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Aleš Pustovrh
*University of Ljubljana, School of Economics and Business, Ljubljana, Slovenia*, ales.pustovrh@ef.uni-lj.si



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ORIGINAL ARTICLE

# Startup Accelerator Returns: J Curve or L Curve? A Comparative Performance Analysis Between a Venture Accelerator and Early-Stage Venture Capital

Aleš Pustovrh

University of Ljubljana, School of Economics and Business, Ljubljana, Slovenia

**Abstract**

**This document analyses the profitability of investments in venture accelerators compared to early-stage venture capital funds. Using a case study of a single fund manager operating both investment types, it tracks the Total Value to Paid-In (TVPI) ratio over 6 years. The early-stage venture capital investments showed a positive trend, exceeding a TVPI of 1, indicating profitability driven by company survival rates, external funding attraction, and growth. Conversely, the accelerator investments underperformed, with a TVPI consistently below 1, suggesting a loss for investors. This raises questions about the long-term viability of the accelerator model, potentially resulting in an L curve rather than the expected J curve of returns. While the accelerator's performance could still improve if the few successful companies significantly outperform the underperforming majority, this reliance on a small number of successes represents an inherently higher risk for investors. Future research should incorporate broader datasets and consider various market dynamics to generalize the findings, utilizing panel data across different geographies and industries.**

***Keywords:*** Venture capital, Accelerators, Investment performance, Startup funding, Return on investment

***JEL classification:*** G24, L26, M13

## 1 Introduction and the theoretical background on startup accelerators

Business accelerators help prospective startups develop initial business solutions, define and identify their customer segments, and provide resources, including capital and employees (Cohen & Hochberg, 2014). Drawing from resource dependence theory and open innovation paradigm, we propose that a business accelerator can be seen in the function of resource provision to growing companies along with the monitoring and control role that it can have in the ecosystem.

Within the entrepreneurship ecosystems a special role is reserved for the "startup factories"—business or venture accelerators (Miller & Bound, 2011). A venture accelerator (or startup accelerator) is a fixed-term, cohort-based programme that provides early-stage companies with seed funding, intensive mentorship, educational resources, and access to a network of investors and industry experts. According to Cohen and Hochberg (2014), accelerators are designed to rapidly accelerate the development of startups through rigorous selection processes, concentrated mentorship, and a structured curriculum that culminates in a "demo day" where startups present their progress to potential investors. This model not only supplies critical early-stage capital and guidance but also enhances a startup's credibility within the broader entrepreneurial ecosystem. In the last decade a new generation of incubation models, i.e. the seed accelerator programme, emerged as a response to the old models, mostly focusing on providing office spaces and in-house businesses (Bruneel et al., 2012).

The main features of the accelerator programmes are preseed investment (usually in exchange for equity), time-limited support, with an emphasis on

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E-mail address: ales.pustovrh@ef.uni-lj.si (A. Pustovrh).

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intensive mentoring, networking and educational programme for cohorts or classes of startups (Miller & Bound, 2011). The programme usually lasts from three to six months and concludes with a demo day when incubated startups present their project to a large number of investors (Kim & Wagman, 2014). Key elements of startup accelerators thus include (Pustovrh, 2019):

- seed capital & equity stakes: Programmes usually offer a modest investment in exchange for a small equity share.
- mentorship and training: Founders receive guidance from seasoned entrepreneurs, industry experts, and sometimes former accelerator alumni.
- cohort-based learning: Entrepreneurs benefit from peer-to-peer interaction, shared learning experiences, and collaborative problem solving.
- access to networks: Accelerators connect startups with venture capitalists, corporate partners, and other ecosystem players, often opening doors that would be difficult to access independently.

Initial research related to this topic provides detailed description of accelerators, their functioning and programmes (Isabelle, 2013; Miller & Bound, 2011), their distinction to incubators and other support mechanisms, and the importance of the various aspects of the programmes to the success of their incubatees (Cohen & Hochberg, 2014). It finds the primary distinguishing features of accelerators in the limited duration of the programmes, for classes of startups who enter and graduate together.

There is an emerging consensus that accelerators have a role in the success of their startups. According to a recent comprehensive multinational study of more than 8000 startups supported by 408 accelerators in 176 countries (Assenova & Amit, 2024), accelerated startups were more likely to raise venture capital (VC), raised more capital in the 1st year after graduating from these programmes, and planned to raise more capital afterwards, on average, over the next year. Accelerated startups also generated more revenue, hired more full-time employees, and paid more in wages to their employees, on average—indicating that they scaled faster than their peers (Assenova & Amit, 2024). They have an estimated 23% higher survival rate than their peers (Regmi et al., 2015). Other findings suggest an overall positive impact on accelerated startups in terms of acquisition of new knowledge (Battistella et al., 2017; Wise & Valliere, 2014), startup valuation (Kim & Wagman, 2014; Smith et al., 2016), entrepreneurial orientation (Hayter et al., 2018; Stayton & Mangematin, 2019), and ability to receive subsequent funding (Radojevich-Kelley & Hoffman, 2012). Evidence highlights the importance of pursuing higher efficiency over the life cycle of a startup (Balboni et al., 2019). Accelerators aid startups regardless of their pre-acceleration growth status (i.e., growing, stagnating, or declining). Furthermore, nongrowing startups selected for acceleration exhibit better chances of achieving growth postacceleration compared to already growing counterparts (Tekic et al., 2024).

The performance of venture accelerators is influenced by several key variables, as highlighted in selected recent studies. Cánovas-Saiz et al. (2020) emphasize the importance of portfolio size, startup survival rates, and the number of employees in accelerated firms, noting that these factors positively impact the median funding received by startups. Additionally, the longevity and geographical location of accelerators, particularly those in the U.S., are shown to enhance startup survival rates. Moroz et al. (2024) lend support to the positive impact that venture accelerators may have across multiple levels of observation—for example, accelerated startups' levels of survival, investment funding (timing, levels, rounds, and speed), growth measures (employees, revenues, valuation), exit pathways (acquisition, IPO, sale), and a wide range of intangible measures (new/faster product development, entrepreneurial efficacy, cognitive bias effects, and key milestones). Their structured review underscores the necessity of a comprehensive evaluation approach that considers both quantitative and qualitative metrics to accurately gauge accelerator performance.

Academic critiques of the venture accelerator model emphasize several limitations inherent in its design and reporting practices. For instance, the reliance on a cohort-based structure has been criticized for introducing survivorship bias, as success stories tend to dominate public narratives while failures remain underreported (Cohen & Hochberg, 2014). This focus on the most successful outcomes can mask the true risk profile and variability of performance among startups in an accelerator, thereby providing an overly optimistic picture of the model's efficacy. Moreover, the intensive networking and shared experience within cohorts may inadvertently promote groupthink, reducing the diversity of innovative approaches and potentially stifling alternative strategies that could lead to breakthrough success (Smith et al., 2016).

Other scholars have drawn attention to the issue of asymmetric bargaining power between accelerators and startups. Critics argue that accelerators, by virtue of their influential position and network advantages, may secure disproportionately favourable equity terms from startups—potentially compromising the long-term value creation for the entrepreneurs

involved (Hallen et al., 2020). In addition, research suggests that opaque reporting practices in accelerator performance further complicate an unbiased evaluation of returns and risks, calling for more rigorous, transparent reporting of startup valuations (Charoontham & Amornpetchkul, 2023). These critiques highlight the need for further research to refine the accelerator model and develop more comprehensive metrics for assessing its impact within the VC ecosystem (Leitão et al., 2022).

Another gap in the literature is the research on accelerators in peripheral entrepreneurial ecosystems. The establishment of Y Combinator acceleration programme (in the USA) pointed to the active role of business accelerators in an entrepreneurial ecosystem, and they have grown rapidly in the U.S. ever since, followed by a trend replication in Europe (Miller & Bound, 2011). Business accelerators have become an interesting subject of scholarly research only later, with scholars investigating the demand and supply of business incubation services across different incubator generations (Bruneel et al., 2012), exploring the accelerators' incentives to choose a portfolio size and disclose information about participating ventures (Kim & Wagman, 2014) or focusing on a specific type of business accelerators, for example, corporate accelerators (Kohler, 2016). One of the first studies focusing exclusively on European business accelerators (and excluding other technology business incubation mechanisms, such as technology parks, incubators, and innovation centres) was provided by scholars (Pauwels et al., 2016) who proposed a typology of accelerators, that is, the "ecosystem builder," the "deal-flow maker," and the "welfare stimulator." Although the study delivered a rich overview on how accelerators operate as a new-generation incubation model and how they differ from existing incubation mechanisms, the research focused on the three "leading accelerator regions" in Europe: London, Paris, and Berlin, which indicates an opportunity and need for future research in other countries (Mian et al., 2016).

However, as the main body of research evidence is based on data from developed economies of the U.S. and Western Europe, there may be some discrepancies in the evolution of the business accelerators in less developed markets (Uhm et al., 2018). More importantly, the role that business accelerators have in the startup ecosystem might be different in emerging startup ecosystems than in the more developed and resource-abundant environments. Research exploring how an accelerator can help and speed up the development of entrepreneurship ecosystems, how it can help less developed entrepreneurship regions, and how policy makers can help towards development is lagging behind—although not completely absent either (Pustovrh et al., 2020). Another topic not well researched is the commercial success of the accelerators and the factors influencing their success—for example, their geographic or industry focus. Even a simple general question—"Are investments into venture accelerators profitable?"—lacks a clear answer, with the public generally pointing towards a string of successful companies accelerated by Y Combinator but failing to research its overall profitability or factors influencing its rate of return on invested capital. To gain more insights on whether venture accelerators represent a viable investment opportunity for private investors seeking their required rate of return—such as early-stage VC funds—more empirical research is required. There is a clear gap in the academic literature evaluating the financial performance of accelerators across different markets—and even in the markets with the most developed accelerator ecosystems. While the importance of public policy interventions for support of accelerators is widely available (European Commission & Organisation for Economic Co-operation and Development, 2019), its effects on the accelerator performance—its rate of return—are not sufficiently researched.

However, this question is important. If they are profitable, there is a clear market solution to providing acceleration services to startups. Essentially, they would represent another segment of the VC market—the preseed- and seed-stage-focused VC.

If, conversely, venture accelerators consistently do not deliver market-rate returns, this suggests the presence of market failures or externalities that call for consideration for public intervention, such as subsidies, grants, or other forms of support aimed at fostering innovation and entrepreneurial activity. Such interventions can be justified if they address information asymmetries, coordination problems, or positive externalities associated with startup acceleration (Grilli et al., 2018). The "ecosystem builders" role could be an example of this (Pauwels et al., 2016). However, these externalities will have to be evaluated and measured to determine the scope and modes of public intervention and support of accelerators. Even if accelerators would not provide positive returns on investments by themselves, there might still be appetite for corporate investments into corporate accelerators—essentially supplementing financial returns for strategic benefits that such organizations would contribute to large corporations (Kohler, 2016; Kupp et al., 2017; Weiblen & Chesbrough, 2015).

This piece of research is thus focused on answering the following hypothesis:

*Is there empirical evidence that a venture accelerator model can deliver a positive rate of return on its*

*investments that is comparable to returns in early-stage VC funds?*

## 2 Expected returns of VC funds

To answer our hypothesis, it makes sense to treat accelerators as a specific form of early-stage VC fund as, like VC funds, they make investments into a set of early-stage startup companies and obtain an equity stake in them.

VC is a form of private equity financing provided by investors to early-stage, high-growth companies in exchange for an equity stake, with the aim of fuelling their rapid expansion and innovation (Hayes, 2024). VC investments are often specialized according to the stage of business development of the investee company:

- preseed: This is the earliest stage of business development, when the startup founders try to turn an idea into a concrete business plan. They may enrol in a business accelerator to secure early funding and mentorship.
- seed funding: This is the point where a new business seeks to launch its first product. Since there are no revenue streams yet, the company will need a VC fund's or accelerator's funding to fund all of its operations.
- early-stage funding: Once a business has developed a product, it will need more capital to ramp up production and sales before it can become self-funding. The business will then need one or more funding rounds, typically denoted incrementally as Series A, Series B, and so forth.

Preseed and seed stage startups are typically funded by business angels or accelerators while more traditional (and usually larger) investments that are required by early-stage startups are provided by more traditional VC funds. This distinction is not clear and many early-stage VC funds also run their own accelerators and vice versa. Y Combinator, for example, primarily identifies itself as a startup accelerator. Its core programme is a three-month, intensive cohort-based experience that provides early-stage companies with seed funding, mentorship, and access to a robust network of entrepreneurs and investors. However, it has also expanded its investment activities—for example, through the YC Continuity Fund, which supports its accelerated companies in later growth stages.

VC has garnered considerable attention amidst the upsurge of entrepreneurship, particularly in the United States, as noted by Kaplan and Schoar (2005). Their paper, "Private Equity Performance: Returns, Persistence, and Capital Flows," provides one of the most cited empirical analyses of private equity performance, including VC and buyout funds. The study primarily examines fund-level returns using measures related to Multiple on Invested Capital (MOIC) and Total Value to Paid-In Capital (TVPI).

MOIC is a performance metric that measures the total return on an investment by comparing the sum of its current residual value plus any distributions received to the total capital invested. Essentially, it indicates how many times over the initial investment has been returned, though it does not account for the time value of money. TVPI is a comprehensive measure of a VC fund's performance. It is calculated by dividing the sum of the current residual value of the investment portfolio and the distributions returned to investors by the total paid-in capital. This ratio reflects both realized and unrealized returns, providing a full picture of a fund's overall return on invested capital. Both TVPI and MOIC measure fund performance using the total value (realized plus unrealized) of private equity investments. The difference is in the denominator. MOIC divides the total value of the investment or fund by the total invested capital, while TVPI divides it by the paid-in capital (Albers-Schoenberg & Zeisberger, 2019; Moreira, 2023).

The J curve is a graphical representation illustrating the typical return trajectory of VC funds over time. In the first few years, these funds often experience negative returns due to management fees, operational expenses, and the early stages of capital deployment. This early decline is followed by a period where returns begin to improve as portfolio companies mature, gain traction, and potentially achieve profitable exits, resulting in positive returns for investors. This progression forms a curve resembling the letter "J" (Meyer & Mathonet, 2005).

The J-curve effect highlights the importance of long-term investment horizons in VC, as significant returns are generally realized only after several years of nurturing and developing portfolio companies. Empirical evidence shows that VC funds typically require between 5 to 7 years to reach an inflection point where cumulative returns turn positive (Kaplan & Schoar, 2005).

Several factors contribute to the J-curve effect in VC funds (Grabenwarter & Weidig, 2005):

1. early-stage expenses: At the outset, funds incur management fees and operational costs before any significant investment gains materialize, leading to initial negative returns.
2. investment maturation: Investments in startups require time to develop, scale, and reach liquidity events. During this period, the fund's valuations may remain static or even decline until successful exits occur.

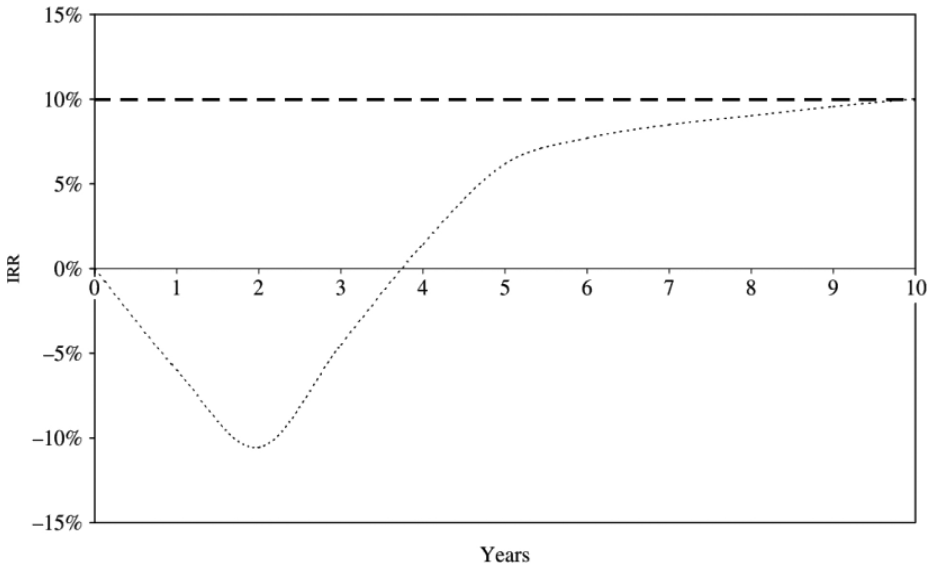


*Fig. 1. Fund standard J curve.*
*Source: Meyer and Mathonet (2005)*

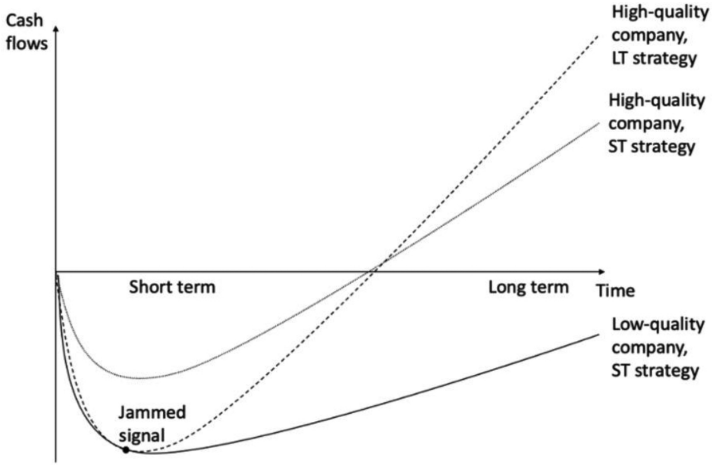


*Fig. 2. Signal jamming problem masking the underlying quality of a venture.*
*Source: Hellmann et al. (2024)*

3. value impairments and write-offs: Some portfolio companies may underperform or fail, resulting in impairments and write-offs that can further depress early returns.

It is important to note that the presence of a J curve does not necessarily indicate poor performance; rather, it reflects the inherent life cycle of venture investments. As successful portfolio companies achieve exits, the gains can offset early losses, leading to the upward slope of the J curve. Understanding this pattern helps investors set realistic expectations about the timing of returns in VC investments.

However, it can also send investors mixed signals about the quality of their portfolio or reveal differences between portfolio managers (Chan et al., 2020). The model presented in Fig. 1 of Hellmann et al. (2024) illustrates the classic J-curve phenomenon in VC investing by mapping out cash flow trajectories over time. In the figure, high-quality ventures are depicted with two distinct J curves—one corresponding to a short-term strategy and another to a long-term strategy—while a low-quality venture, employing a short-term approach, shows a shallower curve. The model presented in Fig. 2 captures a "signal jamming" problem: although a high-quality venture ideally prefers a long-term investment strategy to unlock its full growth potential, doing so may mask its underlying quality by making its initial negative cash flows appear similar to those of a low-quality venture. Consequently, the model highlights the trade-off

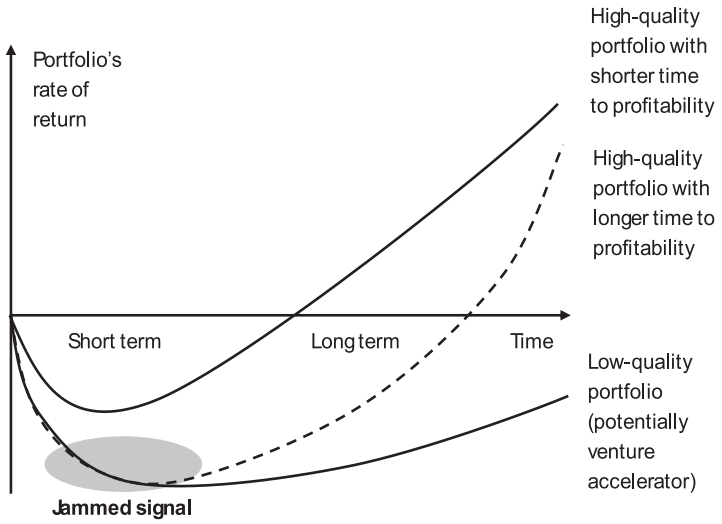


*Fig. 3. Signal jamming problem in venture accelerators.*

entrepreneurs face between enhancing short-term cash flows to secure follow-on financing and preserving long-term cash flow potential, with investors' loss tolerance—shaped by their exit opportunities—playing a pivotal role in determining the optimal strategy.

In order to evaluate whether accelerators with their portfolio of investments in very-early-stage startup companies represent a viable investment, a clear gap in the literature has been identified—there are very few empirical studies analysing the rate of return of early-stage VC funds and no studies on the rate of return on investments into venture accelerators. An intuitive model on the expected J-curve cash flows for startups of different quality in Fig. 1 provides a good framework also for analysing the differences between early-stage VC funds and venture accelerators. While a well-performing portfolio of early-stage startups (in either long-term or short-term quality) is expected to follow a J curve and eventually show positive rates of returns, a portfolio of startups in the accelerator could potentially remain in the negative returns, indicating lower quality (or higher risk) of such startup investments—essentially following an L curve instead of the expected J curve. On the other hand, it might also simply take longer time for such a portfolio in an accelerator to become profitable, indicating a longer-term strategy towards the expected (higher) rates of return of a portfolio of startups in the venture accelerator as the investments by the accelerator were implemented in an earlier development stage of startups. Investors cannot know their portfolio's underlying quality as its initial negative cash flows appear similar to those of a low-quality venture. As seen in Fig. 3, it might simply need more time to mature.

This signal jamming problem on the quality of different portfolios has not been researched empirically so far in early-stage VC funds or venture accelerators.

## 3 Empirical evidence on the J-Curve returns in VC

VC returns have been the subject of extensive empirical and theoretical inquiry, with several studies highlighting the interplay of risk, timing, and diversification in shaping fund performance. Sahlman (1990) laid the foundation by contrasting venture-capital organizations with large public corporations and leveraged buyout firms, emphasizing the unique agency issues and contractual solutions that characterize VC structures. This early work underscores how the inherent high risk in early-stage investments is managed through carefully designed operating procedures and investor relationships.

Building on this framework, Prencipe (2017) presents an analysis based on a hand-collected dataset of approximately 3600 VC investments backed by the European Investment Fund (EIF) spanning from 1996 to 2015. The study reveals that VC returns are not static; rather, they show sensitivity to economic cycles and follow a power-law distribution, suggesting that a small number of investments generate outsized returns. Moreover, the work highlights that diversification strategies, enabled by the heterogeneity of deals, help to mitigate risk and lower the correlation of VC returns with broader

*Table 1. Expected total value to paid-in capital (TVPI) for venture capital funds.*

| Fund quartile | Expected TVPI (Year 6) |
|---|---|
| Top quartile | 1.5–2.0 |
| Median fund | 1.2–1.4 |
| Bottom quartile | ∼1.0 |

Source: Extrapolated estimations based on Kaplan and Schoar (2005).

asset classes. Notably, firm experience—particularly in later-generation funds—appears to bolster performance, although this might also reflect the stringent screening of first-time teams by the EIF.

Complementary insights are offered by Weidig and Mathonet (2004), who compare risk profiles across investment vehicles, finding that direct VC investments bear a roughly 30% probability of total capital loss, whereas VC funds and funds of funds benefit from diversification effects that substantially reduce this risk. Swildens and Yee (2017) further refine this understanding by proposing a risk-and-return matrix specific to VC, which situates these investments within the broader private equity landscape. Recent market analyses, such as those reported by Clemens (2024) on net cash flow J curves, corroborate the delayed yet robust return profile of VC funds, underscoring the importance of temporal dynamics in performance assessment.

In their study, Kaplan and Schoar (2005) find that, on average, private equity funds (including VC funds) have an MOIC close to 1.8 times the invested capital at their maturity (after about 10 years). For VC funds specifically, the TVPI (a measure that includes both realized and unrealized returns) tends to be above 1.5 at maturity in top-quartile funds and closer to 1.0 in median funds. Since private equity and VC funds generally follow a J-curve pattern, in Year 6 and extrapolating on these results, a typical fund would likely have a TVPI between 1.2 and 1.4, depending on fund quality. Given that many funds distribute capital primarily after Year 6, the implied MOIC and TVPI in Year 6 would be modestly above 1.0 for the average fund and significantly higher for top-tier funds. Kaplan and Schoar (2005) thus imply that by Year 6, the TVPI for early-stage VC funds typically ranges from 1.2 to 1.5, with top-tier funds exceeding 1.5. Lower-performing funds might still hover around 1.0, indicating limited appreciation at that stage. The expected TVPI values for VC funds are presented in Table 1. These results align with the broader J-curve effect, where many VC funds are still in the value creation phase in Year 6. This will be the benchmark used for our empirical analysis.

## 4 Methodology and data collection

### *4.1 Sample and setting*

To evaluate whether investments into venture accelerators are profitable, a set of data on returns on two portfolios was collected: a portfolio of investments into startups that were accepted into an accelerator and another portfolio of investments into startup companies invested from an early-stage VC fund. Both portfolios were managed by the same fund management company with clearly defined investment criteria. The fund management company operates in Central and Eastern Europe and is sector-agnostic but geographical-region-specific. It is a suitable case for analysis as it manages both the accelerator and the early-stage VC fund, making investments into both from two separated compartments and distinct investment strategies but with the same investment committee. Individually, both the fund and the accelerator structures resemble those of typical accelerators and early-stage VC firms. Combined, the single fund management for both funds is quite an exceptional, although not unique, example and is thus specifically suitable for addressing the research question. With full access to their performance data on a quarterly basis, this makes it a good case study for our analysis.

Preseed and seed-stage investments of up to EUR 200,000 were invested into startups that did not achieve a product-market fit yet (and sometimes lacked any revenue whatsoever). These companies were accepted into an accelerator programme. Each 3-monthly programme would provide standard acceleration services in addition to the investment: workshops and seminars or webinars, mentor office hours, access to support networks (other startups, alumni, potential local customers, perks, and other organizations in the local startup ecosystem as well as a concluding demo day). In the first 5 years, 10 such programmes were implemented and a total of 113 investments (and EUR 7.4 million) were implemented from the accelerator.

In parallel, early-stage investment was limited to startups that had already achieved product–market fit and had at least some initial and growing revenue and potential for future growth. Investments into such companies were larger, starting at EUR 250,000, and could be followed by additional investments if these companies continued or even accelerated their growth. The largest amount invested into a single company from this early-stage VC fund was EUR 1.5 million. During the fund's 5-year investment period, a total of 32 investments (and EUR 29.4 million) were implemented from this early-stage VC fund.

Both portfolios were industry-agnostic and not limited to digital/software startups only—although such startups represented a clear majority of investees. Due to the large number of investments, startups from almost all industries were supported, except for those from a standard list of restricted sectors.[1]

It is important to note that some startup companies that have been accepted into the accelerator were also able to secure the early-stage VC investment, usually at EUR 250,000 or slightly more. There were 21 companies that were able to receive both accelerator and early-stage investments. With these companies, selection bias could be an issue if they were systematically different from those receiving only one type of investment. This represents an opportunity for future research. In the current analysis, companies that received both investments had the same estimated valuation as their value used in the accelerator compartment was always equal to their value in the early-stage VC compartment.

### *4.2 Portfolio valuation methodology and the valuation measures used*

To analyse the differences in the value progression of both portfolios, an objective valuation methodology was developed for all startups invested from both compartments—the early-stage VC and the accelerator compartment. Its aim is to establish a reasonable valuation for each portfolio company and thus for both portfolios. Since private company valuations are inherently complex, an accepted methodological approach was developed that reduces subjectivity by applying weighted external measures to decide an assessed valuation consistently across reporting periods and compartments (startups in the accelerator or in the early-stage VC fund).

The method incorporates three valuation bases:

- revenue multiple
- cost basis adjusted for short runway and liquidation preferences
- external funding rounds

All portfolio companies were categorized into three groups based on investment age and growth trajectory. Specifically, three main indicators from startup quarterly reports provided key observations used to categorize them: their revenue growth, their cost growth with an estimation of their runway (projected number of months before they run out of currently held cash reserves), and external funding rounds used as a proxy for market-based transaction setting the valuation of the company:

a) 1st-year investments: Investments made within 12 months of the reporting date are typically held at cost unless extreme negative circumstances arise, or an external funding round has occurred. Follow-on investments by the fund extend this period, but valuation remains at cost.
b) growing investments: Investments beyond the 12-month window that demonstrate growth—based on individual targets but never below 10% month-on-month—were valued using a weighted combination of revenue multiples, cost basis, and external funding rounds. The most important reason to increase the value of the company in the portfolio was always in the external round. If an external funding round has occurred, the postmoney valuation was incorporated, provided the investment firm played a minority role or did not take part.
c) stalled investments: Investments not meeting expected growth projections are subject to impairment. Discounts are applied based on the potential recoverability of the business or underlying assets, often resulting in significant write-downs. For example, if a company from the accelerator was not able to raise an external round and its growth and development consistently lagged behind its own plans and investor expectations, and the company had short runway, the value of such a company was impaired by 25% each quarter, resulting in a total impairment within 1 year. In general, 25% valuation impairment per quarter was the norm for underperforming companies, but not all of them were fully impaired if the investment compartment had certain preferential rights such as a liquidity preference.

Each startup company was evaluated using these measures every quarter. Based on revenue, cost and potential external funding rounds reported by each portfolio startup company, these data were cross-checked with the annual financial statements to assure their reliability. For external funding rounds, the companies were contractually obliged to report all such transactions and their terms. These data were cross-checked with industry benchmarks for their respective industries in order to validate that postmoney valuations were in line with them.

[1] A typical example is available at Guidelines on the EIF Restricted Sectors.

*Table 2. Quarterly Total Value to Paid-In (TVPI) for the early-stage venture capital (VC) compartment and the accelerator (ACC) compartment.*

| Time | TVPI (early-stage VC compartment) | TVPI (ACC compartment) | No. of companies invested (VC) | No. of companies invested (ACC) |
|---|---|---|---|---|
| Q3 2019 | 0.61 | 0.12 | 5 | 3 |
| Q4 2019 | 0.87 | 0.79 | 10 | 22 |
| Q1 2020 | 0.63 | 0.52 | 10 | 25 |
| Q2 2020 | 0.7 | 0.61 | 14 | 35 |
| Q3 2020 | 0.71 | 0.69 | 21 | 54 |
| Q4 2020 | 0.77 | 0.7 | 25 | 65 |
| Q1 2021 | 0.75 | 0.63 | 33 | 72 |
| Q2 2021 | 0.69 | 0.61 | 39 | 77 |
| Q3 2021 | 0.8 | 0.52 | 44 | 80 |
| Q4 2021 | 0.94 | 0.58 | 45 | 87 |
| Q1 2022 | 0.89 | 0.64 | 46 | 92 |
| Q2 2022 | 0.99 | 0.69 | 50 | 93 |
| Q3 2022 | 0.93 | 0.69 | 50 | 100 |
| Q4 2022 | 1.03 | 0.67 | 50 | 105 |
| Q1 2023 | 1.06 | 0.6 | 50 | 105 |
| Q2 2023 | 1.28 | 0.67 | 52 | 106 |
| Q3 2023 | 1.34 | 0.61 | 52 | 106 |
| Q4 2023 | 1.33 | 0.64 | 53 | 113 |
| Q1 2024 | 1.34 | 0.66 | 53 | 113 |
| Q2 2024 | 1.51 | 0.66 | 53 | 113 |
| Q3 2024 | 1.53 | 0.64 | 53 | 113 |
| Q4 2024 | 1.8 | 0.59 | 53 | 113 |

*Note.* There were 21 companies that were able to receive both accelerator and early-stage VC investments.

### *4.3 Analytical technique*

The methodology assigns weightings to different valuation approaches depending on the company's circumstances. The revenue multiple approach applies industry-standard benchmarks:[2]

- 5x annual recurring revenue (ARR) for hardware sales (nonrecurring revenue)
- 10x ARR for service-based models (nonrecurring revenue)
- 20x ARR for recurring service revenues
- 30x ARR for recurring service revenues with strong customer retention

The cost basis valuation is adjusted based on financial runway, with discounts applied for short cash reserves and further adjusted for liquidation preferences if applicable. The final valuation assigns weightings based on the relative importance of each method. For instance, a recent external round may receive a higher weighting (up to 100%) in valuation, while a company struggling to secure funding may see greater emphasis placed on cost basis adjustments. Obtaining a valuation of each startup company in both portfolios each quarter was the basis for computing the net asset value of the whole portfolio in the accelerator and the early-stage VC fund separately.

This methodology ensures a consistent and structured, data-driven approach to VC valuation in both the accelerator and early-stage VC fund, mitigating subjectivity while reflecting the financial and operational realities of portfolio companies.

## 5 Results and analysis

The valuation of both portfolios was conducted on a quarterly basis and for both the accelerator and early-stage VC fund at the same time. The resulting startup valuations, together with information on the values of capital calls and management fees, were used to calculate both MOIC and TVPI. Other performance metrics (Internal Rate of Return [IRR], Distributed to Paid-In [DPI]) were also considered, but DPI was rejected as most of the value gains in startups were not realized yet and DPI measures only realized gains, while IRR is used less often and thus not good for comparing results with other studies. For benchmark analysis, the resulting TVPI was used for comparison between the accelerator and early-stage VC fund in their 6th year of operations.

The results are presented in Table 2 and Fig. 4.

For the early-stage VC portfolio, J-curve results are clearly observable. While the TVPI was initially relatively low at the very beginning of both operations due to establishment costs being paid

[2] Grinda (2020, 2021); Miller (2022); Ostin (2021); Sarath (2021); microcap.co. (2021); Wilhelm (2021).

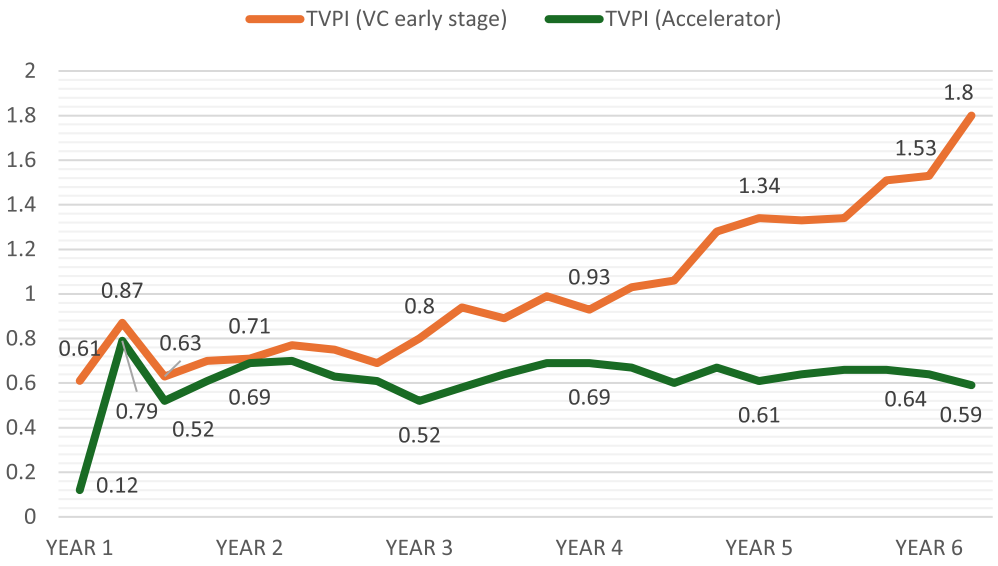


*Fig. 4. Total Value to Paid-In (TVPI) comparison between accelerator and early-stage venture capital (VC) fund in their 6th year of operations.*

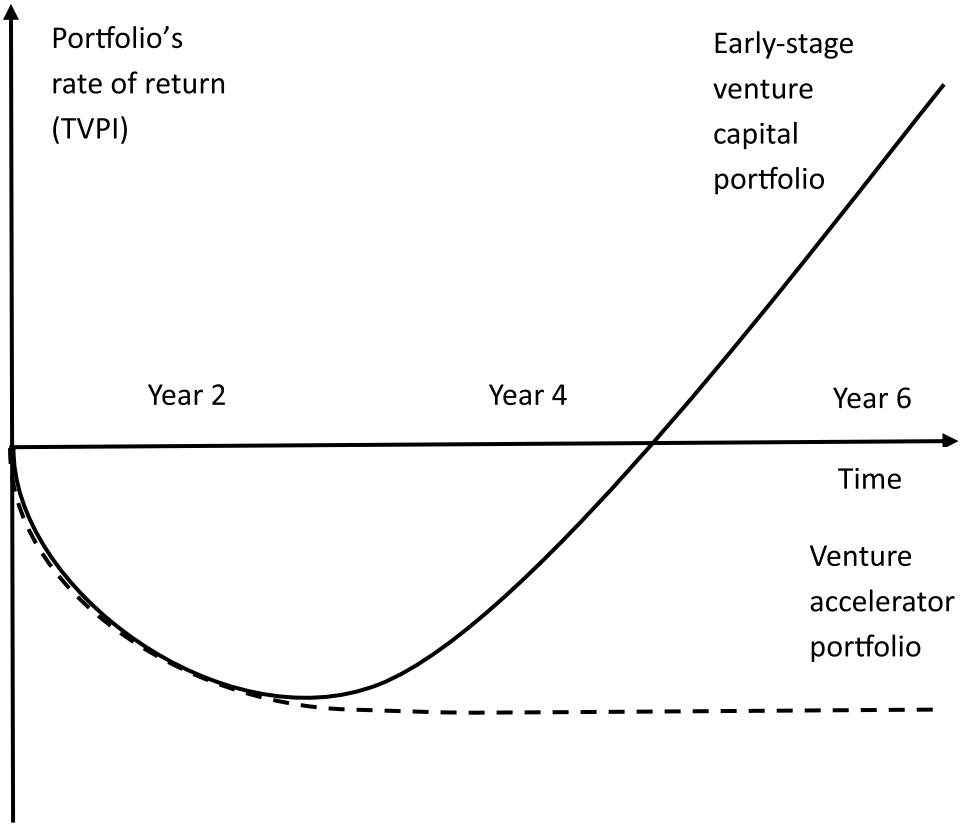


*Fig. 5. The observed J-curve returns for the early-stage venture capital portfolio and L-curve returns for the venture accelerator after 6 years of operation.*

in Q1, the Q2 TVPI result for the early-stage VC portfolio was 0.87. In the same period, the accelerator portfolio's TVPI is comparable at 0.79. As predicted by the J curve, TVPI for both portfolios falls to much lower, and in both cases actually the lowest, values—0.63 for the early-stage VC portfolio and 0.52 for the accelerator portfolio.

However, the two portfolio returns started to differ from this point forward. The TVPI for the early-stage VC portfolio began to increase, mostly due to the relatively high survival rate of invested companies as well as relatively good results for some of them—some companies in this portfolio started raising money from external funding sources (typically other VC

funds). The TVPI for this segment reached 0.8 by Year 3 and exceeded 1 in the 4th year (14th quarter of operation). As a select few companies in this portfolio embarked on accelerated growth and their valuations reached much higher values, this more than replaced the write-down for those companies that underperformed. By Q2 in Year 6 (22nd quarter of operation), this portfolio's TVPI reached 1.8 and was clearly on path to increasing further.

On the other hand, the accelerator compartment did not achieve this growth in TVPI. In fact, its TVPI at the end of the observed period (22nd quarter of operation) was 0.59, lower than in Year 1 (4th quarter). While the TVPI in the accelerator portfolio recorded both increases and decreases in the observed period, it was generally stagnant and below 1, indicating that the accelerator compartment was returning less than it was invested into—thus losing money for its investors. In this case, the answer to our hypothesis—*Is there empirical evidence that a venture accelerator model can deliver a positive rate of return on its investments that is comparable to returns in early-stage VC funds?*—is clear: the venture accelerator portfolio was not profitable in the 6th year of operation. The venture accelerator portfolio's TVPI value remained well below 1. On the other hand, the early-stage VC portfolio investments were profitable in the same time period, showing a clear growth trend in increasing profitability after the initial decrease—thus following a clear J curve. The early-stage VC portfolio started making positive returns after 4 years and was close to reaching a TVPI of 2 at the end of its 6th year.

As the stagnant trend of TVPI-measured returns for the accelerator was very clear, it is also possibly the most likely outcome that the accelerator will continue losing money throughout its 10-year investment period. As presented in Fig. 5, its J curve would thus turn into an L curve. It might be possible that the answer to our research question on the profitability of investments into an accelerator will remain negative—at least the trend of the first 22 quarters of this accelerator would imply that.

## 6 Discussion and implications, limitations, and future research avenues

As the typical length of a VC fund is 10 years and both studied portfolios were in their 6th year of operation, the results of the case study will only become clear in the future. There are some factors that might suggest that the TVPI of the venture accelerator might increase in the future. The most obvious one is that the few successful accelerator investments need more time to start rapid growth—due to their very early stage when accepted into the accelerator, they simply require more time to show clear results. And their results need to be extremely good as a large proportion of accelerated startups eventually do not bring any returns on investment—so the remaining few need to make much larger returns, and these take more time. In our case study, out of 112 venture accelerator investments, 21 have received a follow-up investment from the early-stage VC fund from the same fund manager, but only 3 have increased their value by a factor of 5 or more (but less than 10)—which is not enough to show positive results for the whole venture accelerator's portfolio. Their numbers might still increase, but most of the accelerated companies have already had their value impaired, some of them fully. While this is expected and a normal result of the high-risk profile of such early-stage investments, it nevertheless requires the few successful startups to make so much larger returns. For example, if the exit success rate of accelerated startups is only 1%, the increase in the value of those startups that make a return must reach 100 times the initial investment value just to return the initial investment into the whole portfolio. Such "lottery-ticket winners" are rare, and there is a clear possibility that the accelerator portfolio will struggle to reach even positive values in the remaining 4 years.

There is also another possibility. The reason for stagnant TVPI in the accelerator compartment is that only a few companies were able to embark on a path of fast growth, raising external funding rounds in the process. A large majority of the portfolio was unable to achieve that and would either become a small, break-even lifestyle business or would not survive. In both cases, the valuation methodology would require the valuation of such companies to be significantly or completely impaired. The combined decrease in the value of those companies was significant enough to outweigh the increase of the few companies in the portfolio whose values were increasing. However, as the investment period of 5 years has passed, the impairment of nonperforming investments will eventually lead to full realization of losses, leaving only a handful of companies whose value is expected to keep increasing. If the combined value of these few selected companies' valuations keeps increasing, this trend will eventually overcome the valuation impairments that would cease due to the total elimination of the nonperforming part of the portfolio. One can even imagine a hypothetical extreme case where the valuation of a single accelerator-invested company (a "unicorn") could be worth much more than the combined valuation of the fully impaired portfolio of all other invested companies. This is the case in the Y Combinator, which has successfully created several

such "unicorn" companies. But not many other accelerators can show such success.

In such a case, the accelerator's returns would still follow the J curve, but at a much slower rate than in the early-stage VC fund. Their returns would also be more dependent on a small number of successful startups, their expectations for prolonged fast growth, and their ability to attract external investors to support it. However, even in such cases this dependence on a lower number of successful startups represents a greater risk than in the early-stage VC fund.

That means that this case study represents a clear, if incomplete, answer to the research question. It provides evidence that a venture accelerator does not deliver a positive rate of return for its investors, while an early-stage VC fund does provide such a positive return for its investors.

### *6.1 Practical implications*

There are a few clear lessons for venture accelerators resulting from this study. Investors should understand that this is highly risky investment opportunity that depends on few selected successful startups and a large majority of startups whose value will be partially or fully impaired. An accelerator should thus make investments accordingly—into bold new ideas implementing disruptive innovations and potentially creating and capturing a lot of value. Individual startup investments should most likely estimate the chances of such an investment making a return of 100 times the initially invested capital—even 10-times returns on a single investment will not be sufficient to make the investments into the whole portfolio profitable. It should also consider steps towards spreading the same investment potential to a larger portfolio of startups to increase the chances of supporting a startup with the huge growth potential required. Portfolio size has been shown by other studies (Cánovas-Saiz et al., 2020) to be important to individual accelerated startup results—our study shows that larger cohorts are also positive for the investors into the accelerators.

Another outcome of this case study provides a clear rationale for public policy intervention. If private investors cannot make a required rate of return investing into assets as risky as the accelerator's portfolio, public intervention is justified—especially if other positive externalities can be observed. This brings other risks, mostly connected to the selection of startups, where not every startup company has an opportunity to create value—so how can accelerator managers be incentivized to select those startups that are high-risk but have at least a potential for high return and not simply invest public money into startups that realistically cannot expect to make returns on investment? In such a case, an investment from an accelerator would effectively become a grant and as such even represent state aid. It seems that a private–public-partnership could provide a solution, for example by mixing private investment capacity and capabilities with public investments. There are good examples of public organizations and institutions acting as lead or anchor investors into private accelerators but requiring additional private money to be invested as well, including from the accelerator management. While such arrangements are quite common in VC funds, they are much less popular in the financing of venture accelerators.

### *6.2 Theoretical implications*

This study advances the existing literature on venture accelerator financing and VC performance by juxtaposing empirical results and comparing them to a nuanced theoretical framework. It shows that while J-curve returns are observed in early-stage VC, such returns in a venture accelerator might not be realistic and might resemble an L curve—and thus not provide the positive returns that venture accelerators would require to make investments into such organizations. This would also favour public intervention to support such organizations in case clear positive externalities would be obtainable. While prior research has acknowledged the J-curve phenomenon—where startups experience initial losses before achieving profitability—our work delves deeper into the strategic trade-offs between short-term profitability and long-term growth. This study bridges a critical empirical gap in the literature by linking investor loss tolerance with startup performance outcomes in two different but comparable investment portfolios, offering valuable insights for entrepreneurs and policymakers aiming to foster innovation and economic growth.

### *6.3 Future research avenues*

The primary limitation of this case study method is its reliance on data from a single fund manager running both an early-stage VC fund and an accelerator, positioned in a specific context of the emerging financial systems of Central and Eastern Europe. While this approach allows for in-depth analysis, it raises questions about the external validity of the findings.

To increase robustness, extending the analysis beyond 6 years would be crucial to observe later-stage performance dynamics. In order to increase the validity of results, an additional interview with another, older venture accelerator in the same region was conducted; it made its first investments more than 10

years ago and has also made investments into 10 cohorts through a period of 5 years. While a slightly different valuation methodology was used, that accelerator's portfolio results were quite similar to our observation and its portfolio's rate of return on its investments remained below 1 even after 10 years. While no more than an indication, this observation hints that the L-curve portfolio returns might remain the same even through a longer period than the one observed in our case. However, in order to verify these expected results, we plan to repeat our analysis in 4 years' time.

To generalize these results from a single case study, other case studies involving a broader set of similar funds would be necessary, focusing on actual performance metrics such as returns on investments. The specific geographic and industry contexts of this fund manager could limit the applicability of the results. Different regions or sectors may show distinct market dynamics and funding landscapes, particularly in later stages of startup growth. These variations could significantly influence startup valuations and overall fund performance, thereby affecting the generalizability of the study's conclusions. Including data from multiple accelerators and early-stage VC funds to rule out idiosyncratic factors related to the specific fund manager studied would greatly increase the robustness of the empirical results observed in our case study.

Future research could also benefit from a formal econometric approach controlling for other factors (e.g., industry, stage of investment, macroeconomic conditions). Adopting panel data methods to analyse a broader array of accelerators across different geographies and industries would also be desirable and would offer additional insights. This approach would enable researchers to capture longitudinal changes and assess how varying economic, regulatory, and market conditions influence accelerator performance and VC returns over time. By including diverse accelerators in such a panel, scholars could conduct comparative analyses that reveal underlying patterns and distinct operational efficiencies across different environments, ultimately leading to a more nuanced understanding of the VC ecosystem.

Finally, the role of lead partners as investors into VC funds and venture accelerators, particularly funds of funds, presents a crucial avenue for future inquiry. These entities often control access to privately collected data that are not publicly available, which makes them key stakeholders in understanding the full spectrum of investment outcomes. Moreover, public and multilateral organizations that act as anchor investors in many accelerators and VC funds could further enrich the analysis. Their involvement may help standardize data collection and offer insights into the external factors that contribute to the generalizability of research findings, thereby strengthening the overall validity of future studies.

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