

THE RISKS TO FINANCIAL STABILITY OF A POTENTIAL TECH STOCK CORRECTION

Rapid technological progress in recent years, driven above all by digitalisation and the development of generative artificial intelligence (AI) models, has made many firms keen to adopt new technologies in their productive processes. Specifically, through routine task automation and human-AI complementarity in complex tasks, AI can boost productivity by making processes more efficient and fostering greater product innovation.¹

These developments have given a significant boost to the business opportunities and earnings expectations of firms offering products and services linked to new technologies. The main global firms that carry out these activities are based in the United States and their shares are traded on US stock markets.

Favourable earnings expectations have sparked a surge in tech stock prices in recent years. Since early 2019, the Nasdaq-100, home to the main US tech stocks, has seen cumulative gains of over 220%, versus 132% on the S&P 500 (see Chart 1). The stock prices of some of these firms, such as Nvidia and Tesla, have shot up in this period, gaining 4,110% and 1,083%, respectively.

The increase in stock prices has resulted in historically high market value ratios. For example, the price-to-earnings (P/E) ratio, calculated by dividing a firm’s share price by its earnings per share, is currently above its historical average for both the S&P 500 and the Nasdaq-100 (see Chart 2). This reflects the market expectations that these firms will generate much higher earnings in the future, anticipating that the new technologies will have far-reaching effects and that these companies will be highly capable of reaping the rewards.

The surge in tech stocks prices has increased tech firms’ weight in the broad US stock market indices significantly. For instance, depending on the firms considered, they account for 32%-45% of the S&P 500 (see Chart 3). By contrast, their index weight is considerably lower in Europe: around 14% of the EURO STOXX (see Chart 4). In absolute terms, the market capitalisation of the S&P 500 technology index² was around 29 times that of the EURO STOXX Technology index at the end of October.

Tech firms’ current situation shares some similarities with the global dot-com bubble episode of the early 2000s.

Chart 1
US stock market indices

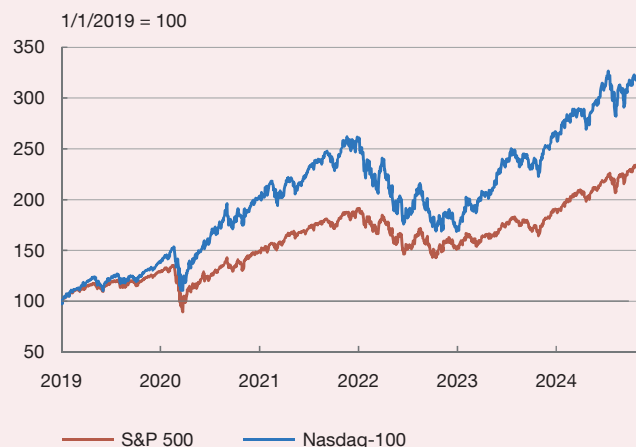
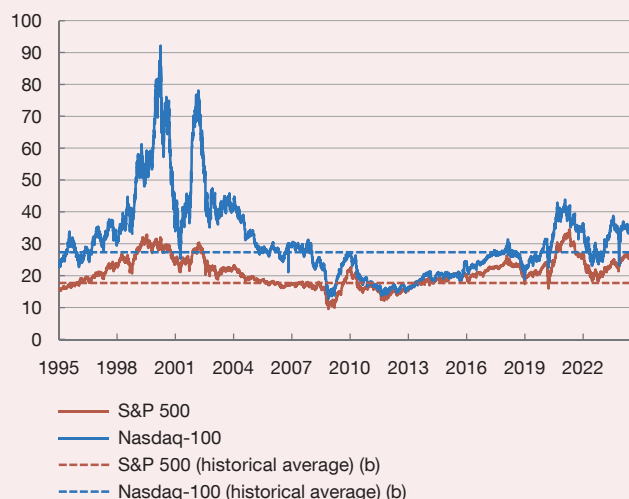


Chart 2
P/E ratio. US stock market indices (a)



SOURCES: Refinitiv Datastream and Banco de España.

- a The P/E ratio reflects the relationship between stock price and earnings per share.
- b Historical average since 1973.

1 For a more detailed discussion of AI developments and their macroeconomic and financial sector implications, see, for example, Chapter 3 of Bank for International Settlements. (2024). *Annual Economic Report*.
 2 The S&P 500 Information Technology (IT) index plus the Magnificent Seven firms not included in that index (see note b to Chart 3).

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During this period, their share prices also saw significantly stronger growth than other economic sectors: the Nasdaq-100 climbed by 716% between early 1996 and the peak of the bubble in March 2000, versus the S&P 500 which rose by 147% (see Chart 5).³

Optimism about the internet's transformative potential underpinned the gains in tech stock prices, with the P/E ratio of the Nasdaq-100 reaching an all-time high in early 2000 (see Chart 2). However, these high values proved unsustainable and the main tech indices around the world underwent a sharp correction: between March 2000 and end-2002, the Nasdaq-100 lost 79% of its value.⁴

This correction had a relatively small impact on the US economy, thanks to the tech sector's low level of debt, the financial sector's limited exposure to internet-related firms and the fact that share holdings were concentrated on higher income earners, which softened the fall in aggregate demand.⁵ Even so, the correction in tech stock prices, together with other factors, meant that the US economy experienced a shallow recession between March and November 2001,⁶ with the unemployment rate reaching 5.5%. Meanwhile, the euro area economies – above all the region's core countries – slowed down considerably in 2001.⁷

Chart 3
Capitalisation of the S&P 500 technology indices

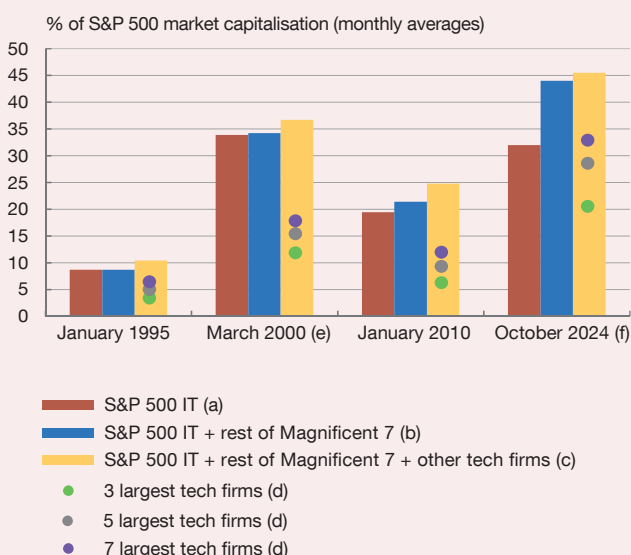
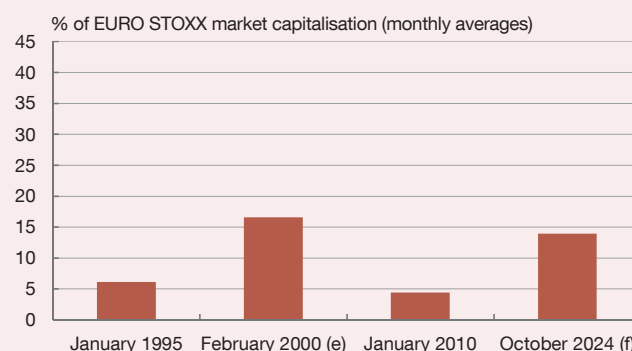


Chart 4
Capitalisation of the EURO STOXX Technology index (g)



SOURCES: Refinitiv Datastream and Banco de España.

- a S&P 500 IT, comprising 67 firms, including three of the Magnificent Seven (Microsoft, Apple and, since March 2000, Nvidia).
- b S&P 500 IT + rest of the Magnificent Seven: includes Amazon and Alphabet since March 2000 and Meta and Tesla since September 2024.
- c S&P 500 IT + rest of the Magnificent Seven (see note b) + some of the most relevant tech firms during the dot-com period (ATT, Automatic Data Proc, Comcast, Ebay, Electronic Arts, Jack Henry & Associates, SBA Comms. and Verizon).
- d Market capitalisation of the three, five and seven largest tech firms as a percentage of the broad aggregate shown in note c above.
- e Month of 2000 in which, in average terms, the capitalisations of the S&P 500 and EURO STOXX technology indices as a percentage of the broad index peaked (March 2000 and February 2000, respectively).
- f Monthly average up to 28/10/2024.
- g EURO STOXX Technology, comprising 20 firms.

3 The Nasdaq-100 peaked on 27 March 2000. There is no consensus over when the dot-com bubble episode began. Between early 1990 and the peak of the bubble the index gained 2,002%. Calculated from 1998, the gains amounted to 375%. For more details, see J. Bradford DeLong and Konstantin Magin. (2006). "A Short Note on the Size of the Dot-Com Bubble". NBER Working Papers, 12011, National Bureau of Economic Research.

4 The more tech-oriented European indices also experienced deep corrections. For example, the German NEMAX 50 index fell by more than 90% and was subsequently discontinued. See William Quinn and John D. Turner. (2020). "Chapter 9. The Dot-Com Bubble". In *Boom and Bust: A Global History of Financial Bubbles*. Cambridge: Cambridge University Press, pp. 152-169.

5 *Ibid.*

6 For more information, see the National Bureau of Economic Research [announcement](#) of 17 July 2003 and [NBER Business Cycle Dating](#).

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US tech firms' stock market position is not, however, identical to that of the dot-com bubble. There are some key differences. First, as depicted in Chart 2, while the Nasdaq-100's P/E ratio has increased – with fluctuations – in recent years and stands above its historical average, it is far from the highs recorded during the 2000 bubble. A more granular

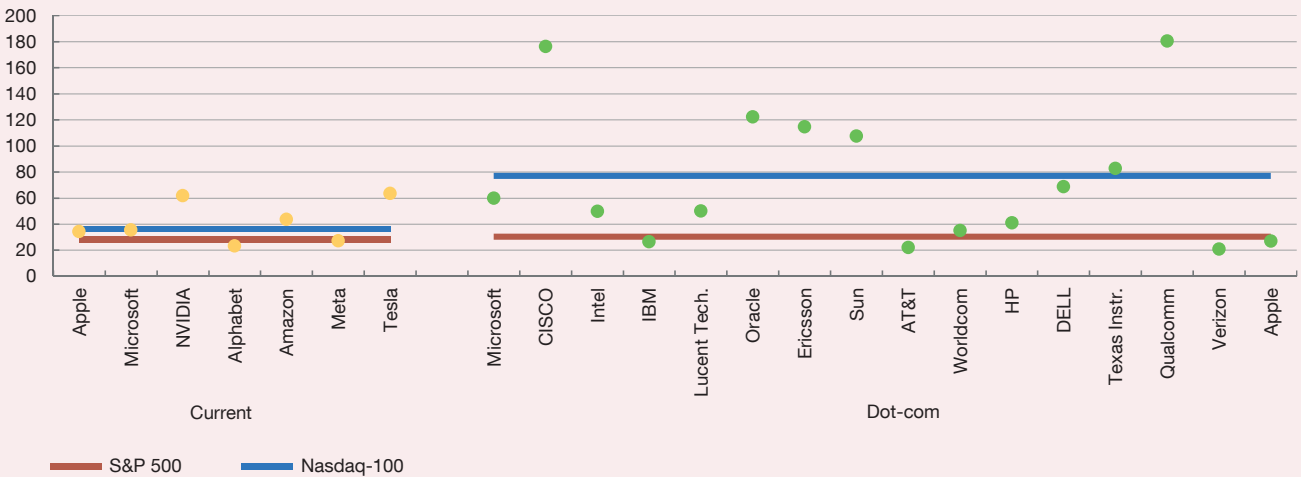
analysis for a selection of firms from the two periods – the current Magnificent Seven and a group of relevant firms from the dot-com era – confirms that, in general, today's tech firms, with the highest market capitalisation, have a more contained P/E ratio than several of the dot-com firms during the 2000 bubble (see Chart 6).

Chart 5
US stock market indices



SOURCES: Refinitiv Datastream and Banco de España.

Chart 6
Price-to-earnings (P/E) ratio (a)



SOURCES: Refinitiv Datastream and Banco de España.

a The P/E ratio measures a firm's share price relative to its observed earnings per share. Data provided by Refinitiv Datastream for the "Magnificent Seven" (ordered from highest to lowest capitalisation) in the current period (August-October 2024 average) and for some relevant tech firms in the dotcom period (January-March 2000 average). The lines represent the average values of the S&P 500 and Nasdaq-100 indices in the current and dot-com periods. Not all firms shown in the dot-com period are included in the S&P 500 or Nasdaq-100 indices.

7 For further details, see the Banco de España's *Annual Report 2001*.

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Another key difference is that, compared with the ecosystem of many small and young tech firms in the early 2000s, today's tech leaders have cemented their position, meaning they could be better placed to retain the earnings from new technologies such as AI. In addition, these technologies, unlike those developed during the dot-com episode, are characterised by their robust network effects and product customisability. This entails a very strong tendency towards concentration, which reinforces their ability to harness the economic value they create for their customers.

However, in the current period, the concentration of market capitalisation among a handful of firms increases the potential systemic impact of idiosyncratic risks linked to those companies, should they materialise. For instance, the three largest US technology firms (Apple, Microsoft and Nvidia) currently account for roughly 20% of the S&P 500, far more than their equivalents at the height of the dot-com bubble (just over 11%) (see Chart 3).

Given their current high levels, tech stock prices are at risk of abrupt corrections, which could be triggered if these companies' earnings fail to grow as quickly as the markets expect. Here, it is important to note the significant uncertainty surrounding the potential profits associated with new technologies and how long they will take to materialise. Indeed, in the most recent period technology firms' stock prices have been particularly sensitive to their earnings releases.

A case in point is the recent correction in the share price of ASML Holding, one of Europe's largest technology firms. The company's shares plunged 15.6% in a single day after it announced lower than expected earnings guidance on the back of weak chip demand. The correction spread to other global chipmakers, whose stock prices declined more moderately.⁸

Moreover, the earnings of the most innovative firms are subject to risks associated with, inter alia, the emergence of new competitors, regulatory changes and potential global supply chain problems, against a backdrop of high geopolitical tensions and trade conflicts.

The transition to a carbon-neutral economy could also impact their business, as some of these companies are energy-intensive and might be constrained by the need to reduce emissions. In other cases, demand for their products could rise as the transition gathers pace (e.g. electric vehicles).

Lastly, the share prices of technology firms are highly sensitive to shifts in the macro-financial environment. This is because tech stock prices, more than those of other firms, reflect the discounted present value of strong future earnings expectations. Thus, lower than anticipated economic growth or unexpectedly high inflation that leads to an upward revision of interest rate expectations could have a particularly adverse impact on tech stock prices.

A potential correction in tech stock prices could affect financial stability through a number of channels. First, consumption and economic activity would suffer due to the decrease in the wealth of these firms' shareholders and the potential erosion of agents' confidence. The fact that these firms' market capitalisation has a large weight in US broad indices means that any stock price correction could be far-reaching. The declines could spread to other firms and markets, such as those in Europe, through various mechanisms. These include those associated with heightened global risk aversion or potential fire sales by investment funds in the event of a significant increase in redemptions.

Moreover, lower stock prices would affect the tech firms themselves, diminishing their capacity to raise equity financing, while also potentially increasing the cost of bond or bank loan financing. This reduced financing capacity would, in turn, make it harder for them to sustain the high investment levels⁹ on which their future earnings growth largely relies.

Lastly, these corrections could affect banks' capacity to lend if they are highly exposed to such firms or if banks' share prices were severely hit by the shock.

To assess the possible direct effects of a potential correction in tech firms' share prices, it is useful to start by analysing their ownership structure. As Chart 7 shows,

⁸ Similarly, Meta shares suffered single-day drops of 26% in February 2022 and of 24% in October 2022, following the release of quarterly earnings.

⁹ At June 2024, the annual investment of the "Magnificent Seven" US tech firms represented, on average, 11% of their assets and 56% of their after-tax profit.

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most of the capital of the top seven US tech firms by market capitalisation is held by investment funds (54.8%) and retail investors (30%). Among investment funds, it may be reasonably assumed that most of the ultimate holders are natural persons.¹⁰ Meanwhile, as Chart 8 shows, these investment funds are mostly domiciled in the United States, although the unit-holders may be more geographically dispersed. This ownership structure means that the wealth effects described above and the possible amplifying factors, through investment funds and an overall increase in risk aversion and liquidity constraints on the financial markets, may be significant. Conversely, direct contagion to banks through shareholdings would be very limited given their low exposure.

Information available on the balance sheet structure of the top seven US tech firms reveals that most operate with low leverage and a high degree of equity financing (over 50% on average) (see Chart 9). Moreover, most of them have sufficient liquid assets to cover a large share or all of their credit obligations (see Chart 10). This balance sheet

structure should mean that tech firms are well placed to cushion potential financial problems associated with a share price correction, which would help contain their credit quality deterioration.

To sum up, the high share values of tech firms pose some risks to global financial stability, given that they account for such a high proportion of US stock market capitalisation. Specifically, if the earnings growth of these companies falls substantially short of market expectations, they could experience sharp corrections in their share prices that could spill over into other assets and markets.

Compared with the dot-com bubble of the 2000s, today these risks seem more contained, as stock valuation metrics are closer to historical averages. In addition, leading tech firms are now more consolidated and, therefore, in comparison with some pioneering internet firms in the 2000s, are better positioned to retain the benefits of new technologies such as AI, thanks also to the network effects that these technologies entail. Nevertheless, today's higher

Chart 7
Ownership structure of main US tech firms by institutional sector (a)

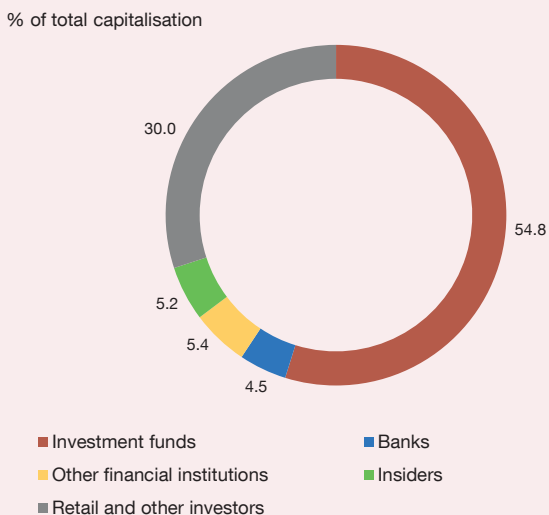
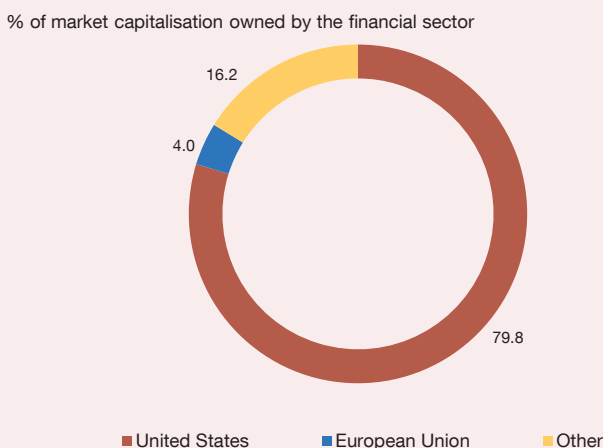


Chart 8
Geographical distribution of financial sector ownership of main US tech firms (a)



SOURCE: Capital IQ.

a Average weighted by market capitalisation for the top seven US tech firms: Alphabet, Amazon, Apple, Meta, Microsoft, Nvidia and Tesla.

10 According to Investment Company Institute data, in 2023 households held 88% of the shares (units) of US investment funds, and 95% in the case of long-term investment funds. More than half of all US households held such investments, which accounted on average for 22% of their savings.

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level of concentration of market capitalisation across just a few firms increases the systemic importance of the risks associated with this sector.

The risk of bank-level contagion of a possible stock price correction appears contained, given banks' low exposure to tech firms' capital and the healthy structure of most

tech firms' balance sheets. However, the potential amplifying effects through investment funds could be comparatively more significant, in view of their high shareholdings in tech firms. Lastly, while the United States would foreseeably see the most impact, significant global effects could also be expected, given the high interconnectedness of the financial markets.

Chart 9
Sources of funding of main US tech firms. June 2024

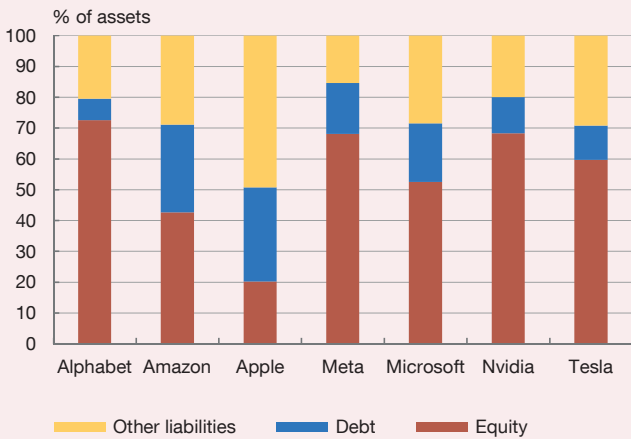
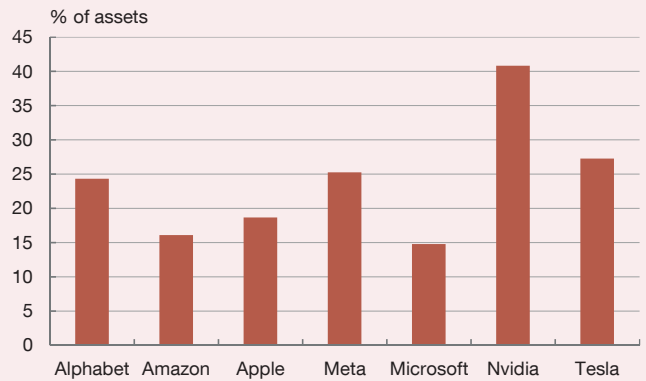


Chart 10
Liquidity of main US tech firms. June 2024 (a)



SOURCE: Capital IQ.

a Liquidity is defined as the sum of cash and cash equivalents, short-term investments and trading asset securities.