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# Understanding the Role of Venture Capital Business in the Japanese IPO Market

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Venture Capital (VC) business is getting started to attract some attention. In Japan, venture capital industry has diverse portfolios including retail and wholesale businesses despite the fact that venture capitalist invest in high-tech companies. This article tests whether venture capital investment does have an impact on initial returns. The findings show that neither the number nor the share venture capitalist is satisfactory on the level of initial returns.

*JEL Classification Numbers:* G15, G24

*Key Words:* Venture Capital, IPO

## 1. Introduction

Many researchers have examined initial public offerings (IPOs) and venture capital business. In particular, venture capital business is widely considered in regional economic development and as well as in capital market enlargements. Venture capitalists enable small firms to tap the technological resources and seek for liquidating their investments. The most known way of the exit is usually through IPOs.

The primary focus of this study is to provide empirical evidence on the role of venture capital industry on initial return (IR) on the Nasdaq, Mothers and Hercules stock markets. The paper discusses the Japanese economy, venture capital policy, and the relationship between high-tech IPOs and venture capital.

The contribution of this paper is two-fold. First, the paper focuses on the Nasdaq Mothers and Hercules stock markets. The reason is that most of VC-backed firms prefer listing on new markets due to light listing requirements. Further, the paper discusses venture capital policy in Japan and tries to figure out how the presence of venture capital affects initial returns. Second, the time period used in this study gives further insight into the partial adjustment phenomenon. The book-building IPOs are used to test partial adjustment hypothesis. The book-building regime was introduced in 1997 and therefore, the sample used in this study starts from 1998.

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The paper is organized as follows: Section 2 introduces literature survey and characteristics of venture capital business in Japan. Section 3 explains the data used in the empirical study and methodology. Section 4 shows the empirical findings and Section V concludes.

## **2. Literature Survey**

This section discusses in more detail the proposed explanations for initial returns and venture capital investment. A central argument in much of the research on primary market is: Does venture capital business have an effect while determining initial returns?

In the IPO literature it has been argued that there is a positive relation between partial price adjustment in the offer price range and first-day return. It is widely accepted that both underwriters' function during filing procedure and demand of investors play a key role. Some have summarized the reasons under the heading of partial price adjustment. Among them, Benviste and Spindt (1989) argue that underwriters underprice issues to reward the investors for the information revealed truthfully. Underpricing is related to level of interest in the market collected by the underwriters during the filing period. In their model, underwriters partially adjust IPO prices upward upon the positive information. Hanley (1993) argues that underpricing is positively related to revision in the offer price range and further, finds that the wider the offer range, the greater the uncertainty.

Some recognition has been given to the importance of relationship between venture capital and underpricing. Megginson and Weiss (1991) study certification role of venture capitalists and find that VC-backed firms have less underpricing than non-VC-backed firms. In their paper, Bates and Dunbar (2002) show that venture capital business affected initial returns in the U.S. only between 1999 and 2000. In Japan, few researchers have examined the relationship between venture capital investment and initial returns. Hamao et al (2000) studied Jasdac auctioned IPOs during 1989–1995 and reported that VC-backed IPOs had greater underpricing than non-VC-backed IPOs over their sample period. Kutsuna et al (2002) tried to explain the underpricing phenomenon with ownership structure. Kaneko and Pettway (2003) applied a pilot test for Japanese book-building IPOs during 2000–2001 to see the impact of venture capital and found that venture capital was not significantly related to IPO returns. This paper tests the influence of venture capital, both number and shares of VC, on initial returns during 1998–2001.

Some studies have focused on the behavior of the shareholders to determine initial returns. Habib and Ljungqvist (2001) examine the relationship between initial returns and shares offered by shareholders. They report that

firms which offer larger proportion of secondary shares have less underpricing. Regarding the firm characteristics the current study tries to examine the relationship between secondary shares and initial returns.

Among the firm characteristics, Beatty and Ritter (1986) test the relationship between ex-ante uncertainty and initial returns. They suggest that older firms have lower ex-ante uncertainty compared to younger firms. High initial returns are expected for young companies.

The analysis suggests that there is a considerable information contained in the ICRG economic ratings. It is assumed that the economic risk factor is important while deciding the initial offering (Erb et al, 1995). Issuing firm, underwriter, and venture capitalist together come to decision of timing of IPO. The reason is that when the financial markets seem stable it is rather easier to attract investors' attention while raising funds. Therefore, this paper sets out to test the ranking of risk factors, which is taken used from Political Risk Services' International Country Risk Guide (ICRG).

One of the major factors underlying the high initial returns is high-tech stocks. The different business environments and demand, particularly for the high-tech products like internet, computer, and mobile phones, extend beyond basic differences. Schultz and Zaman (2001), Loughran and Ritter (2001), Ljungqvist and Wilhelm (2003) examine IPO pricing for high-tech issues particularly internet stocks and report severe returns for these issues. In Japan, internet bubble has realized from 1999 to second half of 2000. In particular, establishment of two new markets; Mothers and Hercules in 1999 and 2000 respectively, accelerated the listing of young, high-tech firms. Therefore, the paper tests the effect of high-tech firms including communication, and IT (Information Technology) on initial returns.

## **2.1 Venture capital in Japan**

This paper extends the debate about the relative efficiency of VC-backed IPO firms by explaining the limited involvement of venture capitalist. Understanding the link between stock market and venture capital business requires understanding the history and the regulations of venture business in Japan. This section points out some factors to explain why both share and number of venture capitalists are relatively low at IPO firms. Further, analysis shows the effects of low rate participation of VC capital on initial returns.

In Asia, including Japan, venture capital business differs from those in the U.S. and Europe. Bruton et al (2004) study venture capital in Hong-Kong, Taiwan and Singapore. They stress that the venture capital in East Asia can be called private equity financing. The reason is that in the West, venture capitalists are engaged in early stage investments. Unlike the U.S., Japanese ven-

ture capitalists do not take parts in start-ups. They find these investments risky therefore most of VC investments are involved in later stages. Regulations and government policies force Japanese VCs take small stakes in a large number of firms; limiting the potential for true venture type businesses. Japanese industry has been financing through main bank system and there is a keiretsu relation among banks, security firms and venture capitalists. Equity positions of venture capitalists are small, passive and public offerings are the most common for venture capital firms. Acquisition is even less common (Milhaupt 1997).

In Japan, venture capital business has been modeled upon those in the U. S. and has pretty long history comparing to other East Asian venture businesses. In the 1970's, Japanese main financial institutions formed their risk-averse subsidiaries. Furthermore, hot markets in the 1980s stimulated Japanese attention and accelerated forming new venture capital companies. The environment for venture capital started changing in the 1990's and a number of policies were enacted such as Small and Medium-sized Enterprise Promotion Undertaking (1994), revision of the Law on Temporary Measures to Facilitate Specific New Businesses and an enactment of Small and Medium Size Enterprise (SME) Creation Law (1995). Since then some organizations started establishing venture capital subsidiaries (Nozaki et al 1998, Kenney et al 2002). Further, positive reactions of venture capitalists to the government policies continued in the second half of the 1990's. The limited partnership act for venture capital business enacted in 1998 and contributed to VCs to take off. Then, continuing low interest rates made institutional investors become more inclined to deposit their money into bank accounts or into bonds (Hamada, 2000). Many entrepreneurs established firms to exploit the new business opportunities in internet and mobile telephone services. Specifically, the internet boom accelerated entrepreneurship in the country.

Japan as a large economy has a lot to do more in the emerging role of venture capital. Still, the regulations restrict venture capitalists to take risky positions. Therefore, the holdings of venture capitalists in portfolio firms are relatively low. Most venture capital firms invest in small portions and invite others. This is called "convoy style" (Sako, 2001)

### **3. Data and Methodology**

The sample from Mothers, Hercules and Jasdaq VC-backed IPOs are selected. Responding to recent developments in the high-tech business new stock markets are established with less strict listing requirements. Therefore many young firms, particularly VC-backed firms, prefer going public in those OTC markets. The current study focuses on the period from 1998 to 2001. There are

343 VC-backed IPOs in the data set. Venture capital data, including the number of venture capital firms involved in each IPO, is taken from Asia Securities Printing Company (ASP). In Japan, there is no special classification for computer firms. These firms are classified in service industry. In the official web page of Jasdaq, Mothers, and Hercules stock exchanges these firms are classified as Information Technology (IT).

In September 1997, Japan started using book-building system. Therefore, the starting year is 1998. Information about each IPO firm is taken Nomura Securities. Equally weighted Jasdaq index is used across the sample. Further, the paper provides country risk ratings compiled by the International Country Risk Guide (ICRG), which is only an international rating agency to provide detailed and consistent monthly data over an extended period for a large number of countries

Initial return (IR) is the return of the stock  $i$  at time  $t$  defined as relative price change from offer price ( $p_{i,o}$ ) to closing price at the offering day ( $p_{i,t}$ ).

$$IR_{i,t} = \frac{p_{i,t}}{p_{i,o}} - 1 \quad (1)$$

Multiple regression is used to figure out the determinant of initial return. Six models are applied to explain initial returns of IPOs. The variables used in the analysis are listed here:

*Market Return*: shows the percentage change in the equally-weighted Jasdaq index during the filing of the preliminary prospectus which is usually 15 working days of time lag.

*OP Position*: is the percentage change from final offer price to expected offer price where expected price is the midpoint of maximum and minimum offer prices in the filing procedure.

*Secondary Shares*: is the ratio of shares offered by shareholders to the total shares offered.

*LnAge*: is the age of the company, calculated by subtracting the foundation year of the firm from the year of IPO.

*Width*: is the percentage change in the maximum and minimum offer prices.

*Economic Risk*: is the ranking of risk factors in economies. This measure is from Political Risk Services' International Country Risk Guide (ICRG).

*LnVC Number*: is the number of venture capitalists in each IPO.

*VC Share*: is the percentage of total share of venture capitalists that take part in each IPO.

*IT (Information Technology)*: is a dummy variable which takes on the value of 1 if firm belongs to information technology, and 0 otherwise.

*Communication*: is a dummy variable, which takes on the value of 1 if firm be-

longs to communication industry and 0 otherwise.

The multiple regression equation for initial returns is given below.

$$\begin{aligned} \text{InitialReturn}_i = & \beta_0 + \beta_1 \text{MarketReturn}_i + \beta_2 \text{PriceRevision}_i + \beta_3 \text{Width}_i + \beta_4 \text{SecondaryShares}_i + \\ & \beta_5 \text{LnAge}_i + \beta_6 \text{EconomicRisk}_i + \beta_7 \text{LnVCNumber}_i + \beta_8 \text{VCShare}_i + \\ & \beta_9 \text{Communication}_i + \beta_{10} \text{IT}_i + e_i \end{aligned} \quad (2)$$

Table 1 gives detailed information about the sample selection procedure. There are 441 IPOs on the three markets and 90 of them are non-VC-backed companies. The final sample includes 343 VC-backed IPOs.

Table 1 . Distribution of Sample in Each Stock Market

Market	Total IPOs	Non-VC-Backed IPOs	VC-Backed IPOs
Mothers	36	7	29
Hercules	76	16	58
Jasdaq	329	67	256
Total	441	90	343

#### 4. Empirical Findings

In this section the findings of the empirical study are presented. Table 2 summarizes the distribution of VC-backed firms by stock market and by year.

Table 2

Panel A: Distribution of Sample in Each Stock Market

Market	Total IPOs	Age	IR %	Number of VC	Share of VC %
Mothers	29	6.52	41.19	7.72	13.15
Hercules	58	11.95	59.97	8.12	12.99
Jasdaq	256	24.80	51.62	5.55	7.03
Total	343	21.08	52.15	6.17	8.55

Panel B: Distribution of Sample in Each Year

Year	Total IPOs	Age	IR %	Number of VC	Share of VC %
1998	46	24.33	22.39	5.04	6.07
1999	61	24.95	137.67	4.41	5.04
2000	122	21.82	19.50	6.12	8.88
2001	114	16.92	54.44	7.61	11.08

From column 3 to 6, all calculations are in mean values.

Panel A shows that IPO firms on the Mothers and Hercules markets are younger than the firms on Jasdak stock exchange. This reflects the fact that the requirements of newly established markets are easier than those of Jasdak market. The findings further show that initial returns are the highest in the Hercules market. This result can be linked to volatility of the Hercules market. Indeed, this market was first established as a joint venture between Softbank Corporation and National Association of Securities Dealers (NASD) under the name of Nasdaq Japan. Soon after due to instability and volatility problems it is re-structured and re-named.

In general, the highest VC participation occur in the Hercules market, however, such is not the case for Jasdak IPOs. This finding reveals the fact that the more venture capitalists involve the more companies exit early in the Hercules and Mothers markets.

In Panel B shows the distribution of initial returns by year. In 1998 and 1999, the participation of venture capitalist was low but it seems that the supportive regulations have made VC participation increase in recent years. This

Table 3 . Distribution of Sample in Each Industry

Industry	Number of IPOs	Initial Return %	VC Number	VC Share %
Chemical	8	52.74	3.38	5.17
Communication	7	273.08	7.43	7.58
Construction	7	30.21	3.57	3.53
Electronics	27	44.29	7.47	8.63
Financial Institutions	4	12.55	5.00	21.26
Food	5	8.56	3.20	2.49
Glass, Oil, Paper, and Rubber	6	72.94	2.83	5.06
IT (Information Technology)	62	80.90	8.00	11.84
Machinery	15	18.33	6.00	8.79
Metal Products	4	-3.30	2.50	3.19
Others	18	32.08	5.61	9.39
Precision Metal	8	70.31	6.00	13.46
Realestate	18	80.05	9.06	9.52
Retailer	57	40.11	6.02	9.01
Service	56	35.68	5.89	7.47
Vehicle	3	7.21	2.67	7.63
Warehouse	3	78.02	4.00	2.50
Wholesale	35	37.63	4.26	4.71

The offerings in Air cargo<sup>(1)</sup>, fishery<sup>(1)</sup>, medicine<sup>(1)</sup>, non-steel<sup>(1)</sup>, transportation<sup>(1)</sup> are added to "others".

finding is also consistent with the results of Panel A that the establishment of the Mothers and Hercules, in 1999 and 2000 respectively, may have a positive effect on VC-backed IPOs. Indeed, it was the government policy to attract more technology-intensive companies to go public. The average initial return was extremely high (137%) in 1999, it was low (20%) in 2000. The decrease in initial returns in 2000 can be attributed to sluggish in the economy.

Descriptive statistics of Table 3 show that Japanese venture capitalists have diverse portfolios including more retail and wholesale business as well as high-tech industries such as information technology, communication, and electronics. A high level of initial returns is observed in these industries. There seems a boom of high-tech companies and initial returns. This result can be interpreted that many young and growth-promising firms tried to access equity markets using that fashionable atmosphere.

Table 4 presents the number and share of venture capital investment for the offer price range. The final offer price is  $P_{\text{offer}}$ . There are minimum and maximum offer prices as  $P_{\text{min}}$  and  $P_{\text{max}}$  respectively, in the offer price range. The expected offer price is defined as  $(P_{\text{min}} + P_{\text{max}}) / 2$ . Table 4 shows that most of the high first-day returns are associated with the issues whose offer prices exceed their expected offer prices. Further, there are relatively low initial returns for 68 issues that are priced below their expected offer prices.

In Table 5, the independent variables are regressed against initial returns for Nasdaq IPOs for the full sample. The results show that pre-market activities during the filing procedures give strong explanatory power. The findings indicate a positive and significant relation between initial return and OP position. The first day returns of VC-backed companies are parallel to market returns. Further, there is a significant and inverse relation between initial return and width of the offer price range.

The economic risk measure has ability to explain initial returns. The analysis investigates the link between each month's economic risk measures and the returns of offerings. There is a positive and significant correlation between economic risk and initial returns. According to ICRG an economic risk rating indicates that ranking from 0.0% to 24.5% is very high risk, from 25.0% to 29.9% is high risk, from 30.0% to 34.9% is moderate risk, from 35.0% to 39.9% is low risk, and 40.0% or more is very low risk. Therefore, this positive significant result reflects the fact that risk indexes are highly correlated with the initial returns. This result demonstrates low risk exposure and may indicate the risk-averse behavior of Japanese venture capital business and issuing firms.

Company age is employed as a proxy for ex-ante uncertainty and the findings show that high ex-ante uncertainty is negatively associated with degree

Table 4 . Offer Price Range and Venture Capital

Range	# of IPOs	IR %	# of VC	Share of VC %
$P_{\text{offer}} < P_{\text{expected}}$	68	-1.88 (0.00)	6.28 (5.00)	9.42 (7.05)
$P_{\text{offer}} = P_{\text{expected}}$	10	27.88 (18.05)	6.40 (4.00)	6.12 (4.12)
$P_{\text{offer}} > P_{\text{expected}}$	265	66.93 (31.16)	6.13 (5.00)	8.42 (5.27)

Medians are illustrated in parentheses and others are in mean values.

Table 5 . Regression Results for Determinants of Initial Return (IR)

	Jasdaq			Full Sample		
	1	2	3	4	5	6
Constant	-2.49 (-1.37)	-3.34 <sup>c</sup> (-1.77)	-2.40 (-1.40)	-2.34 (-1.41)	-2.95 <sup>c</sup> (-1.73)	-2.65 <sup>c</sup> (-1.69)
Market Return	1.42 <sup>b</sup> (2.36)	1.44 <sup>b</sup> (2.40)	1.46 <sup>a</sup> (2.71)	2.23 <sup>a</sup> (3.92)	2.28 <sup>a</sup> (4.00)	2.25 <sup>a</sup> (4.30)
OP Position	2.72 <sup>a</sup> (3.42)	2.74 <sup>a</sup> (3.45)	2.39 <sup>a</sup> (3.35)	2.58 <sup>a</sup> (4.15)	2.55 <sup>a</sup> (4.10)	2.39 <sup>a</sup> (4.19)
Width	-1.56 <sup>a</sup> (-3.57)	-1.55 <sup>a</sup> (-3.56)	-1.30 <sup>a</sup> (-3.30)	-1.37 <sup>a</sup> (-4.15)	-1.37 <sup>a</sup> (-4.15)	-1.26 <sup>a</sup> (-4.15)
Secondary Shares	-1.06 <sup>a</sup> (-3.55)	-1.17 <sup>a</sup> (-3.81)	-0.90 <sup>a</sup> (-3.22)	-0.70 <sup>a</sup> (-2.75)	-0.75 <sup>a</sup> (-2.90)	-0.70 <sup>a</sup> (-2.60)
LnAge	-0.37 <sup>a</sup> (-4.27)	-0.33 <sup>a</sup> (-3.78)	-0.19 <sup>b</sup> (-2.29)	-0.26 <sup>a</sup> (-4.03)	-0.23 <sup>a</sup> (-3.58)	-0.15 <sup>b</sup> (-2.38)
Economic Risk	12.21 <sup>b</sup> (2.55)	13.82 <sup>a</sup> (2.83)	9.89 <sup>b</sup> (2.23)	10.46 <sup>b</sup> (2.39)	11.50 <sup>a</sup> (2.58)	9.91 <sup>b</sup> (2.42)
LnVC Number		0.26 (1.32)	0.04 (0.21)		0.28 (1.70)	0.13 (0.89)
VC Share		0.30 (0.33)	0.82 (1.01)		0.02 (0.03)	0.40 (0.63)
Communication			2.79 <sup>a</sup> (6.93)			1.98 <sup>a</sup> (5.71)
IT			0.41 <sup>b</sup> (2.42)			0.33 <sup>b</sup> (2.52)
F Statistics	11.19 <sup>a</sup>	8.84 <sup>a</sup>	13.93 <sup>a</sup>	12.55 <sup>a</sup>	9.94 <sup>a</sup>	12.85 <sup>a</sup>
Adjusted R <sup>2</sup>	0.193	0.197	0.336	0.168	0.173	0.258
Total IPOs	256	256	256	343	343	343

T-ratios are computed using White's (1980) heteroskedasticity-adjusted standard errors. T-ratios are shown in parentheses

<sup>a</sup> 1 % significance level, <sup>b</sup> 5 % significance level, <sup>c</sup> 10% significance level

of first-day returns. The negative coefficients for these variables suggest that young firms are associated with high initial returns across the sample period. Furthermore, regression findings provide another significant result that there is also an inverse relationship between initial return and secondary shares. This supports the hypothesis that shareholders tend to offer few shares, so to avoid wealth loss, as expected level of initial returns increase. The low portion of secondary shares is associated with high underpricing. The Jasdqa IPOs offer less secondary shares than IPOs on the Mothers and Hercules.

In order to show the interest of venture capital industry, the number and share of venture capitalists in each IPO is used for the full sample. The results show that neither number nor share for VC is significantly related to initial returns. Thus, venture capital business does not appear to have explanatory power. This result is consistent with the findings of Kaneko and Pettway (2003).

## **5. Conclusion**

In this paper, the role of venture capital business on the level of initial return is examined. It is shown that venture capital business has no significant influence on initial returns while it is proved that venture capital business is playing a significant role on initial returns in the U.S. IPO markets. The reason is that in the U.S. venture capitalists take large portions at IPO firms.

Few of the prior research concerning the role of the venture capitalists have focused on the effect of venture capitalists on initial returns in Japan. The conventional wisdom is that the presence of venture capital reduces the degree of underpricing. The VC business in Japan is highly interested in information technology, communication industries. The findings suggest that both number and share of venture capitalists in these industries are comparatively higher than those of venture capitalists in other industries. Despite of increasing venture capital involvement in raising funds, the portion of Japanese venture capital industry is not significantly enough. Given the current state of venture capital business, the potential contribution of such study may help Japanese entrepreneurialism to be cultivated by more global partnership and collaboration; nevertheless venture capitalists play gradually a vital role in investing more industries and help more firms to exit.

The findings show that high initial returns have shifted towards technology stocks. In particular, the initial returns in IT and communication industries are significantly different from those of other industries. Furthermore, the evidence suggests high initial returns are the products of issues that are set above the expected offer prices.

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