

Econ 133 – Global Inequality and Growth

What is Capital?

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Roadmap

1. Capital and wealth: definitions
2. The wealth/income ratio in the long-run
3. The link between capital income and wealth

1 Capital and wealth: definition

1.1 Private wealth

- Private wealth $W = \text{assets} - \text{liabilities}$ of households
- Assets = all non-financial (housing, land...) and financial assets (equities, bonds, bank deposits...)
- Recorded in national balance sheets

1.2 Public wealth

- Public wealth = assets – liabilities of the government
- Liabilities = public debt; assets = schools, roads, barracks...

1.3 National wealth

- National wealth = private wealth + public wealth

National wealth can be decomposed as follows:

- National wealth = domestic capital K + net foreign assets
- K = domestic capital = land + housing + other domestic capital
- At world level: wealth = capital
- Key reference for data on wealth and its composition: World Inequality Database, <http://wid.world>

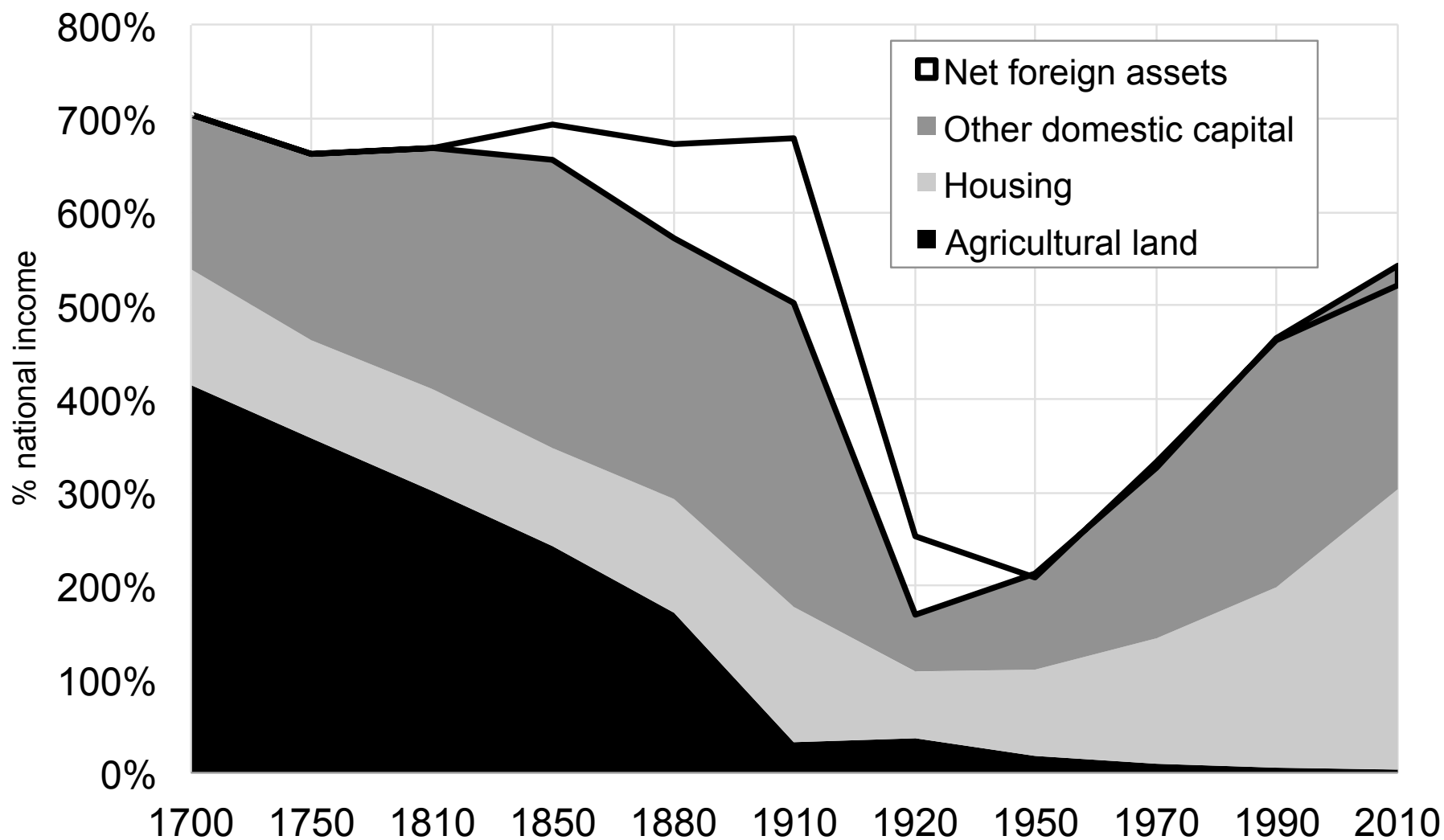
2 The wealth/income ratio in the long run

Object of interest $\beta = W/Y$

2.1 Data sources

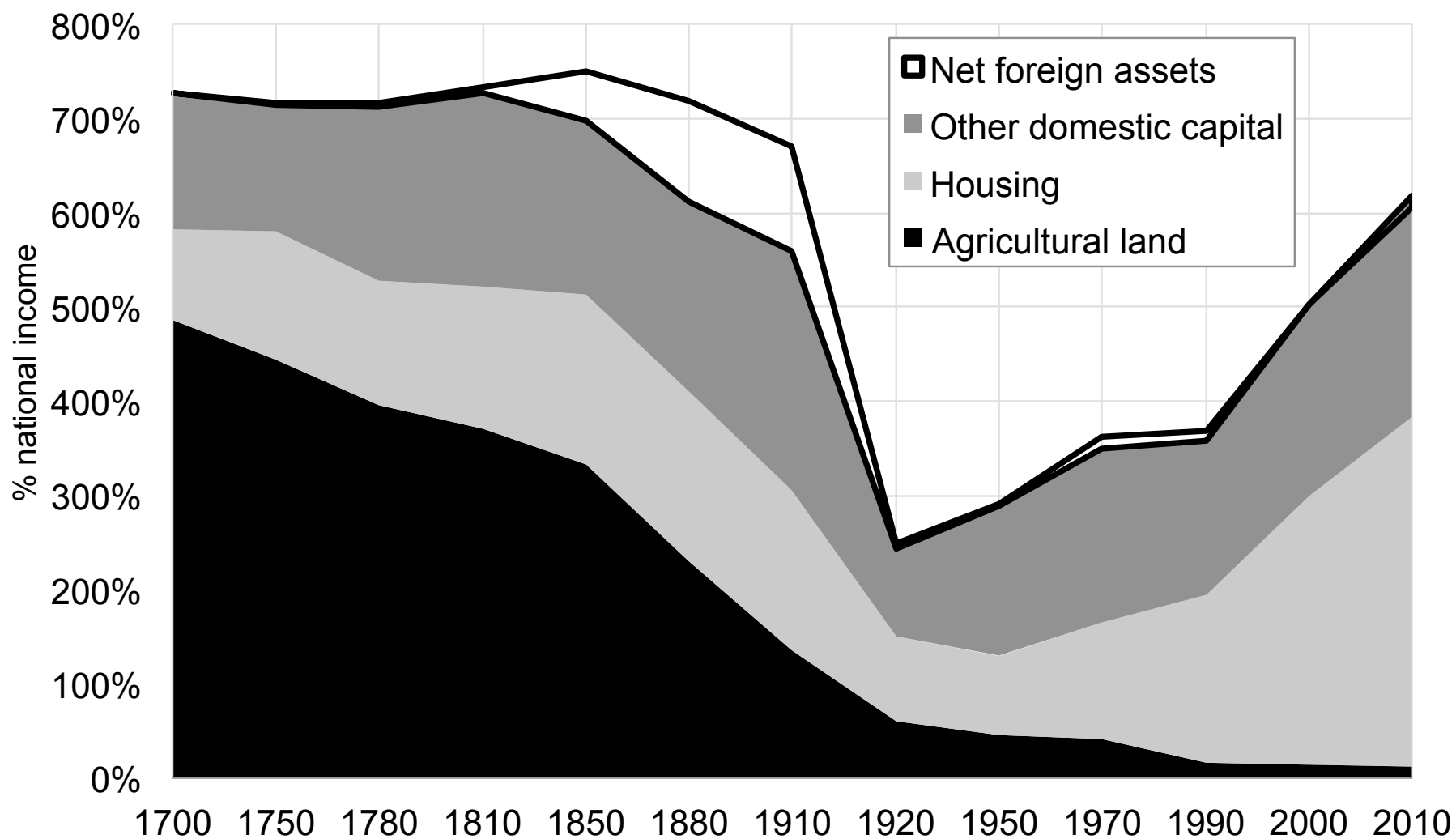
- Long tradition of national wealth estimates in Britain (Petty, King, Giffen) and France (Vauban, Lavoisier, Colson) in 18th-19th cent.
- Not sufficiently precise to study short-run fluctuations; but fine to study broad orders of magnitudes and long-run evolutions

The changing nature of national wealth: UK 1700-2010



Source: Piketty and Zucman (2014). National wealth = agricultural land + housing + other domestic capital goods + net foreign assets

The changing nature of national wealth: France 1700-2010



Source: Piketty and Zucman (2014). National wealth = agricultural land + housing + other domestic capital goods + net foreign assets

2.2 The long-run wealth-income ratio: $\beta = s/g$

In the long-run, the wealth to income ratio β is equal to the ratio of the saving rate s by the growth rate g

Proof of the formula $\beta = s/g$:

- $W_{t+1} = W_t + s_t Y_t$
- Divide both sides by $Y_{t+1} = Y_t(1 + g_t)$ to get:

$$\beta_{t+1} = \frac{W_t + s_t Y_t}{Y_t(1 + g_t)} = \frac{\beta_t + s_t}{1 + g_t}$$

In steady state:

- $\beta_t = \beta_{t+1}, s_t = s, g_t = g$
- Plug in above equation, solve for β , and get $\beta = s/g$

Ex: if $s = 10\%$ and $g = 3\%$ then $\beta = 333\%$

Ex: If $s = 10\%$ and $g = 1.5\%$ then $\beta = 666\%$

Only assumption: $W_{t+1} = W_t + s_t Y_t$, i.e., no price effects

Consider an economy where there is no income growth ($g = 0\%$) and people save at a rate of $s = 1\%$. Then:

- A — The wealth-income ratio will tend to 100% in the long-run
- B — The wealth-income ratio will tend to 0% in the long run
- C — The wealth-income ratio will tend to 1% in the long run
- D — The wealth-income ratio will tend to infinity in the long run

2.3 Where does s come from?

Different reasons why people save:

- Precautionary saving
- Life-cycle saving
- Leaving bequests
- Wherever s comes from, $\beta = s/g$ if no price effect

Gross and net saving in rich countries, 1970-2010			
	Gross private savings (% national income)	Minus: Capital depreciation	Equal: Net private saving
U.S.	18.8%	11.1%	7.7%
Japan	33.4%	18.9%	14.6%
Germany	28.5%	16.2%	12.2%
France	22.0%	10.9%	11.1%
U.K.	19.7%	12.3%	7.3%
Italy	30.1%	15.1%	15.0%
Canada	24.5%	12.4%	12.1%
Australia	25.1%	15.2%	9.9%

A large part of gross saving (generally about half) corresponds to capital depreciation; i.e. it is used solely to repair or replace used capital.

Sources: Piketty and Zucman (2014)

Private and public saving in rich countries, 1970-2010			
	National saving (private + public) (net of depreciation) (% national income)	incl. Private saving	incl. Public saving
U.S.	5.2%	7.6%	-2.4%
Japan	14.6%	14.5%	0.1%
Germany	10.2%	12.2%	-2.0%
France	9.2%	11.1%	-1.9%
U.K.	5.3%	7.3%	-2.0%
Italy	8.5%	15.0%	-6.5%
Canada	10.1%	12.1%	-2.0%
Australia	8.9%	9.8%	-0.9%

A large part (variable across countries) of private saving is absorbed by public deficits, so that national saving (private + public) is less than private saving.

Sources: Piketty and Zucman (2014)

2.4 What does the $\beta = s/g$ formula say?

Any β possible in steady-state, as s and g vary for lots of reasons

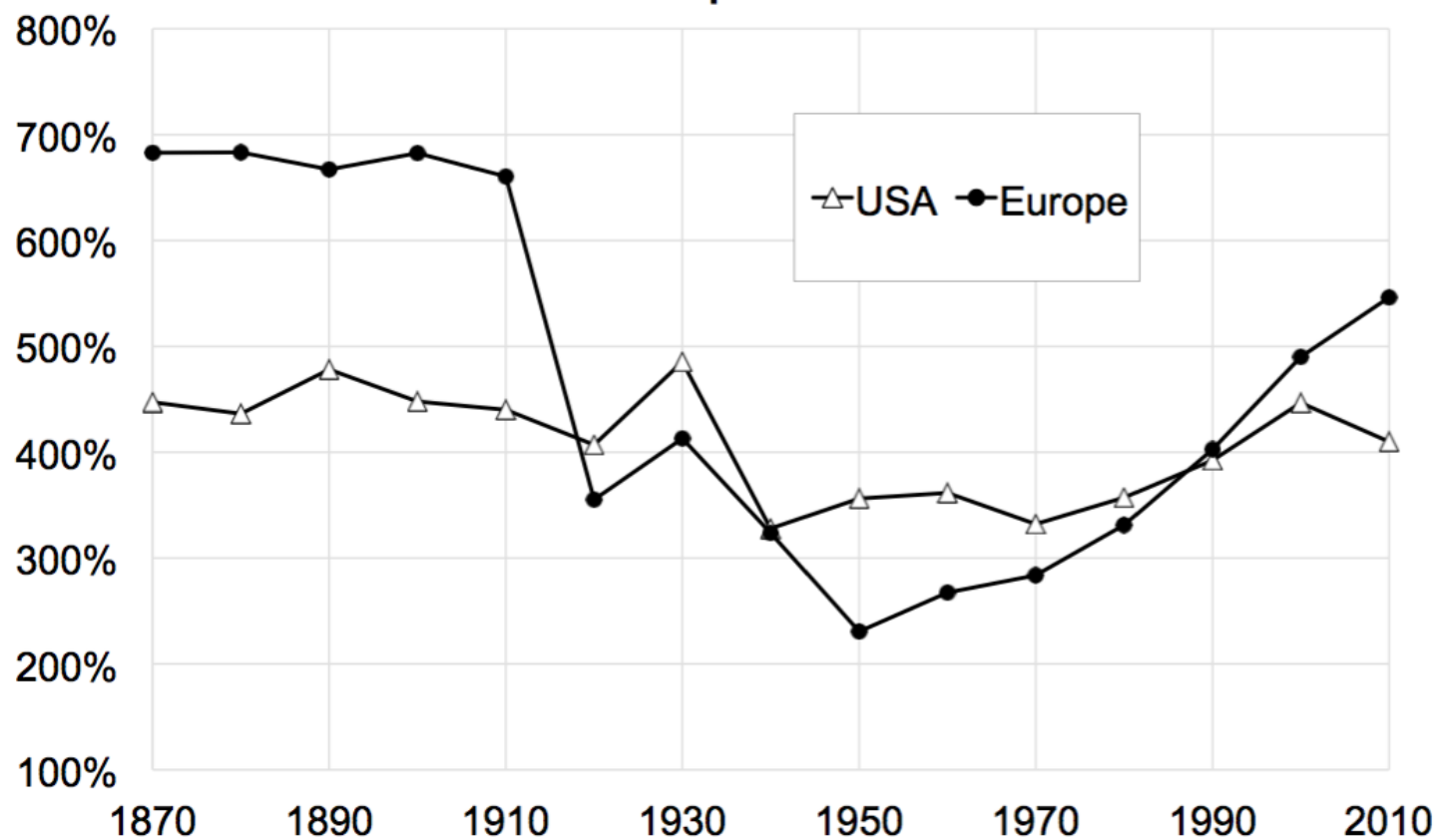
Countries with low g tend to have high β

Explains why 18th century economies had high β

Explains Europe vs. US

Explains high Chinese saving rate

**Figure 4: Private wealth / national income ratios 1870-2010:
Europe vs. USA**



Authors' computations using country national accounts. Private wealth = non-financial assets + financial assets - financial liabilities (household & non-profit sectors). Data are decennial averages (1910-1913 averages for Europe)

2.5 Lessons of $\beta = s/g$ for the 21st century

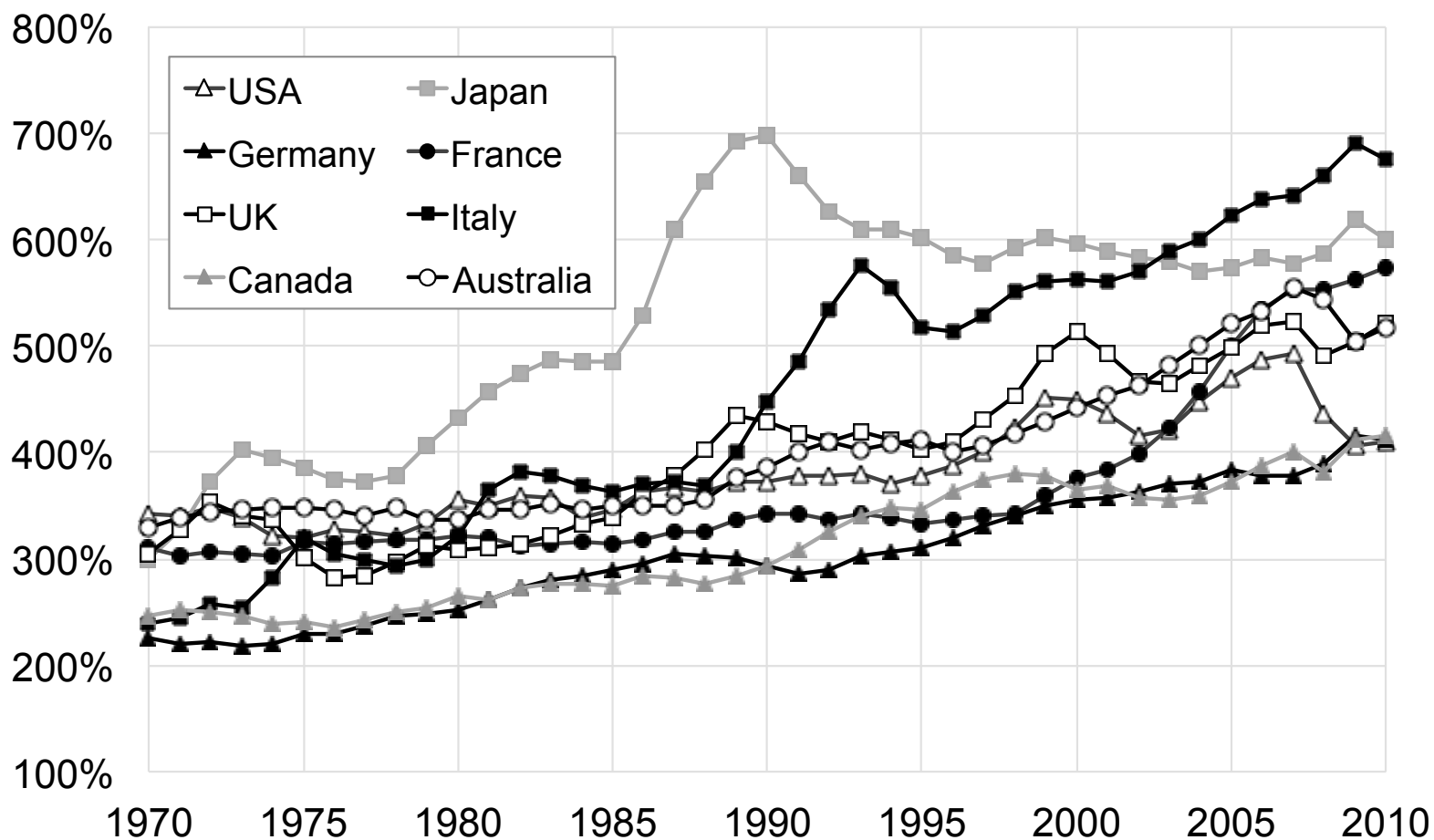
Population growth will fall $\rightarrow \beta$ might become high at global level

If in addition productivity growth falls, β might become very high

Are high β a good thing or a bad thing?

- Good: capital is useful (e.g., infrastructure, houses, etc).
- Problem: might exacerbate inequality

Private wealth / national income ratios 1970-2010



Source: Piketty and Zucman (2014). Authors' computations using country national accounts. Private wealth = non-financial assets + financial assets - financial liabilities (household & non-profit sectors)

3 The link between capital income and wealth

- Define $r =$ average rate of return to wealth $= Y_K/W$
- **Basic accounting law:** $\alpha = r \times \beta$
- Typical values: $\beta = 600\%$, $r = 5\%$, $\alpha = 30\%$
- In practice, average rate of return to capital r varies a lot across assets and over individuals

References

Barro, Robert, "Are government bonds net wealth?", *Journal of Political Economy* 1974 (web)

Lane, Philip and Gian Maria Milesi-Feretti, "The External Wealth of Nations Mark II," *Journal of International Economics*, 2007, 73 (web)

Piketty, Thomas, and Gabriel Zucman, "Capital is back: wealth-income ratios in rich countries 1700-2010", *Quarterly Journal of Economics*, 2014 (web)

Ricardo, David *On the principles of political economy and taxation*, 1817

Knoll, Katharina, Moritz Schularick and Thomas Steger (2014). "No Price Like Home: Global House Prices, 1870-2012", CEPR DP. (web)

Piketty, Thomas, and Gabriel Zucman, "Capital is back: wealth-income ratios in rich countries 1700-2010", *Quarterly Journal of Economics*, 2014 (web)