

# Discussion on “Capital in the XXI Century”

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# Outline

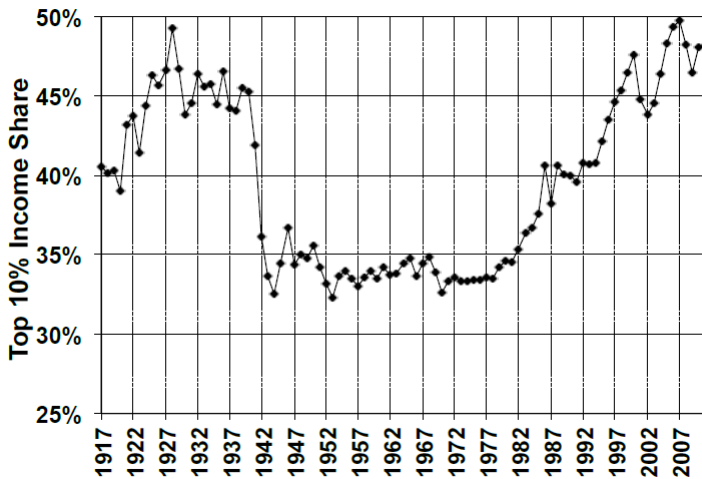
Facts

Piketty's Capital

The debate

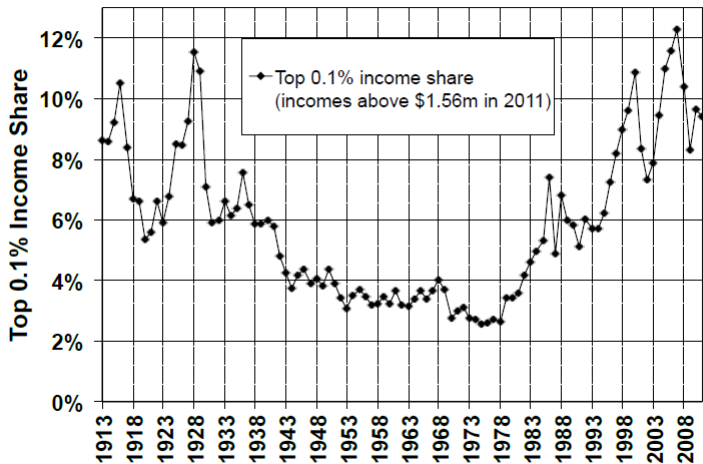
# Income Inequality Top 10%

## Top 10% Pre-tax Income Share in the US, 1917-2011



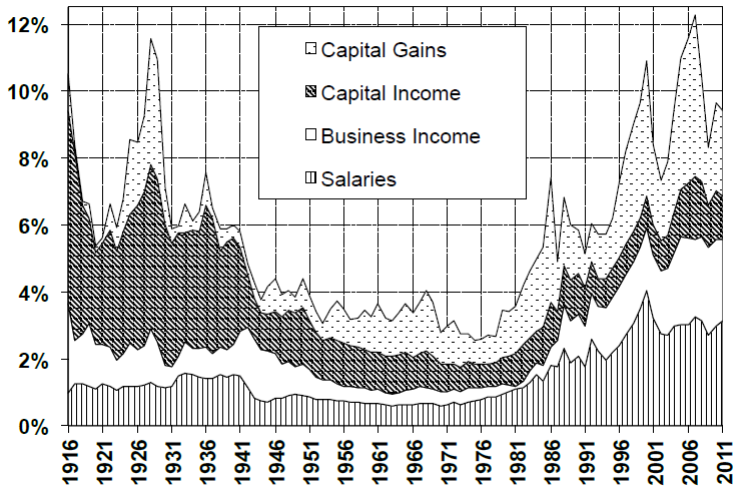
# Income inequality Top 0.01%

## Top 0.1% US Pre-Tax Income Share, 1913-2011



# Why has income inequality increased?

## US Top 0.1% Pre-Tax Income Share and Composition



## Why has income inequality increased? II

- Wage inequality has increased (top salaries story)
  - Piketty's previous work on top incomes (with Saez and Atkinson)
- The share of capital income with respect to total share has increased (and capital-ownership is concentrated)
  - Capital in the XXI Century

## In terms of national accounting

- Total income is the sum of total wage income and total capital income:

$$Y = wN + rK$$

- What Piketty argues is that  $rK$  is becoming larger and  $wN$  is becoming smaller.
- Capital is getting a larger share of total national income.
  - If we divide by  $Y$  both sides of the equation, we get the share of capital and the share of labor:

$$\frac{Y}{Y} = w \frac{N}{Y} + r \frac{K}{Y} = 1$$

- Using Piketty's notation, capital share is :

$$\alpha = r \frac{K}{Y} \tag{1}$$

- Since labor share and capital share sum 1, labor share  $w \frac{N}{Y} = 1 - \alpha$
- Equation 1 is the “First Fundamental law of Capitalism”.
  - But it is not any law. It is just an accounting identity.

# Evolution of the Capital share

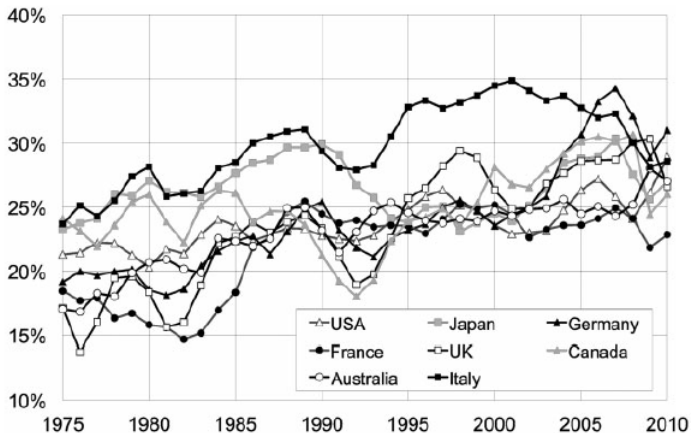
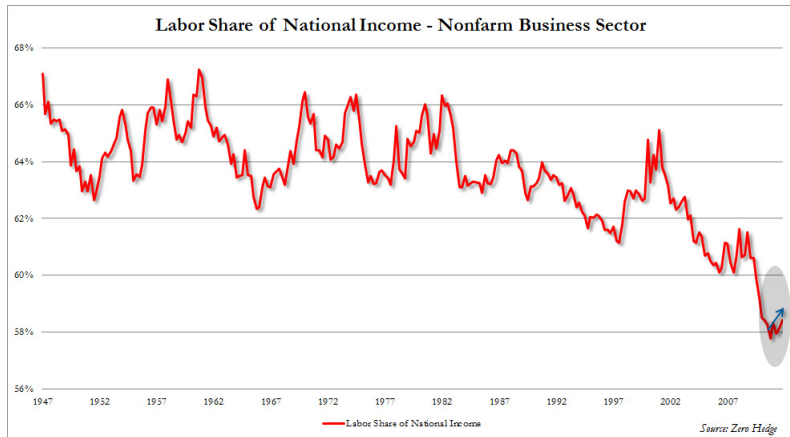


FIGURE XII

Capital Shares in Factor-Price National Income, 1975–2010



And this seems to be recent trend...



## And this seems to be recent trend...

- Constancy of capital and labor share has always been an assumption for growth theorists
  - It is what growth theorists call a Kaldor fact
  - It has been the motivation for the use of a very particular production function (Cobb-Douglas)

$$Y = F(K, L) = K^\alpha L^{1-\alpha}$$

- But it seems not to be a fact anymore, so the use of this function is not motivated either
- Which production function then? This is a very complex question and one of the weakest parts in Piketty's story (more later)

## How does Piketty explain these dynamics?

- Back to the definition of capital share:

$$\alpha = r \frac{K}{Y}$$

- The capital share is driven by  $r$  and  $\frac{K}{Y}$
- If  $\frac{K}{Y}$  rises and  $r$  remains constant (or its fall doesn't offset the rise of  $\frac{K}{Y}$ ), then  $\alpha$  rises.
- What do data say about this?

# Evolution of $\frac{K}{Y}$

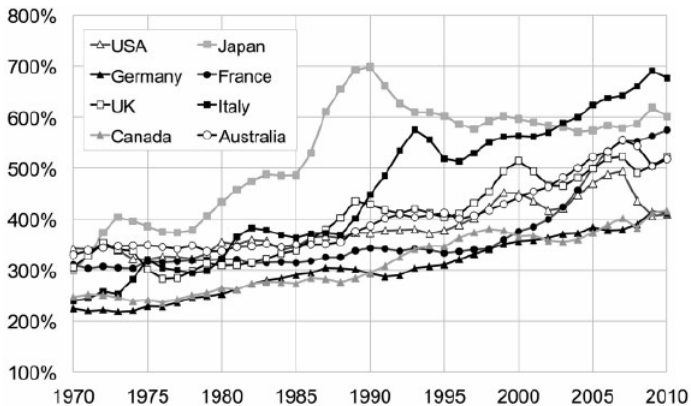


FIGURE I

Private Wealth-National Income Ratios, 1970–2010

# Evolution of $r$

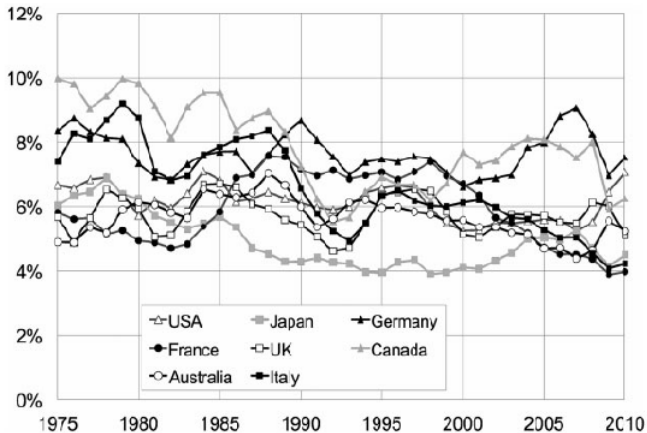


FIGURE XIII

Average Return on Private Wealth, 1975–2010

## Does Piketty have theories to explain $\frac{K}{Y} \uparrow$ and the constancy of $r$ ?

- Lets start with  $\beta = \frac{K}{Y}$
- Piketty shows that this  $\beta$  is rising.
- Lets take  $\beta$  in one random period  $t$  and its subsequent:  $\beta_t$  and  $\beta_{t+1}$
- The growth of  $\beta$  between  $t$  and  $t+1$  is given by:

$$\frac{\beta_{t+1}}{\beta_t} = \frac{\frac{K_{t+1}}{Y_{t+1}}}{\frac{K_t}{Y_t}} = \frac{K_{t+1}}{K_t} \frac{Y_t}{Y_{t+1}} = \frac{1 + g_K}{1 + g} \quad (2)$$

- Piketty assumes a constant net savings rate  $s$ , then:

$$g_K = \frac{K_{t+1} - K_t}{K_t} = \frac{sY_t}{K_t}$$

$$\frac{K}{Y}$$

- Equation 2 becomes

$$\frac{\beta_{t+1}}{\beta_t} = \frac{\frac{K_{t+1}}{Y_{t+1}}}{\frac{K_t}{Y_t}} = \frac{\frac{K_{t+1}}{K_t}}{\frac{Y_{t+1}}{Y_t}} = \frac{1 + \frac{sY_t}{K_t}}{1 + g}$$

- In the steady state  $\beta_t = \beta_{t+1}$  and  $1 = \frac{1 + \frac{sY_t}{K_t}}{1 + g}$
- This gives us what Piketty calls The Second Law of Capitalism:

$$\frac{K}{Y} = \frac{s}{g} \tag{3}$$

## Merging the two laws

- First law (recall that it is just an accounting identity):
  - $\alpha = r \frac{K}{Y}$
- Second law (it is more than an identity, it is a model).
  - $\frac{K}{Y} = \frac{s}{g}$
- And putting them together, the capital share is:
  - $\alpha = r \frac{s}{g}$



$$r - g$$

- We have  $\alpha = r \frac{s}{g}$
- where  $s$  is constant
- then if  $g$  falls and  $r$  remains above  $g$ , the capital share will grow and grow (Piketty's prediction)
- Then... the main question is: is it reasonable to assume that  $r$  will remain constant?

## Theories on $r$

- In any model of optimal behavior,  $r$  is the marginal productivity of capital. What does this mean?
- And in any plausible economic model, the marginal productivity of capital decreases in the amount of capital
- Then as  $\frac{K}{Y}$  rises, we should expect future declines in  $r$ .
- This is something in which Piketty agrees, because he uses standard production functions

# Theories on $r$

- Then the question is the speed at which  $r$  declines as  $\frac{K}{Y}$  rises (as a result of  $g$  declines)
  - ... and this a big debate
  - ... and a debate on the nature of technology (the degree of substitution between capital and labor)
- Piketty assumes that capital and labor are highly substitutes factor of productions
  - ... and the majority of the profession disagrees with him

## Where is the debate?

- The content of  $K$ 
  - Wasmer and coauthors (2014) on housing capital
- How  $r$  responds to falls in  $g$ 
  - Substitution between labor and capital

*Thanks!*