. + \gamma - \tau(1-\gamma)\beta r\right], \end{aligned} \tag{27}$$

$$\begin{aligned} \frac{\partial G}{\partial \tau} &= \frac{G}{\tau} - \alpha\tau w \frac{\delta}{1+\delta} \frac{1-\tau}{(1-\alpha\tau)^2} (\gamma\alpha - (1-\gamma)\beta r) \\ &\quad -\tau w \frac{\delta}{1+\delta} \frac{1}{1-\alpha\tau} \left((1-\tau)(\alpha+\beta r)\frac{\partial \gamma}{\partial \tau} - \gamma\alpha + (1-\gamma)\beta r\right). \end{aligned} \tag{28}$$

While expanding interest taxation boosts tax revenue through higher payments of stayers, some revenue from interest and deferred taxation is lost due to additional emigration. Moving towards more deferred taxation shifts some tax load from the young to old stayers. At the same time, some revenue is lost due both to existing and additional migrants. Finally, while increasing the ordinary tax rate increases tax payments of young individuals and old stayers, the tax base also shrinks through induced outmigration.

As before, the government sets $(\tau, \alpha, \beta) \in [0,1]^3$ such as to maximize social welfare subject to $G \geq g$. The Lagrangean is:

$$L = W(\tau, \alpha, \beta) + \lambda(G(\tau, \beta, \alpha) - g) \tag{29}$$

with $\lambda \geq 0$ as multiplier. We again ignore the parameter constraints for α and β to lie in the unit interval and assume that g is sufficiently small to allow for feasible solutions.

In an optimum, we must have $\tau > 0$ and, thus, $\partial L/\partial\tau = 0$. Therefore, the Lagrangean multiplier can be derived as

$$\lambda = -\frac{\partial W/\partial\tau}{\partial G/\partial\tau} = \frac{\dfrac{\delta(1-\alpha)+(1-\alpha\tau)}{(1-\alpha\tau)(1-\tau)} + \dfrac{\alpha+\beta r}{r\tau}\cdot\dfrac{\partial W}{\partial\beta}}{\dfrac{\alpha+\beta r}{r\tau}\cdot\dfrac{\partial G}{\partial\beta} + B} \tag{30}$$

with

$$\begin{aligned} B &= w\left[1-\tau\frac{\delta}{1+\delta}\frac{1-\tau}{1-\alpha\tau}\left(\frac{[\alpha(1-\tau)-\tau(1-\alpha\tau)]\,[\gamma\alpha-(1-\gamma)\beta r]}{(1-\tau)(1-\alpha\tau)}\right.\right. \\ &\quad \left.\left. +\frac{(1-\gamma)(\alpha+\beta r)}{\tau}\right)\right]. \end{aligned} \tag{31}$$

Clearly, full taxation of interest income combined with full deferral of taxation of savings remains optimal if international mobility is sufficiently low. This unsurprising result emerges since immobility is simply a boundary case of low mobility:

Proposition 2 *The optimal tax structure consists in $\alpha = \beta = 1$, that is, full taxation of interest and full deferral of taxation of savings, if mobility is sufficiently low.*

Proof. See Appendix B. □

Although the mobility of the elderly induces pressure to reduce both the degree α of deferred taxation and the level β of interest taxation, the optimal policy can never consist in full immediate taxation plus zero tax on interest, as the migration cost distribution implies that some elderly will always stay in their home country.

Proposition 3 *It is never optimal to implement $\alpha = \beta = 0$, that is, to both fully defer taxation and exempt interest from taxation.*

Proof. See Appendix C. □

Proposition 3 can be interpreted as follows. If possible, it will be welfare increasing to tax old individuals, both by deferred taxation of savings and by taxation of interest income. The same reasoning as in the absence of mobility applies: in an underinvestment scenario, reducing transfers from the young to the old enhances welfare. Of course, taxing the old now induces outmigration. But since at $\alpha = \beta = 0$, where the old remain untaxed, outmigration is not associated with any loss in tax revenue or utility, the only first-order impact of introducing a small tax by marginally increasing α or β lies in redistribution from the old to the young - which is desirable. Hence, $\alpha = \beta = 0$ cannot constitute the optimal policy.

Taxing capital income and deferring taxation of savings are imperfect substitutes for each other. Both instruments shift the burden of taxation from young to old individuals and induce outmigration. Therefore, the possibility of pensioner emigration tends to reduce both the rate at which interest income is taxed and the share of deferred taxation. A complete theoretical characterization of the optimal tax policy is not possible, even in our model with its highly parametric framework. Welfare results appear to depend in a complex way on the migration cost distribution.

Some further insights can, however, be gained from numerical simulation exercises. A particularly relevant case arises by fixing the rate β at which capital income is taxed. Such a scenario is quite common, as international tax agreements in this area will plausibly harmonize the taxation of interest, while leaving the degree of deferred taxation to national discretion. If individuals are immobile, full deferral ($\alpha = 1$) characterizes the optimal tax policy for any fixed level of β according to the proof of Proposition 1 (see equations (33) and (34)). Simulation exercises in the case of mobility indicate that, depending on the level at which β is fixed, the optimal share of deferred taxation can now be at any level $\alpha \in [0, 1]$. Thus, also an interior solution and full immediate taxation of savings can maximize welfare.

The possibility of full deferral ($\alpha = 1$) in the optimum is immediate from Proposition 2, which deals with the case of almost no mobility. When mobility intensifies, deferred taxation comes under pressure. Our examples, available upon request, demonstrate that we generally may obtain optimum values in the interior rather than jumping to the lower boundary $\alpha = 0$. Further, though Proposition 3 excludes $\alpha = \beta = 0$, high mobility in combination with a sufficiently high tax rate on capital income can make full immediate taxation of saving optimal.

Similar results are obtained when α is exogenously fixed at some positive level, leaving the government with discretion only over β. Again, depending on the specification of the distribution of migration costs, β may be optimally set at its upper boundary $\beta = 1$, at its lower boundary, $\beta = 0$, or at some intermediate level.

5 Concluding discussion

Deferred taxation of savings and full taxation of interest is desirable in an economy characterized by no international mobility and dynamic efficiency. This continues to hold as long as pensioner mobility is low. However, an exit option by which migrants can escape from deferred taxation of savings will generally bring down both the optimal tax rate on interest and the degree of deferred taxation of savings. It never makes sense to cut the rate of interest taxation to zero and to simultaneously move to full immediate taxation of savings. Yet, governments may well choose one of these extreme values if the other instrument cannot be moved arbitrarily, for example, due to harmonization agreements with respect to taxation of interest.

This suggests that national governments are well advised to respond to the increased international mobility of the elderly by slowing down their policy shifts towards full deferral of savings. An alternative clearly would be to enforce tax laws also on the emigrants. While this seems relatively easy to implement for public pensions as they can be taxed at source, matters look less promising for private pension plans and other vehicles for private savings which may already be purchased abroad, enabling the individuals to avoid deferred taxation by relocating in old age.

References

Atkinson, A., Sandmo, A., 1980. Welfare implications of the taxation of savings. Economic Journal 90, 529–549.

Auerbach, A. J., Hines, J. R., 2002. Taxation and economic efficiency. In A. J. Auerbach, M. Feldstein (eds.), Handbook of Public Economics, Vol. 3. Amsterdam, North-Holland, 1347–1421.

Banks, J., Diamond, P., 2010. The base for direct taxation. In J. Mirrlees et al. (eds.), Dimensions of Tax Design - The Mirrlees Review. Oxford, Oxford University Press, 548–648.

Bernheim, B.D., 2002. Taxation and saving. In: A. J. Auerbach, M. Feldstein (eds.), Handbook of Public Economics, Vol. 3. Amsterdam, North-Holland, 1173–1249.

Blumkin, T., Sadka, E., 2004. Estate taxation with intended and accidental bequests. Journal of Public Economics 88, 1–21.

Bradford, D., 2000. Taxation, Wealth, and Saving. Cambridge MA, MIT Press.

Burbridge, J., 2004. Tax-deferred savings plans and interest deductibility. Canadian Journal of Economics 37, 757–767.

Chamley, C., 1986. Optimal taxation of capital income in general equilibrium with infinite lives. Econometrica 54, 607–622.

Cremer, H., Pestieau, P., Rochet, J.-C., 2003. Capital income taxation when inherited wealth is not observable. Journal of Public Economics 87, 2475–2490.

Fisher, I., Fisher, H.W., 1942. Constructive Income Taxation. A Proposal for Reform. Harper, Homewood IL.

Grochulski, B., Piskorski, T., 2010. Risky human capital and deferred capital income taxation. Journal of Economic Theory 145, 908–943.

Judd, K. L., 1985. Redistributive taxation in a simple perfect foresight model. Journal of Public Economics 28, 59-83.

Kaldor, N., 1955. An Expenditure Tax. Allen and Unwin.

Appendix

A: Proof of Proposition 1

Optimization with respect to the tax rate obviously requires an interior solution $\tau \in (0, 1)$. Now set up the Lagrangean:

$$L = \ln C^y(\tau) + \delta \ln C^o(\tau, \beta, \alpha) + \lambda(G(\tau, \beta, \alpha) - g) \tag{32}$$

with $\lambda \geq 0$ as multiplier, ignoring the boundary constraints for α and β.

Observe that, for all $\tau \in (0,1)$ and $\beta \in [0,1]$:

$$\frac{\partial C^o}{\partial \alpha} = \frac{\delta}{1+\delta}\frac{w(1-\tau)}{(1-\alpha\tau)^2} r\tau(1-\tau\beta) > 0, \tag{33}$$

$$\frac{\partial G}{\partial \alpha} \geq 0. \tag{34}$$

Hence, the optimal α lies at the upper boundary: $\alpha = 1$. Rewriting the remaining optimization problem yields

$$\begin{aligned} L &= \ln C^y(\tau) + \delta \ln C^o(\tau,\beta,1) + \lambda(G(\tau,\beta,1) - g) \\ &= \ln(1-\tau) + \delta \ln\left(1 + r - \tau(1+\beta r)\right) \\ &\quad + \lambda\left(\tau w \left[1 + \beta r \frac{\delta}{1+\delta}\right] - g\right) + \Psi, \end{aligned} \tag{35}$$

where Ψ collects some constants that are immaterial for the optimization. The derivatives of this Lagrangean are given by

$$\frac{\partial L}{\partial \tau} = -\frac{1}{1-\tau} - \frac{\delta(1+\beta r)}{1+r-\tau(1+\beta r)} + \lambda w \left[1 + \beta r \frac{\delta}{1+\delta}\right], \tag{36}$$

$$\frac{\partial L}{\partial \beta} = \tau r \delta \left(-\frac{1}{1+r-\tau(1+\beta r)} + \lambda \frac{w}{1+\delta}\right). \tag{37}$$

Since τ has to be positive in the interior, $0 < \tau < 1$, the condition $\frac{\partial L}{\partial \tau} = 0$ must hold. Hence,

$$\lambda = \frac{\frac{1}{1-\tau} + \frac{\delta(1+\beta r)}{1+r-\tau(1+\beta r)}}{w\left(1 + \beta r \frac{\delta}{1+\delta}\right)}. \tag{38}$$

Plugging this into $\frac{\partial L}{\partial \beta}$, we obtain

$$\begin{aligned} sgn\left[\frac{\partial L}{\partial \beta}\right] &= sgn\left[-\frac{1+\delta+\delta\beta r}{1+r-\tau(1+\beta r)} + \frac{\delta(1+\beta r)}{1+r-\tau(1+\beta r)} + \frac{1}{1-\tau}\right] \\ &= sgn\left[1 - \tau\beta\right] > 0, \end{aligned} \tag{39}$$

which always holds due to $\tau < 1$. Hence, the optimal β is also at the upper boundary $\beta = 1$. Plugging $\alpha = \beta = 1$ into the budget constraint yields the optimal value for τ.

B: Proof of Proposition 2

Recalling Proposition 1, we only need to check whether the strict inequalities of the derivatives of the Lagrangean with respect to α and β at $\alpha = \beta = 1$ still hold if mobility is allowed for.

The Lagrange multiplier at $\alpha = \beta = 1$ is

$$\lambda|_{\alpha=\beta=1} = \frac{1+\delta(1-\gamma)}{w(1-\tau)\left[1-\tau\frac{\delta}{1+\delta}\left[\gamma-(1-\gamma)r+\frac{\partial\gamma}{\partial\beta}\frac{(1+r)^2}{r}\right]\right]}. \tag{40}$$

Furthermore, we get

$$\begin{aligned}\left.\frac{\partial L}{\partial\beta}\right|_{\alpha=\beta=1} &= -\frac{\delta r\tau}{(1+r)}\frac{(1-\gamma)}{(1-\tau)} \\ &\quad +\lambda\frac{\tau w\delta}{(1+\delta)}\left[(1-\gamma)r-\frac{\partial\gamma}{\partial\beta}(1+r)\right]\end{aligned} \tag{41}$$

and

$$\begin{aligned}\left.\frac{\partial L}{\partial\alpha}\right|_{\alpha=\beta=1} &= \frac{\delta\tau}{1-\tau}\left[1-\frac{1-\gamma}{1+r}\right] \\ &\quad +\lambda\left[\frac{1}{r}\frac{\tau w\delta}{(1+\delta)}\left[(1-\gamma)r-\frac{\partial\gamma}{\partial\beta}(1+r)\right]\right. \\ &\quad \left.-\frac{\tau w\delta}{(1-\tau)(1+\delta)}\left[1-\tau(1-\gamma)(1+r)\right]\right].\end{aligned} \tag{42}$$

If mobility is low, such that γ and $\frac{\partial\gamma}{\partial\beta}$ are close to zero, the multiplier becomes

$$\lambda|_{\alpha=\beta=1} = \frac{1+\delta}{w(1-\tau)\left[1+\tau\frac{\delta}{1+\delta}r\right]}. \tag{43}$$

Moreover, the derivatives of the Lagrangean with respect to α and β are positive:

$$\left.\frac{\partial L}{\partial\beta}\right|_{\alpha=\beta=1,\gamma=\frac{\partial\gamma}{\partial\beta}=0} = \frac{\delta r\tau}{1-\tau}\left[\frac{1}{1+\frac{\delta}{1+\delta}r}-\frac{1}{1+r}\right] > 0 \tag{44}$$

and

$$\left.\frac{\partial L}{\partial\alpha}\right|_{\alpha=\beta=1,\gamma=\frac{\partial\gamma}{\partial\beta}=0} = \frac{\delta r\tau}{(1-\tau)(1+r)}+\lambda\frac{\tau w\delta}{(1+\delta)}\left[1-1+\frac{\tau r}{1-\tau}\right] \tag{45}$$

$$= \frac{\delta r\tau}{(1-\tau)}\left[\frac{1}{1+r}+\frac{\tau}{(1-\tau)\left[1+\tau\frac{\delta}{1+\delta}r\right]}\right]>0.$$

Therefore, if mobility is sufficiently low, $\alpha=\beta=1$ still constitutes the optimal solution.

C: Proof of Proposition 3

Consider $\alpha=0$. Then we get

$$\left.\frac{\partial L}{\partial\alpha}\right|_{\alpha=0} = \delta\tau\left[1-\frac{(1-\gamma)}{1+r(1-\beta\tau)}\right] -\lambda\tau w\frac{\delta(1-\tau)}{1+\delta}\left[\gamma+\beta\frac{\partial\gamma}{\partial\beta}-\tau(1-\gamma)r\beta\right] \tag{46}$$

where the Lagrange multiplier is

$$\lambda|_{\alpha=0} = \left[\frac{1+\delta}{1-\tau}+\beta\frac{\delta(1-\gamma)r}{1+r(1-\beta\tau)}\right] / \left[\beta w\frac{\delta(1-\tau)}{1+\delta}\left[(1-\gamma)r-\frac{\partial\gamma}{\partial\beta}\beta r\right]+B\right]. \tag{47}$$

At $\alpha=\beta=0$, the multiplier simplifies to

$$\lambda|_{\alpha=\beta=0}=\frac{1+\delta}{(1-\tau)w}. \tag{48}$$

Since the assumption on the support of the migration cost distribution implies $\gamma<1$, we arrive at

$$\left.\frac{\partial L}{\partial\alpha}\right|_{\alpha=\beta=0} = \delta\tau\left[1-\frac{1-\gamma}{1+r}\right]-\frac{1+\delta}{(1-\tau)}\tau\frac{\delta(1-\tau)}{1+\delta}\gamma \tag{49}$$

$$= \delta\tau\left[1-\frac{1-\gamma}{1+r}-\gamma\right]$$

$$= \delta\tau(1-\gamma)\left[1-\frac{1}{1+r}\right]>0.$$

Furthermore, at $\beta = 0$,

$$\left.\frac{\partial L}{\partial \beta}\right|_{\beta=0} = -\frac{\delta(1-\gamma)r\tau}{1+r-\tau\alpha} + \lambda\tau w \frac{\delta}{1+\delta}\frac{1-\tau}{1-\alpha\tau}\left[(1-\gamma)r - \frac{\partial\gamma}{\partial\beta}\alpha\right]. \qquad (50)$$

Evaluated at $\alpha = \beta = 0$, this expression simplifies to

$$\begin{aligned}\left.\frac{\partial L}{\partial \beta}\right|_{\alpha=\beta=0} &= -\frac{\delta(1-\gamma)r\tau}{1+r} + \tau\delta\left[(1-\gamma)r\right] \qquad (51)\\ &= \tau\delta\left[(1-\gamma)r\right]\left[1-\frac{1}{1+r}\right] > 0.\end{aligned}$$

Hence, $\alpha = \beta = 0$ can never maximize welfare.