Conference on the divergences in productivity
between Europe and the United States
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The Breaks in per Capita Productivity Trends in a Number of Industrial Countries

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Introduction

Three main stylised facts on productivity trends :

- Gordon (1999) describes the american productivity growth since 1870 as «One Big Wave »

- Europe and Japan begin to catch up with the United States in the 50s (Gordon, 2002).

- The catching-up process is interrupted in the middle of the 90s (Gust and Marquez, 2002 or Lecat, 2003).

Main objectives of the paper

Re-examine these stylised facts with the method for a sequential estimation of break dates elaborated by Bai and Perron (1998).

The method is implemented on Productivity per capita (GDP/employee) on :
- long samples of annual data, covering the XXth century, for the United States, the United Kingdom and France
- short samples of quarterly data, beginning in the 50s or in the 60s, for the same three countries plus Japan, Germany, Netherland and Spain.

The Bai et Perron method

Main advantages of this test : an endogeneous selection of the number **and** the dates of breaks

For each data series, 4 specifications are tested :

- Specifications 1 et 2 use productivity in levels (logarithms)

- Specifications 3 et 4 use productivity in gowth rates (differences of logarithms)

Problems of reliability for long data

For various reasons, results on long data samples must be treated cautiously :

- there is a large disparity in the methods and sources used in the different countries, and in one country at different times ;

- the deep economic changes recorded in the XXth century imply an heterogeneity of data between the beginning and the end of the sample ;

- borders have changed in France (Alsace-Lorraine) and in the United Kingdom (Southern Ireland).

Results on long samples (1)
United States

Spec.1	**1890**	**1922**	**1967**	**2002**
	1,3%	2,5%	1,3%	
Spec.3	**1890**	**1933**	**1967**	**2002**
	1,1%	3,0%	1,3%	

This table displays the average productivity growth rates between the various trend break dates.

The « Big wave » is confirmed with:

- an acceleration after 1922 or 1933 ;
- a slowdown after 1967 (earlier than in most of the studies).

Results on long samples (2)
France

Spec.1	**1890**	**1945**	**1970**	**1990**
	0,6%	5,4%	2,4%	
Spec.3	**1890**	**1945**	**1970**	**1990**
	0,6%	5,4%	2,4%	

- Acceleration in French productivity after 1945, with an higher growth rate than in the US

- Slow-down in 1970

Results on long samples (3)
United Kingdom

Spec.1	**1875**	**1943**	**2002**
	0,7%	1,9%	
Spec.3	**1875**	**1943**	**2002**
	0,7%	1,9%	

- Only one trend break detected with WWII

Results on long samples (4) conclusion

The Bai et Perron test allows us to confirm :

- the « Big wave » for the American Productivity per employee over the XXth century ;

- the acceleration in productivity in Europe after WWII, at least in France and in the UK.

Results on short samples (1)
United Sates

Spec.1	**1948Q1**	**1966Q1**	**1983Q1**	**2002Q4**
	2.8%	0.7%	2.0%	
Spec.2	**1948Q1**	**1966Q1**	**1983Q1**	**2002Q4**
	2.8%	0.7%	2.0%	
Spec.3	**1948Q1**	**1966Q1**		**2002Q4**
	2.8%		1.3%	
Spec.4	**1948Q1**	**1966Q1**		**2002Q4**
	2.8%		1.3%	

- The slowdown in the 60s is confirmed with a similar date (1966q1)
- Acceleration in 1983 (earlier than usually admitted, Cf Hansen, 1998)

Results on short samples (2)
United States, hourly productivity

Spec.1	**1964Q1**	**1967Q4**	**1995Q3**	**2002t4**
	3.2%	1.4%	2.2%	
Spec.2	**1964Q1**	**1967Q4**	**1995Q3**	**2002t4**
	3.2%	1.4%	2.2%	
Spec.3	**1964Q1**	**1968Q1**	**1995Q3**	**2002Q4**
	2.6%	1.5%	2.2%	
Spec.4	**1964Q1**	**1968Q1**	**1995Q3**	**2002Q4**
	2.6%	1.5%	2.2%	

- The slowdown in the 60s is confirmed
- Upward break in 1995, in accordance with Basu, Fernald and Shapiro (1998), Gust and Marquez (2002) or Hansen (1998).

Results on short samples (3)
Conclusion on American data

- Slowdown in 1966-1968, long before the oil shock

- Acceleration in 1983 or 1995, depending on the definition of productivity (per employee or per hour)

Results on short samples (4)
France

Spec.1	**1959Q1**	**1973Q3**	**1991Q2**	**2002Q4**
	5.0%	2.1%	1.1%	
Spec.2	**1959Q1**	**1973Q1**	**1991Q1**	**2002Q4**
	4.9%	2.2%	1.1%	
Spec.3	**1959Q1**	**1973Q2**	**1990Q1**	**2002Q4**
	5.0%	2.2%	1.1%	
Spec.4	**1959Q1**	**1973Q2**	**1990Q1**	**2002Q4**
	5.0%	2.2%	1.1%	

Results on short samples (5)
United Kingdom

Spec.1	**1955Q1**	**1972Q2**	**2002Q4**
	2.7%	1.9%	
Spec.2	**1955Q1**	**1972Q2**	**2002Q4**
	2.7%	1.9%	
Spec.3	**1955Q1**		**2002Q4**
	2.2%		
Spec.4	**1955Q1**		**2002Q4**
	2.2%		

Results on short samples (6)
Japan

Spec.1	**1961Q1**	**1973Q2**	**1990Q3**	**2002Q4**
	8.0%	2.9%		1.2%
Spec.2	**1961Q1**	**1973Q2**	**1990Q3**	**2002Q4**
	8.0%	2.8%		1.2%
Spec.3	**1961Q1**	**1973Q2**	**1990Q3**	**2002Q4**
	8.0%	2.9%		1.2%
Spec.4	**1961Q1**	**1973Q2**	**1990Q3**	**2002Q4**
	8.0%	2.8%		1.1%

Results on short samples (7)
West Germany

Spec.1	**1960Q1**	**1973Q4**	**1998Q4**
	4.1%	1.9%	
Spec.2	**1960Q1**	**1973Q4**	**1998Q4**
	4.1%	1.9%	
Spec.3	**1960Q1**	**1969Q4**	**1998Q4**
	4.3%	2.2%	
Spec.4	**1960Q1**	**1973Q1**	**1998Q4**
	4.2%	2.0%	

Results on short samples (8)
Reunified Germany

Spec.1	**1991Q1**	**1997Q3**	**2002Q4**
	1.9%	0.8%	
Spec.2	**1991Q1**	**1997Q3**	**2002Q4**
	1.9%	0.8%	
Spec.3	**1991Q1**	**1997Q3**	**2002Q4**
	2.2%	0.8%	
Spec.4	**1991Q1**	**1997Q3**	**2002Q4**
	2.1%	0.8%	

Results on short samples (9)
Spain

Spec.1	**1970Q1**	**1985Q4**	**1996Q1**	**2003Q2**
	3.3%	1.5%	-0.4%	
Spec.2	**1970Q1**	**1985Q4**	**1996Q1**	**2003Q2**
	3.3%	1.5%	-0.4%	
Spec.3	**1970Q1**	**1994Q1**	**2003Q2**	
	2.9%	-0.1%		
Spec.4	**1970Q1**	**1994Q1**	**2003Q2**	
	2.9%	-0.1%		

Results on short samples (10)
Netherlands (half-yearly)

Spec.1	**1960S1** 4.1%	**1976S1** 1.4%	**2003S1**
Spec.2	**1960S1** 4.1%	**1976S1** 1.4%	**2003S1**
Spec.3	**1960S1** 3.7%	**1976S2** 1.3%	**2003S1**
Spec.4	**1960S1** 3.7%	**1976S2** 1.3%	**2003S1**

Results on short samples (11)
Conclusion on european data

- All european countries and Japan encounter a slowdown in the per capita productivity growth rate around 1973

- All european countries (except for the United Kingdom and the Netherlands) and Japan show a slowdown in the productivity growth rate in the 90s, which contrasts with the acceleration in American productivity. The end of the catching-up process appears in the trends of productivity per capita.