

The logo for World KLEMS, featuring a brown oval with a blue border containing the text "WORLD KLEMS".

WORLD KLEMS

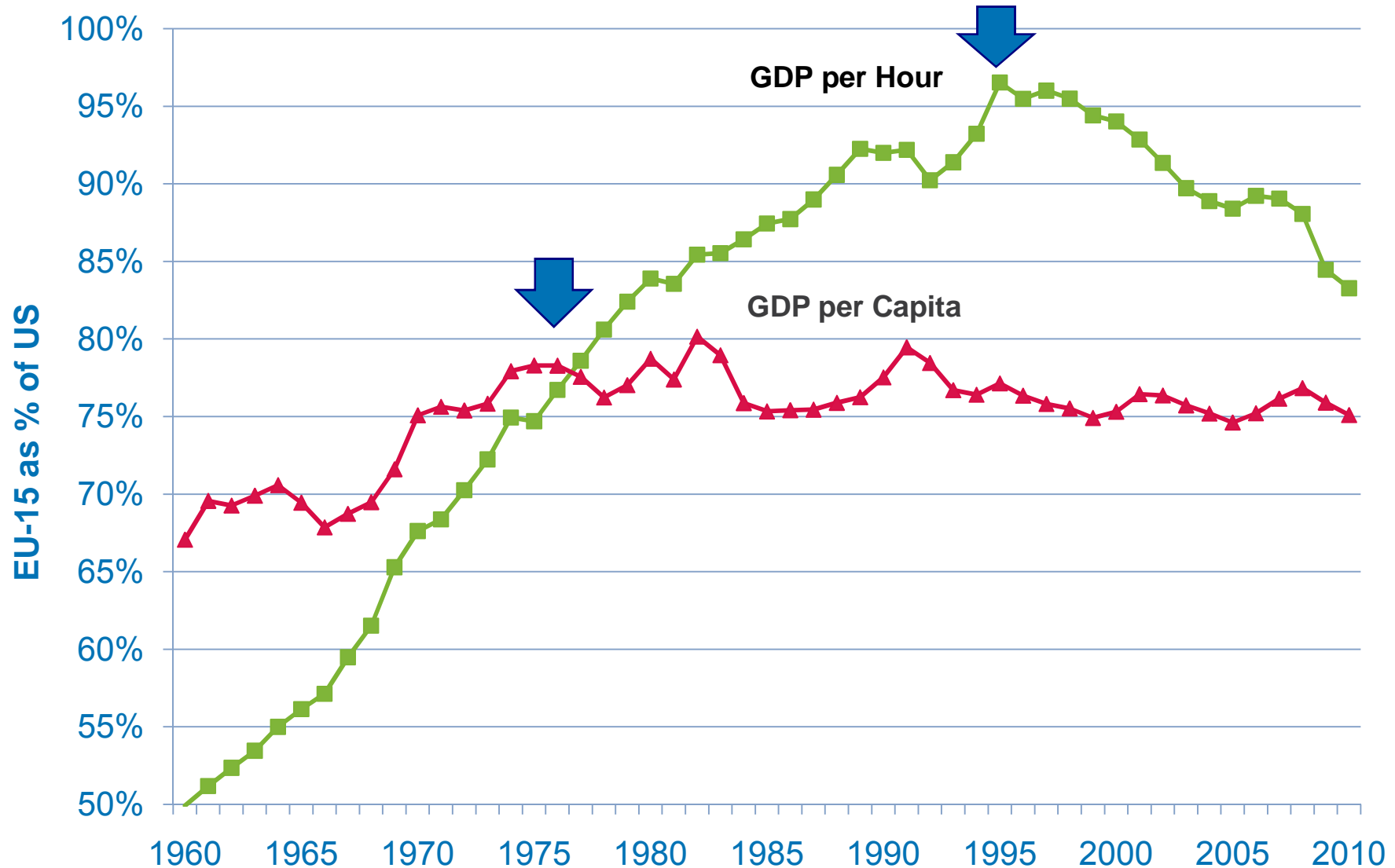
From EU KLEMS to World KLEMS: What are the Key Issues?

Bart van Ark
19 August 2010

Productivity issues pre-crisis, recovery and post-recovery

- **Productivity issues pre-crisis:**
 - Europe's productivity slowdown post-1995
 - The roles of ICT and product & labour market regulation
 - The emerging economy boom driven by capital or TFP?
- **Productivity issues during recovery (and looking backward):**
 - The breakdown of pro-cyclicality and jobless recovery
 - Productivity in the financial sector
- **Productivity issues in the near future:**
 - Productivity in non-market sectors
 - The rebalancing of sectoral growth in emerging economies
 - The role of demand and global trade (WIOD)
 - The role of intangible capital and social infrastructure

Two breakpoints in comparative post WWII performance of “old EU-15” and U.S.



Source: The Conference Board Total Economy Database, August 2010 (unpublished update)

Economic Growth in Europe

A Comparative Industry Perspective

Marcel P. Timmer
Robert Inklaar
Mary O'Mahony
Bart van Ark

CAMBRIDGE

EU KLEMS Consortium:

- *GGDC*
- *NIESR*
- *CEPII*
- *CEBR*
- *CPB*
- *DIW*
- *FPB*
- *ISAE*
- *IVIE*
- *HSE*
- *WIFO*
- *WIIW*
- *AMBER*
- *TCB*
- *FK Konstanz*
- *Uni-BHAM, PTT Helsinki*



Europe fell behind U.S. on major contributors to creation of knowledge economy

European Union and United States (annual average volume growth rates, in %), market economy

| | European Union* | | | United States** | | |
|---|-----------------|------------|------------|-----------------|------------|------------|
| | 1980-1995 | 1995-2007 | 2000-2007 | 1980-1995 | 1995-2007 | 2000-2007 |
| 1 Growth rate of market economy output | 2.1 | 2.5 | 2.0 | 3.3 | 3.5 | 2.4 |
| 2 Hours worked | -0.5 | 0.8 | 0.6 | 0.8 | 0.5 | -0.1 |
| 3 Labour productivity | 2.5 | 1.6 | 1.5 | 2.4 | 3.0 | 2.5 |
| <i>Contributions from</i> | | | | | | |
| 4 Labour composition | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 |
| 5 Capital services per hour | 1.2 | 0.9 | 0.7 | 1.4 | 1.5 | 0.9 |
| 6 ICT capital per hour | 0.4 | 0.5 | 0.4 | 0.8 | 1.0 | 0.6 |
| 7 Non-ICT capital per hour | 0.8 | 0.4 | 0.3 | 0.6 | 0.5 | 0.3 |
| 8 Multifactor productivity | 1.1 | 0.6 | 0.6 | 0.8 | 1.2 | 1.4 |
| Contribution of the knowledge economy to labor productivity (4)+(6)+(8) | 1.8 | 1.3 | 1.1 | 1.8 | 2.5 | 2.2 |

* excludes 5 member states of EU-15: Greece, Ireland, Luxembourg, Portugal and Sweden;

** based on USA old standard industrial classification;

Source: EU KLEMS database (Timmer, O'Mahony and van Ark, 2007, updated)

Multifactor productivity growth differentials in market services accounted for major differences in growth

Major sector and factor input contributions to market economy labour productivity growth, 1995-2007
in percentage points

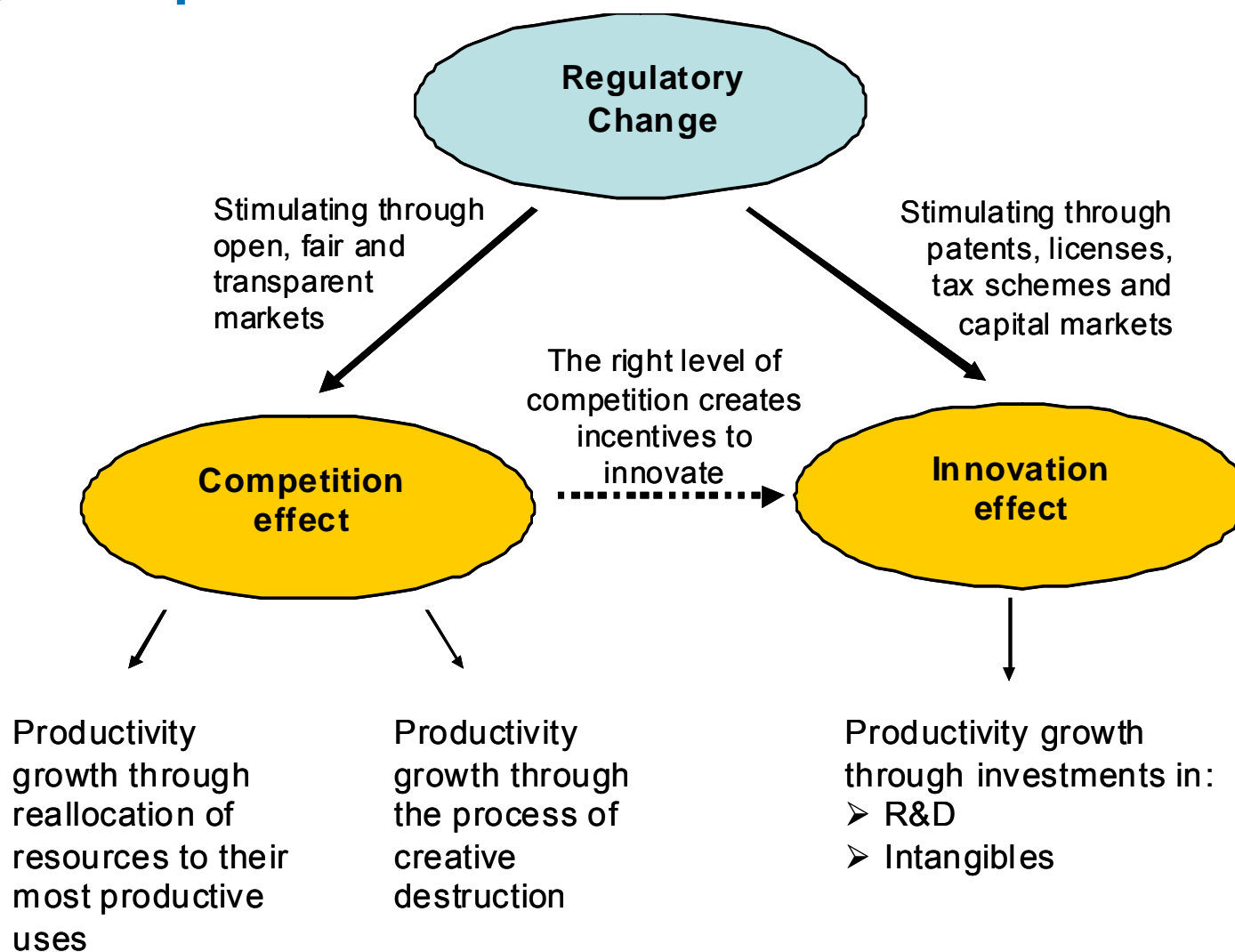
| | European Union* | | | United States** | | |
|---|-----------------|-----------|-----------|-----------------|-----------|-----------|
| | 1980-1995 | 1995-2007 | 2000-2007 | 1980-1995 | 1995-2007 | 2000-2007 |
| Market services labor productivity | 1.4 | 1.2 | 1.0 | 1.6 | 3.0 | 2.7 |
| <i>Distribution services contribution</i> | 1.1 | 0.7 | 0.6 | 1.2 | 1.3 | 0.9 |
| of which from factor intensity growth | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 |
| of which from multifactor productivity growth | 0.7 | 0.3 | 0.2 | 0.8 | 0.8 | 0.5 |
| <i>Finance and Business services contribution</i> | 0.1 | 0.3 | 0.4 | 0.0 | 1.3 | 1.5 |
| of which from factor intensity growth | 0.5 | 0.4 | 0.3 | 0.8 | 1.0 | 0.6 |
| of which from multifactor productivity growth | -0.4 | -0.1 | 0.1 | -0.8 | 0.3 | 0.9 |
| <i>Personal services contribution</i> | -0.1 | -0.1 | -0.1 | 0.2 | 0.2 | 0.2 |
| of which from factor intensity growth | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| of which from multifactor productivity growth | -0.2 | -0.2 | -0.2 | 0.1 | 0.1 | 0.1 |
| <i>Contribution from labor reallocation</i> | 0.3 | 0.2 | 0.1 | 0.2 | 0.2 | 0.1 |

* excludes 5 member states of EU-15: Greece, Ireland, Luxembourg, Portugal and Sweden;

** based on NAICS

Source: EU KLEMS database (Timmer, O'Mahony and van Ark, 2007, updated)

The impact of regulatory change on productivity works through competition and innovation



Source: Van Ark et al. (2009). The Conference Board; based on Aghion et al.

Technology gap models provide no great help in sorting the impact of regulations on productivity growth

$$\Delta \ln \text{MFP} = \beta(\text{Technology gap}) + \gamma X + \delta(X * \text{Technology gap})$$

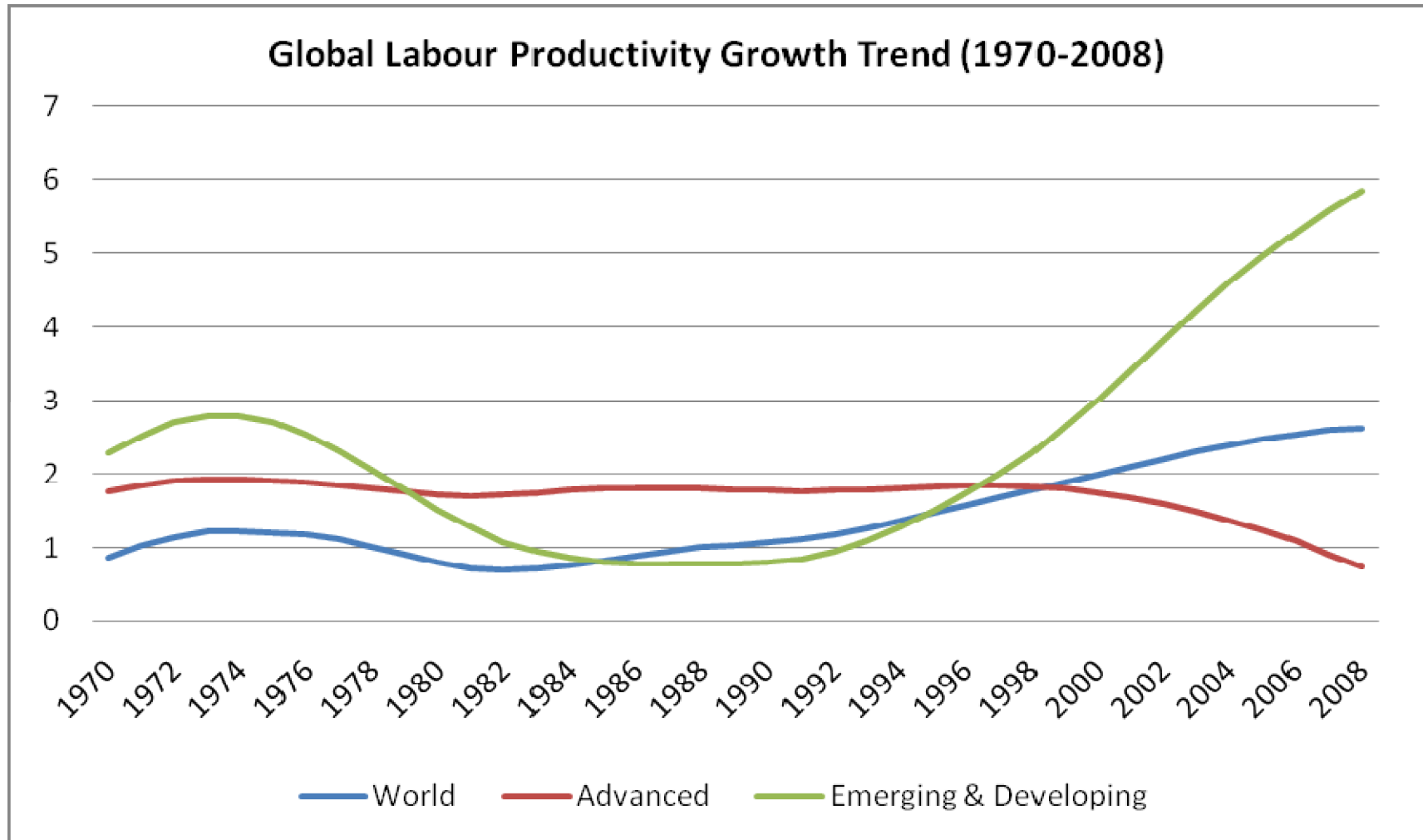
Table 10. The effect of barriers to entry on productivity growth in market services

| Dependent variable: MFP growth | Crude MFP | | | | Sophisticated MFP | | | |
|--------------------------------|---------------------|--------------------|---------------------|---------------------|---------------------|-------------------|-------------------|-------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Technology gap | 0.027*** (0.005) | 0.020** (0.009) | 0.016 (0.010) | 0.050** (0.021) | 0.019*** (0.004) | 0.009 (0.007) | 0.009 (0.006) | 0.010 (0.012) |
| Barriers (average) | 0.011 (0.011) | 0.006 (0.012) | | | 0.000 (0.007) | -0.004 (0.007) | | |
| Barriers (industry-level) | | | -0.024** (0.011) | -0.002 (0.014) | | | -0.010 (0.007) | -0.009 (0.010) |
| Barriers*Technology gap | | 0.010 (0.012) | | -0.052** (0.022) | | 0.015 (0.009) | | -0.002 (0.017) |
| Number of observations | 2376 | 2376 | 715 | 715 | 2376 | 2376 | 715 | 715 |

Notes: Dependent variable in the regressions is annual MFP growth in market services industries, independent variables are the technology gap of the industry relative to the productivity frontier and measures of barriers to entry from the OECD and their interaction. ** and *** denote a coefficient significantly different from zero at, respectively, the 5% and 1% level. Standard errors, consistent for heteroscedasticity and autocorrelation, are in parentheses. For definitions of crude and sophisticated MFP, see Table 7. Average barriers to entry uses an average index of barriers to entry, calculated by averaging across the entry barriers indices of all non-manufacturing industries for which the index is available for the 1980–2003 period, see Conway and Nicoletti (2006). Industry barriers to entry uses industry-specific entry barriers indices for retail (1996–2003), transport and storage (1980–2003, output-weighted average of road, rail and air transport), post and telecommunications (1980–2003 output-weighted average of post and telecommunications) and professional services (1996–2003).

Source: Inklaar, Timmer and van Ark (2008)

Global trend in productivity is increasingly driven by emerging economies

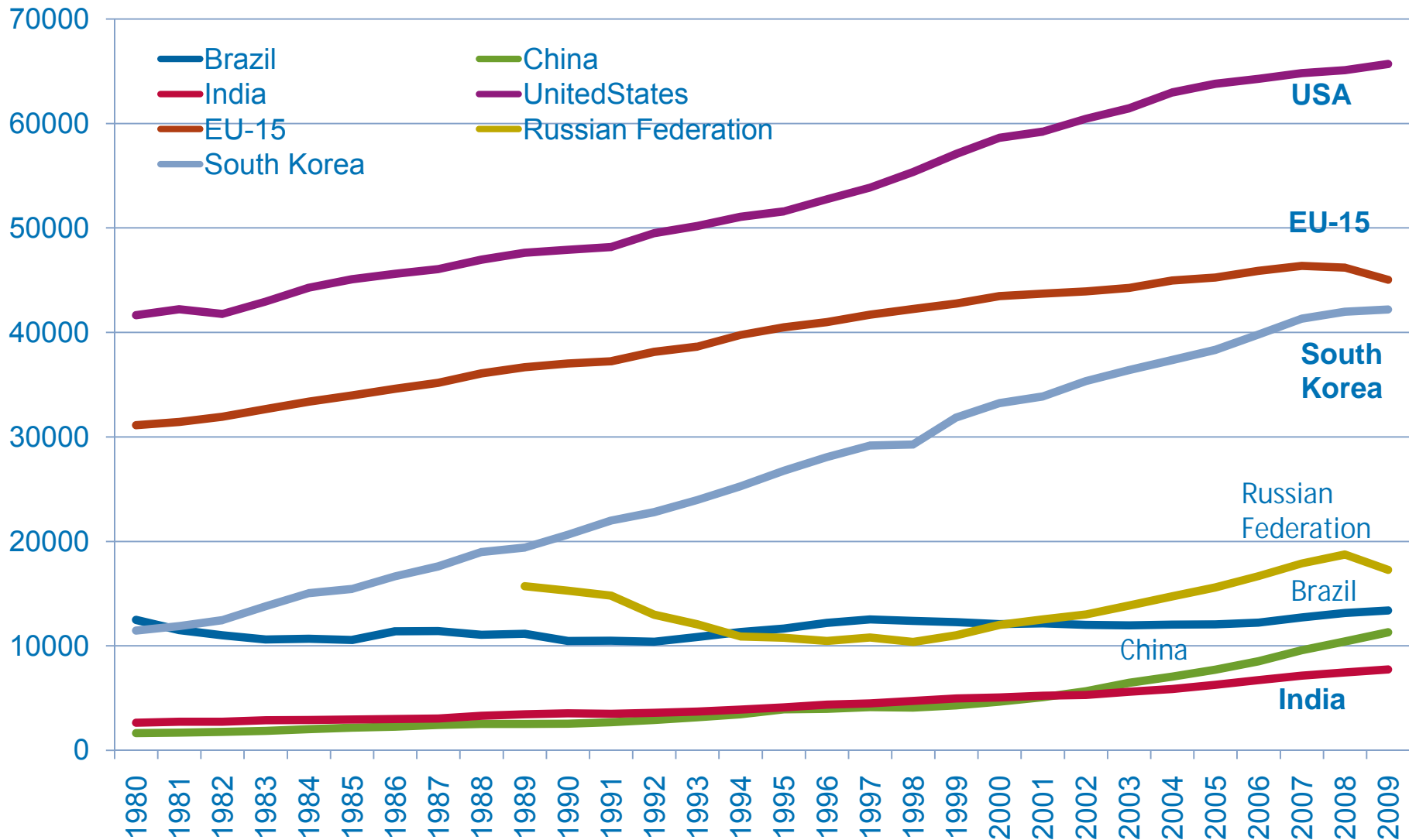


Note: Trend based on HP filter with $\lambda=100$

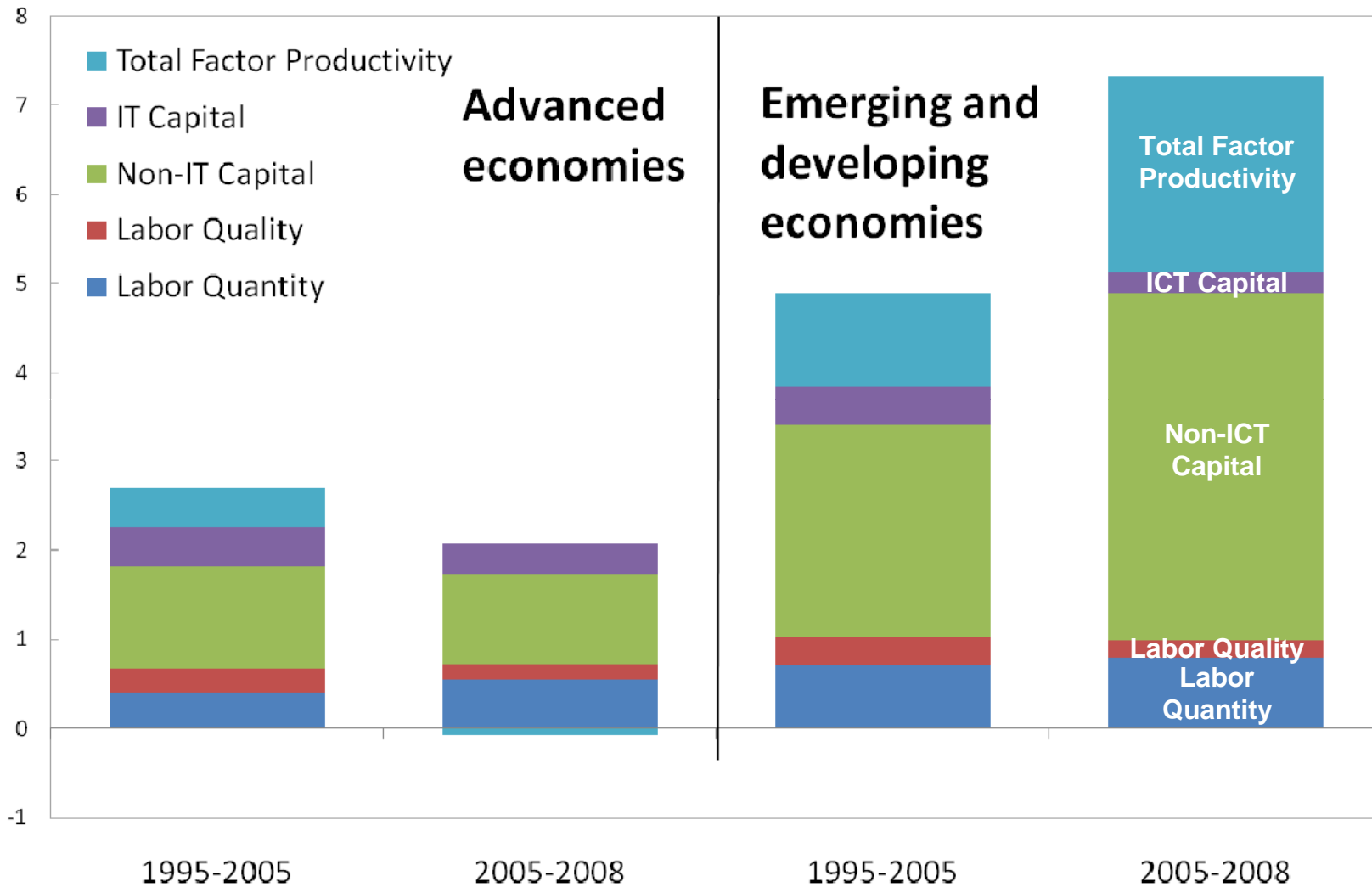
Source: The Conference Board Total Economy Database (August 2010, unpublished)

Productivity level differences leave much room for catch up

GDP per Person Employed, in US \$, PPP adjusted

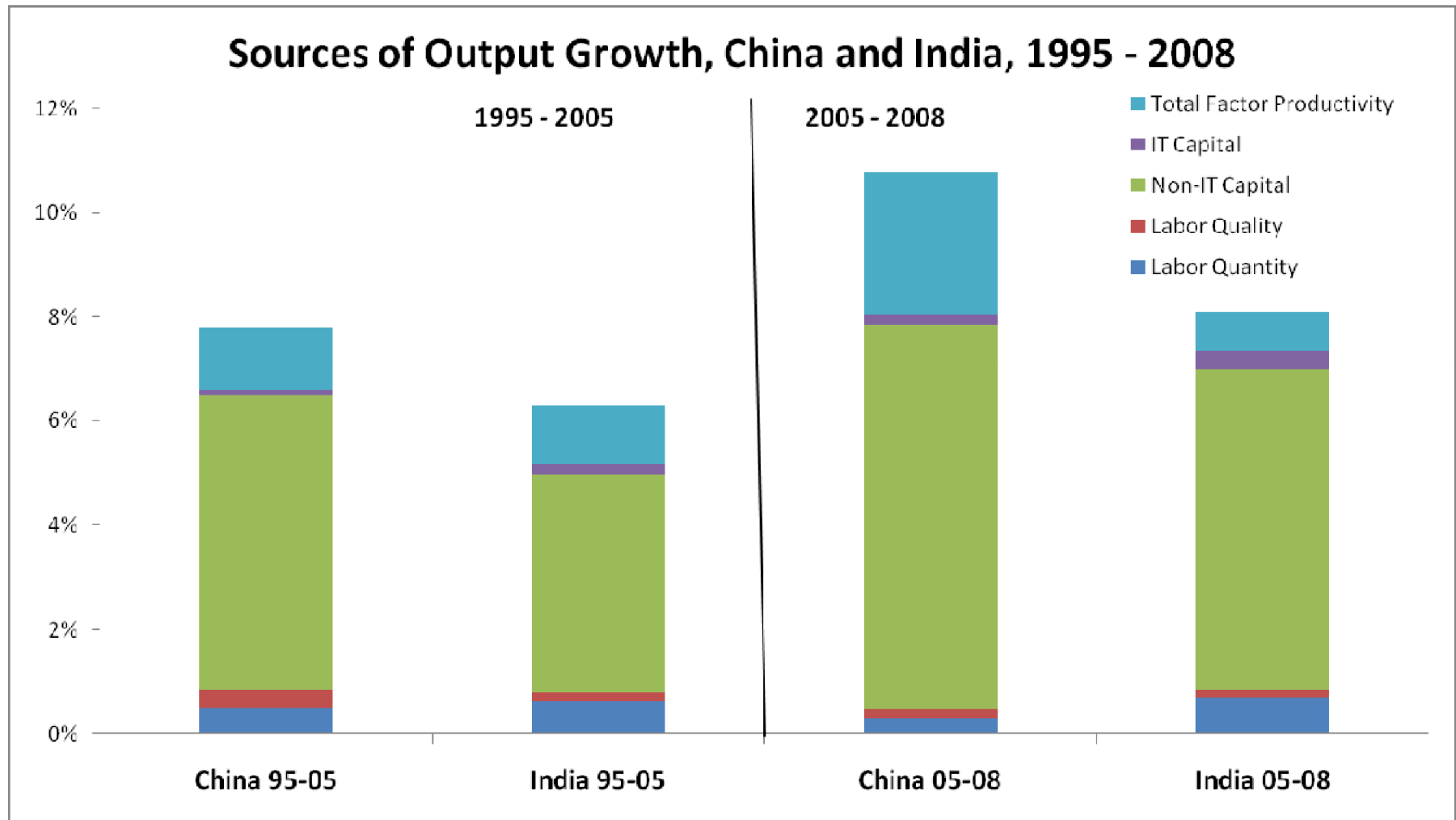


Emerging economies are growing not only through investment, but also through greater efficiency



Source: The Conference Board calculations (unpublished)

Growth in emerging economies is capital driven, but in China the “efficiency” component also has strengthened



Source: The Conference Board Total Economy Database, January 2010

| Growth in GDP, Employment and GDP per Person Employed by Major Region, 2008-2010 | | | | | | | | | |
|---|-------------|------------|-------------------------|-------------|-------------|-------------------------|------------------------|-------------|-------------------------|
| | 2008 | | | 2009 | | | 2010 (estimate) | | |
| | GDP | Employment | GDP per Person Employed | GDP | Employment | GDP per Person Employed | GDP | Employment | GDP per Person Employed |
| US | 0.0 | -0.4 | 0.4 | -2.7 | -3.6 | 0.9 | 2.7 | -0.5 | 3.2 |
| EU-15 (old) | 0.4 | 0.7 | -0.3 | -4.4 | -1.9 | -2.6 | 0.8 | -0.9 | 1.7 |
| Japan | -1.2 | -0.3 | -0.9 | -5.5 | -1.6 | -3.9 | 1.9 | -1.0 | 2.9 |
| Other Advanced* | 1.4 | 1.7 | -0.3 | -1.6 | 0.3 | -1.9 | 4.0 | 1.0 | 3.0 |
| Advanced Countries | 0.2 | 0.4 | -0.1 | -3.5 | -2.0 | -1.5 | 2.1 | -0.5 | 2.6 |
| China | 9.1 | 0.6 | 8.5 | 8.7 | 0.7 | 8.0 | 9.1 | 0.8 | 8.2 |
| India | 6.5 | 2.4 | 4.0 | 5.9 | 2.0 | 3.9 | 7.2 | 2.0 | 5.3 |
| Other developing Asia | 4.6 | 3.0 | 1.6 | 1.7 | 3.0 | -1.3 | 4.9 | 3.0 | 1.9 |
| Latin America | 4.0 | 1.9 | 2.1 | -2.0 | -0.3 | -1.7 | 3.3 | 0.1 | 3.1 |
| Middle East | 4.5 | 2.0 | 2.5 | 1.7 | 2.0 | -0.3 | 4.0 | 2.1 | 1.9 |
| Africa | 5.6 | 2.8 | 2.8 | 2.8 | 2.8 | 0.0 | 4.2 | 2.8 | 1.4 |
| Central & Eastern Europe | 3.0 | 2.1 | 0.8 | -4.1 | -0.6 | -3.5 | 2.4 | 0.2 | 2.2 |
| Russia and other CIS** | 5.1 | 0.8 | 4.3 | -8.3 | 0.3 | -8.6 | 2.9 | 0.3 | 2.6 |
| Emerging Market and Developing Countries | 6.0 | 1.8 | 4.2 | 2.3 | 1.5 | 0.8 | 5.8 | 1.6 | 4.2 |
| World | 2.9 | 1.6 | 1.3 | -0.7 | 0.9 | -1.6 | 3.9 | 1.3 | 2.6 |
| Addenda: | | | | | | | | | |
| EU-12 (new) | 3.9 | 1.8 | 2.2 | -3.6 | -1.8 | -1.8 | 1.5 | -1.2 | 2.8 |
| EU-27 | 0.8 | 0.9 | -0.1 | -4.3 | -1.8 | -2.5 | 0.9 | -1.0 | 1.9 |
| Euro Area | 0.5 | 0.7 | -0.2 | -4.2 | -1.9 | -2.4 | 0.7 | -1.0 | 1.8 |
| OECD | 0.6 | 1.0 | -0.4 | -4.0 | -1.3 | -2.7 | 1.8 | -0.4 | 2.2 |

Note: This table is based on estimates for 111 countries (see table 9)

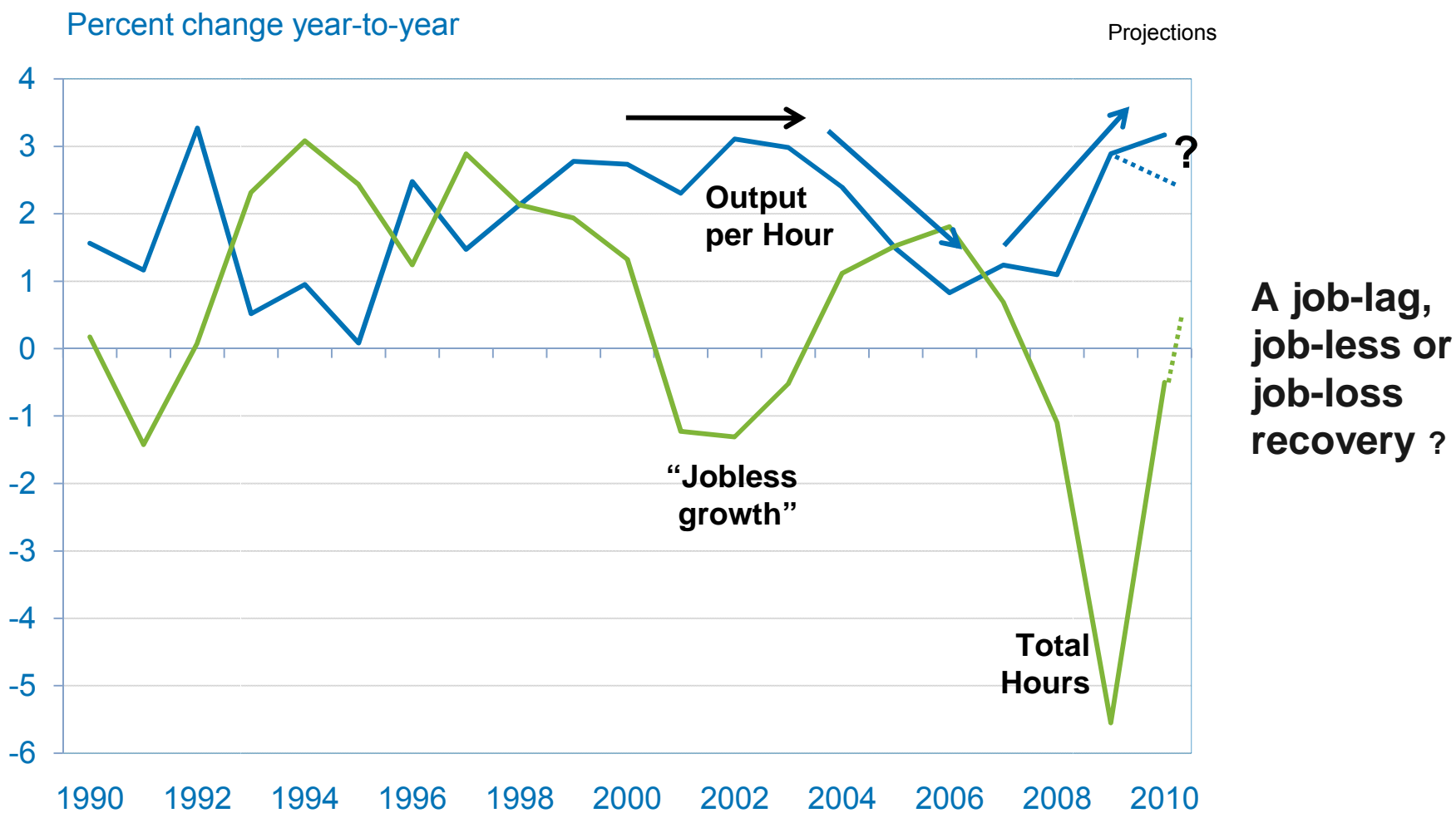
Note: Growth rates are based on the difference in the log of the levels of each variable

*Other advanced includes Canada, Switzerland, Norway, Israel, Iceland, Cyprus, Korea, Australia, Taiwan Province of China, Hong Kong, Singapore, New Zealand

**CIS: Commonwealth of Independent States

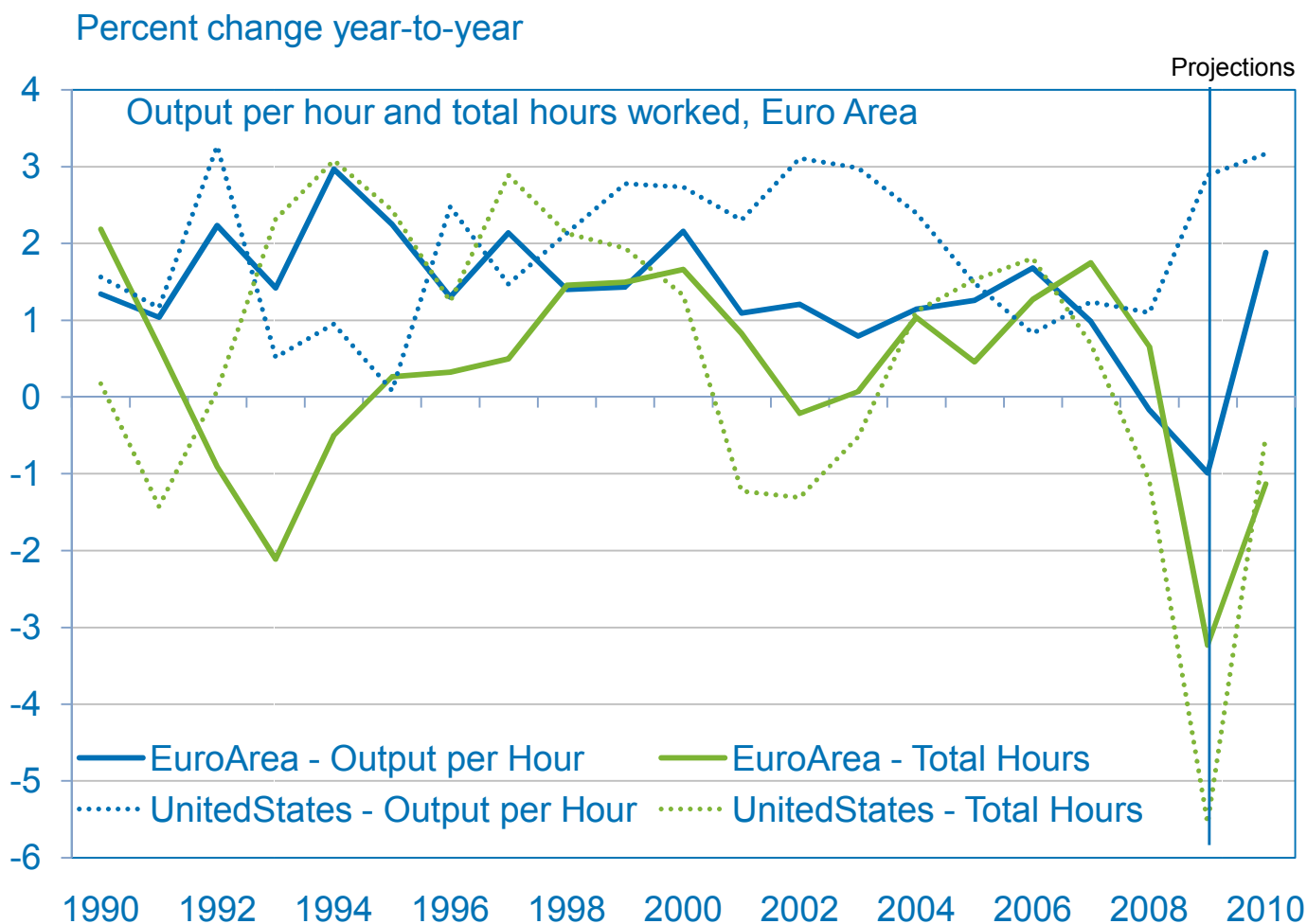
Source: The Conference Board Total Economy Database (August 2010, unpublished), OECD, IMF, World Bank

U.S. productivity growth has slowed since 2003 and turned counter-cyclical during recession



Source: The Conference Board Total Economy Database, September 2010

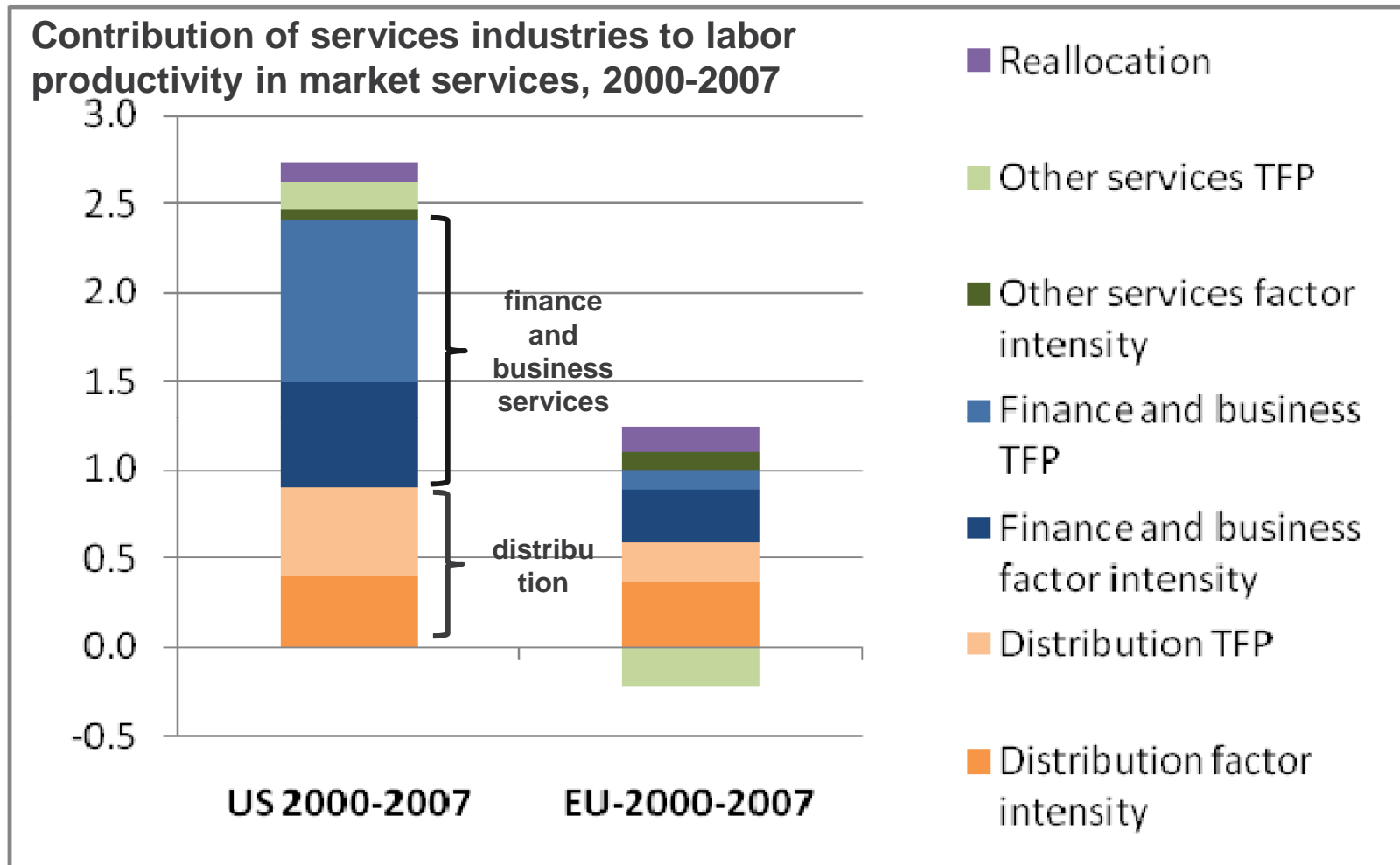
Europe shows long-term productivity slowdown, but did not lose as many working hours as U.S. – can this last?



Can Euro Area productivity growth recover to U.S. level without losing more jobs?

Source: The Conference Board Total Economy Database, September 2010

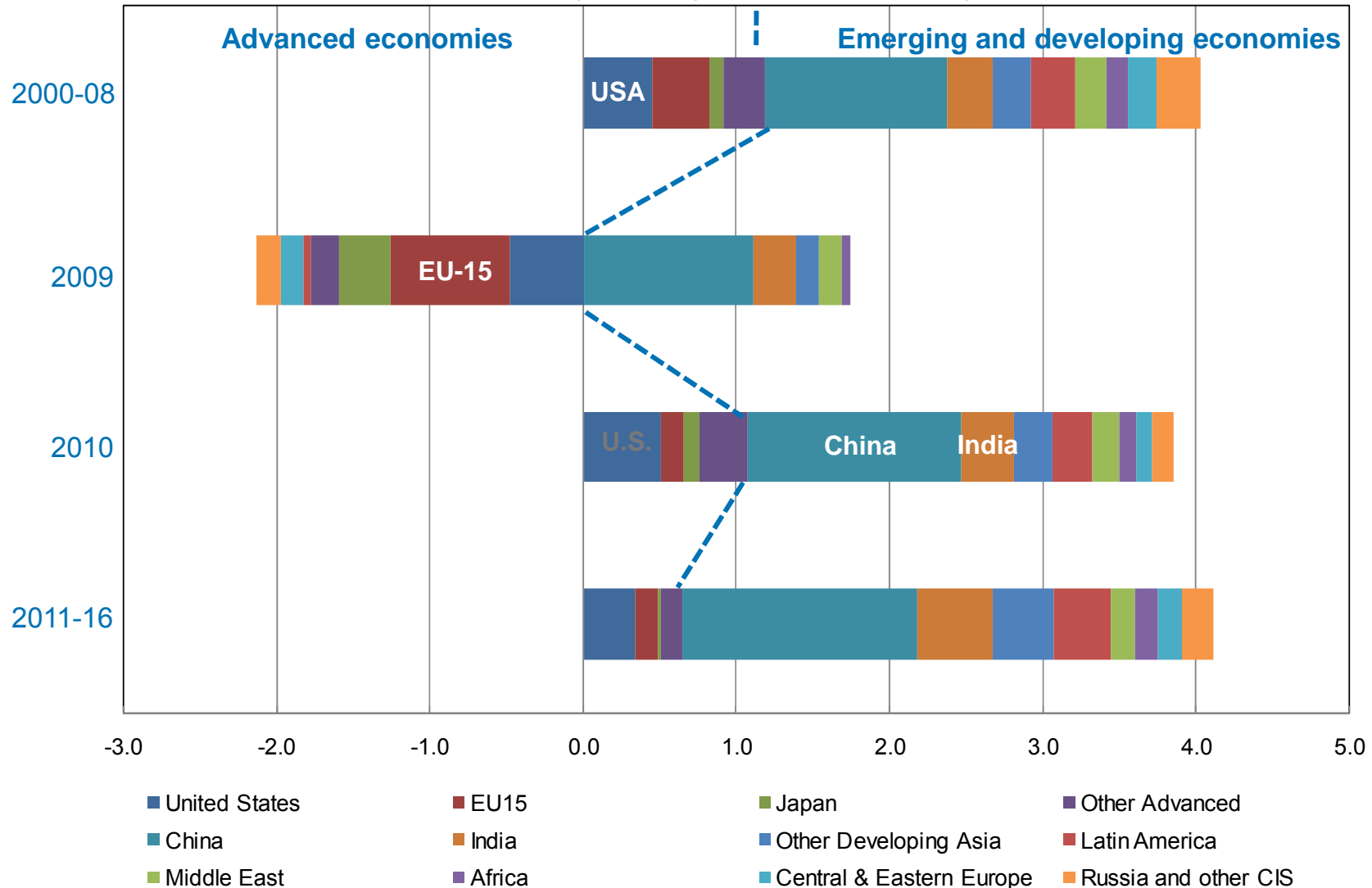
Distribution and finance & business services were key to U.S. productivity boom – was it real ?



Note: "EU" refers to 9 major Euro Area economies and the United Kingdom
 Source: EU KLEMS, November 2009

World growth may stay return to pre-2008 growth – but growth contribution of emerging economies rises

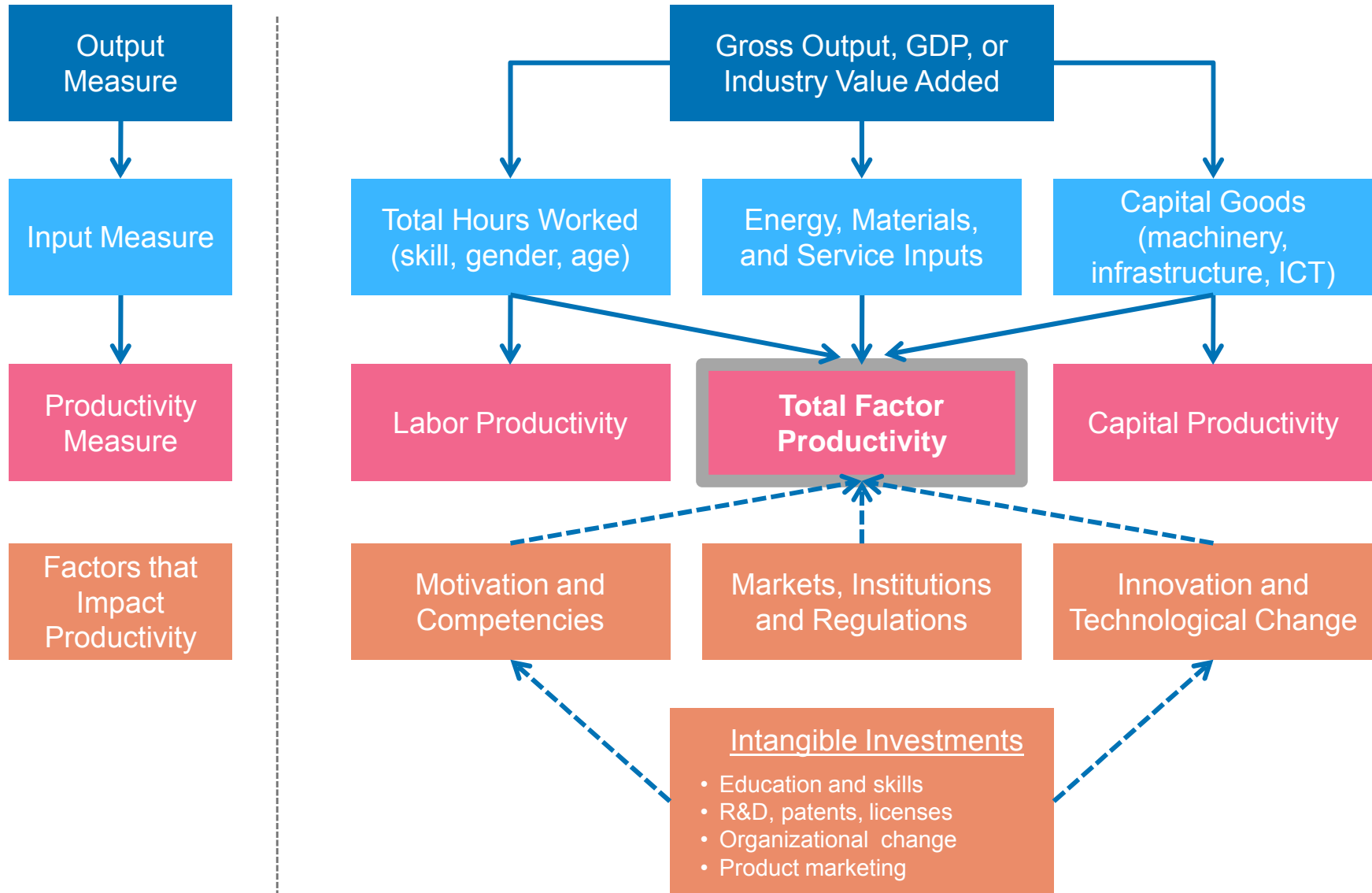
Contributions of global regions to world GDP growth, %-point



Sources: The Conference Board Total Economy Database, Jorgenson and Vu, OECD, IMF, World Bank



Productivity growth results from wide range of external and within-firm effects



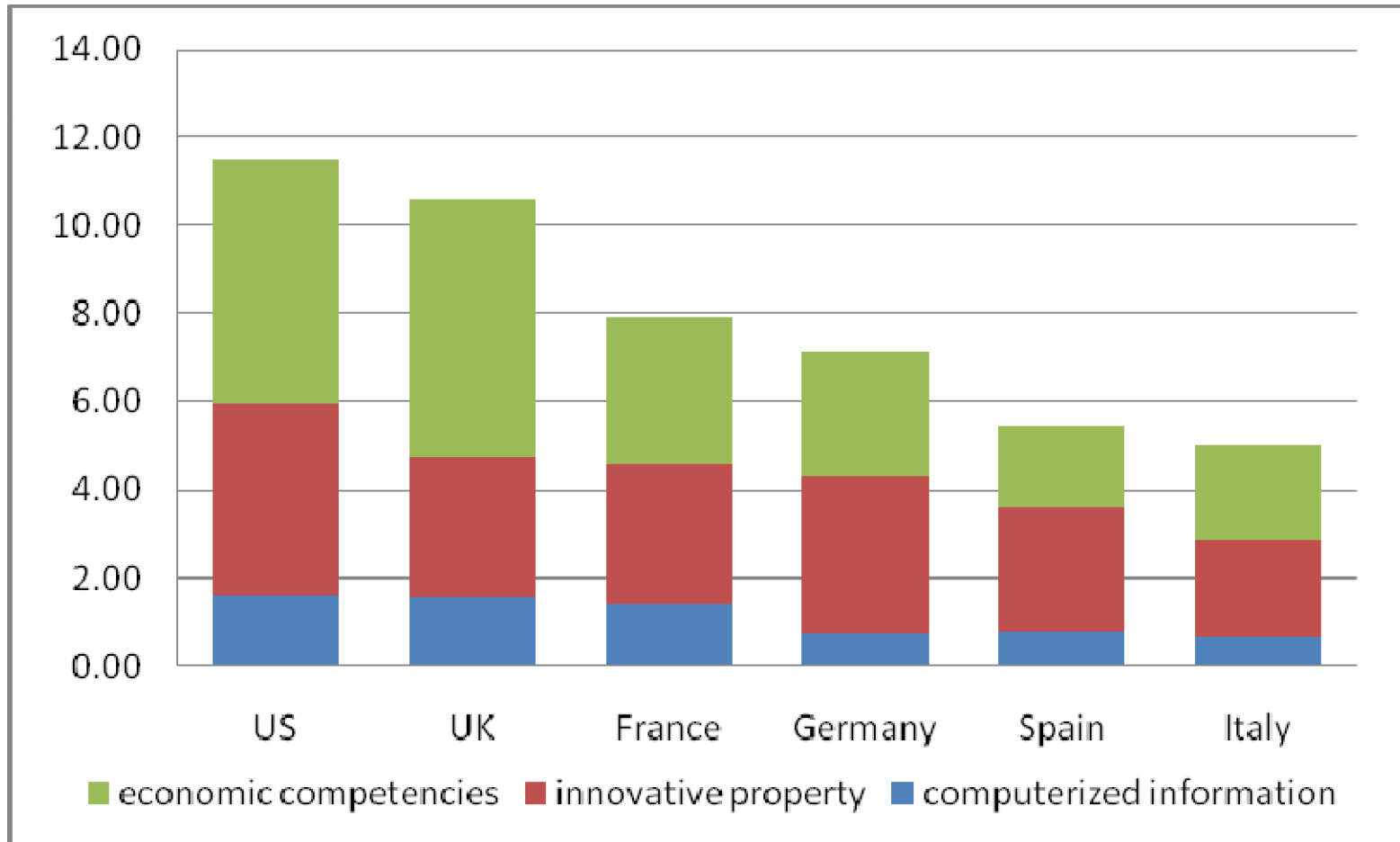
Intangible capital is major source of strategic advantage to an economy and individual firms – “strategic capital”

| <u>Intangible Investment Groups</u> | <u>Types of Strategic Capital</u> |
|--|---|
| Computerized Information (“informatization”) | Software, computer programs and computerized databases |
| Scientific and Creative Property | Scientific R&D and non-scientific inventive and creative activities |
| Economic Competencies | Firm-specific human capital, organizational capital and brand names |

Source: Corrado, Hulten and Sichel (2005)

Investments in strategic capital (intangibles) are large relative to total GDP – but large differences exist across countries

Intangible Investments in the Market Sector in 2006 (% GDP)



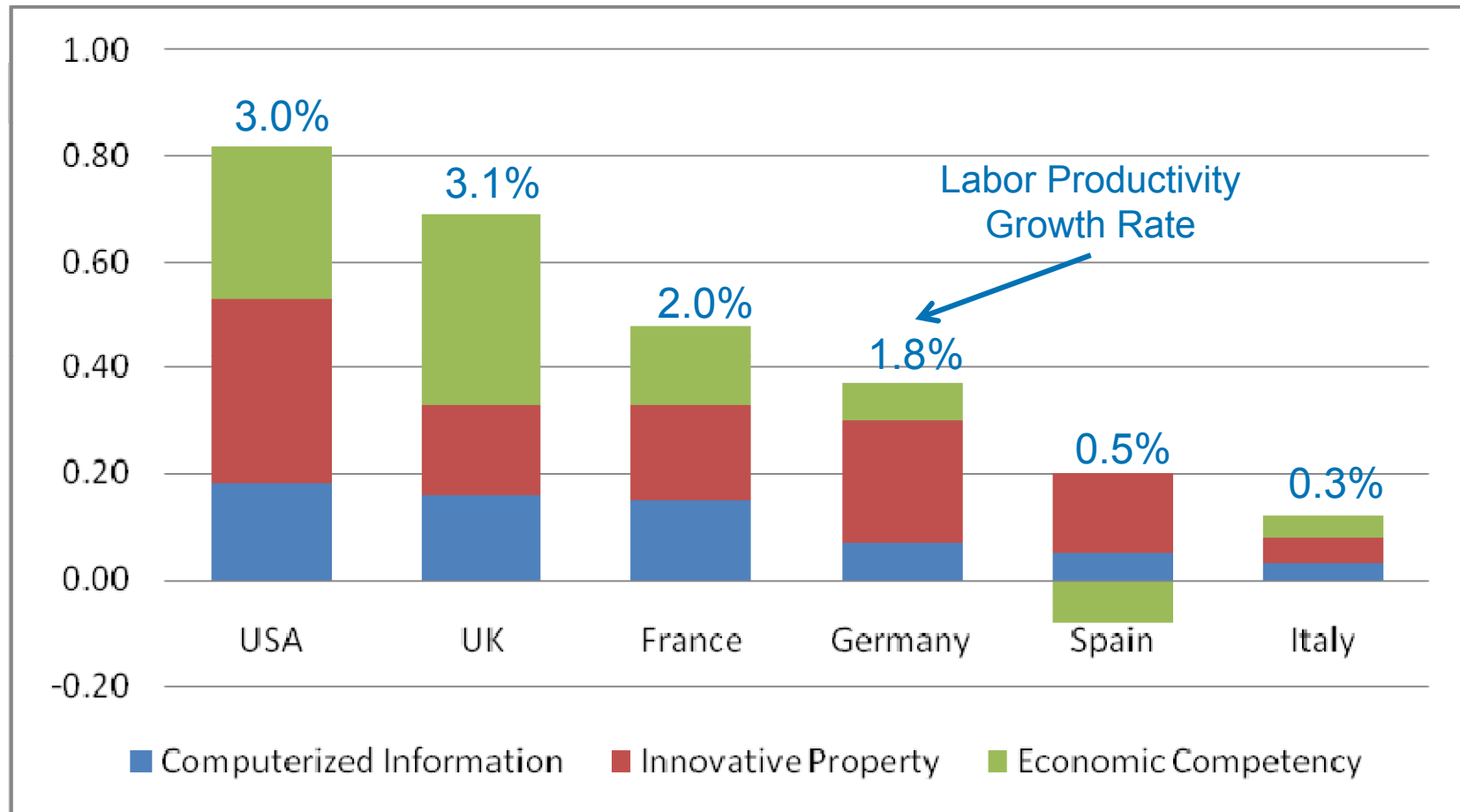
Source: The Conference Board

* Market Sector in U.S. is non-farm business sector. In Europe it is total economy excluding government, education and health industries



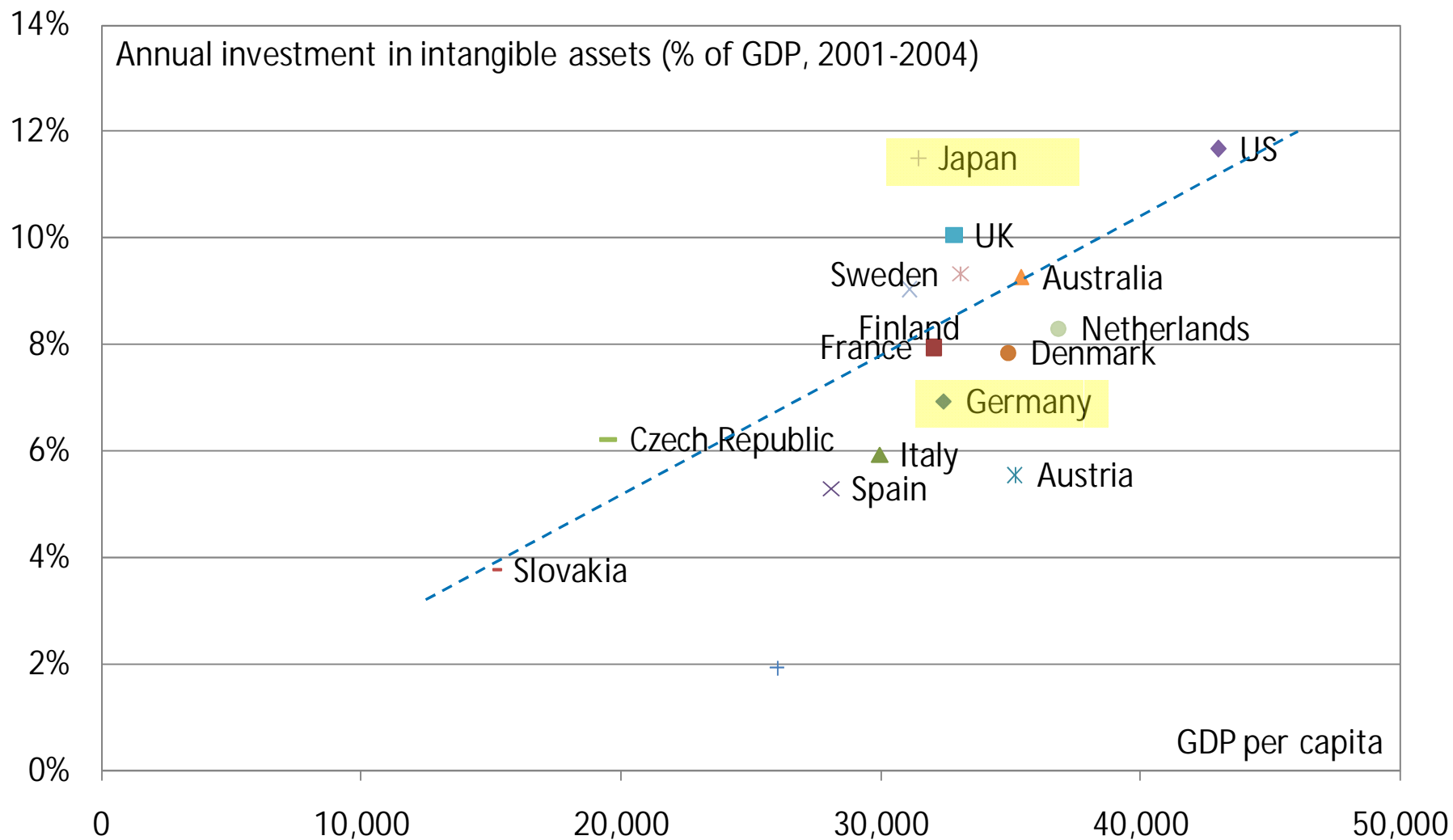
Intangible investments are key to supporting innovation and productivity growth

Contribution of Intangible Assets to the Growth of Labor Productivity in the Market Sector – 1995-2006



* Percentages are the annual growth rates of labor productivity on average from 1995 to 2006.

Intangible investment share in GDP correlates to rises with productivity and welfare, but variations exist



Source: Corrado, Hulten and Sichel (2005).

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