Econ 230B – Graduate Public Economics

Capital taxation: a historical perspective

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Roadmap

1. What are capital taxes?
2. The history of capital taxes
3. Who pays capital taxes?
4. Inheritance and its taxation in the long run

1 What are capital taxes?

- Taxes on the stock of capital: one-off taxes (inheritance, estates, gifts) vs. annual taxes (property, wealth)

- Taxes on the flow of capital income: corporate level (corporate profits) vs. individual level (dividends, interest, rents, capital gains)

- Capital taxes T_k account for a sizable but falling share of government revenue T

- In the US: T_k about 25% of government revenue T

Macro capital tax rates in the US (2018)

- In the US, capital taxes $T_K = 25\%$ of total tax revenue T
- $T \approx$ 30% of total national income $Y \to T_K = 7.5\%$ of Y
- Capital income $Y_K = 30\%$ of Y
  (Capital/income ratio $\beta = K/Y \approx 500\%$; $r \approx 6\% \to$
  $\alpha = r \cdot \beta = 30\%$)
- Macro capital tax rate $\tau_K = T_K/Y_K \approx$ 25%

The structure of capital taxes in the US (2018)

- Corporate tax $=$ 1.5% of Y (around 10% of a 15% tax base)

- Annual property taxes $=$ 3% of Y (around 1% of a 300% tax base)

- Personal taxes on capital income $=$ 2.8% of Y
  (Around 20% of a 14% tax base)
  (Tax base: around 65% of Y is taxable, of which capital income is a bit more than 20%)

- Estates $=$ 0.2% of Y (around 2% of a 10% tax base)

Taxing flows vs. taxing stocks

- If rate of return r is the same for all individuals and assets, then flow and stock capital taxes are equivalent

- Ex: 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

- In practice returns differ; individual i prefers stock taxes if $r_i > r$

- Argument in favor of taxes on stock rather than on flow: they put incentives to get a high return on capital (Allais, 1966, 1977)

- See Guvenen et al. (2017) for recent analysis

2 The history of capital taxes

The property tax: the oldest capital tax

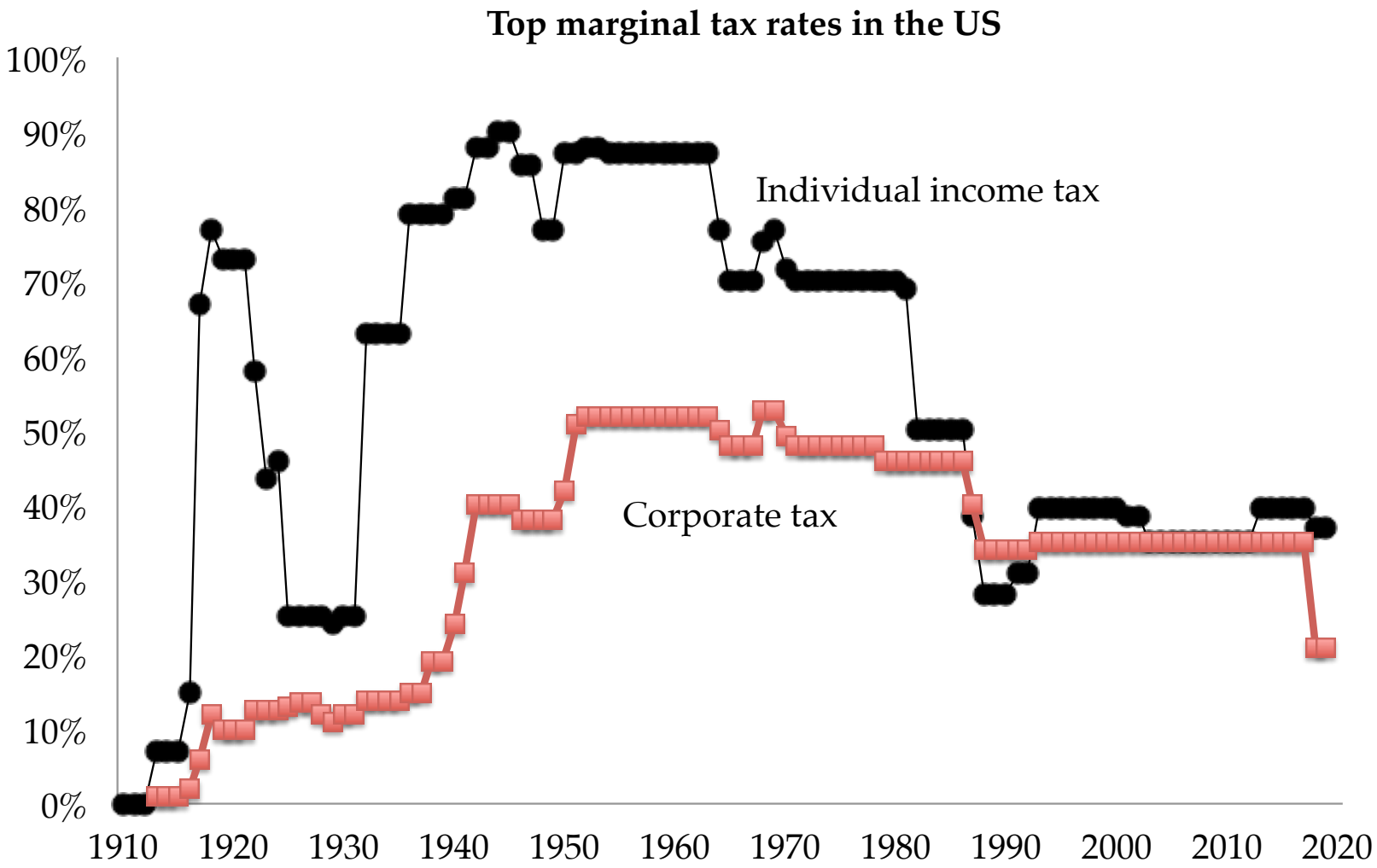
- US: property taxes in Northern states as far back as 17th century (Einhorn, 2004). France: created in 1790.
- On personal real estate and business properties (buildings, land, offices, warehouses, etc.)
- Usually proportional (no wealth declaration required) and low rates
- Still collects sizable revenue (US: about 3% of national income)

Taxes on capital income

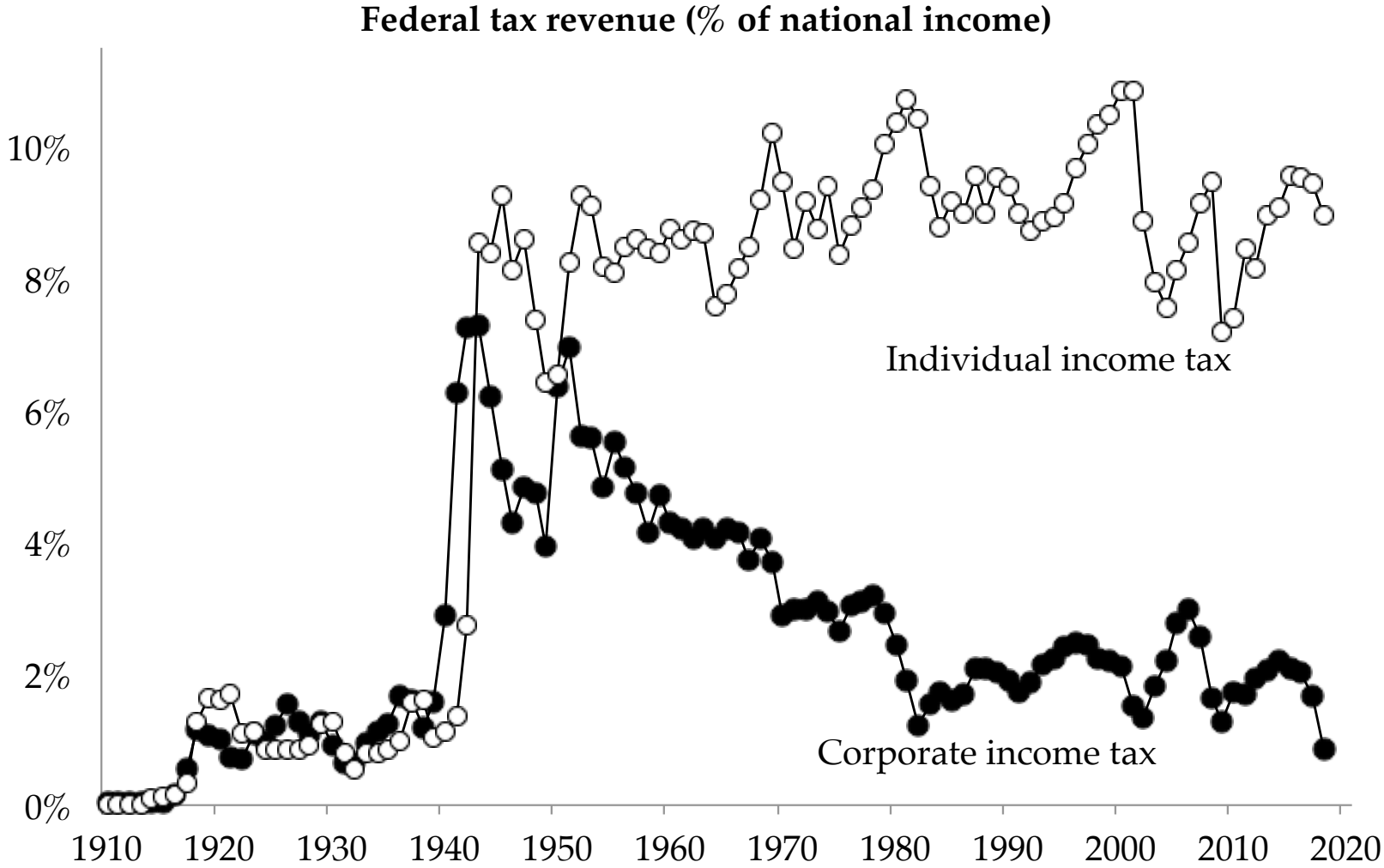
- Individual income tax: initially mostly on capital income (interest, dividends, rents, etc.), because of high exemption threshold

- Corporate tax created at the same time as individual income tax

- Corporate tax is a backstop: without it the rich incorporate $\rightarrow$ progressive income tax fails



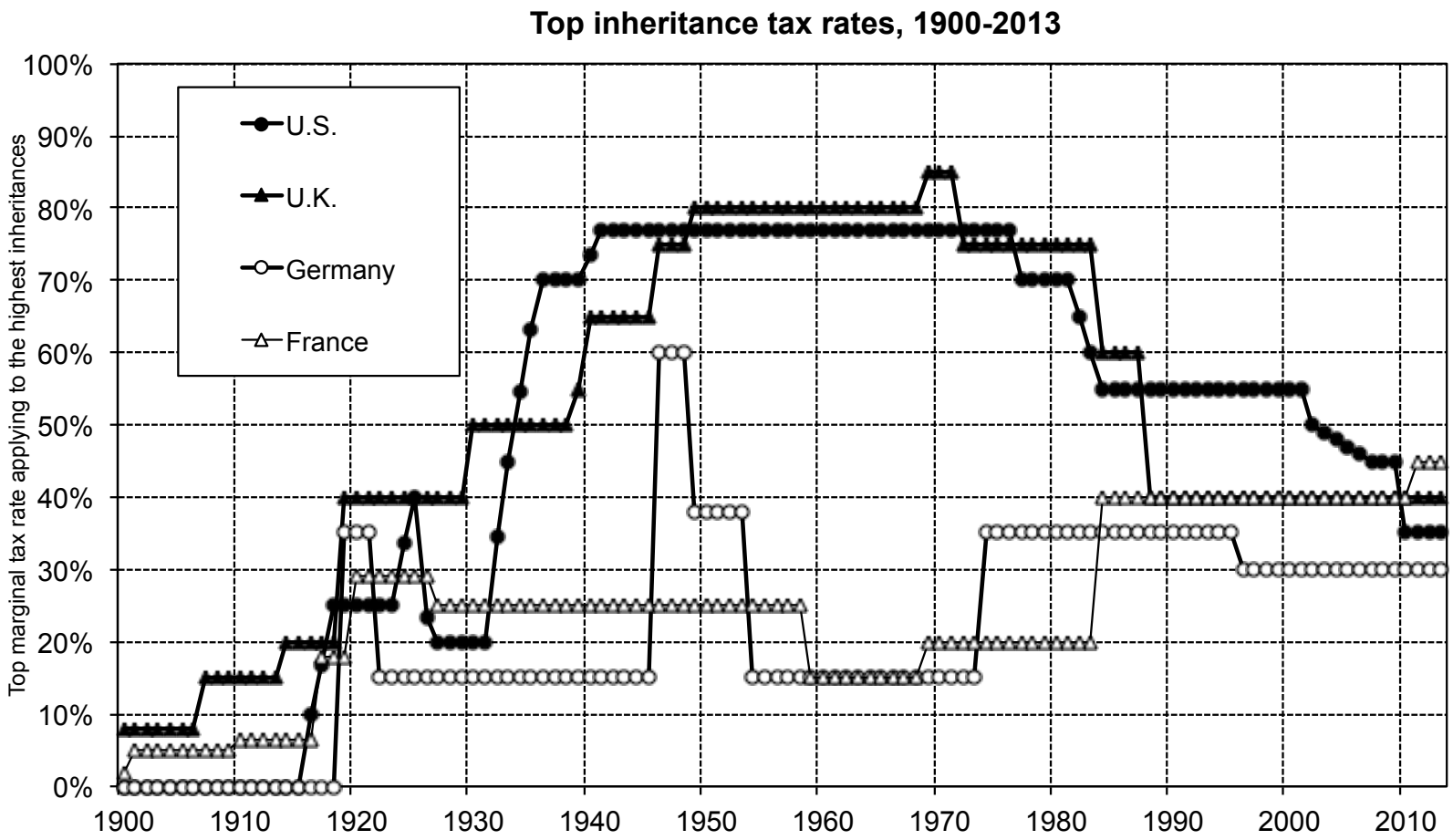
Source: Saez and Zucman (2019).



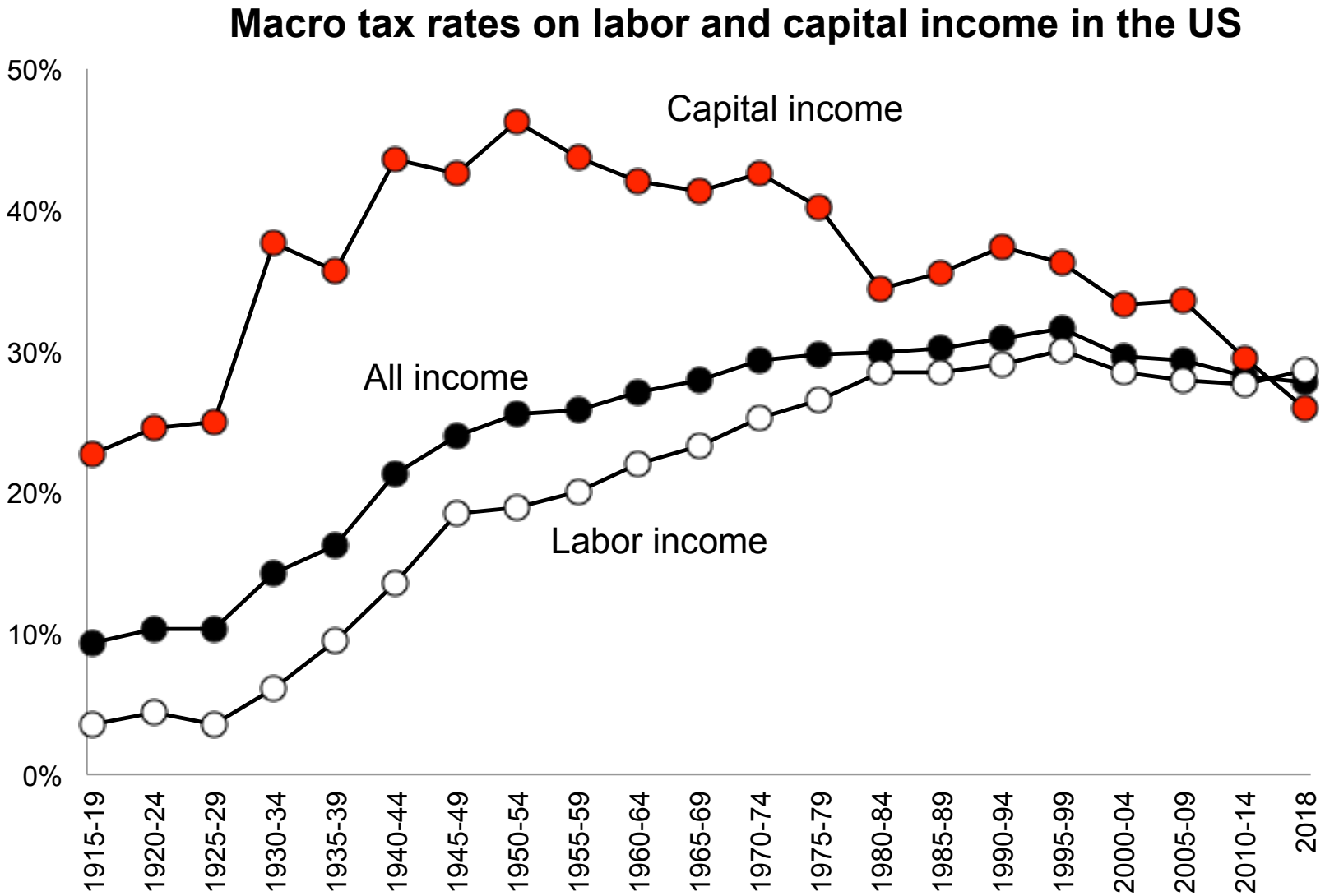
Source: Saez and Zucman (2019).

Inheritance and estate tax

- Estate tax: on wealth of the deceased (US, UK...)
- Inheritance tax: on wealth received by heirs (France, Germany, Japan...)
- Estate / inheritance taxes: smaller (in terms of revenue) than other capital taxes
- But more progressive than other K taxes $\rightarrow$ key role for inequality
- Big increase in inheritance taxation after mass-mobilization wars (Scheve and Stasavage, 2012, 2016)



Source: Piketty (2014).



Source:Saez and Zucman (2019).

3 Who pays capital taxes?

- Are capital taxes really paid by capital owners or shifted to labor?
- Key distinction: residence vs. source capital taxes
  - Residence: capital tax based on residence of owner of capital (or location of headquarter for firms) $\rightarrow$ not easy to avoid
  - Source: Capital income tax based on location of capital $\rightarrow$ incidence shifted to labor if capital is mobile
  - Most individual income tax systems are residence based (with credits for taxes paid abroad); most corp. taxes are source based

The incidence of labor vs. capital taxes

- Consider $Y = F(K, L) = Y_K + Y_L$ and a tax τ_K on capital income Y_K and tax τ_L on labor income Y_L

- Is τ_K paid by K and τ_L paid by L? Depends on:

  – The elasticity of capital supply $e_K = \mathrm{d}log K / \mathrm{d}log((1-\tau_K)r)$

  – The elasticity of labor supply $e_L = \mathrm{d}log L / \mathrm{d}log((1-\tau_L)v)$

  – The elasticity of substitution between K & L $\sigma = \frac{\mathrm{d}log(K/L)}{\mathrm{d}log(v/r)}$
  (determines the elasticities of demand for K & L)

Tax incidence with linear production

- Simplest case: linear production $Y = rK + vL$ ($\sigma \to \infty$)
- $r =$ fixed marginal product of capital; $v =$ fixed marginal product of labor
- Labor demand is infinitely elastic at rate $v \to$ whatever e_L, labor pays labor taxes τ_L
- Capital demand is infinitely elastic at rate $r \to$ whatever e_K, capital pays capital tax τ_K
- The factor markets are like 2 separate markets with no interaction

Tax incidence with Cobb-Douglas production

- With $Y = K^{\alpha} L^{1-\alpha}$, the two factor markets interact and part of labor taxes are shifted to capital and vice versa

- Ex: Consider a small increase from τ_L to $\tau_L + d\tau$, then

$$\frac{dv}{v} = \frac{\alpha e_L}{1 + \alpha e_L + (1-\alpha) e_K} \cdot \frac{d\tau}{1 - \tau_L}$$

$$\frac{dr}{r} = \frac{-(1-\alpha) e_L}{1 + \alpha e_L + (1-\alpha) e_K} \cdot \frac{d\tau}{1 - \tau_L}$$

- If $e_L = 0$ then labor bear full burden of τ_L; if $e_L \to \infty$ then wage adjusts and τ_L entirely shifted to K. Vice versa for $\tau_K \to \tau_K + d\tau$

Tax incidence with general production function

- With CES production, same conclusion as Cobb-Douglas except σ enters the formulas. See Sachs et al. (2016) for a general analysis.

- τ_K borne by capital if e_K small relative to σ

- τ_K shifted to labor if e_K large relative to e_L and σ

- For residence-based K tax, e_K possibly quite small: can only avoid tax by changing residency or reducing saving

- For source-based K tax, e_K can be higher, especially in small open economies

Incidence of the corporate tax

Case 1: Open economy with fully mobile capital and source taxation

- Local GDP: $wL + rK = F(K, L) = L \cdot F(K/L, 1) = L \cdot f(k)$ where $k = K/L$ is capital stock per worker

- Net-of-tax rate of return fixed by the international rate r^* so that

$$(1 - \tau_c)F_K(K, L) = (1 - \tau_c)f'(k) = r^*$$

- As $wL + r^*K = F(K, L)$, wage $w = F_L(K, L) = f(k) - r^* \cdot k$ falls with $\tau_c \rightarrow$ corporate tax τ_C is fully borne by labor

Case 2: Capital not mobile internationally but mobile within country

- Then net return to corporate capital needs to equal return to non-corporate capital $\rightarrow$ all capital affected by τ_c (Harberger 1962)
- Unless little capital market integration (e.g., limited substitution between real estate and business capital)
- Small countries more likely to be in case 1, while big countries more like in case 2?
- But limited empirical evidence, because hard to find large quasi-experimental variation in τ_C and good control groups

Fuest, Peichl & Siegloch (2016): municipal corporate tax incidence in Germany

- Municipalities $\approx$ small open economies where incidence likely to be on labor
- Use 20-year panel of data on 10,000 German municipalities' tax rates linked to administrative matched employer-employee data
- Find about half of the tax shifted to workers
- Effect not through K accumulation but bargaining: workers lose part of rents generated by the firm when τ_C rises.

Case 3: Capital not even perfectly mobile within country:

- Many firms depend on local amenities (pool of workers, other firms)
- Apple or Google could not costlessly move away from Silicon Valley $\rightarrow$ firm owners bear more of the corporate tax burden
- Suarez-Serrato and Zidar (2016) develop spatial equilibrium model with firms; stimate incidence and structural elasticities
- Find that firm owners bear roughly 40% of the incidence, while workers and landowners bear 30-35% and 25-30%, respectively

The incidence of the property tax

View 1: the property tax is mostly a capital tax like the corporate tax

- Property tax in community i is $\tau_i = \bar{\tau} + \epsilon_i$ with $\bar{\tau}$ national average property tax rate and ϵ_i local deviation (Mieszkowski, 1972)
- Harberger model $\rightarrow \bar{\tau}$ tax on all forms of capital
- ϵ_i residual either shifted to prices or immobile factors (labor, land)
- Raising property taxes nationally is progressive, but locally can be regressive

View 2: the property tax is not really a tax ("benefit view")

- Property taxes finance local public goods
- Mobile taxpayers would not live in a jurisdiction that charges a tax higher than value of its local public goods: Tiebout (1956)
- Local property tax is a price paid for those local goods (it's like a fee paid to a gated community for the community's pool)
- Problem: taxpayers probably not as mobile as Tiebout assumes; part of property taxes do not fund local public goods (e.g., part goes to State)

4 Inheritance and its taxation

Why tax inheritances?

- Most normative theories of distributive justice put a strong emphasis on individual merit $\rightarrow$ tax bequests

- But individuals value the possibility of leaving a bequest to their children $\rightarrow$ don't tax bequests

- Less bequest (and capital) taxation means more labor taxation (for given government spending)

$\rightarrow$ Interesting trade-offs (Piketty and Saez, 2013)

Piketty and Saez (Ecometrica 2013)

- Measure one of individuals, who are both bequests receivers and bequest leavers (in ergodic general equilibrium)
- Linear tax τ_B on bequests funds lumsump grant E
- Life-time budget constraint: $c_i + b_i = R(1-\tau_B)b_i^r + y_{Li} + E$
- with c_i consumption, b_i bequests left, y_{Li} inelastic labor income, b_i^r pre-tax bequests received, $R = 1 + r$ generational rate of return
- Individual i has utility $V^i(c, \underline{b})$ with $\underline{b} = R(1-\tau_B)b$ is net-of-tax

bequests left and solves

$$\max_{b_i} V^i(y_{Li}+E+R(1-\tau_B)b_i^r-b_i, Rb_i(1-\tau_B)) \Rightarrow V_c^i = R(1-\tau_B)V_{\underline{b}}^i$$

- Gov B.C.: $E = \tau_B b$ with b aggregate (=average) bequests; solves:

$$\max_{\tau_B} \int_i \omega_i V^i(y_{Li} + \tau_B b + R(1-\tau_B)b_i^r - b_i, Rb_i(1-\tau_B))$$

- with $\omega_i \geq 0$ Pareto weights

- Meritocratic Rawlsian criterion: maximize welfare of those receiving no inheritances with uniform social marginal welfare weight $\omega_i V_c^i$ among zero-receivers

Optimal inheritance tax rate:

$$\tau_B = \frac{1 - \bar{b}}{1 + e_B}$$

- With e_B: elasticity of aggregate bequests, and $\bar{b} = E[b_i | b_i^r = 0]/b$ relative bequest left by zero-receivers

1. Optimal $\tau_B < 1/(1 + e_B)$ revenue maximizing rate because zero-receivers care about bequests they leave
2. $\tau_B = 0$ if $\bar{b} = 1$ (i.e, zero-receivers leave as much bequest as avg)
3. If bequests are quantitatively important, highly concentrated, and low wealth mobility then $\bar{b} << 1$

The inheritance flow

- Key parameter to think about inheritance and its taxation: b
- How big is the flow of wealth transmitted at death every year in a country?
- There are 2 ways to measure this flow:
  - Fiscal flow: use tax data on inheritances / estates
  - Economic flow, using the following accounting equation:

$$b_t = (1 + v_t) \cdot \mu_t \cdot m_t \cdot \beta_t$$

- Where: $m_t =$ mortality rate (number of adult decedents divided by total adult population)

- $\mu_t =$ ratio between average adult wealth at death and average adult wealth for the entire population

- $v_t = V_t/B_t =$ estimate of the gift/bequest flow ratio

- $\beta_t =$ private wealth / national income ratio

- Gap between the fiscal and economic flows can be interpreted as capturing tax evasion and other measurement errors

Piketty (QJE 2011)

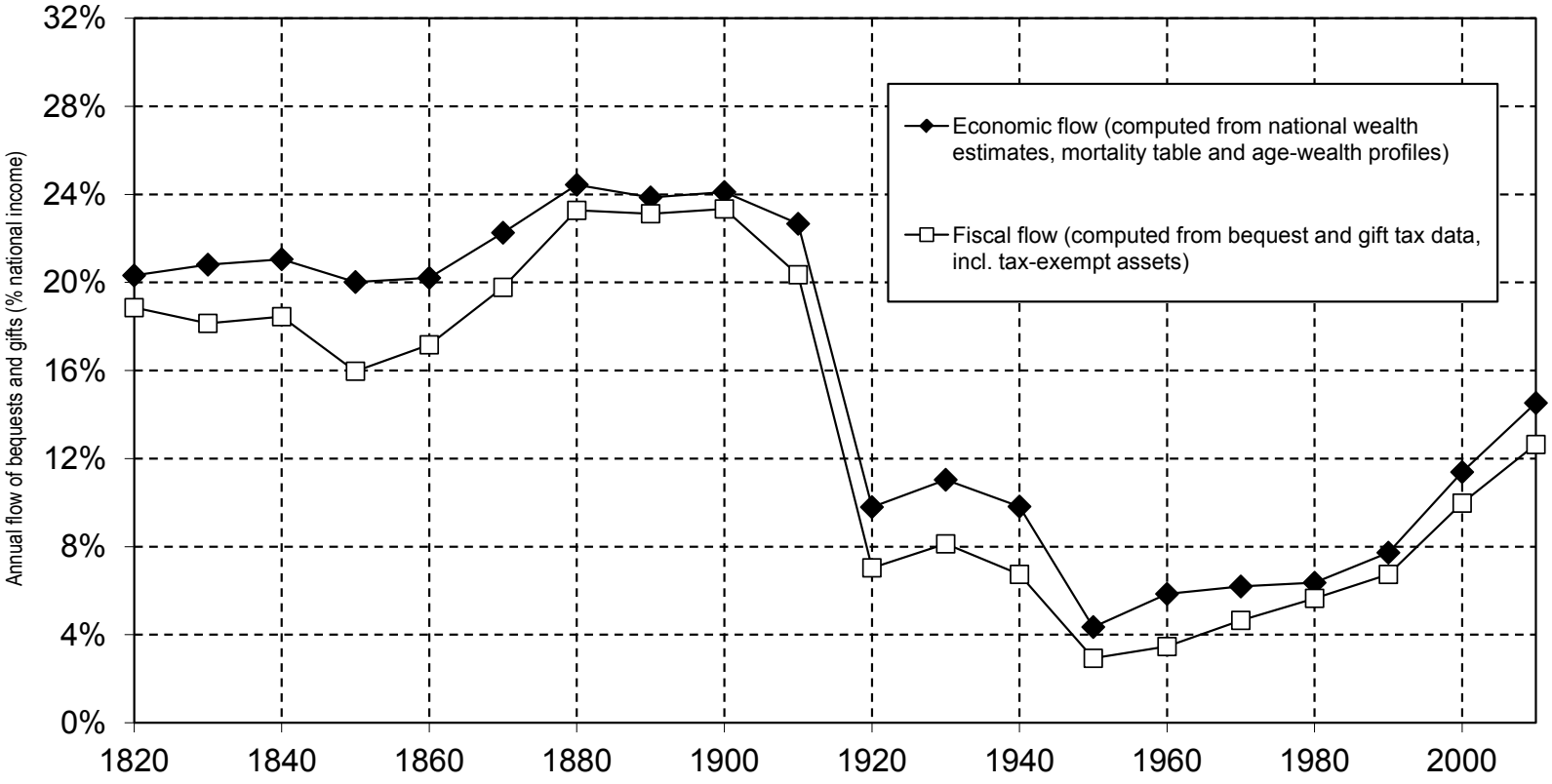
- Estimates bequest flow b in France, country where inheritance tax data are exceptionally good

- b has followed a spectacular U-shaped pattern over the 20th century.

- b was relatively stable around 20–25% of national income throughout the 1820–1910 period (with a slight upward trend)

- Then divided by a factor of 5–6 between 1910 and the 1950s, and multiplied by a factor of 3–4 between the 1950s and the 2000s

Figure 4.1. The annual inheritance flow as a fraction of national income, France 1820-2010



The annual inheritance flow was about 20-25% of national income during the 19th century and until 1914; it then fell to less than 5% in the 1950s, and returned to about 15% in 2010.

Source: Piketty (2011).

The share of inherited wealth in total wealth

- What is the fraction of total wealth W that is self-made vs. comes from inheritances?

- Most natural way to define the share of inherited wealth in aggregate wealth is to cumulate past inheritance flows

$$W_{Bt} = \int_{s \leq t} B_s \cdot ds$$

- Pb 1: key to include in this sum not only past bequest flows B_s (wealth transmissions at death) but also inter vivos gift flows

- Pb 2: One should only take into account fraction of inheritance flows $B_{st} \leq B_s$ received at time s by individuals still alive at time t

- Requires very detailed individual-level information

- Standard simplifying assumption: cumulate the full inheritance flows observed the previous H years, where $H =$ generation length

- Pb 3 (key): inheritances produce flow returns!

- So past inheritance flows need to be upgraded

Kotlikoff-Summers (1981) vs. Modigliani (1986)

- Modigliani (1986, 1988) chooses zero capitalization.

$$W_{Bt}^{M} = \int_{t-30 \leq s \leq t} B_s^* \cdot ds$$

- Assume fixed inheritance flow-national income ratio $b_y = B_s^*/Y_s$, growth rate g (so that $Y_t = Y_s \cdot e^{g(t-s)}$), generation length H, and aggregate private wealth-national income ratio $\beta = W_t/Y_t$.

- Steady-state stock of inherited wealth relative to national income W_{Bt}^{M}/Y_t and share of inherited wealth $\varphi_t^M = W_{Bt}^{M}/W_t$ given by:

$$W_{Bt}^{M}/Y_t = \frac{1}{Y_t} \int\limits_{t-30 \leq s \leq t} B_s^* \cdot ds = \frac{1 - e^{-gH}}{g} \cdot b_y$$

$$\varphi_t^M = W_{Bt}^{M}/W_t = \frac{1 - e^{-gH}}{g} \cdot \frac{b_y}{\beta}$$

- Kotlikoff and Summers (1981, 1988): full capitalization

$$W_{Bt}^{KS}/Y_t = \frac{1}{Y_t} \int\limits_{t-30 \leq s \leq t} e^{r(t-s)} \cdot B_s^* \cdot ds = \frac{e^{(r-g)H} - 1}{r - g} \cdot b_y$$

$$\varphi_t^{KS} = W_{Bt}^{KS}/W_t = \frac{e^{(r-g)H} - 1}{r-g} \cdot \frac{b_y}{\beta}$$

- If growth rates and rates of return are negligible then both definitions coincide: $\varphi_t^M = \varphi_t^{KS} = Hb_y/\beta$

- If g and $r - g$ are significantly different from zero, the two definitions can lead to widely different conclusions

- Ex: with $g = 2\%$, $r = 4\%$ and $H = 30$, for a given inheritance flow $b_y = 10\%$ and aggregate wealth-income ratio $\beta = 400\%$, $\varphi_t^M = 56\%$ and $\varphi_t^{KS} = 103\%$.

Piketty et al. (EHH, 2014)

Wealth accumulation process always involves two different kinds of people and wealth trajectories

- Inheritors: people whose assets are worth less than the capitalized value of the wealth they inherited (over time they consume more than their labor income)

- Severs: people whose assets are worth more than the capitalized value of the wealth they inherited (they consume less than their labor income)

- Aggregate inherited wealth can then be defined as the sum of inheritors' wealth plus the inherited fraction of savers' wealth

- Self-made wealth is then equal to the non-inherited fraction of savers' wealth.

- By construction, inherited and self-made wealth are less than 100% and sum to aggregate wealth,

- Downside of this definition: more demanding in terms of data availability. Requires micro data.

Estimates of the share of inherited wealth in total wealth

- Burgeoning literature attempts to estimate b and φ (Alvaredo et al., 2017; Atkinson, 2013; Ohlsson et al. 2016)

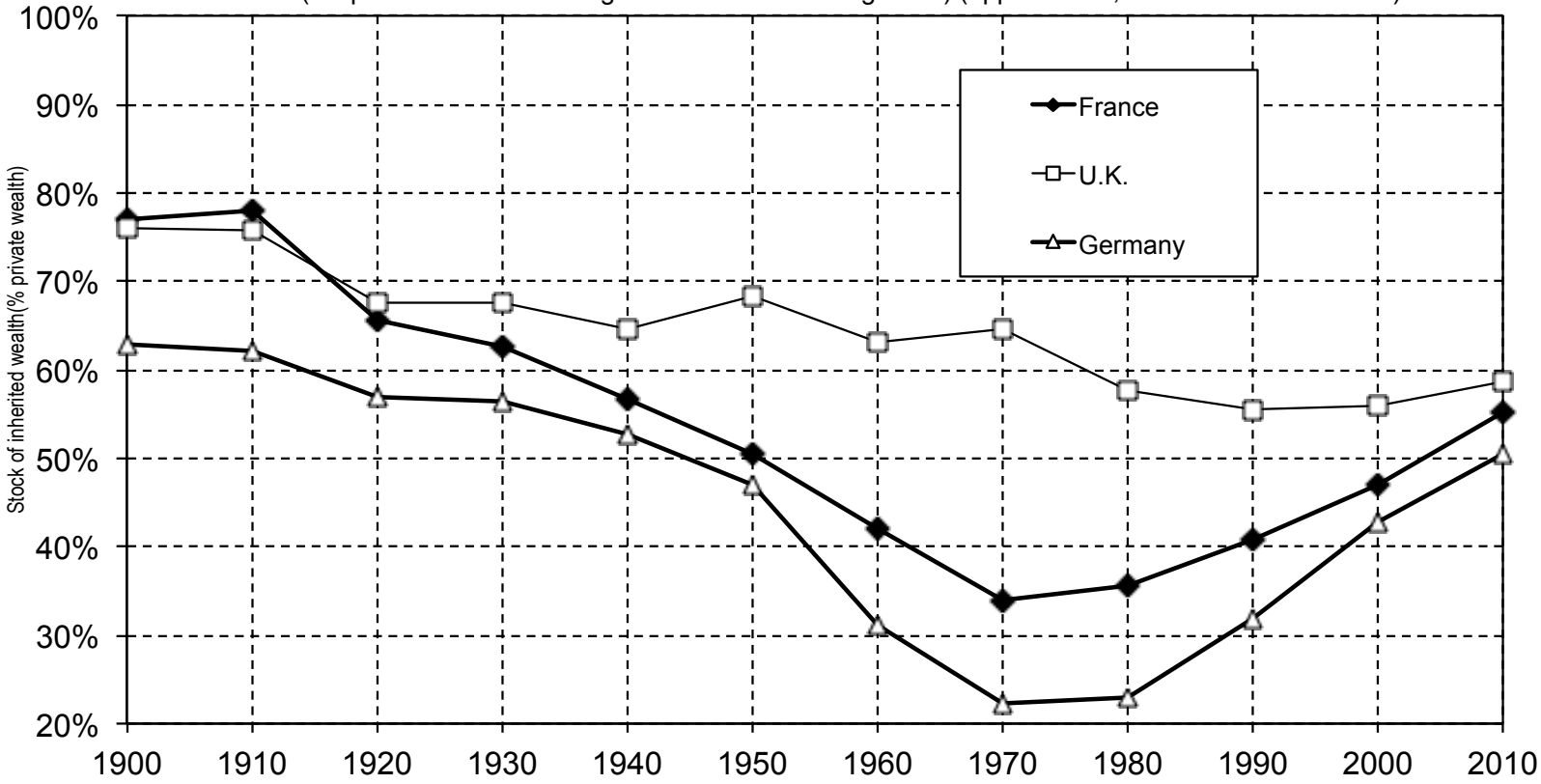
- In Europe, b_t and φ_t have also followed a U-shaped pattern over the past century

- Less marked in the United States

- Data limitations, however, make it difficult at this stage to make precise comparisons between countries

Figure 4.6. The inheritance stock in Europe 1900-2010

(simplified definitions using inheritance vs. saving flows) (approximate, lower-bound estimates)

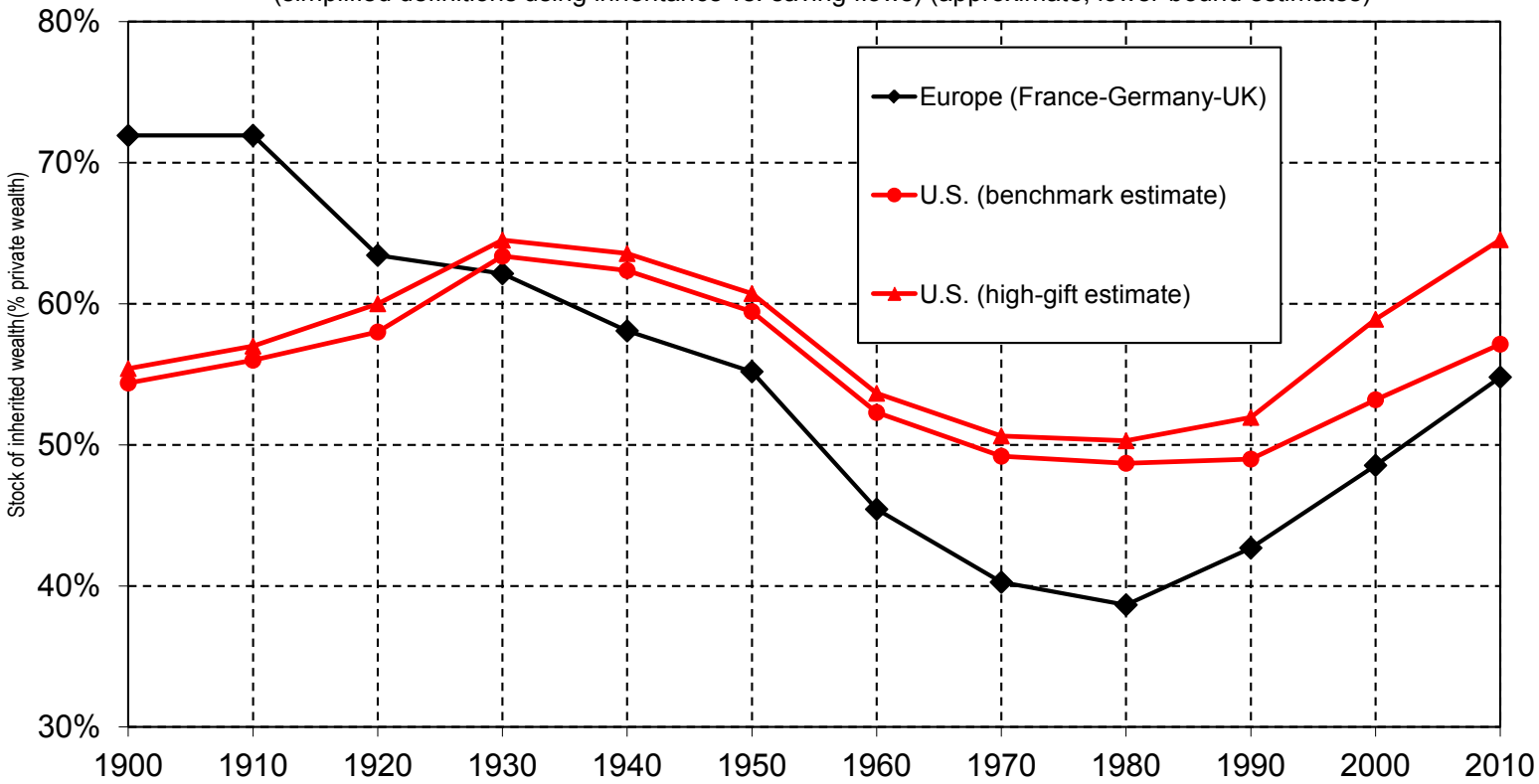


The inheritance share in aggregate wealth accumulation follows a U-shaped curve in France and Germany (and to a more limited extent in the U.K. and Germany. It is possible that gifts are under-estimated in the U.K. at the end of the period.

Source: Piketty and Zucman (2015).

Figure 1. The share of inherited wealth. Europe and the U.S. 1900-2010

(simplified definitions using inheritance vs. saving flows) (approximate, lower-bound estimates)



The inheritance share in aggregate wealth accumulation was over 70% in Europe in 1900-1910. It fell abruptly following 1914-1945 shocks, down to 40% in 1970-1980 period. It is back to about 50-60% in 2000-2010 and rising. The U.S. pattern also appears to be U-shaped, but less marked, and with significant uncertainty regarding recent trends, due to data limitations.

Source: Alvaredo, Garbinti and Piketty (2015)

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