Lecture 6: Capital Taxes over Time & across Countries
(February 10th 2015)
(check on line for updated versions)
Basic notions & notations

- National income $Y = F(K,L) = Y_K + Y_L = rK + vL$
  
  with $r =$ average rate of return
  
  $v =$ average wage rate

- Individual income $y_i = y_{Ki} + y_{Li} = r_i k_i + v_i l_i$
  
  with $r_i =$ individual rate of return, $v_i =$ individual wage rate

- Individual capital (wealth) $k_i$ comes from past savings and/or from inheritance (or sometime from various forms of appropriations or privatization processes, e.g. for natural resources: land, oil, gold, etc.)

- In order to study capital taxation, one needs to specify where $k_i$ comes from, i.e. one needs a dynamic, multi-period model: static, one-period model are fine to study labor income taxation, but cannot be used to study capital taxation → see next lecture for explicit dynamic models; today = mostly a description of existing capital taxes
Reminder: what is capital?

- $K = \text{real-estate (housing, offices..), machinery, equipment, patents, immaterial capital,..}$
  
  $(\approx \text{housing assets + business assets: about 50-50})$

- $Y_K = \text{capital income = rent, dividend, interest, profits,..}$

- In rich countries, $\beta = K/Y = 5-6$ $\quad (\alpha = Y_K/Y = 25-30\%)$
  
  (i.e. average rate of return $r = \alpha/\beta = 4-5\%$)

- Typically, in France, Germany, UK, Italy, US, Japan: $Y \approx 30\ 000\text{€} \text{ (pretax average income, i.e. national income /population)}$, $K \approx 150\ 000-180\ 000\text{€} \text{ (average wealth, i.e. capital stock/population)}$; net foreign asset positions small in most countries (but rising); see this graph & inequality course for more details
Key distinction: taxes on flows versus stock

- Total tax burden EU27 \( \approx 39\% \) of GDP, incl. 9\% in capital taxes (US: 28\%, incl. 8\% in capital taxes). See Eurostat 2013
- With a capital share \( \alpha = \frac{Y_k}{Y} \approx 30\% \), this is equivalent to an average tax rate \( \approx 30\% \) on all capital income flows
- With a capital/income ratio \( \beta = \frac{K}{Y} \approx 600\% \), this is equivalent to an average tax rate \( \approx 1.5\% \) on the capital stock
  \( \rightarrow \) both forms of capital taxes raise \( \approx 9\% \) of GDP

- In practice, there is a large diversity of capital taxes: \textbf{stock-based} (one-off inheritance and transfer taxes, annual property or wealth taxes) or \textbf{flow-based} (corporate income taxes, taxes on capital income: rental income, interest, dividend, \( k \) gains etc.); why are they not all equivalent?
• In the simplest economic models, we have a general equivalence result: if the rate of return on capital is equal to \( r \) and is the same across all individuals \& over all assets (=perfect capital markets), then a tax at rate \( t_k \) on the capital income flow is exactly equivalent to a tax at rate \( \tau_k \) on the capital stock, with:

\[
\tau_k = r \times t_k, \text{ or } t_k = \frac{\tau_k}{r}
\]

• If \( r=5\% \), it is equivalent to tax capital stock at \( \tau_k=1\% \) per year or to tax capital income flow at \( t_k=20\% \) per year

• If \( r=4\% \), then \( \tau_k=1\% \) on stock \( \leftrightarrow \) \( t_k=25\% \) on income flow
• Exemple: assume that you own an appartement worth \( k = 1 \text{ million } € \), and that its annual rental value is equal to \( y_k = 40 \ 000€ \), i.e. \( r = 4\% \)
• Assume you have to pay a property tax (taxe foncière) at a rate \( \tau_k = 1\% \): \( 1\% \) of \( k = 10 \ 000€ \) in tax
• It is equivalent to pay a tax at rate \( t_k = 25\% \) on the rental income (real or imputed):
  
  \[ 25\% \text{ of } y_k = 40 \ 000€ = 10 \ 000€ \text{ in tax} \]
• Same computations with \( k = 100 \ 000€ \), \( y_k = 4 \ 000€ \)

• Note: in France, average rate of property tax \( \approx 0,5\% \); in the US or UK, it is closer to \( \approx 1\% \)
• In practice, the key reason why taxes on the capital stock and taxes on the capital income flow are not equivalent is the existence of capital market imperfections: the rate of return $r_i$ varies across assets & individuals

• For individuals with $r_i > \text{average } r$, then it is better to have stock taxes than flow taxes (& conversely for individuals with $r_i < \text{average } r$)

• If $r_i=10\%$, $\tau_k=1\%$ on stock $\leftrightarrow t_k=10\%$ on income flow

• If $r_i=2\%$, $\tau_k=1\%$ on stock $\leftrightarrow t_k=50\%$ on income flow

• Key argument in favor of taxes on capital stock rather than on flow (i.e. capital tax rather than income tax): they put incentives to get a high return on $k$ (Allais)
• In the EU & US, capital taxes = 8%-9% GDP
• Typical structure:
  • inheritance taxes <1% GDP 
    (say, 5%-10% of a 10% tax base)
  • + annual wealth & property taxes 1%-2% GDP 
    (say, 0,5% of a 200%-400% tax base)
  • + corporate profits tax 2%-3% GDP 
    (say, 20%-30% of a 10% tax base)
  • + personal capital income tax 2%-3% GDP 
    (say, 20%-30% of a 10% tax base)
Exemple of inheritance taxes

• Basic distinction:

• **Estate taxes**: tax rates depend on the total “estate” (real estate: immobilier + personal estate: mobilier, incl. financial), i.e. the total wealth left by the decedent, irrespective of how it is split between successors
  = **applied in US & UK** (complete testamentary freedom... but egalitarian default rules if no testament)

• **Inheritance taxes**: tax rates depend on the wealth received by each successor (part successorale) and the kin relationship (children vs stangers)
  = **applied in France & Germany** (limited testamentary freedom; rigid transmission rules)

→ in order to understand how the tax is computed, one first needs to understand how the wealth is divided
• Rigid transmission rules in France: the $1/n+1$ rule
• « Réserve héréditaire » (this has to go to the children, no matters what) = $n/n+1$
• « Quotité disponible » (what you can transmit to individuals other than your children) = $1/n+1$, with $n =$ number of children
• With $n = 1$, free disposal of 50% of your wealth
• With $n = 2$, free disposal of 33% of your wealth
• With $n = 3$ or more, free disposal of 25% of your wealth; the other 75% is divided equally among children
• These basic rules were unchanged since 1804
• Default matrimonial regime: « community of acquisition » (« communauté réduite aux acquêts »)
• Married couple wealth \( w = w_c + w_1 + w_2 \)
• with \( w_c = \text{community assets} = \text{assets acquired during marriage} \)
  \( w_1, w_2 = \text{own assets (biens propres) = inherited by each spouse (or acquired before marriage)} \)
• Only \( w_c \) is split 50-50

• Other matrimonial regimes: separate property; universal community (very rare)
French 2012-2013 tax schedule (applied to 2012-2013 decedents):

(\textit{barème des droits de successions})

(see www.impots.gouv.fr)

<table>
<thead>
<tr>
<th>Inheritance brackets (in excess of exemption)</th>
<th>Marginal tax rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 \quad 8,072</td>
<td>5,0%</td>
</tr>
<tr>
<td>8,072 \quad 12,109</td>
<td>10,0%</td>
</tr>
<tr>
<td>12,109 \quad 15,932</td>
<td>15,0%</td>
</tr>
<tr>
<td>15,932 \quad 552,324</td>
<td>20,0%</td>
</tr>
<tr>
<td>552,324 \quad 902,838</td>
<td>30,0%</td>
</tr>
<tr>
<td>902,838 \quad 1,805,677</td>
<td>40,0%</td>
</tr>
<tr>
<td>1,805,677</td>
<td>45,0%</td>
</tr>
</tbody>
</table>

This tax schedule applies "in direct line", i.e. for transmissions from parents to children, on individual estate shares ("parts successorales")

The exemption for children is equal to: \textbf{100 000}

Inter vivos gift: exemption every 15 year

Spouses: tax exempt

Note: until 2011, top rate = 40\% instead of 45\%

Key change in 2012: in 2007-2011, children exemption = 150 000€, every 6 year

I.e. if they start giving to their children at age 50 and die at age 80, each parent could transmit 6 x 150 000€ = 900 000€ to each children with zero tax; i.e. a couple with two children could transmit 3,6 millions € with zero tax.

Since 2012, such parents can "only" transmit 4 x (3 x 100 000€) = 1,2 millions € with zero tax

In practice, less than 5\% of direct line transmissions pay inheritance taxes (but this depends a lot on tax planning)

(in 1992-2006: children exemption = 50 000€, every 10 year)
**Exemple 1: married couple with wealth \( w = 1 \text{ million } \text{€} \) and two kids, no inter vivos gift**

Assumption: each spouse owns 500 000€, and the couple wishes to transmit 500 000€ to each kid.

Assume that the first decedent transmits the full property of 500 000€ to kids; then the second decedent transmits the remaining 500 000€ to the kids.

Inheritance tax at first death:

\[
5\% \times (8 \, 072 - 0) + 10\% \times (12 \, 109 - 8 \, 072) + 15\% \times (15 \, 932 - 12 \, 109) + 20\% \times (250 \, 000 - 15 \, 932 - 100 \, 000) \\
= 28 \, 194 \text{€} = 11,3\% \text{ of } 250 \, 000 \text{€}
\]

Estate tax at second death = same computation = 28 \, 194 \text{€} = 11,3\% \text{ of } 250 \, 000 \text{€}

Total estate tax paid by each children = 56 \, 389 \text{€} = 11,3\% \text{ of } 500 \, 000 \text{€}

Total inheritance tax paid = 112 \, 777 \text{€} = 11,3\% \text{ of } 1,000 \, 000 \text{€}

Effective tax rate = 11,3\% < Marginal tax rate=20\%

**Exemple 2: married couple with wealth \( w = 10 \text{ million } \text{€} \) and two kids, no inter vivos gift**

Assumption: each spouse owns 5 millions €, and the couple wishes to transmit 5 millions € to each kid.

Assume that the first decedent transmits the full property of 5 millions € to kids; then the second decedent transmits the remaining 5 millions € to the kids.

Inheritance tax at first death:

\[
5\% \times (8 \, 072 - 0) + 10\% \times (12 \, 109 - 8 \, 072) + 15\% \times (15 \, 932 - 12 \, 109) + 20\% \times (552 \, 324 - 15 \, 932)
+ 30\% \times (902 \, 838 - 552 \, 324) + 40\% \times (1 \, 805 \, 677 - 902 \, 838) + 45\% \times (2 \, 500 \, 000 - 1 \, 805 \, 677 - 100 \, 000) \\
= 842 \, 394 \text{€} = 33,7\% \text{ of } 2 \, 500 \, 000 \text{€}
\]

Estate tax at second death = same computation = 842 \, 394 \text{€} = 33,7\% \text{ of } 2 \, 500 \, 000 \text{€}

Total inheritance tax paid by each children = 1 \, 684 \, 789 \text{€} = 33,7\% \text{ of } 5 \, 000 \, 000 \text{€}

Total inheritance tax paid = 3 \, 369 \, 577 \text{€} = 33,7\% \text{ of } 10 \, 000 \, 000 \text{€}

Effective tax rate = 33,7\% < Marginal tax rate = 45\%
• Other exemples of computations using tax schedules from France and the US: see excel file

• Chaotic evolution of top inheritance tax rates over time and across countries: see graph

• On the historical evolution of inheritance taxes:
Figure 14.2. Top inheritance tax rates, 1900-2013

The top marginal tax rate of the inheritance tax (applying to the highest inheritances) in the U.S. dropped from 70% in 1980 to 35% in 2013. Sources and series: see piketty.pse.ens.fr/capital21c.
Progressive wealth taxes

• Exemple with French ISF: see excel file

Marginal vs average tax rates: illustration with French 2008-11 Wealth Tax

French 2008 wealth tax schedule (applied to 1/1/2008 wealth):
(\textit{barème de l’impôt sur la fortune (ISF)})

<table>
<thead>
<tr>
<th>threshold (€)</th>
<th>marg. rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>770 000</td>
<td>0.55%</td>
</tr>
<tr>
<td>1 240 000</td>
<td>0.75%</td>
</tr>
<tr>
<td>2 450 000</td>
<td>1.00%</td>
</tr>
<tr>
<td>3 850 000</td>
<td>1.30%</td>
</tr>
<tr>
<td>7 360 000</td>
<td>1.65%</td>
</tr>
<tr>
<td>16 020 000</td>
<td>1.80%</td>
</tr>
</tbody>
</table>

(see www.impots.gouv.fr)

(no major reform in 2008-2011, except small adjustment for inflation)

Exemple with wealth \( w = 1 \) million €

\[0.55\% \times (1\,000\,000 - 770\,000) = 1\,265€ = 0.13\% \text{ of } 1\,000\,000 \,€\]

>>> marginal wealth tax rate = 0.55\%, average wealth tax rate = 0.13\%

Implicit wealth income tax rate:
If \( r = 2\% \), i.e. \( rw = 20\,000 € \), then average wealth income tax rate = 6.32\%
If \( r = 10\% \), i.e. \( rw = 100\,000 € \), then average wealth income tax rate = 1.26\%

Exemple with wealth \( w = 10 \) million €

\[0.55\% \times (1\,240\,000 - 770\,000) + 0.75\% \times (2\,450\,000 - 1\,240\,000) + 1\% \times (3\,850\,000 - 2\,450\,000) + 1.30\% \times (7\,360\,000 - 3\,850\,000) + 1.65\% \times (10\,000\,000 - 7\,360\,000) = 114\,850€ = 1.15\% \text{ of } 10\,000\,000 \,€\]

>>> marginal wealth tax rate = 1.65\%, average wealth tax rate = 1.15\%

Implicit wealth income tax rate:
If \( r = 2\% \), i.e. \( rw = 200\,000 € \), then average wealth income tax rate = 57.43\%
If \( r = 5\% \), i.e. \( rw = 500\,000 € \), then average wealth income tax rate = 22.96\%
If \( r = 10\% \), i.e. \( rw = 1\,000\,000 € \), then average wealth income tax rate = 11.48\%
Marginal vs average tax rates: illustration with French 2012 Wealth Tax

<table>
<thead>
<tr>
<th>Threshold (€)</th>
<th>Marg. Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>800 000</td>
<td>0,50%</td>
</tr>
<tr>
<td>1 310 000</td>
<td>0,70%</td>
</tr>
<tr>
<td>2 570 000</td>
<td>1,00%</td>
</tr>
<tr>
<td>5 000 000</td>
<td>1,25%</td>
</tr>
<tr>
<td>10 000 000</td>
<td>1,50%</td>
</tr>
</tbody>
</table>

French 2013 wealth tax schedule (applied to 1/1/2013 wealth): threshold marg. rate

(Barème de l’impôt sur la fortune (ISF))

(see www.impots.gouv.fr)