

Investment Performance of a Governmental Venture Capital Firm

—An Empirical Analysis Based on INCJ's Portfolio Firms—

Chuo University • RIETI Yuji Honjo
Kobe University Hidenori Takahashi

Abstract

This study provides a comprehensive evaluation of the investment performance of early-stage and venture firms in INCJ's portfolio. We empirically analyze exit strategies and time-to-exit, financial returns, and stock performance at and after initial public offerings (IPOs). Our findings indicate that larger investments are more likely to exit via IPO, whereas smaller investments tend to exit through withdrawal. Younger firms also exhibit a lower probability of IPO exits. For INCJ-backed firms later listed on the Tokyo Stock Exchange Mothers and Growth markets, we assess market performance using initial returns and buy-and-hold abnormal returns (BHARs) over post-IPO periods. Additionally, we examine the stock price reaction of acquiring (listed) firms to INCJ's trade sale announcements using an event study approach with cumulative abnormal returns (CARs). Overall, our results provide no clear evidence that INCJ's involvement significantly enhances either the financial returns or market valuation of its portfolio firms.

Keywords: INCJ, governmental venture capital, investment performance

1 Introduction

In recent years, increasing attention has been paid to the “entrepreneurial ecosystem” or “start-up ecosystem” (Acs et al., 2017; Stam, 2015), which fosters sustainable entrepreneurship by organically connecting regional actors and factors to stimulate the economy through start-ups and entrepreneurs. Start-ups are expected to drive the creation and growth of new businesses and industries. For instance, in November 2022, the Japanese government announced the “Startup

Development Five-year Plan,” aiming to increase investment in start-ups tenfold within 5 years. This initiative demonstrates the government's growing interest in revitalizing the economy through start-ups.⁽¹⁾

However, start-ups face challenges in internally meeting all of their personnel, capital, and technological needs. They rely heavily on external markets and organizations—such as labor, capital, and product markets—for most of their resources. Venture capital (VC) firms play a crucial role in supplying capital to start-ups. However, predicting which start-ups will succeed with VC funding is difficult because their projects are highly uncertain and characterized by significant information asymmetry between entrepreneurs and investors. Venture capitalists often have difficulty understanding new technologies or services well enough to accurately evaluate a project's potential. Moreover, while external economic actors may hold high expectations for emerging technologies, the uncertainty surrounding these projects and the information asymmetry between investors and entrepreneurs make it difficult for private VC firms alone to provide sufficient funding for innovative start-ups developing technologies that could serve as future social infrastructure. Since such technologies can be considered public goods, involving public organizations in funding innovative start-ups may be an effective approach.

This study examines the investment performance of early-stage and venture companies funded by Japan's governmental VC firm, INCJ, Ltd. (formerly INCJ), from multiple perspectives. First, we investigate the exit strategies employed by INCJ for its portfolio companies. Because VC firms must eventually exit their investments, we also examine the time from INCJ's initial investment to its exit—that is, the time to exit.

Next, we evaluate the investment returns using the multiple of invested capital (MOIC) and the internal rate of return (IRR). Furthermore, to assess the stock performance of INCJ-backed companies listed on the Tokyo Stock Exchange's Mothers and Growth markets, we analyze initial returns at the initial public offering (IPO) and buy-and-hold abnormal returns (BHARs). In addition, when INCJ transfers shares of its portfolio companies to other listed firms, we conduct event studies with cumulative abnormal returns (CARs) to analyze how stock prices react to transfer announcements. This analysis provides insight into the market evaluation of trade-sale exits.

In recent years, start-ups—particularly innovative ones—have been viewed as key drivers of economic and policy objectives. Within the entrepreneurial ecosystem, VC firms are expected to supply equity capital to start-ups. In particular, governmental VC firms are expected to generate a crowding-in effect, encouraging additional investment from private VC firms (Colombo et al., 2014). However, to the best of our knowledge, Japanese VC firms—especially governmental VC firms—have not been sufficiently studied. This study empirically evaluates the performance of a governmental VC firm by examining the time to exit, investment returns, and stock performance of INCJ's portfolio companies. Our findings may shed light on the role and significance of Japan's governmental VC firms.

The remainder of this paper is organized as follows. Section 2 provides the background and literature review. Section 3 describes the data and sample characteristics. Section 4 presents the results. Section 5 concludes.

2 Research Background

2.1 Investments by VC Firms

VC firms perform two key functions: the screening effect (or the selection effect) and the value-added effect (Brander et al., 2002; Croce et al., 2013).⁽²⁾ VC firms accumulate knowledge about promising projects through their investment

experience. This accumulated knowledge enables them to make better investment decisions, thereby exerting a screening effect. In addition, VC firms often adopt a hands-on approach and actively participate in the management of their portfolio companies. Such managerial involvement interacts synergistically with capital provision, leading to improved firm performance. In this way, VC firms not only select high-potential companies but also enhance their value through active engagement. Consequently, VC firms are considered instrumental in fostering companies with latent growth potential.

However, because VC firms typically invest in high-risk companies—such as high-tech start-ups—the returns (i.e., interest) demanded by financial institutions like banks are insufficient to compensate for such risk. VC firms, therefore, seek high returns by selling equity acquired through their investments, a process known as an exit strategy. One common exit route is through an IPO, while another is through mergers and acquisitions (M&As), in which unlisted shares are sold to other firms or individuals. IPOs and M&As are generally regarded as “successful exits” because they can yield substantial returns for VC firms. These exit strategies serve as an important measure of a VC's success (Gompers & Lerner, 2000). For VC firms, achieving exits efficiently is essential, as the capital recovered can be redeployed into new investments.

Previous studies (Gompers et al., 2020; Rosenbusch et al., 2013) have examined the relationship between VC investments and the performance of portfolio companies. From both screening and value-added perspectives, VC-backed firms generally outperform their non-VC-backed counterparts. However, unlike investments in publicly listed companies, investing in start-ups entails considerable risk due to project uncertainty and information asymmetry. A common mechanism to mitigate such risks is syndication (Lerner, 1994), in which multiple VC firms invest in a start-up instead of relying on a single investor. The participation of multiple VC firms can

facilitate portfolio growth by leveraging their diverse expertise and industry knowledge.

For VC firms, it is important to determine which partners to syndicate with and who will serve as the lead investor. In early-stage ventures, which are often characterized by severe information asymmetry, investors often face challenges in gathering sufficient information. The lead VC typically conducts due diligence and shares information with other syndicate members, enabling better investment decisions. VC firms not only provide capital but also exert a certification effect on their portfolio companies, signaling quality and credibility to other investors (Guerini & Quas, 2016; Li et al., 2020). This signaling reduces information asymmetry, attracts additional funding, and promotes the further growth of investee firms.

2.2 VC Investments in Japan

Japan's financial system has traditionally been bank-centered (Allen & Gale, 2000; Weinstein & Yafeh, 1998). This characteristic also applies to start-up financing, which typically comes in the form of loans from financial institutions. Examples include the Japan Finance Corporation's New Business and Start-up Support Loan, as well as loan programs offered by credit unions and regional banks to support start-ups that contribute to local economic development.⁽³⁾ From the demand side (i.e., firms), these loans represent debt financing, which remains the dominant funding method—even for early-stage firms.

In contrast, equity financing is relatively uncommon in Japan. According to the Global Entrepreneurship Monitor survey, fewer individuals in Japan invest in start-ups than in other countries, and public awareness of “angel investing” —that is, investing in firms at the founding or early stages—remains low (Honjo & Nakamura, 2020). Compared with households in North America and Europe, Japanese households tend to hold a larger share of their financial assets as cash deposits and a smaller share as equity holdings. Consequently, a substantial portion of

Japan's financial assets comprises bank deposits.⁽⁴⁾ Furthermore, in the name of investor protection, Japan imposes relatively strict regulations on small public offerings, private placements to a limited number of investors, and equity-based crowdfunding. There is no simplified disclosure system designed to reduce the cost of fundraising. As a result, equity financing for unlisted firms (“private equity”) is still underdeveloped and insufficient.⁽⁵⁾

Figure 1 shows the rate of VC investment to GDP for G7 countries and South Korea over the past decade (2014–2023). In 2023, Japan's VC investment-to-GDP ratio is 0.045%, the second lowest among the G7 countries—just above Italy—and significantly lower than that of South Korea (0.140%). This figure indicates that VC investment in Japan remains muted compared to other advanced economies. Expanding VC investments, as envisioned in the government's “Startup Development Five-year Plan,” appears to be an urgent priority for promoting start-up growth.

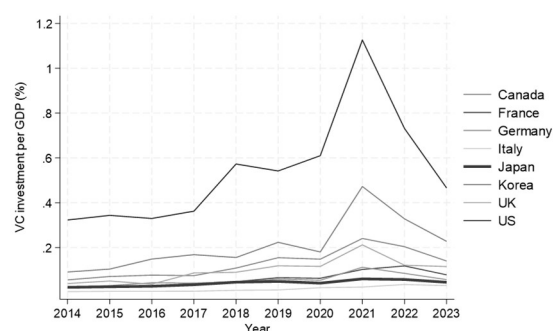


Figure 1 - Percentage of VC Investment to GDP for G7 Countries and South Korea

Source: Venture capital investments (market statistics): OECD Entrepreneurship Financing Database

2.3 The Role of Governmental VC Firms

VC firms can be categorized according to their origin—independent, corporate, bank-affiliated, academic, or governmental (Bertoni et al., 2015; Luukkonen et al., 2013). INCJ is a governmental VC firm, often referred to as a governmental fund. Since INCJ was established with both public and

private funds, it is also described as a public-private fund or government-initiated fund.⁽⁶⁾

Governmental VC firms are expected to bridge the funding gap left by private VC firms (Colombo et al., 2016). While VC firms reduce uncertainty and information asymmetry by carefully screening potential investees, it remains difficult to predict the outcomes of start-up projects—especially in their early stages, when both uncertainty and information asymmetry are particularly high. As a result, investment in such start-ups tends to be limited. This is especially true for high-tech and innovative start-ups, whose technologies often possess the characteristics of public goods—being non-rivalrous and non-excludable—and thus generate positive externalities for society through spillover effects. Moreover, industries that could form the basis of future social infrastructure, such as renewable energies or pharmaceutical development, typically require large-scale, long-term investments. Consequently, VC firms seeking early exits tend to hesitate to invest in these fields. Since private VC firms alone often cannot provide sufficient capital to offset such risks, governmental VC firms play a vital role in filling this funding gap.

The role of governmental VC firms in several countries has been discussed (Brander et al., 2015; Luukkonen et al., 2013). Governmental VC firms are expected to stimulate investment from private VC firms through a crowding-in effect. When information asymmetry is substantial, governmental VC investments can also serve a certification function, signaling the quality of portfolio companies and encouraging additional private VC firms (Guerini & Quas, 2016). Conversely, excessive public capital intervention can have a crowding-out effect, discouraging private VC firms by supplying an excessive amount of capital to the market.

Concerning governmental VC firms and governmental funds in different countries, in the United States, for example, the federal government launched the Small Business Innovation Research (SBIR) program, which was established to promote the commercialization of

innovative technologies developed by small and medium-sized enterprises. There has been an increase in employment and sales among regional companies that receive VC funding through the SBIR program (Lerner, 1999). In Israel, the 1993 Yozma Program is widely recognized as a successful model that has significantly contributed to the development of the domestic VC industry (Colombo et al., 2016). Similarly, Australia's Innovation Investment Fund has played an important role in nurturing the country's VC industry (Cumming, 2007). An analysis of governmental VC firms in China, Hong Kong, and Taiwan shows that in China, where IPOs are subject to strict regulatory controls, the involvement of governmental VC firms is associated with a higher rate of successful exits (Suchard et al., 2021). Although these studies show the positive effects of governmental VCs, there are also negative effects. Canada's Labour Sponsored Venture Capital Corporation program has been cited as an example of governmental VC activity producing a crowding-out effect (Cumming & MacIntosh, 2006).

Although governmental VC firms are expected to play roles distinct from those of private VC firms, empirical evidence on their investment performance remains mixed. Luukkonen et al. (2013) find that government-backed VC firms do not necessarily outperform private ones, and that the areas of value-adding activities provided by government-backed VC funds differ from those provided by independent VC funds. Governmental VC firms often complement, rather than substitute for, private VC firms, and the benefits of co-investing with private VC firms are frequently emphasized (Brander et al., 2015).

Because government-backed VC firms differ widely across countries in their institutional frameworks and policy objectives, their portfolio characteristics and investment outcomes exhibit considerable heterogeneity (Colombo et al., 2016). Hence, research from different countries is essential to improving our understanding of the roles and effectiveness of governmental VC firms.

To date, few studies have analyzed Japanese governmental VC firms, leaving a notable gap in the literature. Motivated by this gap, this study empirically examines INCJ's investment performance using data from its portfolio companies.

3 Data

3.1 Data Sources

INCJ, Ltd.'s predecessor, the Innovation Network Corporation of Japan, was established in July 2009 based on the Act of Partial Revision of the Industrial Competitiveness Enhancement Act. INCJ was formed through a corporate split from the Innovation Network Corporation of Japan in September 2018. INCJ was intended to complement private sector efforts and made direct investments based on three principles: addressing social needs, growth potential, and innovativeness (Hattori, 2020). It ceased making new investments in April 2020 and reached the end of its operational period in March 2025.

We use data provided by INCJ up to May 2025. Of the 144 companies in which INCJ invested, we analyze those that INCJ classified as “early stage” or “venture companies.” We exclude investments aimed at business reorganization or integration. Our final sample consists of 105 INCJ investee companies.⁽⁷⁾ INCJ made its first-round investments between May 2010 and April 2020. The invested and harvested amounts as well as the exit strategies for these companies are based on INCJ data.

We obtain company information, such as establishment dates, from STARTUP DB provided by for Startups, Inc. To compare INCJ's investment returns, we use data from the VEC YEARBOOK 2021 and the Survey on Venture Capital Investment Trends published by the Venture Enterprise Center (VEC). In addition, we obtain stock price data from “The Data of Returns Related to the Listed Japanese Stocks” provided by Financial Data Solutions, Inc. Together, these data provide the information necessary for our

empirical analysis.

3.2 Sample

Table 1 presents the summary statistics for the amounts invested and harvested across the 105 INCJ investee companies.⁽⁸⁾ The mean investment amount is 1.5 billion yen, with a median of 0.9 billion yen. The mean harvested amount is 1.3 billion yen, with a median of 0.2 billion yen.

Table 1 - Summary Statistics of Total Investment Amounts

	Mean	SD	p10	Median	p90
Amount invested	15.4	20.8	3.0	8.9	35.0
Amount harvested	13.3	30.4	0.0	2.0	41.1

Source: Created by the author based on data provided by INCJ.

Note: $N = 105$. Unit: 100 million yen. SD represents standard deviation. p10 represents the 10th percentile. p90 represents the 90th percentile. The amount invested is the total amount invested in that company.

Figure 2 shows the investment and harvest amounts by industry for the investee companies. The industry classifications are based on those indicated by INCJ. Substantial investments are observed in the information technology (IT), business services, content, and intellectual property fields, followed by the health and medical and infrastructure fields. Exit amounts are also substantial in the infrastructure field, as well as in IT, business services, content, and intellectual property. In contrast, exit amounts in the health and medical field are relatively small. Given the high business risks in areas such as drug development, these modest exit amounts suggest the difficulty of identifying and investing in successful ventures in this sector.

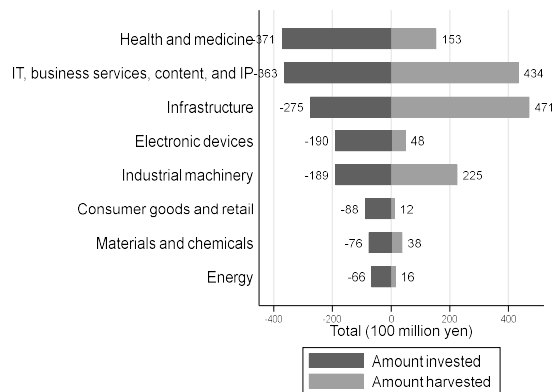


Figure 2 - Amounts Invested and Harvested by Industry

Source: Created by the author based on data provided by INCJ.

Next, we describe the exit strategies. INCJ categorizes exit strategies into IPOs, trade sales, stock buybacks (i.e., the reacquisition of a company's own shares), and withdrawals. Table 2 shows the distribution of exit strategies under this classification. Trade sales are the most common, accounting for over 70% of the total. IPOs represent 14%, while withdrawals account for less than 10%. There is only one case of stock buyback. Considering the characteristics of this case, we include stock buyback in the trade sale category in the subsequent analyses of exit strategies and investment horizons, resulting in three consolidated categories: IPOs, trade sales, and withdrawals.

Table 2 - Exit Strategies for Sample Companies

Category	Number of companies	%
IPO	15	14.2
Trade sale	80	76.2
Stock buyback (acquisition of one's own stocks)	1	1.0
Withdrawal	9	8.6
Total	105	

Source: Created by the author based on data provided by INCJ.

4 Results

4.1 Investment Horizon

We clarify the investment horizon for each of INCJ's exit strategies—IPO, trade sale, and withdrawal. However, this analysis presents certain challenges. For instance, the investment horizon for IPOs cannot be observed in cases where a trade sale has occurred. To address this, we estimate the restricted mean survival time (RMST) for each exit strategy.

Table 3 shows the RMST estimates. The RMST for IPOs is approximately 132 months (11 years), while for trade sales it is about 81 months (6 years and 9 months). This comparison indicates that harvesting investments through IPOs generally takes longer. The RMST for withdrawals is 147 months (12 years and 3 months), suggesting that withdrawals take longer than IPOs and trade sales, likely reflecting the time required to reach a withdrawal decision.

Table 3 - Restricted Mean Survival Time by Exit Strategies

	Mean	SE	95%CI
IPO	132.3	6.7	[119.3 145.4]
Trade sale	81.5	4.0	[73.6 89.3]
Withdrawal	146.7	4.8	[137.3 156.1]

Source: Created by the author based on data provided by INCJ.

Note: $N=105$. Unit: months. SE represents the standard error.

To examine how the exit rate evolves, we apply the Nelson–Aalen estimator, a non-parametric method for estimating the cumulative hazard rate function. Figure 3 shows the cumulative hazard based on the respective Nelson–Aalen estimators for the three exit types: IPO, trade sale, and withdrawal. The Nelson–Aalen estimator represents the cumulative value of the hazard of the exit occurring during the next observation period, conditional on no prior exit by time t . As shown in Figure 3, for all exit types, the cumulative hazard of exit begins to rise noticeably 24 months (2 years) after the initial investment. Overall, the cumulative hazard for trade sales increases slightly faster than that for IPOs, although the

general trends are broadly similar for both exit types.

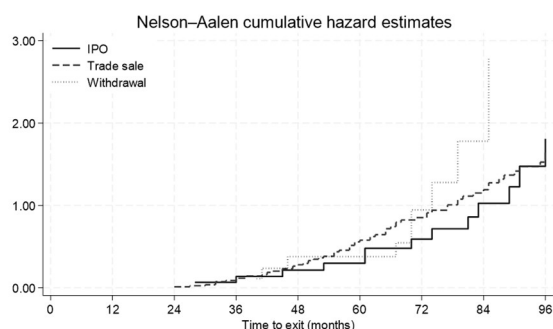


Figure 3 - Nelson–Aalen Cumulative Hazard for Exit

Source: Created by the author based on data provided by INCJ.

Note: $N=105$. See Table 2 for the number of exits through IPO, share transfer, and withdrawal. Investments with a time horizon exceeding 96 months are not shown.

Furthermore, we analyze exit strategies using a competing-risks regression model, which allows for multiple potential exit events. In such a framework, if a competing event (e.g., a trade sale) occurs before an IPO, the time to IPO exit cannot be observed. Considering this, we estimate the determinants of exit strategies using the competing-risks model instead of the proportional hazards model typically applied in the survival analysis.⁽⁹⁾ As explanatory variables, we include the log of INCJ's total investment amount and the log of company age to examine whether investment amount and company age influence exit type. In addition, we include industry dummies and initial investment year dummies to control for differences by sector and investment timing.⁽¹⁰⁾

Table 4 presents the estimation results of the competing-risks regression model for the three exit types: IPO, trade sales, and withdrawal. The table shows subhazard ratios instead of coefficients; a ratio greater than 1 indicates a positive effect, while a ratio less than 1 indicates a negative effect. As shown in Table 4, for IPOs, the subhazard ratio for investment amounts exceeds 2 and is significant at the 5% level, indicating that larger

investments are more likely to exit through IPOs. In contrast, for withdrawals, the subhazard ratio for investment amounts is below 0.3 and significant at the 1% level, suggesting that smaller investments are more likely to end in withdrawal. No significant relationship between investment amount and trade sales is observed. Moreover, for IPOs, the subhazard ratio for company age is greater than 1 and significant at the 5% level, indicating that older companies have a higher likelihood of exiting through IPOs. Conversely, younger companies are less likely to go public but more likely to withdraw, as reflected in the results for withdrawal. Although many industry and initial investment year dummies are not significant, the health and medical sector dummy and the 2010–2011 investment year dummy are significant at the 10% level for withdrawals. This suggests that investments in the health and medical sector and those made during the early period (2010–2011) are associated with a higher probability of withdrawal.

Table 4 - Determinants of Time to Exit: Competing-Risks Model Estimated Results

	IPO	Trade sale	Withdrawal
ln Investment amount	2.146*** (0.591)	0.909 (0.123)	0.294*** (0.138)
ln Company age	1.781** (0.449)	0.999 (0.084)	0.666** (0.110)
Materials and chemicals	2.234 (2.341)	0.534 (0.280)	3.553 (4.671)
Health and medical	0.374 (0.445)	0.723 (0.272)	6.771* (7.802)
Machinery and electronics	1.358 (1.076)	0.827 (0.317)	0.411 (0.608)
IT and business	1.589 (1.284)	1.252 (0.493)	0.205 (0.260)
2010–2011 investments	0.484 (0.642)	0.689 (0.316)	14.343* (19.727)

2012–2013 investments	0.998 (1.126)	0.938 (0.406)	0.953 (1.139)
2014–2015 investments	1.311 (1.155)	0.590 (0.222)	0.589 (0.758)
2016–2017 investments	1.249 (1.160)	0.866 (0.334)	0.413 (0.635)
Number of observations	105	105	105
Event occurrence	15	81	9
Pseudolikeli hood	–62.0	–328	–32.1
Wald test	20.1**	8.46	19.5***

Note: This table presents the subhazard ratios. Heteroscedasticity-robust standard errors are in parentheses. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$. See Table A1 for the variable definitions.

4.2 Investment Returns

We evaluate investment returns for INCJ investee companies using MOIC and IRR. MOIC is defined as the ratio of the exit amount to the invested amount. The IRR is a performance measure that accounts for the length of the investment period. Assuming all cash outflows occur at time 0 and all cash inflows (V_1) occur at exit, the IRR is given by

$$V_1 = (1 + IRR)^t V_0$$

where t denotes the number of years from the first investment to exit.

Table 5 reports summary statistics for MOIC and IRR for the 105 INCJ investee companies. For MOIC, both the mean and the median are below 1, indicating that many investments are not recovered. A two-sided t -test of the null hypothesis that the average MOIC equals 1 fails to reject the null at the 5% level. For IRR, the average is –24%, indicating a negative average return. A two-sided t -test of the null hypothesis that the average IRR equals 0 rejects the null at the 5% level. Thus, on average, INCJ's investment returns are low.

Table 5 - Summary Statistics of MOIC and IRR

	Mean	SD	p10	Media n	p90
MOIC	0.92	1.61	0.00	0.21	2.23
IRR	–0.24	0.39	–0.81	–0.23	0.17

Source: Created by the author based on data provided by INCJ.

Note: $N = 105$. SD: standard deviation. p10 represents the 10th percentile. p90 represents the 90th percentile.

Figure 4 shows the time-series trend of MOIC for INCJ and for other VC funds by investment year. For the comparison group, MOIC is calculated by dividing the sum of cumulative distributions and residual valuation by the total invested amount for each fund's starting year, based on VC firms that responded to the Survey on Venture Capital Investment Trends conducted by the VEC. As shown in Figure 4, MOIC around 2010—when INCJ began its exits—is extremely low. However, MOIC has gradually increased and recently exceeded that of other VC funds, indicating an improvement in investment performance over time. A plausible explanation is that early performance is depressed by INCJ's initial unfamiliarity with new investment frameworks, whereas learning effects and process refinement contribute to more efficient exits in later years.

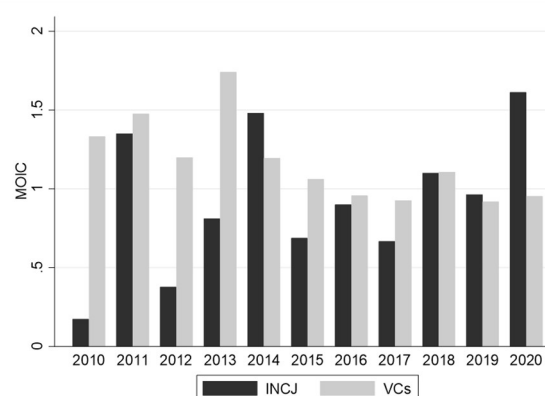


Figure 4 - Comparison of MOIC between INCJ and VC Funds

Source: Created by the author based on data provided by INCJ and the VEC YEARBOOK 2021.

Note: The VC funds ("VCs") sample includes a total of 234 funds

(both active and liquidated) started in each year as of May 31, 2021. This comparison is not strict; INCJ investee companies differ in firm characteristics, initial investment year, investment timing, and operating period. In addition, since participation in the VEC's survey was voluntary, reported performance may be subject to upward bias if underperforming funds chose not to report.

4.3 Stock Performance

We first examine how INCJ investee companies are valued by the stock market by analyzing IPO initial returns. We compare the initial returns—defined as the percentage change between the offer price and the first market price—of the 13 INCJ investee companies listed on the Tokyo Stock Exchange's Mothers or Growth market from 2015 to 2024 with those of non-INCJ investee companies listed in the same markets and period.

A large number of studies have examined IPO initial returns, with multiple theoretical frameworks proposed to explain them.⁽¹¹⁾ Among these, information-based theories attribute the difference between the offer price and the opening price (i.e., the initial return) to information asymmetry between new investors, existing investors, underwriters, and issuers. Within this framework, informed VCs are thought to certify firm quality (Megginson & Weiss, 1991). We test whether INCJ, a government-backed firm, exhibits a similar certification effect.

Table 6 shows the regression results using the initial return (%) as the dependent variable. The independent variables include a dummy for INCJ investment (INCJ dummy), the proceeds raised (total offering amount), IPO year dummies, and lead underwriter dummies. The coefficient on the INCJ dummy is 42.25 ($p=0.111$), implying that the initial returns of INCJ-backed IPO firms are, on average, 42 percentage points higher than those of non-INCJ-backed firms; however, this difference is not statistically significant. Therefore, based on this specification, we cannot conclude that INCJ investments had a certification effect.

Table 6 - Determinants of Initial Returns: OLS Regressions

	Initial return (%)
INCJ dummy	42.252 (26.453)
ln Proceeds	-52.485*** (4.559)
Constant	206.415*** (18.195)
Year dummies	Yes
Lead underwriter dummies	Yes
Number of observations	647
Adjusted R^2 squared	0.325

Note: Heteroscedasticity-robust standard errors are in parentheses. ***: $p < 0.01$.

Next, we examine the long-term market performance after IPOs using BHAR. BHAR measures the degree to which an IPO stock purchased at the end of the listing month and held for a certain period outperforms (or underperforms) the market return over the same period. Specifically, BHAR is calculated as follows:

$$\text{BHAR}_{i,T} = \prod_{t=1}^T (1 + R_{i,t}) - \prod_{t=1}^T (1 + R_{m,t}),$$

where $R_{i,t}$ represents the returns of company i over month t , and $R_{m,t}$ represents the return of the benchmark (TOPIX) for the same period.

Figure 5 shows the 24-month BHAR for 12 INCJ-backed IPOs, excluding those listed for fewer than 6 months as of the end of 2024. For companies listed for fewer than 24 months, BHAR is calculated over the available post-IPO period.

The stock prices of INCJ-backed IPOs are volatile, with no clear upward or downward trends. In month-level tests, the null hypothesis that the mean BHAR equals zero cannot be rejected at the 5% level. For non-INCJ-backed IPOs (not plotted), the corresponding BHARs are also not significantly different from zero and can be treated as $\text{BHAR} = 0$ on the figures' y -axis. Therefore,

within the scope of this analysis, there is no evidence that INCJ investment affects post-IPO stock performance.

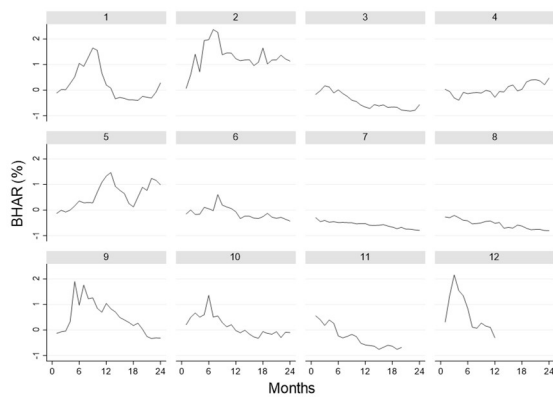


Figure 5 - BHAR of INCJ Investee Companies After IPO

Source: Created by the author based on data provided by INCJ and “The data of returns related to the listed Japanese stocks.”

Note: The analysis covers 12 INCJ-backed IPOs listed on the Tokyo Stock Exchange’s Mothers or Growth market between 2015 and 2024, excluding one company with less than 6 months since its IPO. The IPO month is set to $t = 0$, and the figure shows BHAR from $t = 1$ to 24 months. Since BHAR is calculated using stock price data up to December 2024, the full 24-month BHAR is not available for companies whose IPO occurred less than 24 months before this date.

Finally, we examine market reactions to trade sale announcements using an event study approach. The event date ($t = 0$) is defined as the announcement date on which INCJ disclosed the trade sale of all or part of its shares in an investee company to a publicly listed firm. We identify 29 such events through the end of 2024, restricting the sample to trade sales where the transferee is a listed Japanese firm and the announcement date is clearly verifiable from public disclosures.

To measure the market reaction of the transferee companies, we calculate CARs over the event window $(-1, +1)$, using abnormal returns estimated from risk-adjusted expected returns based on the Fama–French three-factor model (Fama & French, 1993).

Figure 6 shows the average CAR around the

event date. The average CAR $(-1, +1)$ is 2.3%, but the null hypothesis that CAR $(-1, +1)$ equals zero cannot be rejected at the 5% significance level ($p = 0.07$). While the stock price reactions to trade sale stock are not statistically significant, Figure 6 shows an increase in the stock price of transferee companies on and after the announcement date. Further research could incorporate transfer-specific characteristics—such as deal size or potential synergies—to provide further insights.

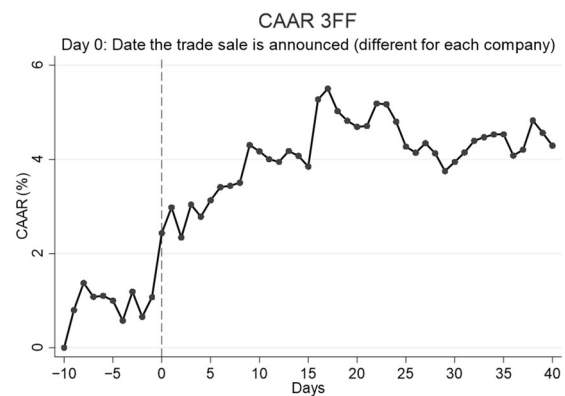


Figure 6 - CAAR Response to Trade Sale Announcements

Source: Created by the author based on data provided by INCJ and “The data of returns related to the listed Japanese stocks.”

Note: $N = 29$. This figure shows the cumulative average abnormal returns from $t = -10$ to $t = +40$, with the trade sale announcement date set as $t = 0$. Abnormal returns are calculated using risk-adjusted expected returns estimated from the Fama–French three-factor model (Fama & French, 1993). Daily stock data from 250 to 30 trading days before the event ($t = [-250, -30]$) are used for estimation.

5 Conclusion

In recent years, interest in developing entrepreneurial ecosystems and promoting start-up activity has increased from both economic and policy perspectives. VCs play a key role by providing risk capital to innovative start-ups. However, systematic empirical evaluations of VC performance are scarce in Japan, particularly for government-backed VCs.

Using data from INCJ, this study examines the

investment performance of 105 early-stage and venture companies in which INCJ, one of Japan's government-backed VCs, has invested. We assess performance along four dimensions: exit strategies (IPO, trade sale, or withdrawal), investment horizon, investment returns (MOIC and IRR), and stock performance (initial returns, BHARs, and CARs).

Our empirical findings indicate that larger investments are more likely to exit via an IPO, whereas smaller investments tend to end in withdrawal. Younger firms also have a lower probability of IPO exits.

Although INCJ's MOIC and IRR are generally low, the year-by-year trend suggests that INCJ's MOIC has surpassed that of other VC funds in recent years, indicating gradual improvement.

For companies listed on the Tokyo Stock Exchange's Mothers or Growth market, we calculate initial returns at the IPO date and BHARs over the post-IPO period. Neither measure shows a statistically significant effect attributable to INCJ's investment.

Furthermore, an event study of trade sale announcements to other listed companies indicates positive but statistically insignificant market reactions, as measured by CARs.

Overall, this study provides a comprehensive empirical assessment of INCJ's investment performance. Nonetheless, several limitations remain to be addressed. IPO initial returns and BHARs are influenced by firm characteristics, market conditions, and underwriter characteristics, many of which are not fully captured in our models. Future research should incorporate richer explanatory variables and employ more robust estimation frameworks.

In addition, although INCJ pursues both financial returns and social impact, this study focuses solely on financial performance. Future research should develop appropriate metrics and gather additional data to evaluate non-financial outcomes alongside financial results.

Appendix

Table A1 shows the definitions and mean values of the independent variables used in the estimation for Table 4 in Section 4.1.

Table A1 - Variable Definitions and Mean Values

	Definition	Mean
	Natural logarithm of	
ln Investment amount	INCJ investment amount (100 million yen)	2.256
	Natural logarithm of	
ln Company age	the number of years from incorporation to INCJ's initial investment	3.347
Materials and chemicals	1 for materials and chemicals, 0 for others	0.105
Health and medical	1 for health and medical, 0 for others	0.181
Machinery and electronics	1 for industrial machinery and electronic devices, 0 for others	0.257
IT and business	1 for IT, business services, content, and intellectual property, 0 for others	0.305
2010–2011 investments	1 for INCJ initial investment in 2010–2011, 0 for others	0.105
2012–2013 investments	1 for INCJ initial investment in 2012–2013, 0 for others	0.229
2014–2015 investments	1 for INCJ initial investment in 2014–2015, 0 for others	0.276
2016–2017 investments	1 for INCJ initial investment in 2016–2017, 0 for others	0.229

Note: The reference categories for the industry dummy variables are infrastructure (including services), energy, consumer goods, and retail (including services). The reference category for the

INCJ initial investment dummy is 2018–2020.

【Notes】

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- (1) For information on the “Startup Development Five-year Plan,” see the Cabinet Secretariat’s website: https://www.cas.go.jp/jp/seisaku/su-portal/en_index.html [accessed October 19, 2025].
- (2) The effects of VC investment are sometimes referred to as the coaching effect and the scouting effect (Baum and Silverman, 2004; Bertoni et al., 2011).
- (3) For information on start-up financing provided by the Japan Finance Corporation, see New Business and Start-up Support Loan: https://www.jfc.go.jp/n/english/operations/mbis/features.html?utm_source=chatgpt.com [accessed October 19, 2025]. In addition, the Japan Finance Corporation offers Special Loans for Strengthening Capital for Challenge Support, a capital-type loan that applies a low interest rate during periods when profits are not yet generated, with characteristics similar to subordinated debt.
- (4) For the flow of funds in Japan, the United States, and Europe, see the Bank of Japan’s website: <https://www.boj.or.jp/en/statistics/sj/index.htm> [accessed October 19, 2025].
- (5) The term “private equity” is often used to describe buyout investments other than VC investments. In this study, however, the term is used more broadly, referring to all investments in unlisted stocks. For issues related to Japanese private equity, see Tadokoro (2024).
- (6) INCJ’s parent company is the Japan Investment Corporation (JIC), and its shareholders are the government (Minister of Finance) and private companies. Although Tokyo Small and Medium Business Investment & Consultation Co., Ltd. and the Organization for Small & Medium Enterprises and Regional Innovation (SME Support Japan) are often recognized as government-affiliated VCs or government-affiliated funds, they focus on business succession and LP (limited partner) investment, respectively, and thus differ from INCJ in terms of investment objectives and methods.
- (7) A list of INCJ investee companies can be found on the website: <https://www.incj.co.jp/english/performance/list/> [accessed

October 19, 2025].

- (8) While some projects involved phased investments over multiple rounds, the investment amounts in this study are the total amounts for each project.
- (9) Giot and Schwienbacher (2007) use a competing-risks regression model to estimate the time until IPO, trade sale, or liquidation for VC investee companies.
- (10) When estimated using all INCJ industry classifications and all INCJ initial investment years as dummy variables, we are unable to obtain estimation results due to the absence or extremely small number of observations for some industries and initial investment years. Therefore, in Table 4, some industries and initial investment years are integrated for estimation.
- (11) See, for example, Ritter and Welch (2002) for a discussion of the initial return.

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