Growth Accounting Method

- The model features an aggregate Cobb-Douglas production function:

\[ Y_t = A_t K_t^\alpha L_t^{1-\alpha} \]

- Rewrite the production function as:

\[ \frac{Y_t}{N_t} = A_t^{1/(1-\alpha)} \left( \frac{K_t}{Y_t} \right)^{\alpha/(1-\alpha)} \left( \frac{L_t}{N_t} \right) \]

where \( N_t \) is the working age population.
Constructing the TFP Series

• First we collect data for real investment, real GDP, working age population, and hours worked (or employment)

• We construct the capital series using the perpetual inventory method:

\[ K_{t+1} = (1 - \delta)K_t + X_t \]
Constructing the TFP Series

- TFP is calculated as:

\[ A_t = \frac{K_t^\alpha L_t^{1-\alpha}}{Y_t} \]
Japan Growth Accounting

\[
\frac{1}{A_t^{1-\alpha}}
\]

\[
\frac{Y_t}{N_t}
\]

\[
\left(\frac{K_t}{Y_t}\right)^{\frac{\alpha}{1-\alpha}}
\]

\[
\frac{L_t}{N_t}
\]
- US 1973-75 Recession
- Sharp fall in TFP and employment
- Quick recovery
• US 1979-82 Recession ("double dip recession")
• Sharp fall in TFP and employment
• Quick recovery
- US 2007-09 (“Great”) Recession
- Sharp fall in employment, not large fall in TFP
- Delayed recovery, especially in employment
• Korea 1997-98 Recession ("Sudden Stop")
• Sharp fall in employment, not large fall in TFP
• Quick recovery in output, not in employment
- Mexico 1994-95 Recession ("Sudden Stop")
- Sharp fall in TFP, not large fall in employment
- Slow, but steady recovery
• Greece Debt Crisis (2007, 2010)
• Sharp fall in TFP, also lagged drop in employment
• Recovery?

\[ \left( \frac{K_t}{Y_t} \right)^{\frac{\alpha}{1-\alpha}} \]

\[ \frac{L_t}{N_t} \]

\[ \frac{1}{A_t^{1-\alpha}} \]

\[ \frac{Y_t}{N_t} \]
• Spain 2007-? Recession
• Sharp fall in employment, but not in TFP
• Recovery?