IPOs on the Japanese OTC Market:
The Preliminary Evidence

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1. Introduction

For many years, new and small-medium sized firms in Japan listed on an OTC market established by the Japan Securities Dealers Association in 1963. The market was reestablished as the JASDAQ market in 2001. Two new OTC markets, Mothers and NASDAQ Japan, began operations in 1999 and 2000, respectively, to help provide venture companies with an easier alternative source of funding. Mothers was established by the Tokyo Stock Exchange (TSE) on November 11, 1999 and the NASDAQ Japan Market (NASDAQ-J) opened on the Osaka Securities Exchange on June 19, 2000. NASDAQ-J was funded by NASDAQ (US), Softbank Corp., and thirteen leading securities firms. NASDAQ-J closed and stocks now trade on the Hecules OTC market from late 2002.

This note empirically documents the performance of stock returns for IPOs on Mothers and NASDAQ-J.[1] Several studies have investigated IPOs in Japan, however, most of these studies have focused on large exchanges such as the Tokyo Stock Exchange as opposed to the OTC market. Early studies include Hiraki (1985) which looked at the "hot" issue phenomena of IPOs and Hiraki and Hebner (1993) which examine the determinants of initial returns in the context of the deliberate underpricing hypothesis. More recently, Fukuda and Serita (1994) and Hwang and Jayaraman (1995) examine the long run performance of IPOs on the Tokyo Stock Exchange. Cai and Wei (1997) look at the long run investment and operating performance of Japanese IPOs.

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Other studies have turned to a specific regulatory issue or institutional details in order to better understand IPO pricing in Japan. Pettway and Kaneko (1996) look at the impact of the change in pricing regulations. Both Hamao, Packer, and Ritter (2000), and Beckman, Garner, Marshall, and Okamura (2001) investigate the role keiretsu affiliation in the underpricing of Japanese IPOs.

2. Data

The sample in this study includes companies that went public by listing on Mothers and NASDAQ-J between December 1999 and August 2002. Descriptive statistics for the 127 IPO firms are found in Table 1. We collected data on the daily closing prices for the sample of IPO firms primarily from Bloomberg. Since many of the IPO firms on both Mothers and NASDAQ-J have undertaken stock splits after listing, all the data are adjusted for those splits. The daily closing prices for the three stock indices, TOPIX, Nikkei 225, and JASDAQ Index, were obtained through the Bloomberg database and the Yahoo Finance internet website. Other information about various attributes of IPO firms such as the date of incorporation, the industry, the total proceeds from the IPO, etc. were obtained from the database on the official websites of both the Tokyo Stock Exchange and NASDAQ-J. The sample period is December 1999-August 2002 for Mothers and June 2000-August 2002 for NASDAQ-J.

Table 1: Descriptive Statistics

	Mean	Standard Deviation	Min.	Max.	Sample
Mothers					
Initial Return	0.392	1.043	-0.755	3.693	36
Proceeds (billion yen)	7.627	21.521	0.150	128.0	36
Age of Firm (years)	8.571	7.136	0.808	32.083	36
NASDAQ J					
Initial Return	0.553	1.022	-0.827	6.043	91
Proceeds (billion yen)	3.919	8.278	0.002	54.00	91
Age of Firm (years)	12.759	11.411	0.991	52.647	91
Total					
Initial Return	0.507	1.027	-0.827	6.043	127
Proceeds (billion yen)	4.971	13.431	0.002	128.00	127
Age of Firm (years)	11.572	10.523	0.808	52.647	127

We exclude IPO stocks that lack 5 or more consecutive daily closing prices. For the IPO firms that do not have daily closing prices up to 4 trading days, we substituted the previous trading day's closing prices for the missing data. Those IPOs without daily closing prices within the first three days of trading are excluded from the sample.

3. Aftermarket Performance

The aftermarket returns for each firm are calculated over an 18 week post listing time interval. The aftermarket return in event week t is defined as

$$rit = (p_{it} - p_{it-1}) / p_{it-1},$$

for $t = 2, 3 \ldots, 19$. p_{it} is the closing price for the tth trading week.

The benchmark-adjusted returns, ar_{it}, are calculated as the weekly raw return on the IPO stock i, r_{it}, less the weekly benchmark index return for the corresponding period. Ritter (1991) suggests the results could differ substantially depending on the benchmark. Thus three different benchmark indices are used (TOPIX index, Nikkei 225 index, JASDAQ index) as a robustness check. The residual, which is also known as an abnormal return (hereafter abnormal return), for IPO firm i for event week t, is defined as

$$ar_{it} = r_{it} - r_{mt}$$

where r_{mt} is the return on the benchmark during the corresponding time period. Abnormal returns are averaged across an equally weighted portfolio of n firms for each week in event time to obtain the average abnormal return for the week, AR_t.

$$AR_t = \frac{1}{n} \sum_{i=1}^{n} ar_{it}.$$

The cumulative abnormal return for event week t, CAR_t, is defined as

$$CAR_t = \sum_{j=2}^{t} AR_j$$

Due to the short history of both exchanges we limit our aftermarket return analysis to 18 weeks. We assume one week to be 5 trading days and the first

weekly return is recorded on the sixth trading day after the first closing price. Our sample consists of 87 firms (30 Mothers and 57 NASDAQ J). Note the day count is based on the trading days and not on the calendar days.

The t-statistic for AR_t is computed as $\dfrac{AR_t \sqrt{n_t}}{sd_t}$, where AR_t denotes the average benchmark-adjusted return for event week t, n_t, is the number of observations in week t, and sd_t is the cross-sectional standard deviation of benchmark-adjusted returns in week t. The t-statistic for the cumulative average adjusted return in week t, CAR_t is calculated as $\dfrac{CAR_t \sqrt{n_t}}{csd_t}$, where n_t is the number of firms trading in each week, and csd_t is computed as $csd_t = [t \cdot \text{var} + 2 \cdot (t\text{-}1) \cdot \text{cov}]^{1/2}$,where var is the average of the cross sectional variance over the sample period of 18 weeks and cov is the first-order autocovariance of the AR_t series.

Table 2:
Abnormal returns for Mothers IPOs from December 1999-March 2002

Week of Seasoning	Number of firms	Nikkei 225-adjusted				TOPIX-adjusted				JASDAQ index-adjusted			
		ARt	t-stat	CARt	t-stat	ARt	t-stat	CARt	t-stat	ARt	t-stat	CARt	t-stat
2	30	-0.05851	-1.358	-0.05851	-1.564	-0.06039	-1.381	-0.06039	-1.614	-0.05814	-1.384	-0.05814	-1.598
3	30	-0.02080	-0.565	-0.07931	-1.727	-0.02306	-0.643	-0.08345	-1.817	-0.01764	-0.495	-0.07577	-1.695
4	30	-0.00916	-0.383	-0.08847	-1.666	-0.01040	-0.441	-0.09385	-1.768	-0.00267	-0.105	-0.07844	-1.517
5	30	-0.00017	-0.005	-0.08865	-1.492	-0.00452	-0.147	-0.09837	-1.657	0.00356	0.123	-0.07488	-1.294
6	30	0.06159	1.696	-0.02706	-0.416	0.05758	1.570	-0.04079	-0.627	0.04473	1.245	-0.03014	-0.475
7	30	0.06673	1.197	0.03967	0.564	0.06213	1.116	0.02134	0.303	0.07464	1.388	0.04450	0.649
8	30	0.05658	1.363	0.09625	1.280	0.05903	1.411	0.08036	1.069	0.06692	1.609	0.11142	1.520
9	30	-0.03122	-0.940	0.06503	0.815	-0.03458	-1.006	0.04578	0.574	-0.02100	-0.618	0.09042	1.163
10	30	0.01362	0.385	0.07864	0.935	0.00994	0.282	0.05572	0.663	0.01023	0.301	0.10065	1.228
11	30	0.01318	0.471	0.09182	1.041	0.01065	0.385	0.06637	0.753	0.01129	0.439	0.11194	1.302
12	30	-0.01794	-1.153	0.07388	0.802	-0.01873	-1.197	0.04764	0.517	-0.01404	-0.801	0.09789	1.090
13	30	-0.01403	-0.727	0.05985	0.624	-0.01516	-0.798	0.03248	0.339	-0.00893	-0.521	0.08897	0.951
14	30	0.02529	0.806	0.08514	0.855	0.02721	0.854	0.05968	0.600	0.02120	0.678	0.11016	1.135
15	30	0.00907	0.299	0.09421	0.914	0.00567	0.186	0.06535	0.634	0.00707	0.240	0.11724	1.167
16	30	-0.01230	-0.571	0.08191	0.769	-0.01229	-0.571	0.05306	0.499	-0.00544	-0.268	0.11180	1.077
17	30	0.00539	0.214	0.08730	0.796	0.00392	0.162	0.05698	0.520	0.00949	0.406	0.12128	1.134
18	30	-0.01376	-0.920	0.07354	0.651	-0.01350	-0.945	0.04348	0.385	-0.00953	-0.671	0.11175	1.015
19	30	0.00429	0.174	0.07783	0.671	0.00029	0.012	0.04377	0.377	0.00027	0.011	0.11203	0.990

AR_t is the abnormal return and CAR_t is the cumulative abnormal return for week t. Abnormal returns are computed relative to the Nikkei, TOPIX, and JASDAQ stock indices. The t-statistic for the abnormal returns is . The t-statistic for the

abnormal returns is $\dfrac{AR_t \sqrt{n_t}}{sd_t}$. The t-statistic for cumulative average adjusted

return in week t is $\dfrac{CAR_t \sqrt{n_t}}{csd_t}$ where $csd_t = [t \cdot \text{var} + 2 \cdot (t\text{-}1) \cdot \text{cov}]^{1/2}$, var is the

average of the cross sectional variance over the sample period and cov is the first-order autocovariance of the AR_t series.

Table 3:
Abnormal returns for NASDAQ-J IPOs from June 2000-March 2002

Week of Seasoning	Number of firms	Nikkei 225-adjusted				TOPIX-adjusted				JASDAQ index-adjusted			
		ARt	t-stat	CARt	t-stat	ARt	t-stat	CARt	t-stat	ARt	t-stat	CARt	t-stat
2	57	-0.00682	-0.196	-0.00682	-0.255	-0.00927	-0.265	-0.00927	-0.346	-0.00599	-0.173	-0.00599	-0.236
3	57	-0.01110	-0.639	-0.01792	-0.546	-0.01463	-0.847	-0.02391	-0.727	-0.01017	-0.612	-0.01616	-0.520
4	57	-0.04569	-3.376	-0.06362	-1.678	-0.04622	-3.448	-0.07013	-1.845	-0.04053	-3.091	-0.05670	-1.579
5	57	0.01365	0.734	-0.04997	-1.179	0.01429	0.759	-0.05584	-1.314	0.01517	0.809	-0.04153	-1.034
6	57	-0.00077	-0.038	-0.05074	-1.092	-0.00252	-0.124	-0.05836	-1.253	0.00343	0.176	-0.03810	-0.866
7	57	0.03591	1.699	-0.01484	-0.296	0.03305	1.574	-0.02531	-0.503	0.03218	1.724	-0.00592	-0.125
8	57	0.04118	1.695	0.02634	0.491	0.04128	1.689	0.01597	0.297	0.03647	1.628	0.03055	0.601
9	57	-0.01585	-0.946	0.01049	0.184	-0.01541	-0.897	0.00056	0.010	-0.01377	-0.838	0.01678	0.311
10	57	0.01799	0.990	0.02848	0.475	0.02129	1.161	0.02185	0.363	0.02458	1.417	0.04136	0.728
11	57	-0.01881	-1.064	0.00967	0.154	-0.02121	-1.235	0.00065	0.010	-0.01499	-0.915	0.02637	0.443
12	57	-0.01559	-1.057	-0.00592	-0.090	-0.01252	-0.872	-0.01188	-0.180	-0.01460	-1.071	0.01178	0.189
13	57	-0.02640	-1.615	-0.03231	-0.472	-0.02483	-1.502	-0.03671	-0.535	-0.02716	-1.734	-0.01538	-0.237
14	57	-0.00429	-0.264	-0.03661	-0.516	-0.00961	-0.580	-0.04632	-0.651	0.00374	0.233	-0.01165	-0.173
15	57	0.01552	0.903	-0.02108	-0.287	0.01734	0.982	-0.02898	-0.393	0.01343	0.823	0.00178	0.026
16	57	-0.00801	-0.574	-0.02910	-0.383	-0.00760	-0.539	-0.03657	-0.481	-0.01022	-0.859	-0.00844	-0.117
17	57	-0.00669	-0.459	-0.03579	-0.457	-0.00858	-0.583	-0.04515	-0.576	-0.00542	-0.415	-0.01386	-0.187
18	57	0.01134	0.736	-0.02445	-0.304	0.01008	0.652	-0.03507	-0.435	0.01023	0.756	-0.00363	-0.048
19	57	0.01153	0.500	-0.01292	-0.156	0.01178	0.513	-0.02329	-0.281	-0.00223	-0.104	-0.00586	-0.075

Refer to Table 2 for explanation of notation.

Tables 2 and 3 report the average benchmark-adjusted returns (AR_t) and the cumulative benchmark-adjusted returns (CAR_t) for both the Mothers and NASDAQ-J IPOs. Relative to the JASDAQ index the *CAR* for Mothers and NASDAQ-J are 11% and −0.5% respectively, however, both figures are not statistically significant. Overall we find the cumulative average residuals for the IPOs on both OTC markets are not statistically different from zero for the first 19 weeks after listing.[2] The results are robust to the market index we use for adjusting the abnormal returns. One exception is week four for the NASDAQ-J IPOs where the *CAR* is negative and statistically significant. The long-run performance of IPOs is usually gauged on a monthly return basis over a period of several years thus making it difficult for us to facilitate a comparison of our findings with those in the existing published literature. In general, however, most papers do not find statistically significant abnormal performance of IPOs relative to the market during the first one or two months [Hwang and Jayaraman (1995), Isobe, Ito, Kairys (1998) among others]. Thus the negative returns on the Mothers market during weeks 2-4, however, are not necessarily consistent with earlier findings on the Japanese market. The statistically significant negative cumulative returns we observe during the early weeks of post listing could suggest a partial correction for the initial underpricing of the IPOs. We should note, however, that the negative cumulative returns are substantially smaller than the initial returns.

4. Initial Return Regressions

As documented in the empirical IPO literature for many markets, we also find large positive average initial returns on both Mothers and NASDAQ-J (Table 1). On average we obtain a 39% initial return on Mothers and a 55% return on NASDAQ-J suggesting underpricing in the IPO market. These figures are comparable with other studies. For example, Hiraki and Hebner (1994) find a 27% average initial return for OTC IPOs from 1984 to 1991. And Isobe, Ito, and Kairys (1998) find a 41% raw average initial return for IPOs between 1975 and 1989.

To better understand the underpricing phenomena for IPOs on Mothers and NASDAQ-J, we regress the initial returns on a set of explanatory variables often cited in the empirical literature. We focus our attention on three sets of the variables: 1) underwriter reputation, 2) uncertainty as proxied by the size of IPO proceeds and age of the firm, and 3) relevance of the industry factor. The regressions are similar in spirit to those found in Isobe, Ito, and Kairys (1998).

To test the relationship between the initial returns and underwriter reputation, we use a set of dummy variables. In one regression the dummy variable is set equal to one if the lead underwriter is not a major underwriter (*IB*). In a second regression we use separate dummies for three major underwriters: Nomura, Daiwa, and Nikko-Salomon-Smith Barney (Nikko). Booth and Smith (1986) suggest that weaker underwriters have an incentive to underprice in order to aggressively market their stocks. This would mean we would expect a positive sign on the *IB* dummy and negative signs on the Nomura, Daiwa, Nikko dummy variables (relative to the constant term).

Our second interest is the relationship between the initial return and the degree of uncertainty perceived by the market. As proxies for uncertainty, we use the log of proceeds and the age of the issuing firm. Empirical studies have implied that higher the initial returns are associated with the risk of the firms going public. Beatty and Ritter (1986), for example, suggest that the inverse of the IPO proceeds is a good proxy for ex ante uncertainty. In other words, we would expect a negative relationship between initial returns and proceeds. A firm with a longer history is thought to be less riskier than a firm with a short operating history. Thus, we predict a negative relationship between initial returns and age of the firm as well.

Thirdly, we use industry dummy variables for the service, manufacturing, and retail sectors. This is to examine whether there is a tendency towards investor "fads" for a particular industry as often cited in the mass media. In particular, investors who witness the large positive initial returns of high-tech or "new economy" firms in the U.S. could expect the same to occur in Japan with the inception of Mothers and NASDAQ-J. In our sample, the firms categorized

as "service" are more or less involved in business related to the internet.

The initial return for IPO firm i, r_{io}, is defined as the return from the offering price to the closing price on the first day of trading, or

$$r_{io} = (p_{i0} - op_i) \, / \, op_i$$

where op_i and p_{i0} are the offering price and the first closing price shortly after the public trading begins respectively. These initial returns are regressed on a constant, underwriter dummy variable(s), natural log of IPO proceeds, age of the firm, and three industry dummy variables. One of the cross-section regressions simply uses a single underwriter reputation dummy, IB. The second regression employs three separate underwriter dummies for Nomura, Daiwa, and Nikko.

Table 4: Initial Return Regressions for IPOs on Mothers

explanatory variable	estimated coefficient	t-statisitc	p-value
Age	-0.0075	0.459	0.650
Proceeds	-0.0523	0.446	0.659
Service	-0.4922	1.461	0.155
Manufact.	-0.2252	0.407	0.687
Retail	-1.5317	2.247	0.033
IB Dummy	0.4700	1.409	0.170
Constant	0.9442	2.868	0.008
R^2		0.122	
Age	-0.0075	0.459	0.650
Proceeds	-0.0523	0.466	0.659
Service	-0.4922	1.461	0.155
Manufact.	-0.2252	0.407	0.687
Retail	-1.5317	2.247	0.033
Nomura Dummy	0.4700	1.409	0.170
Daiwa Dummy	-0.1771	0.736	0.468
Nikko Dummy	1.595	2.189	0.037
Constant	0.5907	1.739	0.094
R^2		0.283	

Sample size is 36. Age is the age of the firm since incorporation in number of years. Proceeds is the natural log of the proceeds at IPO (offering price times number shares issued). Service is the service industry dummy. Manufact. is the manufacturing industry dummy. Retail is the retail industry dummy. IB is dummy indicating underwriter is not a major underwriter. Nomura, Daiwa, and Nikko are underwriter dummy variables. t-statistics obtained using White heteroskedastic consistent standard deviations.

Table 5: Initial Return Regressions for IPOs on NASDAQ-J

explanatory variable	estimated coefficient	t-statisitc	p-value
Age	-0.0202	3.425	0.001
Proceeds	-0.2952	2.569	0.012
Service	-0.3993	1.278	0.205
Manufact.	0.1458	0.466	0.642
Retail	-0.2242	0.691	0.491
IB Dummy	-0.3949	1.766	0.081
Constant	1.3484	4.041	0.000
R^2		0.207	
Age	-0.0205	3.384	0.001
Proceeds	-0.2857	2.559	0.012
Service	-0.4221	1.403	0.164
Manufact.	0.1379	0.445	0.657
Retail	-0.2434	0.771	0.443
Nomura Dummy	0.2824	1.220	0.226
Daiwa Dummy	0.3306	1.480	0.143
Nikko Dummy	0.5790	1.334	0.186
Constant	0.9792	3.323	0.001
R^2		0.216	

Sample size is 91. See Table 1.

Table 6: Initial Return Regressions for IPOs on Mothers and NASDAQ-J

explanatory variable	estimated coefficient	t-statisitc	p-value
Age	-0.0174	3.126	0.002
Proceeds	-0.2269	2.706	0.008
Service	-0.3254	1.263	0.209
Manufact.	0.0985	0.285	0.776
Retail	-0.2209	0.777	0.438
IB Dummy	-0.4113	2.179	0.031
Constant	1.2013	4.391	0.000
R^2		0.144	
Age	-0.0179	3.140	0.002
Proceeds	-0.2200	2.781	0.006
Service	-0.3588	1.458	0.148
Manufact.	0.0188	0.056	0.955
Retail	-0.2697	0.957	0.340
Nomura Dummy	0.3465	1.583	0.116
Daiwa Dummy	0.2404	1.195	0.234
Nikko Dummy	0.7583	2.007	0.047
Constant	0.8293	3.459	0.001
R^2		0.168	

Sample size is 127. See Table 1.

The estimates for the initial return regressions are presented in Tables 4 to 6. Linear cross-section regressions are run for the Mothers and NASDAQ-J samples separately (Tables 4 and 5) and then pooled in a third set of regressions (Table 6). Contrary to our initial prediction on underwriter reputation, we find the *IB* dummy variable to be negative and statistically significant for the NASDAQ-J sample. And the *IB* coefficient is not statistically significant for the Mothers sample. The Nomura, Nikko, and Daiwa underwriter dummies are not statistically significant. One exception is the Nikko dummy for the Mothers sample. Hence, our findings are mixed. To an extent the results are consistent with Isobe, Ito, and Kairys (1998), and Beckman et. al. (2001) who do not find a statistically significant relationship between underwriter reputation dummy variables and initial returns. Yet, the statistically significant negative *IB* coefficient for the NASDAQ-J sample is puzzling. One possible explanation could be that the investment banks leverage their monopsony power to underprice the IPOs so as to please important buy-side clients [Baron (1982) and Ritter (1984)].

For both OTC markets, the signs on the Age and Proceeds coefficients are negative as predicted. The coefficients, however, are only statistically significant for the NASDAQ-J sample. Overall this suggests that ex ante uncertainty plays a role in possibly explaining the underpricing documented on these two OTC markets. Finally, the sector dummy variables are not statistically significant with the exception of the retail industry in the Mothers market.

5. Concluding Comments

This paper had the modest objective of documenting the underpricing phenomena and aftermarket performance of IPOs on two newly established Japanese OTC exchanges. We find initial returns are related to underwriter reputation and ex ante uncertainty as proxied by IPO proceeds and firm age. As the history of both the Mothers and NASDAQ-J exchanges is short, our data set is not long enough to conduct a thorough analysis of post listing performance. Yet given our limited data set we find little evidence of abnormal performance during the first 19 weeks of the aftermarket.

Notes

(1)   Ibbotson and Ritter (1995) provide a comprehensive survey of the IPO empirical literature. We have also extended the aftermarket sample period to 36 weeks. Preliminary findings for

(2)   NASDAQ-J (reduced sample of 36) indicate little evidence of cumulative abnormal returns. On the other hand we find statistically significant negative cumulative returns for Mothers (reduced sample of 20) from around week 34. As the sample size is small these results are not reported in the paper.

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日本の店頭市場における IPO：実証研究による結果とその傾向

＜　要　約　＞

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　本研究ノートは、日本の店頭市場で新たに開設されたマザーズおよび NASDAQ ジャパンにおける IPO 企業パフォーマンスの傾向を 1999 年 12 月から 2002 年 8 月までのデータを使用した実証研究分析を行った。その結果、上場初期に見られるリターンは、株式引き受け企業の実績及び IPO 後の企業指標の不確実性と相関を持っていることを発見した。なお、IPO 後の超過リターンは最初の 18 週間では、検出することができなかった。