

MACROECONOMICS
AND THE GLOBAL BUSINESS ENVIRONMENT

The Wealth of Nations
The Supply Side

PowerPoint by Beth Ingram adapted by R Helg
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Key Concepts

- GDP Growth
 - Total output
 - Output per capita
- Elements of Growth
 - Labor
 - Capital
 - Total Factor Productivity

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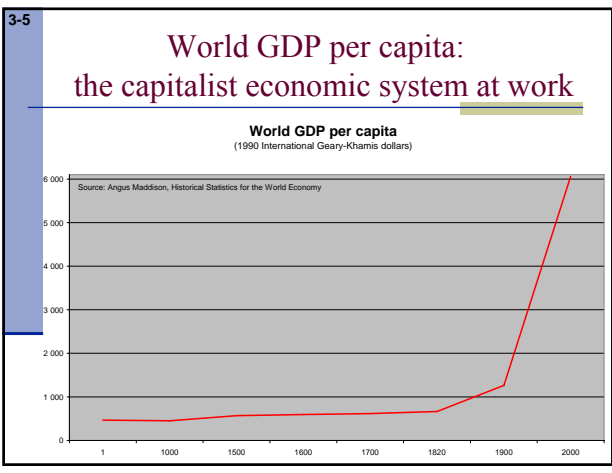
The Importance of Economic Growth

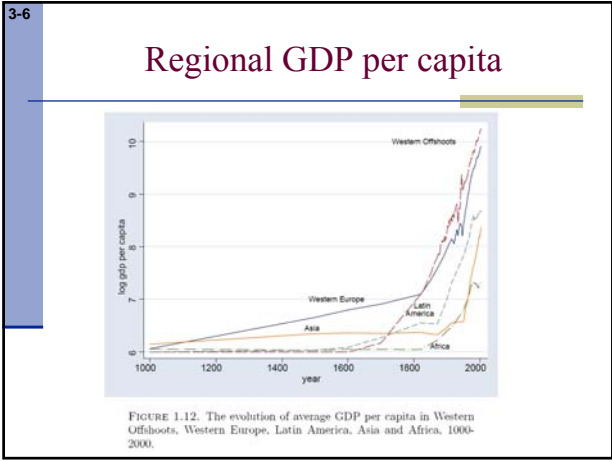
*"No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable."
--Adam Smith*

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GDP Growth

- An increase over time in the quantity of goods and services produced by an economy
- Rate of growth
 - Real GDP: adjusts for inflation
 - Real GDP per capita: adjusts for size of population

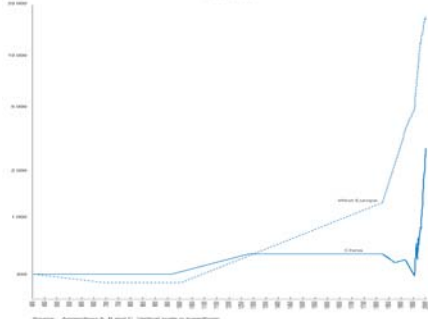




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GDP per capita: Europe vs. China they are coming back!

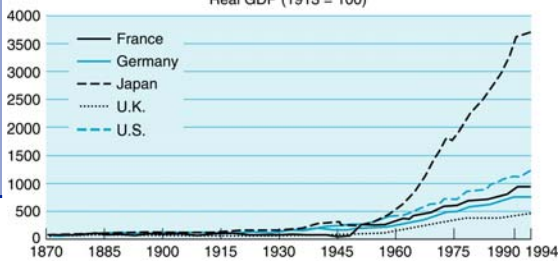
Figure 1-4 Comparative Levels of GDP Per Capita: China and West Europe, 400-1992 A.D.



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Aggregate Real GDP

Real GDP (1913 = 100)



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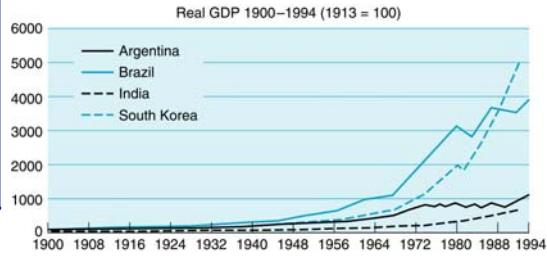
Real per capita GDP

Real GDP Per Capita 1870-1994 (1990 \$)



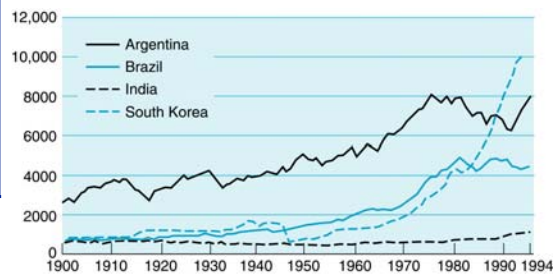
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Aggregate Real GDP



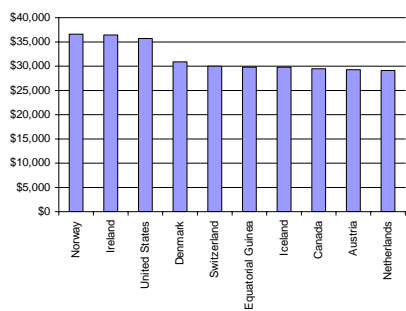
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Real per capita GDP

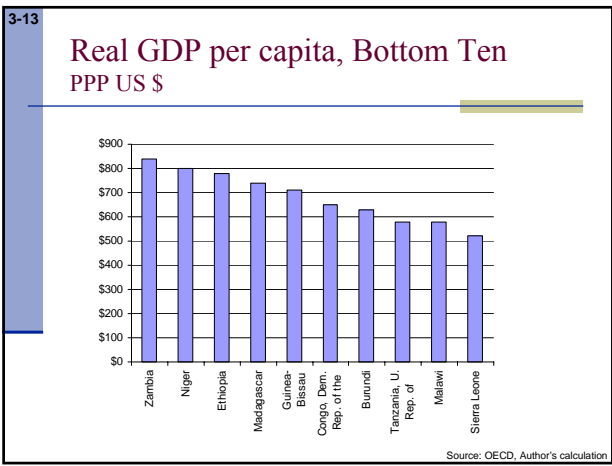


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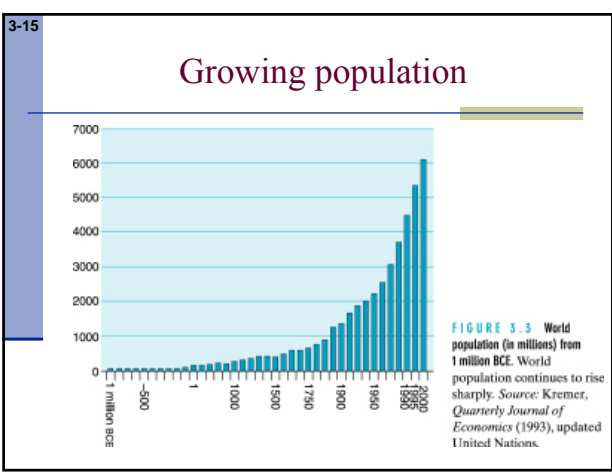
Real GDP per capita, Top Ten PPP US \$



Source: OECD. Author's calculation



- 3-14
- ### Importance of Growth
- Growing population
 - Improving standards of living
 - GDP per capita
 - Life expectancy
 - Poverty reduction



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Poverty reduction: non-monetary poverty

Human Development Index for geographic areas (weighted average)

	1870	1913	1950	1995
Australasia	0.539	0.784	0.856	0.933
North America	0.462	0.729	0.864	0.945
Western Europe	0.374	0.606	0.789	0.933
Eastern Europe		0.278	0.634	0.786
Latin America		0.236	0.442	0.802
Eastern Asia			0.306	0.746
China			0.159	0.650
South Asia		0.055	0.166	0.449
Africa			0.181	0.435

Source: Crafts (2000)

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Growth, poverty and inequality

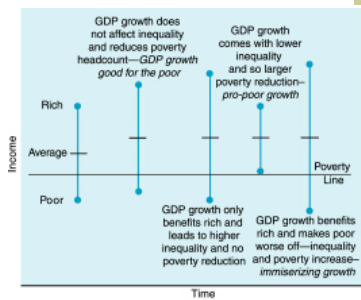
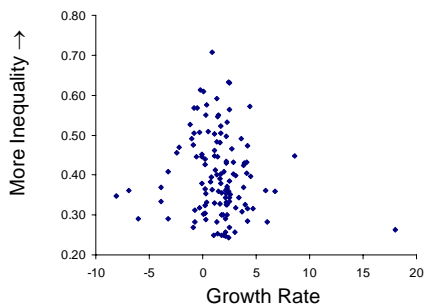


FIGURE 3.4 Growth and poverty linkages. GDP growth can theoretically have varied effects on poverty.

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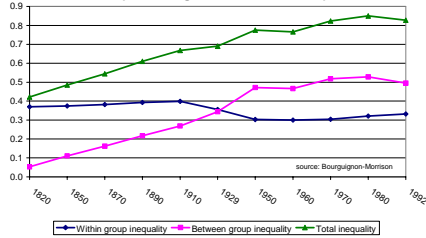
Inequality and Growth: no systematic relationship



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World income inequality

World Income Inequality 1: the long run
(mean logarithmic deviation)

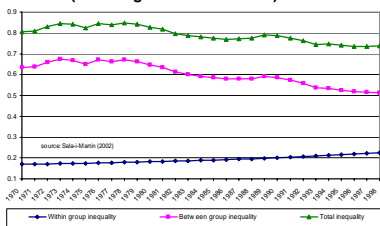


Continuously increased between 1920 and 1980.
Between 1920 and 1930 within country inequality has been the most important component of world income inequality.
After 1930 the leading component has become across country inequality.

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World income inequality

World Income Inequality 2: the last 30 years
(mean logarithmic deviation)



After 1980 world income inequality has inverted its trend and started reducing.
Mainly due to the fast convergence in per capita income between China (from 1980) and India (from 1990), on one side, and the developed countries, on the other.
Note also the increase in the role played by within country inequality.

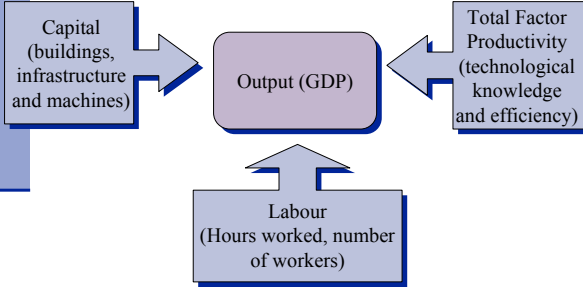
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Compounding is a wonderful thing...

	1999 GDP per capita (US = \$30600)	Years to attain US 1999 level				Actual growth rate (1990-99)
		1% growth	3% growth	6% growth	9% growth	
Germany	\$25350	20 years	7 years	4 years	3 years	1.5%
UK	\$22640	32 years	11 years	6 years	4 years	2.1%
Brazil	\$4420	196 years	66 years	34 years	23 years	1.7%
China	\$780	370 years	145 years	64 years	44 years	9.8%
Ethiopia	\$100	577 years	194 years	99 years	67 years	2.2%

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Analysis of Growth



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GDP per capita: decomposition

$$\text{GDP per capita} = \frac{\text{GDP}}{\text{Population}}$$

$$= \frac{\text{GDP}}{\text{Hours}} \times \frac{\text{Hours}}{\text{Number Employed}} \times \frac{\text{Number Employed}}{\text{Labor Force}} \times \frac{\text{Labor Force}}{\text{Population}}$$

Labor Productivity

Average Hours Worked

Employment Rate

Labor Force Participation Rate

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GDP per capita: decomposition

- Labor productivity
- Average hours worked
- Employment rate = 1 – Unemployment Rate
- Labor force participation rate



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GDP per capita decomposition

TABLE 3.5 Decomposition of GDP per Capita 2001, US\$ PPP

GDP per capita varies across countries due to differences in productivity, hours worked, unemployment, and population structure.

	GDP per Capita (SPPP)	Hourly Productivity (SPPP)	Average Annual Hours Worked	Employment Rate	Participation Rate
U.S.	33869	38.28	1821	0.952	0.51
Japan	25480	27.96	1821	0.949	0.53
Korea	15226	13.66	2447	0.961	0.47
Denmark	28360	37.28	1482	0.957	0.54
France	24230	39.27	1532	0.915	0.44
Germany	25427	36.67	1467	0.920	0.51
Italy	25055	38.29	1606	0.904	0.45
Netherlands	27337	40.08	1346	0.976	0.52
Norway	30691	43.86	1364	0.964	0.53
Sweden	25580	32.65	1603	0.950	0.51
U.K.	24819	30.92	1711	0.949	0.49

Source: Authors' Calculations, OECD and BLS, www.bls.gov/fls/flsgdp/pdf

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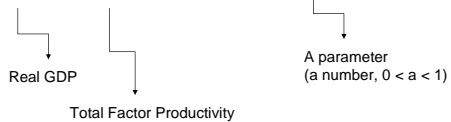
Role of Inputs

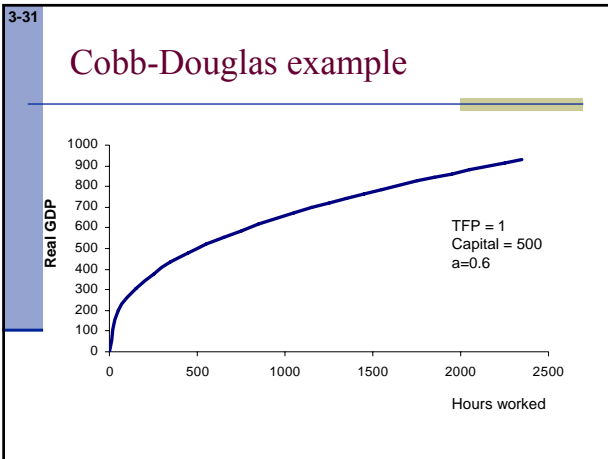
- More inputs means more output
 - Diminishing returns
 - 1 worker = \$10 in output
 - 2 workers = \$18 in output
 - 3 workers = \$24 in output
- Marginal return is \$8 in output
Marginal return is \$6 in output

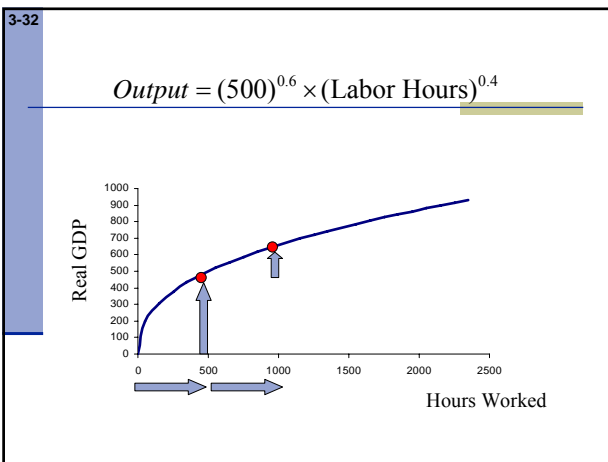
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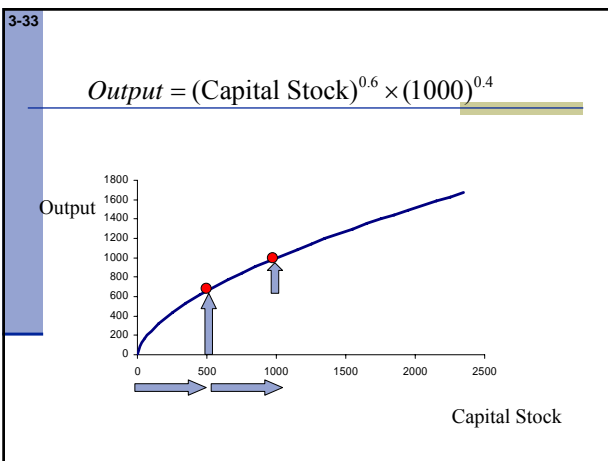
Production Function

$$\text{Output} = \text{TFP} \times \text{Capital Stock}^a \times \text{Labor Hours}^{(1-a)}$$









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Implications for labor productivity

$$\text{Output} = \text{TFP} \times \text{Capital Stock}^a \times \text{Labour Hours}^{(1-a)}$$



Production function in intensive form:

$$\frac{\text{GDP}}{\text{Labor Hours}} = \text{TFP} \times \left(\frac{\text{Capital}}{\text{Labor Hours}} \right)^a$$



Labor Productivity

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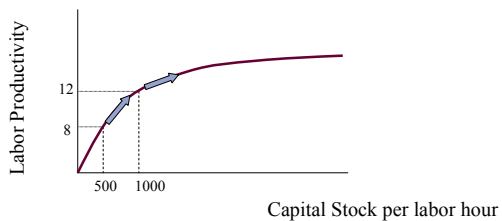
Changes in Labor Productivity

- Total Factor Productivity
- Capital per Labor Hour



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$$\text{Labor Productivity} = \text{TFP} \times (\text{Capital Stock/Labor Hours})^a$$



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Output Growth

Assuming hours worked per capita constant we have:

$$\% \Delta \text{ GDP per capita} = \% \Delta \text{ Labor Productivity}$$

And:

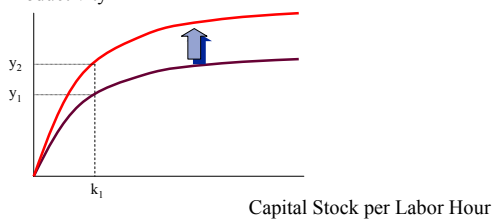
$$\% \Delta \text{ Labor Productivity} = \% \Delta \text{ TFP} + a \times \% \Delta \left(\frac{\text{Capital}}{\text{Labor Hour}} \right)$$

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Increase in TFP

$$\text{Output/Labor Hour} = \text{TFP} \times (\text{Capital/Labor Hour})^a$$

Labor Productivity



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Growth in Output

- Increase in labor supply
 - May have no impact on GDP per capita
 - Not sustainable
- Increase in capital stock
 - Must increase at faster rate than labor
- Increase in TFP
 - No diminishing returns in this framework

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Economic growth: case study 1

Case study 1:

The relative slow rate of growth of the European economy if compared to that of the US especially after the second half of the '90s.

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Economic growth

After the WW II Europe converged to the US both in terms of **GDP per capita** and in terms of **labour productivity** (= GDP per hour worked).

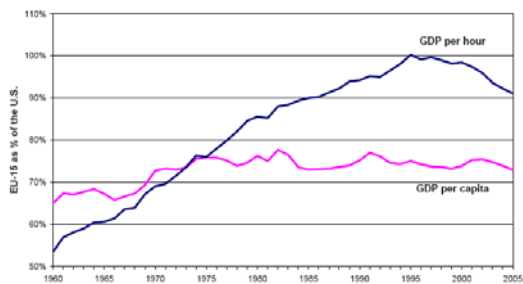
This catching-up pattern experienced two major breaks in the last 30 years:

- **Break 1:** GDP per capita convergence ended after 1975
- **Break 2:** labour productivity convergence was reversed after 1995

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Economic growth

GDP per capita and labour productivity, EU-15 as % of US



Note: EU refers to 15 EU membership as before 1 May 2004.
Source: Groningen Growth and Development Centre (GGDC) & The Conference Board (TCB)

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Economic growth

There are two different interpretations of this:

- a) The glass is half empty (Sapir Report)
- b) The glass is half full (Blanchard)

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Economic growth

- Half empty

UE experienced:

strong convergence in GDP per capita for 2 decades and a half
weak convergence in the '70s

divergence after the first half of the '90s

EU GDP in 1970 and in 2000 is approximatively the 70% of the US one

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Economic growth

- Half full

This is true, but it is valid only for **output per capita**.

The picture is much less negative when we consider **output per hour worked**: EU is approx 90% of the US one.

The difference is due to the fact that European employees work less hours during the year.

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Economic growth

$$\Delta\%(GDP/Pop) = \Delta\%(GDP/Hours) + \Delta\%(Hours/Pop)$$

GDP per capita growth =
Hourly labour productivity growth +
Hour worked per capita growth

The difference is due to the fact the European employee work a smaller number of hours per year wrt to US citizens.

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Economic growth

- Half full (continues)

for example, between 1970 and 2000 the number of hours worked per person decreased by 23% in France and increased by 26% in the US

The Europeans have "decided" to increase leisure rather than income...

But this is not the only explanation available

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GDP per capita: expanded decomposition

$$GDP/Pop = (GDP/Hours) * (Hours/Pop) =$$

$$= \frac{GDP}{Hours} * \frac{Hours}{N.Empl.} * \frac{N.Empl.}{Lab.Force} * \frac{Lab.Force}{Pop_{lab}} * \frac{Pop_{lab}}{Pop}$$

Labour Productivity
(b)

1-Unemployment Rate
(e)

Average Hours Worked
(d)

Labour Force Participation Rate
(f)

(g)

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Economic growth

- **Blanchard's** explanation focus on the second term on the right (however, it's decline explains only one third of the decline hours per capita)
- Other explanations:
 - **Prescott (2004)**: all decline in hours per capita was caused by higher labour taxes in Europe
 - **Ljungqvist-Sargent (2006)**: European welfare system increases unemployment and reduces labour force participation
 - **Alesina, Glaeser, Sacerdote (2006)**: decline in hours is mainly due to the political pressure by trade unions and left-wing parties to reduce hours and lower the retirement age

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Economic growth

But in the last 10 years European performance in terms of hourly labour productivity has not been good

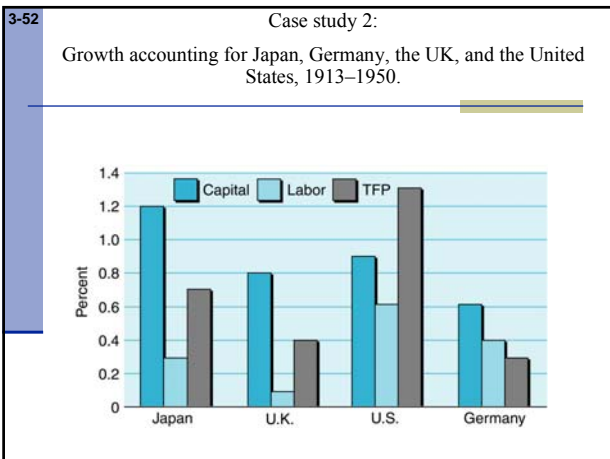
.....probably because of the slower diffusion of information technologies

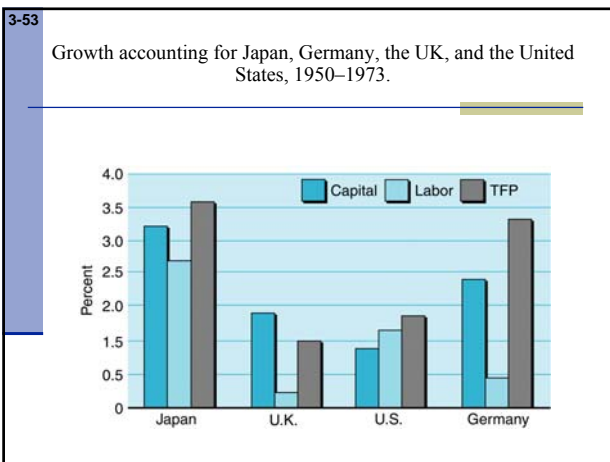
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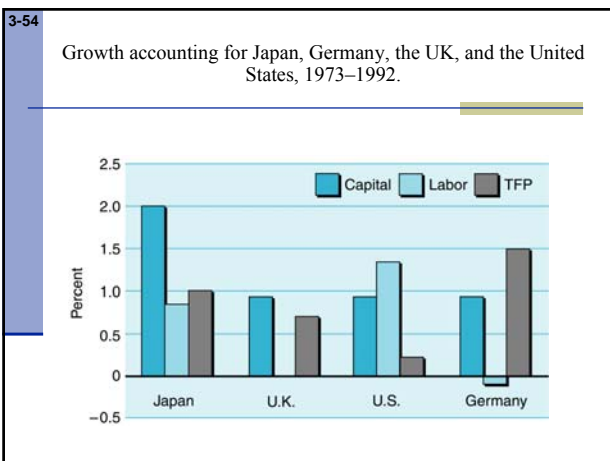
Economic growth

source: Ark (2004)



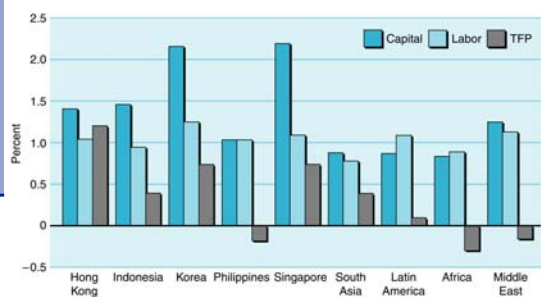






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Growth accounting in emerging markets, 1960–1994.



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Summary

- Importance of Growth
- Sources of Growth
 - *GDP per capita*
 - Hourly productivity
 - Number of hours worked
 - *Productivity*
 - Capital Accumulation
 - TFP
- Growth Accounting

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