

8. Equity-based financing under asymmetric information: A microeconomic analysis of seed and venture capital in startup development

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ABSTRACT

Purpose: The aim of the chapter is to identify how seed and venture capital funds operate, their investment criteria, and the support they offer to entrepreneurs, especially under conditions of asymmetric information.

Design/methodology/approach: The chapter is based on an in-depth review of academic literature in economics and finance. It applies concepts from microeconomic theory, especially information economics, to examine how financing decisions are shaped in early-stage startup investments.

Findings: The study highlights the distinct roles of seed and venture capital across the startup life-cycle. It shows that investors rely on screening mechanisms such as due diligence, expert networks, and staged financing to evaluate ventures, while entrepreneurs use signalling strategies including business plans, backgrounds, and strategic partnerships. Trust and credible commitments are also identified as critical for sustaining cooperation beyond the initial investment phase.

Originality and value: The chapter offers a structured application of microeconomic concepts like screening, signalling, and trust to the practice of early-stage financing. It contributes to a better understanding of how informational and relational mechanisms jointly enhance the effectiveness of equity-based startup support, particularly in high-risk and innovation-driven environments.

Keywords: financing, investment, seed capital, venture capital, startup, asymmetric information.

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Introduction

Startups play a crucial role in driving innovation, enhancing competitiveness, and contributing to economic growth, especially in knowledge-based sectors such as IT, biotechnology, and artificial intelligence. However, one of the most significant barriers to their development is access to early-stage financing. In this context, equity-based financing mechanisms, particularly seed capital and venture capital, have emerged as key instruments to support startups during the initial phase of development (Colombo et al., 2016).

Financing business ventures in their early stages of development, especially through equity funds, is a key factor determining the success of innovative startups. Cooperation with such funds opens up possibilities for entrepreneurs not only to access capital but also strategic and substantive support, which translates into long-term development and expansion of their business. Nevertheless, the process of obtaining financing from funds is demanding and requires solid preparation and a convincing business presentation (Bosio et al., 2024).

This chapter analyses key aspects of equity-based financing, with a particular focus on the operational mechanisms of seed and venture capital funds, their investment criteria, and the forms of support they offer to startups. Drawing on the theory of asymmetric information, it examines how these funds address uncertainty and information gaps when evaluating early-stage ventures. The chapter also explores the nature of the relationship between investors and entrepreneurs, highlighting how signalling and screening mechanisms influence funding decisions. Finally, it identifies the critical factors that determine success in obtaining financing and sustaining long-term cooperation.

The analysis is based on an in-depth review of academic literature and online resources concerning equity investment mechanisms. The primary aim is to explore the role of equity-based financing, particularly seed capital and venture capital, in supporting startups during their early development stages. By examining how these funds operate and what they offer to entrepreneurs, this chapter contributes to a broader understanding of how financial and non-financial support mechanisms can foster innovation and drive startup success. The chapter argues that while both seed and venture capital play critical roles in supporting startups, seed capital is particularly crucial in the earliest development stages by offering higher flexibility, tolerance for risk, and broader strategic support tailored to nascent ventures.

The chapter is structured as follows: the first section provides an overview of the specific characteristics and investment criteria of seed and venture capital funds, explaining how they differ in terms of risk, financing structure, and stage

of startup development; the second section explores the strategic role of equity financing in supporting entrepreneurs, including the operational and advisory functions of investors; the third section applies microeconomic concepts to analyse how information asymmetry is managed through screening and signalling mechanisms, and how trust and credible commitments shape long-term investor–entrepreneur relationships.

8.1. Characteristics of seed and venture capital: How seed and venture capital operate

Capital is a fundamental economic resource that enhances value creation and can take various forms, including intellectual, monetary, and physical assets. In classical economics, capital is considered one of the core factors of production alongside land and labour. It refers to tangible or financial resources employed in income-generating activities. In a broader sense, capital also encompasses technology and intangible assets that generate returns through royalties, dividends, or interest (Cumming et al., 2023).

Seed capital represents the earliest form of equity financing used to launch a startup. It is typically provided by angel investors or early-stage funds to support idea development, prototyping, or market validation. At this point, startups usually lack a finished product, a defined business model, or a clear source of revenue, which makes this type of investment particularly risky. In contrast, venture capital is directed toward more mature startups that have demonstrated initial market traction or possess a working business model. Venture capitalists not only provide substantial financial resources but also strategic guidance, mentorship, and access to networks that facilitate business scaling (Tunggal, 2025).

The distinction between seed capital and venture capital lies primarily in the stage of company development, the scale of investment, and the associated level of risk. Seed capital is part of the broader venture capital category, functioning as its earliest and most risk-tolerant subsegment. Investments at this stage are typically smaller, ranging from tens to hundreds of thousands of dollars, and focus on transforming innovative ideas into viable prototypes. Venture capital, on the other hand, involves institutional investors, larger financial commitments, and more complex contractual frameworks designed for startups entering the growth or expansion phase.

Seed funding constitutes a crucial stage in the startup lifecycle, enabling entrepreneurs to transform their concepts into operational ventures. Due to the

uncertainty surrounding unproven business models, seed investors bear high risk in exchange for significant potential returns. By comparison, venture capital funds tend to engage once a company achieves proof of concept and enjoys early commercial success, often investing from hundreds of thousands to several million dollars in exchange for equity (Kornenberger, 2021).

Venture capital transactions are typically characterised by formalised procedures and comprehensive contractual safeguards that reflect the scale of the investment and the expectations for growth. Such arrangements commonly involve due diligence, governance rights, and performance milestones, which allow investors to manage risk and monitor progress.

Seed capital investments, by contrast, are marked by greater flexibility and tolerance of uncertainty. Seed investors often play an active role in refining a startup's product or strategy, offering mentorship and operational guidance in addition to financial support. These features make seed capital a cornerstone of innovation ecosystems, particularly in markets where institutional venture capital is less developed or where early-stage ventures face limited access to external financing.

8.2. Investment focus and stages

Seed capital funds specialise in investing in companies at the earliest stage of development. Unlike private equity funds, which target mature firms with established market positions and high profitability, seed funds allocate resources to nascent ventures characterised by high uncertainty and rapid learning cycles. Such investments involve substantial risk but offer the potential for outsized returns if the startup succeeds. Seed funding typically supports both pre-seed and early-stage projects, providing the financial foundation necessary for product development, initial market entry, and organisational setup (Janik, n.d.).

The startup and seed phases encompass the period from the conception of a business idea to the formal launch of a company. During this phase, entrepreneurs may seek financing either from seed capital funds or from business angels, who invest their own resources in promising ventures. The fundamental difference between these two forms of financing lies in their structure and degree of formalisation. Business angels tend to adopt a flexible and informal approach, while seed capital funds operate under structured internal procedures for project evaluation and risk management. This systematic approach to risk mitigation is one of the principal advantages of seed capital funds over angel financing (Werth & Boeert, 2013).

Seed capital funds constitute the earliest subcategory within the broader venture capital framework. While later-stage venture capital funds invest in firms that have already validated their business models, seed funds engage at the inception stage, financing early development and the first phase of expansion. Seed funds carry the highest level of investment risk among venture capital categories, primarily because they support highly innovative projects with limited collateral and no established credit history (Proksch et al., 2018).

Seed funds exhibit specific sectoral preferences, with a strong concentration in industries such as media and multimedia, robotics and automation, environmental technologies, biotechnology, healthcare, and information technology (Husaini & Sohail, 2023). However, most seed funds are not confined to a single sector. Instead, they prioritise the quality, scalability, and innovative potential of individual projects, which allows for flexibility in investment selection.

Seed capital funds primarily invest in innovation-driven projects with the potential to stimulate economic growth. Increasingly, these funds focus on artificial intelligence (AI) and other deep-tech fields that redefine market dynamics. By supporting emerging technologies, seed investors not only foster technological development but also influence broader innovation trends (Santos & Qin, 2019).

The average financing provided by seed capital funds is typically smaller than that of private equity or later-stage venture capital. These investments usually range from several dozen to hundreds of thousands of dollars, covering activities such as prototype development and market testing. In return, seed funds generally acquire equity stakes between 20% and 70%, with investment horizons spanning three to eight years (Bernstein, 2022).

Seed capital funds are instrumental in transforming innovative concepts into sustainable businesses. By providing both financial resources and strategic guidance, they enhance startups' operational and legal stability, improve access to subsequent funding rounds, and increase long-term survival prospects (Prado & Bauer, 2022).

8.3. Financial strategy and a startup's life cycle

When selecting an appropriate financing strategy, a startup should not only assess the advantages and disadvantages of available capital sources but also align them with its current stage of development to ensure consistent and adequate financial support throughout its growth trajectory (Figure 8.1).

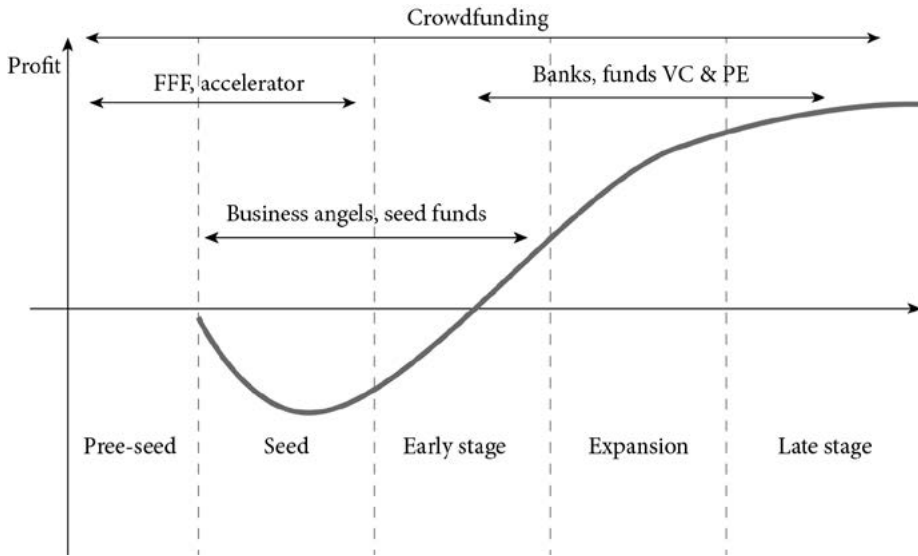


Figure 8.1. Supporting specific stages of a startup's life cycle

Source: own study based on Bernstein (2022).

The pre-seed phase represents the earliest and most uncertain stage of a startup's development. At this point, entrepreneurs formulate business concepts and outline preliminary product ideas, often before the existence of a working prototype. Financing typically comes from the so-called FFF group (family, friends, and fools), individuals who believe in the potential of the project and are willing to assume high risk despite the absence of financial returns in the short term. Investments at this stage involve considerable risk, as the return on capital may take between five and seven years, or even longer under unfavourable market conditions. Institutional investors and venture funds that seek a rapid return on investment, typically within two years, rarely participate in this stage due to its prolonged payback period. Accelerators, by contrast, are prepared for longer mentoring and incubation processes, supporting startups until they achieve scalability and readiness for dynamic market expansion (Weiss, 2023).

The seed phase, often referred to as the idea validation stage, constitutes the second major step in the startup lifecycle. At this point, entrepreneurs typically possess a prototype or have initiated limited market operations to test demand and business feasibility. As operations expand, costs increase and internal resources become insufficient. Startups therefore require external capital injections to sustain development and reach the break-even point. At this stage, if revenues are present, they are typically reinvested into growth activities, leaving little

or no operational profit. Because of persistent operational risks and the absence of stable cash flows, financial institutions such as banks are reluctant to provide loans or credit at this point. Nevertheless, this is the phase in which startups are most likely to attract investment from seed funds and business angels, as investors can evaluate tangible progress rather than a purely conceptual idea (Janik, n.d.).

The early growth stage is characterised by declining operational risk and initial signs of profitability. The company begins to consolidate its market position and prepares for expansion. Although revenues begin to grow, development expenditures remain high, requiring continued external financing. At this stage, access to foreign capital remains limited and relatively expensive. Startups may therefore seek financing from venture capital funds, which tend to engage once firms demonstrate scalability and potential for international expansion (Malec, n.d.).

The expansion and stabilisation phases are marked by high profitability and a validated business model, which facilitate access to larger financing rounds. At this point, investment and operational risks decrease significantly, attracting private equity and venture capital funds that seek established yet scalable enterprises. During these phases, companies rely less on equity financing and increasingly turn to bank loans, non-bank debt, and private equity investment to support growth and market consolidation (Cumming et al., 2023).

8.4. Venture capital support mechanisms

Venture capitalists provide both financial capital and “smart money”, which combines funding with expertise, strategic guidance, and access to professional networks for companies with high growth potential and validated business models. Smart money refers to professionally managed capital originating from institutional investors, funds, or financial experts with advanced market knowledge.

A major advantage of venture capital financing lies in the enhancement of a company’s credibility, the absence of debt-related obligations, and the strategic value added by experienced investors. The effectiveness of venture capital financing depends on the alignment of investor and entrepreneur objectives. Unlike debt financing, where repayment is mandatory regardless of performance, venture capital involves shared risk: both profits and losses are distributed proportionally to equity ownership (Janik, n.d.).

Equity investments can be categorised as direct or indirect, depending on the mode of capital involvement. Direct investments occur when individual investors or business angels acquire shares in a company, while indirect investments are made through venture capital funds that pool capital from institutional and

private investors. These funds operate on a portfolio basis, offsetting potential losses in one investment with gains from others. In addition to capital, equity investors contribute strategic expertise and industry knowledge that enhance firms' competitive capacity (Mroczkowski, 2021).

Venture capital constitutes a form of equity financing provided by specialised funds operating outside public markets. These investments target companies in the early growth and expansion phases that offer innovative and scalable solutions. The capital raised may be used for technology development, market expansion, acquisitions, or scaling production capacity (Dall-Orsoletta et al., 2022).

Venture capitalists accept substantial risk when financing early-stage companies in exchange for the prospect of high returns. This form of financing typically targets small and medium-sized enterprises (SMEs) with legal entity status, providing capital in return for equity ownership. Profits are realised through increases in company valuation over time, usually within two to five years (Lerner, 2022).

Venture capital funds raise and manage capital from institutional and private investors, allocating it to high-growth enterprises. Their operations are professionalised and follow structured investment processes that include detailed due diligence, valuation, and risk assessment. Funds may provide financing in the form of convertible loans or direct equity purchases, allowing participation in the company's value appreciation (Lerner, 2022).

Most venture capital funds operate on a ten-year cycle; the initial years focus on active investment, while later stages emphasise portfolio management and exit strategies. These funds are often structured as limited partnerships, in which General Partners (GPs) identify, negotiate, and oversee investments, and Limited Partners (LPs) provide capital under predefined terms. In Poland, some funds function as Closed-End Investment Funds (Polish: FIZ), operating under the Investment Funds Act (Kato, 2021).

In Poland, the main sources of venture capital funding include institutional investors (e.g., banks, pension funds, and foundations), corporations seeking innovation-driven growth, high-net-worth individuals, and public initiatives co-financed by the European Union. Examples include the National Centre for Research and Development (NCBR) and programs such as Bridge Alpha, the National Capital Fund, and the Polish Agency for Enterprise Development (PARP), which support the creation and expansion of innovative enterprises (Bernstein, 2022).

Small and medium-sized enterprises (SMEs) remain the central focus of venture capital activity. Investors prioritise firms that demonstrate innovative products, scalable business models, and strong management teams. Preferred sectors include IT/ICT, Internet of Things (IoT), FinTech, biotechnology, renew-

able energy, and telemedicine. Before investing, funds conduct comprehensive evaluations of the management team, product-market fit, and financial forecasts to minimise risk and identify ventures with the highest growth potential (Kato, 2021).

Despite the strong growth potential of many startups, not all succeed in obtaining venture capital financing. A decisive factor is the quality of preparation: professionally developed pitch decks, transparent financial models, and coherent business strategies significantly increase the likelihood of funding. Conversely, a lack of clarity or incomplete data discourages investors, who prioritise well-structured projects that align with their investment criteria (Lerner, 2022).

8.5. Information asymmetry and investment decisions in seed and venture capital

Venture capital investments are inherently uncertain and occur under conditions of high information asymmetry, where not all relevant details about a startup, its team, or its market potential are observable at the time of investment. To mitigate such information gaps, investors employ mechanisms rooted in the economics of information, most notably screening and signalling, while simultaneously building trust and establishing credible commitments over time (Glücksman, 2020).

Investing in early-stage startups requires navigating substantial uncertainty and information asymmetry. Unlike mature firms, startups often lack historical financial data, validated business models, and reliable performance indicators. Their success depends on volatile and interdependent factors such as team execution, technological advancement, market adoption, and competitive dynamics, most of which are difficult or impossible to predict at the time of investment (Hyun & Kim, 2024).

This uncertainty is compounded by information asymmetry between investors and entrepreneurs. Founders typically possess more knowledge about the true potential, risks, and internal dynamics of their venture than external investors. This imbalance creates challenges for efficient capital allocation and increases the risk of adverse selection funding ventures that appear promising but lack fundamental viability (Akerlof, 1978).

Managing information asymmetry therefore becomes a central challenge in venture capital investing. Investors develop systematic tools to screen opportunities and extract credible signals about startup quality, while entrepreneurs attempt to communicate their value and reduce perceived risk. These dynamics are well explained by information economics, particularly the concepts of screening (Stiglitz & Weiss, 1981) and signalling (Spence, 1974). Understanding these mechanisms allows for a more granular analysis of investment decision-making

and reveals how trust, reputation, and long-term relationships influence capital allocation in startup ecosystems.

In environments with high uncertainty, investors rely on screening mechanisms to identify startups with the greatest potential for success. Screening comprises a set of actions and analytical processes undertaken to gather reliable information and mitigate adverse selection (Svetek, 2022). The most fundamental screening instrument is due diligence—a systematic assessment of the startup’s business model, market opportunity, technology readiness, and competitive position. This process also evaluates the competence and cohesion of the founding team, as human capital is often the most decisive factor at the early stage (Franke et al., 2008).

Beyond formal analysis, venture capitalists leverage professional networks and industry-specific expertise to verify entrepreneurial claims and benchmark startups against peers. Trusted co-investors, sector experts, accelerators, mentors, and former founders offer valuable insights, particularly in opaque or nascent markets with limited public data (Capizzi & Carluccio, 2016). Another key screening mechanism is staged financing, in which capital is released incrementally based on reaching specific milestones. This structure allows investors to continuously assess performance, ensure alignment with expectations, and retain the option to withdraw should the venture underperform (Klausner & Litvak, 2017).

While investors reduce uncertainty through screening, entrepreneurs engage in signalling—the deliberate communication of information that conveys startup quality and potential. In information economics, signalling denotes actions by the informed party (the entrepreneur) to credibly demonstrate value to less-informed investors (Spence, 1974). A central signalling tool is the business plan, which articulates the startup’s mission, product, target market, competitive positioning, and financial projections. Although projections are inherently speculative, their internal coherence and underlying assumptions indicate the founders’ strategic thinking and market awareness (Kirsch et al., 2009).

Another class of signals concerns the educational and professional backgrounds of the founders. Degrees from reputable universities, previous entrepreneurial experience, and industry employment serve as proxies for competence and execution capability. “Serial entrepreneurs” who have successfully exited ventures often benefit from reputational credibility (Aggarwal et al., 2015). Entrepreneurs also use partnerships with established firms, research institutions, or pilot customers to validate their solutions and signal early market traction. Such collaborations through letters of intent, pilot programmes, or distribution agreements enhance legitimacy and reduce demand uncertainty (Mochkabadi et al., 2024).

Further signalling occurs through pitching and investor relations. The ability to communicate effectively, respond to critical questions, and build rapport during meetings or demo days often serves as a proxy for leadership and commitment. Over time, transparent communication reinforces trust and mitigates perceived risk (Kalvapalle et al., 2024).

Although screening and signalling dominate the pre-investment phase, co-operation challenges persist after funding. Because early-stage ventures require long-term engagement, sustained trust and credible commitments become essential for aligning investor and entrepreneur interests (Panda & Dash, 2016). One key mechanism for maintaining oversight and reducing opportunism is monitoring, typically exercised through investor participation in governance. Venture capitalists often request board seats, enabling strategic influence and direct access to information. This involvement boosts oversight and strengthens relational bonds, particularly when investors assume mentoring roles (De Clercq & Manigart, 2007).

A complementary oversight instrument is milestone-based financing, where funds are disbursed in tranches contingent on achieving measurable goals. This structure incentivises performance, facilitates ongoing evaluation, and provides both parties with a clear roadmap for collaboration (Verloop, 2013). However, not all dimensions of the relationship are formalised. Contracts typically define ownership, rights, and obligations, yet they remain inherently incomplete due to entrepreneurial uncertainty and rapid change. Consequently, investors rely heavily on relational trust, built through repeated interaction and open communication, which can substitute for formal oversight in dynamic environments (Blatt, 2009).

Within startup ecosystems, reputation effects play a critical role in shaping behaviour. Both investors and entrepreneurs understand that their conduct in one deal influences future opportunities. Maintaining credibility and honouring informal commitments thus becomes essential for long-term positioning within innovation networks (Plummer et al., 2016).

Conclusions

Seed capital and venture capital play a fundamental role in financing startups and young companies at different stages of their development. Although both instruments support innovation and entrepreneurship, they differ in size of investment, financing structure, risk exposure, and degree of investor oversight.

Seed capital funds focus on the earliest stages of company development, providing financing for prototyping, market testing, and initial operations. Given

the high risk and limited collateral of startups, these investments are typically modest, ranging from several dozen to hundreds of thousands of dollars. Seed funds most often target sectors such as technology, biotechnology, artificial intelligence, and other innovative fields with significant growth potential.

Venture capital funds, in contrast, invest larger amounts in companies that have already validated their business models and achieved a certain level of market stability. These investments often reach several million dollars and aim to accelerate growth and expansion. Venture capital funds apply rigorous financial analyses, seeking to maximise return on investment through value appreciation and subsequent exit strategies, such as trade sales or public listings.

A critical factor in obtaining financing is the degree of startup preparedness for the investment process. Firms must present a coherent business model, realistic financial forecasts, and a credible growth strategy in order to increase their attractiveness in the eyes of investors. The quality of presentations is equally important, since a professionally designed pitch deck and well-prepared documentation can significantly influence investment decisions.

Both seed and venture capital funds concentrate on industries with high growth potential, including IT/ICT, the Internet of Things (IoT), FinTech, biotechnology, renewable energy, and telemedicine. However, they are not confined to specific sectors. The decisive criteria for investment are market potential, innovation capacity, and the company's ability to generate sustainable long-term returns.

In addition to financial resources, startups supported by investors gain access to know-how, mentoring, business networks, and strategic advisory services. This combination of capital and expertise underscores the role of venture and seed funds as catalysts for innovation and economic development.

Mechanisms for mitigating information asymmetry, such as screening, signalling, and the building of trust and credible commitments, play a crucial role in the investment process. Under conditions of uncertainty and limited data availability, investors use screening tools, including due diligence, staged financing, and expert networks to assess startup quality and minimise selection risk. Simultaneously, entrepreneurs signal their value through transparent financial projections, demonstrated competence, strategic partnerships, and effective communication with investors.

In the post-investment phase, cooperation depends on both formal control mechanisms such as monitoring, milestone-based financing, and contractual agreements and informal instruments rooted in trust and reputation. The interplay of these three dimensions screening, signalling, and trust forms the foundation of effective collaboration between investors and entrepreneurs, thereby

enhancing the likelihood of sustainable growth and long-term success of financed ventures.

Ultimately, seed capital represents the most suitable form of support for startups in the earliest phases of their development, as it combines financial assistance with operational and strategic guidance. These dual forms of support are essential for the survival, scalability, and long-term competitiveness of emerging companies.

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