Great Depressions of the Twentieth Century

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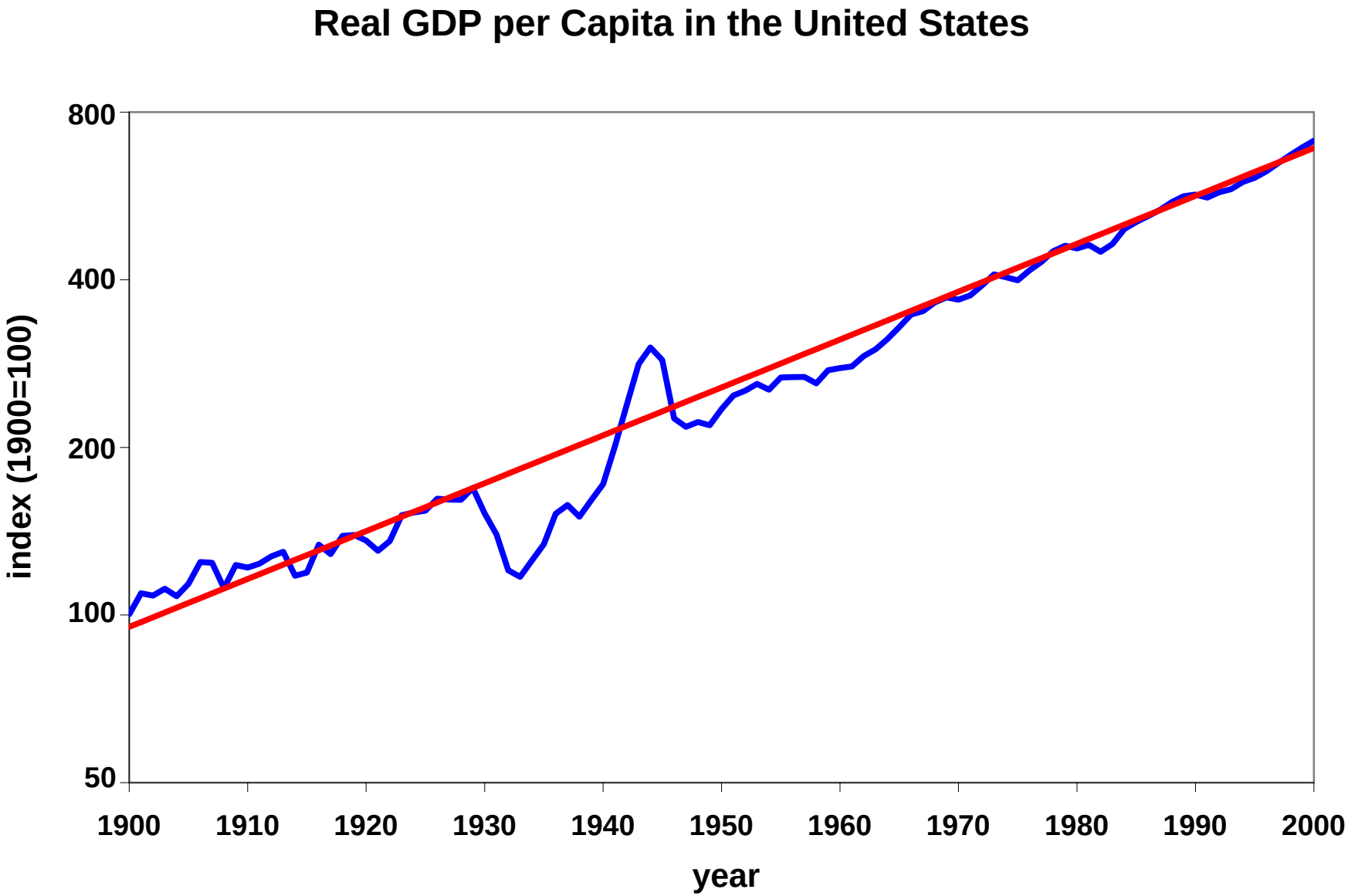

Real GDP per Capita in the United States
800
400
200
100
50
index (1900=100)
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
year

Great Depressions of the Twentieth Century Project

Use growth accounting and applied dynamic equilibrium models to reexamine great depression episodes:

United Kingdom (1920s and 1930s) — Cole and Ohanian
Canada (1930s) — Amaral and MacGee
France (1930s) — Beaudry and Portier
Germany (1930s) — Fisher and Hornstein
Italy (1930s) — Perri and Quadrini
Argentina (1970s and 1980s) — Kydland and Zarazaga
Chile and Mexico (1980s) — Bergoeing, Kehoe, Kehoe, and Soto
Japan (1990s) — Hayashi and Prescott

(*Review of Economic Dynamics*, January 2002
revised and expanded version forthcoming
as Minneapolis Fed volume)

Great Depressions Methodology

Cole and Ohanian (1999), Kehoe and Prescott (2002)

Aggregate production function:

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha}.$$

When $A_t = A_0 g^{(1-\alpha)t}$, output per capita grows at constant rate $g - 1$.

Measure output growth with respect to this trend.

- Trend growth represents the stock of useable production knowledge growing smoothly over time.
- This knowledge is not country specific.
- Countries grow at the same rate, $g-1$, on different balanced growth paths.
- Levels differ across countries because institutions are different.
- Changing institutions moves the country to a different balanced growth path.
- Take $g-1$ to be growth rate of the industrial leader – United States.

$$g = 1.02$$

Growth Accounting

Y_t : real GDP (national income accounts)
X_t: real investment (national income accounts)
L_t : hours worked (labor surveys)

Construct Capital Stocks:

$$K_{t+1} = (1-\delta)K_t + X_t$$

Total factor productivity is the residual:

$$A_t = Y_t \big/ K_t^{\alpha} L_t^{1-\alpha}$$

$$\delta = 0.05 \qquad \alpha = 0.30$$

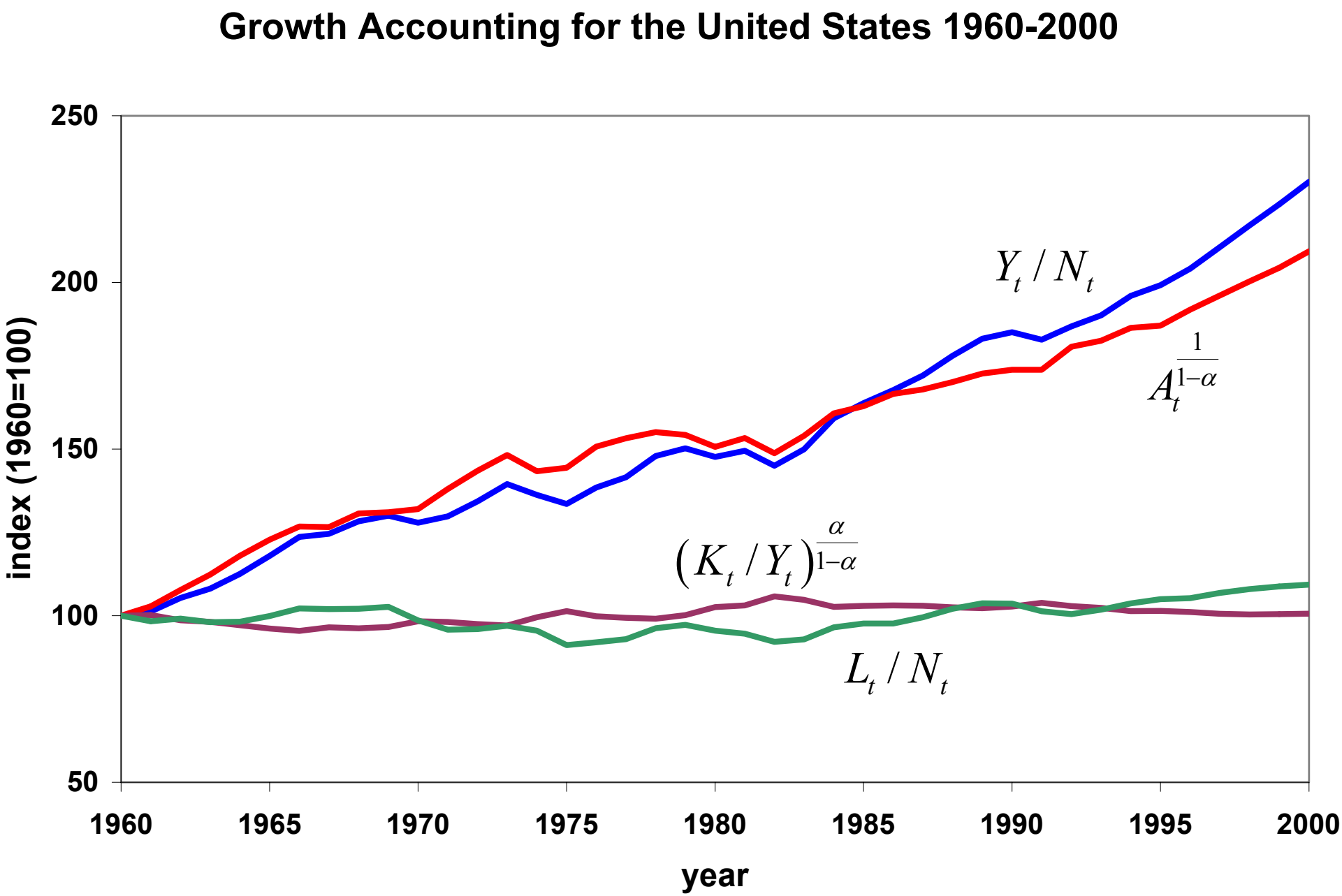
Decomposing Changes in GDP per Working-Age Person

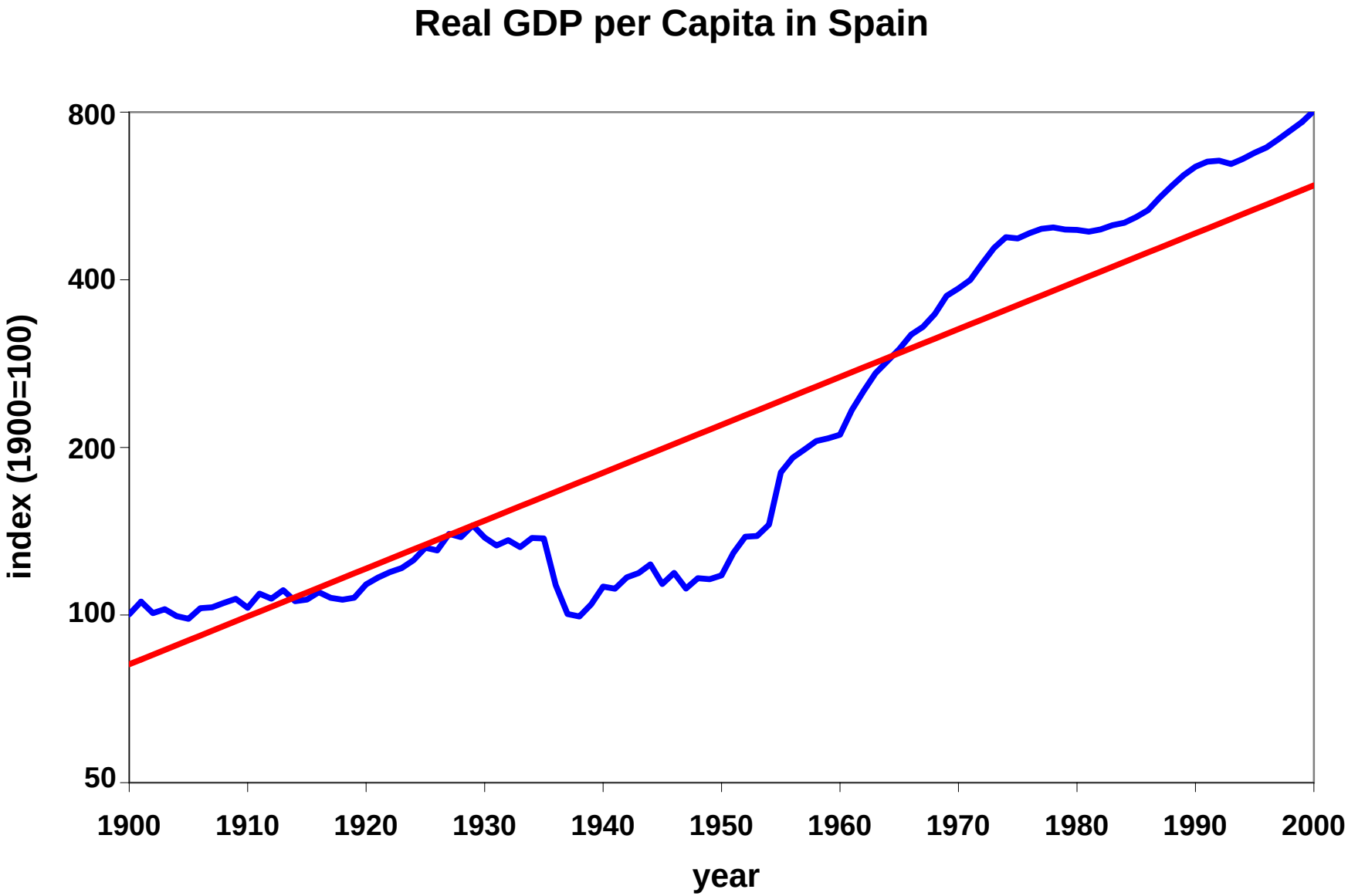
$$\log\left(\frac{Y_t}{N_t}\right) = \frac{1}{1-\alpha}\log\left(A_t\right) + \frac{\alpha}{1-\alpha}\log\left(\frac{K_t}{Y_t}\right) + \log\left(\frac{L_t}{N_t}\right)$$

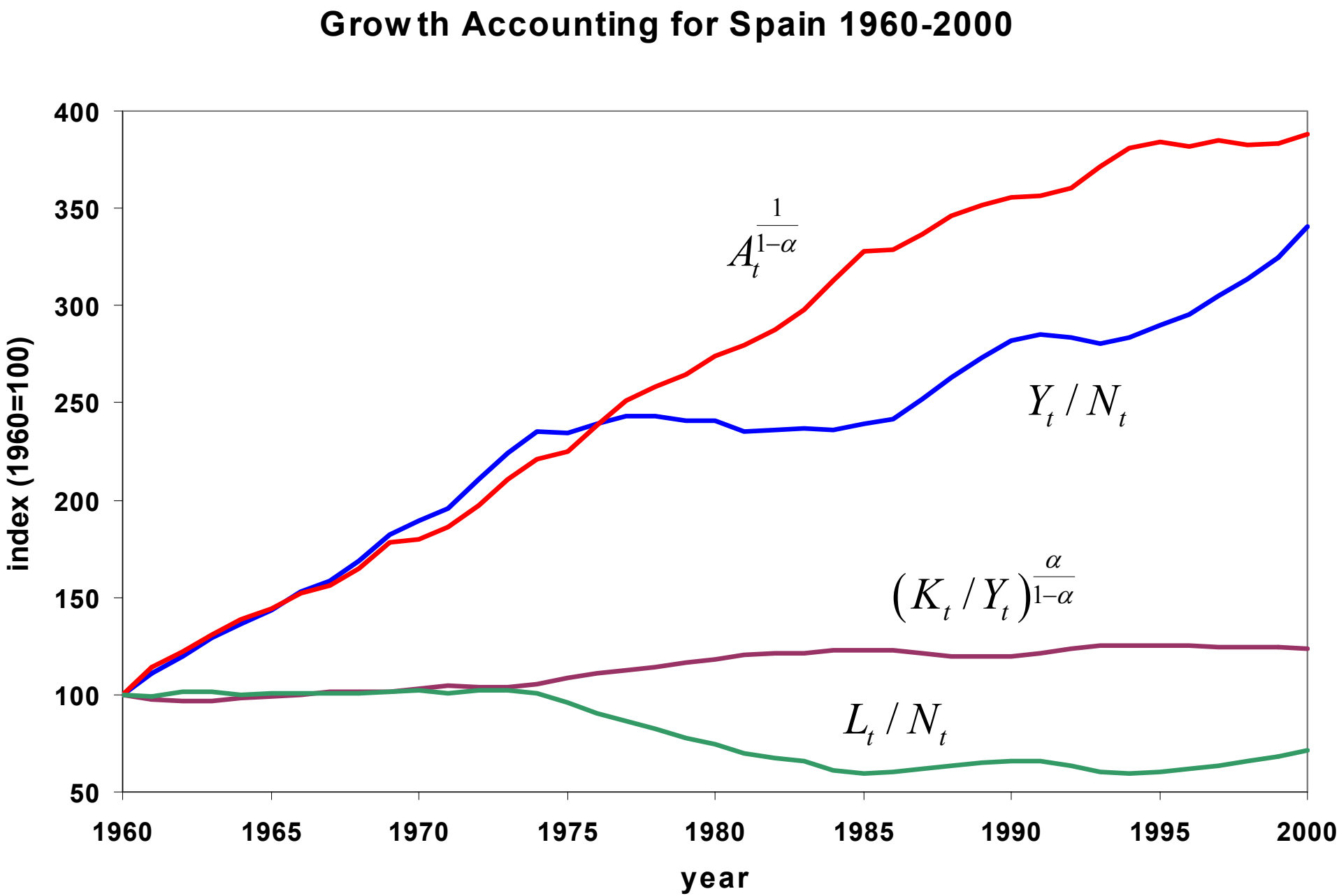
Traditional theories of depressions stress declines in the capital stock or in hours worked as the most important factors in accounting for depressions.

Lessons from Great Depressions Project

- The main determinants of depressions are not drops in the inputs of capital and labor — stressed in traditional theories of depressions — but rather drops in the efficiency with which these inputs are used, measured as total factor productivity (TFP).
- Exogenous shocks like the deteriorations in the terms of trade and the increases in foreign interest rates that buffeted Chile and Mexico in the early 1980s can cause a decline in economic activity of the usual business cycle magnitude.
- Misguided government policy can turn such a decline into a severe and prolonged drop in economic activity below trend — a great depression.


Growth Accounting for the United States 1960-2000
250
200
150
100
50
index (1960=100)
1960
1965
1970
1975
1980
1985
1990
1995
2000
year
Y_t / N_t
$A_t^{\frac{1}{1-\alpha}}$
$\left(K_t / Y_t\right)^{\frac{\alpha}{1-\alpha}}$
L_t / N_t


Real GDP per Capita in Spain
800
400
200
100
50
index (1900=100)
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
year


Growth Accounting for Spain 1960-2000
400
350
300
250
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150
100
50
index (1960=100)
1960
1965
1970
1975
1980
1985
1990
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2000
year
$A_t^{\frac{1}{1-\alpha}}$
Y_t / N_t
$(K_t / Y_t)^{\frac{\alpha}{1-\alpha}}$
L_t / N_t