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# Title: The US as a benchmark for EU15 productivity: lessons? [1]

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## Abstract:

Measured productivity growth rates have picked up in the US since 1995 while slowing down in EU15 as a whole, leading to some concerns about the effectiveness of EU innovation and growth policies. This paper argues that the underlying productivity performance in the EU is substantially better than its reputation: Once corrections are made for differences in statistical methods, industrial composition, the absolute and relative improvement of EU15 labour market performance, as well as other factors, it is uncertain whether the US in this period has indeed been better at improving the efficient use of production factors. This is not to say that benchmarking is unproductive as a source for improving policy making: but to be useful it needs to be very careful – and more gains may be had from studying performance in specific sectors than from comparing country averages. In so doing, benchmark analyses need to take a hard look at data quality and be cautious in equating differences in (growth in) productivity with differences in (growth in) welfare.

[1] The views expressed in the working paper are those of the author, not necessarily the Ministry of Finance.

## US and EU15: Trends in relative per capita income and productivity

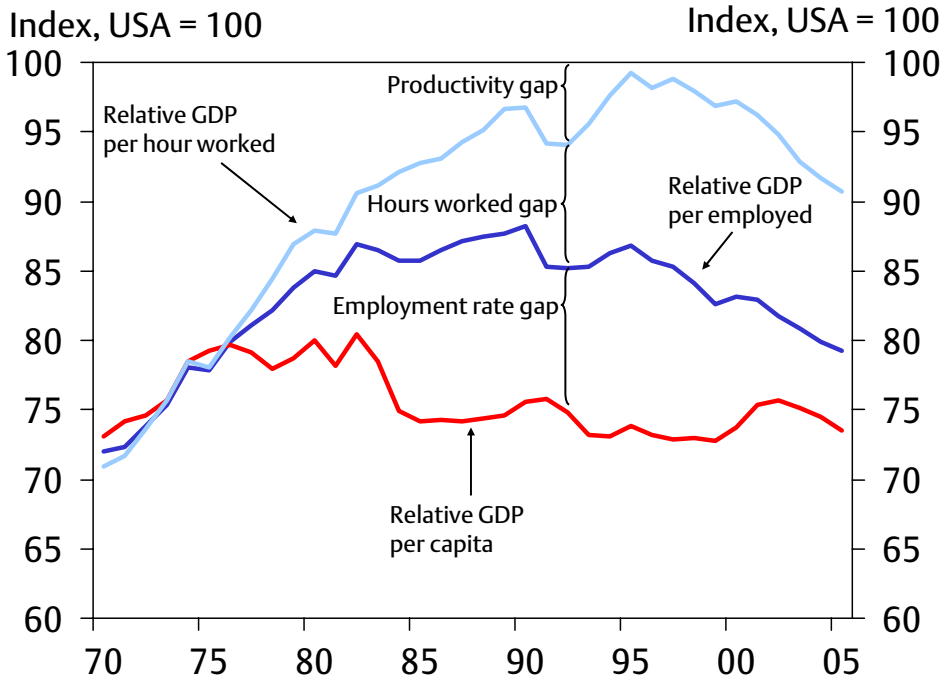
From 1970 to 1995, EU15-countries were, on average, still catching up with the US in terms of productivity (*relative GDP per hour worked*), reflecting a traditional catching-up process with EU15 being able to import technology from the world leader, cf. *figure 1*. The *productivity gap* narrowed from nearly 30 per cent in 1970 to close to zero in 1995.

From 1970 to about 1975, this was also reflected in a correspondingly narrower gap in *GDP per capita*, which was reduced from just over 30 per cent in 1970 to 20 per cent five years later. The other two components of GDP – *employment rates* (share of working age population in employment) and *working hours* (hours worked per employed) – started off at the same levels in EU15 and the US, and experienced broadly similar trends in this period.

Between 1975 and 1995, however, the gap in GDP per capita widened somewhat despite continuing productivity convergence. This reflected widening gaps in both working hours and employment rates.

**Figure 1**

**EU-US = Gaps of productivity, employment and hours worked**



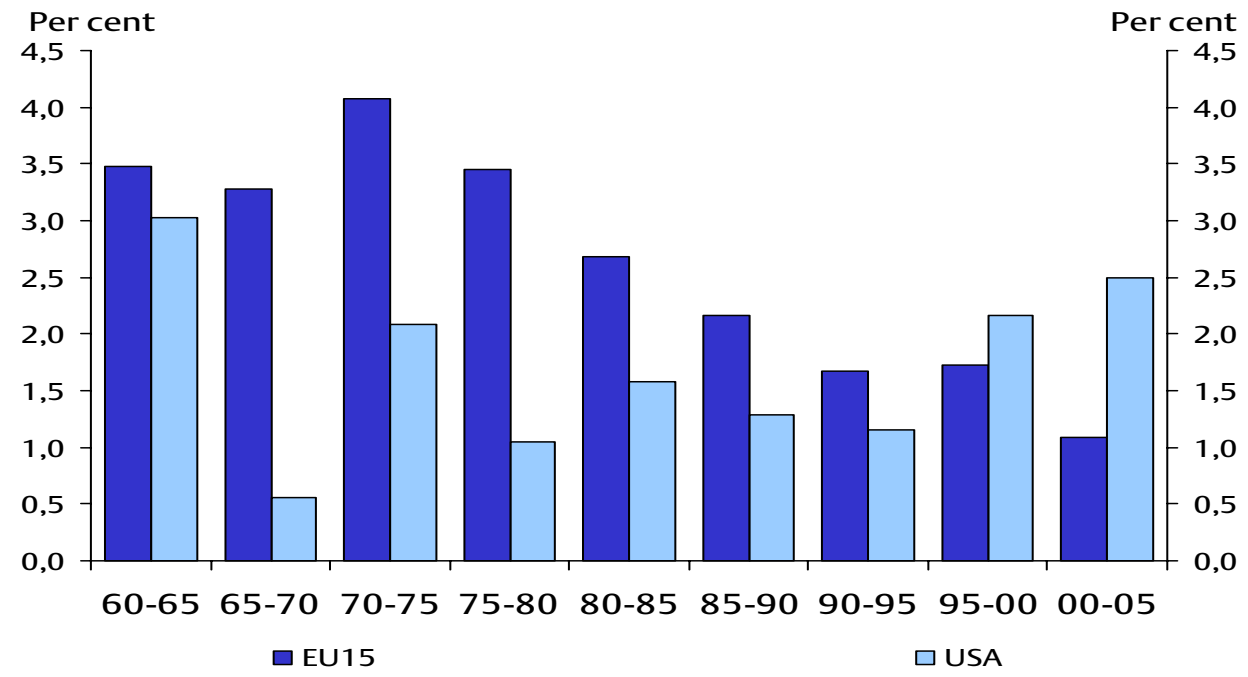

1) Per capita in the working age population (15-64).
Source: Ameco, Groningen Growth and Development Centre and the Conference Board, Total Economy Database, September 2006, http://www.ggdc.net and own calculations.

From 1995 to 2005, the productivity gap started to increase after having fallen steadily since 1960. This reflected both a declining trend in productivity growth in the EU15, and faster growth in US productivity relative to the low growth rates recorded in the early 1990s, *cf. figure 2.*

Nonetheless, relative GDP per capita was broadly unchanged from 1995 to 2005. As detailed in *table 1,* employment rates grew significantly more in the EU15 than in the US, contributing nearly 10 percentage points to relative GDP per capita – on average almost 1 per cent per year. Meanwhile, changes in the relative level of hours work per employee played only a marginal role, *cf. table 1.*

**Figure 2**

**Annual productivity growth 1960-2005**




Note: From 1960-1970 productivity is measured as GDP per employed, from 1970 onwards it is measured as hourly productivity.
Source: Groningen Growth and Development Centre, 60-Industry Database, September 2006, http://www.ggdc.net/, own calculations

Hence, the gap in EU15 per capita GDP remained largely unchanged from 1995 to 2005 at just below 30 per cent. The productivity gap explains roughly 1/3 of this gap with shorter working hours and lower employment rates accounting for the remaining difference.

**Table 1**

**Relative performance in the US and EU15, 1995-2005 – decomposition of levels and changes**

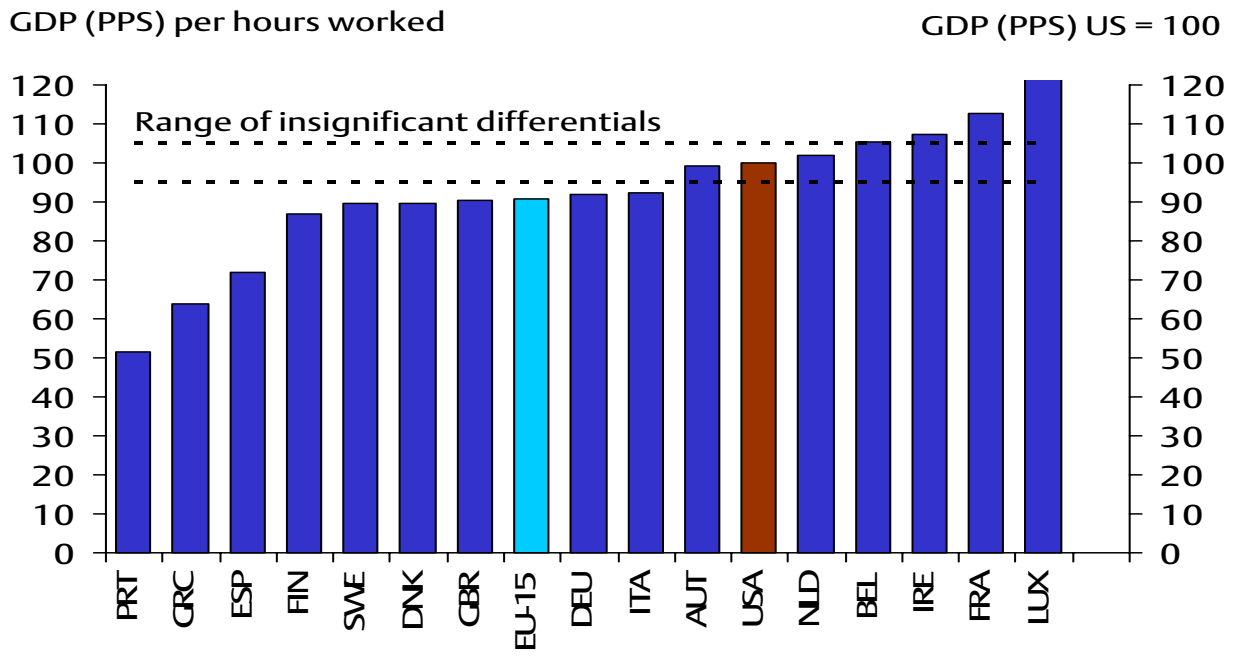
| | Excess growth in the US, in per cent | | Level of gap 2005, in per cent |
|---|---|---|---|
| | Whole period | Average pr year | |
| GDP per capita | 1,5 | 0,1 | 26,2 |
| Of which coming from | | | |
| - Employment rates | -9,0 | -0,8 | 5,7 |
| - Hours worked pr employed | 1,6 | 0,1 | 11,5 |
| - Output per hour | 8,9 | 0,7 | 9,3 |

Source: Groningen Growth and Development Centre and the Conference Board, Total Economy Database, September 2006, http://www.ggdc.net, AMECO and own calculation.

For roughly half of the EU15-countries, there is virtually no productivity gap relative to the US. Due to measurement problems, such a gap should exceed 5 per cent to be statistically significant.[2] Three EU15 countries have productivity levels that are at least 5 percent higher than the US (FR, B and LUX) while another four fall within the range of insignificant differentials *cf. figure 3*. The lower average productivity for EU15 as a whole in 2005 is quite heavily influenced by Portugal, Greece and Spain. These three countries account for 13 per cent of employment in EU15, and all have productivity levels that are less than 75 per cent of the US.

**Figure 3**

**EU15 vs. USA relative productivity levels, 2005**




Notes: Dotted lines represent +/- 5 per cent of USA level.
Source: Groningen Growth and Development Centre and the Conference Board, Total Economy Database, September 2006, http://www.ggdc.net.

[2] OECD (1999).

## Factors explaining the apparent lower growth of productivity

A number of factors suggest that the underlying relative productivity performance of the EU15 may in fact have been as good as in the US in the period 1995 - 2005 as a whole.

*Statistical uncertainty and bias*

In addition to general statistical uncertainty[3], there are some well-identified specific differences in statistical conventions that as a whole tend to inflate growth in the US relative to EU15. They include more use of hedonic pricing for IT-products, i.e. larger statistical upward adjustments in quality/performance and hence for any given nominal value of production, a larger estimate of the volume of production and a lower level of prices. US conventions have also tended to count a larger share of growing software purchases as investments rather than intermediate inputs to the production. This is only partially offset by different weights used for calculation of aggregate GDP which tend to reduce the relative growth rate in the US. There are partial studies showing that the net effects from these three factors could have increased the measured US GDP growth rate vis-à-vis the EU15 on the order of ¼ percentage point on an annual basis in the late 1990s[4].

*Industrial composition and terms-of-trade effects*

The larger increase in US productivity in the period 1995-2000 was essentially due to higher contributions to productivity from a relatively small part of the whole economy, accounting for less than 20 per cent of total value-added: IT-manufacturing, retail and wholesale distribution plus financial services *cf. table 2.* Had the US industrial structure in terms of value-added prevailed in EU15, total annual productivity growth would have been essentially the same as in the U.S. (last column of table 2).

The higher overall contribution to productivity growth from semiconductors and office machinery – accounting by itself for half of the difference in the measured growth rate of productivity in the period 1995-2000 of a ½ percentage point – is due to their larger share of total economy value-added combined with the large increases in productivity these sectors continue to experience world-wide. These two industries account for 1¼ per cent of total value-added in the US against less than ½ per cent in EU15. Adjusting only for these two sectors, the difference in overall productivity performance would fall to roughly ¼ per cent.

[3] As a rule, the differential in annual productivity growth should exceed ½ percentage point to move outside the area of statistical uncertainty, cf. Ark (2004). When comparing annual average growth rates over several years, the statistical uncertainty is likely smaller, unless related to systematic differences in statistical methods that bias comparisons over time. US productivity growth relative to EU15 was just above ½ percentage point higher per year for the period as a whole.

[4] These issues are explored and partly quantified in OECD (2002) and OECD (2003).

**Table 2**

**The importance of industrial structure for relative overall performance of productivity, USA and EU15, 1995-2000**

| | Share of value-added in percent (1) | | Average growth of prodictivity (2) | | Contribution to annual productivity growth | | | Difference in contribution to productivity growth in EU15 | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | US structure of value-added | | US structure of value-added |
| | US | EU15 | US | EU15 | US | EU15 | EU15 | | |
| Office machinery | 0,3 | 0,2 | 95,6 | 72,7 | 0,27 | 0,14 | 0,20 | -0,12 | -0,06 |
| Electrical valves & tubes | 0,8 | 0,2 | 40,1 | 76,9 | 0,34 | 0,14 | 0,65 | -0,20 | 0,31 |
| Retail and wholesale | 10,0 | 8,2 | 6,0 | 2,2 | 0,61 | 0,18 | 0,22 | -0,43 | -0,39 |
| Finansial services | 5,4 | 4,6 | 5,9 | 3,9 | 0,32 | 0,18 | 0,21 | -0,14 | -0,11 |
| Other services | 67,0 | 67,2 | 0,9 | 1,1 | 0,59 | 0,72 | 0,71 | 0,12 | 0,12 |
| Other manufacturing | 16,4 | 19,7 | 1,8 | 2,5 | 0,30 | 0,50 | 0,42 | 0,20 | 0,12 |
| Total | 100,0 | 100,0 | | | 2,43 | 1,86 | 2,41 | -0,57 | -0,00 |

Note: Calculated as Share of value-added (1) and multiplied by growth of productivity (2). 1997 used as weight for sector composition.

Source: Groningen Growth and Development Centre, 60-Industry Database, September 2006, http://www.ggdc.net and own calculations.

Since 2000, the impact of differences in sector composition has been more neutral and has not significantly influenced the total relative productivity performance, *cf. table 3.*

**Table 3**

**The importance of industrial structure for relative overall performance of productivity, USA and EU15, 2000-2003**

| | Share of value-added in percent (1) | | Average growth of prodictivity (2) | | Contribution to annual productivity growth | | | Difference in contribution to productivity growth in EU15 | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | US structure of value-added | | US structure of value-added |
| | US | EU15 | US | EU15 | US | EU15 | EU15 | | |
| Office machinery | 0,2 | 0,1 | 87,0 | 107,5 | 0,16 | 0,15 | 0,20 | -0,01 | 0,04 |
| Electrical valves & tubes | 0,5 | 0,2 | 27,3 | 17,0 | 0,14 | 0,03 | 0,09 | -0,11 | -0,05 |
| Retail and wholesale | 9,9 | 8,2 | 4,1 | 1,5 | 0,40 | 0,13 | 0,15 | -0,27 | -0,25 |
| Finansial services | 6,1 | 4,5 | 4,7 | 0,6 | 0,29 | 0,03 | 0,04 | -0,26 | -0,25 |
| Other services | 68,8 | 68,5 | 1,8 | 0,9 | 1,26 | 0,63 | 0,63 | -0,64 | -0,64 |
| Other manufacturing | 14,6 | 18,5 | 4,2 | 1,6 | 0,61 | 0,30 | 0,24 | -0,31 | -0,38 |
| Total | 100,0 | 100,0 | | | 2,87 | 1,27 | 1,35 | -1,61 | -1,52 |

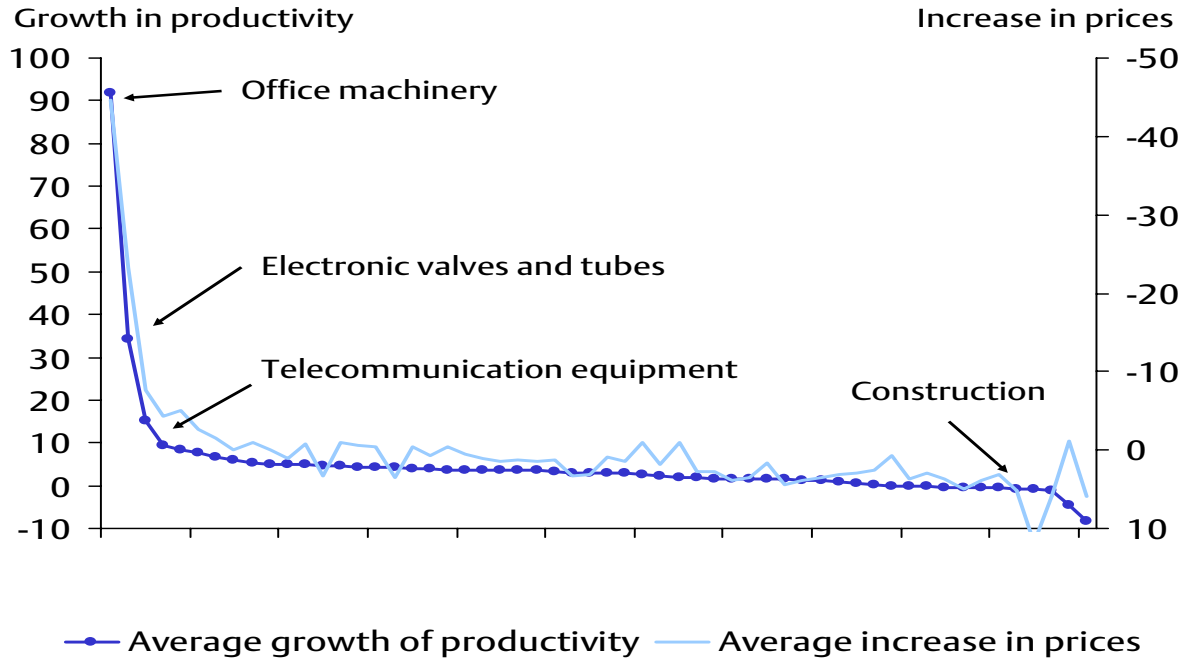
Note: Calculated as Share of value-added (1) and multiplied by growth of productivity (2). 2001 used as weight for sector composition.
Source: Groningen Growth and Development Centre, 60-Industry Database, September 2006, http://www.ggdc.net and own calculations.

The overrepresentation in the two above-mentioned industries with a world-wide structural capacity to engineer huge improvements in productivity is not necessarily an advantage for the US as those sectors continuously face losses in terms-of-trade. An industry with a generic advantage in terms of being able to generate higher yearly productivity increases will tend to see correspondingly lower increases in sales prices if competition ensures that margins and profitability are kept at competitive-market levels.

This general fact is well born out by the experience of the US industries in the period 1995-2003. Industries with low structural levels of productivity growth such as construction have been able to keep the highest level of increases in sales prices while IT-manufacturing, including telecommunications, have consistently faced double-digit annual falls in sales prices, nearly 40 per cent for semiconductors (valves and tubes), *cf. figure 4.* The dramatic fall in prices is a key factor in the declining share of these two sectors in total value-added in the US over the last 10 years as evidenced by table 2 and 3.

**Figure 4**

**Higher productivity growth means smaller increase in sales prices**




Note: Data from 60 US industries average yearly increase in the period 1995-2003
Source: Groningen Growth and Development Centre, 60-Industry Database, September 2006, http://www.ggdc.net/, own calculations.

The structural worsening of the terms-of-trade for industries with high structural increases in productivity tends correspondingly to be translated into structural terms-of-trade losses for *countries* with overrepresentation of such sectors selling goods and services in sharp international competition. Worsening terms-of-trade implies that a country need to sell still more domestically produced goods and services to buy a given basket of import goods and services. So if country A specialises in producing blue cheese and country B in semiconductors, the evidence is that country B will have to produce ever more semiconductors to purchase the same amount of blue cheese from country A. At the global level, Singapore and Malaysia with very large shares of IT manufacturing are perhaps the clearest examples of countries with large increases in productivity emanating from this sector while also facing substantial ongoing worsening of terms-of-trade[5].

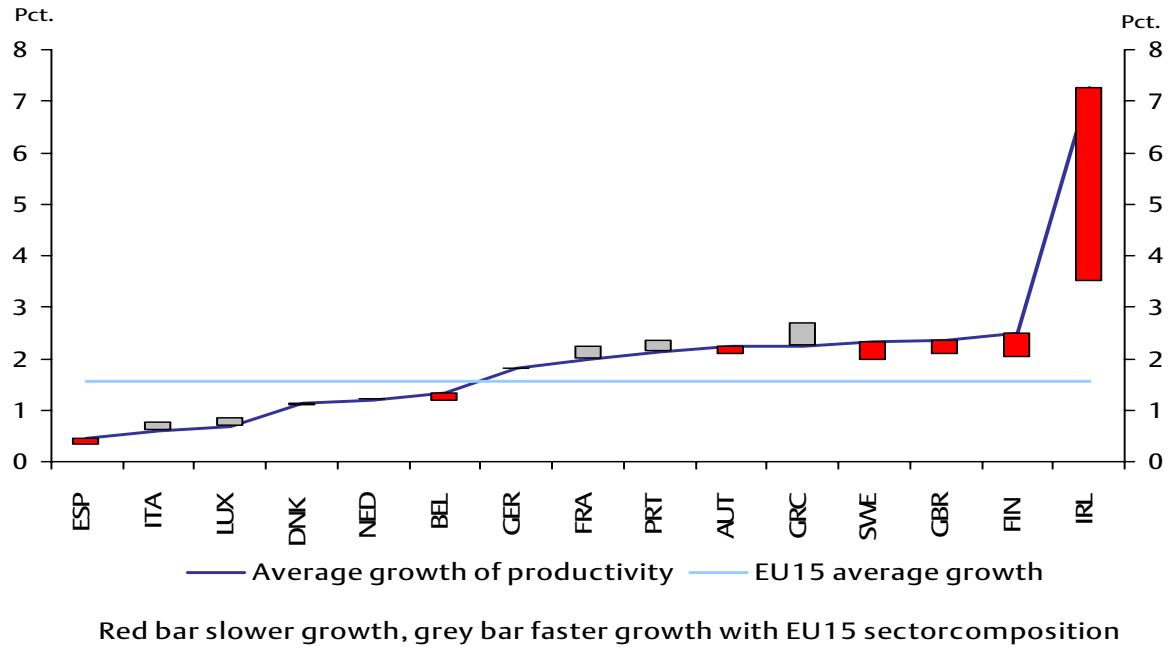
Within the EU, Ireland is another example of this structural link between ICT driven productivity growth and continuously worsening terms of trade. If Ireland had the same sector composition as the rest of the EU15 – while still maintaining its national growth rates of productivity in each industry – its total annual productivity growth over the period 1995-2003 would be reduced from over 8 per cent to 3½ per cent – still impressive by EU standards, but less astounding *cf. figure 5 and box 1*. At the same

[5] Bayomi and Haacker (2002) conclude in a cross-country study (32 countries) that the high productivity increases in IT-manufacturing essentially benefit the users and not the firms or countries producing these goods and services. The apparent benefits are larger for the US than for most EU15-countries, but that is mainly because the U.S. spends more on IT. A survey study by Nahuirs and Geurts (2004) concludes – though with considerable uncertainty – that a marginal increase in one country's level of productivity of 1 per cent will imply a worsening of the terms of trade – export prices divided by import prices – by more than ½ per cent in the medium term and close to 1 per cent in the long term, which may also, at least partially, reflect such compositional factors.

time, its terms-of-trade has fallen vis-à-vis countries such as Spain and Italy characterised by industrial structures that are more neutral in terms of their influence on average productivity rates, see also box 1.

**Figure 5**

**Average annual productivity growth rates and contributions from differences in sector composition relative to the average sector composition of the EU-15 average, 1995-2003**




Source: Groningen Growth and Development Centre, 60-Industry Database, September 2006, http://www.ggdc.net.

**Box 1 Ireland: the importance of ICT for the performance of productivity and terms of trade**

The two top industries in terms of productivity performance at a global level, namely office machinery and electronic valves and tubes, account for 3 per cent of value-added in Ireland, far above US levels, *cf. table 3.* The two sectors alone contributed more than 5 percentage points to Ireland's total average annual productivity growth in the period 1995-2003. With the same sector compositions as the rest of EU15, the contribution would have been less than 1 per cent.

**Table 3**

**Contribution to annual increase in labour productivity in selected sectors and decomposed, 1995-2003**

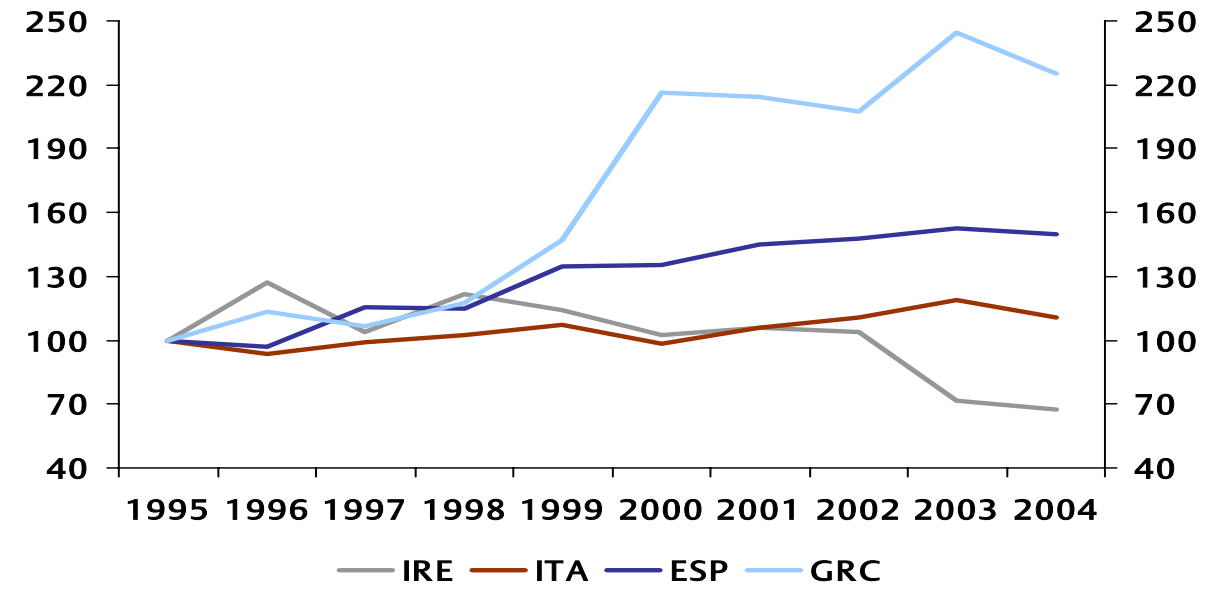
| | Ireland | | EU |
|---|---|---|---|
| | Irish sector composition | EU sector composition | |
| Chemicals | 2,16 | 0,39 | 0,11 |
| Office machinery | 1,90 | 0,15 | 0,15 |
| Electronic valves and tubes | 1,07 | 0,14 | 0,09 |
| Annual increase from the 3 sectors | 5,13 | 0,69 | 0,35 |
| Increase from rest of economy | 2,77 | 2,87 | 1,27 |
| Total labour prod. increase | 7,90 | 3,55 | 1,62 |
| 3 sectors' contribution to total increase | 64,9% | 19,4% | 21,6% |

Source: The Conference Board and Groningen Growth and Development Centre, Total Economy Database, May 2006, http://www.ggdc.net, Groningen Growth and Development Centre, 60-Industry Database, , own calculations.

The large share of high productivity sectors with structural falls in output prices is likely to be a main factor in the worsening of terms of trade in manufacturing in Ireland over the same period *cf. figure 6.*

**Figure 6**

**Export price relative to import price, manufacturing**




Source: sourceoecd, ITCS statistics.

*Retail trade and wholesale*
In retail and wholesale, the US productivity performance as measured in national accounts has been far superior to EU15 and provides, in conjunction with the contribution from IT-manufacturing, the statistical explanation for the overall higher productivity growth in the period 1995-2005.

While this reflects real relative improvements, substantial notes of caution are warranted. On purely statistical measurement grounds, the better US record in recent years in wholesale seems to disappear if national accounts data are replaced by data better able to take into account different pricing methods in the US.

Alternative measurements of productivity growth in retailing still give the US an edge, albeit of a smaller magnitude[6], but there is strong evidence that the higher measured growth of productivity in the US largely reflects replacement of sales outlets within the same firms to larger outlets[7]. The evidence that US firms have been able to exploit IT better to reduce costs, not least inventory costs, is also arguably closely linked to the different size distribution of outlets[8] in the US with the average outlet being 2-3 times larger than in the EU.

However, both the measured higher *level* of productivity as well as the higher *growth* of productivity in US retailing exaggerate the welfare gains associated with the US distribution model. To caricaturise: what is the welfare level for an US consumer living in urban sprawl with large distances to shopping centres relative to European consumers who to a larger extent can shop closer to their place of residence (combined with shorter commuting distances)?[9]

It is not the same product that is being sold, and hence price and productivity measurements can be more misleading than useful.

Moreover, the slower building up of large shopping centres within and outside city centres in Europe is also due to, at least partially, legitimate social choices reflected in specific restrictions/obstacles that render this building up of large shopping centres more costly or outright impossible[10].

While such regulatory barriers may not always exemplify the best possible solution to trade-offs between conflicting policy objectives, it does imply that relative welfare levels and gains cannot simply be equated with differences and changes in "production" costs in the retail sector.

*The effect of labour market reforms and less (relative) capital per hour*
The slightly weaker overall productivity performance has also been the statistical effect of the substantially higher increases in employment rates in the EU15. Employment rates – the share of the working age population in employment – increased by roughly 5-6 percentage points from 1995 to 2005 while

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6 Timmer (2005). Based partly on the same study, Blanchard (2004) also plays down the significance of the difference of productivity growth in the retail sector.

7 Foster et al. (2002) conclude that within-firm closing down and opening up of new outlets account for the bulk of improvements of productivity for the retail sectors as a whole, while the Conference Board (2005) concludes that pharmacies/drugstores have seen massive reductions in market shares of sales units with few employees within the context of significant increase in the market shares of the largest firms.

8 Conference Board (2005) presents estimates from Mintel Retail Intelligence that suggest that the average number of employees per outlet in the US is around 14 while it is well below 10 in all EU15-countries but UK and typically around 2-6.

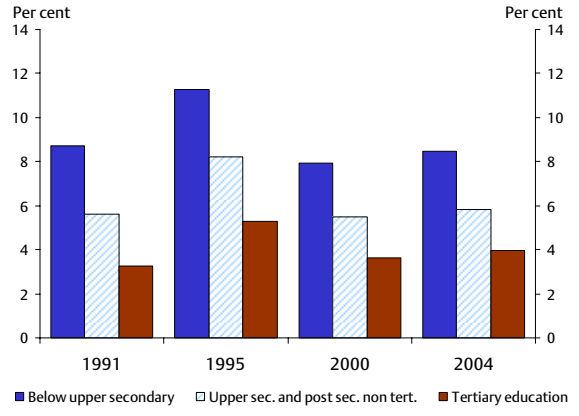
9 The importance of choice of life styles, the availability of "cheap" land to build Wal-Marts and land regulation takes a central place in explaining differences in productivity in the retail sector between US and EU in Gordon(2004b)

10 There is a large literature that suggests that in particular (restrictions on) land use policies have had and have a major impact on the structure of the retail industry, one example being McKinsey (2002).

remaining almost unchanged in the US. To the extent that this reflects the inclusion of alternatively non-employed persons with less than average productive capacity, it has reduced the average production per employed. A number of European labour market reforms did explicitly target such inclusion, e.g. by lowering employer's social security contribution for low paid workers and easing employment protection legislation for example by allowing more temporary work contracts[11]. Looking at outcomes, this has been translated into low-skilled workers having enjoyed relatively large gains in employment rates and the largest (absolute) reductions in unemployment rates since the mid 1990s, fully offsetting losses from the early to mid-1990s, *cf. figures 7a and b.*

**Figure 7a**

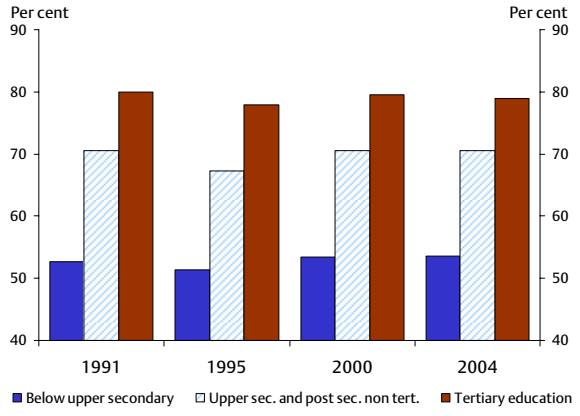
**EU19 – Unemployment rates by educational attainment (pop. aged 25-64)**




Source: OECD Education at a glance 2006.

**Figure 7b**

**EU-19 – Employment rates by educational attainment (pop. aged 25-64)**




Source: OECD Education at a glance 2006.

This should be seen as a welfare gain. Relative productivity for normal/higher skilled workers in the EU15 may well have kept pace with their equivalents in the US, while low skilled persons experienced higher net incomes. Tax payers as a whole benefited from a larger tax base and hence, on the margin, increased room for tax cuts/less need to raise tax rates.

The pattern of bilateral productivity performances vis-à-vis the US for the EU15 countries seems to confirm this line of reasoning. For a very large group of the EU15 countries with comparable levels of GDP per hour, the differential was largely within the above-mentioned range of statistical insignificance (+/- ½ percentage point) *cf. figure 8.* Those with highest relative growth rates tended to be countries with initially relative low *levels* of productivity (catching-up) and/or smaller increases in employment rates vis-à-vis US.

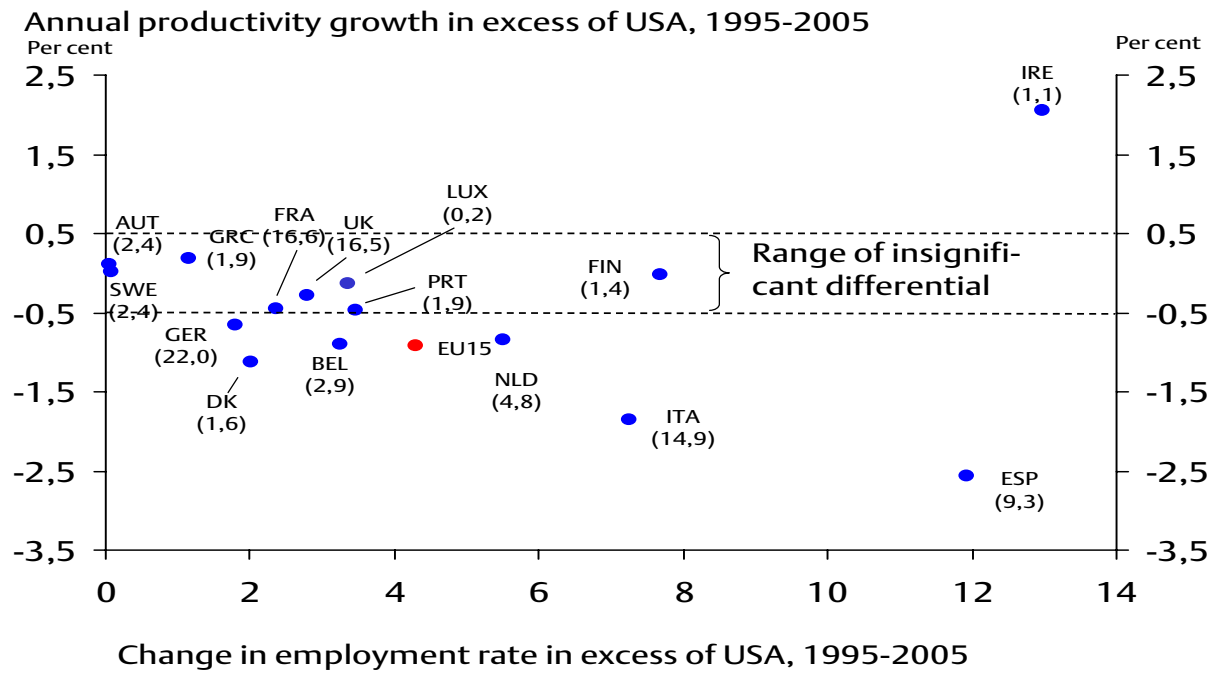
Furthermore, the entire measured differential in productivity growth can be explained statistically by Italy, the Netherlands and Spain. Together they account for 25 per cent of the EU15 labour force and they experienced particularly high growth of employment rates and at the same time the lowest increases of productivity. Measured as opposed to underlying productivity growth was also adversely affected during the latter part of this period by the integration of formerly illegal immigrant workers into GDP and labour force estimates in national accounts[12]

[11] For a formal analysis of the effects in France, see Cette (2005b).

[12] See for example Banca D'Italia (2005) box on page 38 and Banco de Espana (2005), box on page 48. In national accounts, activity undertaken by illegal immigrants tended to by better covered than their actual jobs, thus inflating overall

**Figure 8**

**EU15 vs. USA productivity and labour market participation**




Notes: The productivity measure for employed is output per hour worked. Numbers in parenthesis refer to the given country's share of total EU15 GDP. The employment rate is share of persons aged 15-64 in employment.

Source: AMECO, GGDC Total Economy Database, September 2006, http://www.ggdc.net.

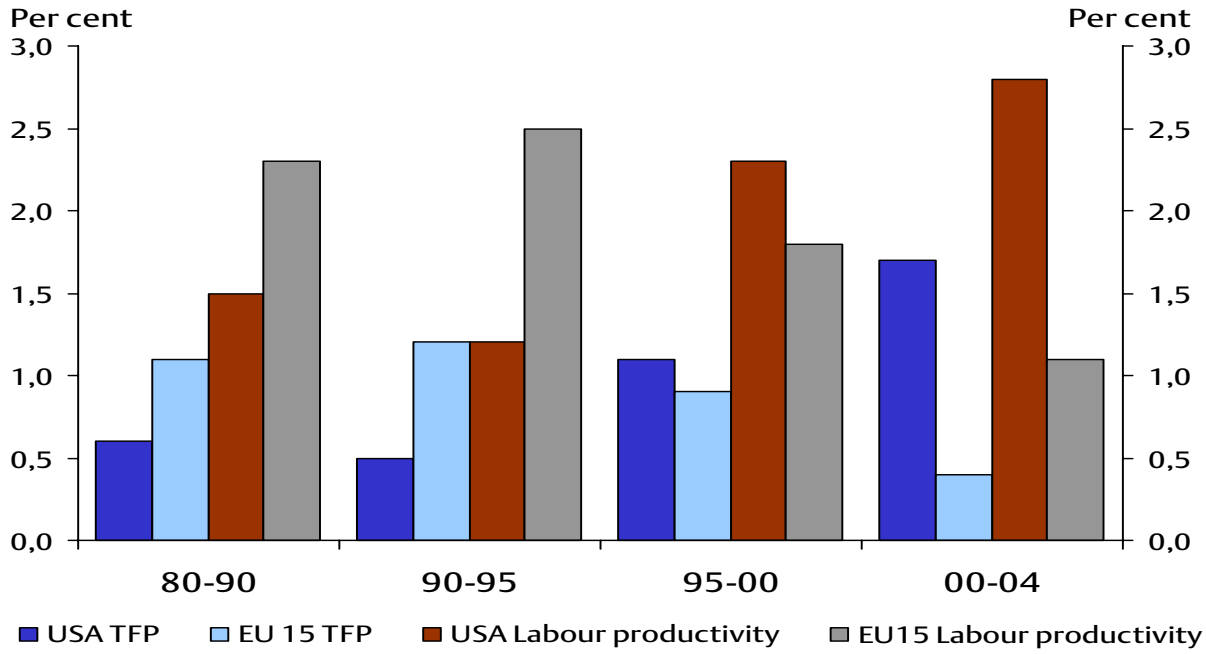
The relatively lower growth of labour productivity could also be affected by "capital thinning". The large increase in employment rates in the EU was not accompanied by increases in investment sufficient to prevent the capital-to-labour ratio of the EU from falling relative to the US[13]. Over the period 1980-2000, total factor productivity (TFP) growth – where labour productivity is adjusted for an assumed return on capital – was broadly unchanged around 1 per cent in EU, falling to just under ½ per cent per year in the period 2000-2004 *cf. figure 9*. The recent slow-down in EU TFP growth is less pronounced than the slowdown in EU labour productivity. Moreover, the differences in TFP growth between the EU and the US are smaller than differences in the unadjusted labour productivity.

productivity levels. Thus "naturalisation" has tended to boost number of registered jobs more than activity, reducing measured productivity growth.

[13] See for example IMF (2004).

**Figure 9**

**Labour productivity and TFP growth, 1980-2004**




Notes: Figure displays annual growth in productivity.
Source: Marcel P. Timmer, Gerard Ypma and Bart van Ark (2003), IT in the European Union: Driving Productivity Divergence?GGDC Research Memorandum GD-67 (October 2003), University of Groningen, Appendix Tables, updated June 2005.

In part, this story cannot be disentangled from the effect of labour market reforms that tend to reduce the cost of labour in some segments of the labour market relative to capital and thus boost the relative demand for labour relative to capital at least for a period until investment catches up with employment growth[14]. However, the "capital thinning" does not capture all the effects of labour market reforms. In fact, under certain conditions a lower price of labour in one country only affects the ratio of capital to labour in the industries in which employment increases to the extent that producers face weak competition[15]. At the aggregate level country level, however, capital-to-labour ratio ratios may be affected by sector shifts for example if labour intensive industries experience stronger than average growth.

Finally, the underlying trend in TFP and labour productivity growth in EU15 in the most recent years may be more positive than figure 9 suggest. In the period 1990-1995, EU employment performance, not the least in the countries posting the huge employment rate increases over the following10 years,

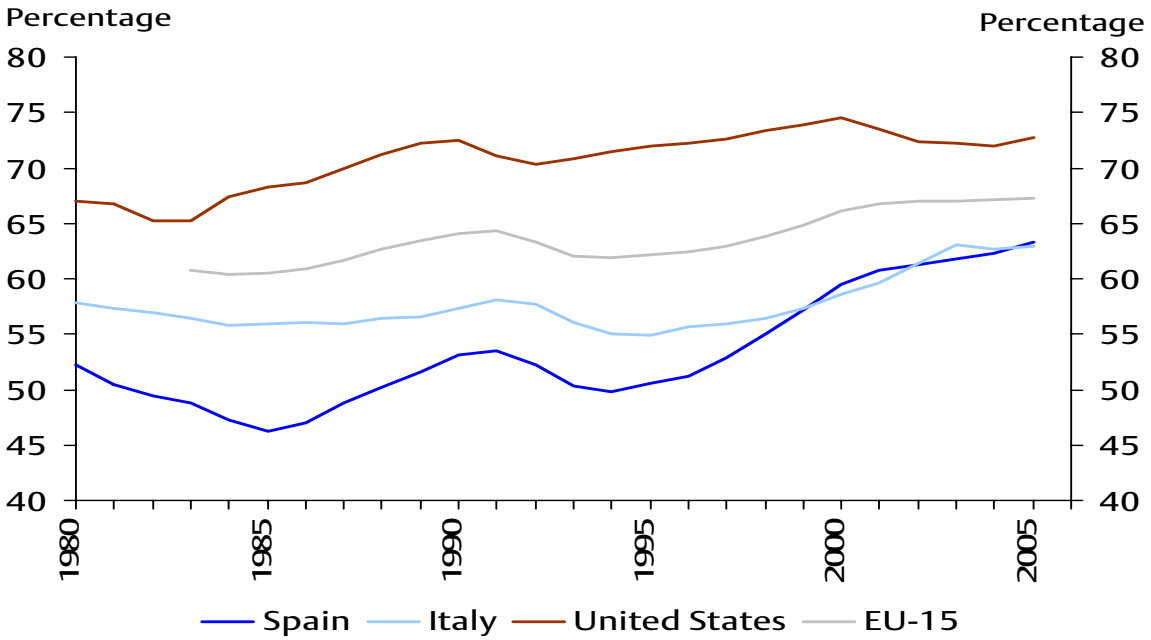
[14] Differences in investment rates are also partly related to measurement problems as already described above. Software expenditures are to a larger extent counted as investments in the US and as annual production costs in EU (OECD 2003). Using production per hour adjusted for costs of capital (total factor productivity) will tend to counteract the bias resulting from different classifications methods for investments.

[15] Essentially, the labour demand curve is a derived demand curve, which points to the importance of the conditions that employers face in product markets. To the extent that employers are price-takers , the marginal product of labour is determined exclusively by the market rate of interest adjusted for risk, the tax system and the parameters of the production function, *see Jensen et. al.* (1994). Thus, under certain conditions, a lower price of labour, which allows the firm to sell more, will lead to a parallel expansion of demand for labour and capital, keeping the capital-to labour ratio unchanged. Given that part of the expansion in employment has been for low-skilled workers often employed in highly competitive industries including pressures from emerging economies, the assumption of price-taking in product markets is relatively realistic.

was clearly inferior to the US as suggested *by figure 10*. This suggests that the higher labour productivity and TFP growth in 1990-1995 was partly due to weak labour market performance and that the subsequent falling back was due to strong employment performance.

**Figure 10. Employment rates, 1980-2005, USA, EU15, Spain and Italy**

**Employment rates, 1980-2005, USA, EU15, Spain and Italy**




Source: AMECO.

**Conclusions: using the US as a benchmark for productivity growth**

Looking at the last 10 years, value-added per man-hour has grown by roughly 1 percentage point faster per year in the U.S. than in the EU15, but it is quite uncertain to what extent that reflects better underlying performance in using production factors more efficiently:

- For the period 1995-2000, the difference was zero when adjusted for differences in sector composition.
- Differences in statistical methods have also, as a whole, tended to boost measured relative US performance in this period.
- Furthermore, for some sectors – not least the highly important retail sector – higher levels of productivity growth and levels in the US reflect both more plenty of land as well as different policy attitudes as regards allowing and providing for the big malls that have been a main factor behind strong US productivity growth in this sector.
- The substantial improvement in relative employment performance has arguably led to pricing in of lower skilled labour, leading to substantial improvements in overall welfare in EU15, but also a measured relative weakening in the average level of productivity.

- In fact, most EU15 countries have had growth in productivity rates that was within or close to the range of insignificant differences in productivity. The increased productivity gap was largely explained by three countries accounting for roughly ¼ of the total work force that posted rises in employment rates far above the EU average and, consequently, even further above the more or less unchanged US employment rate.

- The slowdown in EU15 productivity growth post-1995 must be seen in light also of the reversal in labour market performance: the overall sharp decline in employment rates from1990 to 1995 arguably boosted average productivity growth as low skilled workers were most affected while the subsequent marked improvement for this group in particular have tended to weaken average productivity as argued above.

The lesson may well be that cross-country benchmarking of productivity:

- at the macro level should be very thorough to avoid potentially misleading conclusions.

- may provide more policy lessons if focused on specific sectors and reviewing in much more detail the specific reasons, including policy-driven factors, behind the differences in productivity at the industry, branch and/or firm level.

- Data needs to be reviewed more critically in terms of quality.

- Caution is needed in equating productivity with welfare differences as well as with underlying effectiveness of policies.

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