Flash Economics

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Who will win the battle of innovation: the United States, China or Europe?

We compare the United States, China and Europe in terms of innovation effort and its impact on economic growth.

One can see that, in terms of fundamental research (number of scientific publications, number of patents), Europe is not lagging behind the United States or China.

But the situation is very different if we look at companies.

European companies do less R&D than American or Chinese companies and invest less in new technologies. This is the result of the weak links between universities and companies in Europe, the strong risk aversion of European companies, and the small amount of venture capital and, more generally, risky savings in Europe.

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Europe is not lagging the United States or China with respect to fundamental research

The good performance of European fundamental research can be seen by:

- **the size of academic R&D**: 0.36% of GDP in the United States, 0.2% in China, 0.48% in the European Union;
- **the number of researchers**: 18.1% of all researchers worldwide are located in the United States, 21.2% in China and 23.5% in the European Union;
- **the number of triadic patent families**; in 2021 China filed 6,106 triadic patent families; the United States filed 14,341 triadic patent families and Europe 11,230;
- **patents relating to disruptive technologies**, which in 2022 numbered 2,000 in the United States, 1,200 in Europe and 360 in China;
- **the number of scientific publications**: in 2023, there were 1,040,000 in China, 714,000 in the United States and 1,030,000 in the European Union. The global share of publications produced in the European Union is 20%. If we limit ourselves to the top 10% of scientific articles cited, there are 54,000 in China, 36,000 in the United States and 32,000 in Europe.

We can observe that both the quantity and the quality of fundamental research are at the same level in the European Union as in the United States and China.

The European lag concerns corporate R&D

The higher level of R&D in the United States, compared with China or the European Union, comes from **corporate R&D** (**Charts 1 and 2**).

Chart 1
Total R&D spending (as % of nominal GDP)

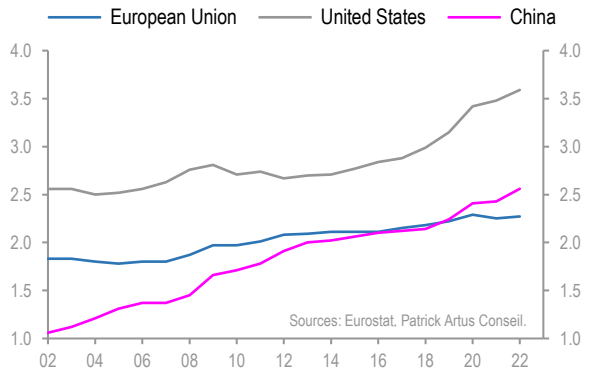
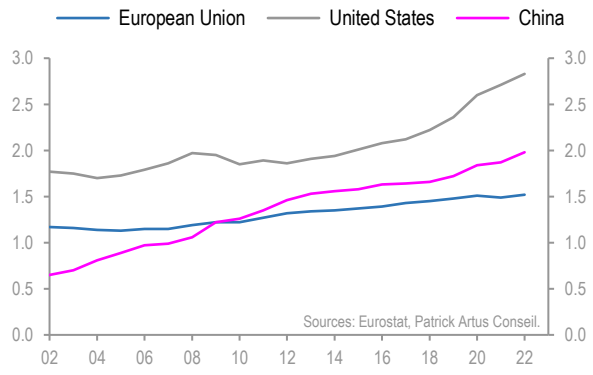


Chart 2
Corporate R&D spending (as % of nominal GDP)



Among the **2,500 global companies doing the most R&D** in 2021, 32% are American, 24% are Chinese and 16% are European (located in the European Union).

Furthermore, R&D spending by companies **is concentrated in Europe in the automotive sector, in the United States and to a lesser extent in China in new technologies** (hardware and software), **Table 1**.

Table 1: R&D investment by EU, US and Chinese companies in automobile and ITC sectors (as % of total corporate R&D spending in 2021)

Countries	Automobile	Information and communication technologies
United Staes	4	54
China	7	36
European Union	32	15

Source: Science for policy brief, European Commission

The two problems facing Europe in terms of insufficient corporate R&D are as follows:

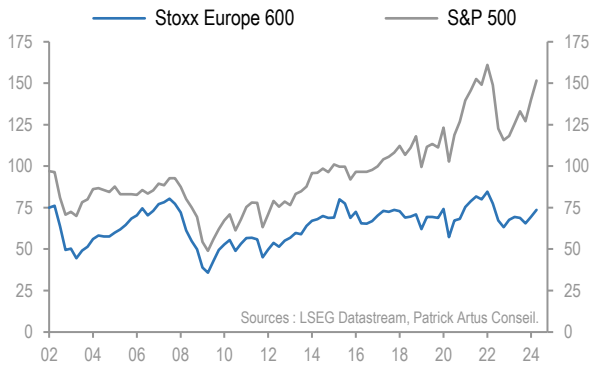
- **insufficient links between university research and corporate research;**
- **the small amount of venture capital in the European Union.** In 2021, the peak year for venture capital fundraising, the United States raised $330 billion, China $104 billion and the European Union only $33 billion.

Summary: strengthening the links between academic research and corporate research in Europe

While academic research in Europe is on a par with that in the United States and China, corporate research, and hence the development of new goods and services, is very weak in the European Union. This is very probably primarily linked to the inadequacy of relations, contacts and contracts between academic research institutions and companies, and secondly to the small amount of venture capital in the European Union.

The small amount of venture capital is a further manifestation of the strong risk aversion of European savers and lenders, which is also reflected in the low level of stock market capitalisation in Europe (Chart 3), and the high proportion of life insurance, deposits and savings accounts in the savings of Europeans.

Chart 3
Market capitalisation (as % of nominal GDP)



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