Advanced Macroeconomics I
Lecture 7 (1) Growth - Facts

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Spring 2011

Kaldor's stylized facts

- The long-run behavior of economic variables in an economy (Balance growth path)

Fact

1) The growth rate of output g_y is constant over time.
2) The capital-labor ratio K/L grows at a constant rate.
3) The capital-income ratio K/y is constant.
4) Capital and labor shares of income are constant.
5) Real rates of return are constant.

- An inter-country comparison (International differences)

Fact

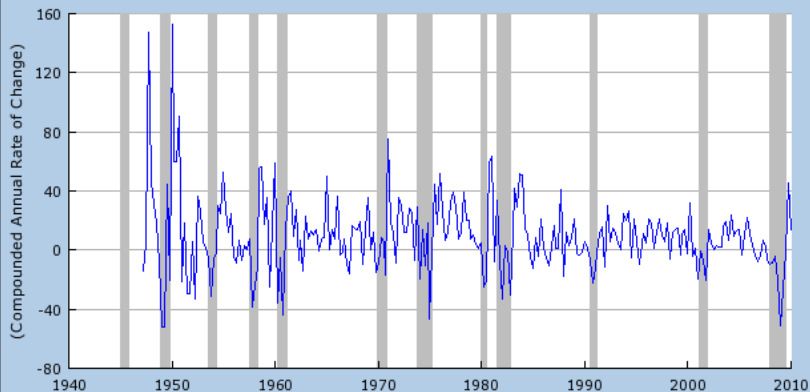*6) Growth rates persistently vary across countries.*

Real Gross Domestic Product, 1 Decimal (GDPC1)
Source: U.S. Department of Commerce: Bureau of Economic Analysis
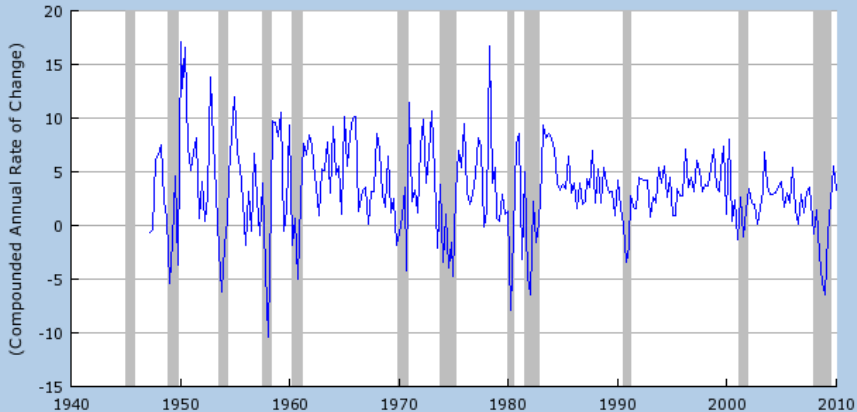
Shaded areas indicate US recessions.
2010 research.stlouisfed.org

Gross Private Domestic Investment (GPDI)
Source: U.S. Department of Commerce: Bureau of Economic Analysis

Shaded areas indicate US recessions.
2010 research.stlouisfed.org

Table 2. Real GDP per capita
(average annual rates of change)

Country	1979-2008	1979-1990	1990-1995	1995-2000	2000-2008	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
United States	1.8	2.0	1.2	2.9	1.2	1.6	2.7	2.0	1.8	1.0	0.2
Canada	1.6	1.5	0.6	3.2	1.3	0.9	2.1	1.9	2.1	1.6	-0.7
Australia	1.9	1.7	1.5	3.0	1.7	1.7	2.7	1.4	1.4	2.1	0.4
Japan	1.9	3.3	1.2	0.8	1.2	1.2	2.7	1.9	2.0	2.3	-0.7
Republic of Korea	5.3	6.5	6.7	3.5	3.9	2.3	4.2	3.7	4.8	4.8	1.9
Singapore	4.3	5.3	5.7	3.5	2.5	5.3	7.9	4.8	5.0	3.4	-4.1
Austria	1.9	2.0	1.4	2.8	1.6	0.4	1.9	2.2	2.8	2.7	1.3
Belgium	1.8	2.1	1.2	2.5	1.3	0.6	2.5	1.3	2.3	2.0	0.5
Denmark	1.7	1.8	2.0	2.4	0.9	0.1	2.0	2.2	3.0	1.2	-1.7
France	1.5	1.8	0.7	2.4	1.0	0.4	1.7	1.1	1.5	1.7	-0.1
Germany	1.6	1.9	1.5	1.9	1.2	-0.3	1.2	0.8	3.1	2.6	1.4
Italy	1.5	2.4	1.2	1.9	0.2	-0.8	0.5	-0.1	1.5	0.8	-1.9
Netherlands	1.9	1.6	1.6	3.4	1.5	-0.1	1.9	1.8	3.2	3.2	1.7
Norway	2.4	2.3	3.2	3.1	1.6	0.4	3.3	2.0	1.5	2.1	0.9
Spain	2.1	2.4	1.2	3.5	1.4	1.5	1.6	1.9	2.6	2.0	-0.9
Sweden	1.8	1.9	0.1	3.2	1.9	1.5	3.7	2.9	3.7	1.8	-1.0
United Kingdom	2.1	2.1	1.4	3.1	1.9	2.4	2.3	1.4	2.2	2.4	0.4

Note: Data for Germany for years before 1991 pertain to the former West Germany.

Percent changes were calculated from table 1 using the compound rate method.

Other facts

1. Y/L is very dispersed across countries
2. The distribution of Y/L does not seem to spread out
3. Countries with low incomes in 1960 did not show on average higher subsequent growth (this phenomenon is sometimes referred to as "no absolute β convergence", $\hat{\beta} = 0$)
4. There is "conditional convergence": Within groups classified by 1960 human capital measures (such as schooling), 1960 savings rates, and other indicators, a higher initial income y_0 (in 1960) was positively correlated with a lower growth rate g_y:
   "growth regression": $\hat{\beta} < 0$

$$g_{y,i}^{1960-1990} = \alpha + \beta \log(y_{0,i}) + \gamma \log edu_{0,i} + \varepsilon_i, \ i = 1, 2...$$

5. Foreign trade volume seems to correlate positively with growth
6. Demographic growth (fertility) is negatively correlated with income
7. Growth in factor inputs (capital, labor) does not suffice in explaining output growth. The idea of an "explanation" of growth is due to Solow, who envisaged the method of "growth accounting". Based on a neoclassical production function $y = zF(K, L)$; the variable z captures the idea of technological change

   - The contribution of z (the Solow residual) to output growth is very significant. Use $y = zk^{\alpha}l^{1-\alpha}$, according to Euler theorem,

$$MP_l = (1-\alpha)y/l \Longrightarrow wl = (1-\alpha)y \Longrightarrow 1-\alpha = \frac{wl}{y}$$

$$MP_k = \alpha y/k \Longrightarrow rk = \alpha y \Longrightarrow \alpha = \frac{rk}{y}$$

$$\log z = \log y - \frac{rk}{y}\log k - \frac{wl}{y}\log l$$

8. Workers tend to migrate into high-income countries