Flash Economics

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The four essential factors of growth: capital, labor, technology, energy

When looking for explanations for the growth gap between the US and the euro zone (Europe), we need to look at the four essential factors of production:

- Capital
- Labor
- Technology (R&D expenditure, investment in new technologies)
- Energy (whether or not abundant, inexpensive energy is available).

We can see that technology and faster growth in productive capital help explain why growth is so much stronger in the USA than in Europe.

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Significant growth gap between the United States and Europe

Growth in real GDP or labor productivity is significantly higher in the United States than in Europe (Charts 1a/1b).

Chart 1A
Real GDP (2002.Q1 = 100)

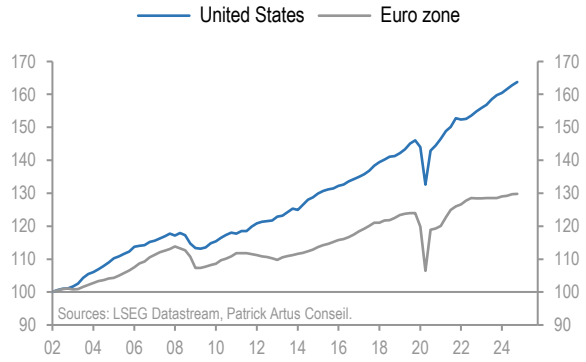
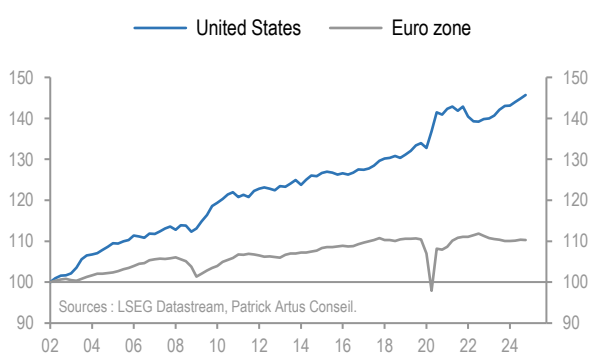


Chart 1B
Productivity per head (2002.Q1 = 100)



A priori, the growth gap between the USA and Europe can be explained by the growth gap between the various factors of production: capital, labor (quantity and qualifications of labor), technology, energy (abundant, inexpensive energy increases the supply of goods and services).

Growth in production factors

1. Corporate capital

Chart 2a shows the growth rate of net capital excluding housing in volume, while Chart 2b shows the evolution of the stock of productive capital.

Chart 2A
Productive capital stocks (as % per year)

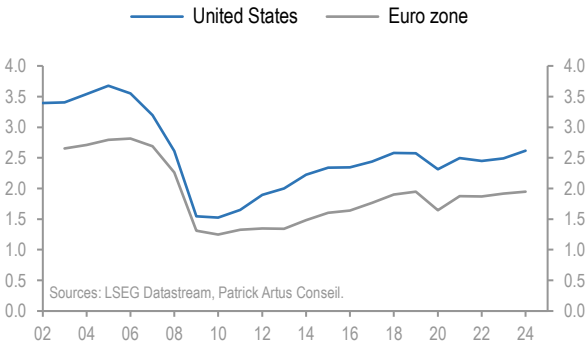
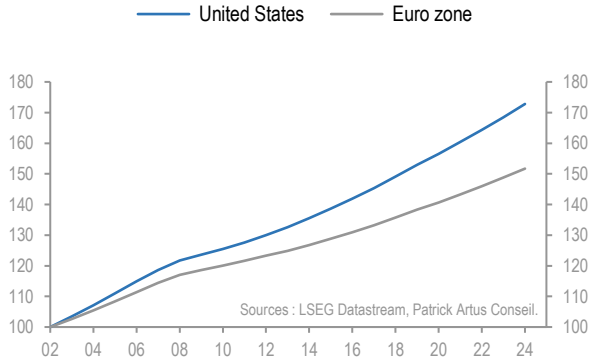


Chart 2B
Productive capital stocks (2002=100)



We can see that the stock of productive capital is growing steadily faster in the United States than in the euro zone.

2. Employees' work and skills

Chart 3a shows employment trends in the USA and the eurozone, while Chart 3b shows trends in the population aged 15-64.

Chart 3A
Employment (2002.Q1 = 100)

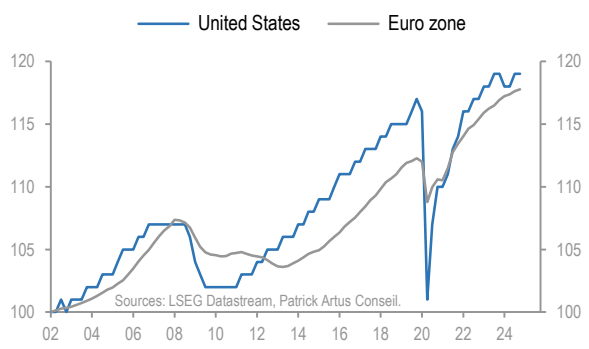


Chart 3B
Population aged 15 to 64 (as % per year)

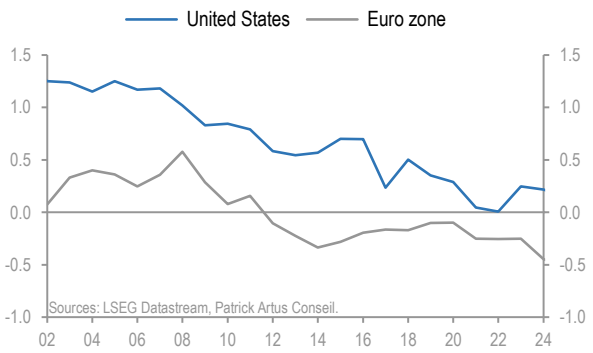


Table 1 shows the results of the 2016 and 2023 PIAAC adult skills surveys in the USA and the euro zone.

Table 1: OECD PIAAC survey results (overall score, by descending score from 2023 survey*)

Country	2026	2023
Germany	217	267
France	258	253
United States	261	251
Spain	249	246
Italy	249	240

* In 2016 average score in numeracy and literacy
Source: OECD

We see :

- similar employment growth in the USA and the euro zone, although the working-age population grew faster in the USA;
- the absence of a skills advantage for the US over the euro zone.

3. Technology

Here we look at the rate of investment in new technologies, total R&D expenditure and company R&D expenditure (Charts 4, 5a, 5b).

Chart 4
ICT investment including software
(in value terms, as % of nominal GDP)

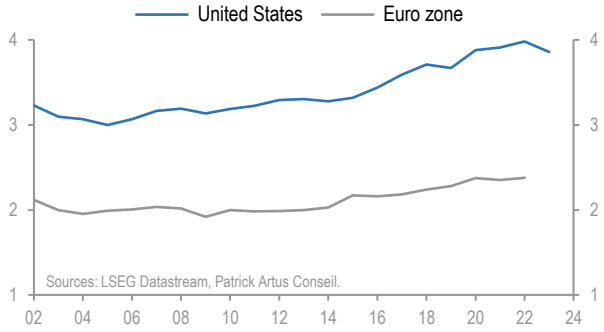


Chart 5A
Total R&D spending (as % of nominal GDP)

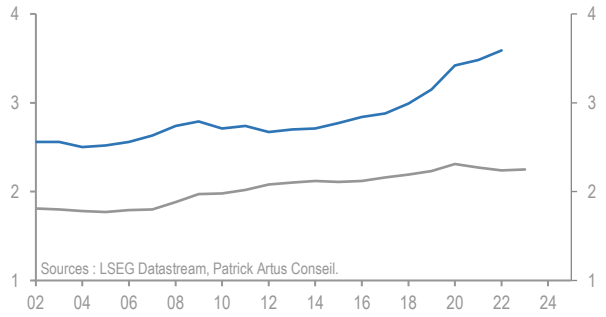
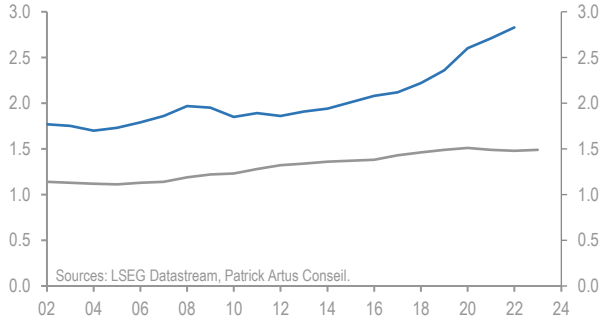


Chart 5B
Corporate R&D spending (as % of nominal GDP)



Investment in new technologies and R&D spending are significantly higher in the United States than in the euro zone.

Chart 6
Natural gas price

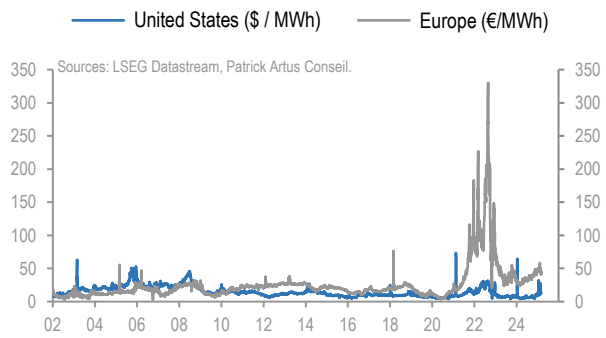
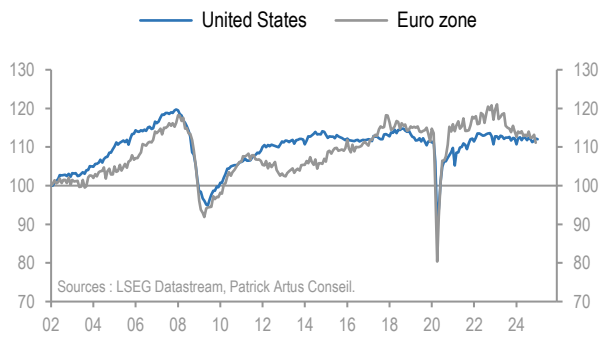


Chart 7
Manufacturing production (2002.M1 = 100)



4. Energy

Oil prices in the USA are very close to those in the euro zone. On the other hand, since the start of the war in Ukraine, **the price of natural gas has been much higher in Europe than in the United States** (Chart 6), which in principle reduces the supply of goods and services, particularly industrial products (Chart 7). However, despite this advantage, manufacturing output is not growing faster in the USA than in Europe.

Summary: overall, the evolution of two factors of production (capital and technology) explains the extra growth in the United States compared to Europe.

We have seen :

- that the capital stock of corporates was growing faster in the USA than in Europe;
- that employment was not growing faster in the US, and adult population capacities were similar in the US and Europe;
- investment in new technologies and R&D spending were higher in the USA than in Europe, relative to GDP;
- since 2022, energy prices in Europe have risen well above their level in the US, but this has not stimulated US manufacturing output.

The average growth differential between the US and the euro zone from 2002 to 2024 is 1 point per year (Table 2).

Table 2: Average GDP growth rates (2002-2024, volume, %)

	United States	Euro zone
Average	**2.19**	**1.18**

Source: LSEG Datastream.

This difference can be attributed :

- 0.25 points to the gap in capital stock growth;
- 0 point to the gap in employment growth;
- 0 point to the gap in manufacturing output growth attributable to higher energy prices in Europe;
- 0.75 points to greater technical progress in the United States than in Europe.

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