On the long run evolution of inherited wealth

The United States in historical and comparative perspectives 1880-2010

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- What do we know about the historical patterns of inheritance in the US?

- Main goal: to provide estimates of the share of inherited wealth in aggregate wealth ($\varphi = W_B/W$) in the US over 1880-2010 [1860-2013]

- 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, …

- For the US, 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
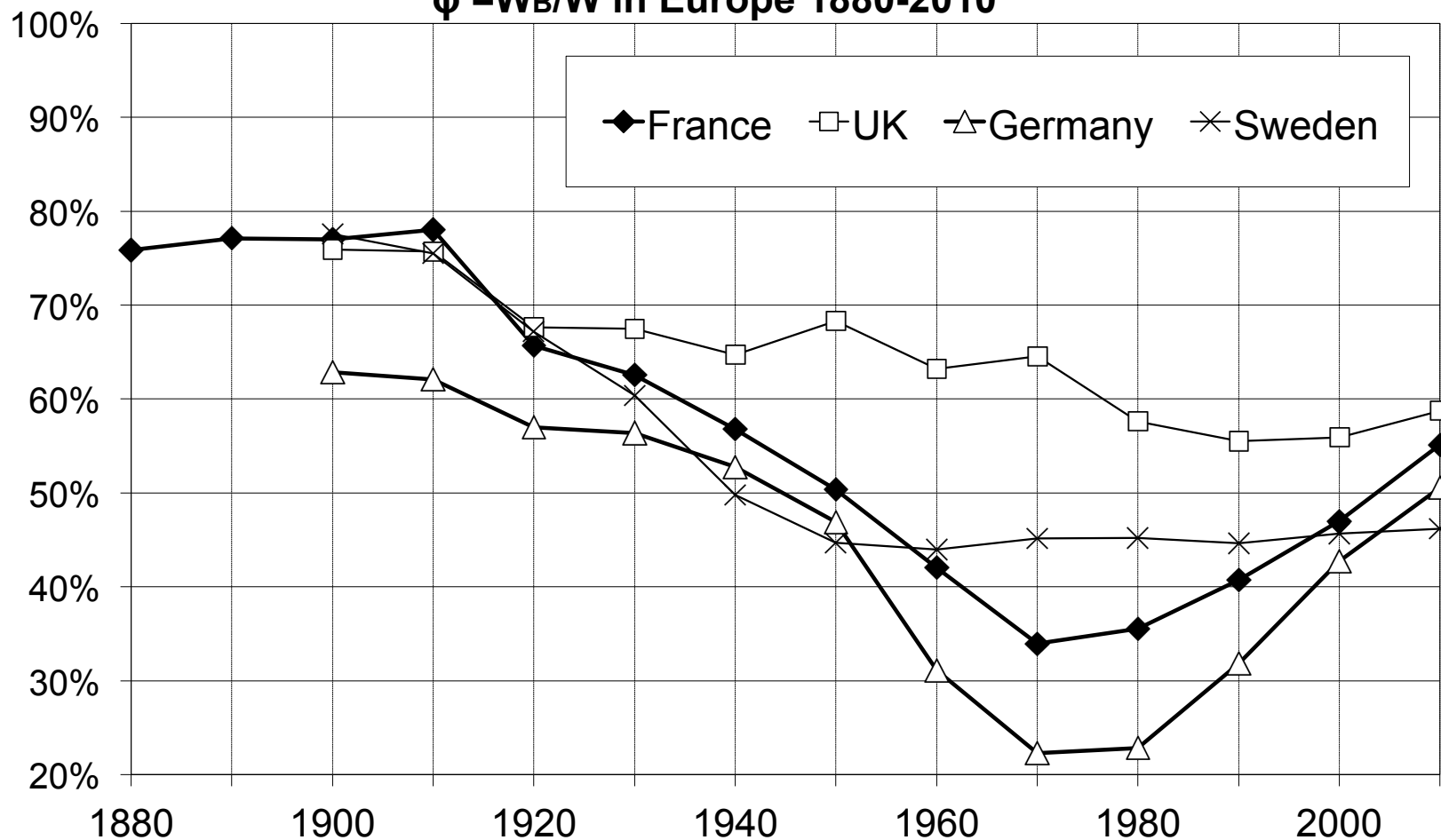
The inheritance share in aggregate wealth accumulation follows a U-shaped curve in France and Germany, and to a more limited extent in the UK. It follows a broadly similar pattern in Sweden, although in recent decades the Swedish inheritance stock increased relatively little, as the private saving rate 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

Annual flow of bequests and gifts (% national income)

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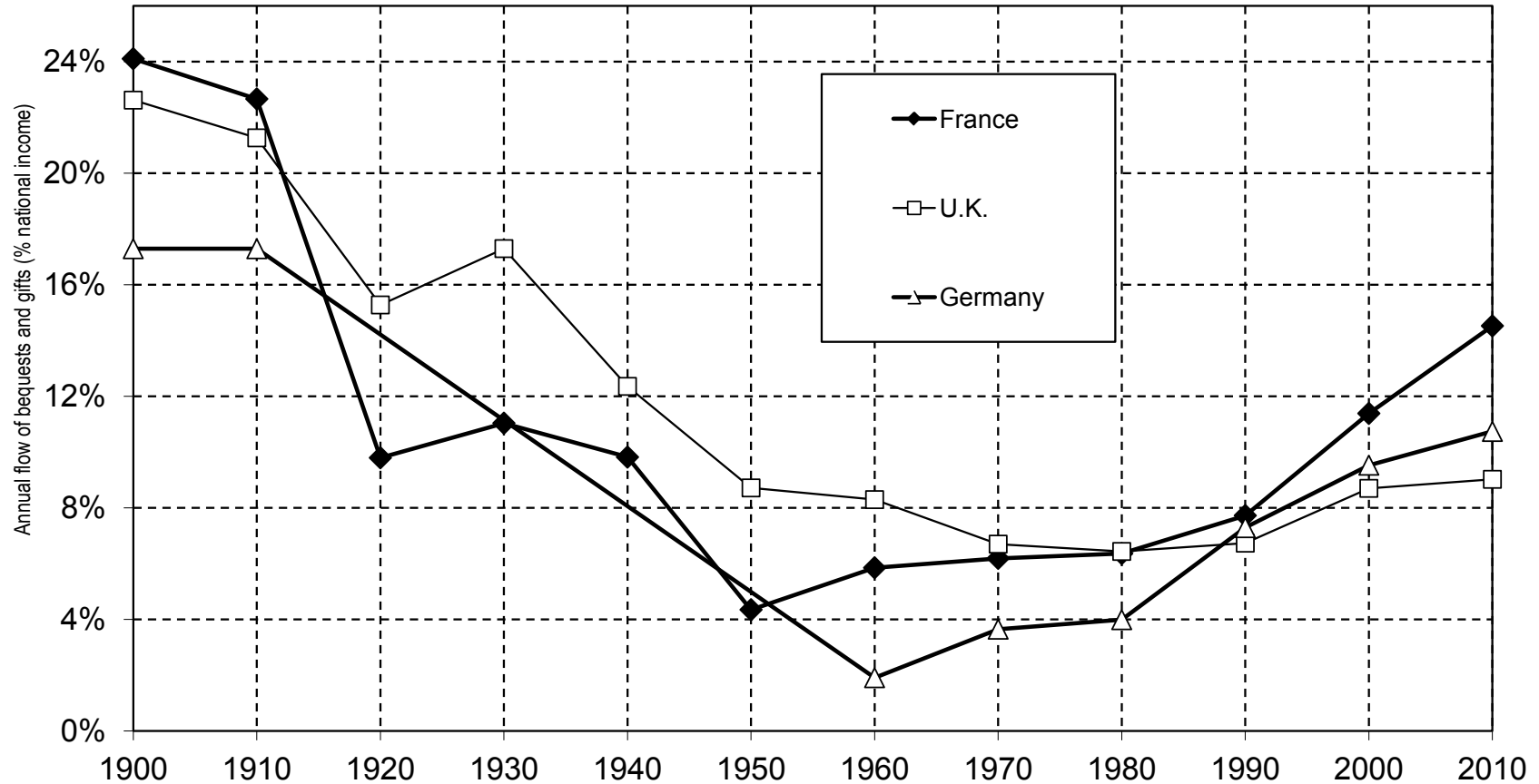
The inheritance flow follows a U-shaped in curve in France as well as in the U.K. and Germany. It is possible that gifts are under-estimated in the U.K. at the end of the period.

Outline

- This is an area where available evidence is scarce and incomplete.

- It is also an area where it is important to be particularly careful about concepts and definitions.

1. Basic notions and definitions

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

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

4. A simplified definition: inheritance flows vs. saving flows

5. Evidence

6. Discussion

1. 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 might seem 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

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

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

  - 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

2. 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%

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

- 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 **<u>less</u>** 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 **<u>more</u>** 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

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

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

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

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.

4. 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**

4. A simplified definition for φ (cont.)

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

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

  - 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
  - It does not depend explicitly on the rate of return

Figure 4.4. The cumulated stock of inherited wealth as a fraction of aggregate private wealth, France 1850-2010
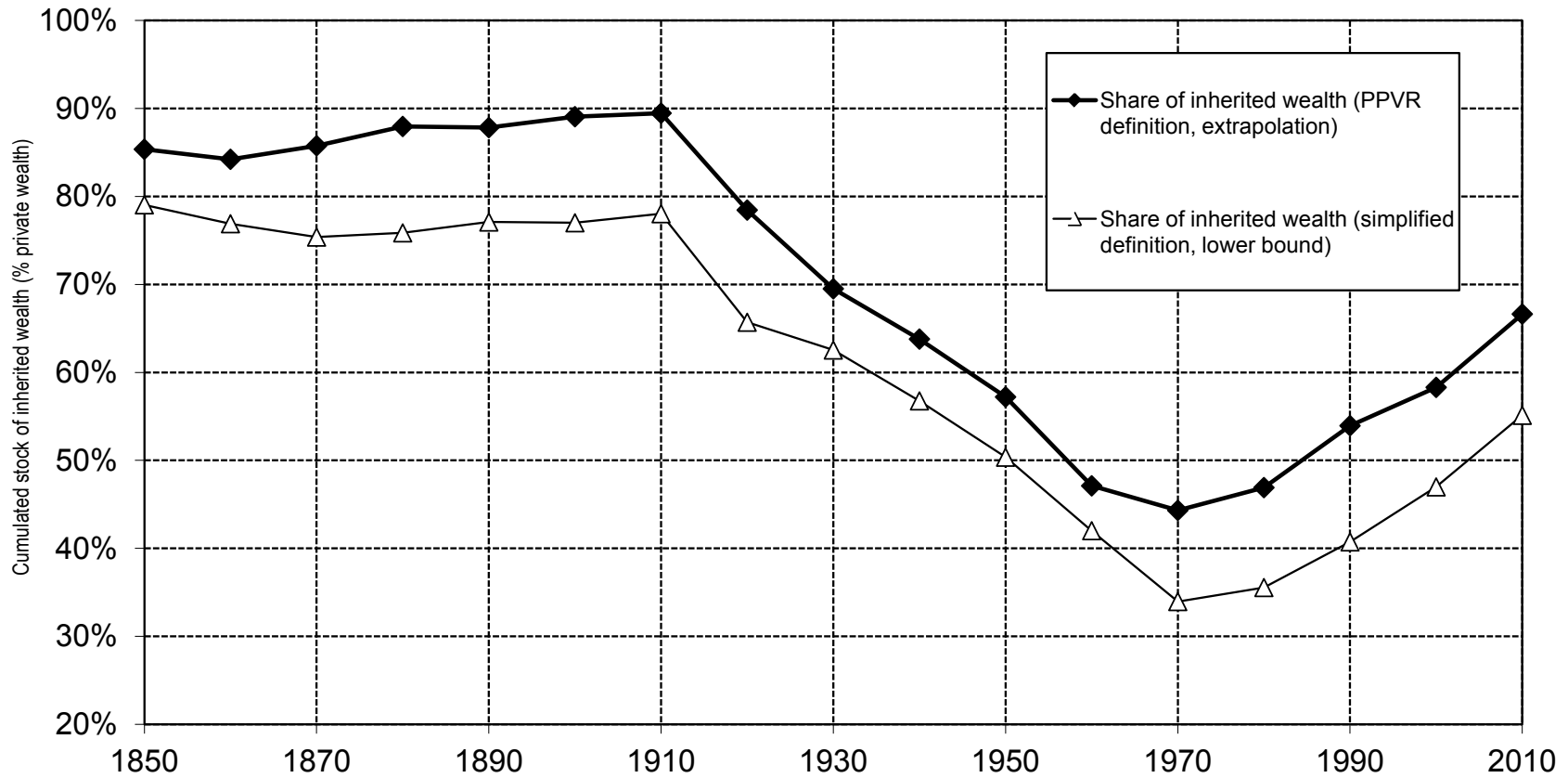
Inherited wealth represents 80-90% of total wealth in France in the 19th century; this share fell to 40%-50% during the 20th century, and is back to about 60-70% in the early 21st century.
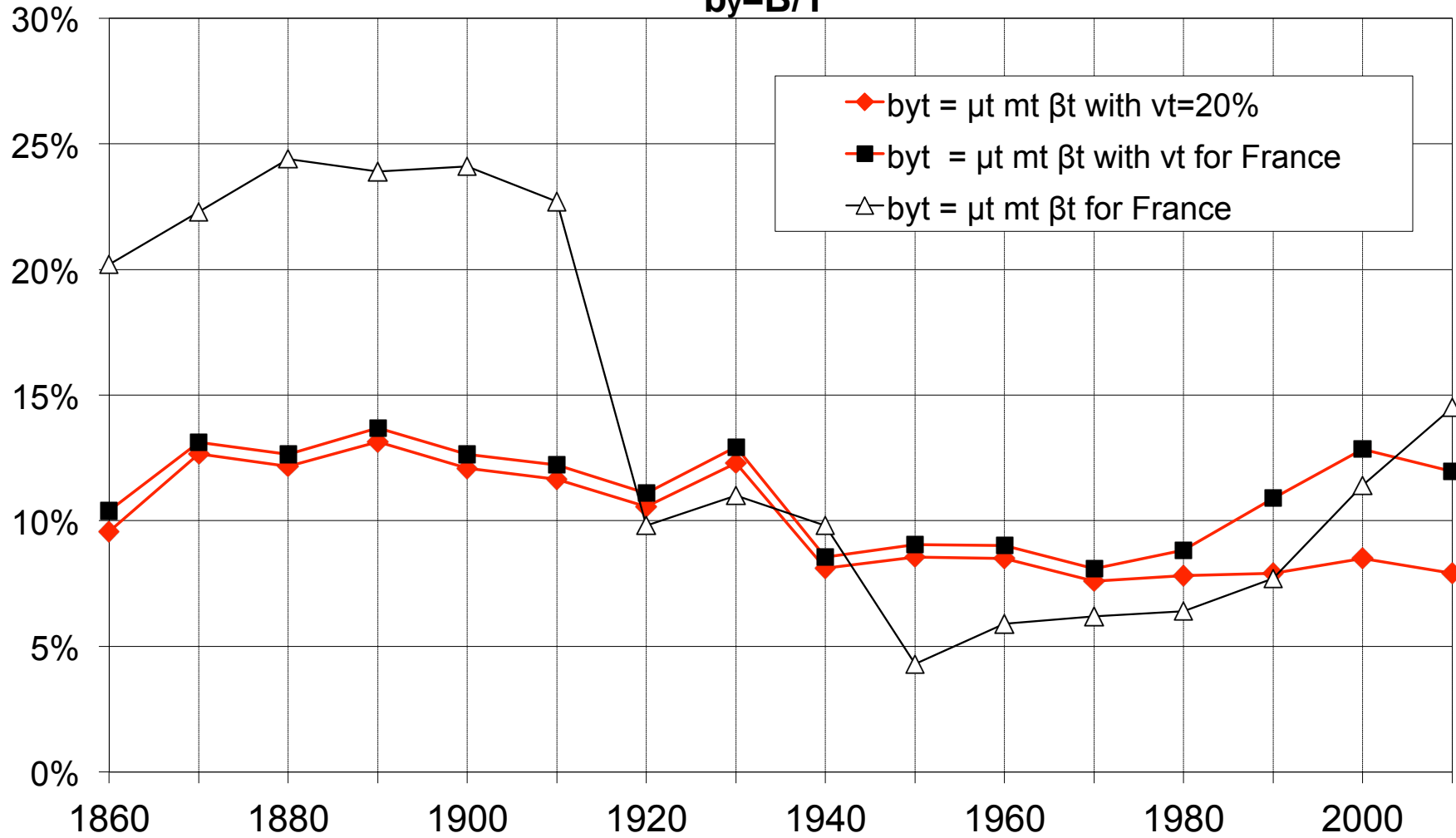
5. Evidence: simplified formula

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

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

|	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)

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
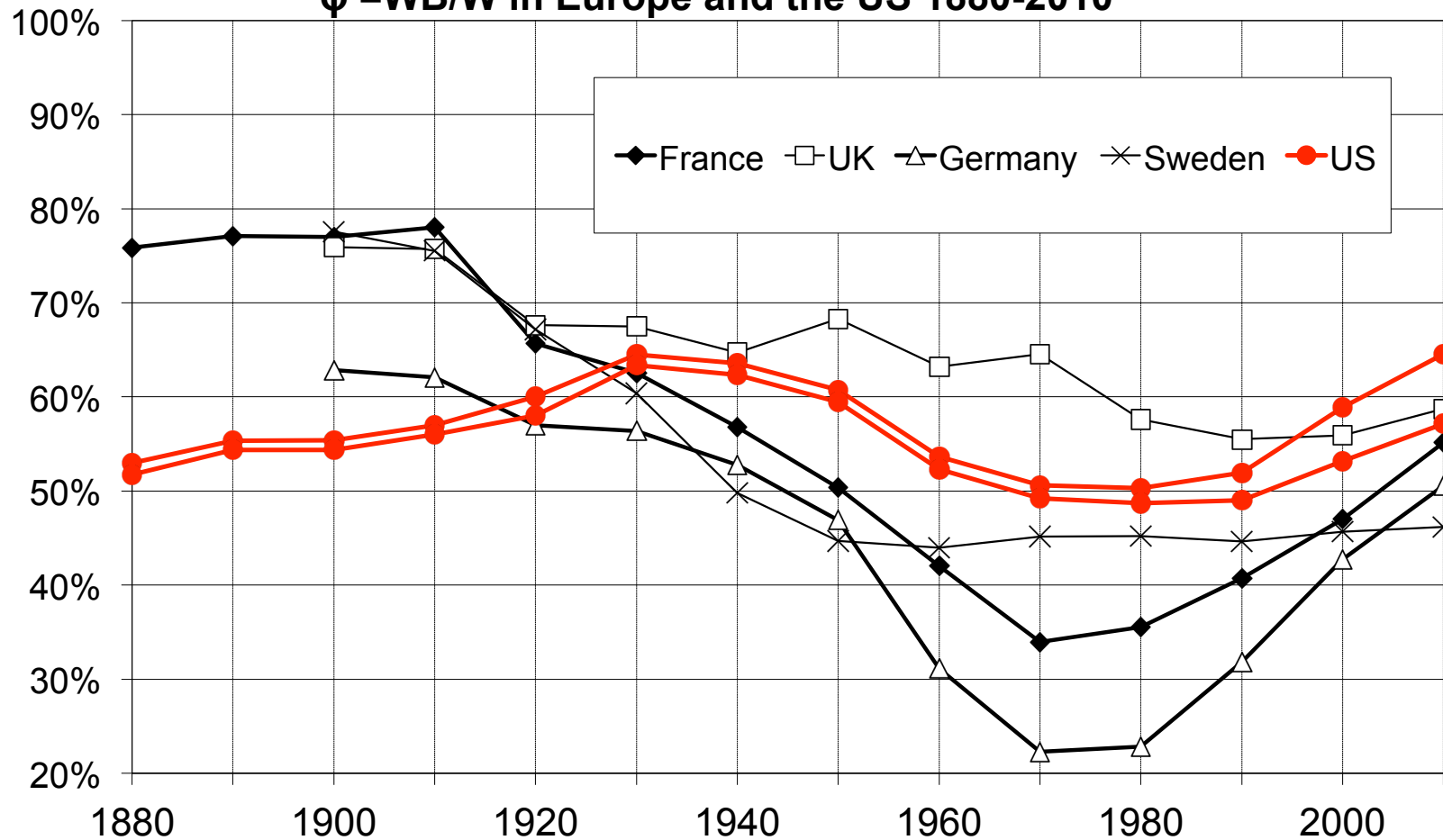- $b_{yt} = \mu_t\, m_t\, \beta_t$ for France

Figure 2.7. Private wealth / national income ratios 1870-2010: Europe vs. USA
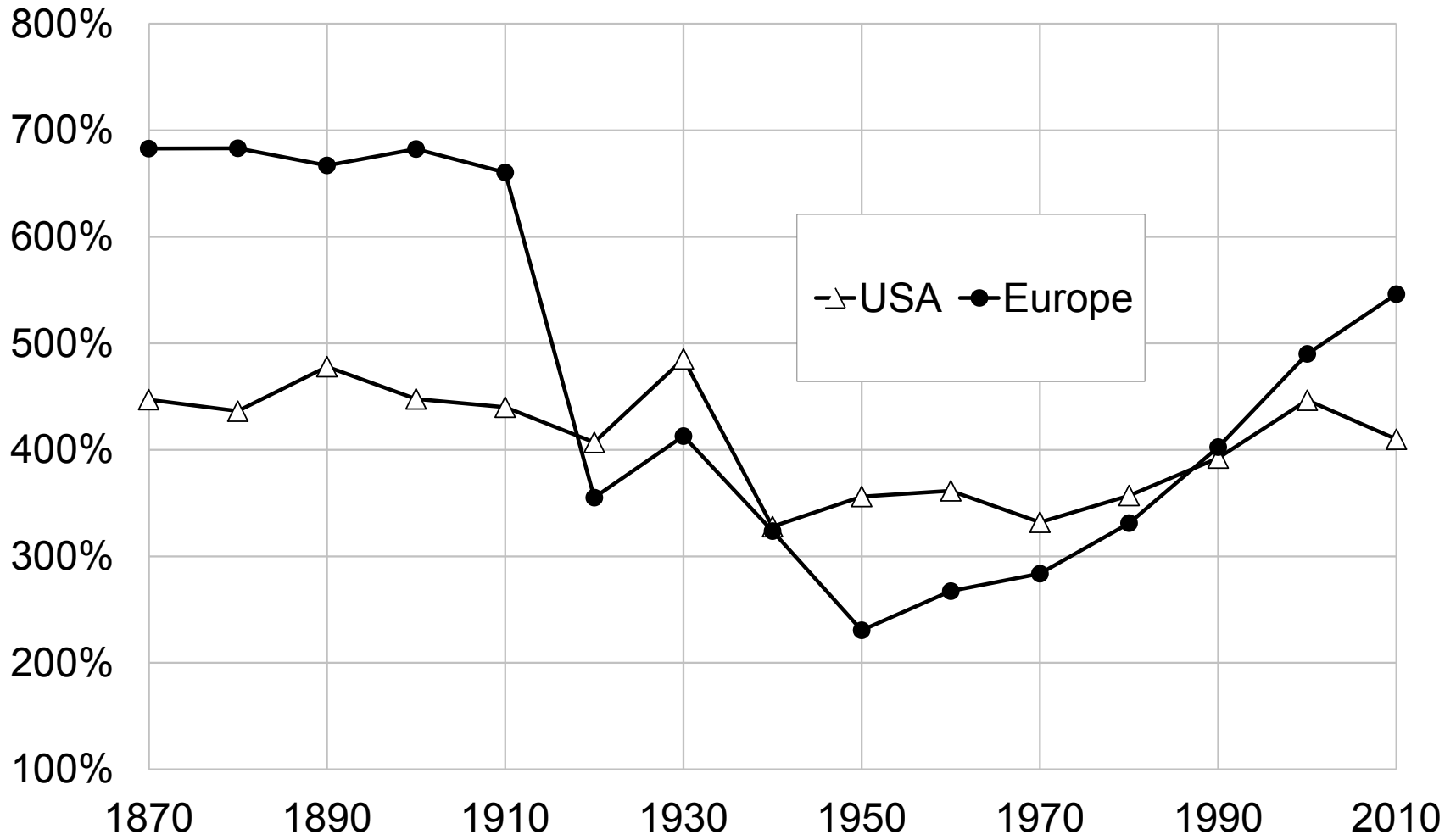
The stock of inherited wealth / private wealth
$\varphi = WB/W$ in the US 1880-2010
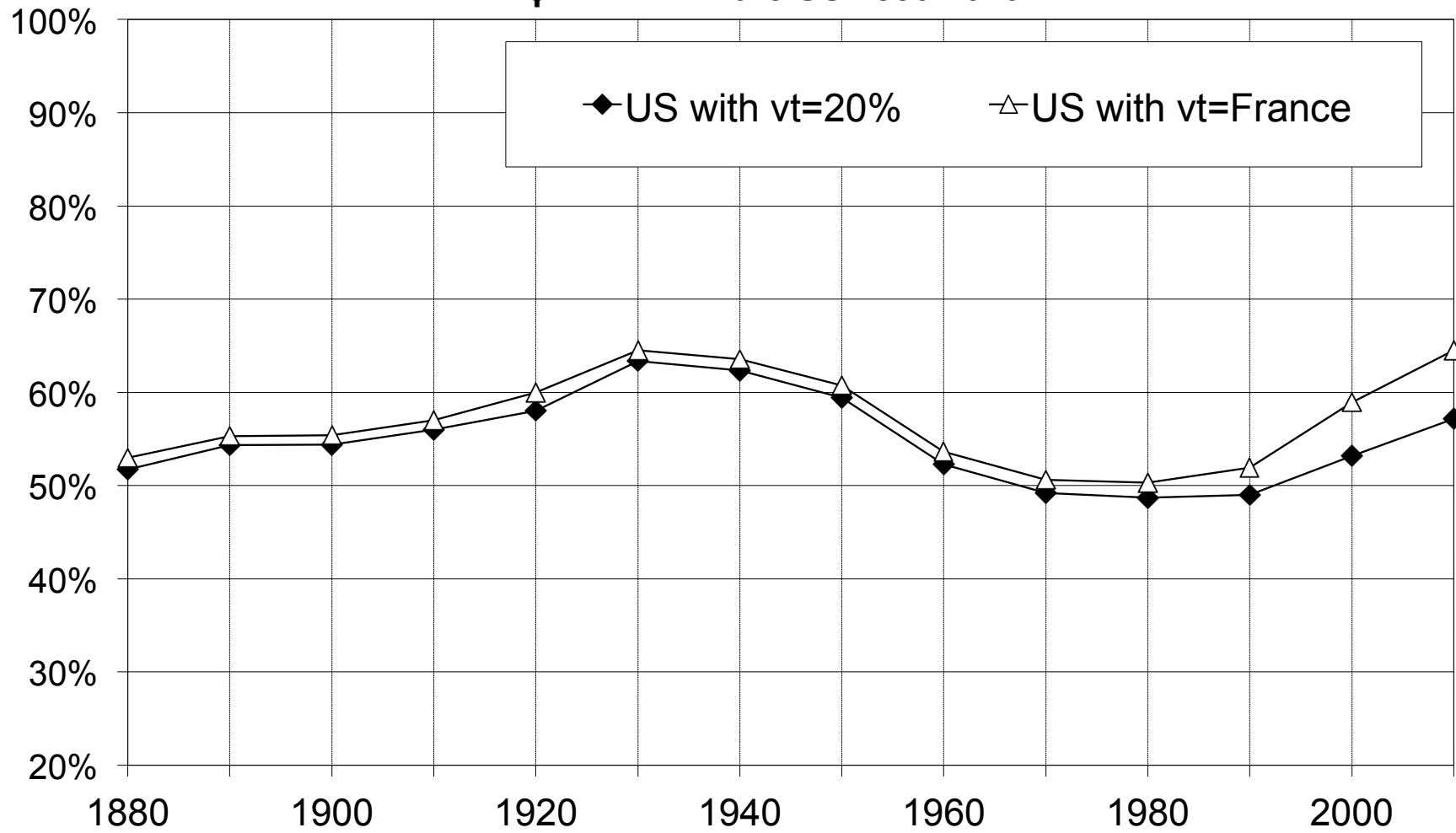
The stock of inherited wealth / private wealth
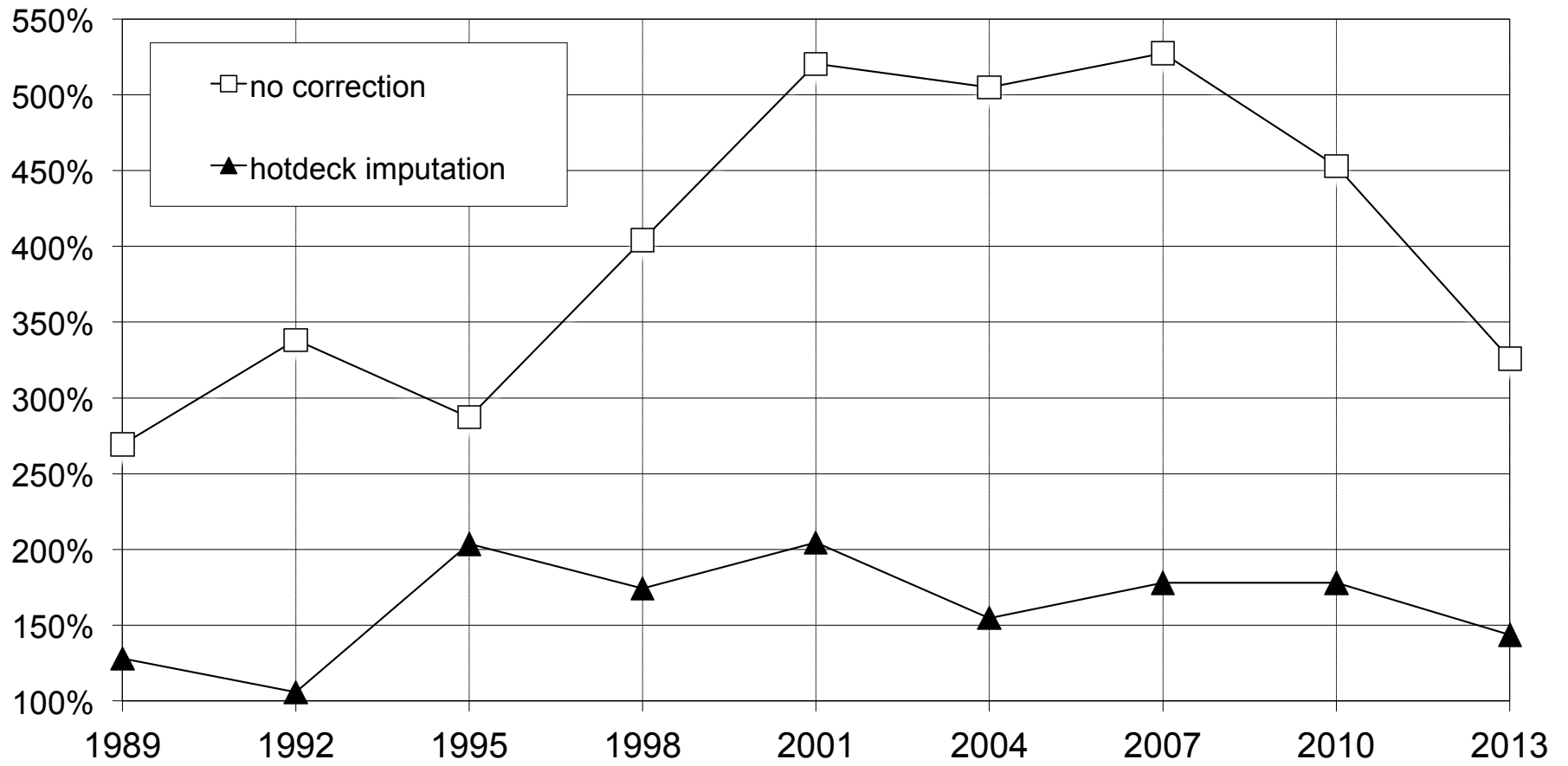## φ =WB/W in Europe and the US 1880-2010

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.
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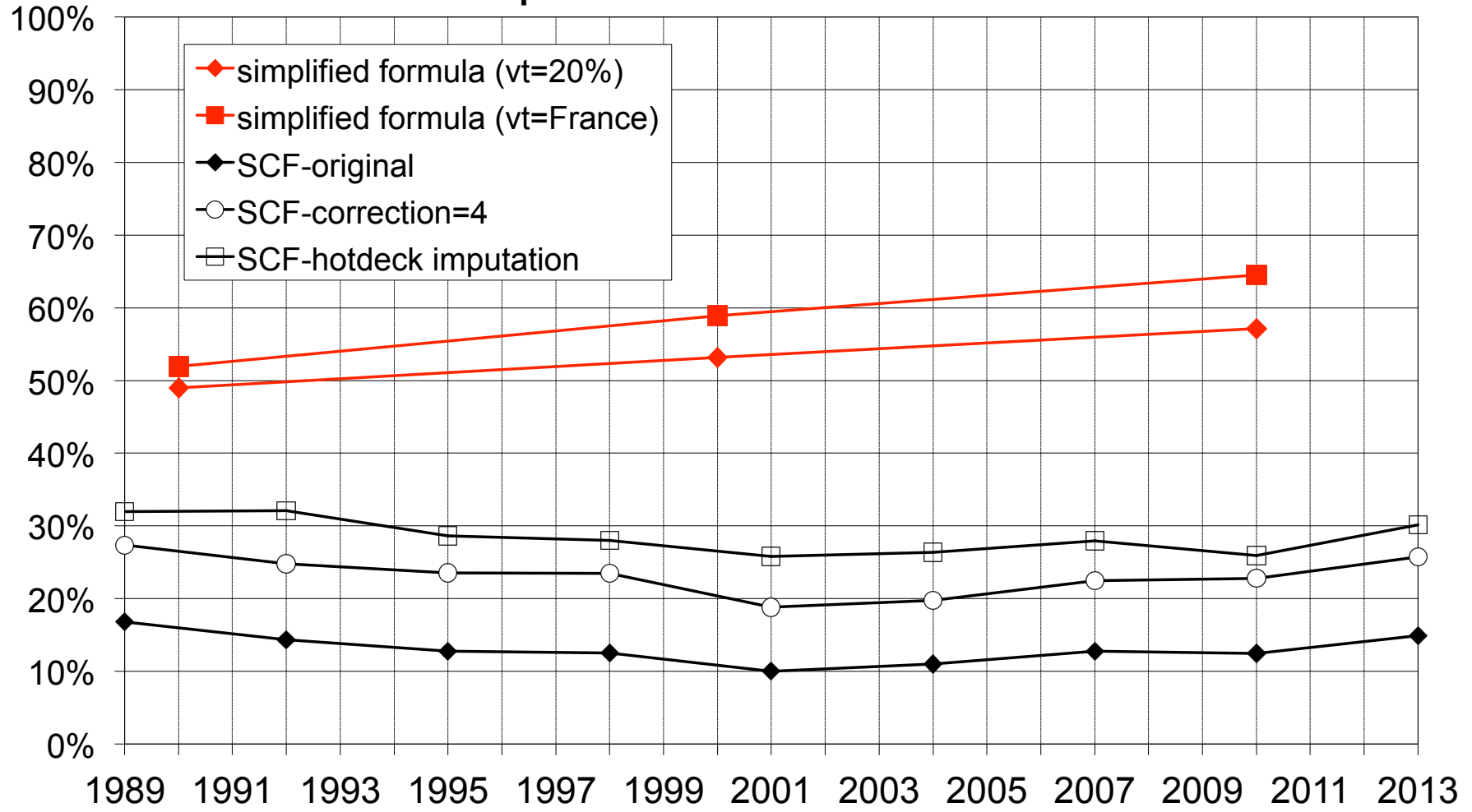# 5. Evidence: PPVR formula

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

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
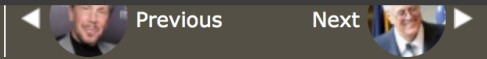- SCF-correction=4
- SCF-hotdeck imputation

6. Discussion

The simplified formula tends to underestimate the true φ, compared to the PPVR definition.

This happens when individuals with labor income only tend to save less than those who have large inherited wealth and capital income.

What is happening in the US SCF data?

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

- Enormous self-reporting biases. Large downward biases in retrospective bequests.

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

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Real Time Net Worth

$42.7 Billion

$0 | 0%

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CEO, Koch Industries

Age	79
Source Of Wealth	**diversified**
Self-Made Score	**5**
Residence	**Wichita, KS**
Citizenship	**United States**

Charles and David Koch's spheres of influence span business, philanthropy and politics. The lightning-rod capitalist brothers continue to add to their empire, plunking down more than $5 billion on acquisitions in the past year.

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Real Time Net Worth

$23.9 Billion

⬆ **$61.4 M | 0.3%**

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Age	75
Source Of Wealth	candy
Self-Made Score	2
Residence	The Plains, VA
Citizenship	United States
Marital Status	Divorced

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Jacqueline Mars and her two brothers, Forrest Jr. and John, own the secretive ($33 billion) candy maker Mars. All three siblings serve on its board of directors, but the family has no role in day-to-day operations. Their grandfather Frank started Mars in 1911 in his Tacoma, Washington kitchen