On the distribution of wealth and the share of inheritance

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Presentation based on two papers by
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There is a new wave of studies on *wealth*-income ratios, *inheritance*, and the distribution of *wealth*

- Piketty, Zucman, 2014
- US (Kopczuk, Saez, 2004; Saez, Zucman, 2014)
- France (Garbinti, Goupille, Piketty, in progress)
- UK (Alvaredo, Atkinson, Morelli, in progress)
- Credit Suisse reports (Shorrocks and Davis)
- Spain (Alvaredo, Artola, 2015)
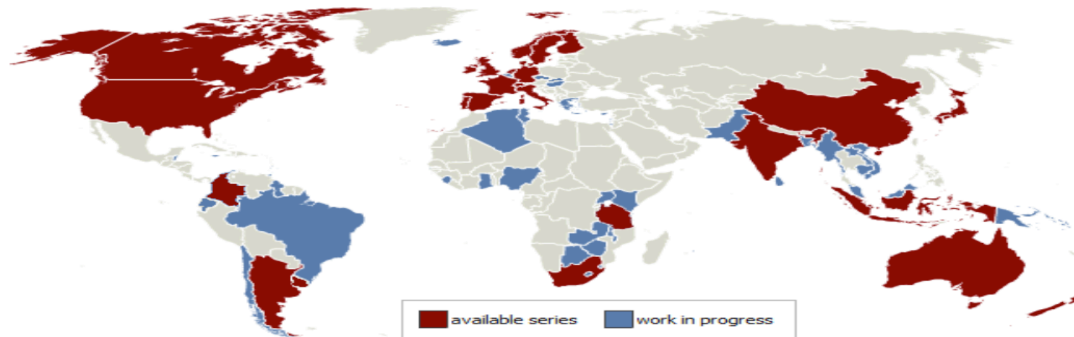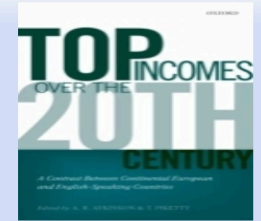- Denmark, Belgium, Germany, Sweden
- Etc…

Potential sources of evidence

- Household surveys
- Multiplied-up estate data
- Multiplied-up capital incomes
- Registers from wealth tax
- Rich Lists (Forbes, Sunday Times)
- Combination of sources

"Estate Multiplier Method"
"Capitalization Method"

W2ID: The World Wealth and Income Database (coming soon)
Wealth-income ratios, wealth distribution statistics, DINAs

Outline

- **PART A**: a brief discussion of the evolution of inheritance in aggregate wealth in the developed world

    - Basic notions and definitions

    - The Kotlikoff-Summers-Modigliani controversy and the capitalization factor

    - The Piketty-Postel Vinay-Rosenthal definition (PPVR)

    - A simplified definition: inheritance flows vs. saving flows

    - Evidence

- **PART B**: Some results for Spain: the concentration of wealth among the decedents (1901-1958), and the distribution of wealth among the living (since 1981)

A. The evolution of inheritance

- There exists substantial uncertainty regarding the relative magnitude of inherited wealth and self-made wealth in aggregate wealth accumulation, and how this changes over time and across countries.

- There seemed to be a general presumption that $\varphi = W_B/W$ should decrease over time, perhaps due to the rise in human capital (leading to the rise of the labor share in income and savings), and/or the rise of lifecycle wealth accumulation

- Only recently there has been new evidence for FR, UK, SWE, GER, …
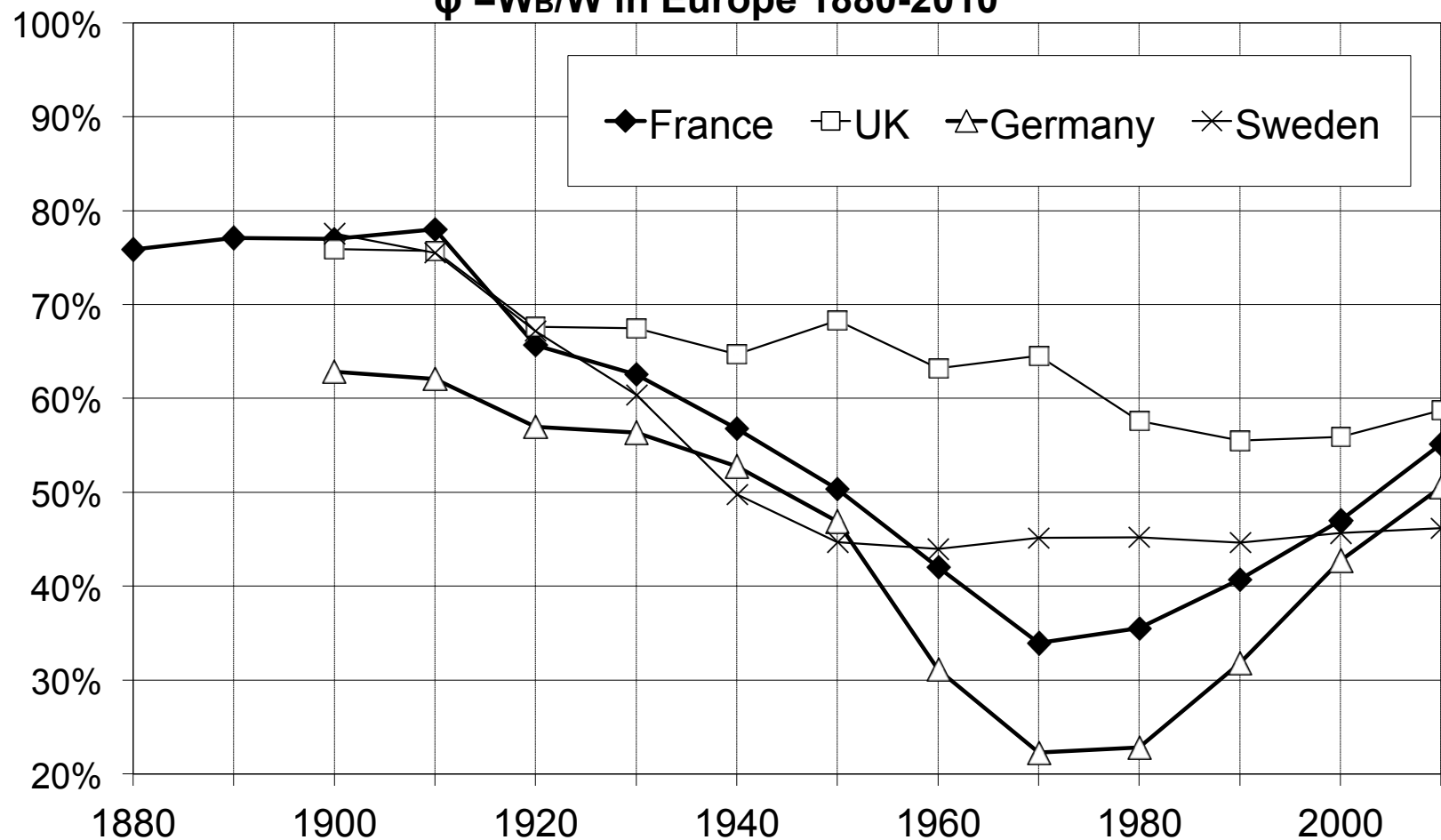
- The 1980s Kotlikoff-Summers-Modigliani controversy:

    Modigliani: W_B/W as little as **20-30%**

    Kotlikoff-Summers: W_B/W is as high as **80-90%**

    They were looking at the same data!

For the US, Wolff and Gittleman (2013): W_B/W dropped from **29%** to **19%** over 1989-2007

The stock of inherited wealth / private wealth
$\varphi = W_B/W$ in Europe 1880-2010

The inheritance share in aggregate wealth accumulation follows a U-shaped curve in France and Germany, and to a more limited extent in the UK. It follows a broadly similar pattern in Sweden, although in recent decades the Swedish inheritance stock increased relatively little, as the private saving rate increased. It is likely that gifts are under-estimated in the UK at the end of the period.
Piketty and Zucman (2014), Atkinson (2014), Ohlsson, Roine and Waldenstrom (2013), and Schinke (2013)

Figure 4.5. The inheritance flow in Europe 1900-2010
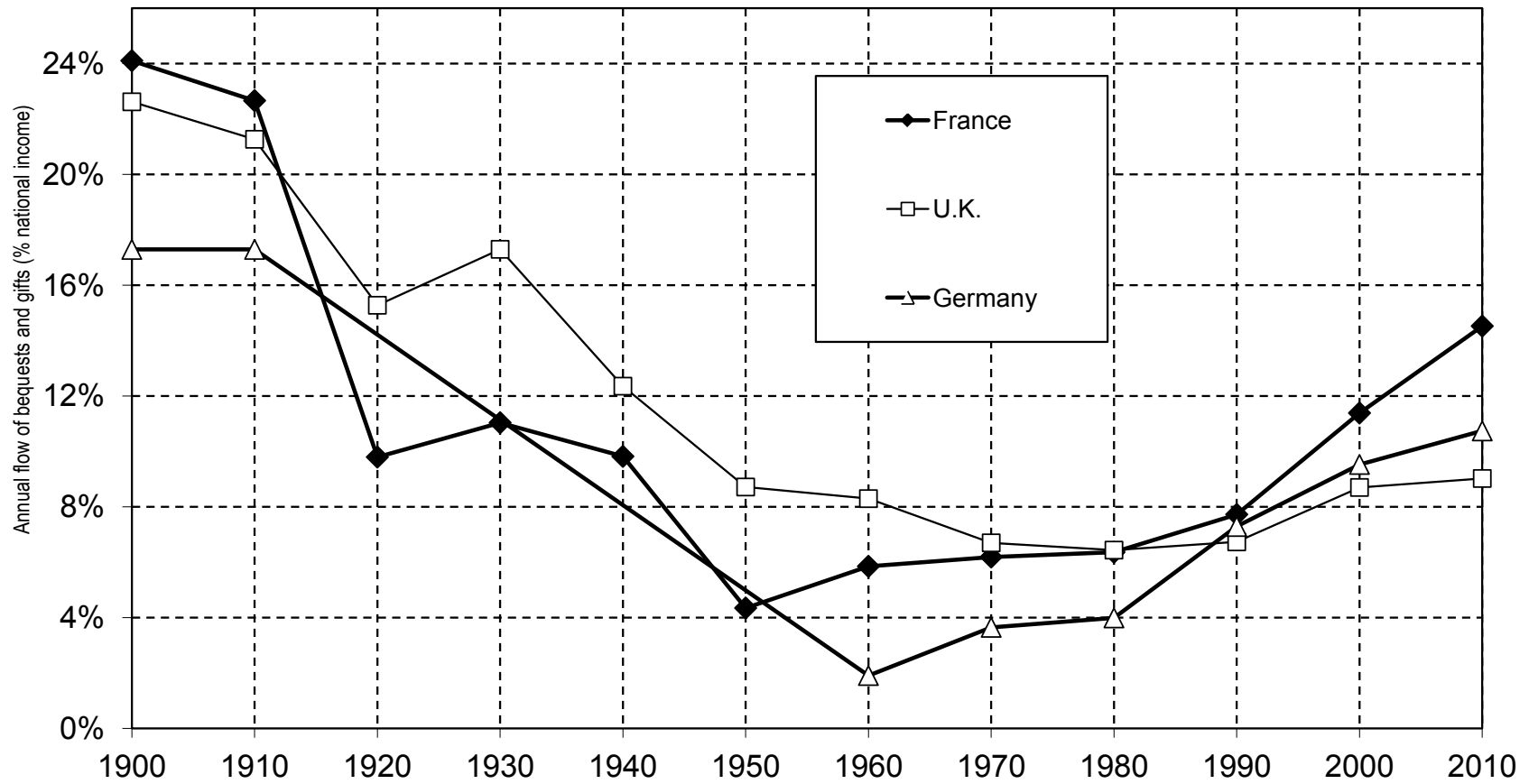
The inheritance flow follows a U-shaped in curve in France as well as in the U.K. and Germany. It is possible that gifts are under-estimated in the U.K. at the end of the period.

A1. Basic notions and definitions

- We would like to estimate the share of inherited wealth in total wealth **φ=W$_B$/W**

$$W_{Bt} \leq W_t$$

$$W_{St} = W_t - W_{Bt}$$

- It seems natural to define **W$_{Bt}$** as the sum of past inheritance flows:

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

- Several problems arise when applied to actual data

  o It is critical to include *inter-vivos* gift flows

$$W_{Bt} = \int_{s \leq t} B_s^* \cdot ds., \text{ with } B_s^* = B_s + V_s$$

  o Only consider bequests received by individuals still alive in *t*

$$W_{Bt} = \int_{t-30 \leq s \leq t} (1 + v_s) \cdot B_s \cdot ds$$

where *v$_t$* is an estimate of the gift/bequest ratio

A2. The Kotlikoff-Summers-Modigliani controversy

- One needs to observe inheritance flows over a relatively long period of time (eg H=30 years)

- Kotlikoff-Summers (1981, 1988) and Modigliani (1986, 1988) used the US inheritance flow $b_y = B_y/Y$ for one year (1962), and assumed that it was stable over time. **[!]**

- -One needs to decide on the capitalization rate

	Modigliani	**Kotlikoff-Summers**
Capitalization rate	0	average rate of return to wealth
$\varphi_t = W_{Bt}/W_t$	$\dfrac{1 - e^{-gH}}{g} \cdot \dfrac{b_y}{\beta}$	$\dfrac{e^{(r-g)H} - 1}{r - g} \cdot \dfrac{b_y}{\beta}$
g=r=0 then for ß=400% and b_y=10%	both definitions coincide: 75%	Hb_y/β
r-g=2% then for ß=400% and b_y=10%	56%	103%
Results for US	20-30%	80-90%

A3. The Piketty-Postel Vinay-Rosenthal definition (PPVR)

- Both no-capitalization and full capitalization seem inadequate

- In an ideal world with perfect data, we would like to observe:

  o **(a) inheritors:** their assets are worth **less** than the capitalized value of the wealth they inherited (they consume more than their labor income)

  o **(b) savers/self-made individuals:** their assets are worth **more** than the capitalized value of the wealth they inherited (they consume less than their labor income)

- So aggregate inherited wealth=inheritors' wealth + inherited fraction of savers' wealth

$$\varphi_t = [\rho_t \cdot w_t^r + (1 - \rho_t) \cdot b_t^{s*}]/w_t$$

- Self-made wealth: non-inherited fraction of savers' wealth

$$1 - \varphi_t = (1 - \rho_t) \cdot (w_t^s - b_t^{s*})/w_t$$

Straightforward definition, but very demanding in terms of data. It requires good quality micro-data over generations. However, no need to observe y_t, c_t paths.

A4. A simplified definition: inheritance flow vs. saving flow

- Assume that all we have is macro data:

$$b_{yt} = B_t/Y_t \qquad s_t = S_t/Y_t \qquad \alpha = Y_K/Y$$

- We want to estimate   **φ=W_B/W**

We do not know which part of the saving rate come from returns to inherited wealth and which comes from labor earnings or past savings

- Assume the propensity to save is the same on both income sources:

  o a fraction **φα** of the saving is attributed to the returns of inherited wealth

  o a fraction **(1-α)+(1-φ)α** is attributed to labor income and past savings

$$\varphi = \frac{b_y + \varphi \cdot \alpha \cdot s}{b_y + s}$$

$$\varphi = \frac{b_y}{b_y + (1 - \alpha) \cdot s}$$

- relatively lower saving rates imply larger **φ**

A4. A simplified definition for φ (cont.)

- **Caveats**
  - Real economies are generally out of steady state, so compute average (eg H=30 years)

$$\varphi = \frac{\int\limits_{t-H \leq s \leq t} e^{(r-g)(t-s)} \cdot b_{ys} \cdot ds}{\int\limits_{t-H \leq s \leq t} e^{(r-g)(t-s)} \cdot \left(b_{ys} + (1-\alpha_s) \cdot s_s\right) \cdot ds}$$

  - This is an approximate formula. It tends to underestimate the true share of inheritance if individuals who only have labor income save less than those with large inherited wealth

- **However**
  - It follows micro-based estimates relatively closely
  - It is much less demanding in terms of data

# A5. Evidence: simplified formula

$$\varphi = \frac{b_y}{b_y + (1 - \alpha) \cdot s}$$

$$b_{yt} = B_t^* / Y_t = (1 + v_t) \cdot \mu_t \cdot m_t \cdot \beta_t$$

	Data sources 1860-2013
m_t is the mortality rate	-mortality.org / UC Berkeley -US 1870 census
μ_t is the ratio between the average adult wealth at death and the average adult wealth for the adult living population	-1860-1870 US Censuses -Estate Tax tabulations (IRS) -SCF: 1962, 1983, 1986, 1989, 1992, 1995 1998, 2001, 2004, 2007, 2010, 2013
v_t is an estimate of the gift/bequest flow ratio	Two scenarios: v_t =20% v_t =estimate for France (Piketty, 2011)
β_t is the wealth/income ratio	Piketty and Zucman (QJE 2014)
s_t private savings rate	Piketty and Zucman (QJE 2014)
α is the capital share in national income	Piketty and Zucman (QJE 2014)

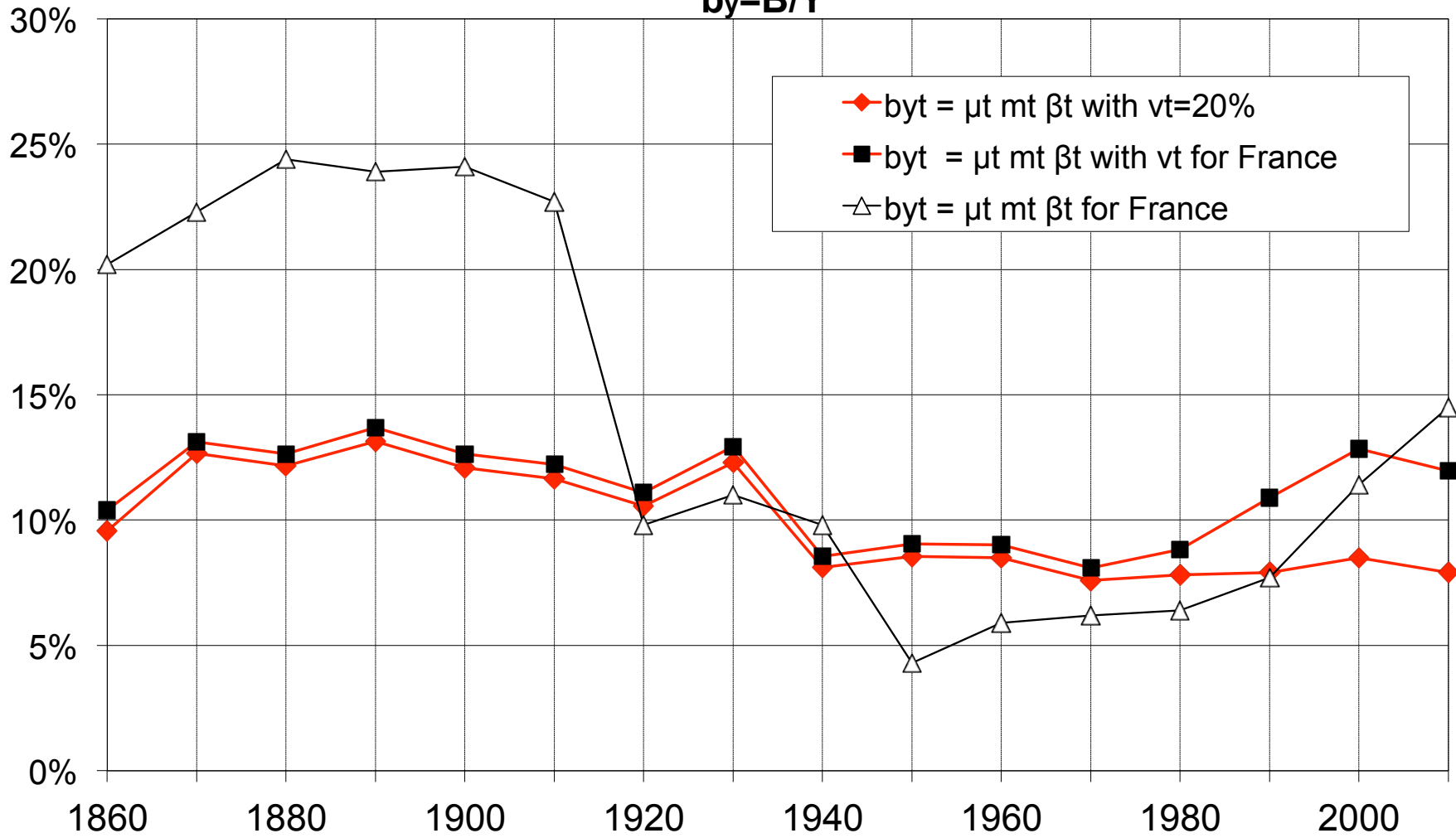# Figure 7. The share of inherited wealth: the case of the U.S.

(simplified definitions using inheritance vs. saving flows) (approximate, lower-bound estimates)
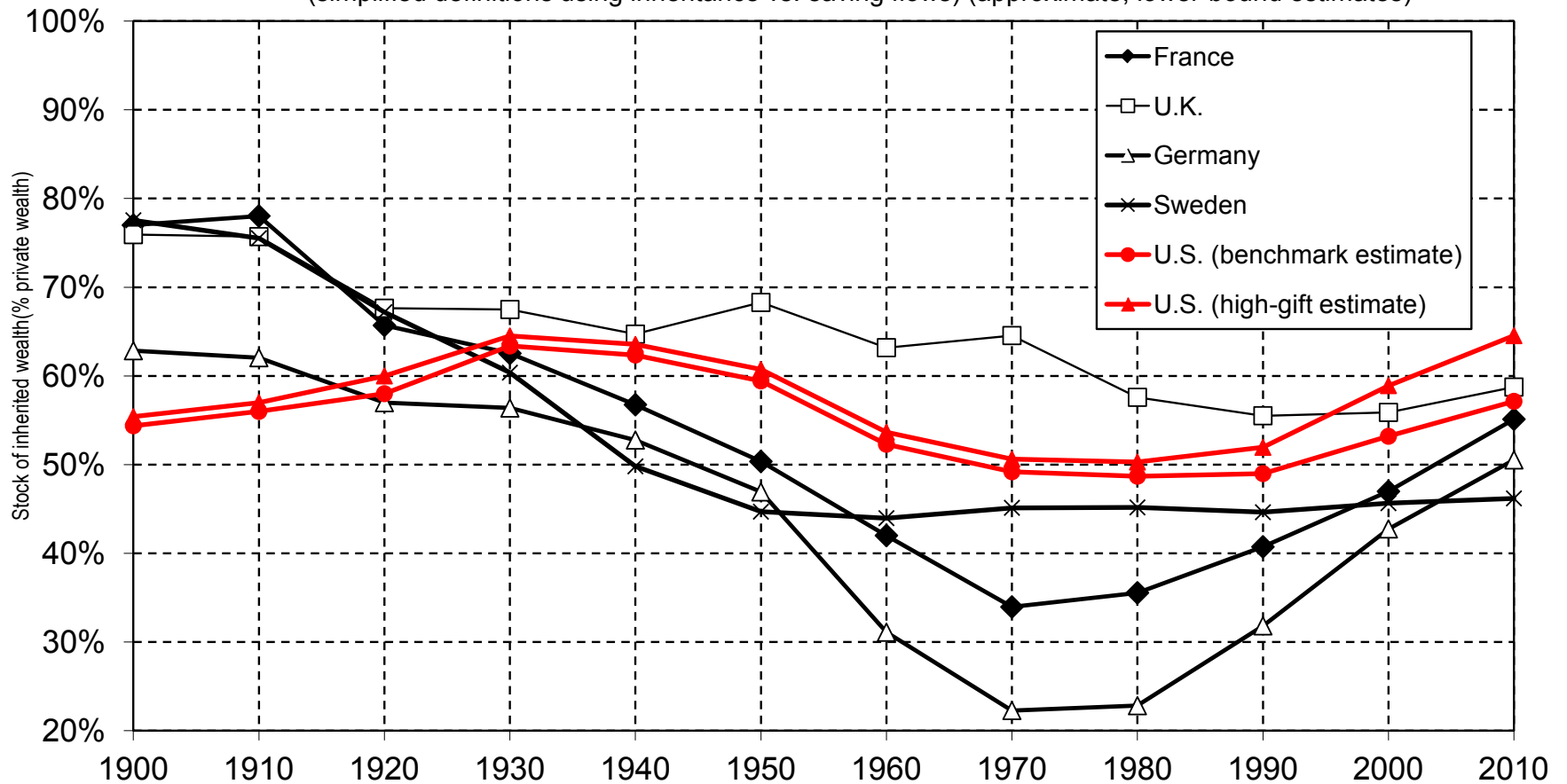
The inheritance share in aggregate wealth accumulation seems to follow a U-shaped curve in the U.S. over the past century, but it is less marked than France and Germany. There is significant uncertainty regarding recent trends, due to data limitations.

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)

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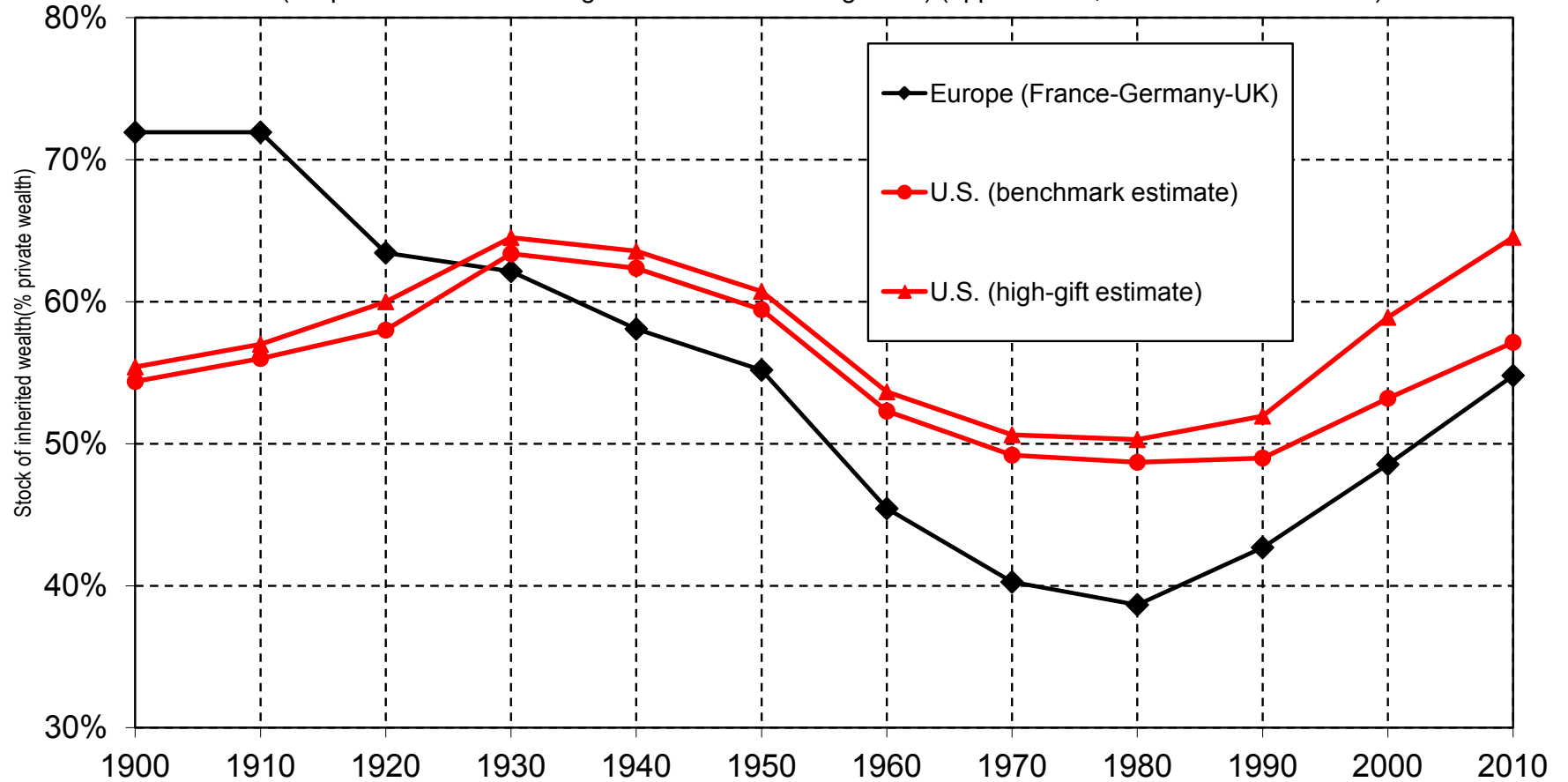
The inheritance share in aggregate wealth accumulation was over 70% in Europe in 1900-1910. It fell abruptly following 1914-1945 shocks, down to 40% in 1970-1980 period. It is back to about 50-60% in 2000-2010 and rising. The U.S. pattern also appears to be U-shaped, but less marked, and with significant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

The annual inheritance flow as a fraction of national income $b_y = B/Y$

Legend:
- $b_{yt} = \mu_t\, m_t\, \beta_t$ with $v_t = 20\%$
- $b_{yt} = \mu_t\, m_t\, \beta_t$ with v_t for France
- $b_{yt} = \mu_t\, m_t\, \beta_t$ for France

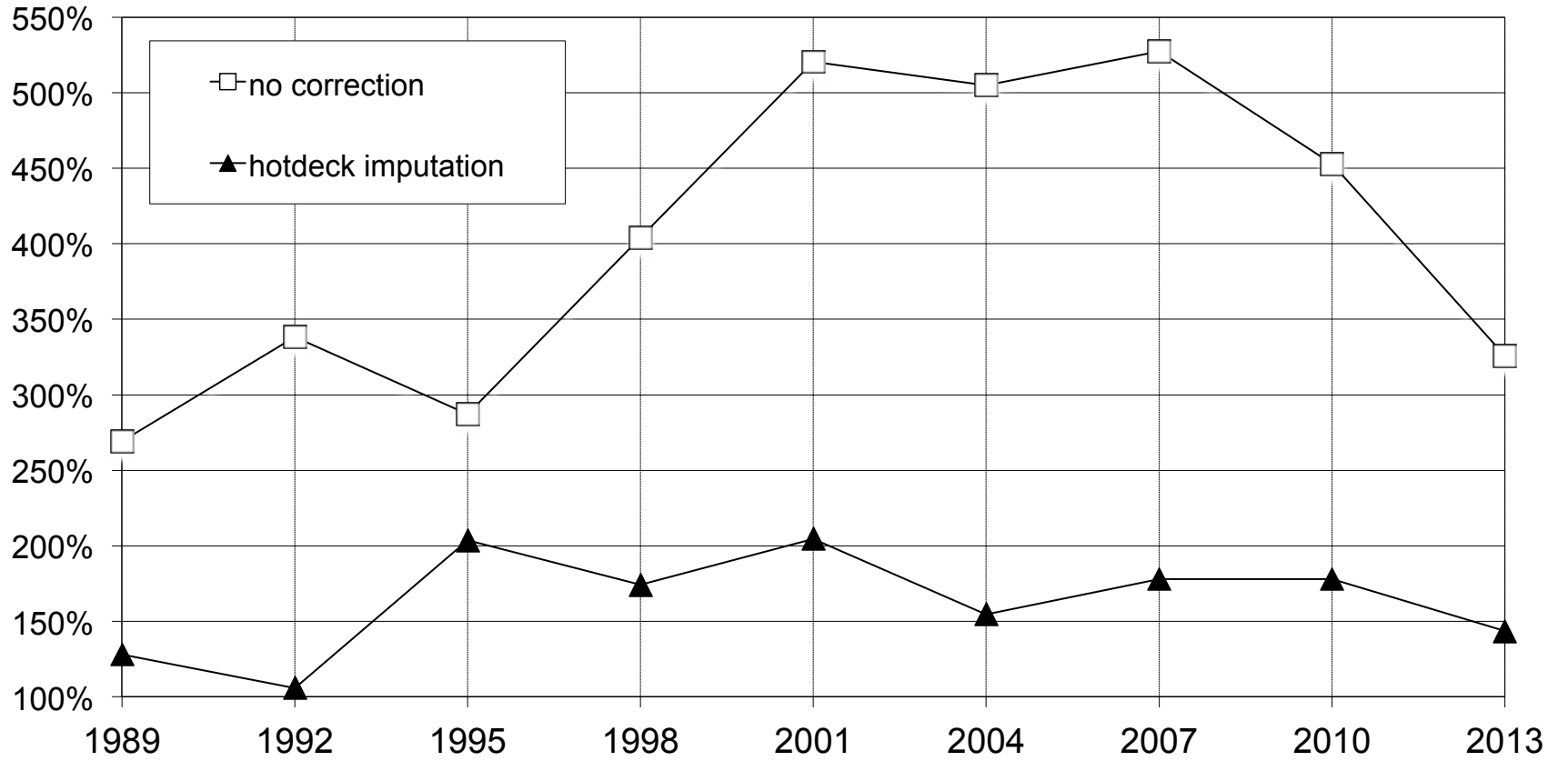**Figure 2.7. Private wealth / national income ratios 1870-2010: Europe vs. USA**
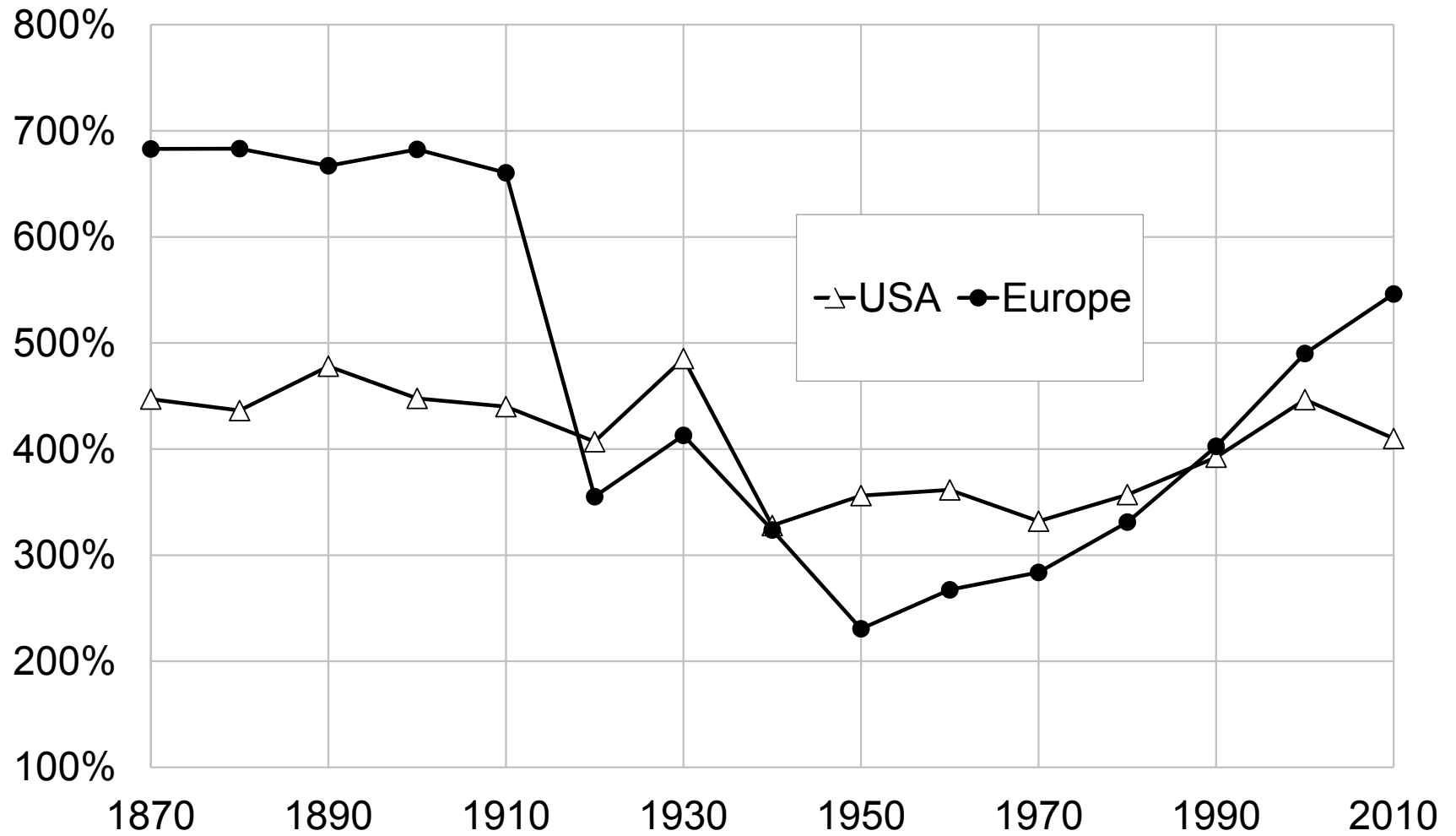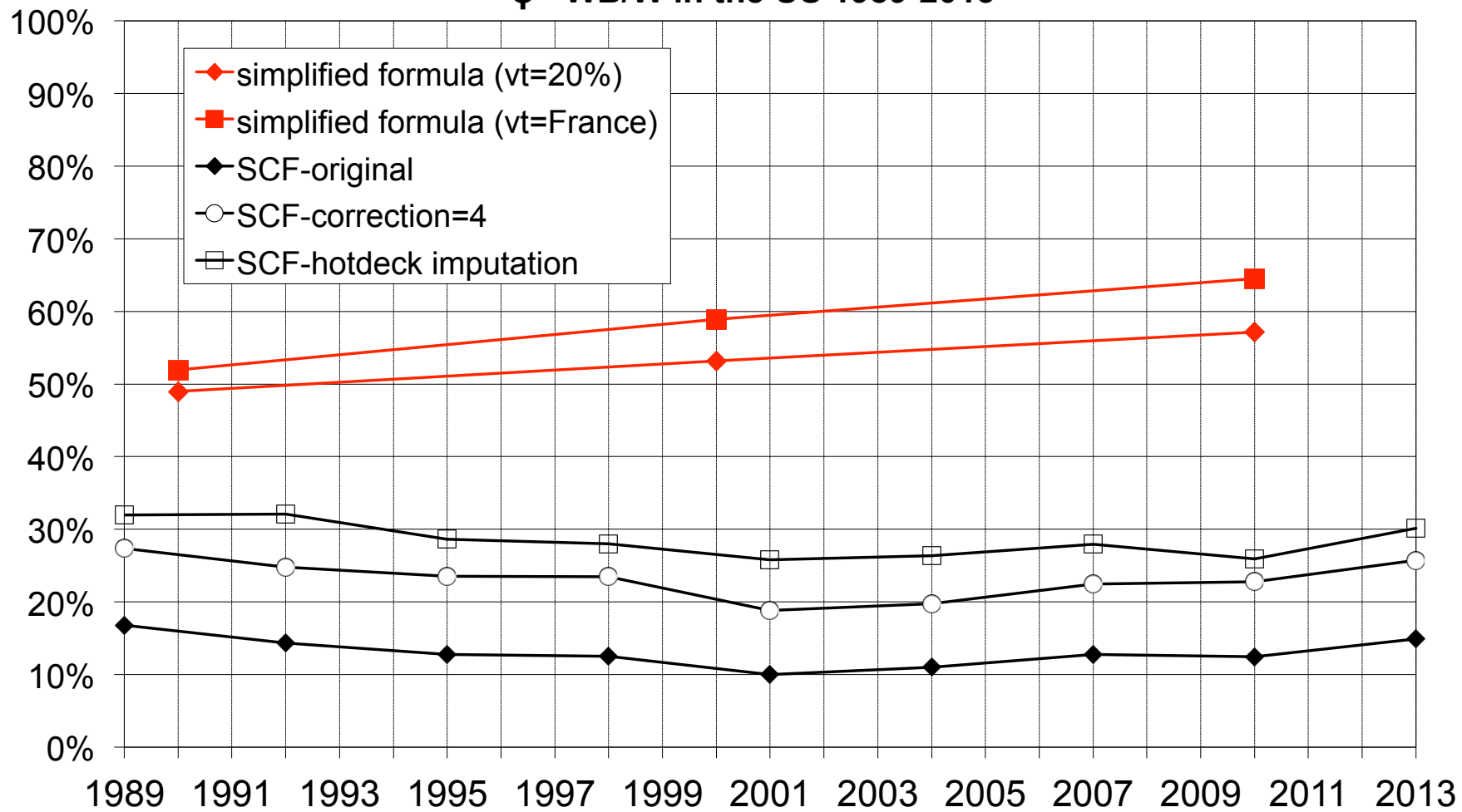
A5. Evidence: PPVR formula

$$\varphi_t = [\rho_t \cdot w_t^r + (1 - \rho_t) \cdot b_t^{s*}]/w_t$$

SCF: 1962, 1983, 1986, 1989, 1992, 1995 1998, 2001, 2004, 2007, 2010, 2013

Economic bequest flow ($B_t = m_t \, \mu^*_t \, W_t$) vs SCF bequest flow

The stock of inherited wealth / private wealth
φ =WB/W in the US 1989-2013

Legend:
- simplified formula (vt=20%)
- simplified formula (vt=France)
- SCF-original
- SCF-correction=4
- SCF-hotdeck imputation

A6. Discussion

- The SCF underestimates the level and trends of wealth inequality (Saez, Zucman 2014)

- The limitations are more stringent to measure inheritance: enormous self-reporting biases. Large downward biases in retrospective bequests.

- Do individuals with only labor income save significantly more than those who have large inherited wealth?

- Is it not socially acceptable/less valued to report oneself as an inheritor?

- Kaplan and Rauh (2013) use Forbes billionaire data: Americans in the Forbes 400 are less likely to have inherited their wealth today than in the 1980s. It is unclear, however, whether this result reflects a true economic phenomenon or illustrates the limits of Forbes and other wealth rankings.

B1. Spain

- Statistics from the inheritance tax were published over 1901-1958 (no age-gender break up; impossibility to apply the estate method)
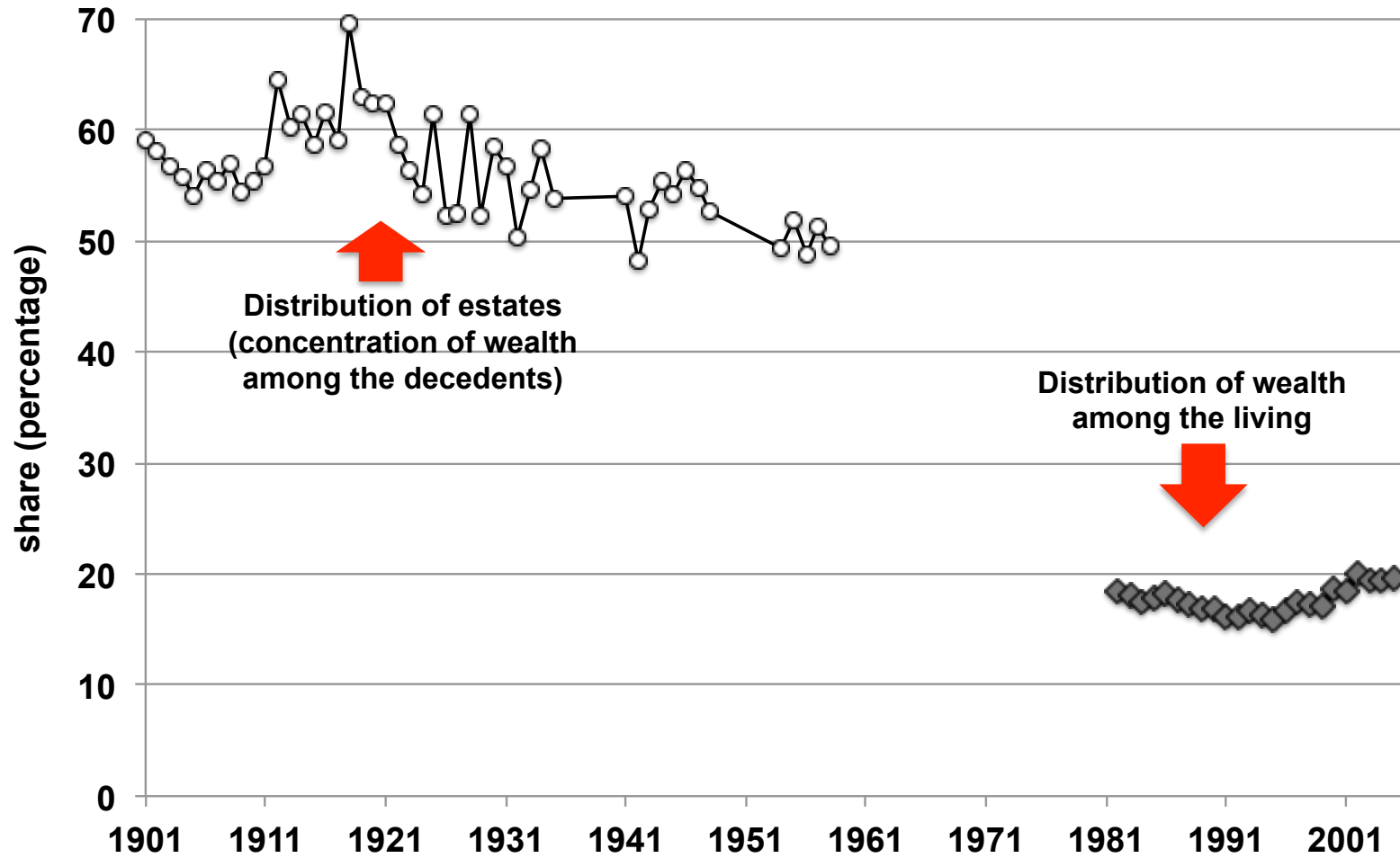
Figure 7. Number of estates as a percentage of deceased adults in Spain, France, Paris and United Kingdom, 1901-1960
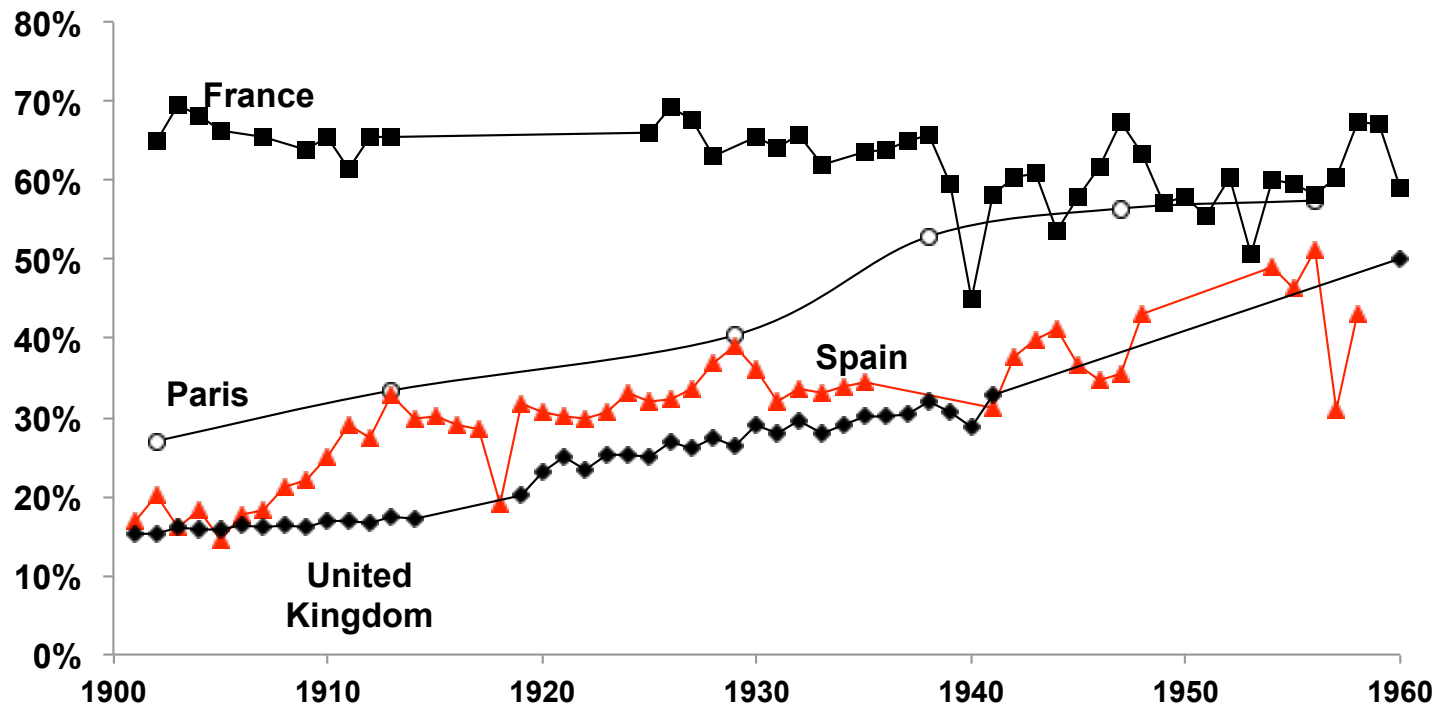
Source: Appendix 2, Piketty (2001), Piketty, Postel-Vinay and Rosenthal (2006), Alvaredo, Atkinson and Morelli (forthcoming)

Note: In France, all estates were taxed in this period. In the United Kingdom, estates under £100, were exempted before 1945. In Spain, around 10% of estates were exempted or evaded before 1910.

Figure 3. The top 1% share in Spain, 1901-2005
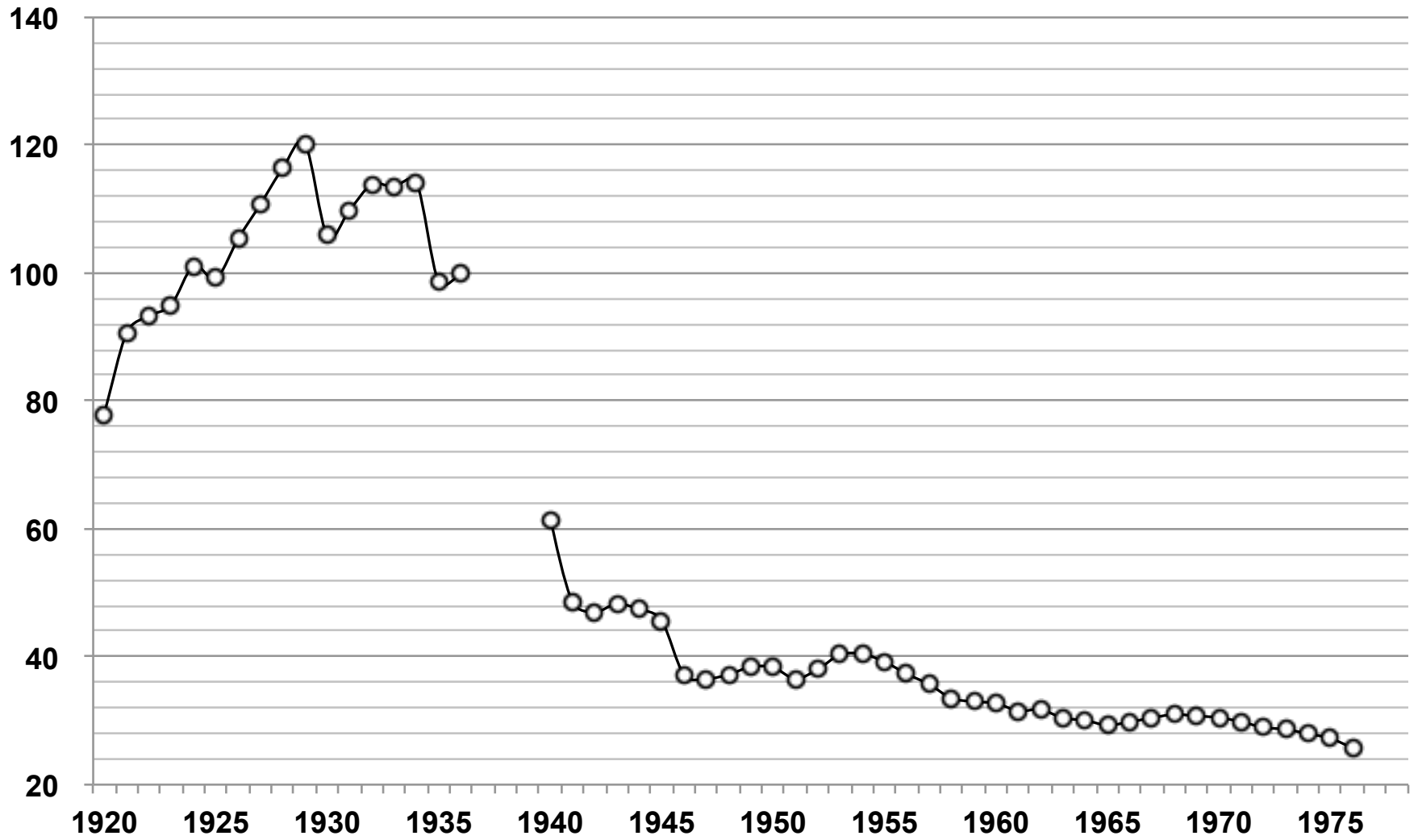(Estate tax data for 1901-1958; wealth tax data for 1982-2007)

Distribution of estates
(concentration of wealth
among the decedents)

Distribution of wealth
among the living

Source: Appendix 2, Alvaredo and Saez (2009)

UK: distributions of estates vs distribution of wealth among the living

Legend:
- – ◆ – Top 1% Estate
- – ● – Top 1% 'Bedrock' (wealth)
- —▲— Top1% -SPI(Individuals)
- – ▲ – Top 1% - SPI(tax units)
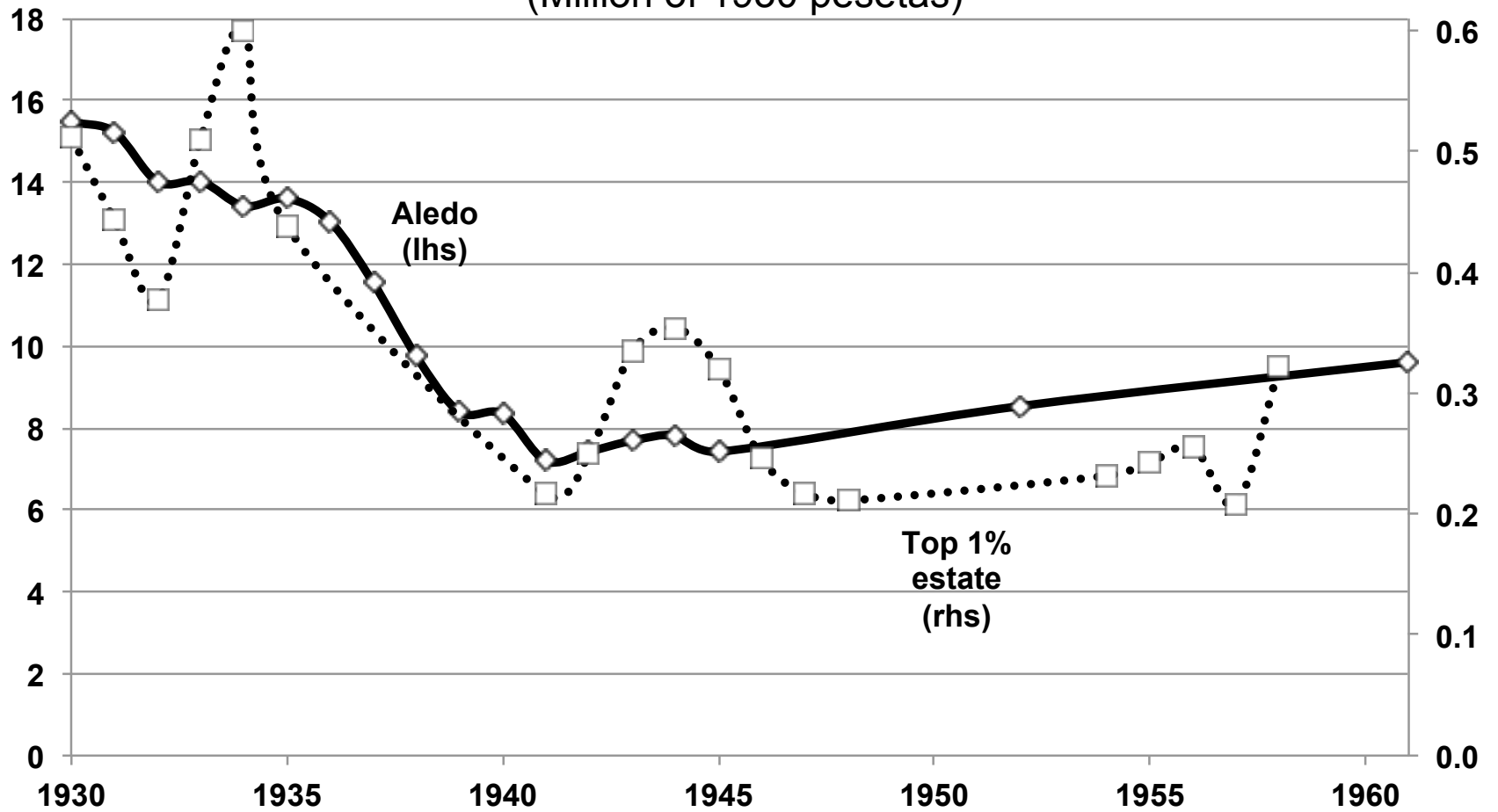
Figure 4. Index of real rental prices (1936=100)

Figure 5. Madrid Stock Exchange General Index
**Real price (1940=100)**
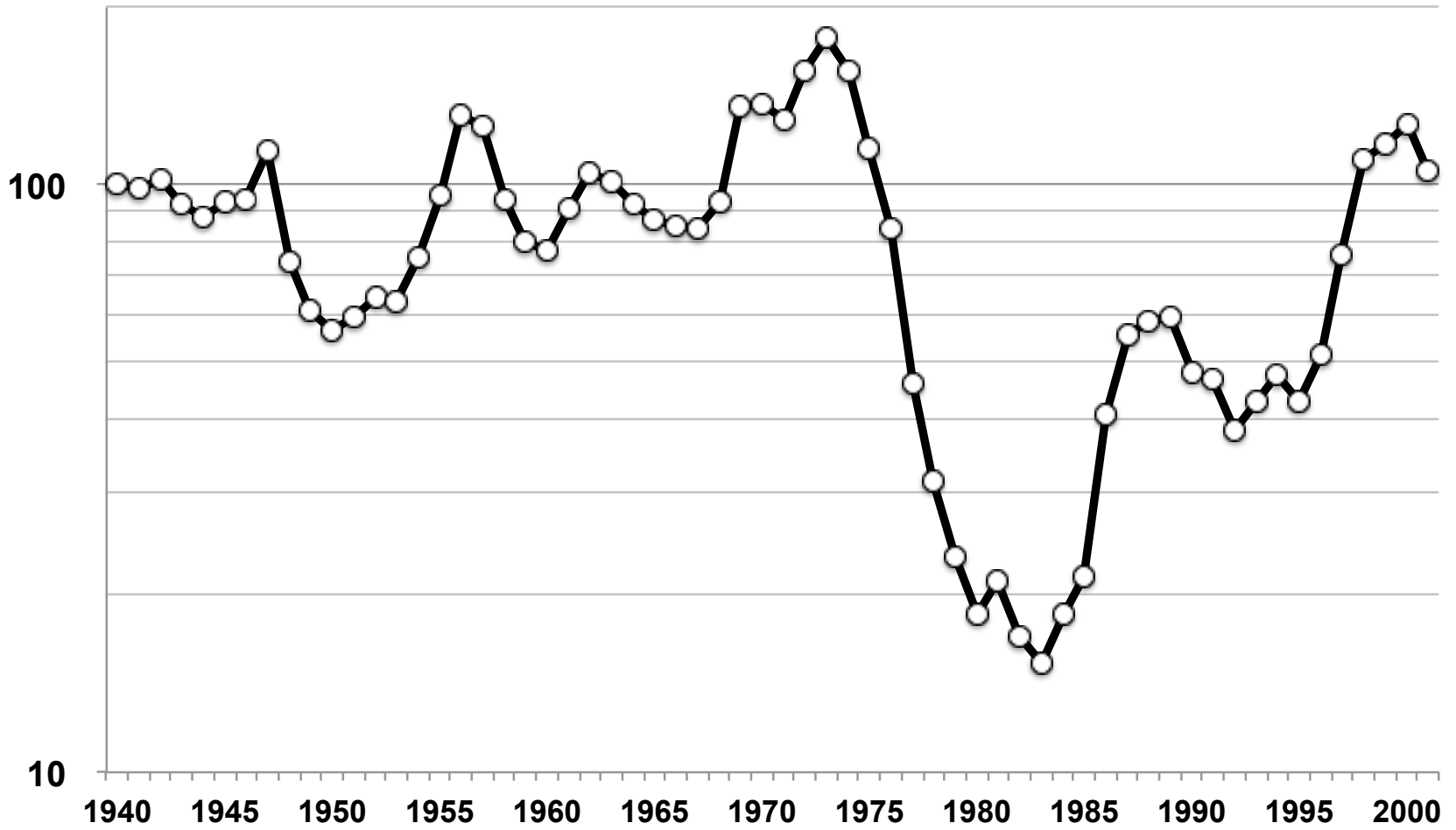
Source: Tafunell 2005

Figure 6. Wealth of the Marquis of Aledo and average estate of top 1%
(Million of 1930 pesetas)

Aledo
(lhs)

Top 1%
estate
(rhs)

Source: Appendix 2, Sección Nobleza del Archivo Histórico Nacional, *Aledo*, C. 1117, 1230

Figure 8. The top 1% estate share in Spain, France, United Kingdom and Portugal, 1895-2011
(Estate distribution for all countries, except Spain 1982-2007)

Legend:
- Spain (Estates)
- France
- UK
- Spain (Wealth)
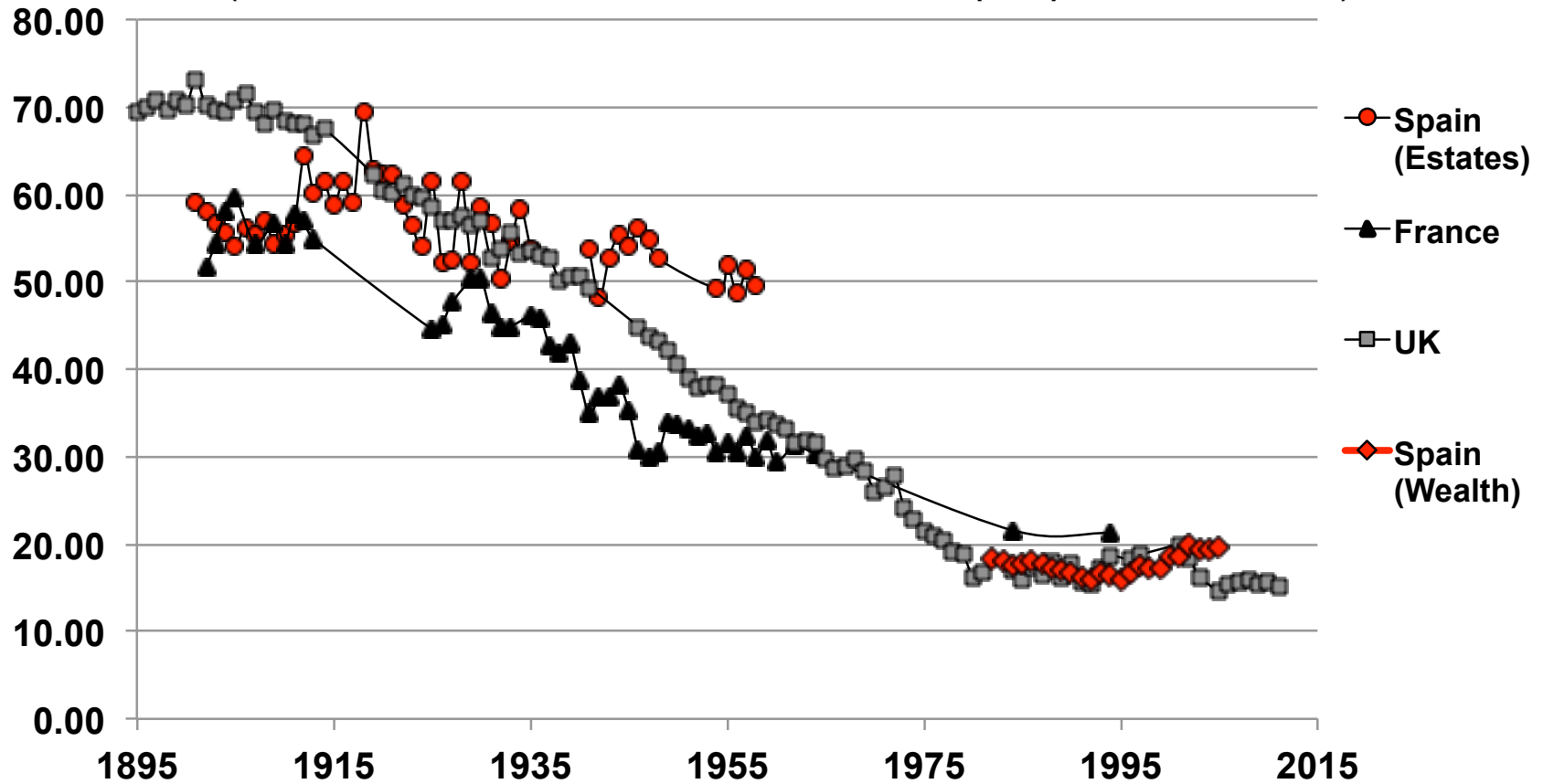
Source: Appendix 2, Alvaredo and Saez (2009), Piketty (2001), Alvaredo, Atkinson and Morelli (forthcoming)

Figure 9. Top inheritance tax rates in the United Kingdom, France and Spain, 1901-2013
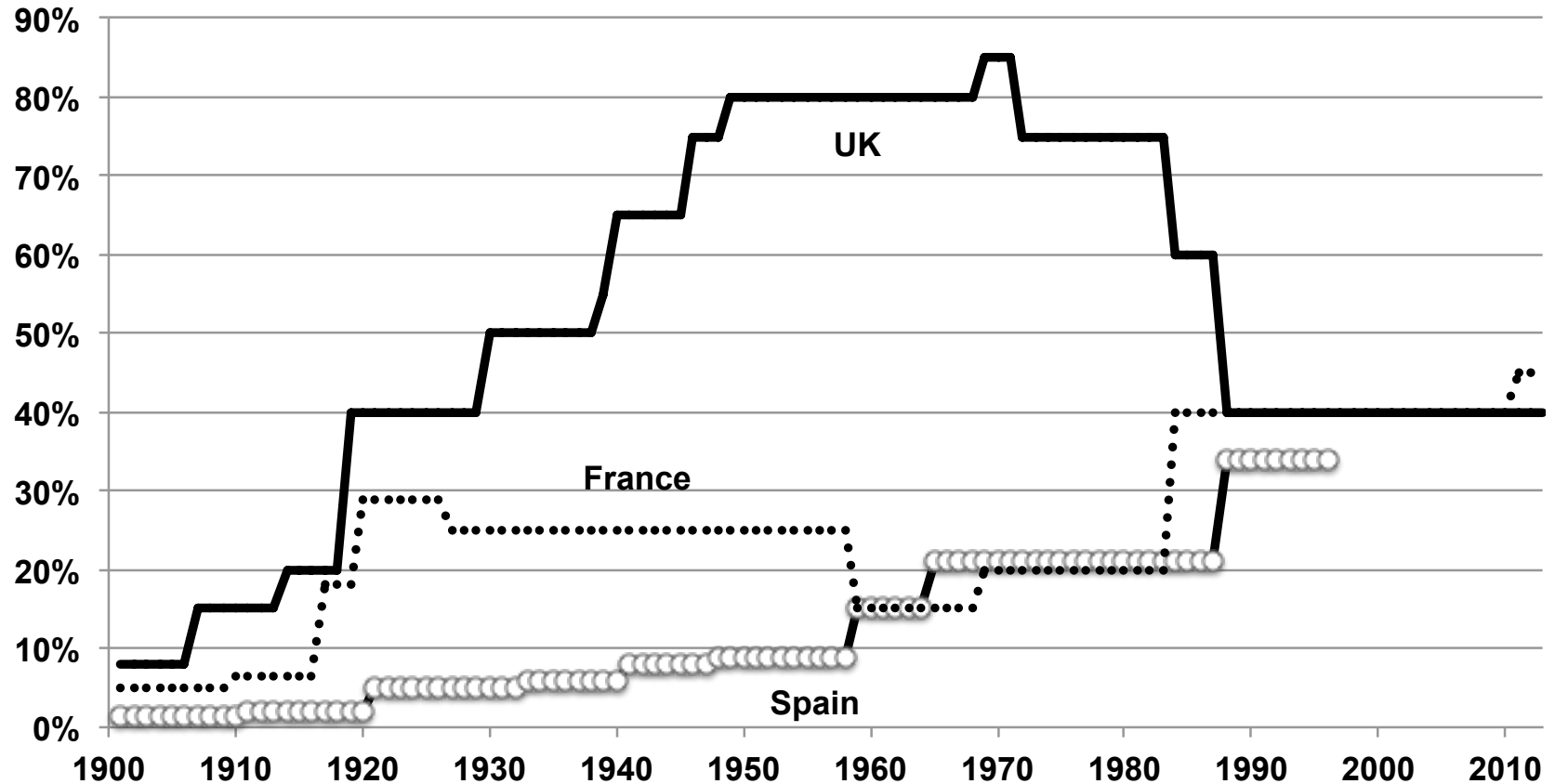
Source: Piketty (2014), *Gaceta de Madrid* and *Boletín Oficial del Estado*
Note: The Spanish series refers to inheritances in direct line. We do not provide tax rates for Spain from 1996 onwards, given enormous variations among regions.