



Comparing Growth and Labour Productivity - measurement issues

OECD Working Paper

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- OECD working paper, November 2003
- Question: does differing statistical methodologies significantly affect the comparability of growth?
- First message: there remain differences in statistical methodologies between OECD countries, and in particular Europe/USA/Japan
- Second message: the impact of these differences remains small compared to differences in GDP growth during 1995-2001.
- However, they begin to count when differences in GDP per capita growth or productivity growth are themselves small.

1. Nominal GDP measurement

- There is a unique conceptual framework: the SNA 93
- But countries or regions do not systematically implement all of the SNA, or interpret it differently
- Three issues are today outstanding:
 - Military equipment
 - FISIM
 - Software

Military equipment

- In 1996, the US NIPA introduced government investment=> raised the level of GDP by around 2%
- In this move, they came closer to the SNA, but went further by recording weapon systems as investment (aircrafts, missiles..) while SNA does not
- Impact on US GDP growth: -0.06%
- This difference could disappear in the next edition of SNA

FISIM

- FISIM = financial intermediation services indirectly measured
- Is allocated to users in the US NIPAs, in accordance with SNA
- Household consumption of FISIM = 2.3% of GDP in the USA
- Not allocated in Europe and in Japan
- => GDP is statistically 2.3% higher in the USA

FISIM (continued)

- Fortunately, this difference has a small impact on growth rates
- The trend of Household volume FISIM has been in line with GDP trend in the 1990s.
- Cumulated over 10 years, the statistical bias is a mere 0.2%
- However, in 2000 and 2001, it reached 0,1%
- Difference should disappear in 2005
- The USA has changed its method in 2003
- Europe and Japan will allocate FISIM in 2005

Software

- SNA 93 recommended capitalising software
- All countries implemented this recommendation in 1999
- But two methods exist:
 - “Demand” : based on what enterprises record as capital
 - “Supply” : Based on a macro estimate of “capitalisable software”

Software (continued)

- Enterprises are very prudent in capitalising software
- Software publishing companies do not capitalise at all their software
- => Demand method gives low software investment
- => Supply method gives high software investment

Software (continued)

- USA uses a supply method : high investment
- France, UK, Italy used a demand method : low investment
- Japan does not record any own account investment in software
- Simulations show that this could have introduced a statistical bias on differential growth of approximately 0.2%, but only during the period 95-2000 (large investment in software, Y2K)
- Eurostat/OECD task force has made recommendations for harmonisation of methods
- Convergence should be reached in a few years

2. Volume GDP measurement

- Three issues are outstanding today that may have impact on growth differentials:
 - The famous “hedonic pricing” issue
 - Output in services
 - The choice of the aggregate index number

Hedonic price indices

- Hedonic price indices = better quality adjusted price indices
- Generally lead to more decrease in price indices (or less increase)
- Less prices \Rightarrow more volume \Rightarrow more GDP growth
- Especially for high tech goods, such as computers
- Statistical difference \Rightarrow can attain, for computers, 10% per year

Hedonic pricing (continued)

- The US is using more and more hedonic pricing
- Europe only starts to implement these new statistical methods
- Fortunately, two effects limit the impact on GDP growth:
- 1/ Imports: if computers are imported, there is no impact on GDP (the difference in investment is compensated by the difference on imports)
- 2/ Some products (semi-conductors) do not affect final uses, but only intermediate uses=> GDP is not affected, only distribution between sectors

Hedonic pricing (continued)

- Several simulations OECD, INSEE, Bundesbank converge in concluding that the overall impact is limited in Europe
- Upper bound: +0.1% for European countries
- But asymmetric: +0.25% for the US
- Future developments: Germany has introduced hedonics methods in 2002
- Methodological convergence: OECD manual on hedonics, Eurostat manual on volume and prices

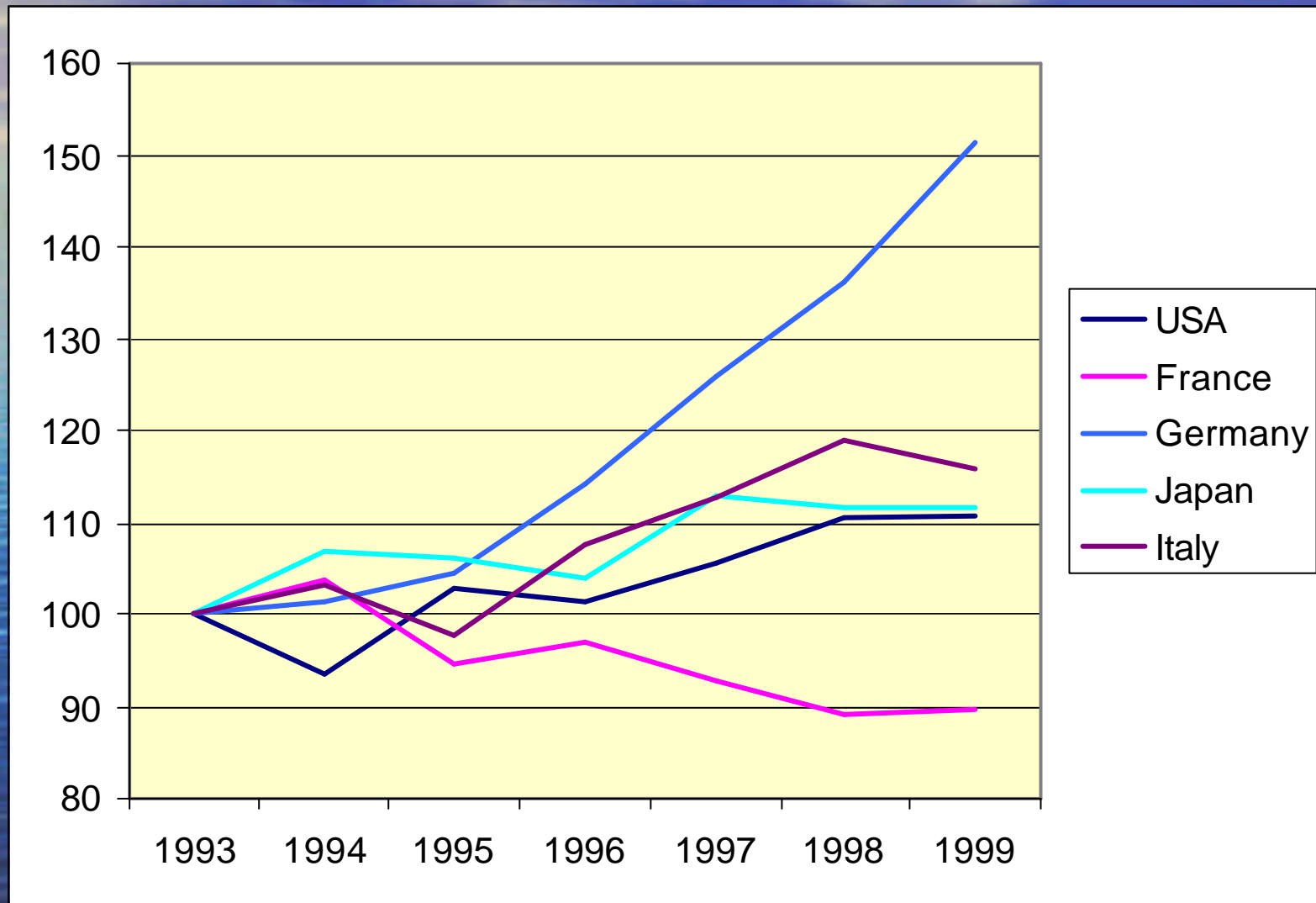
Services

- Service sector = 70 to 80% of GDP
- Some services are hard to measure
- Are they measured consistently between countries?
- Exploratory investigation:
 - Banking services
 - Health and social services
 - “Zero productivity” approach

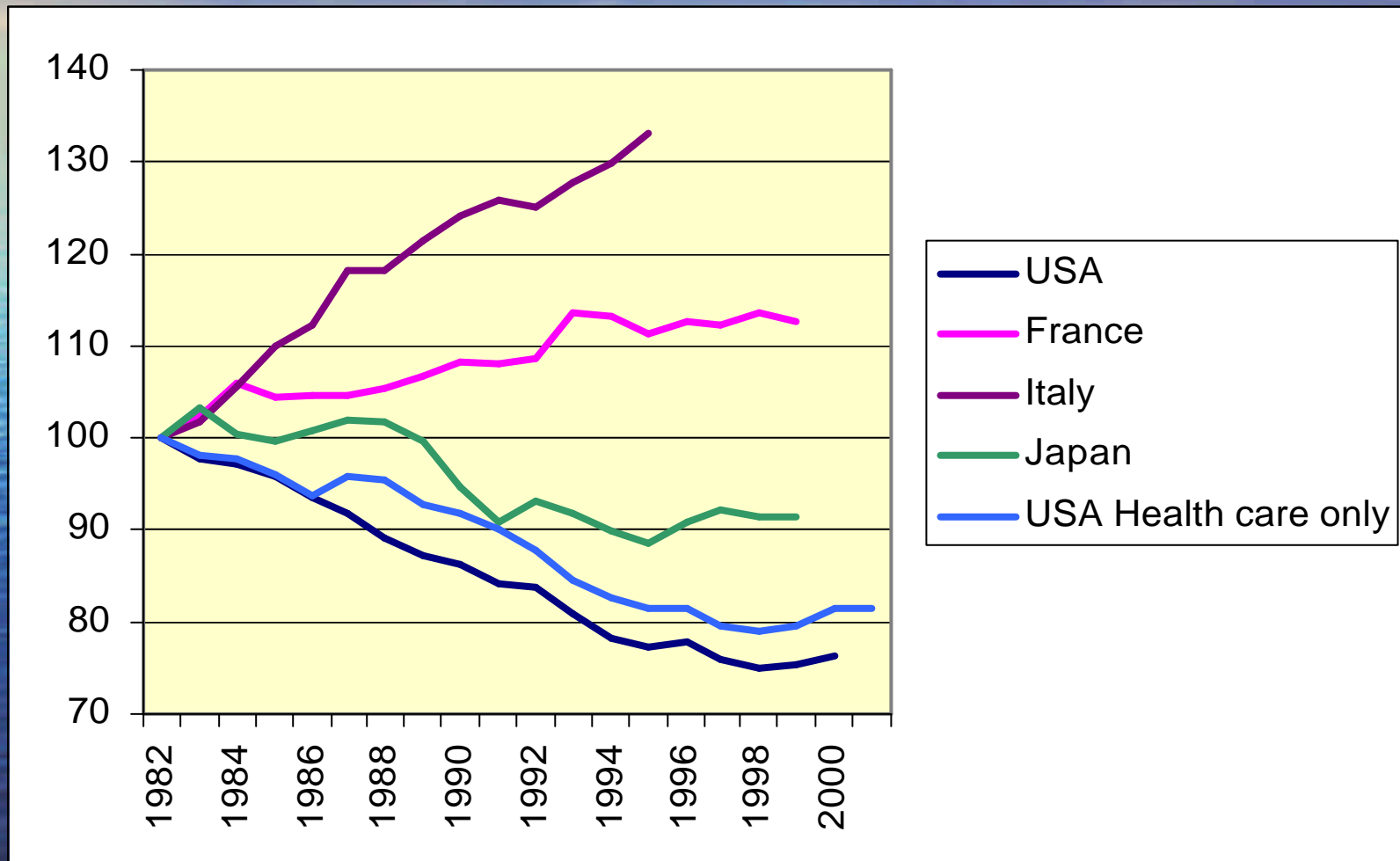
Services (continued)

- Banking services:
 - Large differences in labour productivity (see graph)
 - But more differences between European countries than with the US or Japan
- Health and social services:
 - Price indices based on costs: zero productivity assumption
 - New volume indices based on output
 - Significant differences in labour productivity (see graph)
 - Probably due to measurement issues
 - But impossible to conclude

Real value added per person employed: financial services



Real value added per person employed: health and social services



Services (continued)

- zero productivity simulation”
 - what would happen if certain service industries with negative productivity had in fact zero productivity
 - Recent OECD simulation which could give interesting results in differential
 - In general the effects are concentrated on industries with small final demand
 - => more impact on distribution of value added than on global GDP
 - Impact on US GDP: 0,08%, on France: 0,19%
 - Not evident that the difference (0.1%) is attributable to statistical bias

Aggregate index number

- GDP volume growth = price weighted sum of detailed volume growth
- Which price structure is to be used, with which formula?
- US uses current price structures, with a chained Fisher formula
- Europe and Japan use either a fixed constant year Laspeyres formula, or, for some countries, chained Laspeyres formula
- Chained Fisher gives generally lower volume growth than other formulae
- Simulations show that the difference between fixed Laspeyres and chained Fisher may reach -0.15% for the us.

Aggregate index number (continued)

- If the US was using a fixed Laspeyres, its growth would have been measured higher
- This impact neutralises the impact of the difference in hedonic pricing
- Statisticians recommend to use hedonics combined with chained indices.
- European countries are progressively introducing chained indices.

3. Purchasing Power Parities for Productivity Analysis

Useful for comparing countries in a single time period,

- But:
 - caution when using for time series analysis
 - not suitable for industry-level analysis
 - limitations for government and capital

Statistical methods: a limited impact on GDP growth 1995-2000

- Military equipment : -0.06%
- FISIM < +0.1%
- Software < +0.2%
- Hedonics +0.1% to 0.25%
- Other services < +0.1%
- Index formula < -0.2%
- **Compared growth 1995-2000**
- **USA: 4.1%**
- **Japan:1.4% => US-Japan = 2.7%**
- **Europe:2.6% => US-Eurozone = 1.5%**

Labour Inputs

- Three possible measures:
 - Persons employed (headcount)
 - Full-time equivalents
 - Hours worked
- OECD recommends hours worked, however needs substantial estimations by OECD (Indirect compilation: average hours worked with NA headcounts).

Labour Input

- OECD recommends use of national accounts employment data for consistency with GDP.
- However National accounts employment not well reported by countries
- Recommended quality adjustment but not implemented in practice

Productivity

- Substantial comparability difficulties remain with the denominator: labor input.
- Employment data in the national accounts needs to be better transmitted and controlled
- Direct data on hours worked is essential
- First « more comparable » productivity data shortly in the OECD « productivity database ».