

Part I: Factor Accumulation. Introduction

What explains economic growth / economic development?: A production function approach

$$Y = A \cdot F(K, H)$$

Traditionally, search for determinants of $g_Y \equiv \dot{Y}/Y$

- when income (Y) is already “high” \rightarrow growth theory
- when income is low \rightarrow (macro-economic) theory of development.

This dichotomy begins to disappear (see e.g. David Weil’s book).

The whole subject is subdivided into 3 parts:

I. Accumulation of factors $K, H \rightarrow Y$

- K : capital accumulation: the *core* neoclassical growth theory (Solow, 1956)
- H , human resources, consisting of ...

- Number of people, population, itself determined by fertility and mortality
 - ▶ classical growth theory (Malthus)
 - ▶ the demographic transition
- their health (strength, longevity)
- their education.

II. General Factor Productivity $A = A(T, E)$

- The “residual” in neoclassical growth theory
- Technology, technological progress → New Growth Theory (Romer, 1990).
- Efficiency E

III. Deep Determinants

- an even newer field (\approx Acemoglu and Robinson, 2000)
 - ▶ Political Economy
 - ▶ Governance
 - ▶ Institutions
 - ▶ Culture
 - ▶ Geography

Economic Growth: Introduction

Growth of a variable y

$$\dot{y} = \frac{dy}{dt} > 0$$

Growth rate:

$$\frac{\dot{y}}{y} \equiv g_y$$

in discrete time

$$\frac{y_t - y_{t-1}}{y_{t-1}}$$

e.g. 2 % per year.

[Insert: income growth, continuous and discrete time]

Exponential growth: g_y is constant, e.g. $g_y(t) = g$ for all t .

$$\dot{y} = g \cdot y.$$

Solution of this *differential equation*:

$$y(t) = y_0 \cdot e^{g \cdot t}.$$

Proof:

$$\frac{dy}{dt} = g \cdot y_0 \cdot e^{g \cdot t} = g \cdot y.$$

$y_0 = y(0)$ at initial time $t = 0$.

Doubling period:

$$y(t) = 2y_0 \quad \Rightarrow \quad 2y_0 = y_0 \cdot e^{gt}$$

Solve for t :

$$\log(2) = g \cdot t \approx 0.7 \quad \Rightarrow \quad t = \frac{0.7}{g}$$

for example, 35 years for $g = 0.02$ [9 years for $g = 0.08$]

→ Weil's "Rule of 72".

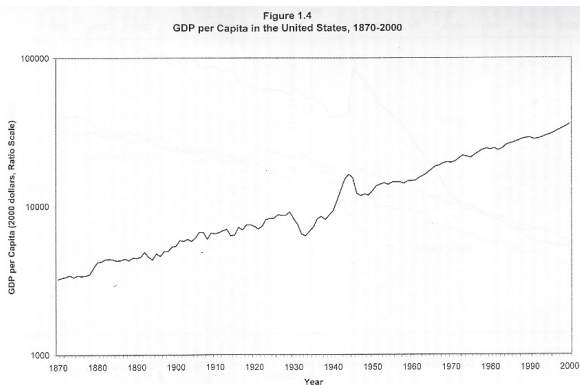
Why growth of (per capita-) income?

- income buys utility (→ happiness)
- many things that cannot exactly be bought are positively correlated with income:



Check out the movies at www.gapminder.org

If growth is exponential, $\log(y)$ is linear in t .



Average growth rate ca. 1.9 % p.a.

- Compare: growth vs. business cycles dynamics.
- Conclude: income growth must be a relatively recent phenomenon (from world history perspective)

- Subsistence minimum: 365 \$ / year (1 \$ a day).
- U.S. today (2000): 33,330 \$
- Suppose $g = 0.019$

$$33,330 = 365 \cdot e^{0.019t} \quad \Rightarrow \quad \log\left(\frac{33,330}{365}\right) = 0.019t$$

and thus

$$t = \frac{4.51}{0.019} = 237 \text{ years.}$$

and $2000 - 237 = 1763 \approx$ begin of industrialization.

[Insert: Stylized development of world income 20000 BC - 2000 AC]

- life (average income) at the time of Goethe was not much different to life at the time of Jesus Christ.
- We're trapped into thinking otherwise because Goethe had above average income (and because of all the innovations between 0 and 1760).
- Why take off around 1800? \rightarrow later.

Yet, by far not all countries experienced growth like the U.S.

TABLE 1—REGIONAL BREAKDOWN OF POVERTY IN DEVELOPING COUNTRIES

Region	Number of people living on less than \$1 per day (millions)			\$1 per day headcount index (percent)		
	1987	1990	1999	1987	1990	1999
East Asia and Pacific, excluding China	418	486	279	26.6	30.5	15.6
Europe and Central Asia	1	6	24	0.2	1.4	5.1
Latin American and the Caribbean	64	48	57	15.3	11.0	11.1
Middle East and North Africa	9	5	6	4.3	2.1	2.2
South Asia	474	506	488	44.9	45.0	36.6
Sub-Saharan Africa	217	241	315	46.6	47.4	49.0
Total:	1,183	1,292	1,169	28.3	29.6	23.2
Excluding China:	880	917	945	28.5	28.5	25.0

Source: World Bank staff estimates (*Global Economic Prospects 2003*).

- Why are some countries so much richer than others?
- Convergence: countries with “low” income per capital (level) grow at higher rates than high income countries.

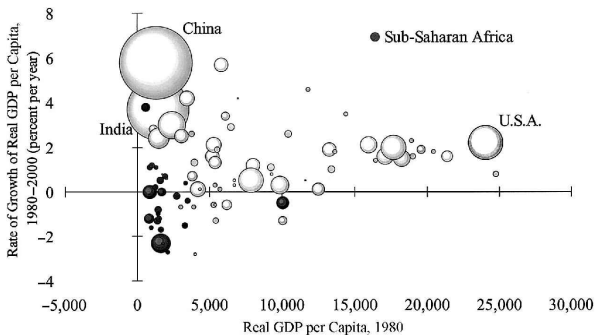
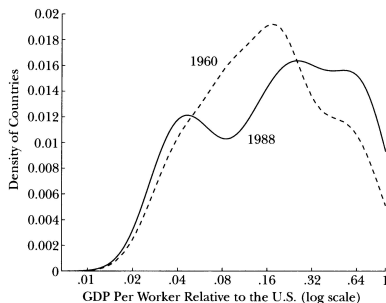


FIGURE 5. AVERAGE ANNUAL GROWTH (1980–2000) ON INITIAL LEVEL OF REAL GDP PER CAPITA (AS IN FIG. 4, BUT WITH AREA PROPORTIONAL TO POPULATION IN 1980)

- “Growth is good for the poor” (Dollar and Kraay, 2001): income of the lowest fifth of the income distribution rises one-for-one with aggregate income (92 countries).
- Yet not for all the poor...

World income distribution: Twin Peaks

Figure 1
World Income Distribution, 1960 and 1988



Conclude:

- club convergence; “Divergence, big time” (Pritchett)
- Also needed: a “theory of non-growth”.
- Non-growth (or retrogression) is a particular phenomenon of SSA → why?

Growth and Happiness

References:

Andrew J. Oswald, 1997, Happiness and Economic Performance, *Economic Journal* 107, 1815-1831.

Happiness and Utility:

a) (neoclassical) Utility:

- axiomatic approach
- claim objectivity
- there is no hedonometer, utility is derived from revealed preferences
- problem: too idealistic, too many assumptions needed (e.g. no self-control problems)

b) Happiness = subjective measure of utility

- “Taken all together, how would you say things are these days? Would you say that you are very happy, pretty happy, or not too happy?”
- “How satisfied with life are you, all things considered?”
- Eurobarometer, GSOEP, US Polls.
- Problem: language, general over- and understatements.

Yet, there are consistency tests. People who say they are happy

- smile more frequently
- are regarded as happy by others
- commit less suicide etc.

Frey and Stutzer: reported subjective well-being is a satisfactory empirical approximation to individual utility.

“Economic performance is not intrinsically interesting. It matters only in so far as it makes people happier.”

Life Satisfaction in Nine European Countries from One Decade to the Next

Country	Average % 1973–81	Average % 1982–90	Well-being increased?
Proportion of the sample who reported themselves as ‘very satisfied’ with their lives			
Belgium	39.5	24.7	No
Denmark	51.7	62.8	Yes
France	12.4	13.7	Yes
West Germany	18.8	23.4	Yes
Ireland	38.8	31.1	No
Italy	9.0	13.2	Yes
Luxembourg	34.6	39.1	Yes
Netherlands	41.3	41.8	Yes
UK	31.7	30.9	No

Source: Own calculations using Eurobarometer Survey numbers provided by Ronald Inglehart of the University of Michigan. Sample size is approximately 1,000 people per year per country.

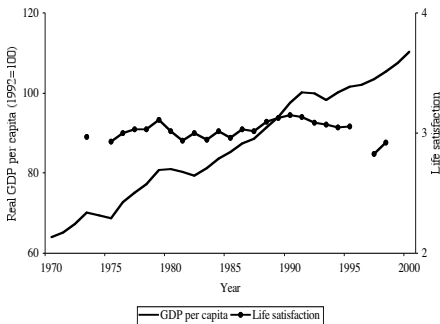


Figure 3. Satisfaction with Life and Income per Capita in Germany between 1973 and 1998

“People in the West have got no happier in the last 50 years. They have become much richer, they work much less, they have longer holidays, they travel more, and they are healthier. But they are not happier. This shocking fact should be the starting point for much of our social science.” (Richard Layard, 2003)

Yet, still richer people are happier:

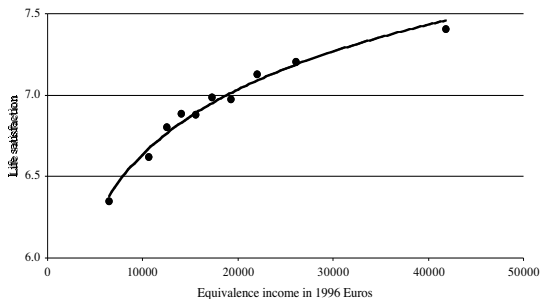
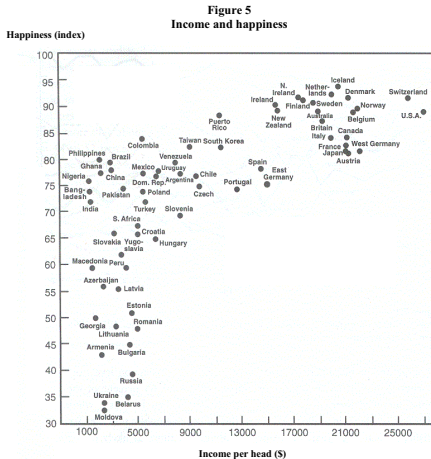


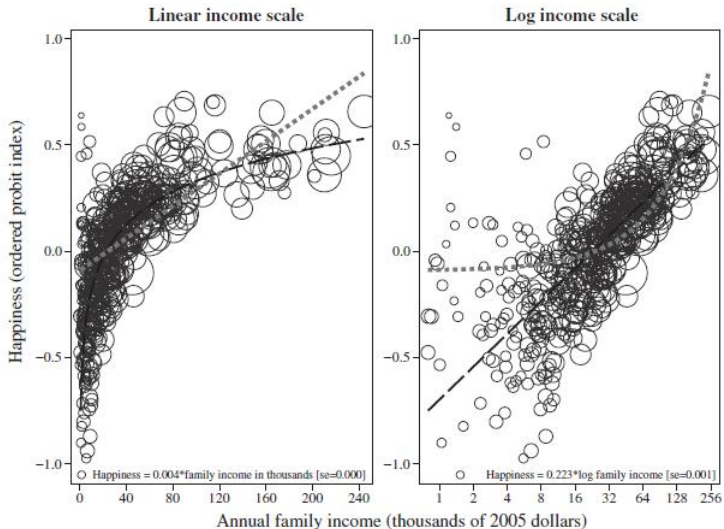
Figure 2. Satisfaction with Life and Equivalence Income in Germany in 2000

Similar regression line for U.S. And across countries...



Source: Inglehart and Klingemann (2000), Figure 7.2 and Table 7.1. Latest year (all in 1990s).

Across Income Groups in the US



Source: General Social Survey (USA), 1972–2006; authors' regressions.

Central idea: people are less happy than expected because they are not self-sufficient but compare current consumption achievements.

- Aspirations increase with income but higher income is not fully translated into higher aspirations (van Praag and van der Sar, 1988, Stutzer, 2004).
- The hedonic treadmill (Kahneman and Thaler, 1991).
- “Normal” concave utility vs. adaptive preferences.
- Life-time utility (life satisfaction) can be observationally equivalent for both cases (Strulik, 2006).
- But: reverse causality...

Integration into growth theory: Carroll, Overland, and Weil (1997, 2000)

- Habitual types save more. They generate more growth!
- Savings and growth can be positively correlated
- Reconciliation with the empirical stylized fact.

Extension/application: Strulik (2006)

- Having habitual preferences can be a vice or virtue.
- Virtue, if people adapt fast enough.

(One possible) Conclusion: Benjamin Friedman: The Moral Consequences of Growth (2006)

- we should accept that we have adaptive preferences
- this yields a deep foundation why we need economic growth.
- “When the broad bulk of the population has the sense of stagnation, opportunity and tolerance erode, fairness falls by the wayside, and democratic institutions are allowed to wither.”