Wealth, Inequality & Taxation

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Wealth and inequality in the long run

• Long run distributional trends = key question asked by 19\textsuperscript{C} economists
• Many came with apocalyptic answers
• Ricardo-Marx: a small group in society (land owners or capitalists) will capture an ever growing share of income & wealth
  → no “balanced development path” can occur
• During 20\textsuperscript{C}, a more optimistic consensus emerged: “growth is a rising tide that lifts all boats”
  (Kuznets 1953; cold war context)
• But inequality ↑ since 1970s destroyed this fragile consensus (US 1976-2007: ≈60% of total growth was absorbed by top 1%)
→ 19C economists raised the right questions; we need to address these questions again; we have no strong reason to believe in balanced development path

• 2007-2011 world financial crisis also raised doubts about balanced devt path… will stock options & bonuses, or oil-rich countries, or China, or tax havens, absorb an ever growing share of world resources in 21C capitalism?
Convergence vs divergence

• **Convergence forces do exist**: diffusion of knowledge btw countries (fostered by econ & fin integration) & wth countries (fostered by adequate educ institutions)

• **But divergence forces can be stronger**:
  1. When top earners set their own pay, there’s no limit to rent extraction → top income shares can diverge
  2. The wealth accumulation process contains several divergence forces, especially with r > g → a lot depends on the net-of-tax global rate of return r on large diversified portfolios: if r=5%-6% in 2010-2050 (=what we observe in 1980-2010 for large Forbes fortunes, or Abu Dhabi sovereign fund, or Harvard endowment), then global wealth divergence is very likely
This lecture: two issues

1. The rise of the working rich  (≈1h, slides 1-22)
   - New results from World Top Incomes Database (WTID)
   - Piketty-Saez-Stantcheva, « Optimal Taxation of Top Labor Income: A Tale of Three Elasticities », NBER WP 2011
     (key mechanism: grabbing hand)

2. The return of wealth & inheritance  (≈1h30, slides 23-76)
   - First results from World Wealth Database (preliminary)
     (key mechanism: r>g)
     (r = rate of return to wealth, g = growth rate)
1. The Rise of the Working Rich

- **World top incomes database**: 25 countries, annual series over most of 20C, largest historical data set
- **Two main findings**:
  - **The fall of rentiers**: inequality ↓ during first half of 20C = top capital incomes hit by 1914-1945 capital shocks; did not fully recover so far (long lasting shock + progressive taxation)
    → without war-induced economic & political shock, there would have been no long run decline of inequality; nothing to do with a Kuznets-type spontaneous process
  - **The rise of working rich**: inequality ↑ since 1970s; mostly due to top labor incomes, which rose to unprecedented levels; top wealth & capital incomes also recovering, though less fast
    → **what happened?**
FIGURE 1
The Top Decile Income Share in the United States, 1917-2010

Source: Piketty and Saez (2003), series updated to 2010.
Income is defined as market income including realized capital gains (excludes government transfers).
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FIGURE 2
Decomposing the Top Decile US Income Share into 3 Groups, 1913-2010
Top 1% share: Developing and emerging countries, 1920-2010
Top Decile Income Shares 1910-2010

Why did top incomes rise so much?

• Hard to account for observed cross-country variations with a pure technological, marginal-product story

• One popular view: US today = working rich get their marginal product (globalization, superstars); Europe today (& US 1970s) = market prices for high skills are distorted downwards (social norms, etc.)

→ very naïve view of the top end labor market…

& very ideological: we have zero evidence on the marginal product of top executives; it could well be that prices are distorted upwards…
• A more realistic view: grabbing hand model = marginal products are unobservable; top executives have an obvious incentive to convince shareholders & subordinates that they are worth a lot; no market convergence because constantly changing corporate & job structure (& costs of experimentation → competition not enough)

→ when pay setters set their own pay, there’s no limit to rent extraction... **unless confiscatory tax rates at the very top**

(memo: US top tax rate (1m$+) 1932-1980 = 82%)
(no more fringe benefits than today)
→ see Piketty-Saez-Stantcheva, NBER WP 2011
Optimal Taxation of Top Labor Incomes

- **Standard optimal top tax rate formula:**  $\tau = 1/(1+ae)$
  With: $e =$ elasticity of labor supply, $a =$ Pareto coefficient
  - $\tau \downarrow$ as elasticity $e \uparrow$: don’t tax elastic tax base
  - $\tau \uparrow$ as inequality $\uparrow$, i.e. as Pareto coefficient $a \downarrow$
    (US: $a \approx 3$ in 1970s $\rightarrow \approx 1.5$ in 2010s; $b = a/(a-1) \approx 1.5 \rightarrow \approx 3$)
    (memo: $b = E(y|y>y_0)/y_0 =$ measures fatness of the top)

- **Augmented formula:**  $\tau = (1+tae_2+ae_3)/(1+ae)$
  With $e = e_1 + e_2 + e_3 =$ labor supply elasticity + income shifting elasticity + bargaining elasticity (rent extraction)
  - **Key point:**  $\tau \uparrow$ as elasticity $e_3 \uparrow$
### Table 4: How Much Should We Tax Top Incomes?  
**A Tale of Three Elasticities**

<table>
<thead>
<tr>
<th>Total elasticity ( e = e_1 + e_2 + e_3 = )</th>
<th>0.5</th>
</tr>
</thead>
</table>

**Scenario 1:** Standard supply side tax effects

- \( e_1 = 0.5 \)
- \( e_2 = 0.0 \)
- \( e_3 = 0.0 \)

**Scenario 2:** Tax avoidance effects

- (a) current narrow tax base: \( e_1 = 0.2 \)
- (b) after base broadening: \( e_1 = 0.2 \)
- \( e_2 = 0.3 \)
- \( e_3 = 0.0 \)

**Scenario 3:** Compensation bargaining effects

- \( e_1 = 0.2 \)
- \( e_2 = 0.0 \)
- \( e_3 = 0.3 \)

**Optimal top tax rate** \( t^* = \frac{(1 + t a) e_2 + ae_3}{1 + ae} \)

- **Pareto coefficient** \( a = 1.5 \)
- **Alternative tax rate** \( t = 20\% \)

**Scenario 1**

- \( t^* = 57\% \)

**Scenario 2**

- (a) \( e_2 = 0.3 \)
- \( t^* = 62\% \)
- (b) \( e_2 = 0.1 \)
- \( t^* = 71\% \)

**Scenario 3**

- \( t^* = 83\% \)
A. Changes Top 1% Share and Top Marginal Tax Rate

B. Growth and Change in Top Marginal Tax Rate
2. The return of wealth & inheritance

• The rise of top incomes should fuel the rise of top wealth

• But there are other long-run effects explaining the return of wealth & inheritance

• Two different effects (could go separately):

(2a) The return of wealth
(Be careful with « human capital » illusion: human k did not replace old-style financial & real estate wealth)

(2b) The return of inherited wealth
(Be careful with « war of ages » illusion: the war of ages did not replace class war)
2a. The return of wealth

- The « human capital » illusion: « in today’s modern economies, what matters is human capital and education, not old-style financial or real estate wealth »
- Technocratic model: Parsons, Galbraith, Becker
  (unidimensional class structure based upon human K)
- But the share of old-style capital income (rent, interest, dividend, etc.) in national income is the same in 2010 as in 1910 (about 30%), and the ratio between aggregate private wealth and national income is also the same in 2010 as in 1910 (about 600%)
- Today in France, Italy, UK: \( \beta = \frac{W}{Y} \approx 600\% \)
  Per adult national income \( Y \approx 30\,000\,\text{€} \)
  Per adult private wealth \( W \approx 200\,000\,\text{€} \)
  (wealth = financial assets + real estate assets – financial liabilities)
  (on average, households own wealth equal to about 6 years of income)
• There are several long-run effects explaining the return of high wealth-income ratios:
  - it took a long time to recover from world war shocks (1913 stock mkt & real estate capitalization recovered during 2000s)
  - financial deregulation & tax competition → rising capital shares and wealth-income ratios
  - growth slowdown in rich countries: $r > g$
    → rise of wealth-income and inheritance-income ratios
    + rise of wealth inequality (amplifying mechanism)
    ($r =$ rate of return to wealth, $g =$ productivity growth + pop growth)

• Aggregate effect: Harrod-Domar-Solow formula: $\beta^* = \frac{s}{g}$
  ($\beta^* =$ wealth-income ratio, $s =$ saving rate)
  (i.e. $s=10\%$, $g=2\% \rightarrow \beta^*=500\%$; if $g=1\%$, then $\beta^*=1000\%$)
  (i.e. if we save 10% of income each year, then in the long run we accumulate 5 years of income if growth rate is 2%)
  → highly unstable process if growth rate is low
• Main results from Piketty-Zucman, « Capital is Back: Wealth-Income Ratios in Rich Countries 1870-2010 »
• How do aggregate wealth-income ratios evolve in the long run, and why?
• Until recently, it was impossible to address properly this basic question: national accounts were mostly about flows on income, output, savings, etc., and very little about stocks of assets and liabilities
• In this paper we compile a new data set of national balance sheets in order to address this question:
  - 1970-2010: US, Japan, Germany, France, UK, Italy, Canada, Australia (= top 8 rich countries)
  - 1870-2010: US, Germany, France, UK (official national accounts + historical estimates)
• **Result 1**: we find in every country a gradual rise of wealth-income ratios over 1970-2010 period, from about 200%-300% in 1970 to 400%-600% in 2010.

• **Result 2**: in effect, today’s ratios seem to be returning towards the high values observed in 19th century Europe (600%-700%).

• This can be accounted for by a combination of factors:
  - Politics: long run asset price recovery effect (itself driven by changes in capital policies since WWs)
  - Economics: slowdown of productivity and pop growth

Harrod-Domar-Solow: wealth-income ratio $\beta = \frac{s}{g}$

If saving rate $s=10\%$ & growth rate $g=3\%$, then $\beta \approx 300\%

But if $s=10\%$ & $g=1.5\%$, then $\beta \approx 600\%$

Explains long run change & level diff Europe vs US
Authors' computations using country national accounts. Private wealth = non-financial assets + financial assets - financial liabilities (household & non-profit sectors)
Private wealth / national income ratios, 1970-2010 (incl. Spain)

Authors' computations using country national accounts. Private wealth = non-financial assets + financial assets - financial liabilities (household & non-profit sectors)
Private wealth / national income ratios in Europe, 1870-2010

Authors' computations using country national accounts. Private wealth = non-financial assets + financial assets - financial liabilities (household & non-profit sectors).
Private wealth / national income ratios 1870-2010

Authors’ computations using country national accounts. Private wealth = non-financial assets + financial assets - financial liabilities (household & non-profit sectors)
• **Lesson 1**: one-good capital accumulation model with factor substitution works relatively well in the long run; but in short & medium run, volume effects (saving flows) can be vastly dominated by relative price effects (capital gains or losses)

• **Lesson 2**: long run wealth-income ratios $\beta = s/g$ can vary a lot btw countries: $s$ and $g$ determined by diff. forces; countries with low $g$ and high $s$ naturally have high $\beta$; high $\beta$ is not bad per se (capital is useful); but **high $\beta$ raises new issues about capital regulation and taxation**:

• With integrated capital markets, this can generate large net foreign asset positions, even in the absence of income diff (or reverse to income diff); so far net positions are smaller than during colonial period; but some countries positions are rising fast (Japan, Germany,..)

• With limited capital mobility, and/or home portfolio biaias, high $\beta$ can lead to large domestic asset price bubbles: see Japan, UK, Italy, France, Spain,..
• **Lesson 3: wealth and technology in 21c : σ>1**
  Global rate of return r doesn’t seem to decline as much as the rise in global β, i.e. global capital share α=rβ↑ as β↑ since 1970 → long run K/L elasticity of substitution σ>1, or rising market power for K, or both ?

• **Lesson 4: wealth and technology in 18c : σ<1**
  • In the very long run, i.e. using national wealth estimates over 1700-2010 for UK & France, we find β stable around 600%-700%, in spite of huge changes in wealth composition, from agricultural land to manufacturing and housing
  • In agrarian, very-low-growth societies, however, it is unclear which forces dominate: β = s/g or β = α/r ? Probably β = α/r
  • I.e. with α = capital share = mostly land rent: determined by technology, politics, & land availability (α≈30%-40% in Europe, vs 10%-15% in land-rich New world, i.e. elast. subst. σ<1), and r = rate of return = 4%-5% = rate of time preference → β = 600%-700% in Europe, vs 200%-300% in New World (simply bc very abundant land is worthless; nothing to do with the β = s/g mechanism, which bumped it in later, with migration)
The changing nature of national wealth, UK 1700-2010

National wealth = agricultural land + housing + other domestic capital goods + net foreign assets

Net foreign assets
Other domestic capital
Housing
Agricultural land
Concepts & methods

- National income \( Y = \text{domestic output } Y_d + r \text{ NFA} \)
- Private wealth \( W = \text{non-financial assets + financial assets – financial liabilities } \) (household & non-profit sector)
- \( \beta = W/Y = \text{private wealth-national income ratio} \)

- Govt wealth \( W_g = \text{non-fin + fin assets - fin liab (govt sector)} \)
- National wealth \( W_n = W + W_g = K + \text{NFA} \)
  
  with \( K \) = domestic capital (= land + housing + other domestic \( k \))
  
  \( \text{NFA} = \text{net foreign assets} \)
- \( \beta_n = W_n/Y = \text{national wealth-national income ratio} \)

- Domestic output \( Y_d = F(K,L) \) (\( L \) = labor input) (e.g. \( K^\alpha L^{1-\alpha} \))
- Capital share \( \alpha = r \beta \) (\( r \) = average rate of return to wealth)
• **One-good capital accumulation model:** $W_{t+1} = W_t + s_t Y_t$
  \[ \beta_{t+1} = \beta_t \frac{1+g_{wt}}{1+g_t} \]
  With $1+g_{wt} = 1+s_t/\beta_t = \text{saving-induced wealth growth rate}$
  $1+g_t = Y_{t+1}/Y_t = \text{exogenous output growth rate (productiv. + pop)}$

• With fixed saving rate $s_t=s$ and growth rate $g_t=g$, then:
  $\beta_t \to \beta = s/g$ (Harrod-Domar-Solow steady-state formula)

• E.g. if $s=10\% \& g=2\%$, then $\beta = 500\%$

• **Pure accounting formula:** valid with any saving motive or utility function, i.e. wherever $s$ comes from

• Wealth or bequest in the utility function: saving rate $s$ set by $u()$ (intensity of wealth or bequest taste) and/or demographic structure; then $\beta=s/g$ follows

• Dynastic utility: rate or return $r$ set by $u()$; if $\alpha$ set by technology, then $\beta = \alpha/r$ follows ($s=\alpha g/r$, so $\beta=\alpha/r=s/g$)

• With general utility functions, both $s$ and $r$ are jointly determined by $u()$ and technology
- **Two-good capital accumulation model**: one capital good, one consumption good
- Define $1+q_t = \text{real rate of capital gain (or capital loss)}$
  $= \text{excess of asset price inflation over consumer price inflation}$
- Then $\beta_{t+1} = \beta_t \frac{(1+g_{wt})(1+q_t)}{(1+g_t)}$
  With $1+g_{wt} = 1+s_t/\beta_t = \text{saving-induced wealth growth rate}$
  $1+q_t = \text{capital-gains-induced wealth growth rate}$

Our empirical strategy:
- we do not specify where $q_t$ come from (maybe stochastic production functions to produce capital vs consumption good, with diff. rates of technical progress);
- we observe $\beta_t, \ldots, \beta_{t+n}, s_t, \ldots, s_{t+n}, g_t, \ldots, g_{t+n}$, and we decompose the wealth accumulation equation between years $t$ and $t+n$ into volume (saving) vs price effect (capital gain or loss)
Decomposition results: 1970-2010

• Annual series for top 8 rich countries, 1970-2010
• Additive vs multiplicative decomposition of wealth accumulation equation into volume vs price effects
• Private saving (personal + corporate) vs personal
• Private wealth vs national wealth accumulation
• Domestic capital vs foreign wealth accumulation

• **Main conclusion**: capital gains account for a small part of the aggregate level of 2010 wealth accumulation (10%-20%), but for a significant part of the rise in wealth-income ratios between 1970 and 2010 (30%-50%+)

→ we need to put 1970-2010 period into longer perspective
Authors' computations using country national accounts. Private wealth = non-financial assets + financial assets - financial liabilities (household & non-profit sectors)
## Table 2: Growth rate vs private saving rate in rich countries, 1970-2010

<table>
<thead>
<tr>
<th>Real growth rate of national income</th>
<th>Population growth rate</th>
<th>Real growth rate of per capita national income</th>
<th>Net private saving rate (personal + corporate) (% national income)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>2.8%</td>
<td>1.0%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Japan</td>
<td>2.5%</td>
<td>0.5%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Germany</td>
<td>2.0%</td>
<td>0.2%</td>
<td>1.8%</td>
</tr>
<tr>
<td>France</td>
<td>2.2%</td>
<td>0.5%</td>
<td>1.7%</td>
</tr>
<tr>
<td>U.K.</td>
<td>2.2%</td>
<td>0.3%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Italy</td>
<td>1.9%</td>
<td>0.3%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Australia</td>
<td>3.2%</td>
<td>1.4%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>
Predicted wealth / income ratio 2010 (on the basis of 1970 initial wealth and 1970-2010 cumulated saving flows) (additive decomposition, incl. R&D)
<table>
<thead>
<tr>
<th>Country</th>
<th>Private wealth-national income ratios</th>
<th>Decomposition of 2010 private wealth-national income ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Initial wealth effect</td>
</tr>
<tr>
<td>U.S.</td>
<td>342%</td>
<td>410%</td>
</tr>
<tr>
<td>Japan</td>
<td>299%</td>
<td>601%</td>
</tr>
<tr>
<td>Germany</td>
<td>225%</td>
<td>415%</td>
</tr>
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<td>France</td>
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<td>575%</td>
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<td>522%</td>
</tr>
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<td>239%</td>
<td>676%</td>
</tr>
<tr>
<td>Canada</td>
<td>247%</td>
<td>416%</td>
</tr>
<tr>
<td>Australia</td>
<td>330%</td>
<td>518%</td>
</tr>
</tbody>
</table>

Table 3: Accumulation of private wealth in rich countries, 1970-2010 (additive decomposition)
<table>
<thead>
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<tbody>
<tr>
<td></td>
<td>( \beta ) (1970)</td>
<td>( \beta ) (2010)</td>
<td>( g_w )</td>
</tr>
<tr>
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</tr>
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<td>518%</td>
<td>4.4%</td>
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</table>

Table 4: Accumulation of private wealth in rich countries, 1970-2010 (multiplicative decomposition)
<table>
<thead>
<tr>
<th>Country</th>
<th>Net private savings (personal + corporate)</th>
<th>incl. personal savings</th>
<th>incl. corporate savings (retained earnings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>7.7%</td>
<td>4.6%</td>
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<tr>
<td></td>
<td></td>
<td>60%</td>
<td>40%</td>
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<tr>
<td>Japan</td>
<td>14.6%</td>
<td>6.8%</td>
<td>7.8%</td>
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<td></td>
<td></td>
<td>47%</td>
<td>53%</td>
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<tr>
<td>Germany</td>
<td>12.2%</td>
<td>9.4%</td>
<td>2.9%</td>
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<td></td>
<td></td>
<td>76%</td>
<td>24%</td>
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<tr>
<td>France</td>
<td>11.1%</td>
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<td></td>
<td></td>
<td>81%</td>
<td>19%</td>
</tr>
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<td>U.K.</td>
<td>7.3%</td>
<td>2.8%</td>
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<td></td>
<td></td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td>Italy</td>
<td>15.0%</td>
<td>14.6%</td>
<td>0.4%</td>
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<td></td>
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<td>97%</td>
<td>3%</td>
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<td>Canada</td>
<td>12.1%</td>
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<tr>
<td>Australia</td>
<td>9.9%</td>
<td>5.9%</td>
<td>3.9%</td>
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<tr>
<td></td>
<td></td>
<td>60%</td>
<td>40%</td>
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</table>
Private vs government wealth, 1970-2010 (% national income)

Authors' computations using country national accounts. Government wealth = non-financial assets + financial assets - financial liabilities (govt sector)
Authors' computations using country national accounts. National wealth = private wealth + government wealth
Predicted wealth / income ratio 2010 (on the basis of 1970 initial wealth and 1970-2010 cumulated saving flows) (additive decomposition, incl. R&D)
<table>
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<tr>
<th>Average saving rates 1970-2010 (% national income)</th>
<th>Net national saving (private + government)</th>
<th>incl. private saving</th>
<th>incl. government saving</th>
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<tbody>
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<td>U.S.</td>
<td>5.2%</td>
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<td>-2.4%</td>
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<td>Japan</td>
<td>14.6%</td>
<td>14.6%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Germany</td>
<td>10.2%</td>
<td>12.2%</td>
<td>-2.1%</td>
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<td>-1.9%</td>
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<td>Italy</td>
<td>8.5%</td>
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<td>-6.5%</td>
</tr>
<tr>
<td>Canada</td>
<td>10.1%</td>
<td>12.1%</td>
<td>-2.0%</td>
</tr>
<tr>
<td>Australia</td>
<td>8.9%</td>
<td>9.9%</td>
<td>-0.9%</td>
</tr>
</tbody>
</table>
National vs foreign wealth, 1970-2010 (% national income)

Authors' computations using country national accounts. Net foreign wealth = net foreign assets owned by country residents in rest of the world (all sectors)
<table>
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<td>4%</td>
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<td>616%</td>
</tr>
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<td>Germany</td>
<td>312%</td>
<td>8%</td>
<td>418%</td>
</tr>
<tr>
<td>France</td>
<td>304%</td>
<td>11%</td>
<td>605%</td>
</tr>
<tr>
<td>U.K.</td>
<td>365%</td>
<td>6%</td>
<td>527%</td>
</tr>
<tr>
<td>Italy</td>
<td>259%</td>
<td>12%</td>
<td>609%</td>
</tr>
<tr>
<td>Canada</td>
<td>284%</td>
<td>-41%</td>
<td>412%</td>
</tr>
<tr>
<td>Australia</td>
<td>391%</td>
<td>410%</td>
<td>584%</td>
</tr>
</tbody>
</table>
National income / domestic product ratios, 1970-2010

Authors' computations using country national accounts. National income = domestic product + net foreign income
Domestic capital / output ratios, 1970-2010

Authors' computations using country national accounts. Domestic capital/output ratio = (national wealth - foreign wealth)/domestic product
Table 16: Domestic capital accumulation in rich countries, 1970-2010: housing vs other domestic capital

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
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<td>incl. Other domestic capital</td>
<td>incl. Other domestic capital</td>
<td>incl. Other domestic capital</td>
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<tr>
<td>U.S.</td>
<td>381%</td>
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<td>142%</td>
<td>182%</td>
<td>41%</td>
</tr>
<tr>
<td></td>
<td>239%</td>
<td>262%</td>
<td>23%</td>
</tr>
<tr>
<td>Japan</td>
<td>356%</td>
<td>548%</td>
<td>192%</td>
</tr>
<tr>
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<td>131%</td>
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<td>89%</td>
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<td>225%</td>
<td>328%</td>
<td>103%</td>
</tr>
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<tr>
<td>France</td>
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<tr>
<td></td>
<td>104%</td>
<td>371%</td>
<td>267%</td>
</tr>
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<td>236%</td>
<td>247%</td>
<td>11%</td>
</tr>
<tr>
<td>U.K.</td>
<td>359%</td>
<td>548%</td>
<td>189%</td>
</tr>
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<td></td>
<td>98%</td>
<td>300%</td>
<td>202%</td>
</tr>
<tr>
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<td>261%</td>
<td>248%</td>
<td>-13%</td>
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<td>Italy</td>
<td>247%</td>
<td>640%</td>
<td>392%</td>
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<td>107%</td>
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<tr>
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<td>141%</td>
<td>254%</td>
<td>113%</td>
</tr>
<tr>
<td>Canada</td>
<td>325%</td>
<td>422%</td>
<td>97%</td>
</tr>
<tr>
<td></td>
<td>108%</td>
<td>208%</td>
<td>101%</td>
</tr>
<tr>
<td></td>
<td>217%</td>
<td>213%</td>
<td>-4%</td>
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<td>655%</td>
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</tr>
<tr>
<td></td>
<td>172%</td>
<td>364%</td>
<td>193%</td>
</tr>
<tr>
<td></td>
<td>239%</td>
<td>291%</td>
<td>52%</td>
</tr>
</tbody>
</table>
Decomposition results: 1870-2010

- Annual series for US, Germany, France, UK, 1870-2010
- Additive vs multiplicative decomposition of wealth accumulation equation into volume vs price effects
- Private saving (personal + corporate) vs personal
- Private wealth vs national wealth accumulation
- Domestic vs foreign wealth accumulation

**Main conclusion**: over the entire 1910-2010 period, capital gains wash out; i.e. 1910-1950 fall in relative asset price compensated by 1950-2010 (except in Germany, where asset prices seem abnormally low: stakeholder effect?)

- In the long run (1870-2010 or 1910-2010), changes in wealth-income ratios are well accounted for by $\beta = s/g$
Very long run results: 1700-2010

• For the UK and France, there are national balance sheets estimates starting around 1700-1750 (and for the US, starting around 1770-1800)
• These estimates are less precise than post-1870 series; in particular one cannot properly identify volume vs price effects in wealth accumulation equations: saving and investment series are too approximate, and with g very small (typically 1% or less), any small change in s generates huge changes in \( \beta = s/g \)
• However it is still interesting to use these estimates, because they reveal interesting patterns about the changing nature of wealth and technology in the very long run
• **Main conclusion:** In the very long run, we find \( \beta \) relatively stable around 600%-700% in UK & France, in spite of huge changes in wealth composition, from agricultural land to manufacturing capital and housing
The changing nature of national wealth, UK 1700-2010

National wealth = agricultural land + housing + other domestic capital goods + net foreign assets

- Net foreign assets
- Other domestic capital
- Housing
- Agricultural land
The changing nature of national wealth, France 1700-2010

National wealth = agricultural land + housing + other domestic capital goods + net foreign assets
The changing nature of national wealth, US 1770-2010

National wealth = agricultural land + housing + other domestic capital goods + net foreign assets
The changing nature of national wealth, US 1770-2010 (incl. slaves)

National wealth = agricultural land + housing + other domestic capital goods + net foreign assets
The changing nature of national wealth, Canada 1860-2010

National wealth = agricultural land + housing + other domestic capital - net foreign liabilities
• **Why is** $\beta$ **stable around 600%-700% in the very long run in UK & France?**

• In agrarian, very-low-growth societies, it is unclear which forces dominate: $\beta = s/g$ or $\beta = \alpha/r$? Probably $\beta = \alpha/r$

• I.e. with $\alpha =$ capital share = mostly land rent: determined by technology, politics, & land availability ($\alpha \approx 30\%-40\%$ in Europe, vs $10\%-15\%$ in land-rich New world, i.e. elasticity of substitution $\sigma < 1$), and $r =$ rate of return $= 4\%-5\% =$ rate of time preference

$\rightarrow \beta = 600\%-700\%$ in Europe, vs $200\%-300\%$ in New World

(simply because very abundant land is worthless: new world had more land in volume, but less land in value)

(nothing to do with the $\beta = s/g$ mechanism, which bumped it in later, with migration)
• **Capital is back**: the low wealth-income ratios observed in Europe in 1950s-1970s (200%-300%) were an anomaly; with low growth, long run wealth-income ratios are naturally very large (600%-700%); key is \( \beta = \frac{s}{g} \)

• There’s nothing bad about the return of capital: \( k \) is useful; but it raises new issues about \( k \) regulation & taxation

• National accounts used to be mostly about flows; we now need to focus on stocks

• Next steps: **Dynamics of world distribution of wealth**: Will China or global billionnaires own the world? Both divergence can occur, but 2nd one more likely, esp. if \( r > g \)

• Inherited vs self-made wealth: long-run U-shaped pattern in France; on-going work on UK, Germany & US
2b. The return of inherited wealth

- In principle, one could very well observe a return of wealth without a return of inherited wealth
- I.e. it could be that the rise of aggregate wealth-income ratio is due mostly to the rise of life-cycle wealth (pension funds)
- Modigliani life-cycle theory: people save for their old days and die with zero wealth, so that inheritance flows are small
- However the Modigliani story happens to be wrong (except in the 50s-60s, when there’s not much left to inherit…)
- Inheritance flow-private income ratio $B/Y = \mu m W/Y$
  (with $m =$ mortality rate, $\mu =$ relative wealth of decedents)
- $B/Y$ has almost returned to 1910 level, both because of $W/Y$ and because of $\mu$: with $g$ low & $r>g$, $B/Y \rightarrow \beta/H$
  $\rightarrow$ with $\beta=600\%$ & $H=$generation length=30 years, then $B/Y \approx 20\%$, i.e. annual inheritance flow $\approx 20\%$ national income
Figure 1: Annual inheritance flow as a fraction of national income, France 1820-2008

- Economic flow (computed from national wealth estimates, mortality tables and observed age-wealth profiles)
- Fiscal flow (computed from observed bequest and gift tax data, inc. tax exempt assets)
Figure 2: Annual inheritance flow as a fraction of disposable income, France 1820-2008

- Economic flow (computed from national wealth estimates, mortality tables and observed age-wealth profiles)
- Fiscal flow (computed from observed bequest and gift tax data, inc. tax exempt assets)
• An annual inheritance flow around 20%-25% of disposable income is a very large flow

• E.g. it is much larger than the annual flow of new savings (typically around 10%-15% of disposable income), which itself comes in part from the return to inheritance (it’s easier to save if you have inherited your house & have no rent to pay)

• An annual inheritance flow around 20%-25% of disposable income means that total, cumulated inherited wealth represents the vast majority of aggregate wealth (typically above 80%-90% of aggregate wealth), and vastly dominates self-made wealth
• **Main lesson:** with \( r > g \), inheritance is bound to dominate new wealth; the past eats up the future

Note: \( r = \) rate of return to capital = \((\text{net profits} + \text{rents})/(\text{net financial} + \text{real estate wealth})\); \( g = \) growth rate \((g+n)\)

• **Intuition:** with \( r > g \) & \( g \) low (say \( r=4\%-5\% \) vs \( g=1\%-2\% \)), wealth coming from the past is being capitalized faster than growth; heirs just need to save a fraction \( g/r \) of the return to inherited wealth \( \rightarrow b_y = \beta/H \) (with \( \beta = W/Y \))

\( \rightarrow \) with \( \beta = 600\% \) & \( H = 30 \), then \( b_y = 20\% \)

• It is only in countries & time periods with \( g \) exceptionally high that self-made wealth dominates inherited wealth (OECD in 1950s-70s or China today)

• \( r > g \) also has an amplifying effect on wealth inequality
<table>
<thead>
<tr>
<th>Shares in aggregate labor income or inherited wealth</th>
<th>Labor income 1910-2010</th>
<th>Inherited wealth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top 10% &quot;Upper Class&quot;</strong></td>
<td>30%</td>
<td>90%</td>
</tr>
<tr>
<td>incl. Top 1% &quot;Very Rich&quot;</td>
<td>6%</td>
<td>50%</td>
</tr>
<tr>
<td>incl. Other 9% &quot;Rich&quot;</td>
<td>24%</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Middle 40% &quot;Middle Class&quot;</strong></td>
<td>40%</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Bottom 50% &quot;Poor&quot;</strong></td>
<td>30%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Table 3: Intra-cohort distributions of labor income and inheritance, France, 1910 vs 2010
2c. Implications for optimal capital taxation

- Main results from Piketty-Saez, « A Theory of Optimal Capital Taxation »
- **Result 1: Optimal Inheritance Tax Formula**
- Simple formula for optimal bequest tax rate expressed in terms of estimable parameters:

\[
\tau_B = \frac{1-(1-\alpha-\tau)s_{b_0}/b_y}{1+e_B+s_{b_0}}
\]

with: \(b_y\) = bequest flow, \(e_B\) = elasticity, \(s_{b_0}\) = bequest taste

→ \(\tau_B\) increases with \(b_y\) and decreases with \(e_B\) and \(s_{b_0}\)

- For realistic parameters: \(\tau_B=50-60\%\) (or more..or less...)

→ our theory can account for the variety of observed top bequest tax rates (30%-80%)
• **Result 2: Optimal Capital Tax Mix**

• **K market imperfections** (e.g. uninsurable idiosyncratic shocks to rates of return) can justify shifting one-off inheritance taxation toward lifetime capital taxation (property tax, K income tax,..)

• **Intuition**: what matters is capitalized bequest, not raw bequest; but at the time of setting the bequest tax rate, there is a lot of uncertainty about what the rate of return is going to be during the next 30 years → so it is more efficient to split the tax burden

→ **our theory can explain the actual structure & mix of inheritance vs lifetime capital taxation**

(∪ why high top inheritance and top capital income tax rates often come together, e.g. US-UK 1930s-1980s)
• Meritocratic rawlsian optimum, i.e. social optimum from the viewpoint of zero bequest receivers (z=0):

**Proposition** (zero-receivers tax optimum)

\[ \tau_B = \frac{1-(1-\alpha-\tau)s_{b_0}/b_y}{1+e_B+s_{b_0}} \]

with: \( s_{b_0} = \) average bequest taste of zero receivers

• \( \tau_B \) increases with \( b_y \) and decreases with \( e_B \) and \( s_{b_0} \)
• If bequest taste \( s_{b_0}=0 \), then \( \tau_B = 1/(1+e_B) \)
  \( \rightarrow \) standard revenue-maximizing formula
• If \( e_B \to +\infty \), then \( \tau_B \to 0 \) : back to Chamley-Judd
• If \( e_B=0 \), then \( \tau_B < 1 \) as long as \( s_{b_0} > 0 \)
• I.e. zero receivers do not want to tax bequests at 100%, because they themselves want to leave bequests
  \( \rightarrow \) **trade-off between taxing rich successors from my cohort vs taxing my own children**
Example 1: $\tau=30\%, \alpha=30\%, s_{bo}=10\%, e_B=0$

- If $b_y=20\%$, then $\tau_B=73\%$ & $\tau_L=22\%$
- If $b_y=15\%$, then $\tau_B=67\%$ & $\tau_L=29\%$
- If $b_y=10\%$, then $\tau_B=55\%$ & $\tau_L=35\%$
- If $b_y=5\%$, then $\tau_B=18\%$ & $\tau_L=42\%$

→ with high bequest flow $b_y$, zero receivers want to tax inherited wealth at a higher rate than labor income (73% vs 22%); with low bequest flow they want the opposite (18% vs 42%)

**Intuition**: with low $b_y$ (high g), not much to gain from taxing bequests, and this is bad for my own children

With high $b_y$ (low g), it’s the opposite: it’s worth taxing bequests, so as to reduce labor taxation and allow zero receivers to leave a bequest
Example 2: \( \tau=30\%, \alpha=30\%, s_{bo}=10\%, b_y=15\% \)

- If \( e_B=0 \), then \( \tau_B=67\% \) & \( \tau_L=29\% \)
- If \( e_B=0.2 \), then \( \tau_B=56\% \) & \( \tau_L=31\% \)
- If \( e_B=0.5 \), then \( \tau_B=46\% \) & \( \tau_L=33\% \)
- If \( e_B=1 \), then \( \tau_B=35\% \) & \( \tau_L=35\% \)

→ behavioral responses matter but not hugely as long as the elasticity \( e_B \) is reasonable

Kopczuk-Slemrod 2001: \( e_B=0.2 \) (US)

(French experiments with zero-children savers: \( e_B=0.1-0.2 \))
General conclusion

• One substantial conclusion: a world with $g$ low & $r > g$ is gloomy for workers with zero initial wealth… especially if global tax competition drives capital taxes to 0%… especially if top labor incomes take a rising share of aggregate labor income → divergence forces can be stronger than convergence forces

• One methodological conclusion: there is a lot to learn from the long run evolution of income and wealth concentration; the analysis of socially optimal tax policy must be more closely related to empirical parameters