U.S. Real GDP/Capita 1950-2004

\[ g(t) = \ln(Y(t)) - \ln(Y(t-1)) \]
\[ \ln(Y(t)) = \ln(Y(0)) + tg(t) \]
\[ = 9.28 + 0.022t \]
... if g is constant
Natural logs and Growth

\[ g(t) = \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}} \approx \ln(GDP_t) - \ln(GDP_{t-1}) \]

\[ \ln(GDP_t) \approx \ln(GDP_0) + \sum g(t) = \ln(GDP_0) + t \times g \text{ if growth is constant} \]

\[ \approx a + b \times t \text{ a linear function in } t, \text{ slope } b = \text{ growth} \]

U.S. ln(Real GDP/capita) 1950-2004

\[ g(t) = \ln(Y(t)) - \ln(Y(t-1)) \]

\[ \ln(Y(t)) = \ln(Y(0)) + t \times g(t) \]

\[ = 9.28 + .022t \]

\[ \ldots \text{ if } g \text{ is constant} \]

U.S. ln(Real GDP/capita) 1970-1986
U.S. Real Business Cycles 1950-2004
De-trended Real GDP/capita: GRP - Trend
(assumes constant growth)

U.S. Real GDP Growth 1950-2004
(assumes constant growth)
Standard of living growth is fairly constant…convergence?

Takeover/recovery?

Growth correlation and convergence: long run diminishment? convergence to what?

Why and how “long run” growth? and is it, now, the long run?
Does a high standard of living lead to a high rate of growth?

![Graph: Real GDP/capita (chained) vs. Growth (144 countries in 1980)]

Higher investment is positively correlated with real income…

![Graph: Investment Share (Inv/GDP) and Real GDP/capita (chained 2000) (OECD: 1950-2004)]
Does the government crowd out private investment, output, income and growth?