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Should we mind the gap? An assessment of the benefits of equity markets and policy implications for Europe's capital markets union

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Abstract

The European Union (EU) economy depends heavily on bank funding. For this reason, strengthening EU equity markets as an alternative funding source has been a policy priority under the Capital Markets Union (CMU) agenda, and more recently a key feature of the Savings and Investment Union (SIU). EU listed equity markets are smaller and structurally different from those in the United States (US), with differing market capitalisations of listed firms and differences in the number of companies listed, stemming from lower initial public offering (IPO) activity in Europe. This paper aims to understand the drivers behind the EU-US listing gap, focusing on two aspects: (1) the general firm-level benefits of listing, and (2) whether pre-listing financing opportunities in the EU are underdeveloped, hindering firm growth and ultimately market depth. This paper first puts forward an empirical analysis on how a firm's decision to list impacts various key performance indicators, with a view to assessing the implications of listing for the economy at large. Second, it zooms in on innovative firms to shed light on the challenges faced by EU startups in their funding pipelines, with a focus on late-stage equity financing and venture capital (VC) markets. Focusing on the euro area (EA) as a proxy to derive broader benefits of listing in the EU, we find that EA companies' key profitability measures, employment, innovation capacity and productivity all increase after listing – and are thus indicative of wider economic benefits. This is, however, associated with challenges for the long-term investment strategies of listed companies, such as potential short-termism – a topic widely studied in the literature. Moreover, a comparison with the US suggests that, while the benefits and risks of listing are qualitatively similar on the other side of the Atlantic, EA companies seem to benefit somewhat less from listing than their US peers. Looking at pre-listing financing opportunities in the EU, the paper explores the interplay between VC and equity markets, suggesting that enhancing VC access and market size in Europe can support a vibrant pipeline of firms capable of listing domestically. Finally, acknowledging that there are multiple reasons for the listing gap between the EU and the US, and given our results on the impact of listing for EU firms, the paper offers policy recommendations to increase listings and improve pre-listing financing conditions by tackling long-standing obstacles in Europe's Single Market and the capital markets in particular.

JEL codes: G10, G30, L10, L50 G24. G32, L21, L25,

Key words: savings and investments union, capital markets union, equity markets, listing, venture capital, financial structure

Executive summary

Developing equity markets is one of the priorities pursued in the SIU.[1] Deep and liquid equity markets bring several benefits for the economy. They provide alternative (and potentially more flexible) financing sources for companies – especially innovative ones. This enables citizens and investors to invest in productive firms, allowing them to participate in the wealth created by these activities. Well-developed equity markets also help overcome potential funding constraints and reduce overreliance on the banking system. Additionally, they contribute to the development of private risk-sharing channels across EU countries,[2] supporting the resilience of the monetary union, and therefore sit at the core of the CMU project.[3]

In a rapidly evolving geopolitical landscape, European policymakers are increasingly focused on enhancing Europe's productivity and competitiveness and increasing the attractiveness of Europe as an investment destination – with deep and liquid equity markets being one key ingredient.[4] More diversified financing sources able to support risk-taking and innovation are critical to addressing challenges such as funding the green and digital transitions. Promoting deep and liquid capital markets is central to these efforts, ensuring that firms have access to various forms of risk capital to meet their diverse needs throughout their lifecycle. At the same time, efforts focused on financial markets need be embedded in a wider effort to foster European economic integration, resilience and sovereignty.

This paper documents that the EU's listed equity markets display a development gap compared to the US in terms of market size, performance, and dynamism. The introductory section presents stylised facts comparing the two regions and putting these in perspective with the benefits from public listing derived from the literature, emphasising the importance of public listing for market liquidity and wealth access. This provides an underpinning as to why policy makers should consider whether the listing gap in Europe is a matter of concern warranting a policy response.

Our empirical analysis exploits micro-level data to determine the impact of a firm's decision to list on some of its key performance indicators, with a view to assessing the benefits of listing to the economy at large. Chapter 2 shows that EA companies' key profitability measures, employment, innovation capacity and

1 See the European Commission website.

2 See, for example, Born, A.et al. (2023).

3 See the European Commission website.

4 See, for example, Draghi (2024) and Letta (2024). The Eurogroup and Heads of States in the Eurosummit have lent support to the CMU as a priority for the new European legislative cycle. The ECB has also contributed to the public policy debate by outlining priorities in a statement by the Governing Council on advancing capital markets union, alongside regular publications such as the biennial report on financial integration and structure in the EA and the Financial Stability Review.

productivity are all found to increase after listing[5] – and are thus indicative of wider economic benefits. This is, however, associated with challenges for the long-term investment strategies of listed companies, a topic widely studied in the literature referring to short-termism.[6] Moreover, a comparison with the US suggests that, while the benefits and risks are qualitatively similar on the other side of the Atlantic, EA companies seem to benefit somewhat less from public listing than their US peers.

Our results indicate that pre-listing financing opportunities in the EU are less developed, with significant implications for firm growth and market depth. Chapter 3 sheds light on pre-listing financing opportunities in the EU, in particular VC markets, assessing the health of the EU's financing ecosystem for young and innovative firms which may develop into potential candidates for initial public offerings (IPOs). It illustrates the larger, more developed US VC markets and the reliance on foreign — especially US — investors to finance larger funding rounds in the EU, which has implications for where firms list. The chapter highlights the interplay between VC and public equity markets, suggesting that enhancing VC access and market size in the EU can support a vibrant pipeline of firms capable of listing domestically. This, in turn, can enhance market depth and attract new business.

Policy recommendations focus on addressing impediments to listing and enhancing pre-listing financing to deepen EU capital markets. Chapter 4 offers policy recommendations based on the findings of the analysis presented in this paper, aiming to tackle long-standing obstacles in the EU Single Market and the capital markets, such as a lack of harmonisation. In view of the existing structure of the EU economy, which is predominantly composed of small and medium-sized enterprises (SMEs), it assesses the potential for incentivising EU firms to go public, increasing the propensity for listings and enhancing market depth. The chapter also suggests aligning incentives to balance immediate and sustained growth objectives, given the risk that listed firms may prioritise short-term business decisions over longer-term opportunities. Additionally, the need to develop pre-listing VC financing is emphasised; this is crucial to scaling firms so they can eventually list on public markets, and is also a key market segment supporting the development of innovative firms in the EU.

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5 Our analysis focuses on the EA as a proxy to derive broader results for the EU in general. The focus is on public equity (i.e. equity of publicly traded companies) as opposed to private equity (i.e. equity that is not listed and is not held by dedicated specialised investment funds or companies with the aim of bringing in active outside management). For instance, the latter could refer to family-owned businesses or SMEs where the founder or group of founders is the owner. This is distinct from private capital, which is typically invested through a dedicated investment management firm by a venture capitalist or similar investors and is analysed in Chapter 3 when describing the pre-listing financing conditions available to firms which could potentially list on public markets.

6 See for instance Stein (1989), Porter (1992) and Asker et al. (2015), on which we base our empirical approach.

1 Is there a listing gap in the EU? A comparison of the EU and US equity markets

1.1 Why listed equity matters

The academic literature highlights several key benefits from listed equity compared to privately held equity, both for individual investors and the broader economy. First, in general well-functioning equity markets can facilitate efficient capital allocation by channelling funds from savers to companies able to use them for productive investments (Wurgler, 2000). By allocating resources efficiently, capital markets can contribute to higher economic growth, as firms can expand operations, innovate and improve productivity. Deep and liquid equity markets reduce the cost of trading and increase the attractiveness of equities as an investment, encouraging more participation in the market. Second, deep and well-functioning equity markets can contribute to financial stability. They make it easier and less costly for investors to diversify and benefit from risk sharing. A more diversified investor base in turn can benefit financial resilience by spreading potential losses across a wider group of actors. Moreover, an increase in the size of the banking system compared to capital markets is associated with higher systemic risk (Langfield and Pagano, 2016). Equity markets can enhance stability for firms by offering a stable source of financing and reducing reliance on debt.

From a macroeconomic perspective, listing can create positive externalities, ultimately resulting in higher output. Pagano (1993) develops a model whereby public listing allows liquidity-constrained firm owners to diversify their equity holdings by using IPO proceeds to purchase equity in other firms. Within this model, firm owners weigh the cost of going public against the gains from portfolio diversification. Listing in turn increases risk-sharing opportunities for other entrepreneurs. The model can see multiple equilibria emerge, some of which display an inefficiently low number of listed firms, particularly once capital market imperfections such as transaction costs are considered. Regulatory innovations to incentivise listing, when successful, can be an effective tool to coordinate expectations away from this low-listing equilibrium. Saint-Paul (1992) follows a similar argument in a model where higher degrees of capital market development allow for more specialisation, greater division of labour and thus higher productivity. Where capital markets are developed, agents can diversify away some of their specialisation risk, paving the way for a risk/return-optimised allocation of resources that allows a higher degree of specialisation overall, and thus higher levels of output.

A more vibrant stock market could have important spillovers to other parts of the EU capital market. In the literature, deeper equity markets are associated with more market-based financial systems relying primarily on arm's length bond market finance, rather than intermediated finance (Levine, 2002). More developed bond

markets provide firms with more diversified sources of financing, which can reduce funding costs as competition in the credit market increases. Furthermore, a developed bond market can function as a safety valve when problems emerge in the banking system. Recent evidence from the EA confirms that the largest volume of bond issuance stems from listed firms (Papoutsi and Darmouni, 2022). More broadly, access to market-based finance is positively associated with subsequent SME growth (Boccaletti et al., 2025). Moreover, some work suggests that VC markets can benefit greatly from developed equity markets, as they provide VC investors with an attractive exit strategy (see Black and Gilson, 1999). As such, creating a deep and liquid EU equity market could enable more diversified funding opportunities for EU corporations.

The literature suggests a connection between the depth of equity markets and the size and growth of high-tech sectors. Demirgüç-Kunt et al. (2013) consider the effect of size and structure of financial markets on economic growth and report that the relationship changes when economies develop. The authors find that as the level of economic output increases, the contribution to growth from bank financing decreases, while the contribution of securities markets to supporting economic growth rises. More developed stock markets support the growth of these industries, by facilitating investments that lead to productivity growth and a larger number of high-tech startups. Importantly, this contrasts with credit markets, which are found to have limited relevance outside industries that require substantial physical capital for production (Brown et al., 2017). On the firm level, recent evidence suggests that a greater reliance on equity finance is associated with higher and less volatile research and development (R&D) investment (Adilbish et al., 2025). This could be particularly harmful for productivity growth, as disruptions to R&D spending have been found to have a negative impact on average firm growth (Aghion et al., 2010).

Recent literature has looked at the impact of financial structures on economic policy objectives beyond growth. As an example, De Haas and Popov (2023) find that in countries with deeper stock markets, carbon-intensive industries reduce emissions faster than in economies with less developed capital markets. The authors identify two channels that drive their results. First, deeper stock markets are found to increase the number of green patents granted to companies in polluting sectors. Second, carbon emissions are found to decrease more in carbon-intensive industries when stock market funding is a more pronounced part of the capital structure. Finally, there is evidence that stock markets reallocate new investments towards less polluting companies, putting relatively carbon-inefficient companies at a disadvantage compared to cleaner competitors.

More developed equity markets are also beneficial from the perspective of investors and firm owners. Listed equity markets are key for price discovery, enabling investors to make informed investment decisions and facilitating efficient capital allocation. Listed firms are found to provide valuable information to investors and market analysts through public disclosure. Badertscher et al. (2013), for example, find that unlisted companies operating in sectors with a higher concentration of listed firms respond more strongly to investment opportunities. This suggests that developed public equity markets increase economic dynamism within

sectors beyond those firms that are actually listed. Similarly, Kim and Ljungqvist (2023) find that listed firms benefit from a further deepening of public equity markets. Their work shows that IPOs of new firms generate a positive information externality for peers already listed. The increased availability of publicly available information within the industry increases investor interest in the sector and boosts the market liquidity of other listed firms.[7]

Listed equity is also associated with social benefits, including lower barriers to entry, lower transaction costs and increased access to higher returns for retail investors. The pool of investors with access to private equity or VC investments is not as broad as those who have access to public equity markets. This could, for example, be because of minimum investment thresholds or other barriers to entry into these markets, which can typically be overcome by larger or institutional investors such as pension funds or asset managers, but are more significant for retail investors with limited funds and expertise. Where firms rely on private equity, the growth and the wealth generated is inaccessible to the general public. The evidence on private versus public equity is mixed, however, owing in part to the transparency of data. Harris et al. (2014) find the returns realised by VC funds to be 3% higher than those on the S&P 500. Furthermore, as the number of companies listed on a given market decreases, the benefit of diversification obtainable from investing in the entire market diminishes. Lower diversification typically increases volatility, further diminishing the attractiveness of public equity markets and reducing the attractiveness of EU equity markets as a way of allocating savings. Fewer listed firms could therefore have important implications for what has been called the democratisation of wealth creation (European Commission, 2020).

1.2 A brief comparison of EU and US equity markets

Listed companies in the US equity market tend to be better positioned than their counterparts in the EU due to higher market valuations, greater depth and increased liquidity. Market valuations of US companies enjoy a premium. Over time, US-listed companies achieve valuations 3.32 times higher on average than their European counterparts. Higher valuations are observed even when companies' fundamentals are comparable across the US and the EU, pointing to higher market efficiency, depth and liquidity in the US market. This is often attributed in the literature to a combination of elements such as the US market structure, a wider investor base, a supportive regulatory environment, well-functioning corporate governance, broad access to capital, network effects and access to innovation.[8] EU markets are also less liquid than their US counterparts. According to Euronext, combining all companies with a market capitalisation over EUR 250 million, the average daily trading volume is more than four times higher in the US than in EU: EUR 288 billion vs EUR 65 billion in 2023. This liquidity gap with the US is driven by the largest listed corporations (i.e. the mega-caps which reach more than EUR 100

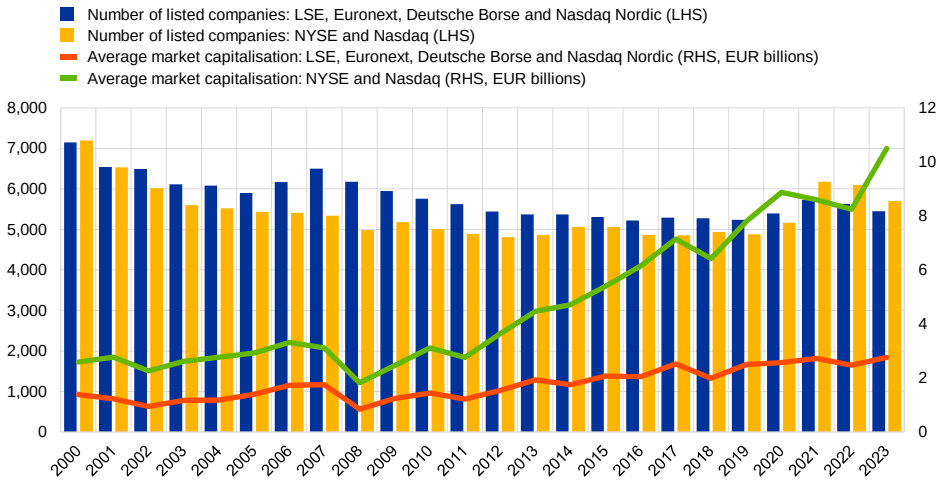
7 Given that positive externalities generally lead to underprovision of a good, the authors conclude that information externalities could contribute to a sub-optimally small equity market.

8 See for example Acharya and Pedersen (2005), Hegey et al. (2008) and Gompers at al. (2001).

billion in market capitalisation).[9] These factors collectively create an environment that supports higher valuations and makes US markets an attractive destination for companies seeking to maximise their market value.

Chart 1

Average market capitalisation and number of listed companies



Sources: World Federation of Exchanges, ECB calculations.
Notes: Number of listed companies (domestic and foreign) aggregated across a relevant subset of US exchanges including the NYSE and Nasdaq (blue bars) and a subset of relevant European exchanges, including the London Stock Exchange, Deutsche Börse, Euronext and Nasdaq Nordic (yellow bars). The underlying data for the World Federation of Exchanges are based on reporting at the exchange federation level. Average market capitalisation represents averages of domestically listed companies.

The recent trend of a declining number of listings in the EU could further widen the gap with US stock markets, further adding to differences in market depth and liquidity. The beginning of the new millennium saw a similar downward trend in the number of companies listing on the other side of the Atlantic. However, since 2019 the number of listings in the US has overtaken that of the EU. Recent analysis indicates that the listing gap has been driven by a slowdown in listings in the EU compared to the US and the greater attractiveness of US markets – especially for foreign firms – rather than by de-listings.[10] If this trend were to continue and the gap widen even further, it could impact European firms' access to funding and growth opportunities.

There are several explanations for the difference between the EU and the US, including the fact that EU firms generally rely more on bank lending than their US peers, and on unlisted equity. Non-bank financial intermediation has been taking a more prominent role in the financing structure of the EA economy since the global financial crisis,[11] however, bank loans remain the most important source of debt financing for non-financial corporations (NFCs) in the EA.[12] One key reason

9 The gap is however smaller when considering other market capitalisation segments. For instance, the average daily trading volume per company is 1.3 times higher for US large caps and twice as high for US mid-caps compared with their EU counterparts. See Richalot, Bonalumi and Boquillon (2024).

10 See Box 7 of ECB (2024).

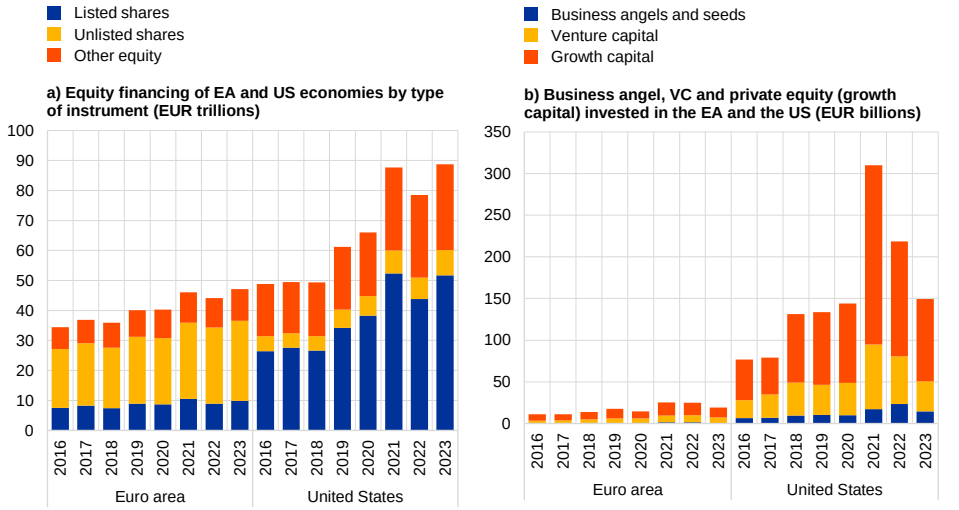
11 Non-bank financial intermediaries accounted for 27% of outstanding credit to NFCs as of the third quarter of 2023. See ECB (2024), Section 4.1.3.

12 See Cappiello et al. (2021).

behind this is the traditional reliance in Europe on relationship-based financing, where firms maintain close ties with banks and private investors; this often leads to a preference for private equity and debt over public equity markets. The EU also has a higher prevalence of family-owned businesses; these tend to be associated with more concentrated ownership as a way of retaining control and confidentiality. Unlisted equity makes this easier to achieve. Family businesses represent 22.4% of listed companies in the US, whereas 43% of European listed companies are family-controlled (defined as owning 20% of the voting rights).[13] Furthermore, capital markets in Europe have developed in a more fragmented manner along national lines compared to the more centralised and mature capital markets in the US. The result is a less vibrant ecosystem for public equity. These factors collectively contribute to the greater reliance on unlisted equity by euro area firms (Chart 2).

Chart 2

Equity financing of EA and US economies by type of instrument



Sources: ECB Financial Integration and Structure in the Euro Area Report (FISEA), 2024. Panel a. ECB and OECD; Panel b: European Business Angel Network, Invest Europe, National Venture Capital Association, Center for Venture Research (University of New Hampshire).
Notes: Panel a: the chart is based on financial accounts data. Other equity refers to equity claims that are not securities listed on an exchange and are not unlisted securities, such as equity in incorporated partnerships, equity in limited liability companies whose owners are partners, capital invested in cooperative societies or investment by the government in the capital of public corporations whose capital is not divided into shares. Data for the United States are based on the global System of National Accounts (SNA) 2008. The European System of Accounts 2010 underlying the EA data is broadly consistent with the SNA 2008, although in some cases it may be more detailed. Panel b: the data cover all EA countries except Cyprus, Malta, Slovakia and Slovenia. Venture capital is a subset of private equity and refers to equity investments made for launch (seed), early development (startup) or expansion (later-stage venture). "Seed" is funding provided before the investee company has started mass production/distribution, with the aim of completing research or defining and designing the product, including market testing and creating prototypes. This funding is not used to start mass production/distribution. "Startup" is funding provided to companies once the product or service is fully developed, to start mass production/distribution and cover initial marketing. Companies may be in the process of being set up or may have been in business for a shorter time, but have not sold their product commercially yet. The use of the capital would mostly be to cover capital expenditure and initial working capital. "Later-stage venture" is financing provided for an operating company, which may or may not be profitable. This tends to be financing provided to companies already backed by VCs. For further details see Invest Europe. "Business angel" investments are (high-risk) investments made by early-stage private investors, typically in the form of seed financing for startup businesses. Angel investments comprise both financial contributions and time, expertise and connections the investors provide in exchange for ownership equity.

The European economy is much more reliant on SMEs than the US, which has implications for the depth of equity markets. SMEs are considered the backbone of the European economy, accounting for a substantial share of employment and value-added in the region. According to the European Commission, SMEs (<250 employees) make up over 99% of businesses and account for 65% of employment

[13] See Dauphine-PSL (2024).

and 53% of value-added.[14] In the US, small businesses (<500 employees) account for about 46% of private-sector employment and about 44% of GDP.[15] European SMEs in the non-financial sector are concentrated in a few industries: construction (25.9% of all EU-27 SMEs), retail (23%) and tourism (14.9%). The sizeable contribution that SMEs make to value-added and employment underscores the essential role they play in the EU economy. However, barriers to scaling up (even in the Single Market) and difficulties accessing adequate financing sources mean European firms are missing growth and productivity-enhancing opportunities. This has led the European Commission to undertake dedicated action to support SMEs' access to listed equity.[16]

Other noteworthy characteristics of listed European firms include their comparatively older age and the longer time span before they reach the IPO stage. As of July 2024, the average firm age for a large sample of listed NFCs stood at 40.1 years in the EA, compared to 33.4 years for firms from other European countries and 23.6 years in the US (see Table 1). The average time to IPO was 23.1 years for firms in the EA, compared to 18.8 years for firms in other European countries and 10.2 years for US firms. Overall, the EA stands out as being home to a comparatively older population of large, listed firms. In a narrower sample of 539 NFCs with at least 10,000 employees, 40% of EA-based firms were founded before 1975 and 75% before 2000, compared to 24% and 55% respectively in the case of US firms. This is indicative of the vibrancy in the landscape of listed firms in the US, which appears to benefit from an ecosystem[17] that encourages young companies to scale up and enter the pool of large, listed corporations.

Table 1

Summary of firm characteristics: US versus European

	Average firm age (years)	Average time to IPO (years)	Average market capitalisation (EUR million)	Average number of employees
US	23.6	10.2	11,137.9	10,006
EA	40.1	23.1	4,180.3	10,269
Other Europe	33.4	18.8	2,150.4	4,760

Source: ECB calculations based on data from Orbis extracted on 26 July 2024.
Notes: Mean values. Average firm age is based on the date of incorporation, which refers to the official date on which a company was legally formed, registered or incorporated according to its national registry or relevant authority and may thus differ from the date of creation of the company. The sample consists of listed NFCs with at least 50 employees. Sample of 2,331 US firms with their primary listing on the New York Stock Exchange or Nasdaq National Market. Sample of 817 EA firms with their primary listing in Amsterdam, Brussels, Dublin, Frankfurt am Main, Lisbon, Madrid, Milan or Paris. Sample of 914 firms from other European countries with their primary listing in London, Stockholm, Warsaw or Zurich.

Whether or not to issue listed equity is just one of a variety of strategic, financial, and market-related decisions firms have to take, but having a pipeline of new IPOs is key to ensuring market vibrancy. On a longer timescale, cumulative net issuance of listed shares in the EA amounted to over EUR 903 billion

14 See the European Commission report on European SMEs 2023/2024.

15 See the US Small Business Administration Office of Advocacy: Frequently Asked Questions About Small Business 2023.

16 See the European Commission website.

17 See Fast et al. in Box 8 of ECB (2024), who find that geographical proximity to financial centres supports firms (in this case fintech startups) in several ways: easier access to equity financing, opportunities to tap into a diversified and pool of fundings tailored to specific needs and the availability of institutional support schemes.

between 1999 and June 2023, indicating that new issues exceeded buybacks and de-listings. The picture is very different in the US, where the figure was EUR 21,380 billion over the same time period. Rather than a trend for going private or de-listing, this likely points to the fact that US firms engage in share buybacks for a variety of reasons.[18] These can include returning capital to shareholders and boosting earnings per share, signalling confidence, managing their capital structure, achieving tax efficiency, utilising excess cash, mitigating dilution, taking advantage of potential undervaluation (market timing) and as a defensive strategy. The specific motivations can vary depending on a company's financial situation, market conditions and strategic objectives. This suggests that having a pipeline of new IPOs is more important for ensuring the markets' vibrancy than transactions by older established firms exiting the market, either by de-listing or more gradually through share buybacks.

These stylised facts point to a gap between the EU and the US in terms of the size, performance and dynamism of equity markets. Given the widespread benefits that well-functioning equity markets are expected to bring, this in turn has implications for addressing broad policy objectives. The following chapters assess the impact listing has on firms and analyse the ecosystem that can support firms to grow into larger listed companies.

[18] Grullon and Michaely (2002) postulate that the slowdown in issuance results from the increasing use of buybacks to compensate shareholders starting in the 1980s, supported by the introduction of supportive legislation facilitating open-market repurchases. Unlike dividends, buybacks reduce net equity issuance by lowering the number of shares outstanding on the market.

2 Deriving the benefits and challenges of listing from firms' choices at the micro level

This chapter exploits micro-level data to determine the impact of a firm's decision to list on different firm-level indicators with a view to identifying the benefits and challenges firms face when going public. Specifically, the analysis that follows aims to derive new evidence on the wider economic benefits of listing in the EA by exploiting data at the firm level and asking the following question: in the years after listing, does a company perform better than otherwise comparable peers that chose to remain unlisted? To do so, we compare EA-listed (i.e. public) and unlisted (i.e. private) firms. In a second step, we extend our analysis to compare results across EA and US-listed firms.

Zooming in on what firms can gain by going public and possible obstacles, the analysis offers insights into how to promote capital market development. The previous chapter laid out a number of arguments – some grounded in theory – for the macroeconomic benefits of deep and liquid equity markets. By looking at the benefits and challenges of listing at the firm level, this chapter complements that work with insights on what deters firms from going public. The aim is to identify policy measures particularly suitable for promoting incentives for firms to list, in order to encourage deeper and more liquid capital markets.

2.1 Do companies benefit from listing?

Empirical identification of the benefits of public listing is challenging, primarily owing to the presence of other factors impacting economic performance and the fact that listing decisions are themselves a reflection of firm characteristics. At the macro level, a large body of literature assesses the benefits of listing by comparing the performance of economies with a high prevalence of listed companies to that of economies with a low such prevalence.[19] However, this approach cannot account for the myriad of additional factors impacting macroeconomic performance, many of which cannot be appropriately controlled for. Moving to the micro level and using firm-level data to derive the likely macroeconomic benefits of listing may be more promising, as the performance of listed companies *within* a given economy or economic area can be benchmarked against that of their unlisted peers. The challenge in doing so, though, lies in the fact that those characteristics that determine a company's performance are the very same ones that might lead the firm to list or remain unlisted. Consequently, it

[19] Among others, see Levine and Zervos (1996), Levine and Zervos (1998), Rajan and Zingales (1998), Henry (2000), Levine (2002), Beck and Levine (2004), Bekaert, Harvey and Lundblad (2005), Demirgüç-Kunt, Feyen and Levine (2013).

becomes difficult to disentangle the impact of listing from pre-existing favourable characteristics – a common issue in econometrics referred to as endogeneity.

A matching approach, where a subset of firms that chose to go public is compared to a matched subset of similar private firms, helps identify the "pure" effect of listing on key performance metrics and hence determine the benefits and risks associated with listing. In a nutshell, EA companies that chose to list are matched with a set of comparable firms that chose to remain private, with the latter set serving as counterfactual. Working with unlisted firms means facing data limitations, as private firms are not subject to the same level of disclosure as public firms. This makes it challenging to match firms on a wide set of variables while keeping a sufficiently large sample. In line with the literature,[20] we use a company's size and sector as the main criteria for performing the matching. This means that, for a given company that choses to list, its relevant counterfactual companies will be drawn from the set of unlisted companies in the same sector with sufficiently similar total assets on the balance sheet. The effects of listing can then be gauged by estimating the difference in key performance metrics and investment choices before and after listing between the listed company and its unlisted counterfactual peers. Box A describes in more detail the matching methodology we use following Asker et al. (2015). It also provides statistics on the goodness of fit of our matching as well as an overview of the robustness checks performed to ensure that incorporating additional variables in the matching equation yields qualitatively similar results. In what follows, results are based on a sample comprising 169 EA firms that listed at some point in the period 2012-2019[21] and more than 1,500 firms that remained private.

The evidence suggests that firms benefit from going public in terms of key profitability measures. They do so after an adaptation period before the benefits of going public materialise (see Chart 3). In particular, the analysis shows that for a sample of matched firms, profitability measured as the ratio of operating income to total assets increases by 3.9 percentage points on average relative to unlisted peers in the sixth year after going public, which appears to be the turning point of generating a net benefit following five years of no net impact on average. Firms in our sample reach the largest increase of 9.4 percentage points[22] eight years after listing compared to the cohort of unlisted firms observed in the same year.[23] This positive impact on profitability for firms going public a few years after an IPO adds to

20 Asker et al. (2015).

21 Listing is restricted to the period 2012 to 2019 to include an additional year before and after the listing year to evaluate the impact of the listing decision by comparing listing and non-listing years.

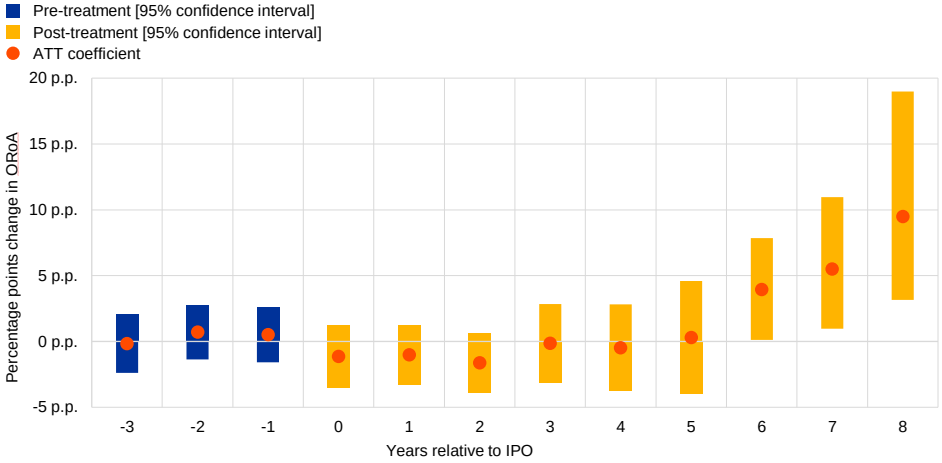
22 To put this result in perspective, we realise an additional estimation based on a simple DiD approach where firms that list in 2012 (treatment group) are observed over the entire eight-year period after listing and compared to the unlisted cohort of firms (control group) over the same period. The average performance for this subset of firms over the entire period amounts to 1.81 percentage points.

23 While this impact is large, it is important to note that the only cohort of listed companies for which performance eight years after listing can be assessed in-sample is the set of those that chose to list in 2012. This is because relevant data are only available starting from 2012 and data from 2020 onwards are deliberately excluded to allow a clean identification not "contaminated" by the pandemic years. On the magnitude of the estimated effect on profitability, also see Larrain et al. (2022). The authors assess the impact of completed and withdrawn IPO attempts on operating ROA over the period 1997 to 2017. They find a 23 percentage-point increase in operating ROA. Unlike our analysis, their results apply specifically to private firms attempting to go public, not necessarily to the overall population of private firms.

the existing literature. Some empirical studies suggest an initial dip in profitability after listing,[24] while others indicate long-term gains as firms leverage new capital and opportunities.[25] In particular, in the presence of product market competition, diversifying the ownership structure by means of an IPO allows firms' owners to tolerate higher profit variability than owners of private firms, given their ability to diversify idiosyncratic risk in the capital market. An IPO can provide firms with the resources necessary to invest in product development, marketing or other competitive strategies. In turn, this can improve the competitive position of firms within their sector.[26]

Chart 3

Average treatment effect on the treated (ATT) for operating ROA (ORoA)



Sources: S&P Capital IQ and LSEG, ECB calculations.
Notes: Our repeated cross-section dataset is composed of 16,638 observations over the period 2011 to 2020, including 1,524 unlisted firms and 169 firms listing over the period 2012 to 2019. In a first step, we match our treated (firms that experience an IPO) to our control group (unlisted firms over the period of interest). We use 1:10 closest neighbour matching with replacement, matching exactly on SIC two-digit industry code and applying a calibrated caliper to the log of total assets size over the three years prior to the listing date (see Box A for details). We display the estimated ATT aggregated depending on the relative distance to the treatment date (annual frequency). We include robust and asymptotic standard errors and a vector of control variables including leverage ratio, cash and cash equivalent to total assets ratio and turnover ratio. We use a Callaway and Sant'Anna (2021) DiD approach with multiple time periods. We assess the internal validity of these estimators by checking that the parallel trend assumption is respected over the three periods before treatment (p-value = 0.9970).

Our results on long-term investment behaviour add to a long-standing finding in the literature that there is a risk of listed firms prioritising short-term business decisions over longer-term opportunities.[27] Our analysis finds that

[24] Pagano, Panetta, and Zingales (1998) find that firms going public often experience a decline in profitability after their IPO, as the decision to go public is driven more by market timing and the ability to capitalise on favourable market conditions. Jain and Kini (1994) found that profitability as measured by operating return on assets tends to decline after a firm goes public, which is attributed to several factors, including increased agency costs, changes in capital structure and the pressures of meeting market expectations. Mikkelson, Partch, and Shah (1997) also note a decline in operating performance following an IPO. Their study suggests that while firms might experience a short-term boost in profitability due to the influx of capital, the long-term effects often include a decrease in operational efficiency and profitability.

[25] Larrain et al. (2022) find a positive effect of going public on profitability (after instrumenting for the decision to complete the IPO using prior market returns), together with an expansion in sales per employee, subsidiaries and countries in which firms operate.

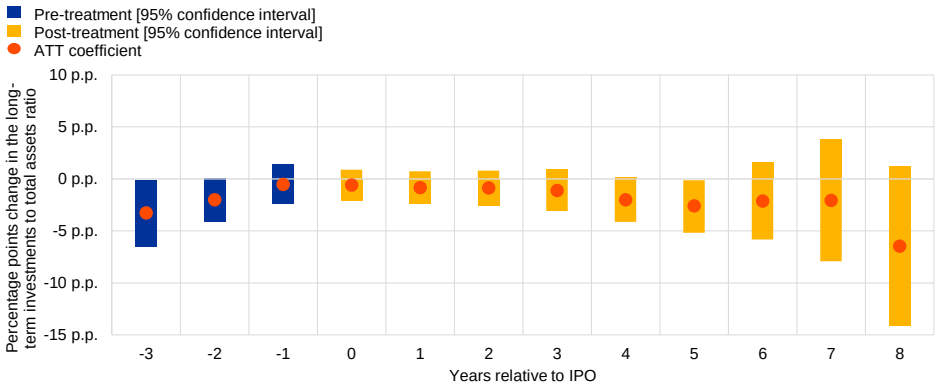
[26] See Chod and Lyandres (2011).

[27] Stein (1988) shows how the threat of takeovers can induce managers to focus on short-term performance at the expense of long-term value creation, which is exacerbated by the pressures of being a publicly traded company. Similarly, Porter (1992) finds that listing encourages short-term thinking among public companies, as the emphasis on quarterly earnings and stock price performance can lead to underinvestment in R&D.

unlisted firms in the sample tend to invest relatively more long-term compared to listed firms. In particular, we observe a consistent (though not significant) negative trend for listed firms in terms of long-term investment (see Chart 4). This observation is supported by several findings in the literature, which shows that companies may go public not only to finance future investments and growth, but also to rebalance their accounts after high investment and growth.[28] In addition, due to the agency costs resulting from separation of ownership and control, managers of listed firms may have an incentive to prioritise short-term profits over long-term investment.[29] At the same time, it should be noted that both the overall size and the investments of a listed company grow following an IPO, with investments growing more slowly.[30]

Chart 4

Average treatment effect on the treated (ATT) for the long-term investments to total assets ratio



Source: S&P Capital IQ and LSEG, ECB calculations.
Notes: Our repeated cross-section dataset is composed of 16,615 observations over the period 2011 to 2020, including 1,524 unlisted firms and 169 firms listing over the period 2012 and 2019. We use the same identification strategy explained for operating return on assets (see Chart 3). We include robust and asymptotic standard errors and a vector of control variables including leverage ratio, cash and cash equivalent to total assets ratio and turnover ratio. We use a Callaway and Sant'Anna (2021) DiD approach with multiple time periods. We assess the internal validity of these estimators by checking that the parallel trend assumption is respected over the three periods before treatment (p-value = 0.4264).

Our findings at the micro level fit with recent findings linking the investment behaviour of firms to the resulting macro and welfare impacts. Based on a quantitative endogenous growth model, a recent analysis[31] compares the relative benefits of the two identified effects of listing: profitability gains on the one hand, against the possible loss of a shorter investment horizon on the other hand. The results reveal that short-termism in long-term investment depresses welfare/growth relatively more than what can be gained from the profitability gain experienced by listed companies. More specifically, the authors find that at the macro level, short-termism distortions impede growth and social welfare. This leads us to consider policy measures to address potential short-termism in Chapter 4, for instance for

28 See Pagano Panetta, and Zingales (1998). Similar evidence suggests that listing is not followed by rapid growth in firm assets – see Rydqvist and Högholm (1995).

29 See, for example, Asker et al. (2015).

30 Importantly, our results assess the impact of listing on long-term investment standardised by total assets. Observing the log of long-term investments and the log of total assets separately, we observe a positive trend for both variables which is only significant for total assets - an indicator for the size of the company. This provides additional evidence for the cohort of listed firms showing that listed firms grow faster, which in turn means that on aggregate the relative share of long-term investments by listed firms increases due to the larger growth of listed firms after listing.

31 See Terry (2023).

intangible-intensive and young firms, for which agency costs associated with increasing information asymmetries could be mitigated by increasing shareholder concentration.

Box A An empirical approach to comparing EA listed and unlisted firms: staggered difference-in-difference conditional on propensity matching

Empirical identification of the benefits of public listing is challenging because the listing decision is a reflection of firm characteristics as well as other unobserved effects which can impact economic performance, such as the macroeconomic environment. Hence, to analyse the effects of firms' choice to list rather than remain private – a decision that is essentially endogenous – we rely on a staggered difference-in-difference (staggered DiD) conditional on propensity matching. An analysis that relies on a DiD estimator without prior matching, i.e. comparing treated (public) and non-treated (private) firms with very different characteristics, could lead to misleading results stemming from possible selection bias and/or reverse causality. In addition, a staggered DiD approach facilitates consideration of listing across multiple periods, which allows for a more dynamic assessment of the impact of firms' listing decision by exploiting the variation in the timing of listing.

The matching approach

To further disentangle the treatment effect of being listed, we first estimate a logit model that explains the probability that a firm is materially affected by the change in status (listed versus unlisted). The propensity score matching we used to estimate the effect of the treatment helps us construct similar samples based on firm-specific characteristics before the listing choice. We match firms based on characteristics that determine performance and investments following Asker, Farre-Mensa and Ljungqvist (2015).

In particular, we match non-financial firms within the same industry[32] based on size measured as the log of total assets. The matching model is estimated using average data per firm for the period three years before a firm goes public.[33] This ensures firms are matched based on their characteristics over a period to prevent results from being affected by short-term fluctuations, including a change in macroeconomic conditions or accounting practices. We use a rolling approach over the listing period 2012 to 2019 to construct the sample. This means that in each year, firms subject to an IPO were matched by drawing from the pool of unlisted firms, excluding any already matched in previous iterations to maintain independence across matching stages. Importantly, our control group is composed of firms that do not change status throughout the entire period.

[32] The industry classification is based on the two-digit SIC code to avoid an excessive number of categories for exact matching. In our sample there are 762 industries at the four-digit level, 361 at the three-digit level and 78 at the two-digit level.

[33] To compute these averages we collect data starting in 2009, even though our panel begins in 2011 and the first treatment period occurs in 2012. In addition, we require that for a company to be included in the treatment group the following key balance sheet and income statement items must be available three years prior treatment (as they partially serve as controls): total assets, two-digit SIC codes, operating income, EBITDA, total revenue, cash and cash equivalents, net income, total liabilities and long-term investments.

More specifically, the analysis relies on nearest neighbour matching with replacement; each listed firm is matched to up to ten unlisted firms[34] within a narrow caliper[35] of 1%. We impose common support. The matching procedure ensures that both groups are similar before listing, so results do not reflect systematic differences between the two.

Assessing the goodness of fit of the matching, and as suggested by Imbens and Wooldridge (2009), Table A also reports normalised differences to compare the group of listed and unlisted companies with respect to the average of key balance sheet variables for the three-year period before the set of listed firms goes public. Normalised differences are a scale-free measure of the difference in distributions, and calculated as the difference in averages by treatment status, scaled by the square root of the sum of the variances. Results are reported for the log of total assets - the key variable on which we match - as well as additional key balance sheet characteristics. As a rule of thumb, groups are regarded as sufficiently equal and adequate for linear regression methods if normalised differences are generally in the range of ±0.25. We find that both groups are very similar.

Table A.1

Descriptive statistics and group comparison (EA listed vs EA unlisted)

	Listed		Unlisted		
Variable	**Mean**	**SD**	**Mean**	**SD**	**ND**
(log) Total assets*	4.3683	1.9668	4.1460	1.7005	0.0855
Leverage	0.6710	0.2638	0.6028	0.3242	0.1632
Cash and cash equivalents	0.1025	0.1300	0.0831	0.1150	0.1117
Turnover	0.9959	0.8022	1.2220	0.9380	-0.1832

Sources: S&P Capital IQ and LSEG, ECB calculations.
Notes: This table shows descriptive statistics for various firm characteristics for the period three years before the set of listed firms goes public. We show all statistics separately for the groups of treated and untreated firms. The last column shows the normalised difference (ND) according to Imbens and Wooldridge (2009), which compares differences between listed and unlisted firms. As a rule of thumb, values between ±0.25 indicate that groups are sufficiently equal and adequate for linear regression methods. An asterisk (∗) indicates that a variable is used for matching. Leverage, cash and cash equivalent and turnover are scaled by total assets.

The staggered DiD approach – a time-heterogenous treatment effects model

The sample of matched treated and matched control firms, derived in a first step as explained above, is used for the second step of the analysis. This involves assessing whether firms that chose to list exhibit profitability gains, and how listing influences their long-term investment strategy a) compared to the period when the firm was still private, and b) relative to a control group that does not list throughout the entire period. In particular, applying a conditional staggered DiD estimation technique, which is equivalent to matching groups before estimating the treatment effect, allows us to estimate whether higher returns and lower long-term investment can be attributed to going public.

The Callaway and Sant'Anna (2021) approach is particularly well-suited for our study due to its ability to handle heterogeneous treatment effects across firms and over time. This method provides flexibility in estimating the average treatment effect on the treated (ATT) across different time periods before and after the listing event, accommodating the staggered nature of our treatment

[34] Increasing the number of matches for both groups, this approach creates a more comprehensive comparison set.

[35] The caliper in propensity score matching sets the maximum allowable difference in propensity scores between matched treatment and control units. This implies that pairs of treated and untreated subjects are formed with propensity scores differing by no more than a pre-specified amount (the caliper width).

(i.e. firms listing at different points in time). Specifically, the Callaway and Sant'Anna approach allows us to:

- *capture dynamic treatment effects*: by estimating the ATT at multiple time points relative to the listing event, we can observe how the impact of listing evolves over time. This is crucial for understanding both the short-term and long-term effects of going public.
- *handle unbalanced panels*: the method is robust to unbalanced panels where firms enter and exit the sample at different times; this aligns with our dataset, where firms get listed at various points during the study period.
- *mitigate bias from staggered adoption*: the approach addresses potential biases arising from staggered adoption of the treatment, providing more accurate estimates of the listing effect.
- *control for covariate-specific trends*: the use of doubly robust DiD estimators (Sant'Anna and Zhao, 2020) models outcome evolution based on the control group, and simultaneously employs generalised propensity scores to re-weight treatment and control units so the distribution of covariates is more similar across public and private firms. This type of conditional DiD further controls for characteristics influencing a firm's listing decision, adding an additional level of robustness to the initial matching made on industry and firm size.

To implement this approach, we specify a model that allows for time-varying treatment effects as follows:

$$Y_{i,t} = \alpha_i + \delta_t + \sum_{k=2010-t}^{2022-t} \varphi_k D_{i,t+k} + X_{i,t} + \varepsilon_{i,t}$$

where $Y_{i,t}$ is the outcome variable (operating return on assets and the ratio of long-term investment to total assets) for firm *i* at time *t*, α_i are firm fixed effects, δ_t are time-fixed effects, $D_{i,t+k}$ is a dummy variable indicating whether firm *i* is listed at time *t+k*, and φ_k captures the treatment effect at different time periods relative to the listing event. $X_{i,t}$ represents the vector of control variables for firm *i* at time *t* and $\varepsilon_{i,t}$ is the error term. In our baseline specification, we control for the leverage ratio (estimated as total liabilities over total assets), cash and cash equivalents (standardised by total assets), and the turnover ratio (estimated as total revenue over total assets).

Robustness analysis:

In addition to the baseline matching and staggered DiD approaches presented above, we ensure that our results are robust to different specifications. Checks include (1) assessing whether results are robust to the choice of matching technique, (2) varying controls in the staggered DiD, (3) incorporating additional variables in the matching equation, such as all the controls (i.e. the leverage ratio, cash and cash equivalents and turnover ratio) and the log of age, in addition to the

matching parameters included in the baseline,[36] and (4) employing different[37] staggered DiD estimators to assess the sensitivity of our results.

Box B Data sources and sample construction

The primary data source for the analysis presented in this chapter is S&P Capital IQ, a comprehensive financial database that offers detailed balance sheet and income statement information on listed and unlisted companies globally. A large number of previous relevant studies have used S&P Capital IQ to shed light on a range of related topics, including (1) the differences in the use of trade credit by public and private firms,[38] (2) questions around cross-listing,[39] (3) the relevance of direct private investments,[40] and (4) the creation and evolution of new stock exchanges geared toward entrepreneurial companies.[41] We use this database to construct a balanced firm-level panel dataset for EA listed and unlisted NFCs for the period 2011 to 2020 at a yearly frequency.[42] We complement the data with information on IPO dates from LSEG. Our initial sample is composed of 424 firms that listed between 2012 and 2019 and 18,538 unlisted companies for the whole period.

We employ several cleaning steps to arrive at our main sample, on which we then perform further matching techniques (see Boxes 1 and 3). The main sample consists of 210 observations for EA listed and 13,697 observations for EA unlisted companies. More specifically, we ensure that our main sample only includes firms with a primary listing in the EU.[43] In addition, due to data gaps, we interpolate the long-term investment variable by applying a linear interpolation (up to four periods) to fill missing values.

36 The approach/selection of matching variables suggested by Asker et al. (2015) proved the best model fit.

37 Our baseline model uses the doubly robust DiD estimator. In addition, we check if results hold when using the improved doubly robust DiD estimator introduced by Sant'Anna and Zhao (2020), which utilises inverse probability of tilting and weighted least squares. We also compared these approaches with several other estimators: the ordinary least squares estimator, the inverse probability weighting estimator developed by Abadie (2005), the stabilised inverse probability weighting estimator and the repeated cross-section estimator to further evaluate our findings. Results are consistent for the doubly robust DiD estimator and, while the significance of the positive ATT for operating RoA and negative ATT for long term investment varies for the other estimators, we find the trends are robust.

38 See Abdulla et al. (2017).

39 See Reddy et al. (2023).

40 See Fang et al. (2015).

41 See Bernstein et al. (2020).

42 We chose to not include observations from 2020 to omit dynamics that are specific to the COVID-19 pandemic, including for example direct support measures for firms aimed at mitigating the negative effects on corporate profitability. This ensures that insights on the potential benefits of listing are not diluted by specific events and can instead provide a more general intuition on the possible benefits of listing.

43 We identify 43 EA-domiciled listed firms that have a primary listing outside the EU; of those, 32 have a primary listing in the US and seven more are listed on the London Stock Exchange.

2.2 Does the decision to list impact firms differently in the US compared to the EA?

This section focuses on EA and US-listed firms and assesses how a subset of matched EA-listed firms compares to a matched subset of US-listed firms that list in the same year. Using a slightly different matching technique, econometric approach and sample (for more details see Box C), the analysis evaluates whether EA firms that go public perform relatively better or worse compared to their US-listed peers after they chose to list. Firms that list in 2015 are observed throughout the period 2011 to 2020. Listed firms are matched based on their size to a set of comparable firms. This allows us to analyse the effect of listing on similarly sized firms located in the EA versus in the US. Contrary to the previous section, which focused on listed versus unlisted firms in the EA, we exclude the industry variable from the matching process, as this would have impacted the size of the sample too significantly. The matched dataset comprises 590 observations for 59 firms,[44] 44 of which list in the US and 15 in the EA.

Providing a broader perspective on the similarities and differences in firm behaviour after being listed between these two economic regions can shed light on whether differences are related to underlying structural difference and obstacles. For example, differences could stem from differences in industry structure and a regulatory landscape which is more fragmented in the EA. In turn, these underlying structural factors might shape firm behaviour across the two economic regions.

Empirical evidence suggests that while both the US and the EA are benefitting from listing in terms of profitability, EA firms benefit less compared to their US peers. This can be seen from model output for operating RoA – measured as the ratio of operating income to total assets – in Table 2, columns (1) and (2); a regression returns a coefficient on listing that is positive and significant (first row), but an interaction term with listing in the EA (second row) that is negative. This can be explained by the fact that US firms have access to a larger market, which provides greater scale and thus higher productivity. In addition, the disparity between the EA and the US may be attributed to the fact that US firms often have access to larger, more liquid capital markets (see the Chapter 1). This allows them to raise significant funds for strategic investments, driving profitability and enabling them to leverage the advantage of a larger product market. In contrast, EA-listed firms may encounter more fragmented and less liquid markets, alongside various regulatory requirements and market fragmentation that can constrain access to capital and impede valuations.

Looking at long-term investment, while both EA and US-listed firms have a tendency to prioritise short-term business decisions over longer-term opportunities, this effect appears somewhat more pronounced for EA-listed ones. Again, assessing the results in Table 2, column (3), the interaction term (row

[44] For robustness, we also tested our models considering two years before and two years after the baseline IPO year, resulting in 261 matched firms. The main findings remain robust. See Box C for more details.

2) reveals that the negative effect on listing seems somewhat more noticeable than for the EA than the US, albeit not significantly so when controls are included in column (4). These findings are broadly in line with the literature, which suggests that while IPOs are indeed often used to raise substantial amounts of new capital, evidence on its use for funding new (and longer-term) growth opportunities is at best mixed. The subsequent use of the capital raised is varied: one study[45] based on data on Italian firms shows that IPOs tend to be preceded by a period of high growth in investments – not the other way round – and firms in the study sample instead use the proceeds of their IPO to reduce leverage after initial periods of high investment. Similar evidence in another study[46] suggests that listing is not followed by a rapid growth in firms' assets. Furthermore, in addition to the differences in regulatory landscape and industry structure mentioned, the larger size of US capital markets compared to those in the EA could explain why the effects on long-term investment are more pronounced in the US than in the EA.

Table 2

Profitability and long-term investment measures (US vs EA, IPO in 2015)

	(1) Operating RoA	(2) Operating RoA	(3) LT_invest/TA	(4) LT_invest/TA
Listed	0.201** (0.0782)	0.173** (0.0792)	-0.0259* (0.0133)	-0.0325** (0.0145)
Listed x EA	-0.167** (0.0657)	-0.141** (0.0612)	-0.0168* (0.00884)	-0.00686 (0.00648)
Controls	No	Yes	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Within R^2	0.0942	0.209	0.110	0.142
N	570	569	406	405

Sources: S&P Capital IQ and LSEG, ECB calculations.
Notes: * p < 0.10, ** p < 0.05, *** p < 0.01.
Standard errors are reported in parentheses.
Regressions are estimated using the within (fixed effects) estimator. The sample includes firms that had their IPO in 2015 and were matched (see Box C), comprising 15 firms listed in the US and 44 firms listed in the EA over the period 2011 to 2020. The set of controls include leverage ratio, cash and cash equivalent to total assets ratio, and turnover ratio. The dependent variable in regressions (1) and (2) is the ratio of operating income to total assets, while in (3) and (4) it is the ratio of long-term investments to total assets. An F-test confirmed that the coefficients for "listed" and the interaction "listed × EA" are jointly significant for Operating RoA in regressions (1) and (2).

Looking at intangible assets as a measure for innovative capacity, our results show that listing increases innovative capacity for both EA and US firms. One of the primary benefits of listing is increased access to capital. This can be particularly beneficial for firms looking to invest in innovation.[47] The results in Table 3

45 See Pagano et al. (1998).

46 See Rydqvist and Högholm (1995).

47 Intangible assets include, for example, patents, trademarks and R&D.

show that firms do in fact spend funds raised on capital investment and R&D, suggesting a positive impact of listing.[48]

Table 3

Intangibles measures (US vs EA, IPO in 2015)

	(1) (log) Intangibles	(2) (log) Intangibles
Listed	1.854*** (0.299)	1.837*** (0.353)
Listed x EA	0.0917 (0.300)	0.306 (0.325)
Controls	No	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Within R^2	0.307	0.332
N	545	529

Sources: S&P Capital IQ and LSEG, ECB calculations.
Notes: * p < 0.10, ** p < 0.05, *** p < 0.01.
Standard errors are reported in parentheses.
Regressions are estimated using the within (fixed effects) estimator. The sample includes firms that had their IPO in 2015 and were matched (details in Box C), comprising 15 firms listed in the US and 44 firms listed in the EA, over the period 2011 to 2020. The set of controls include leverage ratio, cash and cash equivalent to total assets ratio, and turnover ratio. The dependent variable in regressions (1) and (2) is the log of total intangibles. An F-test confirmed that the coefficients for "listed" and the interaction "listed × EA" are jointly significant.

The analysis also shows that listing has a positive effect on firms' productivity and growth overall. US firms seem to benefit relatively more than EA ones in terms of productivity gains. Table 4, columns (1) and (2) show that the EA is lagging behind the US when it comes to relative gains in productivity (negative interaction term in row 2) while overall both economies generally benefit from going public (listed variable in row 1). The analysis displayed in Table 4, columns (3) and (4) also confirms that listed firms are better able to scale up employment, irrespective of whether the firm is in the EA or the US. These findings confirm that listing provides firms with greater access to capital and enables them to invest in technology, infrastructure and human resources, all of which can enhance productivity. Again, US firms benefit more from these productivity gains, possibly because of the larger and more liquid capital markets in the US, which can provide more substantial funding opportunities and better terms. In addition, access to a larger product market with fewer barriers can provide scale and in turn lead to higher productivity.

[48] The relevant literature has revealed mixed results overall. For example, Kim and Weisbach (2008), by employing a large dataset spanning 38 countries and two decades of IPOs, show that in fact firms do spend raised funds on capital investment and R&D. To the contrary, Bernstein (2015), studying patent data for listed and unlisted firms, finds that the quality of innovation declines after an IPO. Stulz (2020) suggests that the propensity of firms to list might be affected by the increasing importance of intangible assets in the production process. He argues that the more a young firm's business model builds on intangible assets, the costlier it becomes to publicly list. In his view public equity investors are passive, while private equity investors have a better understanding of the business model of these firms that can contribute to their development. In fact, there is evidence to suggest that firms seeking VC funding are willing to pay a premium by selling equity at a discount to VC firms with a good reputation, see Hsu (2004).

Table 4

Employee measures (US vs EA, IPO in 2015)

	(1) Productivity	(2) Productivity	(3) (log) Employees	(4) (log) Employees
Listed	0.0630*	0.0767**	1.296***	1.260***
	(0.0329)	(0.0308)	(0.354)	(0.426)
Listed x EA	-0.0430*	-0.0466**	-0.381	-0.336
	(0.0239)	(0.0224)	(0.328)	(0.355)
Controls	No	Yes	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Within R^2	0.0332	0.0476	0.228	0.239
N	455	453	461	452

Sources: S&P Capital IQ and LSEG, ECB calculations.
Notes: * p < 0.10, ** p < 0.05, *** p < 0.01.
Standard errors are reported in parentheses.
Regressions are estimated using the within (fixed effects) estimator. The sample includes firms that had their IPO in 2015 and were matched (see Box C), comprising 15 firms listed in the US and 44 firms listed in the EA, over the period 2011 to 2020. The set of controls include leverage ratio, cash and cash equivalent to total assets ratio, and turnover ratio. The dependent variable in regressions (1) and (2) is the ratio of operating income to the number of total employees, while in (3) and (4) it is the log of total employees. An F-test confirmed that the coefficients for "listed" and the interaction "listed × EA" are jointly significant.

Box C An empirical approach to comparing EA and US firms: DiD conditional on propensity matching

To analyse whether firms in the EA or the US benefit relatively more from listing, this analysis relies on a DiD estimation conditional on matching.[49] The idea is to compare listed firms within the EA to listed firms in the US and assess the relative benefits from listing in both economies. Unlike the analysis described in Box A, here we aim to gauge whether EA firms that go public are relatively better or worse off compared to their US peers after the latter also chose to go public. As explained in Box A, the analysis relies on matching to ensure that largely similar firms are compared with each other. To create a sufficiently large sample, exact matching by industry code is not applied as this substantially constrains the pool of candidate firms.[50] In addition, we ensure that our main sample only includes firms with a primary listing in the EA and exclude US firms trading over the counter.[51] We also interpolate long-term investments similarly to the approach described in Box B.[52] Following these cleaning steps, our sample contains 59 firms, of which 44 listed in the US and 15 in the EA in 2015.[53]

49 For the comparison of the EA and the US we do not rely on a staggered DiD like for the within-EA analysis. Instead, we base our estimation on a simple DiD estimator to be able to capture an additional dimension. In addition, and unlike the previous analysis, we are now not only interested in how companies develop after listing, but also how both economies compare to each other.

50 Further restricting matches by industry would have overly constrained the sample, leading to virtually no matches.

51 In particular, we excluded five US firms trading on the Pink Sheets that had an IPO in 2015. As an over-the-counter listing service with minimal listing requirements, the Pink Sheets often include penny stocks, which may not represent the same standards of financial reporting and transparency as firms listed on major exchanges.

52 Data on long-term investments was available for only about 22% of US-listed firm observations, compared to over 64% for EA-listed firms.

53 We start from a sample of 62 US-listed firms that list in 2015, alongside the 74 firms listed in the EA in the same year. After initial cleaning, the sample decreases to 16 US-listed firms and 48 EA-listed ones.

Assessing the goodness of fit of the matching, and as suggested by Imbens and Wooldridge (2009), Table A below also reports normalised differences to compare the group of companies that list in the EA with those that list in the US with respect to average of key balance sheet variables for the three-year period before listing. Normalised differences are a scale-free measure of the difference in distributions, and calculated as the difference in averages by treatment status, scaled by the square root of the sum of the variances. Results are reported for the log of total assets - the key variable on which basis we match - as well as additional key balance sheet characteristics. As a rule of thumb, groups are regarded as sufficiently equal and adequate for linear regression methods if normalised differences are generally in the range of ±0.25. We find that both groups are very similar.

Table C.1

Descriptive statistics and group comparison (EA-listed vs US-listed)

	EA-listed		US-listed		
Variable	**Mean**	**SD**	**Mean**	**SD**	**ND**
(log) Total assets*	4.4105	2.2224	4.4175	2.6856	-0.0020
Leverage	0.7621	0.3313	1.1580	1.6045	-0.2416
Cash and cash equivalents	0.0982	0.1155	0.2780	0.2277	-0.7040
Turnover	0.8412	0.5796	0.7440	0.4273	0.1350

Sources: S&P Capital IQ and LSEG, ECB calculations.
Notes: This table shows descriptive statistics for various firm characteristics for the period three years prior to listing. We show all statistics separately for the groups of EA and US firms. The last column shows the normalised difference (ND) according to Imbens and Wooldridge (2009), which compares differences between the two groups. As a rule of thumb, values between ± 0.25 indicate that groups are sufficiently equal and adequate for linear regression methods. An asterisk $(*)$ indicates that a variable is used for matching. Leverage, cash and cash equivalent and turnover are scaled by total assets.

Our baseline estimation focuses on IPOs in 2015, as this year exhibits the smallest mean difference in firm sizes across the two regions, which is our reference for matching firms. For robustness, we run the analysis for alternative periods.

The regression specification is:

$$Y_{i,t} = \alpha_i + \delta_t + \beta_1 Listed_t + \beta_2 Listed_t * EA_i + X_{i,t} + \varepsilon_{i,t}$$

where $Y_{i,t}$ represents different outcome variables, including (1) operating RoA, measured as operating income over total assets, (2) long-term investments, measured as long-term investments standardised by total assets, (3) innovative capacity, measured as the log of total intangibles, (4) labour productivity, measured as operating income divided by the total number of employees, and (5) firm size (growth), measured as the log of employees for firm *i* at time *t*. α_i are firm fixed effects and δ_t are time-fixed effects. $Listed_{i,t}$ is a binary variable equal to one if firm *i* is listed at time *t*, and zero otherwise. EA_i indicates whether the firm is located in the EA. The single term EA_i does not appear in the equation because it is absorbed by the firm fixed effects. Hence, the interaction term $Listed_t * EA_i$ is one if both the variable $Listed_{i,t}$ and the variable EA_i amount to one, and zero otherwise. The corresponding coefficient β_2 is the main coefficient of interest. $X_{i,t}$ represents the vector of control variables, comprising the leverage ratio measured as total liabilities over total assets, the cash and cash equivalents to total assets ratio, as well as the turnover ratio, measured as total revenues standardised by total assets for firm *i* at time *t*, while $\varepsilon_{i,t}$ is the error term.

Robustness analysis

In addition to the baseline matching and DiD approaches discussed above, we conduct several robustness checks to ensure the validity of our results. These include: (1) verifying the consistency

of results across different years, specifically two years before and two years after our baseline; (2) examining the impact of different matching techniques on the results; (3) varying the regression estimators by employing pooled OLS estimators instead of within estimators; (4) incorporating additional variables in the matching equation, i.e. the log of age in addition to the matching parameters included in the baseline,[54] and (5) exploring different methodological setups, such as alternative options for clustering errors, varying approaches to winsorising the data, using different measures for intangibles and productivity, and including fixed effects for industry. Finally, (6) to further explore the potential impact of business cycle differences between the two regions, we run additional regressions incorporating macroeconomic controls. Specifically, we include data on real GDP growth, inflation (CPI), total returns on broad indices (MSCI), and the volatility of broad indices (VIX). Our results remain robust across different specifications, confirming that macroeconomic and market differences do not drive our findings.

[54] We are not able to include additional variables as the sample would get too small.

3 Getting more firms to list – growth financing and the interplay with listed equity

3.1 VC as a key piece of the financial ecosystem leading companies to list on EU markets

Our empirical analysis confirms that firms benefit from listing from a profit generation perspective, and points to a gap against the US in terms of both the number of firms listing on EU markets and the relative benefits from listing. Since the relative benefits of listing in the US seem to be at least partially driven by the depth and liquidity of the US equity markets,[55] this chapter seeks to address the question of how to get more firms to list on EU markets. As a starting point, we explore the state of play of the EU financial ecosystem to understand the dynamics between public equity markets and other segments – in particular VC. For this, we refer to the existing literature and provide an extensive descriptive analysis of the EU VC landscape.

A dynamic VC ecosystem supports the depth and dynamism of equity markets. Economies with advanced VC and public equity markets (like the US) are likely benefitting from the global pool of high-growth and innovative companies by attracting foreign firms to list and potentially move their activity to the US thanks to the attractiveness of their VC firms and the depth of their market. The depth and liquidity of the wider ecosystem for public markets plays a critical role in incentivising companies to consider listing. Factors such as valuations and expected returns, the existence of comparable peers, the availability of support and expertise linked to the quality and size of institutional investors, taxation and company law can be key determinants as well.

VC plays an important role in financing the pipeline to public equity markets, as it enables young firms to scale up during their growth phase, potentially reach the IPO stage and eventually develop into large, listed corporations. VC is a dynamic form of private equity financing that targets early-stage, high-potential and growth-oriented startup companies. Venture capitalists support the creation of new firms by providing equity for new ideas to be developed into economic projects – alleviating potential wealth constraints. Aghion et al. (2022) for instance highlight the relevance of a developed VC market for financing firms that are still in the R&D phase. Active VC markets in turn tend to thrive when there are active stock markets to facilitate exit strategies (Black and Gilson, 1998).

[55] See for example, Doidge et al. (2004), who explore the motivations behind foreign firms listing in the US and discuss how US markets provide greater liquidity, which can lead to benefits like higher valuations; also Bekaert and Harvey (2000), who highlight that the deep and liquid nature of US markets can help firms reduce their cost of equity.

Venture capitalists provide not only the necessary capital but also the strategic guidance, industry expertise and networks essential for innovative firms to grow and succeed. Unlike traditional private equity, which typically invests in more mature businesses, VC is uniquely focused on nurturing nascent companies that exhibit strong growth prospects but inherently carry higher levels of risk. Venture capitalists aggregate funds from various investors, which they then allocate to promising startups in exchange for equity stakes. This infusion of capital is pivotal for startups, especially those that lack access to traditional financing channels such as bank loans or public markets. In addition, the mentoring, support and strategic guidance offered by VC investors can also enhance the survival chances of firms in their first years of establishment – showing that VC plays a role beyond traditional financial intermediaries (Hellmann and Puri, 2002).

VC funds tend to specialise in financing tech firms, making this type of financing a strategic segment for economic productivity and EU listed markets, despite being a small segment overall. VC funds tend to target companies that are highly innovative and have high growth potential due to the disruptive technologies or business models they are striving to develop. Both in the EU and the US, tech companies tend to form the majority of companies relying on VC equity financing to sustain their growth. This specialisation by VC funds makes them an important tool for financing disruptive companies, contributing to the EU's productivity and providing a pipeline of firms listing on EU markets, even though the VC market segment itself is small (see Section 3.2). However, analysis from the European Investment Fund (EIF) points that more than 50% of European late-stage tech financing rounds come from outside Europe.[56]

VC is one piece of the financing environment needed to support the creation and success of innovative firms. The availability of seed and startup capital is key to fostering the initial stages when ideas and new businesses emerge, while VC funding at later financing stages plays a particularly important role for market entry, as it provides an outlook for firms to grow and the financial means to scale up. VC is one piece of the puzzle, in combination with other available financing sources such as bank lending. Ultimately, firms reach the point of exit through selling, going public or remaining private.

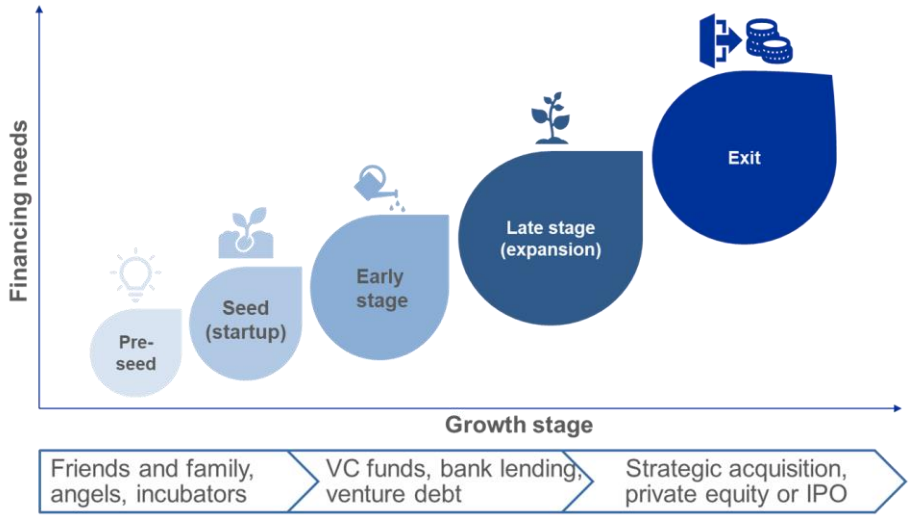
Box D Using PitchBook data to define and analyse different phases of VC financing and the interplay with listed equity

Understanding the stages of VC financing is essential to comprehend how startups evolve from initial concepts to fully operational businesses. We primarily rely on PitchBook as our data source, as it offers an extensive and detailed database on private equity, VC and merger and acquisition (M&A) transactions, providing comprehensive deal histories and firm-level key financials and valuations. PitchBook is widely used in the industry and is also a reference in policy papers owing to its coverage and data quality. The reference point for data in PitchBook is deal values rather than data from the companies as such, which allows us to analyse VC financing rounds. According to PitchBook, VC financing is segmented into distinct stages: pre-seed, seed, early stage

[56] See EIF, September 2023 "Scale-up financing gap".

and later stage. Each stage reflects the company's progression in terms of product development, market validation and scaling of operations.

Figure D.1
The stages of VC financing



Source: Authors' elaboration based on Fratto et al. (2024).

The pre-seed stage represents the earliest phase of VC financing. At this stage the startup is often still in the conceptual phase, focusing on product development and initial market research. According to PitchBook, pre-seed financing may include funding from accelerators, incubators or even product crowdfunding platforms, where individuals provide non-equity funding in exchange for the company's future products. The primary purpose of pre-seed funding is to support R&D, initial product creation and the assembly of a founding team. Given that the business model is still being validated, investments are generally small and the risk is extremely high.

Then comes the seed stage, where the startup continues to develop its product and validate its market. PitchBook defines a seed deal as the initial financing provided to a new enterprise that is in the earliest stages of development. This stage often involves angel investors or early-stage VC firms who provide the capital needed to help the startup achieve key milestones. Seed funding is used to complete product development, conduct market testing and prepare for launch. This stage is crucial for achieving the key milestones that make the startup attractive for larger investments in subsequent rounds.

The early stage, which encompasses Series A and B funding rounds, involves startups that have a functioning product and are seeking to scale their operations. PitchBook categorises an early-stage VC deal as one that occurs within five years of the company's founding date, which can include both Series A and Series B rounds. The primary purpose of early-stage funding is to expand the team, increase production capacity, enhance marketing efforts and scale the business. Startups at this stage have demonstrated initial market traction and have a clearer path to revenue generation. Although the risk remains high, it is more manageable compared to the pre-seed and seed stages.

Finally, the late stage includes Series C and subsequent funding rounds. According to PitchBook, a late-stage VC deal is defined as a Series C to Series D round or any round that

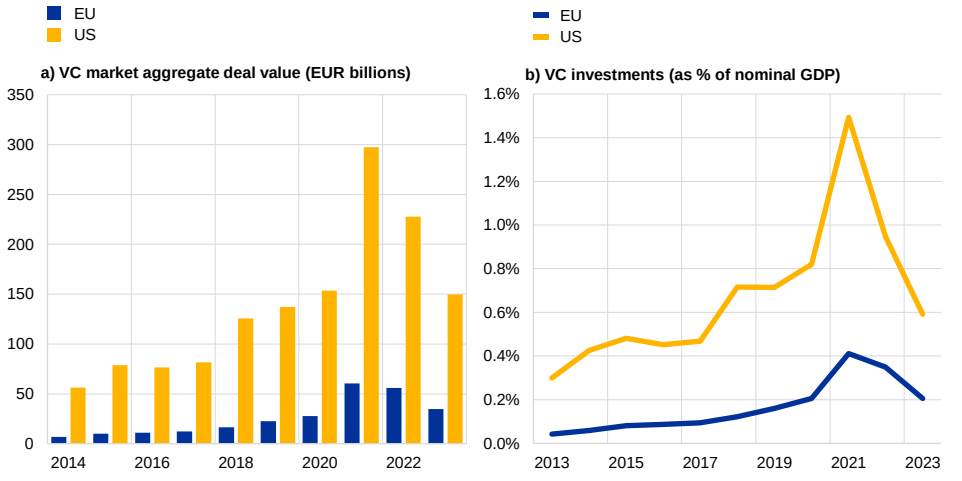
occurs more than five years after the company's founding date. A venture growth deal is defined as a Series E+ round or a round for a company founded more than seven years ago with six or more VC deals behind it. By this stage the startup has established a significant market presence and is focusing on further scaling. Late-stage funding is used for large-scale expansion, entering new markets and preparing for an IPO or acquisition. Late-stage startups typically have substantial revenue, a proven business model and reduced risk compared to earlier stages. Investments at this stage are generally larger and involve more established VC firms.

3.2 How vibrant is the EU's financing ecosystem for young and innovative firms ultimately able to list in the EU?

There is a large gap between the US and the EU in terms of the depth of VC markets. US VC markets are generally more developed than those in the EU – as illustrated by their aggregate deal value (see Chart 5, panel A). Annual VC financing in the EU averaged 0.2% of GDP over the last decade, compared to a US average of 0.7%, indicating that the availability of VC financing in the US is three times greater than in the EU. Fragmentation of private capital pools, higher risk aversion among EU savers and the bank-centric structure of the financial system are cited in the literature as underlying reasons for this discrepancy (see for example Arnold et al., 2024). The following sections provide a descriptive analysis of VC markets in the EU using PitchBook data (see Box D).

Chart 5

EU VC investments lag behind the US



Sources: PitchBook Data, Inc., Eurostat, Bureau of Economic Analysis, ECB calculations
Notes: panel a) The aggregate deal values of VC investments follow similar patterns in the EU and US, with 2021 being a record for US VC markets, most likely following portfolio rebalancing during the pandemic The underlying data include all concluded deals reported for EU and US companies in PitchBook for all VC stages, excluding deals for which no deal size is reported. Panel b) VC investment is defined as the aggregate deal value as described in panel a).

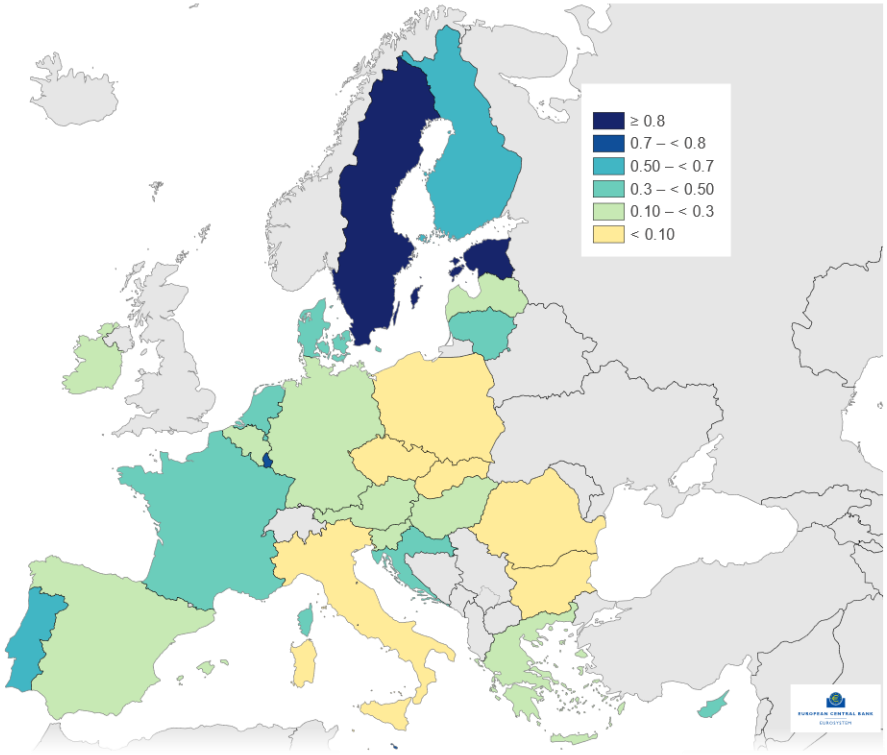
In addition to the depth gap between the US and the EU, there are significant differences within the EU regarding the development of VC markets. The Nordic countries and Baltic states have established more robust VC ecosystems (see Chart 6), characterised by vibrant startup scenes, supportive government policies and a

higher propensity for risk-taking among investors. These regions have successfully attracted a considerable amount of VC, fostering innovation and entrepreneurship. In contrast, eastern and southern European countries often face challenges such as limited access to funding, less developed financial infrastructure and lower levels of investor confidence. These disparities result in uneven levels of entrepreneurial activity and innovation across the EU, further complicating efforts to create a unified and competitive EU VC market.

Chart 6

Aggregate annual VC investment

(in percentage of nominal GDP, yearly average 2019-2023)



Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat
Cartography: Eurostat – IMAGE, 12/2024

Sources: PitchBook Data, Inc., Eurostat, ECB calculations
Note: The underlying data include all concluded deals reported for EU-domiciled companies in PitchBook for all VC stages, excluding deals for which no deal size is reported.

This market fragmentation and lack of scale matter because VC investment can support the creation of new businesses. Broad access to a diversified set of financing instruments is an important determinant for the emergence of new firms and firm-level performance. In addition, studies have demonstrated the effect of VC financing on aggregate economic growth through the creation of new firms. For instance, Popov and Roosenboom (2013) find that the rate of new business creation increases in countries and industries with sizeable VC investment, as this enables the commercialisation of new ideas.[57] Gompers et al. (2005) examine the propensity

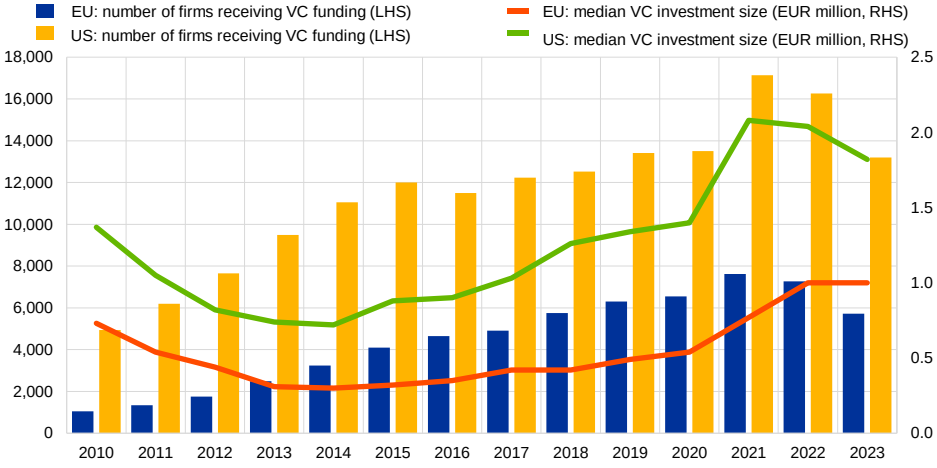
[57] See Popov and Roosenboom (2013). They find that an increase in VC investment by a factor of 7.2 (the difference between an industry at the 25th of VC investment and one at the 75th percentile) leads to an increase in the share of new firms for the medium-entry industry of between 3% and 19%.

of publicly traded firms to create new VC-backed firms. They find that younger public firms located in main hubs of VC activity are the most likely to create new ventures. The employees of these firms are more likely to start their own business because of their exposure to the entrepreneurial process and the fact that they have worked in a network of entrepreneurs and venture capitalists.

The gap in the availability of VC financing translates into fewer firms benefitting from this key source of funding in the EU. Chart 7 shows that almost twice as many firms headquartered in the US received VC funding in 2023 as firms headquartered in the EU, and those receiving financing get twice as much capital as their EU counterparts (as shown by the median investment size in the US compared to the EU). This may be due to several factors, including a possible lack of demand for this type of financing and a general decline in EU productivity growth,[58] but the lower availability of VC means that EU companies are more likely to suffer from insufficient access to finance than their US peers. In 2023 for instance, 4% of firms interviewed in the EIB Investment Survey (Kraemer-Eis and Croce, 2023) saw their request for external funding rejected, compared to 1.7% of US firms, pointing to the relative tighter access to finance in the EU. Consistent with this notion, European VC-backed companies have repeatedly reported securing equity financing as one of the biggest challenges in a series of surveys conducted by the EIF (Kraemer-Eis and Croce, 2023). Ultimately, potential lack of adequate funding can impair firms' ability to accumulate capital to sustain their growth, productivity and employment.

Chart 7

Number of firms receiving VC financing and median investment size



Sources: PitchBook Data, Inc., ECB calculations
Notes: The underlying data include all concluded deals reported for EU-domiciled companies in PitchBook for all VC stages. The figures differ from the number of deals for a given year, as a company could raise capital at several points over the year. Median VC investment size refers to the median of aggregate VC deal value received in a given year.

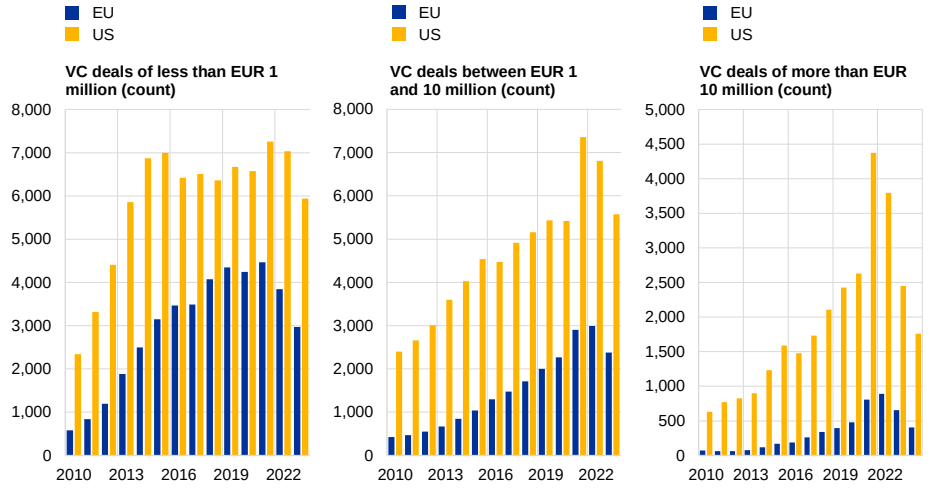
The availability gap in VC funding compared with the US is aggravated further considering the size of funding provided. EU and US firms raise capital in a similar proportion across the funding escalator (i.e. by type of VC funding stage).

58 For an analysis of the causes and consequences of the deceleration in European productivity, see Bergeaud (2024).

However, the gap between the EU and the US increases in absolute terms with the size of the deals. Larger deals in the US represent a relatively larger proportion of deals than in the EU, while EU companies receive far less large-scale VC funding than their US counterparts (see Chart 8). For example, in 2023 the nominal gap in VC investment between the US and the EU for deals under EUR 1 million was EUR 10.9 billion; for deals between EUR 1 million and EUR 10 million it was EUR 24.9 billion; and for those above EUR 10 million it amounted to EUR 35.0 billion. This scarcity of funding for large tickets limits the options for fast-growing companies seeking sufficient scale to compete globally.[59]

Chart 8

Deal count by deal size – a widening gap



Sources: PitchBook Data, Inc., ECB calculations
Note: The number of deals in the EU is declining relative to the US. For deals of less than EUR 1 million EU companies signed 50% fewer deals than their US counterparts in 2023, but this figure rises to 57% fewer deals for tickets between EUR 1 and 10 million and 87% fewer deals for tickets of more than EUR 10 million.

EU VC-backed firms frequently depend on financing from non-EU investors in late-stage financing, which can lead them to list or relocate abroad – ultimately depriving EU markets of a pipeline of firms able to list. This reliance on foreign investors is especially evident for larger ticket sizes during the pre-IPO growth phase (Atomico, 2021).[60] To understand the role of foreign investors, we look at the presence of foreign lead or sole investors in the funding composition of deals in PitchBook. Lead or sole investors (i.e. those responsible for coordinating the funding round and negotiating the terms) provide specialised industry knowledge and their presence can signal the quality of the company, potentially attracting additional investment from other investors. EU firms, in particular scaleups, are more likely to rely on a foreign lead or sole investor and tend to do so more than firms located in the US (Chart 9). In addition, the presence of foreign investors, in particular from the

59 For a detailed study, refer to Fratto et al. (2024).

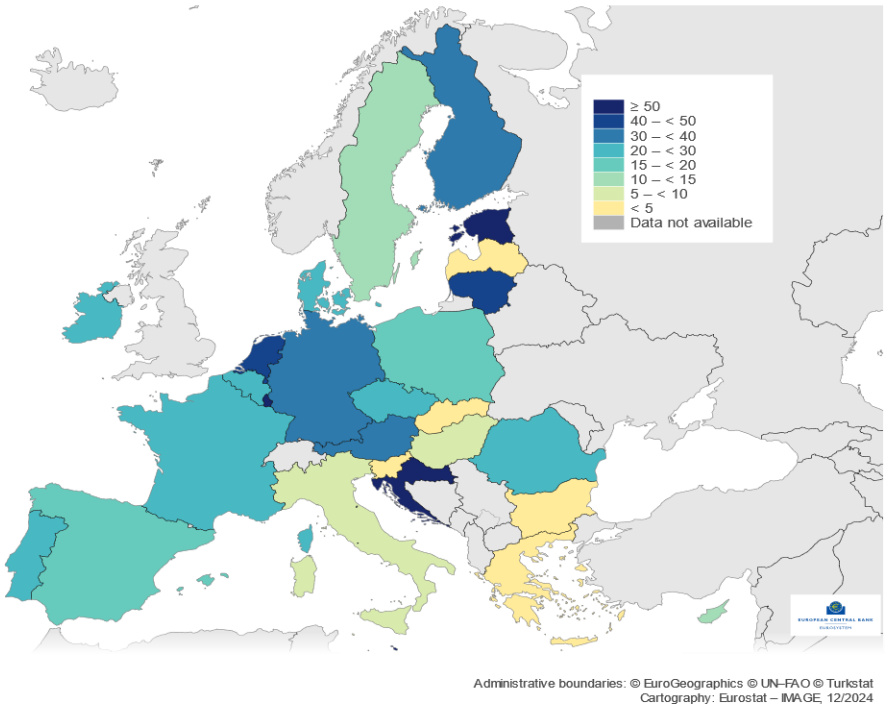
60 For example, Atomico reported that in 2021 US VC was involved in about 80% of investments in Europe exceeding USD 100 million.

US, also increases the likelihood of exits outside Europe and emigration by entrepreneurs (Braun et al., 2019).

Chart 9

Share of late-stage VC deal value involving US investors as sole or lead investor

(2019-2023, in percentage)



Sources: PitchBook Data, Inc., ECB calculations.

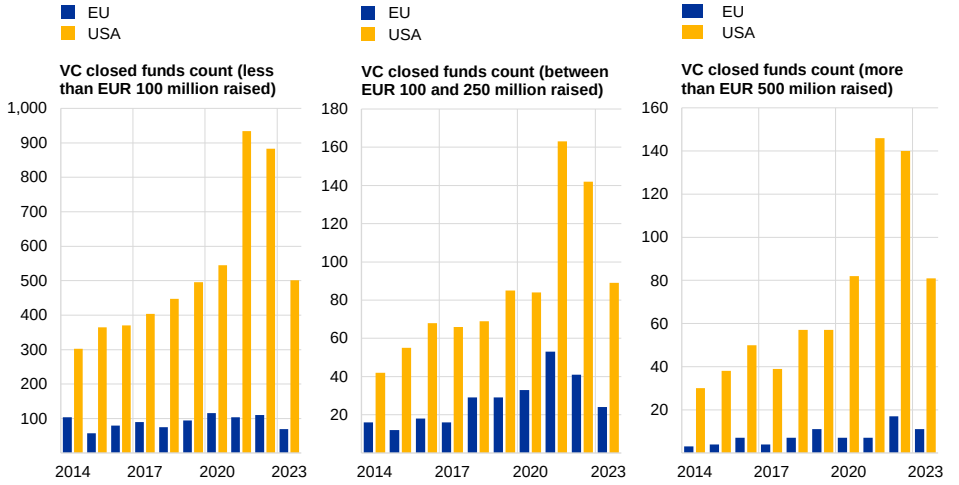
The EU has fewer large VC funds able to meet large funding needs of companies in late-stage financing, meaning that larger deals in the EU are more likely to involve foreign lead investors. Signing large tickets requires VC funds to have a large enough portfolio to allowing for risk diversification. Looking at the distribution of funds relative to the size of their fundraising, we observe that the number of EU funds raising more than EUR 250 million over the period 2019-2023 is one-tenth of the number of US funds (see Chart 10). This helps explain why EU VC-backed companies struggle to attract sufficient big-ticket investment from EU VC funds to support their growth. It also highlights the increased likelihood that EU VC-backed companies will be funded by US funds when the size of the required investment becomes significant. Here again, the EU market is fragmented, with France standing out as the country with the largest concentration of large VC funds closed between 2019 and 2023 (chart 11).[61] This illustrates that initiatives developed at national level to stimulate the local VC ecosystem (such as France's Tibi Initiative

[61] Close-ended funds that successfully completed their fundraising between 2019-2023.

to help the emergence of large-size domestic funds, Germany's Wachstumsfonds and the WIN Initiative creating a fund-of-funds) have been successful at stimulating the local ecosystem, but not necessarily helped to promote pan-European VC ecosystems. At the EU level, the European Tech Champions Initiative (ETCI) managed by the EIF with contributions from the EIB Group and several EU Member States is attempting to increase the number of large VC funds with a target size of over EUR 1 billion. This would allow these funds to offer larger tickets to companies looking for such financing.

Chart 10

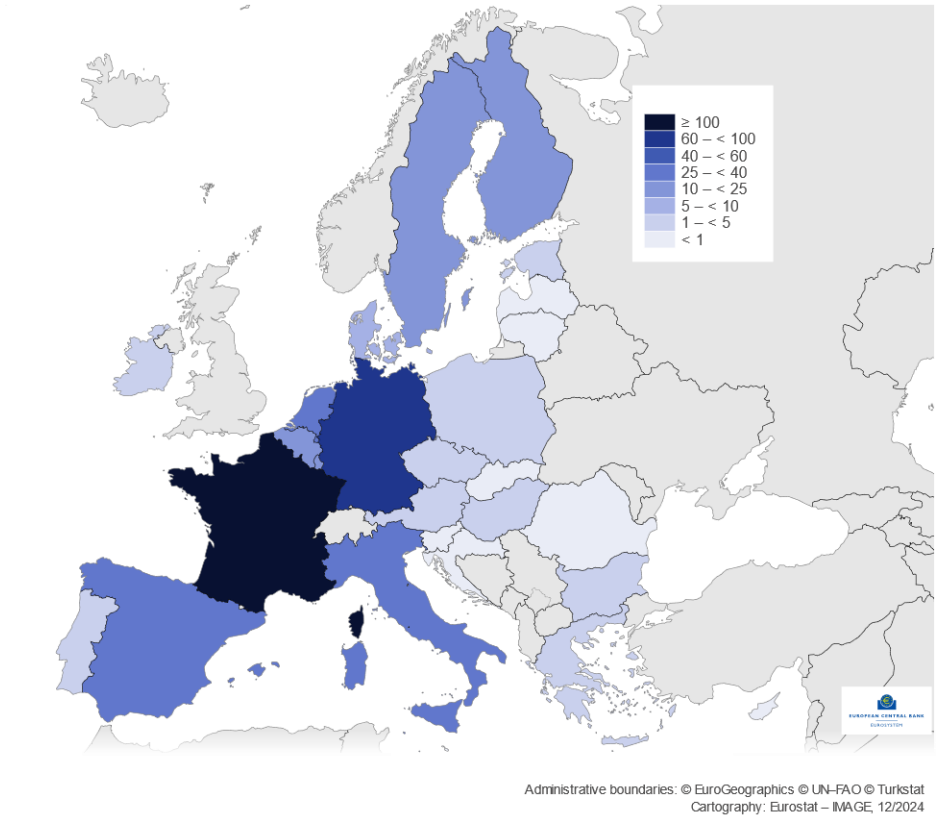
VC closed funds count by amount of capital raised



Sources: PitchBook Data, Inc., ECB calculations.

Chart 11

Number of VC funds exceeding EUR 100 million in size (2019-2023)



Sources: PitchBook Data, Inc., ECB calculations.
Notes: The underlying data include all closed-end VC funds that closed over the period 2019-2023, excluding a small share of evergreen VC funds. Fund size refers to the aggregate capital committed by limited partners.

Reliance on foreign VC investments to support young firms comes with potential benefits, but also risks. There is some empirical evidence for effectiveness in cross-border VC: Wang and Wang (2012) identify a domestic country's economic freedom as crucial for cross-border VC performance. Drawing on a sample of UK-based venture capitalists that invest both domestically and internationally, Espenlaub et al. (2015) find that successful exits via M&A or an IPO occurred quicker in the case of cross-border investments than domestic investments, after controlling for the characteristics of VC backers, deals and portfolio companies. However, their findings are driven by cross-border investments in firms located in North America. For a sample of European VC-backed firms, Braun et al. (2019) find that foreign investors, particularly from the US, generally back much better ventures than domestic ones (e.g. foreign investors play a part in financing ventures that reach higher valuation and are more innovative in terms of patents and patent citations). They also find that the presence of foreign investors is linked to an increased likelihood of foreign exits and foreign acquisitions. Cross-border investments from US venture capitalists are also found to be strongly associated with relocations of firms and the majority of their workforces (Weik et al., 2024). This suggests that spatial proximity between venture capitalists and the startup companies in which they invest has certain advantages. Consistent with this notion,

Cumming and Dai (2010) point to a body of theoretical work and empirical evidence for local bias in VC investments and examine it further across a set of characteristics for a sample of US VC investments. Their findings also point to outperformance of spatially close ventures compared to distant ones.

The fragmentation in EU capital markets makes it difficult to create large VC funds and leads to siloed pools of capital unable to gather the necessary scale to support large scaleups in the EU. At the same time, the smaller size and depth of stock markets in the EU limit exit options for successful firms scaling up, which ultimately impacts valuations and returns to investors. That, in turn, reduces incentives to invest in startups throughout their lifecycle. Moreover, the fragmentation of product markets across EU Member States hampers firms' ability to scale up efficiently, as they encounter different regulatory environments, tax regimes and insolvency laws, complicating cross-border expansion. This combination of financial and structural barriers underscores the need for a broader approach that goes beyond channelling funds and aims to address harmonisation in taxation, insolvency proceedings and market regulations. The development of VC markets and listed equity markets are closely interlinked. VC provides the necessary funding and support for early-stage companies, which can eventually transition to public markets. In turn, the robustness of public markets influences the attractiveness and success of VC investments, creating a feedback loop that supports the growth and development of both markets. The dynamic between VC and listed equity markets is what we explore next.

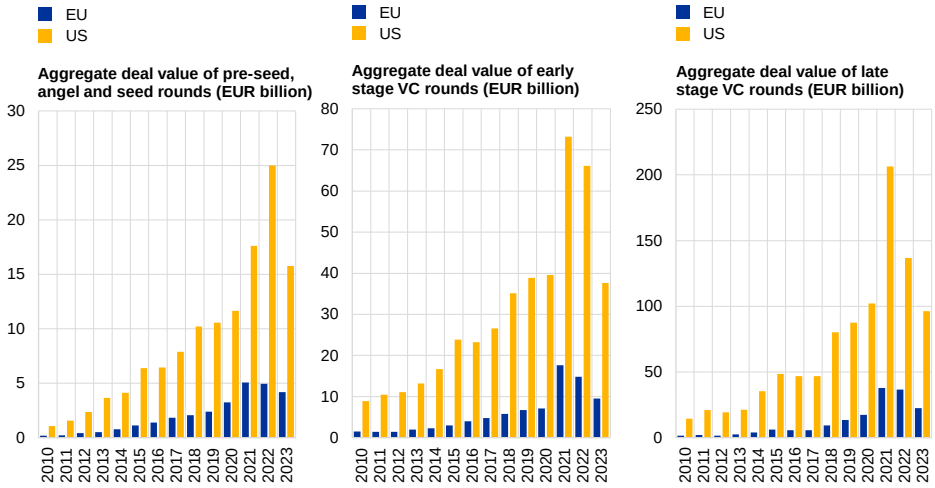
3.2.1 The relevance of VC financing for listed equity markets

The funding gap between the US and the EU can be observed at all stages, but is particularly relevant for scaleups when it comes to supporting a dynamic equity market. EU generally gives birth to far fewer scaleups than the US[62] and a less developed specialised non-bank sector to finance them. As a result, EU companies generally receiving fewer large-ticket investments than their US counterparts, as illustrated by the large difference in their comparative aggregate deal values (Chart 12). When it comes to later rounds of late-stage VC financing, those closest to the moment when a company has to evaluate exit options, EU firms receive a significantly smaller ticket. The 2024 EIF VC survey (Botsari and Lang, 2024) confirms this notion; VC firms pointed to the difficulty in financing companies to scale in Europe in particular – mentioning a lack of private domestic limited partners and large institutional investors. This can have significant implications, including limiting the opportunities for European firms to scale up and ultimately list on stock exchanges. The financing needs of companies seeking to scale increase significantly. Consequently, VC funds able to provide the large tickets to meet these needs have to be significantly larger.

[62] According to Dealogic data, 7,500,000 or 60% of all global scaleups are based in North America, while 990 or 8% are based in EU countries.

Chart 12

The scaleup gap: aggregate VC investment stage of development



Sources: PitchBook Data, Inc., ECB calculations.
Notes: In the EU we observe a rebalancing towards more investment in later-stage funding over the last decade, while the share of late-stage VC rounds in the US seem to have been stationary over the same period, averaging around 60 to 70% of aggregate deal value.

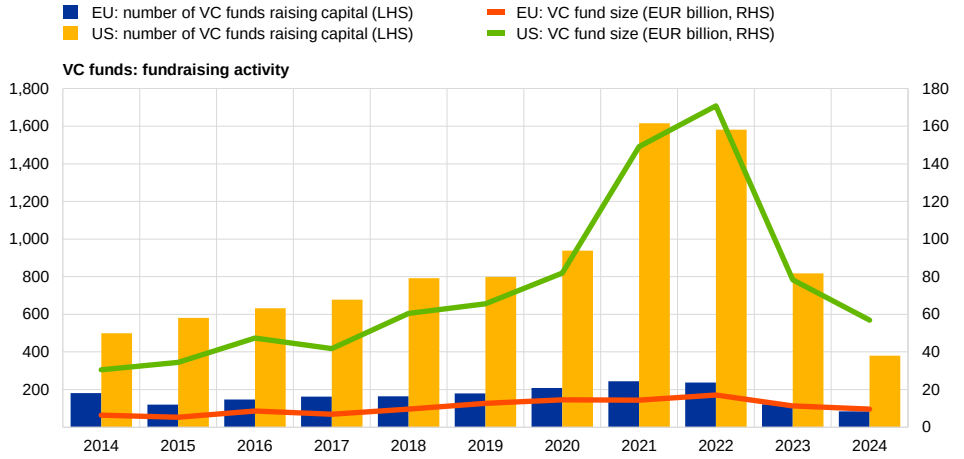
This lack of large VC tickets may stem from both a lack of supply of financing (i.e. scarcity of domestic funding creates financing constraints for EU firms) and a lack of demand due to the incomplete Single Market. Looking at VC fundraising activity in EU compared to the US, we observe that US-domiciled VC funds raise significantly more capital than their EU counterparts. The number of VC funds and the size of funds raised in the US is significantly larger than in the EU, and those differences have become larger over time (with the exception of the last two years) (Chart 13). Demand-side factors are at play here. For instance, barriers, frictions and costs to scaling up may reduce the pool of young companies with significant upside potential seeking VC financing to scale up or undermine their returns relative to US peers.[63] In a similar vein, estimates from the IMF point to the high cost of the remaining barriers to the functioning on Europe's Single Market and therefore impeding firms' growth.[64]

63 See Draghi (2024).

64 See IMF (2024), Note 1, which estimates that remaining barriers to trade within the countries of the EU are equivalent to a 44% tariff on trade in goods, and a 110% tariff on trade in services.

Chart 13

VC fundraising and aggregate fund size

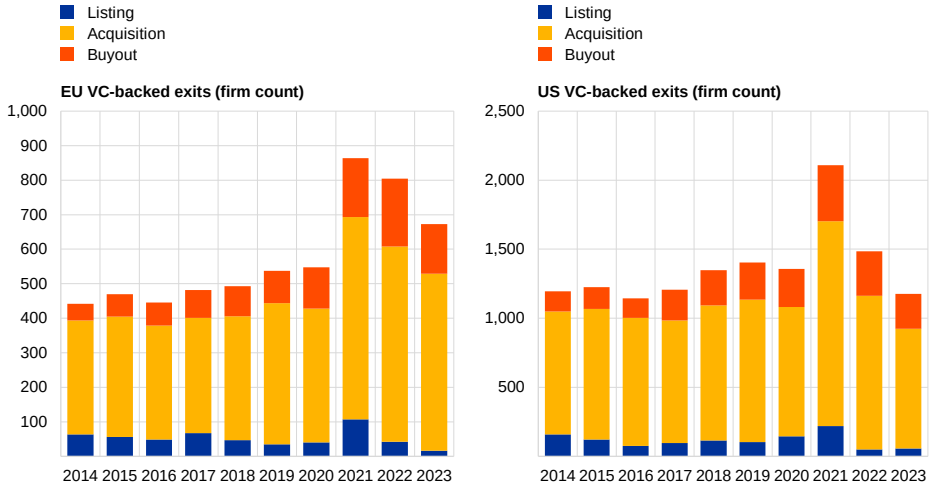


Source: PitchBook Data, Inc., ECB calculations.

Of the three possible exit routes, the largest number of firms exit via acquisition, both in the EU and US; public listing represents the largest exit route in terms of value, driven by a few very profitable firms. Companies reaching a certain stage in their growth face the choice of going public, being acquired or remaining private. Public listing does not represent a large share of the number of firms exiting venture capital, in either the EU or the US (Chart 14). In terms of value however, this is the largest contributor – confirming it as a particularly valuable exit route for investors, who are then able to monetise their returns. Exit valuations are highest for VC-backed IPOs in both the EU and the US, outpacing acquisitions and buyouts if put together by a factor of 9.5 in the EU and 14 in the US. At the same time, average exit valuations of IPOs in the US are 3.88 times higher than average public listings in EU (Table 5). Looking over the past ten years, the high volatility has mainly been driven by a few unicorns entering the market, and the impact of the business cycle on asset prices.

Chart 14

VC-backed exits (firm count)



Source: PitchBook Data, Inc., ECB calculations.
Note: Public listing spurted in 2021, which was a good year in the markets, with high valuations, portfolio rebalancing towards riskier assets and low interest rates.

Table 5

Exit size by type and geography

(EUR million)

Average 2019-2023	EU	US	Ratio US/EU
Acquisition	23.68	56.10	2.39
Public listing	338.49	1312.68	3.88
Buyout	12.05	33.18	2.75

Source: PitchBook Data, Inc., ECB calculations.

The underdevelopment of large VC deals in the EU and the low IPO activity compared to the US are two sides of the same coin. The lack of adequate funding to support companies grow sufficiently to reach the scale to go public may be one driver. In addition, once a company reaches sufficient scale to exit, the question of location arises. The limited depth and integration of EU equity markets is one factor driving firms to decide to list on US stock exchanges so as to benefit from higher valuation and gains.[65] Empirical evidence (Patzig et al., 2024) also indicates that firms that relocate tend to proceed with an IPO and are more likely to open their headquarters in the country where they are listed. Those companies that relocate for better access to financing also seem to have better exit outcomes. Conversely, the literature finds that the potential of an IPO and the related value for investors are the strongest drivers of VC investing. Jeng and Wells (2000) examine a range of factors affecting VC across developed economies and emphasise the outstanding importance of viable exit mechanisms to the development of a VC industry. IPO is

[65] See Fratto et al. (2024). For instance, the EIB finds that 38% of a sample of EU scaleups chose to list on stock exchanges abroad, primarily in the US.

identified as the most attractive exit option and later-stage VC in particular is found to respond strongly to good IPO prospects.

In conclusion, VC often plays a crucial role during the startup and growth phases of companies, before they later develop into large and, possibly, listed corporations. The combination of equity financing and hands-on managerial advice is a key distinguishing feature of VC. As a result, it is often better adapted to the needs of innovative startup companies than the services of traditional financial intermediaries or hired consultants. This also implies a far-reaching influence of VC investors and a preference for startup firms that are spatially close to them. From a EU perspective, the scaleup gap and resulting reliance on cross-border VC investments may come at the cost of entrepreneurial emigration and unrealised economic potential. The US lead in listed equity may in part be explained by its more developed VC ecosystem, which gives it an edge in transforming young startups into large listed corporations. As young innovative firms in the EU seek to benefit from the availability of capital in the US and the potential market valuation gains offered by the larger and deeper markets there, this also saps EU's potential to retain successful firms and their activities.

4 Policy conclusions

The listing gap with the US calls for policy action to improve the efficiency of EU markets. Our analysis illustrates the disparity in firm listings between Europe and the US, pointing to an area where Europe would benefit from taking advantage of deeper and more developed equity markets. These markets are instrumental in fostering private risk sharing and firms' access to a broad range of financial instruments, as well as in expanding the opportunities for retail investors to benefit from a wider range of investment opportunities.

A deep equity market, complemented by a well-developed financial ecosystem that includes VC, can foster entrepreneurship and productivity in the EU while increasing the opportunities of investors to reap the benefits of this growth. Equity markets provide businesses with access to capital, allowing them to expand operations and enter new markets. In the earlier stages of a firm's development, VC can support startups and emerging companies to grow and scale up their activities by offering not only funding but also strategic guidance and expertise. This environment creates strong incentives for entrepreneurs to start new ventures, as they can secure the necessary resources to develop their ideas and scale their operations. By supporting the creation and growth of innovative firms, this financial ecosystem contributes to the EU's overall productivity. Policies to support capital markets should go hand in hand with renewed efforts to dismantle the remaining barriers to the Single Market so as to further economic integration and bolster economic growth in the EU.

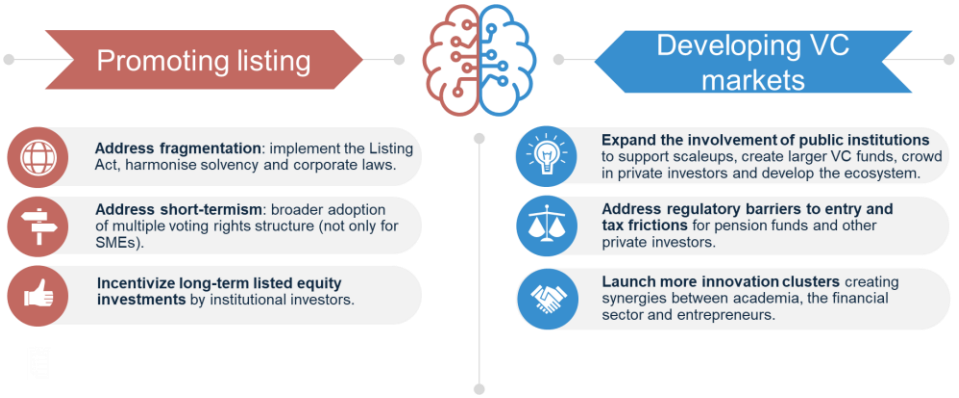
In view of our findings regarding the benefits and challenges of listing, this chapter elaborates on the latest reforms undertaken at the EU level. We also outline concrete policy recommendations to: (i) incentivise more listings, as a way of contributing to the depth and liquidity of the EU's equity markets; (ii) address the potential impact of short-termism linked to listing; and (iii) develop VC to support the pipeline of firms able to scale up and list on the EU markets. The recommendations are summarised in Figure 1 below.

These proposals should be seen in the broader context of the savings and investment union agenda and the Single Market more broadly. The momentum to make progress on CMU has been significantly driven by the insights and recommendations from recent high-level reports such as Draghi (2024) and Letta (2024), which fed into the Commission's competitiveness compass.[66] While it is not their focal point, these reports emphasise the need for a more integrated and efficient capital market across the EU to foster economic resilience, productivity and ultimately growth. By focusing on the financial sector, and in particular supporting the scale of financial markets and the supply of financing, the CMU agenda complements efforts to complete the EU Single Market more broadly to ensure the

[66] The competitiveness compass is the strategic document outlining the Commission's priorities.

free movement of goods, services, capital and labour – in turn supporting the demand for capital.

Figure 1
Overview of policy considerations



Source: Authors' elaboration.

4.1 Promoting listing for SMEs and larger companies

Supporting firms' access to the EU's equity markets has been at the core of the CMU agenda. The Listing Act[67] aims to make public markets more attractive for EU companies, especially SMEs, by simplifying listing rules, reducing compliance costs and increasing legal certainty. For instance, the requirements for prospectuses have been simplified to make it easier and less costly for SMEs to raise capital through public offerings. The Commission has also introduced the concept of SME Growth Markets, a specific category of trading venue to facilitate access to capital for SMEs. These are designed to be more flexible and less burdensome and ultimately less costly in terms of regulatory requirements compared to major exchanges. The EU has also deployed instruments (e.g. via the European Investment Fund) to support SMEs by providing risk finance through various financial instruments and help them grow to a scale where listing becomes a viable option.[68] These actions have helped the EU markets in many crises over the past decades, in particular since the Global Financial Crisis, and supported positive developments. However, their scale is not yet sufficient.

The most recent measures agreed as part of the Listing Act entered into force in December 2024, but their effects will take time to materialise and should be closely monitored. While some provisions included in the reform will come into

67 Regulation (EU) 2024/2809 of the European Parliament and of the Council of 23 October 2024 amending Regulations (EU) 2017/1129, (EU) No 596/2014 and (EU) No 600/2014 to make public capital markets in the Union more attractive for companies and to facilitate access to capital for small and medium-sized enterprises (OJ L, 14.11.2021).

68 The Commission also created dedicated financing programmes such as Horizon 2020 and Horizon Europe, which are research and innovation programmes including funding schemes and support mechanisms for innovative SMEs, indirectly supporting their growth and potential to access public markets.

force immediately,[69] others will be implemented gradually over a period of up to two years, and Member States have time until 2026 to implement the Directive into national law – including the possibility for national exemptions and deviations in some cases. This means that the effects of the latest reforms cannot yet be taken into consideration when assessing the need for potential additional measures to increase firm listings, particularly for SMEs, which make up the largest share of potential firms to ultimately list.

Continued policy actions under the CMU agenda should also target larger companies to ensure all firms have adequate incentives to list and contribute to the depth and liquidity of EU markets. The gap between the US and Europe as regards listings is also widening due to a slowing in new listings in Europe. At the same time, the appeal of US markets for foreign firms is increasing: dual-listed EU companies, benefitting from reduced compliance costs under the US Securities and Exchange Commission's foreign private issuer status, have increased significantly.[70] The drivers behind these developments are beyond the scope of this paper and deserve further investigation. This trend could exacerbate differences in market depth and liquidity between the US and the EU. EU policy has focused on reducing regulatory costs to make listing more attractive for smaller companies, but for larger firms, enhancing the appeal of listing in the EU could further contribute to the depth of the EU equity markets. Addressing fragmentation in the EU stock exchange landscape and supporting the involvement of institutional investors could also help broaden the depth and liquidity of EU equity markets.

Further addressing impediments to the Single Market in capital, such as the lack of harmonisation within the CMU (e.g. in insolvency and corporate law), may attract investors and incentivise firms to go public. The CMU agenda should be seen in the context of broader efforts to support the EU economic integration. Integration and harmonisation are needed to enable investors to better manage their costs and risks when providing equity funding, and to allow companies to reap the benefits of the Single Market more fully – including developing opportunities across borders, finding talent, developing economies of scale and deepening the pools of capital they have access to.

Our analysis demonstrates that listed firms experience profitability gains, with US firms benefitting more than their European counterparts. This evidence suggests that while listing offers economic advantages, the discrepancy in gains between regions points to underlying structural differences, presumably both in market functionality and firm dynamics across the Atlantic.

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69 Some simplifications and exemptions have applied since December 2024. For instance, the minimum threshold of EUR 1 million below which the Prospectus Regulation did not apply has been removed and accompanied by a broadening of the scope of exemptions from the requirement to prepare a prospectus. The new exemptions will effectively remove the requirement to publish a capital increase prospectus in the vast majority of cases, unless the issuer opts to prepare one voluntarily. The new rules also standardise the presentation of information within prospectuses to improve their readability for investors and reduce costs for issuers.

70 Foreign private issuers are exempt from certain SEC rules on disclosure and have more flexibility in the timing of their financial reporting. These advantages can result in lower compliance costs and greater flexibility compared to domestic companies.

At the same time, listing can be associated with short-termism, posing challenges for long-term investment. Our findings are in line with some findings in the literature that public listing can lead to a focus on short-term profits, which may discourage long-term strategic investments compared to unlisted firms. This phenomenon requires careful consideration in policy design to balance immediate market expectations with sustainable growth. For instance, ownership structures play a role in firms' short-termism, necessitating policy incentives for long-term goals such as incentives for institutional investors and governance frameworks that balance control with shareholder protection.[71]

The EU's recent moves towards multiple voting rights represent a step towards harmonisation, albeit a limited one. Aligning incentives between publicly listed and privately financed firms can mitigate the pressures of short-termism. By aligning the incentives of publicly listed firms with those of private ones, which often face fewer short-term pressures, policymakers can create a more balanced environment conducive to both immediate and long-term growth. For example, multiple-vote share structures can allow shareholders to retain decision-making power while accessing public capital markets, but nevertheless providing safeguards to protect the rights of other shareholders. Recent legislative efforts such as the Multiple Voting Rights Directive[72] aim to harmonise voting structures across the EU.[73] However, these measures primarily target the SME growth market, indicating a need for further reforms to enhance the attractiveness and competitiveness of EU equity markets.

Ameliorating agency costs to list is particularly relevant for intangible-intensive and young firms; these are costs associated with increasing information asymmetries and could be mitigated by increasing shareholder concentration. The increasingly large role of intangible assets at the innovative frontier of the economy could help explain why fewer companies are listing or seeking to list only later in their development.[74] For young firms with predominantly

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71 There is a long-standing literature that speaks to the challenges in policy design aimed at achieving a long-term focus while balancing the risks of managerial entrenchment. See for example Gompers et al. (2010); Bebchuk and Kastiel (2017); Masulis et al. (2009); Smart et al. (2008); and Villalonga and Amit (2006).

72 Directive (EU) 2024/2810 of the European Parliament and of the Council of 23 October 2024 on multiple-vote share structures in companies that seek admission to trading of their shares on a multilateral trading facility (OJ l, 14.11.2024). According to a press release from the Council of the European Union, "The Council has adopted the directive on multiple-vote share structures for companies seeking to trade their shares in certain financial markets. It aims to facilitate SME owners' access to market financing without jeopardising the control they have over their companies. The directive creates a minimum harmonisation at EU level that removes obstacles for the access of SMEs with multiple-vote structures not only to SME growth markets but also to any other multilateral trading facility open to trading of SME shares." Some Member States have opted to go beyond the scope of the Directive, e.g. Germany amended its legislation to allow these type of structures on regulated markets as well.

73 The UK also recently amended its listing rules, which now include provisions allowing companies to have multiple class share structures at admission to the LSE in an effort to support the attractiveness of listing in the UK. See the press release by the Financial Conduct Authority.

74 Firms' decision to list later in their lifecycle could have distinct implications for returns for retail investors. If high-growth firms stay unlisted longer, for example to benefit from VC financing to scale up quickly, investors who can only access public markets miss out on a possibly large part of the returns generated over the firms' lifecycle. The evidence on private versus public equity is mixed, however, owing in part to the transparency of data. Harris et al. (2014) find the returns realised by VC funds to be 3% higher than those on the S&P 500. If an increasing share of the total equity market is kept in private markets for longer, this could lead to material distributive effects.

intangible assets whose value depends on specialist knowledge about their potential, finding external funding is a key problem. Since intangibles are by their very nature difficult to pledge as collateral, equity is likely to be the instrument of choice. But for dispersed shareholders in public equity markets, the value of such equity is particularly difficult to verify due to limited direct access to detailed company information.[75] Thus, the rise of intangible assets in the production of goods or services leads to larger and more structural information asymmetries, creating increased agency costs.[76] One way to reduce agency costs and information asymmetries is by having a more concentrated ownership structure. This means having fewer, but larger, shareholders who can exert more influence and control over management decisions. These shareholders are often more informed and engaged, reducing the information asymmetry between management and shareholders.

Reducing agency costs to listing is important to ensure that promoting VC funding does not have adverse effects on the relative attractiveness of listing, especially in growth segments. The literature, in particular for the US, shows that enabling firms to scale up while remaining private has resulted in fewer firms going public,[77] contributing to the shrinking number of publicly listed companies.[78] The trend is evident across sectors like technology and healthcare, where firms can access sufficient private funding and delay their IPOs until they are older and larger.[79] Likewise, the increased availability of private equity offers alternative exit options for venture capitalists, diminishing their reliance on public markets and causing companies to delay or forgo going public.[80] By balancing the growth of private funding alternatives with efforts to deepen and integrate EU equity markets, policymakers can encourage more firms to list domestically, retaining successful companies and their economic benefits within the EU.

In parallel, addressing the potential impediments to investors stepping up their investment in equity markets would support the development of the market. Institutional investors currently play a limited role in financing long-term equity, despite policy efforts to provide incentives for them to do so.[81] In addition, channelling savings into the equity market would also be key to boosting the demand for equity, which is the aim of proposals for a European savings product to encourage higher-return and longer-term household investments.[82]

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75 However, for some companies, rating agencies, bank analysts and other financial entities offer assessments and analyses that can aid in evaluating the company's financial health and performance. These third-party evaluations can help mitigate information asymmetry, though their availability and accuracy can vary significantly across different firms and industries.

76 See for example, Gao et al. (2013).

77 See Ewens and Farre-Mensa (2019).

78 See Stulz (2018).

79 See Siev and Qadan (2022).

80 See Chaplinsky and Gupta-Mukherjee (2013).

81 The latest amendments to the Solvency II Directive, which will have to be implemented by 2027, provide favourable treatment for equities classified as long-term equity investments.

82 For further analysis and proposals for CMU, see Arampatzi, Christie, Evrard et al. (2025).

4.2 Promoting VC to support the pipeline of firms able to list

A robust VC ecosystem is crucial for encouraging innovative firms to list, yet the EU lags in this area. VC is a pivotal segment of the equity market, particularly for scaling innovative firms. The underdevelopment of this sector in the EU hampers the pipeline of companies ready to list, necessitating targeted interventions to enhance VC availability.

The lack of large VC funds in the EU in particular can have significant implications, including limiting the opportunities of EU firms to scale up and ultimately list on stock exchanges. Financing needs of companies seeking to scale increase significantly. Consequently, VC funds that are able to provide the large tickets for meeting these needs have to be significantly larger. To address this issue of lack of scale, a new pan-European EIF vehicle could also be established to accelerate creating larger pools of capital from EU pension and insurance funds to invest in larger EU VC funds with the EIF doing the due diligence and allocating the capital to the VC funds.[83]

There is evidence in the literature that VC funds have a preference for investing locally[84] and empirical evidence that there is a correlation between the location of VC funds and the location of capital raised and invested. Developing the VC ecosystem is therefore important to incentivise investment in the EU. While the EU VC market is maturing and growing there is still a significant gap and in particular, European scaleups are relying on resources from outside the EU to finance their growth. This can be attributed to the lack of availability of VC financing as well as a lack of expertise in the EU, leading firms to seek this resource elsewhere.

At the same time, it is important to recognise that the lack of VC funding is not the only reason for firms setting up in other jurisdictions, such as the US. Broader structural factors (such as access to a bigger market) or framework conditions (such as ease of doing business) that enable young firms to scale up more easily are also at play. This combination of factors influences the decision of EU firms to seek funding elsewhere, but also means that the benefits of financing and growing firms in the riskier phases are reaped outside.

A comprehensive approach to strengthening the EU VC ecosystem, particularly for innovative firms in the scaleup phase, is needed starting, with a greater involvement of public actors such as the EIB Group. Developing VC in the EU can support the pipeline of firms ready to scale up and list, facilitating a more

83 Arnold et al. (2024).

84 The literature refers to a local bias in VC investments, which is attributed to a range of factors including reduced information asymmetries, reduced transaction costs and network effects (Gorman and Sahlman, 1989; Jeng and Wells, 2000; Sorenson and Stuart, 2001; Hochberg et al., 2007, Cumming and Dai, 2010). Furthermore, local bias may be related to the specific value venture capitalists can add to their portfolio companies: beyond just providing equity financing, they often advise entrepreneurs on the management of their companies.

dynamic and liquid market. Some EU[85] and national public funding programmes already aim at mobilising institutional investments in startups and scaleups by serving as a catalyst for reducing risk and increasing the attractiveness of these ventures. These programmes can de-risk investment opportunities through co-investment mechanisms and guarantees, effectively lowering entry barriers for institutional investors. In addition, further utilising the resources of institutions like the EIB and the EIF can have a beneficial impact on startup performance,[86] crowd in private capital through public sector co-investments[87] in VC funds and provide patient financing sources.[88] In particular, this would mean mobilising and increasing the resources of the EIB Group to utilise the toolset of instruments to a greater extent to channel funds into VC and attract new private investments, in particular large institutional investors, who tend not to invest in small and fragmented markets.

At the same time, a robust VC ecosystem would warrant a broader investor basis. The average share of government agencies in European VC fundraising is already substantial. Potential expanded involvement by public agencies should therefore crowd in private investors and incentivise them to invest in the market.[89] For instance, the presence of the EIF in the current or previous rounds can provide a signal of the quality of a company, catalysing additional investment from less sophisticated investors.

Building on existing initiatives such as the ETCI to support European scaleups is welcome and should focus on attracting private investors and delivering benefits across the EU.[90] A new TechEU programme from the EIB Group could further improve access to finance for European companies throughout the innovation and growth cycle, by deepening the pan-European VC market. Importantly, the TechEU programme will include the ETCI 2.0 initiative, which aims to support European scaleups and attract private-sector institutional investors such as pensions

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85 EU programmes such as InvestEU can support VC by providing guarantees and equity investments that can attract venture capitalists to invest in early-stage companies. Additionally, InvestEU aims to facilitate access to a network of investors and industry experts through its Advisory Hub and Portal. The European Innovation Council (EIC) and its EIC fund also finances innovative projects and early-stage startups.

86 Studies from the EIF document the positive effect of VC investments supported by the EIF on the financial growth and performance of young innovative firms (see Pavlova and Signore, 2019).

87 For instance, the presence of the EIF, which has expertise and experience in identifying opportunities, can facilitate due diligence by less specialised investors. Evidence shows that EIF investments effectively crowded-in additional capital from other VC investors following the economic crisis; see Kraemer-Eis, Signore and Prencipe (2016).

88 The presence of investors with a longer-term horizon can protect VC in downturns.

89 The EIF's Institutional Asset Management Umbrella Fund (AMUF), ETCI 2 and other initiatives aim to bring in retail investors and crowd-in other investors. See, for example, Botsari, Gvetzade and Lang (2024), Figure 21 and Kraemer-Eis et al. (2018).

90 The ETCI is a fund of funds aimed at channelling late-stage growth capital to promising European innovators, launched by the EIB with six Member States. To date this fund has mobilised EUR 10 billion in public and private resources and supported 16 tech scaleups. This is significant, considering that in 2023 European scaleups received around EUR 30 billion in VC. Building on the success of the ETCI, the EIB Group is working on the launch of ETCI 2.0—a larger, more ambitious fund of funds. By pooling capital from private and public investors, including pension funds and insurers, it aims to bridge the funding gap for European scaleups.

funds and insurance companies to help bridge the funding gap for European scaleups.

Currently, institutional investors play a limited role in VC in Europe. This is due to several factors including a lack of expertise, trade-offs between the costs of due diligence and the limited number of large VC funds, regulatory restrictions[91] and national specificities, resulting in heterogeneity and limitations.[92] Institutional investors (in particular pension funds) could be incentivised to play a more active role by addressing potential barriers in the regulatory framework, reducing tax frictions (such as the debt and equity bias), providing potential tax incentives[93] and developing private and pillar II pension funds to expand capital pools able to invest in this asset class. Coordinating best national practices at the EU level regarding the provision of adequate tax incentives could foster a level playing field and support cross-border investments. Finally, some of the requirements in EU regulation may also explain the limited involvement of high-net-worth private investors. For instance, while MiFID[94] itself does not explicitly prevent these individuals from investing in VC, some aspects of the Directive might pose challenges or create barriers for such investments.[95] The Alternative Investment Fund Managers Directive (AIFMD)[96] also restricts the eligible investor base of alternative investment funds to professional investors – limiting the potential involvement of high-net-worth individuals. The European Venture Capital Fund Directive (EuVECA)[97] on the other hand took a more open approach by setting a minimum investment threshold for investors of EUR 100,000 unless they are a professional client. Aligning the eligibility criteria for investors in VC funds would be desirable and could in this case follow the streamlined approach taken in EuVECA.

A focus on developing regional hubs and local VC ecosystems is also crucial to reducing reliance on foreign investors and should be coupled with EU-wide initiatives to integrate markets. National public financial institutions such as

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91 Solvency II offers the option investing in VC with lower risk weights, but this is not widely used in practice.

92 For instance, the EU regulatory framework subjects investment by institutional investors in assets such as VC to the “prudent person principle”, which can be further defined at the national level.

93 For example, since January 2024 the VAT exemption for the management of investment funds has been extended to all Alternative Investment Funds (AIFs) in Germany. The exemption applies to the management of all private equity, VC or crypto funds, without the requirement to be comparable to open-end mutual funds (UCITS) or qualify as certain VC funds (“Wagniskapitalfonds”), as was previously the case.

94 Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (recast) (OJ L 173, 12.6.2014, p. 349).

95 These stem from the difficulties high net worth individuals may face to be treated as professional investors. For instance, one of the criteria is linked to frequency of investments, when by nature VC and private equity investments are long-term investments with a low investment frequency.

96 Directive 2011/61/EU of the European Parliament and of the Council on Alternative Investment Fund Managers and amending Directives 2003/41/EC and 2009/65/EC and Regulations (EC) No 1060/2009 and (EU) No 1095/2010 (OJ L 174, 1.7.2011, p. 1).

97 Regulation (EU) No 345/2013 of the European Parliament and of the Council of 17 April 2013 on European venture capital funds (OJ L 115, 25.4.2013, p. 1). This offers a voluntary EU-wide marketing passport to smaller fund managers, sparing them the costs associated with authorisation and compliance with the AIFM Regulation (Commission Delegated Regulation (EU) No 231/2013 of 19 December 2012 supplementing Directive 2011/61/EU of the European Parliament and of the Council with regard to exemptions, general operating conditions, depositaries, leverage, transparency and supervision (OJ L 083, 22.3.2013, p. 1)).

France's Tibi Initiative to help the emergence of large-size domestic funds and Germany's Wachstumsfonds and the WIN Initiative creating a fund-of-fund can play a role in developing VC ecosystems and have been successful at stimulating the local VC ecosystem – but have not necessarily helped to promote it pan-European level. These should therefore be coupled with enhanced interventions at the EU level, such as developing funds with a regional or pan-European approach.

Innovation clusters can play a role in connecting academia, financiers and entrepreneurs and should be expanded. Connecting the supply and demand for capital with the innovative ideas and the actors able to commercialise these into viable products scaling up in the Single Market is essential. Europe has several well-established innovation clusters, often centred around major cities and regions known for their R&D capabilities. Notable examples include the Paris-Saclay cluster, Berlin's tech ecosystem, and the Eindhoven Brainport in the Netherlands. These clusters benefit from a combination of universities, research institutions, startups, companies and financiers such as VC providers. Such initiatives are key for connecting the supply of funding of VC financing and translating it into concrete economic benefits. The existence of innovation clusters has been identified as one of the contributing factors to the dynamic environment in the US, leading to the rapid evolution and adoption of digital technologies in that country at a time when Europe has kept a more conservative approach to innovation.[98] There is an opportunity to broaden the EIF's support for technology transfer funds that focus on establishing startup businesses or university spin-out companies, typically investing at proof of concept, pre-seed, seed, post-seed and Series A and B rounds.

[98] Bergeaud (2024) illustrates that US firms in traditional industries (e.g. transportation, appliances, etc) have gradually shifted their R&D expenditure towards ICT (e.g. hardware and software, digital platforms and data-backed innovations) as opposed to their European counterparts. This shift was in part supported by positive externalities from R&D clusters that integrated large firms, startups universities and capital venturers.

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