

# Economic Policy Analysis Lectures

## Reforming the Tax System Part II: The Taxation of Savings

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*Teaching Resources at: <https://www.ucl.ac.uk/~uctp39a/lect.html>*

*Mirrlees Review <https://www.ifs.org.uk/publications/mirrleesreview>*

## Some Guiding Principles

- In general, the tax system should be designed to enable consumption and savings choices to be based on trade-offs that reflect the underlying costs of moving productive resources across time – that is, the opportunities for real investment.
- Economic efficiency arguments suggest that the trade-off individuals and households face for consuming tomorrow rather than today should reflect the return to investment in productive capacity in the economy.
- The marginal rate of transformation of consumer goods – the real interest rate.

# Implications

- On this basis the tax system should allow individuals to make their consumption decisions in a way that reflects the true cost of the use of productive resources over time – between current consumption and investment.
- If we define the normal return to be the return on a safe investment, then the normal return reflects this trade-off.
- Taxing (or subsidizing) the normal return on saving will distort the trade-off.

# Guiding Principles for the Taxation of Savings

- As a *counter-example* - if the decision to delay consumption tells us about an individual's earning capacity (e.g. it may be that clever people are patient), then taxing savers may be a useful 'tag' enabling us to tax high-ability people with less distortion to labour supply.
- Remember in a *Mirrlees* tax model the government cannot observe true ability and can only tax income – from earnings and from savings.
  - If savings indicates high ability – high life-time earnings potential – then taxing the return to savings may be optimal - that is high ability types are more patient.
  - It may also be that savings and labour supply are directly linked in preferences - nonseparability.

# Guiding Principles for the Taxation of Savings

A good place to start is the **Atkinson-Stiglitz** theorem (1976, *Journal of Public Economics* 6, 55–75 ) which states:

- When the available tax tools include full nonlinear earnings taxes, differential taxation of first- and second-period consumption is not optimal.

This holds *if* two key conditions are satisfied:

1. all consumers have preferences that are separable between consumption and labour, and
2. all consumers have the same preferences over consumption (the same sub-utility function of consumption).

# The Atkinson Stiglitz Result

- Model with two periods  $t=1$  and  $t=2$ , with no uncertainty.
- Individual gets labor income  $Y_L = w \cdot h$  at  $t=1$  ( $w$  = wage rate,  $h$  = labor supply), and chooses how much to consume  $C_1$  and  $C_2$ .
- Max  $U(C_1, C_2) - V(h)$ 
  - under budget constraint:  $C_1 + C_2/(1+r) = Y_L$ .
- Period 1 *savings*  $S = Y_L - C_1$ ,
- Period 2 *capital* income  $Y_k = (1+r)S = C_2$ ,
- $r$  = rate of return (= marginal product of capital  $F_K$  with production function  $F(K, L)$ )
- >>> taxing capital income  $Y_k$  is like taxing the relative price of period 2 consumption  $C_2$

# The Atkinson Stiglitz Result

- Atkinson-Stiglitz: under additively separable preferences:

$$U(C_1, C_2) - V(h) ,$$

there is no point taxing capital income; it is more efficient to redistribute income by using solely a labor income tax

$$t(Y_L) .$$

- With non-separable preferences:

$$U(C_1, C_2, h) ,$$

it might make sense to tax less the goods that are complements with labour supply (say, tax less day care or baby-sitters, and tax more vacations); but note this requires a lot of information on cross-derivatives.

- If second period leisure time is more complementary with consumption then it may make sense to tax capital income.

## Guiding Principles for the Taxation of Savings (2)

- Returning to the conditions (can be somewhat relaxed):
- The **first** condition states that the marginal benefit derived from consumption over the life-time should not depend on labour supply.
- The **second** requires all consumers to be similar in their desire to smooth consumption across their life-cycle and across potentially uncertain states of the world.
- The theorem refers to not “differentially taxing first- and second-period consumptions.”
- That is, a tax on consumption that is the same in both periods.
- **With no uncertainty and borrowing at the safe rate this is equivalent to exempting interest income from taxation.**



## Guiding Principles for the Taxation of Savings (3)

- It is differential tax rates that matter for efficiency by introducing a “wedge” between the intertemporal marginal rate of substitution (**MRS**) and the intertemporal marginal rate of transformation (**MRT**) between consumer goods in different periods.
- **Two ways** of having differential taxation of consumption in the two periods are:
  1. **through different tax rates on consumption in the two periods and**
  2. **through taxation of the capital income that is received as part of financing second-period consumption out of first-period earnings.**

## Guiding Principles for the Taxation of Savings (4)

- That is, if taxes should not distort the timing of consumption (if the **MRS** should equal the **MRT**), then the optimum is not consistent with taxing these consumer goods other than with equal rates, and thus inconsistent with taxing saving at the margin.
- The theorem extends to having **multiple periods** of consumption.

## A Simple Two-Period Model without Uncertainty

- Consider a two-period model in which an individual receives a fixed income  $Y_1$  (endowment) in period 1 and allocates this between consumption  $C_1$  and  $C_2$  in periods 1 and 2 respectively.
- Savings  $Y_1 - C_1$  earn a known rate of return  $r$ , with the full payout consumed in period 2.
- All individuals can borrow or lend at this risk-free interest rate, which is determined outside the model (perfect capital market; small open economy).
- The individual cares only about consumption, and discounts period 2 utility at the discount rate  $\rho$  (rate of time preference).

## A Two-Period Model without Uncertainty

- In the absence of any tax, the individual chooses  $C_1$  to maximise

$$V = U(C_1) + \left( \frac{1}{1+\rho} \right) U(C_2)$$

subject to  $C_2 = (1+r)(Y_1 - C_1)$  with  $Y_1$  fixed.

## A Two-Period Model without Uncertainty

- Writing

$$V = U(C_1) + \left( \frac{1}{1 + \rho} \right) U((1 + r)(Y_1 - C_1))$$

- we obtain the familiar **Euler equation** for the intertemporal allocation of consumption

$$\frac{\partial V}{\partial C_1} = \frac{\partial U}{\partial C_1} - \left( \frac{1 + r}{1 + \rho} \right) \frac{\partial U}{\partial C_2} = 0 \leftrightarrow \frac{\left( \frac{\partial U}{\partial C_1} \right)}{\left( \frac{\partial U}{\partial C_2} \right)} = \frac{1 + r}{1 + \rho}.$$

## Pure Income Tax

- A tax on income at the constant rate  $t$  implies tax payments of  $tY_1$  on the endowment income in period 1, and  $tr[(1-t)Y_1 - C_1]$  on the interest income in the second period.
- The budget constraint becomes  $C_2 = (1 + (1-t)r)[(1-t)Y_1 - C_1]$  and the first order condition becomes:

$$\frac{\partial V}{\partial C_1} = \frac{\partial U}{\partial C_1} - \left( \frac{1 + (1-t)r}{1 + \rho} \right) \frac{\partial U}{\partial C_2} = 0 \Leftrightarrow \frac{\left( \frac{\partial U}{\partial C_1} \right)}{\left( \frac{\partial U}{\partial C_2} \right)} = \frac{1 + (1-t)r}{1 + \rho}$$

- indicating that, by lowering the rate of return, **the tax on capital income distorts the inter-temporal allocation of consumption.**

## Pure Consumption Tax

- Consumption  $C_i$  in each period ' $i$ ' is taxed at the constant rate  $\tau$ , so that a consumption of  $C_i$  requires an outlay of  $O_i = C_i + \tau C_i = C_i(1 + \tau)$ . Savings are now  $Y_1 - O_1$ , generating an outlay in period 2 of  $O_2 = (1+r)(Y_1 - O_1)$  and consumption in period 2 of  $C_2 = O_2/(1 + \tau)$ .
- The first order condition becomes:

$$\frac{\partial V}{\partial O_1} = \left( \frac{1}{1 + \tau} \right) \left[ \frac{\partial U}{\partial C_1} - \left( \frac{1+r}{1+\rho} \right) \frac{\partial U}{\partial C_2} \right] = 0 \Leftrightarrow \frac{\left( \frac{\partial U}{\partial C_1} \right)}{\left( \frac{\partial U}{\partial C_2} \right)} = \frac{1+r}{1+\rho}$$

- indicating that a tax on consumption levied at a constant rate does not distort the inter-temporal allocation.

## Income Tax with Interest Exemption

- An income tax that exempts interest income implies a tax payment of  $tY_1$  on the endowment income in period 1 only. This is a lump sum tax that does not depend on the individual's consumption choice.
- The budget constraint is now  $C_2 = (1+r)[(1-t)Y_1 - C_1]$  and the first order condition is again

$$\frac{\partial V}{\partial C_1} = \frac{\partial U}{\partial C_1} - \left( \frac{1+r}{1+\rho} \right) \frac{\partial U}{\partial C_2} = 0 \leftrightarrow \frac{\left( \frac{\partial U}{\partial C_1} \right)}{\left( \frac{\partial U}{\partial C_2} \right)} = \frac{1+r}{1+\rho}$$

- and, as expected, there is no distortion to the inter-temporal consumption decision – equivalent to consumption tax in this setting.



# Uncertain Returns

## *Income Tax with Exemption for the Risk-free Rate of Return on Assets*

- Income from capital is now taxed in period 2 at rate  $t$ , with an exemption for the **risk-free rate** of return on assets.
- Income from the safe asset is thus not taxed.
- If the risky asset pays the high rate of return, there is a tax charge of  $t(r^H - r^f)$  on each unit held.
- Symmetrically, if the risky asset pays the low rate of return, there is a tax rebate of  $t(r^L - r^f)$  on each unit held.
- **Exercise: Show this is equivalent to a consumption tax.**

# Key Arguments for Taxing the Return to Saving

## Rents:

- If returns to saving represents pure rents, for example on a holding of land or a monopoly ownership of some resource, then income from savings should be taxed.
- But by how much?
- Notice with uncertainty we only exempt tax on the ‘normal’ return on a safe asset, that is the risk free return.
- Excess returns above this are taxed.
- Consequently rents are captured as excess returns when an allowance for interest payments at the safe rate is made.

# Key Arguments for Taxing the Normal Return to Saving

## Impatience and cognitive ability:

- In experimental psychology there seems to be wide acceptance that higher ability individuals are more patient. Systematically different preferences!
- This gives the high-skill consumers a relatively stronger preference for consumption in the second period of life, and therefore the high-skill save more as a proportion of income than the low-skill.
  - see arguments in Banks and Diamond (*Mirrlees Review*)

# Key Arguments for Taxing the Normal Return to Saving

## 1. Impatience and cognitive ability:

- If the rate of discount varies in a predictable way with productive ability then this gives rise to an optimal tax on the return to risk-free saving.
- The tax on second-period consumption can be achieved by taxing observed saving, and **this will implicitly tax the high-ability types.**
  - for example, *Capital Income Taxes with Heterogeneous Discount Rates* (Johannes Spinnewijn and Peter Diamond) - *AEJ: Economic Policy* 3(4), November 2011

# Key Arguments for Taxing the Normal Return to Saving

## 2. Uncertain earnings ability/individual productivity:

- Suppose an individual is uncertain about his or her ability (productivity) next period
  - they will tend to save ‘too much’.
- That is they will save because they worry they maybe low ability (have low productivity) next period
- If they to have high ability/high productivity they will have saved ‘too much’ and consequently will not work so much. Less than optimal for a high ability/productivity worker,
  - in this case a positive tax on the return to capital/taxation of saving can be optimal – see the discussion of uncertain earnings,
  - *see section 1, page 18 in Banks and Diamond (Mirrlees Review).*

# The Taxation of Savings

## Background readings:

- Auerbach (2006) ‘The Choice between Income and Consumption Taxes: A Primer’ , on website
- Banks and Diamond (2011) *Mirrlees Review, Dimensions of Tax Design*.
- Chapters 13 &14 of *Mirrlees Review: Tax by Design*
- Atkinson and Stiglitz (1976), *Journal of Public Economics* 6, pp55–75.