Enhancing Productivity Growth

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Basic questions

- How to enhance productivity growth in advanced and in emerging market economies?

Schumpeterian growth theory

- Long-run growth driven by innovations
- Innovations result from entrepreneurial activities motivated by prospect of innovation rents
- Creative destruction: new innovations displace old technologies

Appropriate growth policies

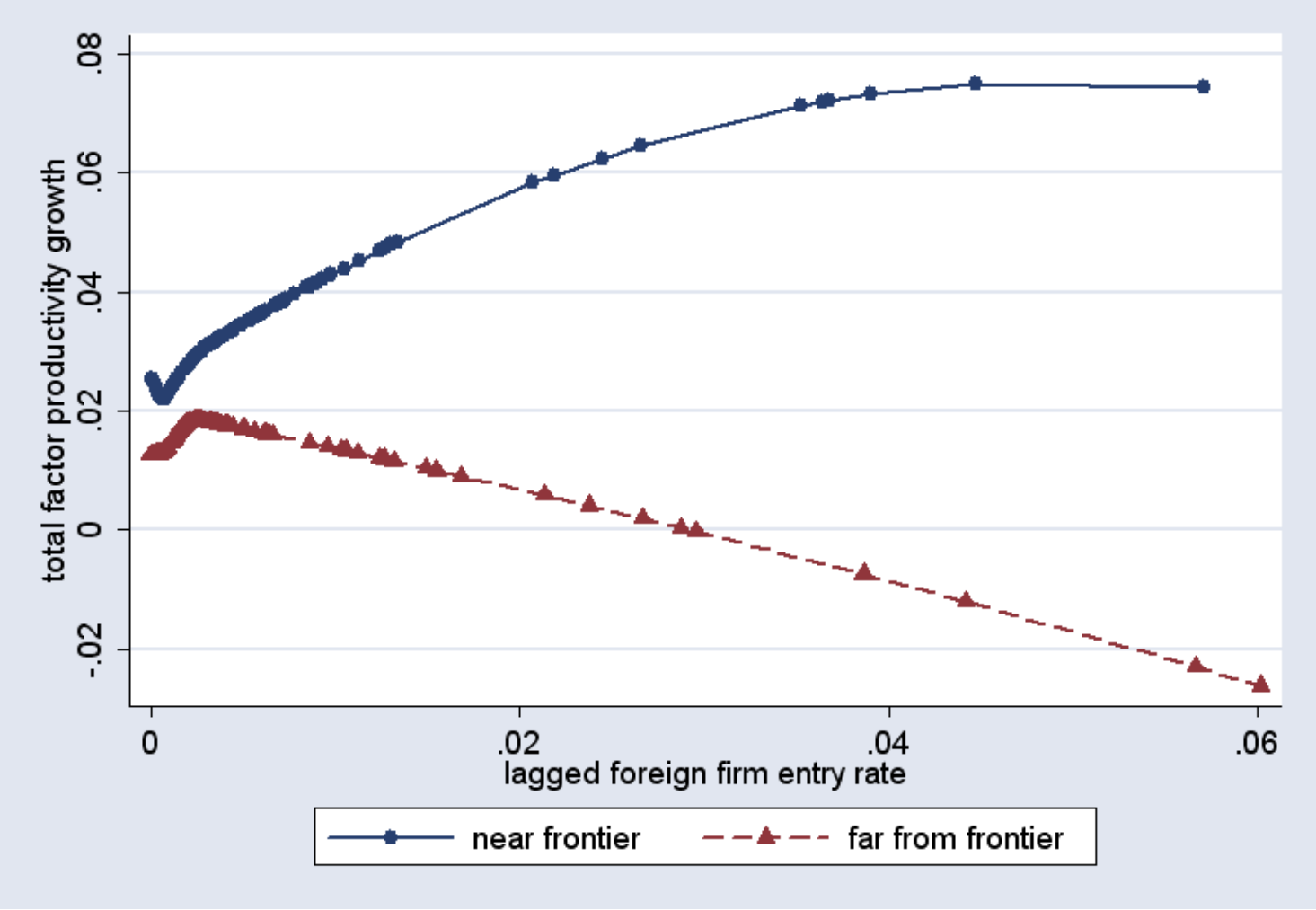
- During the post-war period, growth in European countries was driven by imitation
- Over time, and particularly with globalization, innovation has become the driving force of growth in developed economies
- Innovation requires flexibility and turnover, and different policies and institutions

Enhancing productivity growth in advanced countries

- Investment in higher education
- Liberalization of product market
- Liberalization of labor market
- Equity financing

First pillar: Competition

- Competition/entry is more growth-enhancing for countries or sectors that are closer to technological frontier


total factor productivity growth
-.02
0
.02
.04
.06
.08
0
.02
.04
.06
lagged foreign firm entry rate
near frontier
far from frontier

Three fallacies about competition policy

- Competition policy would counteract effects of patent policy: in fact the two policies are complementary
- Competition policy goes against any form of industrial policy: in fact the two are complementary
- Competition policy works independently of institutions: in fact corruption limits competition

Second pillar: education and universities

- Need good primary/secondary education...importance of good PISA performance
- Haning well-ranked universities is more growth-enhancing closer to technological frontier....importance of good Shanghai rankings

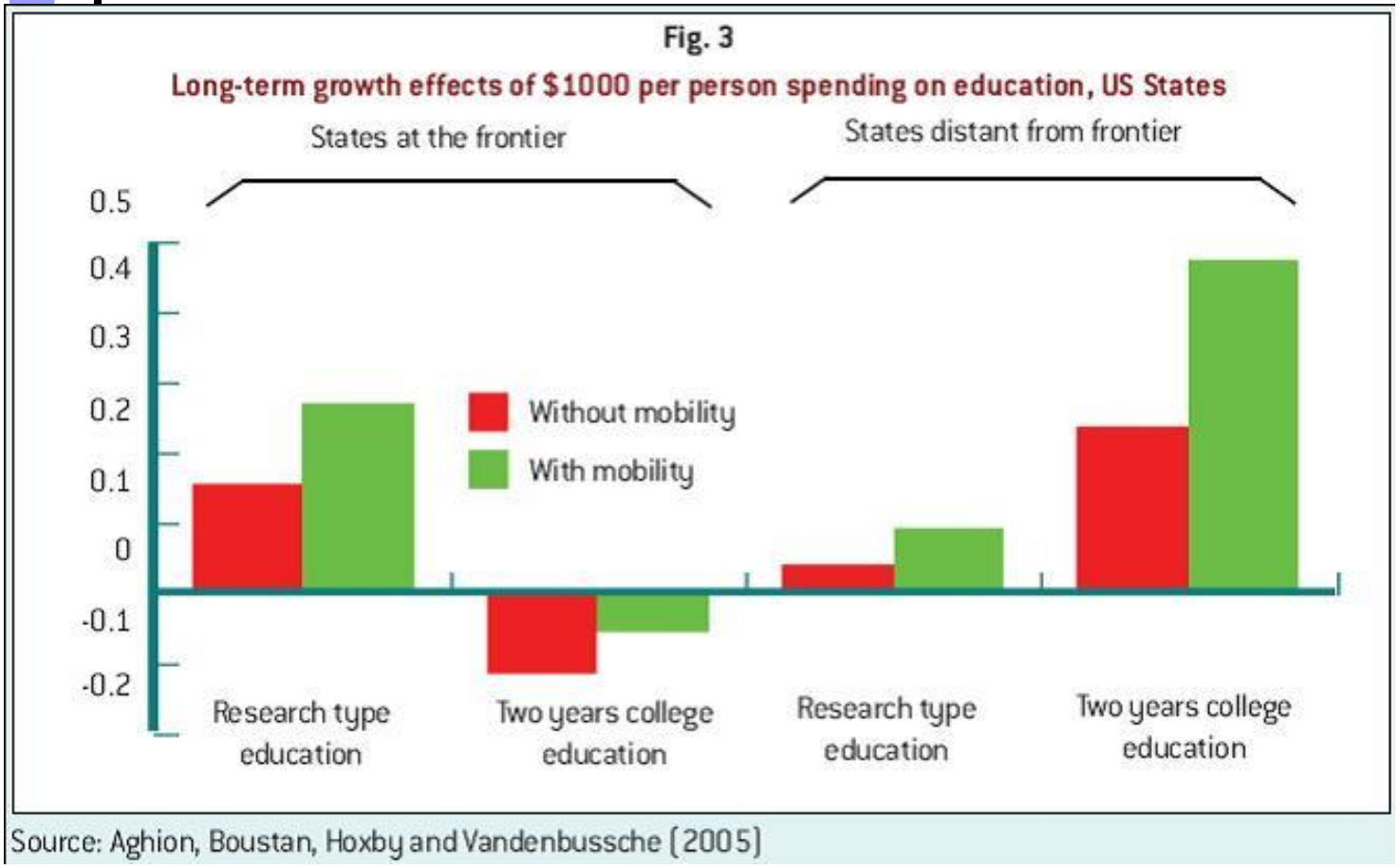


Fig. 3
Long-term growth effects of $1000 per person spending on education, US States
States at the frontier
States distant from frontier
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
Without mobility
With mobility
Research type education
Two years college education
Research type education
Two years college education
Source: Aghion, Boustan, Hoxby and Vandenbussche (2005)

Third pillar: Labor market flexibility: “flexsecurity”

- Labor market flexibility is more growth enhancing the closer a country is to the technological frontier

EPL

Variable	eq1	eq2	eq3	eq4	eq5
Leader MFP growth	0.02949	0.02996	0.02830	0.02813	
Gap to Leader	-0.00858***	-0.00836***			
EPL	-0.00000				
EPL, for highest tercile		0.00002	-0.00009**	-0.00011**	-0.00015***
EPL, for middle tercile		0.00004*	0.00002	0.00001	0.00001
EPL, for lowest tercile		0.00004	-0.00005	0.00002	0.00003
MFP Gap, for highest tercile			-0.01261***	-0.00816	-0.00547
Gap, for middle tercile			-0.00276	-0.00174	-0.00210
Gap, for lowest tercile			-0.00901***	-0.01095***	-0.01173***
EPL*Gap, for highest tercile				-0.00017	-0.00029*
EPL*Gap, for middle tercile				-0.00004	-0.00003
EPL*Gap, for lowest tercile				0.00012*	0.00014**
Leader growth, for highest tercile					0.13600***
Leader growth, for middle tercile					0.00817
Leader growth, for lowest tercile					-0.02597

legend: * p<.1; ** p<.05; *** p<.01

Fourth pillar: Finance

- As country moves closer to frontier, needs to rely more on equity finance and stock markets
- Reason is that innovative investments are more risky and therefore investors require both, to get a share of upside returns and to get control rights (Aghion-Bolton, 1992; Kaplan-Stromberg 2002).

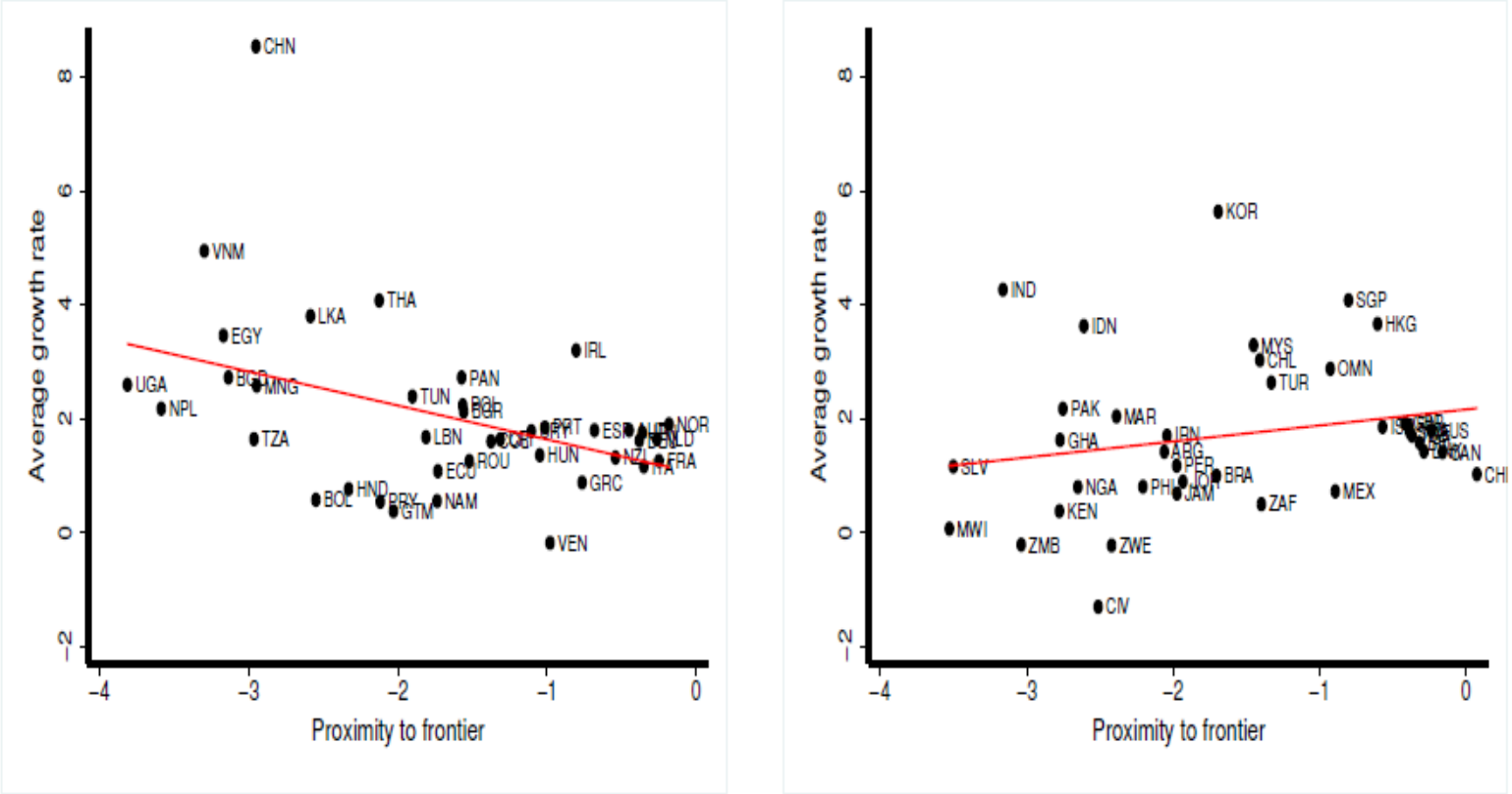


Figure 1: Average growth rate and Proximity to the frontier for the Bank-Based (left) and Market-Based (right) countries (per capita GDP growth rate)

Panel : Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Iceland, Italy, Japan, Korea, the Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States.

Times period : 1995-2007

Dependant variable : Hourly labour productivity growth (instrumental variables method)

	(1)	(2)	(3)	(4)	(5)
Changes in capacity utilization rate	0.00200***	0.00190***	0.00161***	0.000908	0.000634
	(0.000622)	(0.000499)	(0.000475)	(0.000648)	(0.000702)
Growth in working time	-0.583***	-0.787***	-0.797***	-0.784***	-0.698***
	(0.170)	(0.138)	(0.138)	(0.157)	(0.172)
Changes in the employment rate	-0.529***	-0.641***	-0.653***	-0.878***	-0.809***
	(0.177)	(0.165)	(0.160)	(0.203)	(0.217)
Share of ICT production in total VA	0.930***	0.344*	0.372**	0.0614	0.170
	(0.261)	(0.195)	(0.179)	(0.164)	(0.178)
Share of pop. (>15) w/ some higher educ.		0.0808**			
		(0.0348)			
EPL			-0.00726**		
			(0.00307)		
PMR(t-2)				-0.0103**	
				(0.00486)	
EMPL* PMR(t-2)					-0.00368***
					(0.00130)
Constant	-0.0376**	-0.0199	0.0107	0.0296**	0.0197*
	(0.0160)	(0.0153)	(0.0118)	(0.0137)	(0.0113)
Observations	163	149	142	95	95
P-value of the Durbin-Wu-Hausman endogeneity test	0.00066	0.02912	0.03388	0.02966	0.01112
P-value of Basmann test of overidentifying restrictions	0.6354	0.2581	0.4140	0.2075	0.7716

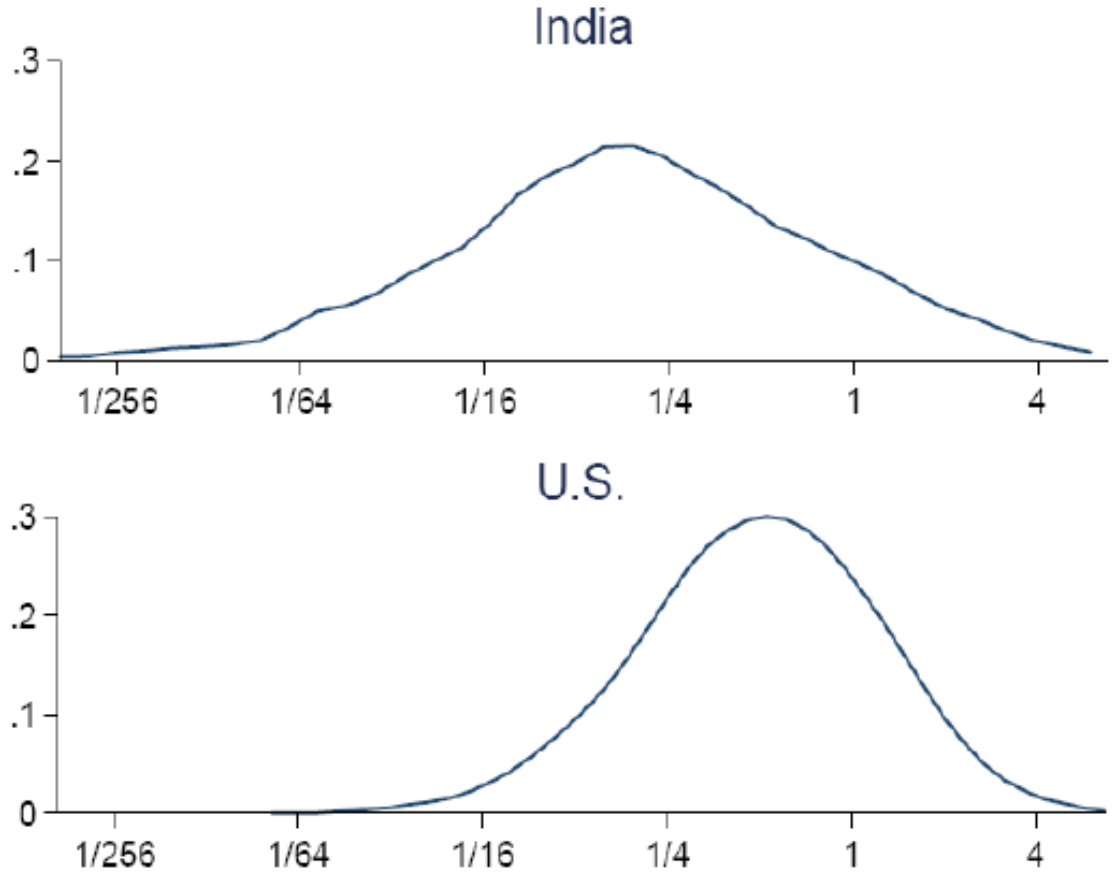
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Enhancing productivity growth in emerging market economies

Enhancing productivity growth in emerging market economies

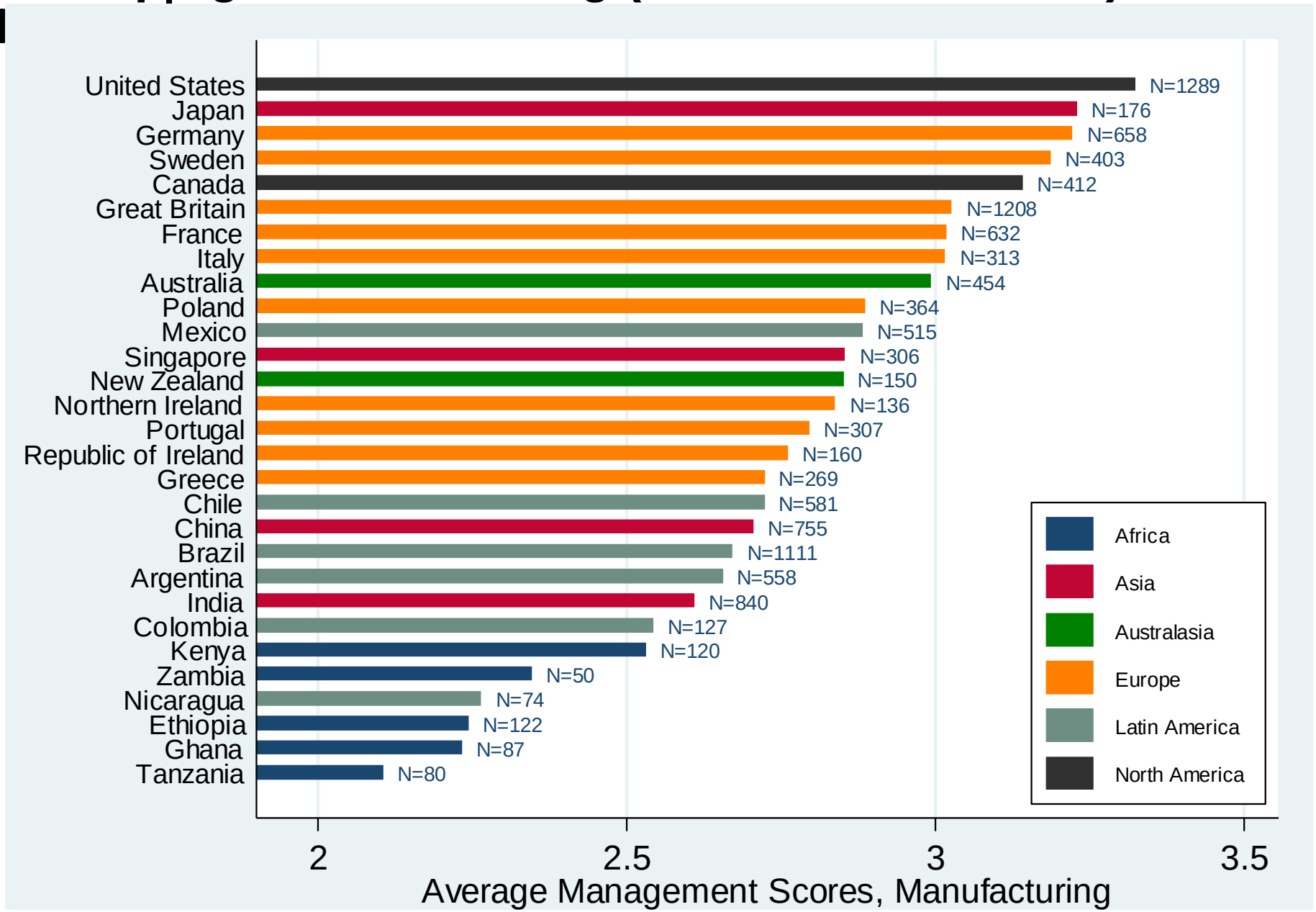
- Foster technology transfers
- Reallocate factors
- Improve management practices

DISTRIBUTION OF PLANT TFP DIFFERENCES IN US VS. INDIA HIGHER US TFP DUE TO REALLOCATION - THINNER "TAIL" OF LESS PRODUCTIVE PLANTS

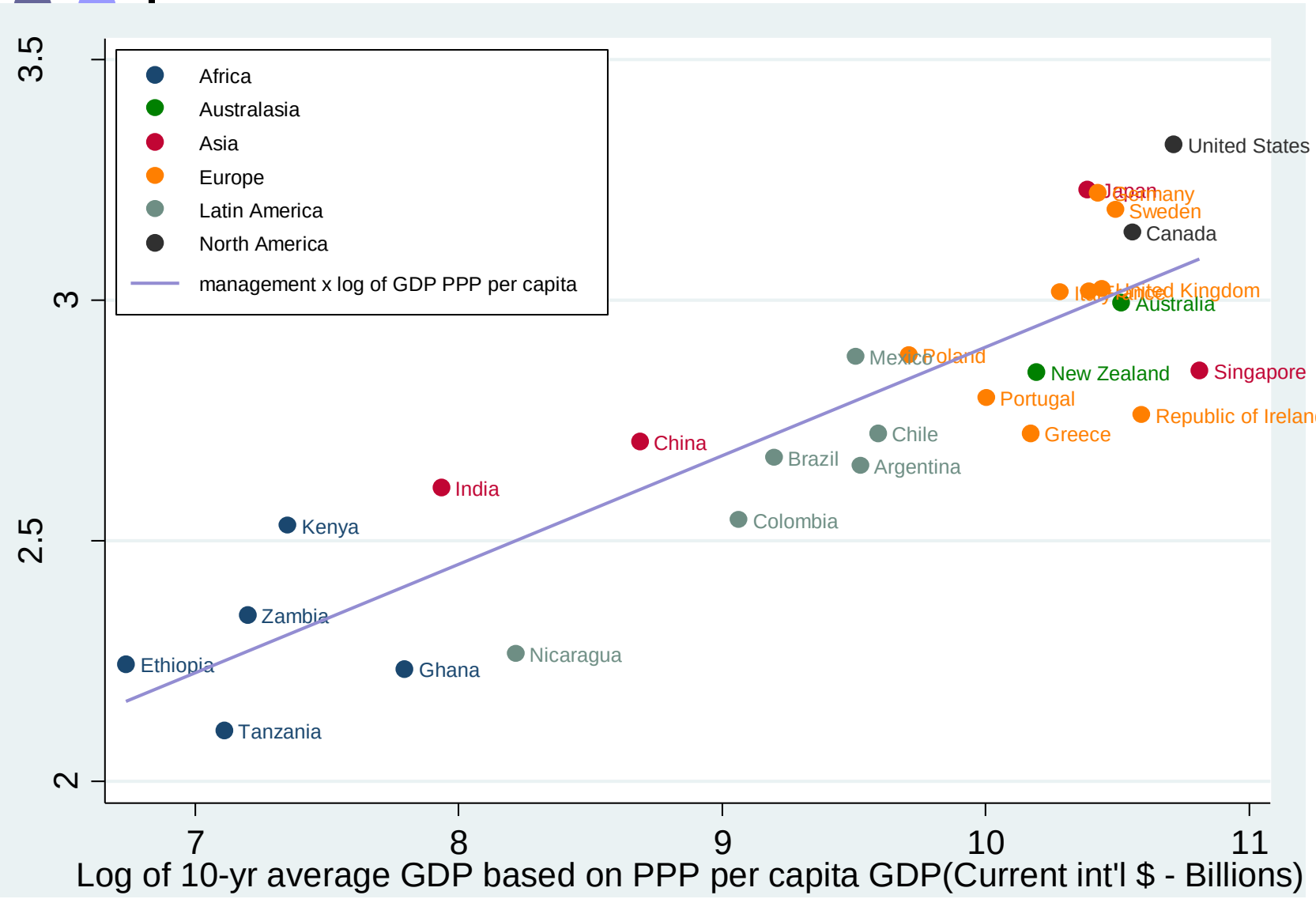


Source: Hsieh and Klenow (2009); US mean=1

Wide variation in management: US and Japan leading, developing nations trailing (includes 2013 wave)



Average management scores across countries are strongly correlated with GDP per capita



Data includes 2013 survey wave as of 9/20/2013. Africa data not yet included in the paper

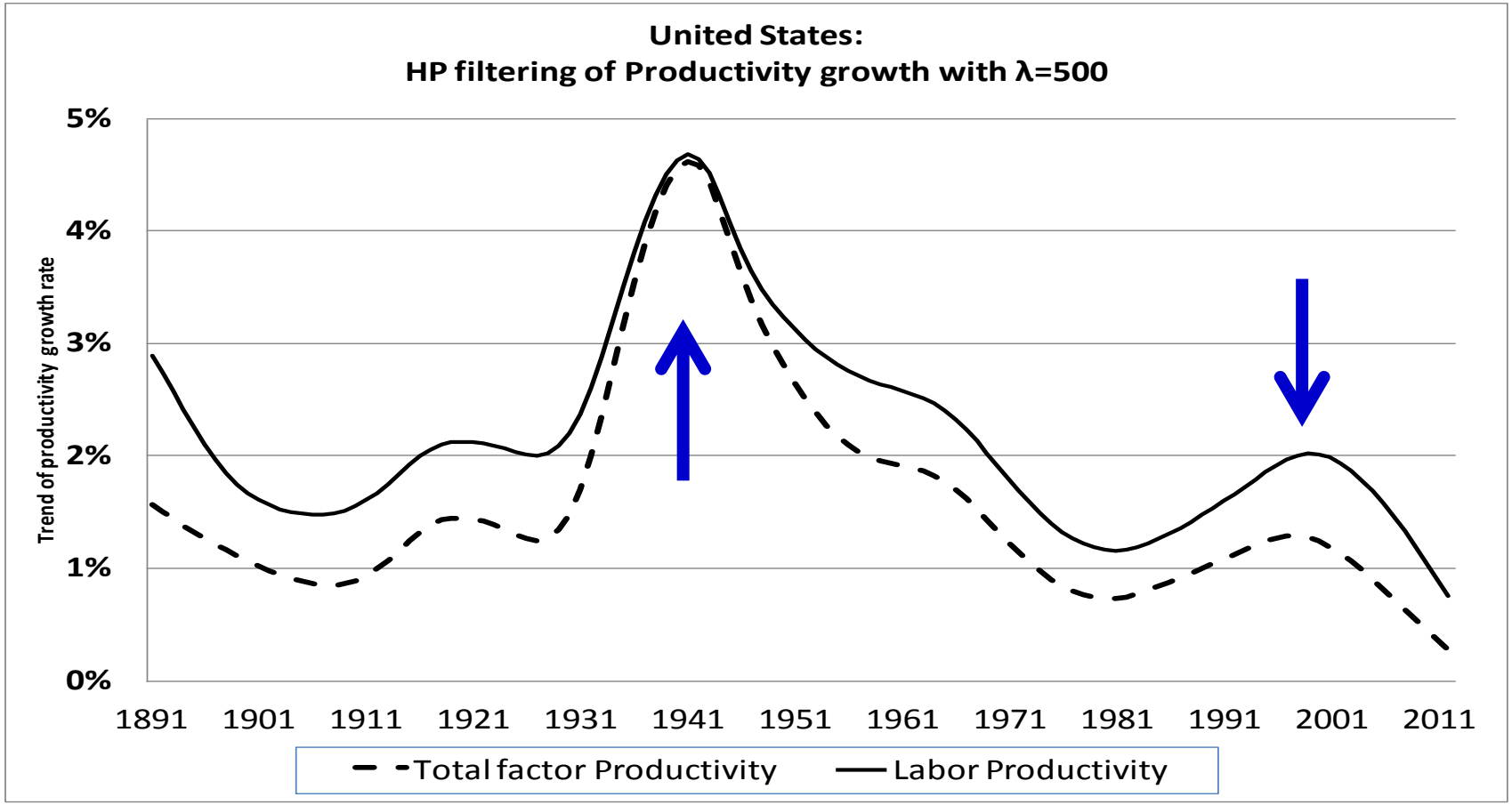
Technological waves

Technological waves

- Drawn from Gilbert Cette et al (2014)
- Productivity over the period 1890-2012
  - Using annual and quarterly data
  - From the end of the Long Depression to the Great Crisis
- 13 advanced countries
  - G7: US, UK, Japan, France, Germany, Italy, Canada
  - Spain, The Netherlands, Finland
  - Australia, Sweden, Norway
  - +reconstituted Euro area
- Labor Productivity and TFP

1. Two productivity growth waves in US

Two productivity growth waves



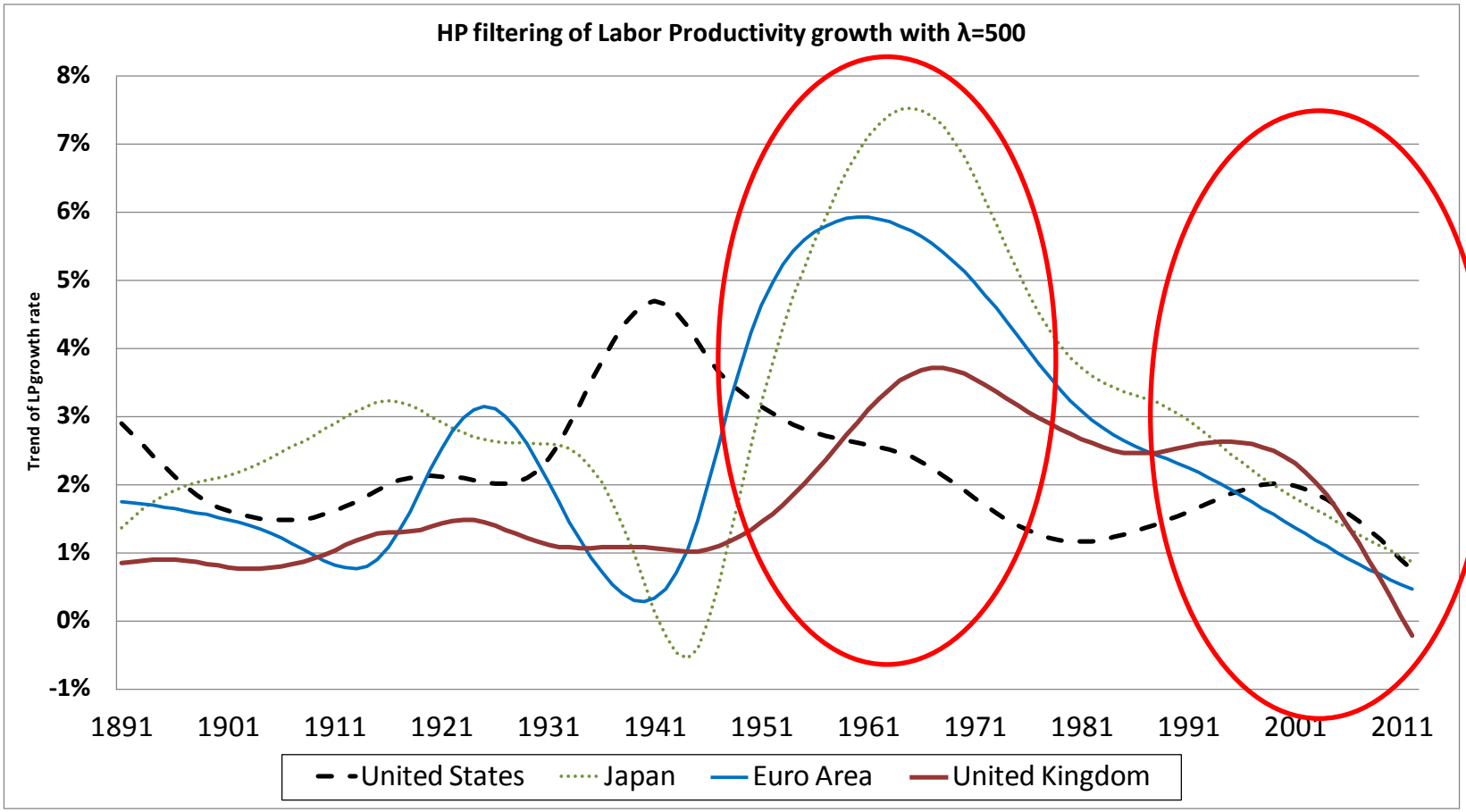
Two productivity growth waves

- 1st productivity growth wave:
  - 2nd industrial revolution: electricity, internal combustion engine, chemistry, communication (Gordon, 2000)
  - But also organizational change and financial development (Ferguson and Washer, 2004)
  - Long lag in diffusion: cf. electricity (David, 1990)

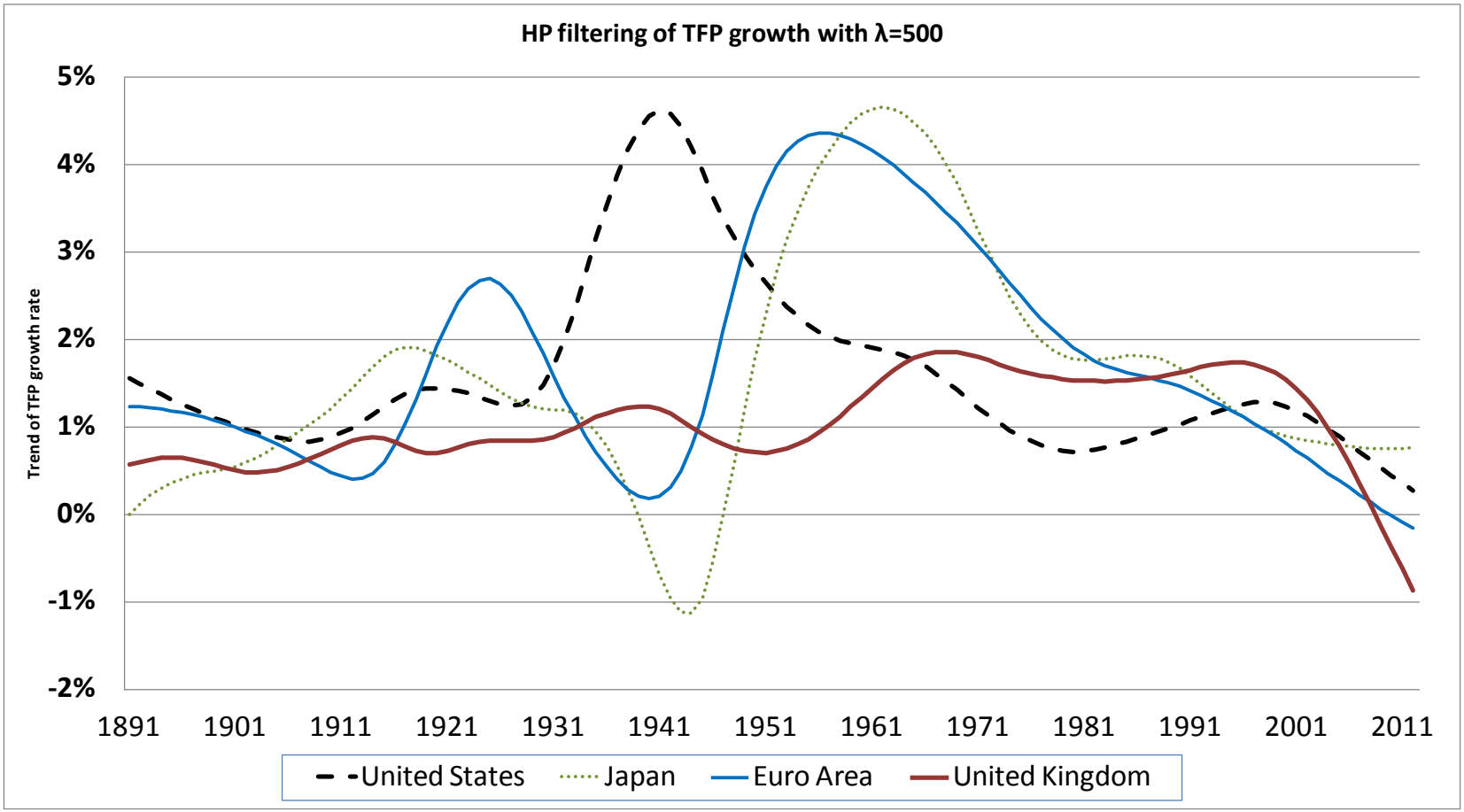
- 2nd productivity growth wave: ICT
  - Smaller wave
  - Ended?

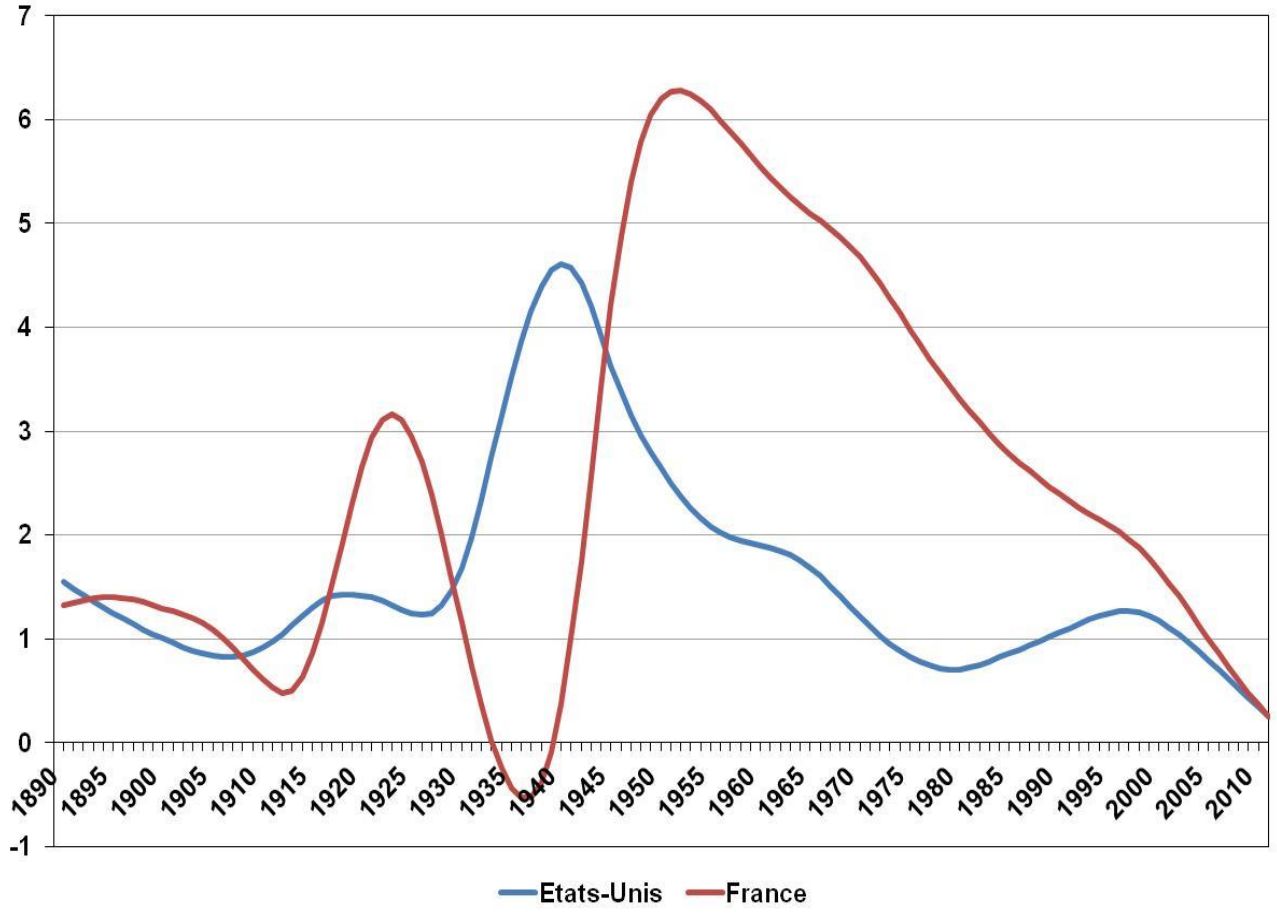
2. In other countries, delayed productivity growth waves (if any)

Delayed productivity growth waves in other countries



Delayed productivity growth waves in other countries

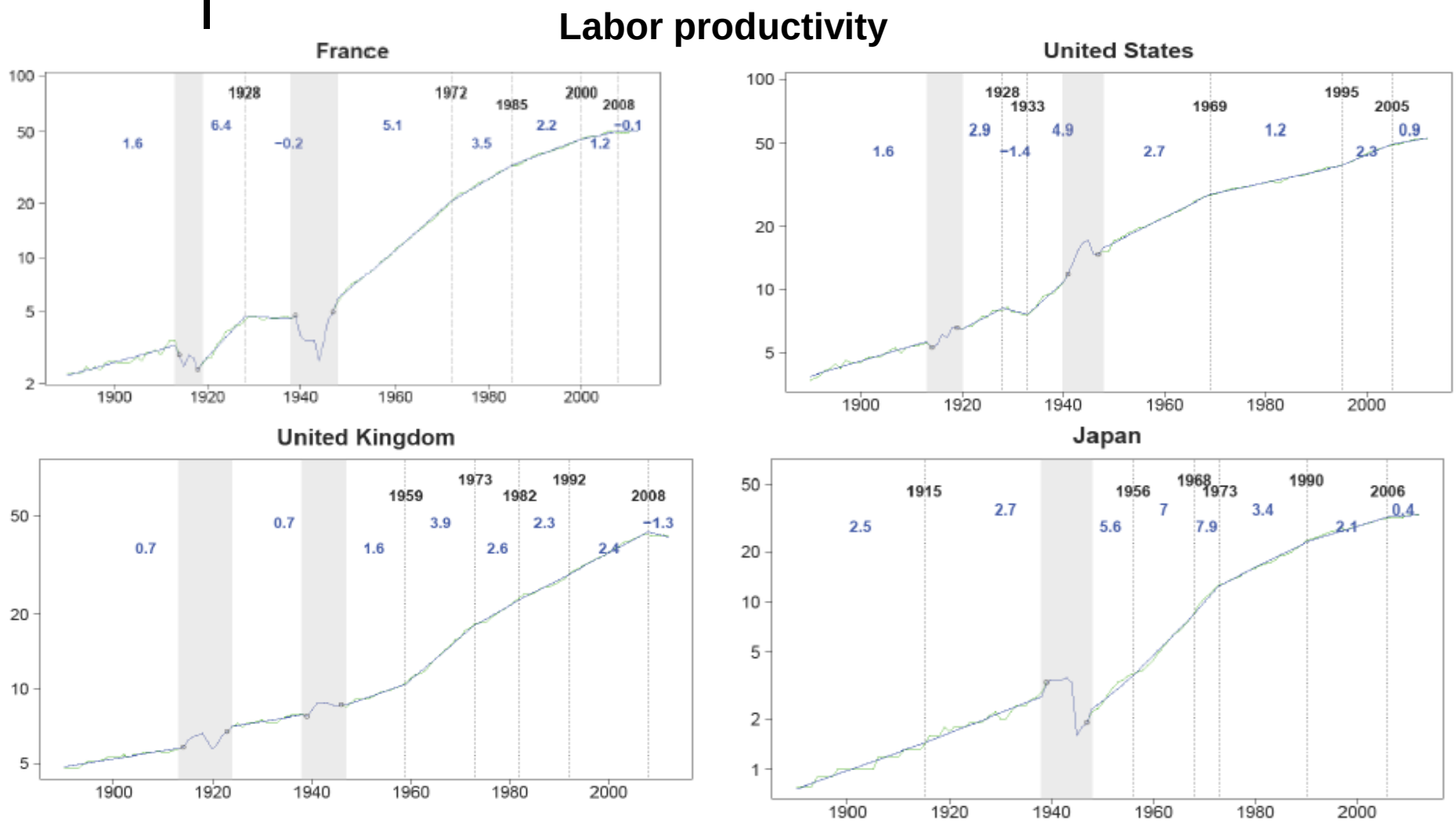



7
6
5
4
3
2
1
0
-1
1890
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Etats-Unis
France

Delayed productivity growth waves in other countries

- 1st productivity growth wave:
  - Hitting the euro area, Japan and UK after WWII
- 2nd productivity growth wave:
  - Absent so far in the euro area and Japan
  - Slow ICT diffusion: Role of market rigidities / education?

Productivity breaks: global shocks



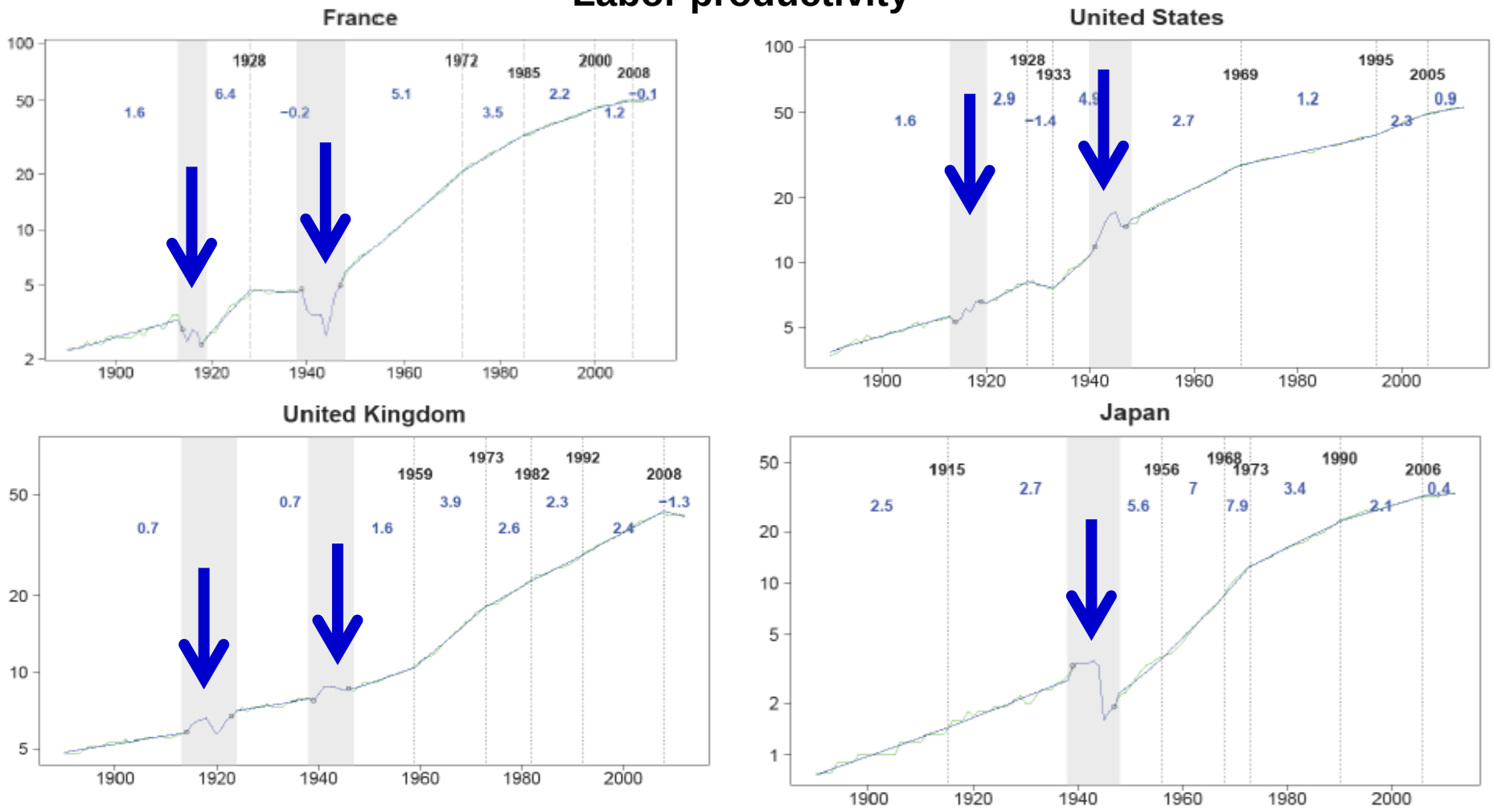
US$ PPP of 2005 (log scale)

Areas in grey: war periods

Productivity breaks: global shocks

Wars

Labor productivity



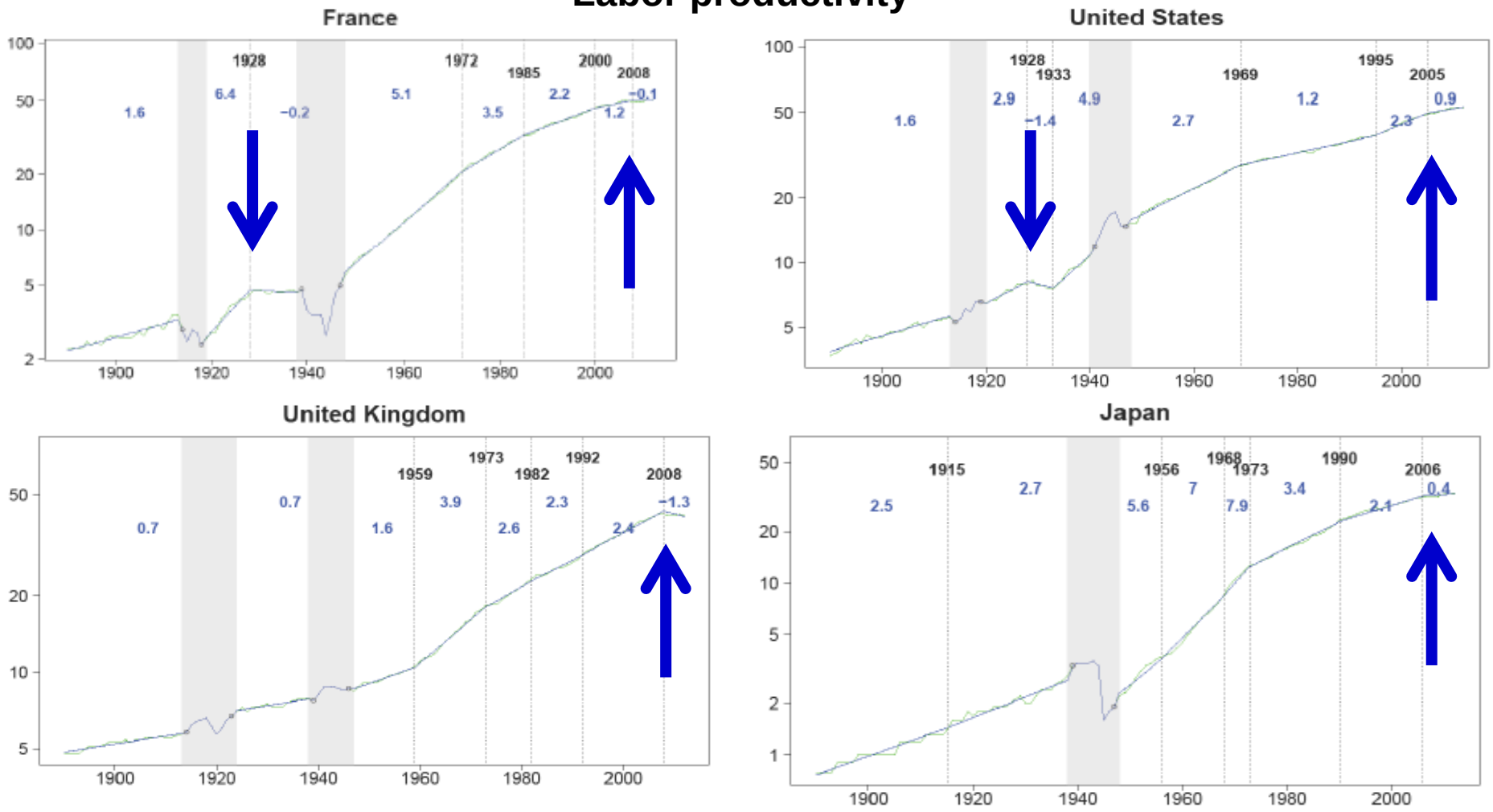
US$ PPP of 2005 (log scale)

Areas in grey: war periods

Productivity breaks: global shocks

Global financial crisis

Labor productivity



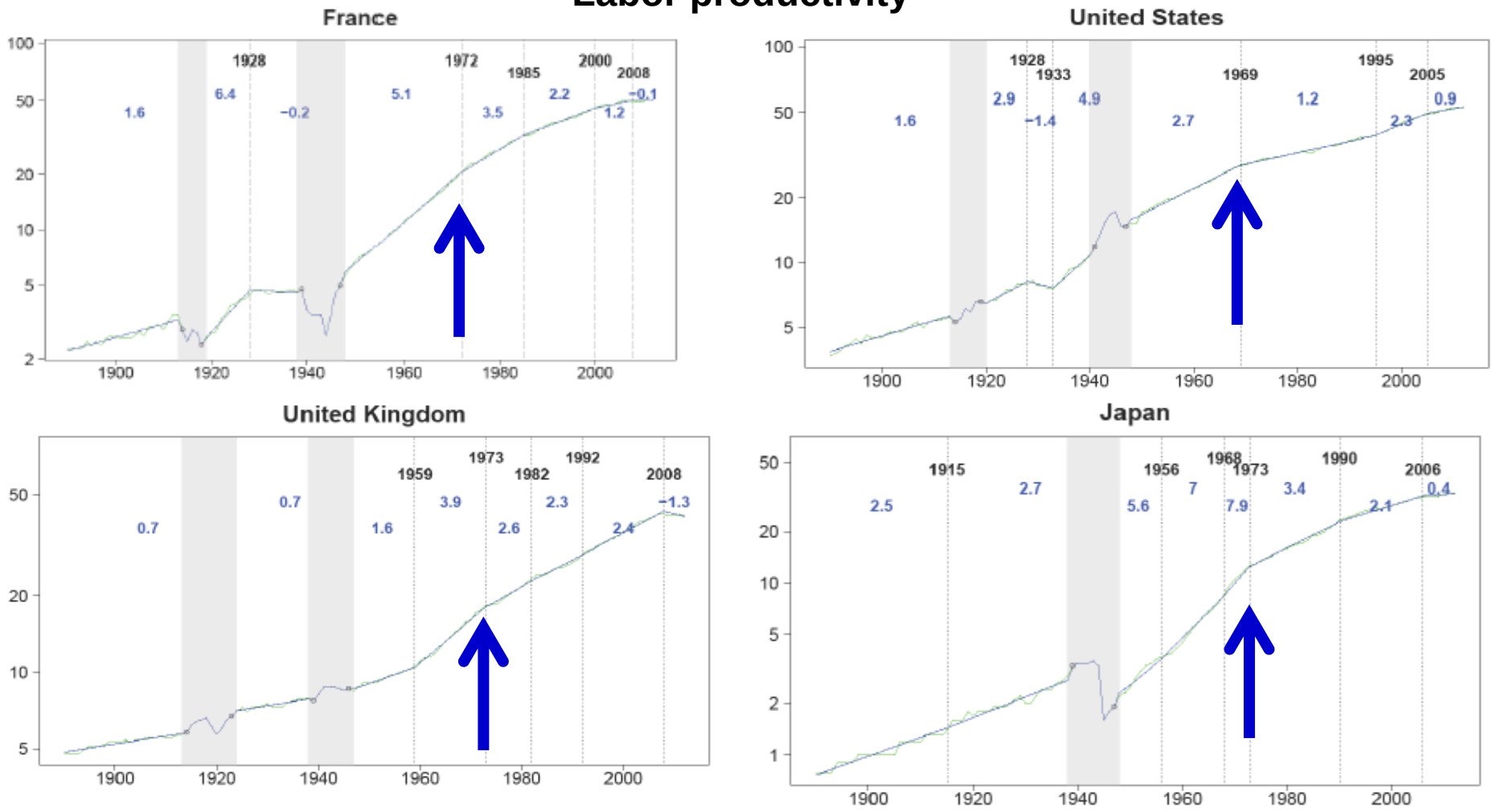
US$ PPP of 2005 (log scale)

Areas in grey: war periods

Productivity breaks: global shocks

Global supply shocks

Labor productivity



US$ PPP of 2005 (log scale)

Areas in grey: war periods

Global Productivity breaks

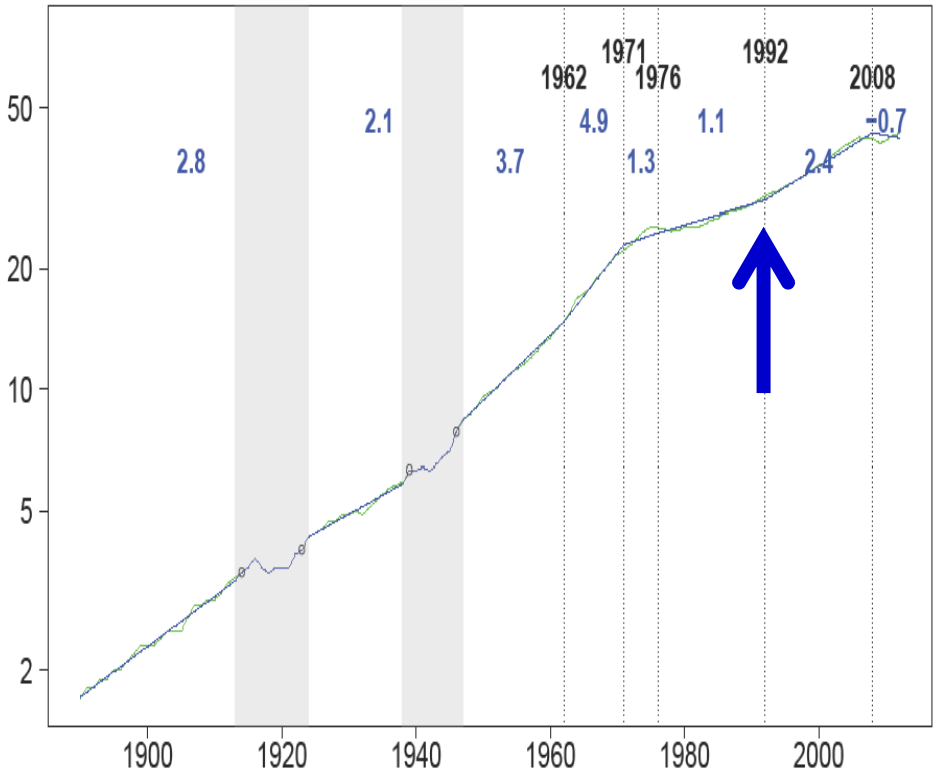
- **Due to wars, but in a divergent way:**
  - Upward level break for the United States
  - Downward for France, Germany and Japan
- **Due to the Great Depression, but very different recovery:**
  - Most countries affected (except Japan, Italy and the UK)
  - Exit through war for most countries
  - But stronger rebound in the US and Canada
- **Due to global supply shocks**
  - Generalized impact of the first oil shock
  - But different timings: US 1966/69

4. Country-specific productivity breaks due to idiosyncratic shocks

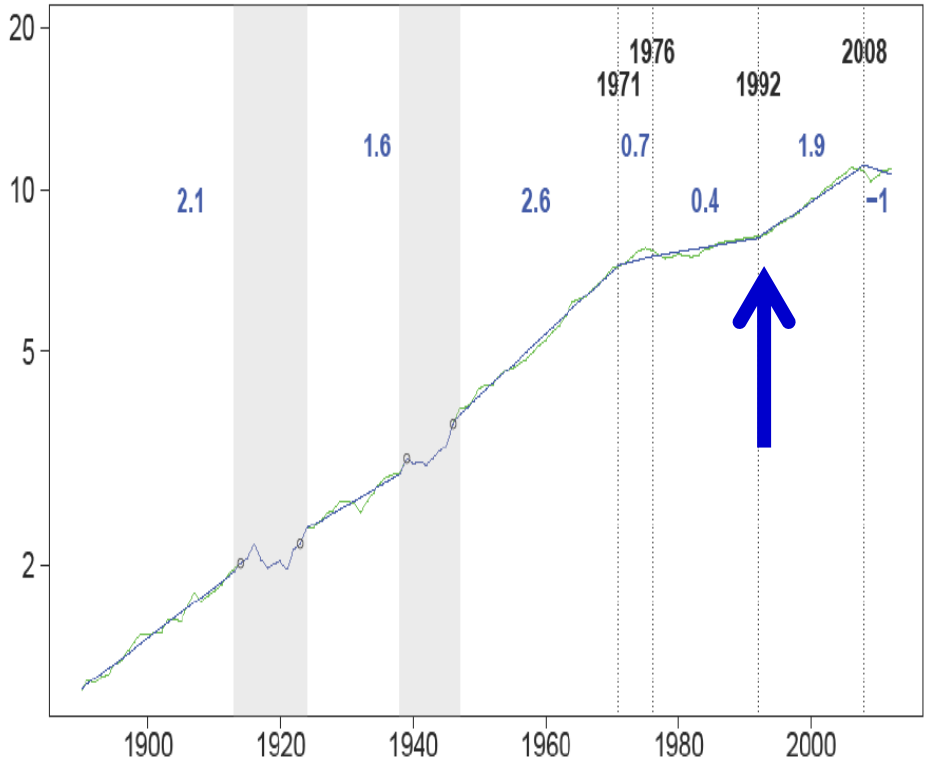
Productivity breaks: country-specific shocks

Sweden

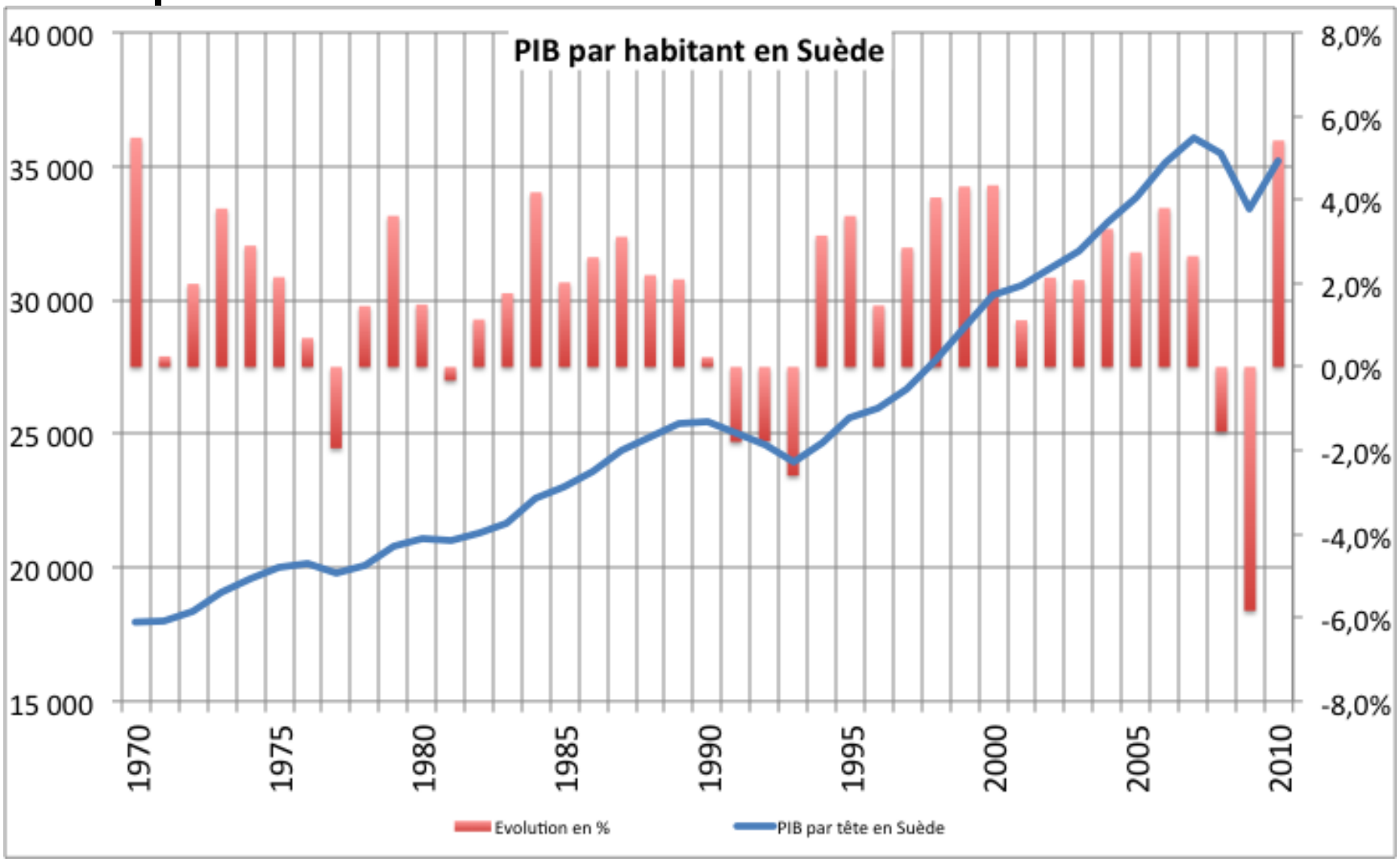
Labor productivity



Total Factor Productivity



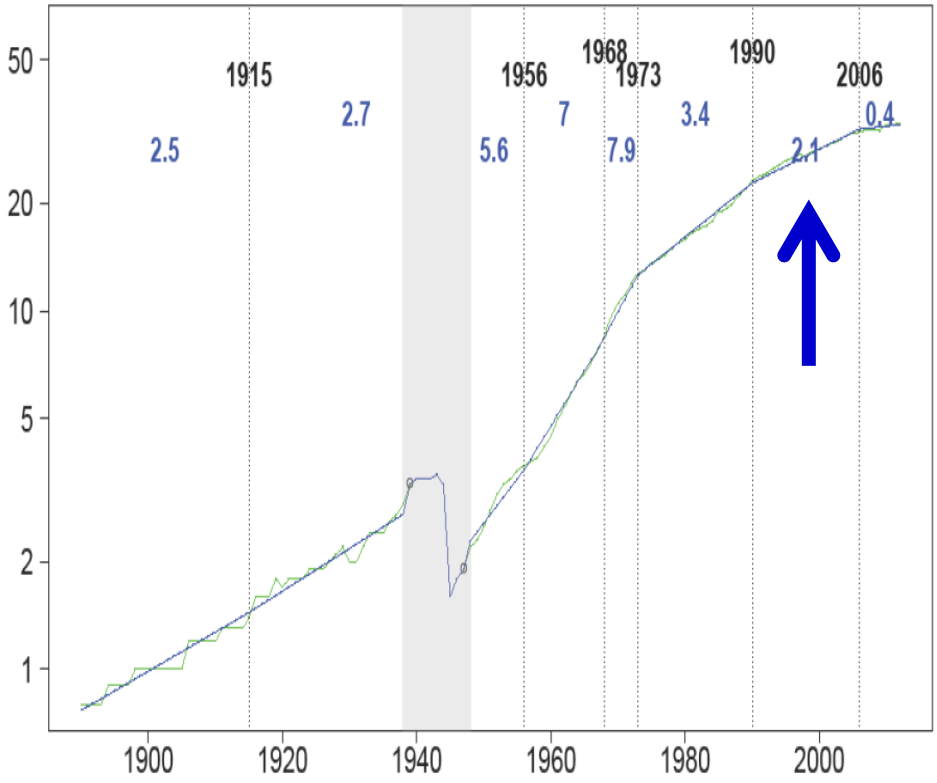
US$ PPP of 2005 (log scale)
Areas in grey: war periods


PIB par habitant en Suède
40 000
35 000
30 000
25 000
20 000
15 000
8,0%
6,0%
4,0%
2,0%
0,0%
-2,0%
-4,0%
-6,0%
-8,0%
1970
1975
1980
1985
1990
1995
2000
2005
2010
Evolution en %
PIB par tête en Suède

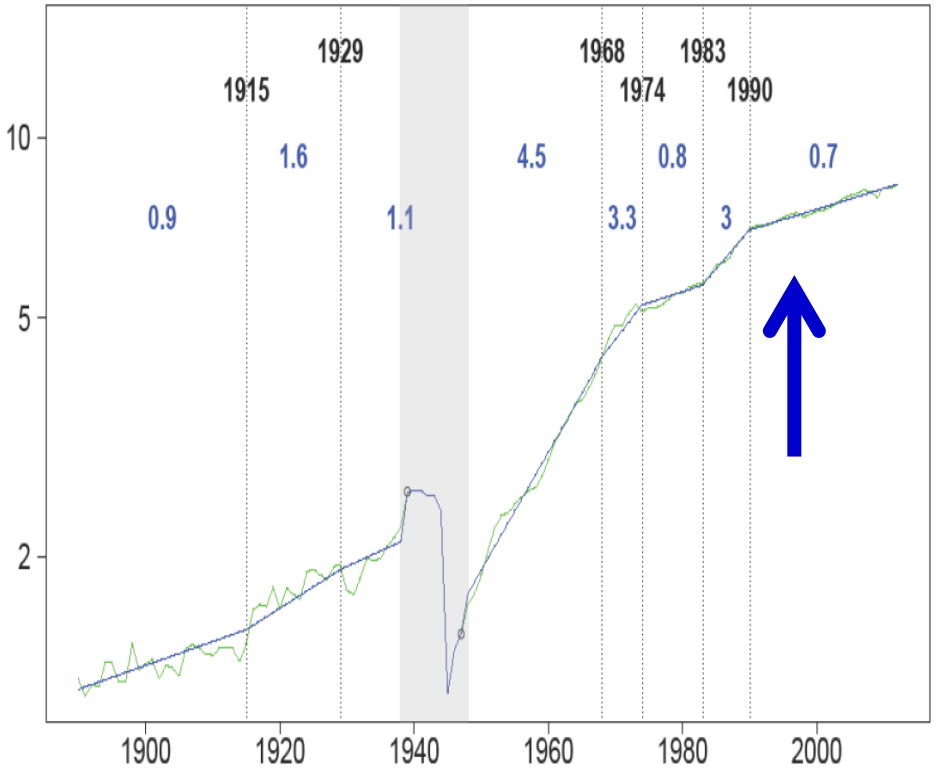
Productivity breaks: country-specific shock

Japan

Labor productivity



Total Factor Productivity



US$ PPP of 2005 (log scale)
Areas in grey: war periods

Country-specific productivity breaks

- Due to policy shocks/structural reforms:
  - Canada or Sweden 1990s
  - The Netherlands, 1983

Country-specific productivity breaks

- **Reformers**
  - **Netherlands:** Wassenaard agreement, 1982
    - TFP growth : 1977-1983 0,5 %, 1983-2002 1,5 %
  - **Canada**, reforms initiated in early 1990s
    - TFP growth: 1974-1990 0,3 %, 1990-2000 1,1 %
  - **Australia**, reforms initiated in early 1990s
    - TFP growth: 1971-1990 0,4 %, 1990-2002 1,4 %
  - **Sweden**, reforms initiated in early 1990s
    - TFP growth: 1976-1992 0,4 %, 1992-2008 1,9 %

Conclusion (1)

- Long-run productivity
  - Role of product and labor market flexibility, of higher education, and of equity financing in developed economies
  - Role of reallocation and management practices in emerging market economies (education, credit, corruption)
- Waves
  - Leader and followers
  - Major role of wars and supply shocks
  - Interaction with structural reforms

Conclusion (2)

- A new Growth Pact for Europe:
  - Structural reforms in exchange for more macroeconomic flexibility
  - Use structural funds to encourage structural reforms
  - New European industrial policy