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THE PRODUCTIVITY GAP BETWEEN THE UNITED STATES AND THE EURO ZONE CONTINUES TO WIDEN

From 1950 to 1970, labour productivity levels converged between the United States – considered to be the global technological leader – Western European countries and Japan. But thereafter this process gradually became less marked before disappearing completely since the mid-1990s: while in the United States, labour productivity growth accelerated, it slowed down in the majority of European countries and Japan. Technological progress, associated with the development of information and communication technologies (ICT), goes some way towards explaining the revival of productivity in the USA, before the dot-com bubble burst. However, it does not tally with the decline seen in Europe because, although the level of investment in ICTs in Europe falls some way behind that of the USA, it has nonetheless grown significantly. A fundamental explanation for the divergence relates to a change in intensity of the employment component of growth. While it fell sharply in the United States, there was a significant rise in Europe where, prior to the crisis of 2007-2008, mass unemployment fell as a result. The most recent data for 2009 confirm the existence of diverging productivity trends.

The scale of the economic crisis for the period 2007-2009 raises the thorny question of post-crisis growth. Past studies[1] seem to indicate that following financial crises, economies tend to revert to pre-crisis growth patterns, with no catch-up effect but with no sustained fall in growth rates either. Nevertheless, this observation – albeit encouraging – is contradicted by what has happened in Japan, which appears never to have really recovered from the banking crisis that rocked the country in the early 1990s. Are we set to experience the same fate?

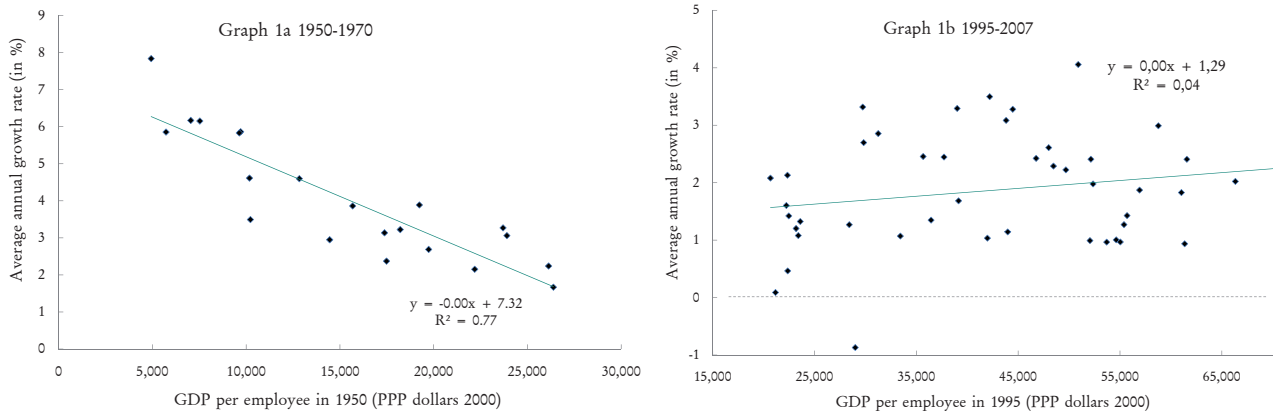
When the crisis began, productivity in continental Europe was already below that of the United States. Coupled with that, the American economy has maintained its productivity gains throughout the crisis thanks to flexibility in the job market, whilst in Europe (Germany in particular), companies have been encouraged to retain employees and hence accept falls in labor productivity. So achieving a recovery in productivity in Europe is going to be no mean feat, especially as companies have stopped investing and uncertainties remain concerning credit. The important question here is to know whether it will be possible for European productivity to converge once more towards that of America, a convergence that has not been seen since the mid-1990s. So it may be useful to go back to the roots of this divergence to understand the interconnection between productivity growth and employment growth.

End of convergence between developed countries

In OECD countries, during the period 1950-1970, the lower the starting point, the higher the growth in output per worker appeared to be (graph 1a), reflecting economic convergence. However, this correlation gradually weakens over time and disappears completely during the most recent period of 1995 to 2007 (*see.* graph 1b). The catch-up process no longer exists; it is also true to say that the gaps in terms of GDP per employee had narrowed considerably in 1995 compared to 1950.

1. C. Reinhart & K. Rogoff (2008), "The Aftermath of Financial Crises", NBER Working Paper No. 14656.

Graph 1 – Productivity growth and level of productivity per employee



NB: Only those countries with a GDP per employee above 5,000 dollars in graph a and a GDP above 20,000 dollars in graph 1b are included.

Source: A. Heston, R. Summers & B. Aten (2009), "Penn World Table Version 6.3", Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania. Authors' figures.

Breaks in the trend: from the first oil crisis to the dot-com bubble

These observations encourage us to try to find and date any obvious trend breaks in terms of labor productivity growth. Are the changes observed long-lasting or do they merely correspond to medium-term fluctuations? To ascertain this, we use a series of statistical tests developed by Bai and Perron (1998)[2]. The principal tests are carried out for 19 OECD countries on productivity per employee – *i.e.*, the relationship between GDP measured at constant prices and the total number of jobs – for the period 1960-2007 (table 1)[3].

Eleven of the nineteen countries (including the EU15 aggregate) experienced a break during the first oil crisis in the period 1972 to 1974; the break corresponded to a sudden and significant reduction in the rate of labor productivity growth of around 60%. Four countries, including Germany, experienced a similar break in terms of scale, but slightly later (between 1977 and 1979). Generally speaking, for the EU15, the break does indeed date back to 1974 and annual productivity growth falls from 4.3% to 1.6%.

In four countries, no trend break was observed in the 1970s. At that time, three of these countries could be defined as emerging countries: South Korea, Spain and, to some extent, Italy; conversely, the change to a downwards trend occurred around 1995. The fourth and final exception is Australia, which has seen no trend break; it has to be said that its productivity gains have always been weak.

Of all these countries, the United States has a unique profile: following a shift to a downward trend in the 1970s, there is a second break in the trend in 1992 but this time it is upward. As a consequence, since the middle of the 1990s, labour productivity gains in the United States have exceeded the European average.

Do recent changes call into question previous analyses?

To test the most recent trends, we use quarterly OECD data since this is updated more frequently than annual data. We have thus been able to include data up to the first quarter of 2009 and hence take into account the initial effects of the 2008-2009 recession. After the period of prosperity between 1995 and 2001, followed by the dot-com bubble burst, productivity gains fell back. Generally speaking, the fall occurred suddenly from the mid-2000s and was well above 1 percentage point (table 2). The United States, where the decline in productivity was just 0.7 of a percentage point at the time of the change in 2000, emerges better than other developed countries. This trend is confirmed – and indeed accentuated – when hourly productivity data is used. The gap between the United States and Europe quite clearly widens.

The impact of the financial crisis of 2007-2009 began to be felt in the real economy during the first quarter of 2008 in the United States and during the third quarter of 2008 in Europe.

2. J. Bai & P. Perron (1998), "Estimating and Testing Linear Models with Multiple Structural Changes", *Econometrica*, vol. 66, n° 1, pp. 47-78.
3. For a more detailed analysis, see C. Bosquet & M. Fouquin (2009), "Productivité du travail: la fin du processus de convergence?", *Économie et Statistique*, n° 419-420, pp. 125-142.

Table 1 –Trends and breaks in productivity per employee for the period 1960-2007 (Average annual growth %)

	Country	Before break	Date of break	After break	Difference
Single downward change	Austria	5.5	1972	1.6	-3.9
	Japan	8.2	1973	1.9	-6.3
	UE15	4.3	1974	1.6	-2.7
	France	4.9	1974	1.7	-3.2
	Belgium	4.4	1974	1.7	-2.7
	Portugal	5.3	1974	1.8	-3.5
	Sweden	3.3	1974	1.7	-1.6
	Greece	7.8	1974	1.6	-6.2
	UK	2.5	1974	2.0	-0.5
	Finland	4.4	1974	2.4	-2.0
	Netherlands	3.9	1977	0.5	-3.4
	Denmark	3.0	1977	1.6	-1.4
	Germany	3.8	1978	0.9	-2.9
	Irland	4.0	1979	3.0	-1.0
	Spain	4.0	1995	-0.3	-4.3
	Korea	4.8	1996	3.3	-1.5
	Italy	3.6	1996	0.3	-3.3
No change	Australia	1.6		1.6	0.0
Double change	USA	1.8	1974	1.3	-0.5
		1.3	1992	1.8	0.5

Interpretation: taking the case of the United States, the average annual growth in productivity per employee is 1.8% between 1960 and 1974, 1.3% between 1974 and 1992 and 1.8% between 1992 and 2007 (tests for the period 1960-2007).

Scope: reporting OECD countries.

Sources: GDP at constant prices, CHELEM-CEPII (2008); OECD employment (2008).

Table 2 – Recent changes in labour productivity per employee between 1st quarter 1995 and 1st quarter 2009 (Average annual growth %)

	County	Before break	Date of break	After break	Diffenrence
Increase	Spain	-0.6	2005Q4	1.1	1.7
Downwards change	Germany	1.4	2004Q2	-0.7	-2.4
	Australia	2.7	1999Q3	0.7	-2,0
	Austria	2.7	2000Q4	1.0	-1.7
	Canada	1.8	2000Q4	0.4	-1.4
	Denmark	1.5	2005Q3	-0.7	-2.2
	USA	2.1	2000Q1	1.4	-0.7
	USA productivity	2.9	2003Q4	1.9	-1,0
	France	1.8	2000Q2	0.6	-1.2
	G7	1.6	2004Q4	0.5	-1.1
	Ireland	3.5	2004Q1	0.8	-2.7
	Italy	0.8	2001Q2	-0.8	-1.6
	Norway	1.5	2005Q4	-0.9	-2.4
	New Zealand	1.2	2004Q3	-0.5	-1.7
	Poland	5.4	2004Q2	1.9	-3.5
	UK	1.9	2004Q3	0.9	-1,0
	Sweden	2.2	2005Q4	-1.4	-3.6
No change	Finland	2.2		2.2	0.0
	Luxembourg	0.2		0.2	0.0
	Portugal	0.6		0.6	0.0
	Korea	3.5		3.5	0.0
	Japan	1.1		1.1	0.0

Source : OECD, June 2009, and authors' figures.

Initial estimates available from the Conference Board[4] tend to support the diagnosis outlined above: European productivity growth stagnates at 0.2% per year whilst in the United States it is maintained at more than 1.8% for the entire 2007-2008 period. What's more it will undoubtedly be above this level in 2009 in the light of data for the third quarter.

Technological breakthrough or variation in the employment component of growth?

The resurgence in labour productivity in the United States over the period prior to the dot-com bubble of 2001 is generally explained by technological breakthrough associated with the spectacular development of information and communication technologies (ICT). However, as Jorgenson *et al.* wrote in (2008)[5], "the contribution of the production and use of information technologies has declined compared to the levels observed at the end of the 1990s. Since 2000, sources of labour productivity growth (...) have crept beyond ICT production". Moreover, the new technology argument cannot explain the decline in European countries and Japan, almost all of which have significantly increased their investments in ICT (an additional fixed investment of 4% on average between 1995 and 2000).

Changes in the employment component of growth appear to be a crucial factor behind the divergences. The situation in the United States between 2001 and 2007 is one of renewed growth "without job creation", at least in comparison with what had been observed following previous recessions.

All things being equal, an increase in the employment rate or working hours is associated with a higher per capita income. However, as the proportion of people employed goes up, there is a corresponding increase in the proportion of less efficient or less qualified people employed, which tends to put a brake on productivity gains. Likewise, it may be reasonable to believe that an increase in working hours reduces the efficiency of each hour worked. This relationship was tested in particular by Bourlès and Cette (2007)[6] and the principal results[7], estimated for a sample of 14 countries, are outlined below:

- a 1% rise in the level of employment reduces hourly labour productivity by 0.43%;
- a 1% increase in the amount of working time is reflected in a 0.42% decline in productivity;
- a 1% increase in the share of ICTs in production increases hourly productivity by 0.51%.

4. *Productivity Brief*, January 2009.
5. D.W. Jorgenson, M. S. Ho & K. J. Stiroh (2008), "A Retrospective Look at the US. Productivity Growth Resurgence", *Journal of Economic Perspectives*, vol. 22.
6. R. Bourles & G. Cette (2007), "Trends in Structural Productivity Levels in the Major Industrialized Countries", *Economics Letters*, vol. 95(1), pp. 151-156.
7. Interpretation of these results must nonetheless take into account the fact that the effect is measured in the short term, since it is assumed that the capital stock remains constant, whereas in the long term the latter may adapt to the new situation and, consequently, the effect on productivity may become less marked. H. Boulhol & L. Turner (2009), "Employment–Productivity Trade-off and Labour Composition", OECD Economics Department Working Papers, No. 698.

Table 3 – Changes in growth rates between 1985-1995 and 1995-2006

	Employment rate	Average work time per employee
Spain	1.49	0.21
Italy	0.74	0.03
Netherlands	-0.70	0.79
Belgium	0.04	0.07
Danmark	0.11	1.20
France	0.36	-0.05
Norway	0.21	0.22
Japan	-0.11	0.40
Germany	-0.08	
Finland	1.68	-0.05
UK	0.01	-0.52
Ireland	0.95	-0.75
Canada	0.23	-0.19
New Zealand	0.67	-0.35
Australia	-0.04	-0.33
US	-0.45	-0.31
Sweden	0.86	-0.76

Scope: reporting OECD countries.
Source: OECD and author's figures.

Data for OECD countries can be used to assess the role of the intensification of work in growth by comparing the period 1985-1995 to the next period (see table 3).

Generally speaking, employment rates have tended to increase in all OECD countries since 1985. This trend became more marked after 1995. In France, for example, the growth in employment accelerated by 0.36% after 1995 compared with the previous decade. There are three exceptions to this: on the one hand, Japan, and on the other, the United States and the Netherlands. The effects of the major banking and economic crises in Japan weighed heavily there for fifteen years, undermining growth and contributing to high levels of unemployment in a country that had previously suffered very little. In order to limit this increase in unemployment, companies slashed annual working hours per employee at the start of the 1990s, and to a lesser extent thereafter. The United States showed a reduction in employment growth (0.45%) together with a reduction in annual working time (0.31%). The Netherlands had experienced a very significant increase in its employment rate during the period 1985-1995, associated with the rapid growth in the number of women employed on a part time basis, encouraged by labour market reforms; this effect disappeared during the subsequent period.

Individual annual working times tend to fall almost everywhere, the reduction becoming more marked with rising levels of part-time work. In fact, only Australia, the United Kingdom and the United States experience productivity gains due to a reduction in the intensity of the employment component in their growth.

Conclusion

Macro-economic analysis clearly highlights the widening of the gaps between the United States and other developed countries. The years 1995-2008 saw a very marked reduction (-3%) in mass unemployment in Euro zone countries. Simultaneously, employment levels rose by between 6 and 7%, thanks in particular to the considerable development of part-time female employment. Labour productivity growth thus slowed significantly in the Euro zone. In the United States, the growth in employment levels fell, unemployment levels remained low (around 5%) while labour productivity growth returned to its previous highest levels. The gap between the two zones has now reached 11.6%, *i.e.*, 0.6% annually on average.

It appears likely that the current crisis is set to accentuate the differences further still. Unemployment has jumped far more sharply in the United States than it has done in Europe, helping to keep productivity levels there high in 2009, in contrast to what is happening in the Euro zone.

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