ECON 442

Critique of Piketty's Laws

Winter 2015

Some Basic Theory

Cobb-Douglas production function:

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

The capital share α and the interest rate r are related according to

$$\alpha = r\left(\frac{K}{Y}\right)$$

Let income Y grow at rate g and suppose people save a fraction s of income.

$$\begin{aligned} \frac{\partial K/Y}{\partial t} &= \frac{\dot{K}}{Y} - \frac{K}{Y}\frac{\dot{Y}}{Y} \\ &= \frac{sY}{Y} - \frac{K}{Y}g \end{aligned}$$

This implies in the long-run a constant $\beta = \frac{K}{Y} = \frac{s}{g}$.

Two main issues

Issue: A rising capital-income ratio implies falling interest rates.

Issue: For $g \to 0$, but positive savings, the capital-income ratio explodes.

What happens to interest rates r in terms of the capital-income ratio K/Y?

What happens to the savings rate as $g \to 0$?

Conclusion: We need a theory that explains both savings and interest rates as a function of g that does not run into trouble when $g \to 0$.

Argument 1: High Elasticity of Substitution

In a modern economy, r could fall less than 1-1 with g ($r >> g$).

Consider instead the production function

$$F(K, L) = \left(aK^{\frac{\sigma-1}{\sigma}} + (1-a)L^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}}$$

where $\sigma \in [1, \infty)$

Then, interest rates are given by

$$r = a\left(\frac{K}{Y}\right)^{-\frac{1}{\sigma}}$$

so that the larger σ, the smaller the effect of K/Y on interest rates.

Evidence does not seem to support this view with long-run elasticities generally less than 1.

Argument 2: Gross vs. Net Savings (Krusell & Smith)

Piketty formulates everything in terms of net income and an exogenously given net savings rates.

He argues that several factors keep savings rates high (e.g. aging population) despite low growth rates $g > 0$.

	Textbook (gross)	Piketty (net)
Output	Y_t	$\tilde{Y}_t = Y_t - \delta K_t$
Savings	$i_t = sy_t$	$i_t - \delta k_t = \tilde{s}_t \tilde{y}_t$
Capital	$(1+g)k_{t+1} = (1-\delta)k_t + sy_t$	$(1+g)k_{t+1} = k_t + \tilde{s}_t \tilde{y}_t$
$\Longrightarrow$	$\frac{k}{y} = \frac{s}{g+\delta}$	$\frac{k}{\tilde{y}} = \frac{\tilde{s}}{g}$

where $Y_t = F(K_t, (1+g)^t L)$, variables are detrended by $(1+g)^t$ and we normalize $L = 1$.

Implications of the "net" assumption

The long-run gross savings rate for Piketty is given by

$$s = \frac{y - c}{y} = \tilde{s}\frac{g + \delta}{g + \tilde{s}\delta}.$$

As $g \to 0$, with a constant net savings rate, we obtain $s \to 1$.

All output is used for savings and none of it is consumed.

In the textbook Solow growth model, we also have that in the long-run steady state

$$\frac{k}{\tilde{y}} = \frac{\tilde{s}}{g}$$

but

$$\tilde{s} = 0.$$

Savings are just enough to replace the depreciated capital stock.

Summary

- Piketty argues that future slowdown in growth is likely to lead to a very large concentration of economic and political power through the unfettered accumulation of physical capital (aka wealth) by a few people at the top of the wealth distribution.

- Economic theory offers little support for such a causality and even puts the consistency of such reasoning into question.

- The policy options presented by Piketty (global tax on capital income) cannot be rationalized based on a benchmark model and in fact miss a critical trade-off between efficiency and redistribution. (see next lecture)

- <u>However:</u> $r >> g$ can still have implications for income inequality (see next lecture).