

The Effects of Public and Private Equity Markets on Firm Behavior

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Abstract

In this article, I review the theoretical and empirical literature on the effects of public and private equity markets on firm behavior, emphasizing the consequences that emerge from disclosure requirements, ownership concentration, and degree of firm standardization. While publicly listed firms benefit from a lower cost of capital, enabling increased focus on commercialization and profitability, they are less suited to pursue long-term risky investments. Privately held firms are better equipped to pursue innovative projects but face a higher cost of capital, which limits their growth. Complementarities between public and private equity markets can mitigate their respective limitations. Innovation in private equity markets supplements commercialization efforts of public firms, and demand for innovation by public firms accelerates entrepreneurial activity in private equity markets. I conclude by discussing directions for future research.

1. INTRODUCTION

One of the key channels through which finance contributes to economic development and growth is the allocation of capital to most productive uses. Public equity markets are often viewed as a central mechanism that enables the allocation of financing to fast-growing entrepreneurial companies (Brown, Fazzari & Petersen 2009; Demirgüç-Kunt & Levine 1996). Recognizing their importance, a major focus of financial policy makers around the world was the creation of new stock exchanges for such companies (Bernstein, Dev & Lerner 2020). At the same time, it is well understood that the transition to public equity markets is not only a financing event but also an occasion that influences many aspects of the firm. Mandatory disclosure of financial information, dispersed ownership of shareholders, liquid stock, and regulatory scrutiny are just a few factors that influence firms' governance structure and incentives.

Do public and private equity markets differentially affect the behavior of firms? If so, how? In this review, I survey the growing literature that explores how public and private equity markets influence firms' behavior. I explore the consequences for reliance on acquisitions, their ability to pursue long-term innovative projects, the impact on the type of human capital they attract, and their focus on profit-enhancing commercialization. I further explore how these effects subsequently impact firm creation and patterns in technology development. Together, the goal of this review is to shed light on how public and private equity markets affect firms' behavior.

I start by reviewing the theoretical literature in Section 2, by focusing on the implications of central features that distinguish public and private ownership structures. The theoretical literature highlights how these differences may lead to a fundamental trade-off. On the one hand, public equity ownership enables access to a lower cost of capital due to increased disclosure, dispersed ownership, and a higher degree of firm standardization. While this may allow firms to increase their level of investment, these very same forces may shift investment composition toward short-term investments and commercialization and away from long-term risky investments. These latter predictions raised significant concerns, especially given the difficulty of financing innovation and the reliance of high-growth listed firms on public equity markets to fund their R&D investments (Brown, Fazzari & Petersen 2009; Hall & Lerner 2010). In contrast, theories suggest that the governance structure of privately held firms enables more exploratory and innovative investments but also imposes a higher cost of capital, which could inhibit these efforts.

Exploring the predictions of these models empirically has proven to be quite challenging. First, since privately held firms are informationally opaque, researchers relied on a host of new data sources to compare their activities to publicly listed firms. Second, the decision of firms to become publicly listed, or to raise private equity funding, is endogenous and may correlate with unobservables that drive firm performance. Addressing this concern is of first-order importance to understanding the real consequences of public and private equity markets. I discuss key empirical challenges throughout the article, highlighting the various approaches adopted by researchers to overcome these issues and establish causality.

The empirical evidence, reviewed in Section 3, suggests that public and private firms play distinct roles in the economy. Publicly traded companies have access to a lower cost of capital, which enables greater reliance on equity issuances and access to cheaper debt. In turn, this access allows an increase in the level of investment, facilitating significant growth in a firm's assets, workforce, and profitability. At the same time, public firms shift their investment composition toward a strategy of commercialization and short-term projects. In contrast, private firms can access only more expensive financing, but their governance structure allows the pursuit of highly innovative, yet risky, investments.

Interestingly, the increased focus on profitability and commercialization of publicly traded firms is also associated with a significant change in the composition of its labor force, where

entrepreneurial-minded employees tend to leave the firm after the initial public offering (IPO), while firms establish more internal controls and processes and become more standardized. The increased focus on areas such as finance, accounting, and internal controls enables public firms' growth and scale but limits their ability to remain innovative.

In light of the importance of private ownership to innovation and long-term investment, I turn to explore two prominent forms of private capital—venture capital and private equity buyouts. While both forms share similarities due to their information opacity and concentrated ownership, they differ substantially from each other. While venture capital investors target early stage companies, typically within the technology sector, private equity buyouts target mature businesses and rely on significant debt to leverage their portfolio companies. Researchers have long sought to understand the causal implications of these forms of capital. In Section 4, I survey their impact on their portfolio companies and the economy and highlight their limitations.

The literature highlights that both public and private equity markets suffer from significant limitations. Researchers raised concerns that public equity markets impose short-term pressures that could even endanger the United States's future competitiveness (Porter 1992). At the same time, privately held firms face significant financial constraints, which may restrict their ability to scale and grow. I highlight that considering each market separately, however, ignores complementarities that emerge between the two, which may mitigate these concerns. First, public firms exploit their low cost of capital to acquire innovation in private equity markets and supplement their commercialization-focused strategies. Second, demand for innovation by public firms incentivizes privately held firms to innovate and triggers the flow of capital to private equity markets, which further supports innovation in the economy. In Section 5, I discuss the evidence on the interaction of public and private equity markets.

Over the past decades, public and private equity markets have experienced significant changes: These markets became more globalized, new methods to go public have emerged, more capital is flowing to late-stage private equity markets, firms remain private longer and go public in more mature stages, and antitrust policies are being considered in a way that could affect both public and private equity markets. These changes provide interesting and important avenues for future research to enhance our understanding of how these markets shape the economy. I discuss these in Section 6.

2. THEORETICAL FRAMEWORK

A fundamental question in corporate finance is how ownership structure affects firm behavior. In a perfect world, with frictionless capital markets of the sort envisioned by Modigliani & Miller (1958), funds simply flow in a way so that marginal product of capital is equated across projects in the economy. In reality, various frictions such as information asymmetry and agency problems may generate significant distortions, affecting firm operations and performance (Jensen & Meckling 1976; Myers & Majluf 1984). In this section, I discuss theories that explore the influence of key features that distinguish public and private ownership structures such as public disclosure, ownership concentration, and degree of firm standardization.

2.1. Public Disclosure

One key feature that distinguishes public and private firms is public disclosure. Publicly traded companies are subject to mandatory disclosure requirements that mitigate information asymmetry for external investors and ensure a level playing field. Firms are required to provide regular financial statements and disclose material events such as transactions involving shareholders and insiders. Public firms are subject to inside trading laws where they are not allowed to selectively

disclose materials to some investors (e.g., Regulation Fair Disclosure of 2000), must comply with various financial and governance requirements of the exchange, and must follow auditing requirements due to federal requirements (e.g., Sarbanes-Oxley Act of 2002). Privately held firms, on the other hand, are informationally opaque to outsiders.

Disclosure may allow public firms to lower their cost of capital for several reasons. First, lower information asymmetry mitigates adverse selection for outsiders and attracts more investors. This, in turn, increases liquidity and reduces firms' cost of capital (Diamond & Verrecchia 1991). The illiquid nature of private equity markets also implies that, in contrast to shareholders in public firms, investors in privately held corporations are typically forced to hold large and undiversified equity stakes (Hall & Woodward 2010; Heaton & Lucas 2004). Such idiosyncratic risk exposure is likely to be priced and increase the cost of capital of privately held firms (Peters 2018). Relatedly, Bodnaruk et al. (2008) show that private firms owned by less diversified controlling shareholders are more likely to go public and that these undiversified shareholders tend to sell more shares at the IPO. Hence, these findings illustrate the additional cost of nondiversified private equity.

Disclosure also allows investors to shift their portfolio, when needed, to incorporate new information. Uninformed investors, on the other hand, are disadvantaged, thus requiring a higher return for holding opaque shares (Easley & O'Hara 2004). Other models provide similar intuition, illustrating that disclosure quality lowers investors' uncertainty about future cash flows and hence lowers required risk premium (for example, see Hughes, Liu & Liu 2007; Lambert, Leuz & Verrecchia 2007).

Public disclosure may also affect firms' investment. On the one hand, access to a lower cost of capital may allow firms to increase their level of investment. At the same time, the composition of investments may change as well. The literature typically distinguishes between long-term risky investments that seek to establish new innovative ideas and exploitative investments that aim to commercialize and exploit existing knowledge and increase current profitability (March 1991). Public disclosure through quarterly earnings can bias firms toward more conventional and short-term projects. In particular, Stein (1989) illustrates that career concerns could lead managers to behave myopically and inflate current stock price, even at the cost of sacrificing long-term investments. Importantly, such behavior is rational. Since the market is not fooled in equilibrium and anticipates such behavior, managers are forced to pursue these short-term projects. These results are consistent with work by others, who have argued that share price could bias firms to focus on short-term investments (Edmans 2009; Holmström 1999; Narayanan 1985; Shleifer & Vishny 1990; Von Thadden 1995).¹

In contrast, private firms are informationally opaque, their shares are illiquid, and investors typically hold them for long durations; therefore, management has no incentive to alter investment for the sake of inflating current prices. Information opacity also allows insiders of private firms to be more tolerant of failures, since failures are not immediately observable, and insiders can time the market by choosing early exit if they receive bad news, enabling private firms to pursue more risky and exploratory projects (Ferreira, Manso & Silva 2014).

Disclosure may also reveal crucial information to competitors, reducing returns from innovation due to increased imitation risk (Bhattacharya & Ritter 1983). This may lead public firms to pursue more exploitative projects that rely on existing knowledge and could be quickly implemented. In contrast, private firms are more insulated from such risks, as they can privately communicate with their investors, and therefore will be more inclined to innovate. Concerns

¹For a comprehensive survey of this literature, see Stein (2003).

about imitation may lead firms to strategically delay public equity issuances to avoid revealing sensitive information (Maksimovic & Pichler 2001).

Taken together, these theories illustrate how disclosure can act as a double-edged sword. While it enables publicly traded firms to have access to a lower cost of capital and increased level of investments, it may also bias firms toward projects with immediate commercialization potential that improve short-term cash flows. On the other hand, private ownership may be more tolerant to risk-taking and better suited to innovation. But a higher cost of capital due to information opacity may inhibit these efforts.

2.2. Ownership Concentration

Ownership concentration is another key feature that typically distinguishes publicly listed and privately held firms. As firms transition to public equity markets, various restrictions on who can own the shares are lifted. Firms are no longer required to limit the number of shareholders, required to sell shares to accredited investors only, and prohibited from general solicitation (advertising) of the offering. Moreover, stock exchanges provide centralized venues where investors can easily sell shares, matching buyers and sellers. Together with the increase in stocks' liquidity, public firms' ownership is typically highly dispersed when compared to privately held firms.

Several models argue that a more concentrated ownership structure, as is the case of privately held firms, may lead to a higher cost of equity. For example, higher concentration is often associated with a smaller number of shareholders who can trade, leading to a less liquid stock and therefore a higher cost of capital (Bolton & Von Thadden 1998). Higher concentration also implies that shares are associated with significant control. Therefore, investors may be reluctant to use equity financing to avoid relinquishing control, or alternatively, they may require a premium for its financing (Amihud, Lev & Travlos 1990; Stulz 1988). Finally, following arguments by Amihud & Lev (1981) and Wright et al. (1996), when management and shareholder interests become increasingly aligned, as is the case under concentrated ownership, management may be more willing to enhance risk-taking, leading lenders to require a higher loan spread.

Concentrated ownership may also allow firms to pursue more exploratory and risky investments by mitigating managerial career concerns. Specifically, managers may avoid pursuing risky projects if failure would lead to their termination at the firm. When ownership is concentrated, investors have sufficient incentives to monitor the firm and protect the manager from layoff in the case of unlucky failures, therefore increasing management incentives to innovate (Aghion, Van Reenen & Zingales 2013). In contrast, the problem is particularly acute when ownership is dispersed, as investors do not have sufficient incentives to monitor the firm, and unlucky failures may be attributed to management. The increased incentive to monitor a firm's fundamental value may further encourage managers to invest for long-run growth rather than short-term profits (Edmans 2009).

Together, these models illustrate how dispersed ownership, which often characterizes publicly traded firms, could reduce the cost of capital but could also adversely affect managerial incentives to pursue innovative and risky projects. The situation is reversed in privately held firms, where shareholders' ownership is more concentrated.

2.3. Firm Standardization

The differences between public and private ownership may arise not only from their governance structure but also from their internal organization. Firms' internal organizations may need to evolve as firms mature and transition to public equity markets.

Over the course of its life, the firm goes through two important transformations. The first requires differentiation, which is akin to exploratory investments that seek innovative ideas and is

associated with significant risks. In the first transformation, the firm seeks to reach scale, which requires significant funding (Rajan 2012; Tushman & O'Reilly 1996; Williamson 2002).

To convince collaborators to participate in the differentiation stage, the entrepreneur needs to have significant ownership and control to provide substantial incentives, which is the case when the firm is privately held and ownership is concentrated (Rajan 2012). As the firm grows and it needs to raise capital to scale, it is more likely to transition to public equity markets. However, Rajan (2012) claims that differentiated and unique enterprises are hard for outsiders to finance, as investors are at risk of having little value in case of an entrepreneur departure. Therefore, as a preparation for the transition to public equity markets, a firm needs to go through a standardization phase, where new internal processes and controls ensure that the firm's key human capital is more replaceable by imposing procedures and rules in place. However, adding these constraints and rules may limit deviation from existing knowledge in a way that could suffocate innovation.

This theory illustrates again, as in previous sections, the fundamental trade-off between access to capital and innovation. The transition to public equity markets may allow access to capital to reach scale, but standardization may render firms less able to innovate.

3. THE REAL EFFECTS OF PUBLIC EQUITY MARKETS

This section reviews the empirical evidence on the real effects of public equity markets by focusing on firms' cost of capital, nature of investment, internal organization, and labor force composition. Such empirical investigation has proven to be particularly challenging due to the scarcity of data available on privately held firms. As a result, researchers resorted to relying on a host of less traditional data sources, such as the US Census Bureau confidential databases or firms' patenting information, or focusing on specific industries and countries where information on private firms is more readily available.

Identifying the real effects of public equity markets is also challenging because of the endogenous nature of the decision to go public, maybe the single most important event in the life of the firm. The preparation for going public takes months. Firms are first carefully evaluated by investment banks, screened by the Securities and Exchange Commission (SEC), and finally priced by a set of institutional investors during the book-building phase. Such scrutiny is often more granular than any data available to researchers. Moreover, the decision to go public may also reflect forward-looking expectations about the trajectory of the firm (Brau & Fawcett 2006). In fact, Maksimovic, Phillips & Yang (2020) find that firms that go public are different already in the early stages of their life, illustrating the difficulty in finding reasonable counterfactuals at the time they go public. Moreover, firms are timing when they go public, typically at the peak of their productivity and innovation cycle (Bernstein 2015; Chemmanur, He & Nandy 2010). Of course, the ideal experiment will include firms that go public for reasons that are independent of their prior history or future trajectory. This would allow separating the true impact of going public on subsequent performance. Absent of such random variation, one may attribute post-IPO activity to the transition to public equity markets, mistakenly attributing performance to the particular timing in which the firms chose to go public. In the remainder of this section, I discuss various approaches used to establish the causal effects of public and private equity markets.

3.1. Cost of Capital

Theory predicts that public firms could benefit from a lower cost of capital due to greater disclosure, dispersed ownership, and a higher degree of standardization. To explore this hypothesis, Brav (2009) relies on data from the United Kingdom, where financial information is available for private companies. He finds that public firms are significantly more likely to fund their operations with

equity, while private companies stockpile cash in good times and dilute their cash holdings in bad times, consistent with the higher cost of equity they face. Private firms also rely more frequently on debt to finance their operations. This greater dependency on debt by private firms was also documented in European countries and the United States (Frank & Goyal 2008; Goyal, Nova & Zanetti 2011). Private firms also maintain a significantly higher level of trade credit, as a substitute for the limited access to other sources of external capital (Abdulla, Dang & Khurshed 2017).

Does the increased reliance on debt of privately held firms imply access to a lower cost of debt? The evidence suggests that the opposite is the case. Pagano, Panetta & Zingales (1998) find that companies experience a reduction in the cost of bank credit after the IPO. They argue that such reduction is driven by improved public information and from the stronger bargaining position public firms have determined by their availability of an outside source of capital. Saunders & Steffen (2011) find similarly significant loan cost disadvantage for private firms. They address the endogenous choice of being a public firm by using firm headquarters' distance from London's capital markets as an instrumental variable to explain the likelihood of going public. Consistent with the implications of disclosure, they find that private firms with public debt did not pay significantly higher spread.

Together, the evidence is consistent with the notion that public firms can access lower cost of capital, which translates into greater use of equity financing, lower cost of debt, and lower reliance on trade credit.

3.2. Nature of Investment

Motivated by the theoretical discussion, I separately explore how public ownership affects firms' sensitivity to investment opportunities and changes in investment composition. I also explore how public ownership affects firms' overall level and scale of investment.

3.2.1. Investment sensitivity. One approach to explore empirically whether public firms invest differently is to compare the investment sensitivity of public and private firms to various proxies of investment opportunities. On the one hand, improved access to capital may allow public firms to respond quickly when opportunities arise, but short-term pressures and career concerns may lead to the opposite outcomes.

The evidence in this literature is mixed. Asker, Farre-Mensa & Ljungqvist (2015) rely on novel data of public and private firms and find that publicly listed firms are significantly less responsive to changes in investment opportunities when compared to a set of observably similar private firms. The effects were particularly concentrated in industries in which short-term pressures were more significant. Similar evidence was found in the context of the chemicals industry, where public firms were less responsive to demand shocks (Sheen 2020). However, other papers reached an opposite conclusion, arguing that improved access to capital enables quick reaction to opportunities when they emerge. Specifically, private firms in the medical device industry were slower to adapt to new investment opportunities that emerged from the Medicare national coverage approvals (Phillips & Sertsios 2017), and in the natural gas industry private firms adjusted drilling activity only for low-capital-intensive investments while selling capital-intensive projects to public firms (Gilje & Taillard 2016). Cross-country evidence suggests as well that public firms were more sensitive to changes in investment opportunities, particularly in countries with well-developed stock markets (Mortal & Reisel 2013).

While this evidence provides important insights about the behavior of public and privately held firms, these findings do not invalidate the concerns that publicly traded firms are less inclined to pursue long-term risky investments. Even if publicly listed firms are more responsive to

investment opportunities, these findings may still reflect investment in short-term projects that boost immediate profits while underinvestment in longer-term projects continues. For this reason, the literature explored additional measures to explore changes in the composition of firm investment.

3.2.2. Investment composition. A survey of more than 400 executives of public companies suggests that stock markets affect the composition of firms' investment. Graham, Harvey & Rajgopal (2005) find that CFOs believe that meeting quarterly earnings benchmarks and analysts' consensus are particularly important. They describe a trade-off between the short-term need to deliver earnings and the long-term objective of making value-maximizing investment decisions. They find that 78% of the survey participants admit to sacrificing long-term value to smooth earnings. In line with the survey results, Almeida, Fos & Kronlund (2016) show empirically that managers of publicly listed firms are willing to trade off investment and employment growth to meet earnings per share forecasts. While useful, this evidence is not sufficient to draw conclusions about the relative behavior of privately held firms.

To do so, researchers have focused on firm innovation, as measured by their patenting activity, which is available for both public and private firms. Of course, concerns around endogeneity and the particular timing in which firms choose to go public remain here as well. One identification strategy to deal with such endogeneity was proposed by Bernstein (2015).² He compares the behavior of firms that went public with firms that filed the IPO registration statements with the SEC in an attempt to go public but withdrew their IPO filing and remained private. To instrument for the IPO completion choice, he used the 2-month NASDAQ fluctuations during the beginning of the book-building phase as an instrument. This variation strongly predicts IPO completion (Busaba, Benveniste & Guo 2001; Dunbar & Foerster 2008; Edelen & Kadlec 2005). A placebo test reveals that outside the book-building phase NASDAQ returns have no impact on long-run behavior, consistent with the notion that these returns affect long-run firm performance only through the IPO completion choice, alleviating concerns regarding the instrument's exclusion restriction condition.³

Using this instrument, Bernstein (2015) finds that firms that went public experienced a decline in innovation quality, measured by patent citations, by an average of 40% in the 5 years after the IPO. Innovation also became narrower and more incremental, and it relied on a smaller set of technologies after the IPO. The decline in innovation following the IPO was also documented by focusing on biotechnology firms (Aggarwal & Hsu 2014), studying Chinese IPOs (Cong & Howell 2021), and exploring European countries (Larrain et al. 2021). Gao, Hsu & Li (2018) find that public firms' patents are more likely to rely on existing knowledge when compared to privately held firms and are less likely to be classified as a new technology class.

² Researchers have used a host of other empirical approaches to estimate the causal effects of going public, such as a fuzzy regression discontinuity design around the delisting criteria of the NASDAQ (Acharya & Xu 2017), within-firm variation in listing status for a sample of firms that go public without raising new capital and so change only their ownership structure (Asker, Farre-Mensa & Ljungqvist 2015), an instrumental variable that exploits variation in the supply of venture capital across states as a determinant for the likelihood of local firms to go public (Asker, Farre-Mensa & Ljungqvist 2015), firms' distance from London was used as an instrument for the decision of firms to go public (Saunders & Steffen 2011), and finally, state-level household stock market participation rate was used as an instrument for the prevalence of local public firms (Gao, Harford & Li 2017).

³ This instrument was also used in different settings to explore the impact of public equity markets on employment growth (Borisov, Ellul & Sevilir 2021), patent litigation (Caskurlu 2019), employee departures (Babina, Ouimet & Zarutskie 2020), local spillovers (Cornaggia et al. 2022), profitability (Larrain et al. 2021), and bank risk-taking (Falato & Scharfstein 2016), among others.

This evidence highlights how the transition to public equity markets leads firms to pursue less long-term and risky investments, consistent with models of disclosure, dispersed ownership, and standardization.

3.2.3. Level of investment. Access to lower cost of capital may allow public firms to increase their level of investment more quickly, reaching a larger scale of operations. The evidence here is somewhat mixed. Focusing on a set of large Italian firms who went public, Pagano, Panetta & Zingales (1996) find that the new equity capital raised is not used to finance subsequent investments but instead used to purchase stakes in other companies and other financial assets. Moreover, Pagano, Panetta & Zingales (1998) find a reduction in investment and leverage after the IPO and also a reduction in firm profitability, a phenomenon that is consistent with other findings also in the United States (Degeorge & Zeckhauser 1993; Jain & Kini 1994; Mikkelsen & Shah 1994). More recent evidence suggests that, relative to private firms, publicly traded firms are able to expand more quickly by increasing the number of countries and the number of subsidiaries in which they operate as well as the number of products they introduce. Moreover, the evidence illustrates that publicly traded firms are also able to increase their workforce rapidly and profitability, consistent with the increased focus of public firms on commercialization (Borisov, Ellul & Sevilir 2021; Larrain et al. 2021; Phillips & Sertsios 2017).

All in all, recent evidence, while not fully conclusive, suggests that public firms shift their investment strategy toward commercialization by focusing on profitability and scale. At the same time, public firms produce less innovative and less exploratory projects. This shift occurs thanks to improved access to capital on the one hand, but changes in incentives imposed by public equity markets lead firms to shift their innovative strategy as well.

3.3. Labor Force Composition and Internal Organization

Public firms' increased focus on commercialization and growth is also associated with changes in labor force composition and internal organization. Around the IPO, a significant portion of top managers and key inventors leave the firm. These individuals tend to join newly established firms, consistent with the notion that entrepreneurial-minded employees leave because they no longer fit the new focus of the firm when it is public (Babina, Ouimet & Zarutskie 2020; Bernstein 2015; Bias et al. 2021).

While early employees depart the firm after the IPO, public firms expand their workforce but tend to hire employees in the areas of finance and accounting and those with prior experience in public firms. These hirings help restructuring the firm into a more formal organization (Bias et al. 2021; Borisov, Ellul & Sevilir 2021). Similarly, Cong, Howell & Zhang (2017) find changes around the IPO that are consistent with a broader standardization of the firm through increases in disclosure and professionalization and separation of enterprise value from specific human capital, as suggested by Rajan (2012).

This segmentation of different types of employees across public and private firms may hold even more broadly. Ouimet & Zarutskie (2014) find that young employees are more likely to work at young and early stage companies, as they argue that younger employees have more up-to-date technical skills and a higher risk tolerance. Similarly, Bernstein et al. (2021) find that young individuals are more likely to be responsive to local opportunities by starting and joining new firms. Given this evidence of assortative matching, it is not surprising that workforce composition may change after firms transition to public equity markets.

This evidence illustrates how the transition to public equity markets not only affects firm investments but also leads to changes in the workforce composition and internal organization. Such changes can support the standardization of firm operations and enable the shift toward

commercialization strategy and growth. At the same time, such changes may further limit the ability of public firms to innovate and pursue exploratory projects.

4. THE REAL EFFECTS OF PRIVATE EQUITY MARKETS

In this section, I focus on two forms of private capital that play an important role in the economy: venture capital and private equity buyouts. While both sources of capital are distinguished from public equity markets due to their informational opacity and concentrated ownership, they differ substantially from each other. Venture capital investors target early stage companies, typically in the technology sector, and provide financing over multiple rounds. Private equity buyouts, however, typically target mature businesses and rely on significant debt to leverage their portfolio companies. Below I discuss the evidence on the real consequences of these forms of private capital.

4.1. Venture Capital: Benefits and Limitations

Over the last three decades, almost half of all companies that went public were originally backed by venture capital investors. These firms contributed disproportionately to aggregate R&D expenditure, and many became among the most prominent and innovative companies in the United States (Gornall & Strebulaev 2021; Lerner & Nanda 2020). This is quite remarkable, given that less than 0.5 percent of firms in the economy are ever funded by venture capital (Puri & Zarutskie 2012). This brings the question of how venture capital investors are able to be associated with such innovative companies, and whether they causally improve the likelihood of such firms to emerge.

Venture capital investors spend a considerable amount of time on deal sourcing and screening. Which screening factors are most important for venture capital allocations? Kaplan & Strömberg (2004) study 67 investment memos and find that key metrics include the attractiveness of the market, technology, customer adoption, competition, and quality and experience of the management team. However, they do not identify the relative importance of these factors. In a large survey of venture capital investors, Gompers et al. (2020) find that they place the greatest weight on a start-up's management and founding team. This finding is consistent with evidence from a randomized field experiment in which investors reacted most strongly to information about the founding team (Bernstein, Korteweg & Laws 2017).

While founding teams are particularly important to capital allocation early on, as start-ups mature, founders experience a significant turnover, while firms' product lines remain quite stable (Kaplan, Sensoy & Strömberg 2009). This evidence is consistent with the theory by Rajan (2012), in which human capital is particularly important at the differentiation stage, but as firms need to raise more capital to scale, they need to standardize and reduce dependence on key employees.

Venture capital investors are also suggested to be active investors and to add value to their portfolio companies (Gompers et al. 2020). They are associated with a variety of professionalization measures, such as the addition of formal human resource policies, adoption of stock option plans, and hiring of marketing executives (Hellmann & Puri 2002). Investors are also involved in structuring the board of directors (Lerner 1995) and the firm governance structure (Baker & Gompers 2003; Hochberg 2012). Moreover, investors' understanding of the uncertain nature of early stage ventures, and their tolerance for failure, enables experimentation among portfolio companies, which drives innovation and risk-taking (Kerr, Nanda & Rhodes-Kropf 2014; Tian & Wang 2014).

Does venture capital activism causally improve performance? The key challenge is to disentangle screening and selection, areas in which venture capital investors specialize. Several papers exploit exogenous variation to identify venture capital real effects. Kortum & Lerner (2001) use the 1979 "Prudent Man act" that allowed pension funds to invest in venture capital, significantly

increasing capital flows to the sector. They find that these capital flows increased the rate of innovation in treated industries. Exploring venture capital impact at the deal level, Bernstein, Giroud & Townsend (2016) exploit the introduction of direct airline routes as an exogenous change to investors' monitoring costs.⁴ They find that when monitoring costs decline and investors can be more involved, portfolio companies perform better and become more innovative. Investors can also add value passively, simply through a certification of their portfolio companies. Using a randomized field experiment, Bernstein et al. (2020) find that high-quality job seekers are significantly more likely to apply for start-ups backed by top venture capital investors. Entrepreneurs are aware of these value-added contributions and are willing to accept lower valuations in order to be affiliated with more reputable venture capital investors (Hsu 2004). Overall, Sørensen (2007) estimates that approximately 40% of the performance differential between venture capital- and non-venture capital-backed firms is attributable to added value services.

At the earlier stages, companies often rely on angel investors, rather than venture capital (Hellmann & Thiele 2015). As such, angel financing appears to play an important role in the financing of private companies (Lindsey & Stein 2019). Do angel investors add value to their investments? To explore this question, Kerr, Lerner & Schoar (2014) rely on a regression discontinuity design that exploits small changes in angel groups' collective interest that leads to significant variation in actual investments. They find that such investments significantly improved firms' survivorship, employment rates, and exit rates. Lerner et al. (2018) examine the globalization of angel investing and its impact across 21 countries, further illustrating its contribution to the entrepreneurial ecosystem.

While the evidence thus far highlights the important contribution of this sector, venture capital also suffers from significant limitations. The venture capital market is highly cyclical and is affected by macroeconomic factors. During hot markets, large influxes of capital are often characterized as "money-chasing deals," leading to a significant increase in valuations and funding of lower-quality companies (Gompers & Lerner 2000; Howell et al. 2020). Moreover, investors typically fund a fairly narrow band of technologies that are able to reach commercialization within the duration of investors' fund (typically 10 years). Therefore, investors are mostly drawn to businesses that are fairly capital efficient and avoid more capital-intensive businesses such as renewable energy and advanced materials. In addition, the venture capital industry is highly concentrated. A small number of large firms hold a disproportionate amount of capital, which is mostly concentrated in a few geographical regions (Lerner & Nanda 2020). Finally, investments suffer from underrepresentation of women and minorities. These could have important consequences for the type of innovation that is being funded and which entrepreneurs are able to build companies (Ewens & Townsend 2020; Gompers & Wang 2017).

4.2. Private Equity Buyouts: Benefits and Limitations

The private equity buyout industry has grown tremendously over past decades, reaching globally to more than \$2 trillion in assets under management by 2019, reflecting an almost three-fold increase since 2010 (McKinsey & Co. 2020).

The impact of private equity buyouts on the economy has been subject to an ongoing debate. On the one hand, Jensen (1989) argues that concentrated ownership, together with private ownership governance structure, active involvement, and the disciplining effect of its capital structure, enables private equity buyouts to add value effectively and also fosters long-term investments. In

⁴Using a large-scale survey, they confirm that direct flights increased investors' interaction with their portfolio companies.

contrast, he argues, public firms are subject to myopic behavior and weak governance that arise from dispersed ownership and stock market pressures. Critics of private equity, however, argue that these investors mostly focus on making profits by exploiting favorable tax treatment rather than by achieving it through operational improvements. Anecdotes about dubious practices, such as special dividends and “quick flips” that enabled private equity investors to extract fees, further raised concerns that private equity buyouts may abrogate explicit and implicit contracts with workers and other stakeholders (e.g., Shleifer & Summers 1988).

Empirical evidence was quite scarce until recently due to difficulties in obtaining systematic data of private equity-backed companies. The earliest work was pioneered by Kaplan (1989) and Lichtenberg & Siegel (1990), who found that post buyout firms experienced improvements in operating income, market value, and productivity. Due to the proliferation of new data sources, the number of papers uncovering the effects of private equity buyouts in large sample settings has increased. Boucly, Sraer & Thesmar (2011) rely on French administrative data to find that employment grows much more rapidly at private equity-backed firms than at observably similar controls. Lerner, Sorensen & Strömberg (2011) find that private equity buyouts improve the quality of innovation while finding no significant decline in the fundamental nature of their research. Exploiting the comprehensive nature of the US Census administrative databases, Davis et al. (2014) track 3,200 target firms and their 150,000 establishments and find only modest effects on net job losses. However, gross job creation and destruction increases, which leads to a significant increase in productivity. At the same time, Davis et al. (2019) highlight heterogeneity across deal types. Public-to-private deals lead to significant employment declines, in contrast to the employment expansion observed in private-to-private deals.

These findings are consistent with a large survey of private equity investors that finds that they claim to add value to portfolio companies, with a greater focus on increasing growth than on reducing costs (Gompers, Kaplan & Mukharlyamov 2016). Can the observed improved operations and productivity be attributed to private equity investors? Or are they merely a reflection of the screening and timing in which transactions took place? Absent of random variation, the standard approach compares the performance of private equity-backed companies with that of a set of observably similar firms. Ideally, one would compare two identical firms, one treated with private equity ownership and one untreated. Bernstein & Sheen (2016) explore a close variation of this experiment by exploiting the dual ownership structure pervasive in the restaurant industry. This enables the comparison of “twin” restaurants within the same restaurant chain, in which private equity owners have a high degree of influence over some stores (directly owned by headquarters) and limited control of others (chain franchisees). Using health inspection data, they find that operational performance improves in stores with greater private equity control, as restaurants become cleaner, safer, and better maintained.

Similarly, other papers obtain granular information using industry-specific data and find significant improvements in product diversity (Fracassi, Previtro & Sheen 2020), reduction in toxic pollution (Bellon 2020), increased workplace safety (Cohn, Nestoriak & Wardlaw 2020), and significant gains from real estate investments (Spaenjers & Steiner 2021). At a more aggregated level, Bernstein et al. (2017) find that industries with more active private equity investors have grown more quickly in terms of productivity and employment and that these industries appear to be less exposed to aggregate shocks.

However, private equity markets are prone to distortions introduced by credit cycles. As documented by Axelson et al. (2013), periods characterized by booming financial markets also experienced greater private equity fundraising, higher transaction valuations, and critically more leverage. That finding raised concerns about the impact of private equity during periods of financial turmoil. Bernstein, Lerner & Mezzanotti (2019) explore whether private equity backing

exacerbated the 2008 financial crisis. They find that in fact private equity-backed companies invested more and grew faster than their peers during the crisis due to better access to equity and debt financing. Such improved access to capital is based on investors' repeated interaction with banks, which reduces information asymmetry and thus enables favorable loan terms (Ivashina & Kovner 2011). Relatedly, Hotchkiss, Smith & Strömberg (2012) find that private equity-backed firms in default spent less time in financial distress and were more likely to survive as an independent reorganized company. Finally, Johnston-Ross, Ma & Puri (2021) find that, during the 2008 financial crisis, private equity investors helped channel capital to failed banks, filling the gap created by a weak and undercapitalized banking sector.

Despite the mounting evidence that supports the view that private equity buyouts are a catalyst for a positive change, several recent papers raise concerns about the consequences of private equity buyouts, particularly in regulated industries. Gupta et al. (2021) find that private equity ownership of nursing homes increased short-term mortality of Medicare patients and led to a deterioration in patient well-being. Eaton, Howell & Yannelis (2020) find that both enrollment and tuition increase once schools are acquired by private equity investors, while graduation rates decline and per-student debt increases. These papers caution that in regulated industries with significant government subsidies, less competition, and opaque product quality, private equity investors may be less aligned with customer needs.

5. COMPLEMENTARITIES BETWEEN PUBLIC AND PRIVATE EQUITY MARKETS

The literature highlights that while public equity markets provide access to lower cost of capital, they shift firms to focus on commercialization and away from long-term and innovative projects. In recent years, many initiatives were proposed to amend these limitations and enhance long-term investments by public firms. Examples include the introduction of the Long-Term Stock Exchange and the development of the American Prosperity Project, which includes proposals to promote long-term investments of public firms.⁵

These proposals, however, tend to consider publicly listed firms in isolation from private equity markets, and as such they may not reveal the full picture. Complementarities between the two markets may mitigate such concerns, as innovation in private equity markets supplements commercialization efforts of public firms, and in turn, demand for innovation by public firms accelerates innovation activities in the private equity markets. I discuss these complementarities below.

5.1. Secondary Market for Innovation

Public firms are well positioned to conduct acquisitions due to their access to a lower cost of capital on the one hand, and the possibility to rely on liquid stock as a currency for acquisitions, particularly when equity is overvalued (Rhodes-Kropf, Robinson & Viswanathan 2005; Shleifer & Vishny 2003). For example, Pagano, Panetta & Zingales (1996) find that the new equity capital raised upon listing is not used to finance subsequent investment and growth but, instead, to purchase stakes in other companies. Similarly, Celikyurt, Sevilir & Shivdasani (2010) show that newly public firms make acquisitions at a torrid pace, utilizing both cash- and stock-financed acquisitions along with debt issuance. These acquisitions are important for their subsequent growth. Not surprisingly, Maksimovic, Phillips & Yang (2013) find that public firms are significantly more active

⁵For more information, see <https://www.ltse.com> or <https://www.aspeninstitute.org/programs/business-and-society-program/american-prosperity-project/>.

participants in mergers & acquisitions (M&A) during merger waves and that their participation is affected by credit spreads and aggregate market valuation.

Therefore, public firms can acquire innovation externally, to supplement their internal innovation and commercialization efforts. Bernstein (2015) finds that while internal innovation declines after the IPO, there is a stark increase in the tendency to acquire innovation, where acquired patents constitute almost one-third of firms' innovation portfolio and most of the acquisitions are of small privately held firms. In fact, Bernstein found that acquired innovation was of higher quality (measured by citations) when compared to internal innovation. Bena & Li (2014) show that large companies rely on acquisition to supplement innovation efforts, as synergies obtained from combining innovation capabilities are important drivers of these acquisitions. Similarly, Zhao (2009) finds that declines in technological innovation drive firms' acquisition strategy, which in turn contributes to subsequent performance and offsets shortage of internal innovations.

Public firms may benefit from innovation in private equity markets through channels other than acquisitions. For example, strategic alliances allow firms to maintain strong research incentives while overcoming difficulties of incentivizing high-risk projects internally (Aghion & Tirole 1994; Lerner & Merges 1998; Robinson 2008). Licensing innovation, or alternatively purchasing patenting rights, is another form of technological transfer. Indeed, small firms' patents are significantly more likely to be sold when compared to those of larger firms (Figueroa & Serrano 2019). Public companies may also provide direct financing to privately held companies through their corporate venture capital (CVC) arm, hoping to also benefit corporate innovation. Consistent with this argument, Ma (2020) finds that CVC arms are more likely to emerge following a deterioration of internal innovation.

At the same time, the secondary market for innovation may affect firms' incentive to innovate. The ability to acquire innovation may disincentivize firms from innovating internally, increasing further the focus of public firms on commercialization. Yet, vibrant acquisition markets provide strong incentives for smaller firms to innovate, further increasing the activity in the secondary market for innovation, where innovation is conducted by smaller companies and acquired by larger ones (Phillips & Zhdanov 2013).

Together, the evidence suggests that the transition to public equity markets leads public firms to change their strategy, increasing their reliance on external innovation, to supplement their commercialization activities. Such demand for external innovation further increases the incentives of privately held firms to innovate. Put differently, private firms may utilize their comparative advantage and innovate. Public firms, on the other hand, can utilize their cost of capital advantage to bring these innovations to market at scale, compensating for the challenges associated with pursuing long-term risky projects as a publicly listed firm.

It is important to note, however, that these effects might be somewhat muted or even potentially reversed if public companies rely on acquisitions for the purpose of blocking future competition, rather than to promote technological transfer. Focusing on the pharmaceutical industry, Cunningham, Ederer & Ma (2021) find that approximately 5% of acquisitions in their sample are killer acquisitions, geared to reduce competition. If this phenomenon becomes widespread, private companies may be acquired before they can bring technology to fruition, which would hinder the complementarities that emerge between public and private equity markets.

5.2. Financing Early Stage Companies

Another form of complementarity between public and private equity markets emerges through the impact on the financing of privately held companies. Valuations of public equity markets are strongly correlated with the tendency of companies to go public or, alternatively, the tendency of public companies to conduct acquisitions (Celikyurt, Sevilir & Shivdasani 2010; Lowry & Schwert

2002; Maksimovic, Phillips & Yang 2013; Rhodes-Kropf, Robinson & Viswanathan 2005). Both IPO markets and M&A activity provide liquidity for private equity investors, allowing them to exit their investments and conduct additional investments in innovative, privately held companies (Gompers et al. 2008; Phillips & Zhdanov 2017). In fact, evidence across 21 countries illustrates that an IPO's market activity is the strongest driver of venture capital activity (Jeng & Wells 2000).

Achieving such liquidity not only affects deal activity but also influences the ability of venture capital firms to raise additional funds, further increasing the amount of capital available to fund early stage entrepreneurial companies (Gompers et al. 1998). This increase in private equity investments could further increase the innovation conducted by privately held firms, which may further contribute to the commercialization efforts of publicly listed firms, as discussed above.

6. DISCUSSION AND FUTURE RESEARCH

This article reviews the theoretical and empirical literature on the real effects of public and private equity markets. The evidence suggests that public disclosure, dispersed ownership, and a high degree of standardization provide publicly listed firms access to a lower cost of capital, as compared to privately held firms. However, the literature also highlights an important trade-off. The exact same factors also affect their incentives and ability to pursue risky long-term investments, shifting firms' focus toward short-term profitability and commercialization. Privately held firms, while financially constrained, are better suited to pursue such long-term and risky investments but with a limited ability to scale and grow.

The overall picture that emerges from this review of the literature is illustrated in **Figure 1**, which describes firm dynamics over its life cycle. At the entry stage, firm sales are low, but the firm engages in significant exploration in an attempt to achieve differentiation. Successful experimentation leads to a significant growth potential, but to do so, firms need to raise significant capital, which can be achieved through the transition to public equity markets. At the same time, the transition to public equity markets shifts firm strategy to a focus on scale and commercialization while changing innovation strategy from exploration to exploitation.

Figure 1 also shows the complementarities between the two markets. Access to a lower cost of capital and liquid stock allows public firms to acquire innovation externally and leads to the transfer of technologies from private to public equity markets. The demand for external innovation and the liquidity provided to private equity investors further contribute to the funding of innovation in private equity markets.

The literature on the real effects of public and private equity markets has made significant progress, both theoretically and empirically. At the same time, these markets have changed significantly over the last decades, providing fascinating opportunities for further research, which I describe below.

6.1. The Composition of Listed Firms

The United States has experienced a dramatic decline in the number of publicly listed firms, and the drop is particularly precipitous among small firms (Doidge, Karolyi & Stulz 2017; Gao, Ritter & Zhu 2013). The decline has raised significant concerns among academics, policy makers, and practitioners. Some argue that regulatory overreach led to these changes following policies such as the Sarbanes-Oxley Act of 2002, which imposed additional compliance costs on publicly traded firms and particularly affected smaller firms. Others attribute the drop in small company IPO volume to a decline in the availability of underwriters who focus on smaller firms and provide analyst coverage. Finally, some propose that changes in economies of scope due to technological changes made small firms more attractive as acquisition targets (Gao, Ritter & Zhu 2013).

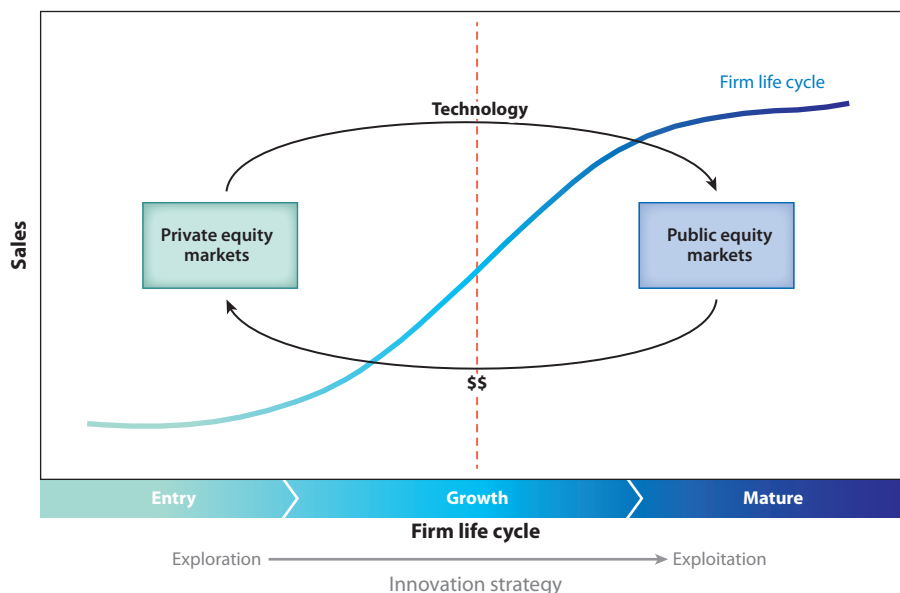


Figure 1

This figure illustrates dynamics over the life cycle of a firm and reflects key insights from the literature. At the entry stage, firm sales are low but the firm engages in significant exploration in an attempt to achieve differentiation. Successful experimentation leads to a significant growth potential, but to do so, firms need to raise significant capital, which can be achieved through the transition to public equity markets (*red dashed line*). At the same time, the transition to public equity markets shifts firm strategy toward scale and commercialization while changing innovation strategy from exploration to exploitation. The black arrows reflect the complementarities between the two markets. Access to a lower cost of capital and liquid stock allows public firms to acquire innovation externally, leading to the transfer of technologies from private to public equity markets (*top black arrow*). The demand for external innovation and the liquidity provided to private equity investors further contribute to the funding of innovation in private equity markets (*bottom black arrow*).

In addition, over the last two decades, venture capital-backed companies remained private longer, transitioning to public equity markets only once they were more mature (Ewens & Farre-Mensa 2021). This change may be partially driven by the increase in the supply of private equity capital. Indeed, capital raised over the last two decades by venture capital-backed private companies grew dramatically from \$28.9 billion in 2002 to \$118.2 billion in 2019, when most of the growth was fueled by late-stage financing. In a sense, private equity capital surpassed the combined amount raised by public firms via both IPOs and secondary equity offerings, allowing firms to remain private longer and to raise significantly more private capital at increasingly higher valuations (Ewens & Farre-Mensa 2021).

The supply in private capital may arise from the growth in investments by nontraditional investors such as private equity funds, mutual funds, and hedge funds, driven partly by regulatory changes and partly by competitive pressures (Bauguess, Gullapalli & Ivanov 2018; Chernenko, Lerner & Zeng 2021; Ewens & Farre-Mensa 2020; Lindsey & Stein 2020). At the same time, technological innovations appear to have decreased start-ups' capital needs, particularly during the initial experimental stage of the entrepreneurial process, as in the case of the emergence of cloud computing and CRISPR (Ewens, Nanda & Rhodes-Kropf 2018; Plumer et al. 2018). Such technological changes reduced the urgency of companies to go public for the sake of fundraising.

While the drivers that lead to the emergence of a new equilibrium in private capital markets are still debated, its macroeconomic implications on innovation, economic activity, and growth are even less well understood. In light of the micro-level evidence discussed above, I speculate that the consequences of this new equilibrium are important. More research is needed in this area.

6.2. Heterogeneity

The IPO market is characterized by significant volatility over time. Some explanations for these IPO waves include variations in investor sentiment and equity overvaluation, fluctuations in companies' demand for capital, changes in market-wide information asymmetry, and availability of capital in private equity markets.⁶ It is well understood that such fluctuations affect the type of firms going public, which may also lead to important heterogeneity in the impact of public equity markets on firms.

Private equity markets are also intensely cyclical, as both venture capital and private equity buyout activity strongly correlate with equity valuations and macroeconomic factors. Increased availability of venture capital funding may delay firms from going public and allow companies to go public at a more mature stage. Moreover, deals transacted during market peaks differ from those in other periods, often reflecting higher valuations and greater risk. These fluctuations may affect the composition of firms funded and also the ability of investors to add value and monitor their portfolio companies. These characteristics suggest that productivity gains from private equity and venture capital may be countercyclical. Moreover, the financial structures around these deals could lead to entirely different incentive structures (see, e.g., Davis et al. 2019).

These considerations suggest that the cyclical nature of both the IPO market and the private equity market may lead to a substantial heterogeneity in the estimated real effects that are currently discussed in the literature. But the exact nature of such heterogeneity is not well understood.

6.3. Innovations in the IPO Process

The process by which firms transition to public equity markets is complex and costly and involves a host of parties, typically including venture capitalists who provided early funding, underwriters who manage the public equity offering, and institutions and analysts who potentially influence the stock price once the firm is public. Critics of the IPO process argue that it suffers from severe conflicts of interest between the different parties involved, due to its opaque allocation mechanism and first-day underpricing. The design of the process affects the cost of going public and the composition of firms who can go through this process.⁷

In recent years, a few alternative mechanisms have emerged that allow companies to go public, such as direct listings and, most notably, the use of special purpose acquisition companies (SPACs). In 2020, 248 companies raised \$75 billion through SPACs, in comparison to 165 IPOs that raised \$61 billion in the same year (Ritter 2022). The predominance of SPACs has ignited a heated debate around the merits and costs of such companies. Some argue that they expand the ability of private companies to go public, while critics cite poor post-merger returns and concerns that they enable immature firms to go public (Gahng, Ritter & Zhang 2021). This debate poses important questions about the optimal design of the transition of firms to public equity markets as well as the ideal nature of firms that should go public.

⁶For a comprehensive survey of this literature, see Lowry, Michaely & Volkova (2017).

⁷For a survey of this literature, see Lowry, Michaely & Volkova (2017).

6.4. Globalization

Public and private equity markets have become considerably more global. While the fraction of worldwide IPOs occurring in US markets was approximately 50% in the early 1990s, this fraction fell to only 10% during the 2007–2011 period (Doidge, Karolyi & Stulz 2013, 2017). The increased globalization of IPO markets is partly due to the rise of second-tier stock exchanges around the world, with lower listing requirements that attempt to attract local high-growth entrepreneurial companies (Bernstein, Dev & Lerner 2020). But this rise may also be attributed to the increasingly global venture capital and private equity sectors. For example, while venture capital investments were predominantly focused on the US market during the 1990s, the share of United States–based venture capital activity dropped significantly from 90% to roughly 50% in 2019 (Nat. Ventur. Cap. Assoc. 2020).

This brings the question of how the real effects of public and private equity markets vary across different institutional settings, policies, and ecosystems around the world. For example, political intervention and policy uncertainty can dampen IPO market activity, which affects listed firms and also early stage financing (Cong & Howell 2021). Local institutions, such as shareholder protection and disclosure, could additionally affect public equity markets (Larrain et al. 2021). Government efforts to foster entrepreneurial ecosystems may further influence the impact of private equity markets (Bai et al. 2021, Lerner et al. 2018). The growing importance of globalized public and private equity markets warrants more research to better understand how local conditions influence the real effects of these markets and their contribution to economic growth and innovation.

6.5. Antitrust Regulation

In recent years, growing concerns have emerged about the increasing power of large publicly traded companies, and various offers to restructure antitrust laws have been made to limit their acquisition power and prevent so-called killer acquisitions (Cunningham, Ederer & Ma 2021).⁸ Such proposals aim to prevent acquisitions by which big companies scoop up potential rivals before they can grow, arguing that such behavior hinders incentives to innovate. In fact, the US Department of Justice and the Federal Trade Commission have challenged many mergers based on similar concerns. Between 2004 and 2014, 33.2% of mergers were challenged due to alleged harm to innovation (Gilbert & Greene 2014).

While these are important considerations, these arguments tend to ignore the importance of complementarities between public and private equity markets. Specifically, curtailing acquisitions may lower exit opportunities for privately held firms, which could adversely affect their ability to attract venture capital and private equity, since it may be harder for investors to monetize their investments (Phillips & Zhdanov 2017). Moreover, such regulations may limit the ability of public firms to integrate external innovation and bring them to market at scale. At the same time, acquisitions allow private firms to sell their innovations, which they are more likely to produce due to their better suited governance structure. Discussions of antitrust regulations should also incorporate the nuanced interplay of public and private equity markets and ensure that regulations do not curtail innovation overall.

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The author is not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

⁸For example, see Senator Amy Klobuchar’s new proposal aimed to reinvigorate America’s antitrust laws, called the Competition and Antitrust Law Enforcement Reform Act.

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