

## **Why Do Firms Raise Capital with Standalone Warrants: Evidence from Japan**

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### **ABSTRACT**

This paper thoroughly examines standalone warrants, a rising financing method in Japan after the 2002 revision of Japanese commercial law. We use seasoned equity offering (SEO) as the frame of reference because standalone warrants can be viewed as an indirect and less certain way of SEO. Because the warrant's nature differs depending on the exercise price, we divide standalone warrant issues into two groups based on whether the warrant is out of the money at the time of board decision. We find evidence suggests that out of the money warrants are mainly issued to signal undervaluation, and in or at the money warrants are mainly used to signal the management's type, thereby reducing the expected agency cost of the issuer.

*JEL Classification: G32*

*Keywords: standalone warrants, information asymmetry, undervaluation, agency cost*

## I. INTRODUCTION

This paper examines standalone warrants, a unique financial instrument that has been increasingly used by Japanese firms since 2002. A warrant is a right issued by a firm to purchase a certain number of new shares in the firm during a specific period at a specific price (Suchard 2005, p.1096). Standalone warrants refer to warrants that are issued independently of other securities. Traditionally, warrants are issued in conjunction with bonds or stocks, referred to as bond-warrant units and stock-warrant units. However, the 2002 revision of Japanese commercial law allows warrants to be issued independently of bonds or stocks, which makes standalone warrants an alternative financing method for firms that are unwilling to issue common stocks immediately. Thereafter, more than 500 Japanese firms conducted over 2000 cases of standalone warrant issues to date, and the total amount raised by warrant issues has reached half the size of proceeds raised by common stocks. The intensive issuance of standalone warrants in Japan makes it possible to study the pure announcement effects of warrant issuance separate from bonds or stocks and simultaneously raises the question of why warrants are issued instead of common stocks.

In Japan, a standalone warrant is an American warrant, which typically has a maturity of two years and a predetermined exercise price that can be set either out of the money or in/at the money. Out of the money warrant issuers receive the initial proceeds by selling warrants and ties the proceeds from warrant exercise to their future stock price performance. According to the signaling hypothesis, out of the money warrant issuers are willing to wait instead of issuing common stocks immediately because they believe their stock prices are currently undervalued and will rise in the future. The market views the management's confidence as a signal of favorable private information and upwardly adjusts its assessment of the issuer: the higher the warrant's exercise price, the more positive the announcement effect. Out of the money warrant can also be issued to reduce the agency cost of Jensen (1986)'s free cash flow problem since the issuer raise additional equity only when the project turns out to be profitable and the stock price rise above the exercise price. If the project fails, the stock price may not rise, and warrants may not be exercised; therefore, no unnecessary capital will be raised. We find the announcement return of out of the money warrant issuers is positively related to the relative exercise price and independent on agency cost proxies, suggesting that the signaling motive is more substantial than agency cost consideration for most out of the money warrant issuers.

On the other hand, in or at the money warrants can be exercised at once, and because the underwriters of warrants (often financial institutions) usually immediately resell common stocks after exercising their warrants, issuing in/at the money warrants can be seen as an indirect public offering if the underwriters exercise all warrants soon enough. Unlike out of the money warrant issuers, in/at the money warrant issues do not signal favorable private information to the market, which raises the question of why issuers voluntarily choose a less predictable way to issue equity.

One possible explanation is that the flotation cost for issuing in/at the money warrant is lower than SEO. We did not find support for this explanation in our sample. Another possible explanation is that in or at the money warrants also reduce agency costs. With the existence of information asymmetry, the market assumes that management has an empire-building incentive and discount the firm value because the actual type of management is not known. Firms that are characterized as prone to the free cash flow

problem suffer more discount in value than firms that are not likely to have the free cash flow problem.

Because underwriters of in/at the money warrants are speculative and downside protected, they tend to wait for the investment project's fulfillment even though warrants are immediately exercisable. If the project fails, issuers' stock price could drop below the exercise price so that warrants will not be exercised. The management's willingness to take the risk of failing to raise additional capital signals the management is a value-maximizer rather than an empire-builder. Therefore, issuing in/at the money warrants should also be viewed positively by the market since it resolves the information asymmetry regarding the management's type and reduces the expected agency cost.

Consistent with the agency cost hypothesis, in/at the money warrant issuers have fewer earnings, more cash and less tangible assets relative to total assets; lower Tobin's Q, lower levels of management ownership and tend to use low-ranking underwriters compared to seasoned equity issuers; thereby more prone to the free cash flow problem. Moreover, the announcement effect of in/at the money warrant issuers is positive and negatively related to issuers' OIBDA, firm age and management ownership. That is to say, the stock market reassesses issuers' expected agency cost, and issuers with severer information asymmetry and prone to the free cash flow problem benefit more from the reassessment.

The rest of the paper is organized as follows. Section II reviews relevant literature and develops hypotheses. Section III describes the data and methodology. Section IV presents and interprets empirical results. Section V concludes the paper.

## II. LITERATURE REVIEW AND HYPOTHESES

Since few countries allow independent issuance of warrants, literature documenting warrants issuance is focused on unit IPO (Barry et al., 1991; Schultz, 1993; Jain, 1994; Dunbar, 1995; How & Howe, 2001; Lee et al., 2003), unit SEO (Ng & Smith, 1996; Byoun & Moore, 2003; Byoun, 2004; Bae et al., 2013) and bond-warrant units (Finnerty, 1986; Billingsley et al., 1990) instead of issuing warrants alone. Warrants in a unit offering can act as a sweetener (Finnerty, 1986; Billingsley et al., 1990), a way to compensate underwriters (Barry et al., 1991; Dunbar, 1995; Ng & Smith, 1996; Bae et al., 2013), a form of staged finance to reduce agency cost of Jensen's (1986) free cash flow problem (Schultz, 1993; Mayers, 1998; Byoun & Moore, 2003) or a signal of firm quality (Jain, 1994; Chemmanur & Fulghieri, 1997; How & Howe, 2001; Byoun & Moore, 2003; Lee et al., 2003).

To the best of our knowledge, the only study that examines the standalone warrant issues is Suchard (2005). Using a sample of 88 rights issues of out of the money warrants made by 84 Australian firms, Suchard (2005) finds a significant positive announcement effect and claims the result is consistent with the agency cost hypothesis and the signaling hypothesis. However, Suchard's (2005) study has two limitations. First, warrants are issued through rights issues in Australia, which makes the announcement effect a combined effect of rights issues and warrant issues. Second, Suchard (2005) did not examine the motives of warrant issues directly. To be specific, questions such as (1) how warrant rights issues' announcement effect differs from common rights issues; and (2) do warrant rights issuers and common stock rights issuers differ in firm characteristics

are left unanswered. This paper extends Suchard's (2005) work to include examinations of motives of standalone warrant issues.

### **A. Signaling Hypothesis**

It is well established that flotation methods may convey information to the market with the existence of information asymmetry. For instance, public offerings signal overvaluation (Myers & Majluf, 1984), which is also confirmed by our sample of Japanese firms, and private placements signal undervaluation (Hertzel & Smith, 1993). Since warrants are issued through private placements, it may follow the reasoning of private placements of common stocks. Hertzel and Smith (1993) argue that private placements solve the adverse selection problem in public offerings (Myers & Majluf, 1984) by allowing investors to access the issuer's firm value through their negotiation with the management of the issuer. The willingness of well-informed investors to commit funds reveals favorable inside information about the issuing firm's value, which is called the certification effect.

In contrast to equity offerings, investors of warrants do not have to underwrite any common stocks of warrant issuers. They purchase warrants at a predetermined price and only exercise warrants when profitable. Therefore, warrant investors bear no downside risk; hence provide limited certification effect compared to equity offerings. However, warrant investors perform due diligence and only purchase warrants that they consider exercisable. Therefore, instead of directly signaling the issuer's current stock price level, underwritten warrants signal the issuer's future stock price will be higher than the exercise price of warrants.

Jain (1994) contends that including out of the money warrants in IPO signals management's confidence in their firms' future stock performance since it ties further financing to future stock price appreciation. Similarly, Suchard (2005) suggests that management use out of the money warrant issue to signal undervaluation when management believes that their firms are currently undervalued. Rather than issue undervalued common shares to raise capital, they issue out of the money warrants and hope it will be exercised when the stock price rises to a reasonable level. By doing so, management ties their capital inflow to the superior future stock performance, which serves as a credible undervaluation signal.

Following Jain (1994) and Suchard's (2005) rationale, out of the money warrant issues should be viewed positively by the market since it signals undervaluation. Moreover, the extent of the stock market reaction should be positively related to the warrant's relative exercise price since the higher exercise price signals the management is more confident in future stock performance. Because our measure of the relative exercise price is the discount rate defined as the ratio of pre-issue closing price to the exercise price minus 1 (see Table3), the expected sign is negative.

*Signaling hypothesis: Out of the money warrant issues should be met with positive announcement returns that are positively related to warrants' relative exercise price (negatively related to discount rate).*

## B. Agency Cost Hypothesis

According to Jensen (1986), management has incentives to overinvest when they have excess cash available. Therefore, with the existence of information asymmetry, equity offerings of common stocks suffer from potential agency costs. Schultz (1993) posits that constructing staged financing by including warrants in IPO prevents management from overinvesting. Similarly, standalone warrant issues also are a form of staged financing. Management uses the proceeds from warrant sales to determine the profitability of a project. If the project turns out to be profitable, the stock price will rise, warrants will be exercised, and management will have raised additional capital to finance sequential investments of the project. If the project fails, the stock price may not rise, and warrants may not be exercised. In this case, no unnecessary capital will be raised, which reduces the agency cost of the free cash flow problem proposed by Jensen (1986).

Without a doubt, out of the money warrants function perfectly in staged financing. However, in or at the money warrants also function well to reduce agency costs, although they are immediately exercisable. Instead of exercising all warrants immediately, underwriters of in/at the money warrants have the incentive to wait for the investment project's fulfillment because they are speculative and downside protected. If the project fails, issuers' stock price could drop below the exercise price so that warrants will not be exercised. The management's willingness to take the risk of failing to raise additional capital signals the management is a value-maximizer rather than an empire builder. Therefore, issuing in/at the money warrants should also be viewed positively by the market since it resolves the information asymmetry regarding the management's type and reduces the expected agency cost.

According to previous studies starting from Schultz (1993), firms choose to use staged financing where the potential agency cost from the free cash flow problem is severe. To be specific, firms with low Tobin's Q, high levels of cash holdings, low levels of management ownership and firms using low-ranking underwriters tend to use staged financing. The reason is that management of firms with abundant cash and limited investment opportunity is more apt to overinvest. Management bears fewer costs from investing in negative NPV projects when management ownership is smaller, and low-ranking underwriters provide low-quality monitoring service.

*Agency cost hypothesis: Standalone warrant issues should be met with positive announcement returns. Compared to seasoned equity issuers, standalone warrant issuers should have more cash holdings, lower Tobin's Q, lower levels of management ownership and use less prestigious underwriters.*

Both the signaling hypothesis and the agency cost hypothesis assume information asymmetry between issuers and the market. Following Schultz (1993) and other previous studies, we measure information asymmetry by firms' age, assets level, the proportion of tangible assets, earnings, and riskiness proxied by leverage and stock return volatility.

Besides the signaling hypothesis and the agency cost hypothesis, another possible determinant of flotation methods is costs consideration. Flotation cost is likely to play an essential role when deciding between in the money warrants and SEO because the former can be exercised immediately. We define flotation cost as the sum of the

discount rate and underwriting fee. If in the money warrant is issued to lower the flotation cost, the flotation cost of in the money warrant should be lower than the flotation cost if SEO has been used instead. We examine the flotation costs explanation as an additional analysis.

### III. DATA AND METHODOLOGY

#### A. The Data

We extract the list of warrant issuers and SEO issuers, the financial and stock price data of issuers from Nikkei Needs Financial Quest and hand-collected issue details from securities registration statements. To better serve this study's purpose, we impose several filters: (1) no other events are announced with the offering on the same day; (2) no other types of equity finance are made in the same fiscal year; (3) issues are made by non-financial firms; and (4) issues have non-missing information regarding contracting terms, stock prices, and accounting data. The resulting sample consists of 194 standalone warrant issues and 224 SEO from 2002 to 2019. The distribution of the sample and proceeds raised is summarized in Table 1.

**Table 1**  
Sample distribution and total proceeds by calendar year and industry

Panel A: Sample size by calendar year and industry							
Year	Warrant	SEO	Total	Industry	Warrant	SEO	Total
2002	2	14	16	Chemicals	1	4	5
2003	5	12	17	Communication Service	4	2	6
2004	20	62	82	Construction	6	6	12
2005	24	22	46	Drugs	4	5	9
2006	11	15	26	Electric & Electronic Equipment	8	13	21
2007	11	12	23	Foods	1	2	3
2008	4	2	6	Machinery	2	11	13
2009	10	3	13	Nonferrous Metal & Metal Products	9	5	14
2010	9	3	12	Other Manufacturing	6	2	8
2011	8	9	17	Precision Equipment	5	4	9
2012	11	4	15	Real Estate	13	21	34
2013	11	14	25	Retail Trade	18	20	38
2014	13	13	26	Services	88	82	170
2015	12	8	20	Stone, Clay & Glass Products	2	1	3
2016	10	7	17	Textile Products	1	2	3
2017	10	5	15	Transportation Equipment	2	1	3
2018	14	10	24	Wholesale Trade	13	19	32
2019	9	9	18	Other Industries	11	24	35
Total	194	224	418	Total	194	224	418

Panel B: Expected total proceeds by calendar year and industry (In billion JPY)

Year	Warrant	SEO	Total	Industry	Warrant	SEO	Total
2002	17.0	494.9	511.9	Chemicals	1.5	22.8	24.3
2003	32.3	493.4	525.8	Communication Service	337.1	99.9	437.1
2004	196.0	1077.4	1273.3	Construction	50.4	412.7	463.0
2005	387.5	73.6	461.0	Drugs	3.2	15.9	19.1
2006	126.6	157.4	284.0	Electric & Electronic Equipment	10.4	764.3	774.7
2007	50.9	71.5	122.5	Foods	0.4	0.8	1.1
2008	6.4	3.8	10.2	Machinery	5.1	67.4	72.5
2009	52.5	3305.2	3357.7	Nonferrous Metal & Metal Products	46.3	11.9	58.2
2010	104.8	97.6	202.4	Other Manufacturing	6.4	2.2	8.6
2011	18.8	150.5	169.3	Precision Equipment	16.9	148.0	164.9
2012	222.0	3.6	225.6	Real Estate	420.8	185.7	606.5
2013	261.4	350.0	611.4	Retail Trade	155.7	249.2	405.0
2014	90.3	567.3	657.5	Services	489.6	1445.8	1935.4
2015	41.6	375.8	417.4	Stone, Clay & Glass Products	12.0	0.5	12.5
2016	10.3	37.3	47.6	Textile Products	8.2	67.2	75.4
2017	10.8	525.7	536.4	Transportation Equipment	6.1	32.3	38.4
2018	30.3	39.9	70.2	Wholesale Trade	34.1	987.1	1021.2
2019	24.5	20.7	45.2	Other Industries	79.6	3332.0	3411.6
Total	1683.9	7845.5	9529.3	Total	1683.9	7845.5	9529.3

Notes: The sample in this study satisfies the following criteria: (1) no other events are announced with the offering on the same day; (2) no other types of equity finance are made in the same fiscal year; (3) issues are made by non-financial firms; and (4) issues have non-missing information regarding contracting terms, stock prices and accounting data. Industry classification is based on Nikkei middle classifications.

## B. Methodology

First, we adopt a short-horizon event study method to measure the announcement effects. For each issuer in the sample, a market model is estimated using a pre-event period from day-120 to day-21 with the announcement day aligned to day 0, and the daily return of TOPIX is used as the market return. The significance level of average abnormal returns (AR) and cumulative average abnormal returns (CAR) are given by the standardized cross-sectional test (SCS Z) that was introduced by Boehmer, Musumeci and Poulsen (1991).

Then, we run cross-sectional regressions on CAR acquired from event study to examine the determinants of announcement effects. Because issuers self-select flotation methods, the inverse mills ratio (IMR) calculated from the probit model (Table 6) is included as a control variable in Model 1 and Model 2 (Table 5). Due to heteroskedasticity, t-statistics are calculated based on heteroskedasticity robust standard errors.

Next, we examine the determinants of flotation methods by running probit regressions of flotation method choices on firm characteristics and issue details. We examine the flotation cost separately from other determinants because the discount rate of SEO can only be observed after the issue, also because direct comparison of flotation costs between different types of issuers may subject to self-selection bias. We address this issue by matching warrant issuers to seasoned equity issuers with the nearest propensity scores calculated from the probit model (Table 6).

#### IV. EMPIRICAL RESULTS

##### A. Announcement Effects

**Table 2**  
Average abnormal returns (AR) and Cumulative average abnormal returns (CAR)

Event windows	All warrants (N=194)		Out of the money (N=79)		In the money (N=115)		SEO (N=224)	
	mean(%)	t-value	mean(%)	t-value	mean(%)	t-value	mean(%)	t-value
AR[-10]	-0.19	-0.65	-0.52	-1.31	0.04	0.32	0.15	0.64
AR[-9]	-0.55	-2.29 **	-0.93	-2.27 **	-0.28	-1.16	0.09	0.50
AR[-8]	0.16	0.81	0.39	0.85	0.00	0.34	-0.48	-1.70 *
AR[-7]	0.32	0.76	0.62	0.97	0.11	0.15	-0.04	0.85
AR[-6]	0.27	0.46	0.01	-0.43	0.44	0.80	-0.41	-1.54
AR[-5]	-0.24	0.10	-0.13	0.21	-0.32	0.03	-0.56	-1.71 *
AR[-4]	-0.05	-0.24	-0.79	-1.64	0.46	0.42	-0.59	-1.47
AR[-3]	0.27	0.71	0.09	0.42	0.40	0.58	-0.49	-2.43 **
AR[-2]	-0.12	-0.22	-0.52	-0.31	0.15	0.00	-0.10	-1.17
AR[-1]	0.96	2.06 **	1.00	1.95 *	0.94	1.06	-0.59	-2.39 **
AR[0]	1.28	2.68 ***	0.89	1.71 *	1.55	2.06 **	-3.49	-8.36 ***
AR[1]	0.94	0.74	2.97	1.54	-0.45	-0.39	-0.40	-1.85 *
AR[2]	0.24	0.78	1.12	2.01 **	-0.37	-0.89	-0.18	-0.91
AR[3]	-0.31	-0.41	-0.11	0.13	-0.45	-0.76	-0.53	-1.58
AR[4]	0.13	0.41	0.52	0.71	-0.14	-0.14	-0.74	-3.25 ***
AR[5]	-0.83	-1.82 *	-0.69	-0.45	-0.92	-2.31 **	-0.38	-2.06 **
AR[6]	0.03	-0.31	-0.03	-0.44	0.07	-0.09	-0.61	-3.69 ***
AR[7]	0.28	0.00	0.56	0.78	0.09	-0.51	-0.41	-1.34
AR[8]	-1.05	-1.89 *	-0.88	-1.73 *	-1.16	-1.26	-0.04	0.34
AR[9]	-0.23	-1.06	-0.79	-1.61	0.16	-0.64	-0.44	-2.41 **
AR[10]	0.04	1.08	0.04	0.30	0.04	1.10	-0.71	-3.51 ***
CAR[-10,2]	-0.13	0.00	-1.78	-0.96	1.00	0.51	-2.43	-2.80 ***
CAR[-1,1]	3.19	2.35 **	4.86	2.67 ***	2.04	0.89	-4.48	-8.49 ***
CAR[2,10]	-1.69	-0.83	-0.26	0.64	-2.68	-1.23	-4.06	-6.91 ***
CAR[-10,10]	1.36	0.50	2.82	1.34	0.36	-0.17	-10.97	-10.55 ***

Notes: Abnormal returns are estimated using the market model with an estimation window day-120 to day-21, where day 0 is the announcement day. The daily return of TOPIX is used as the market return. The significance level of average abnormal returns (AR) and cumulative average abnormal returns (CAR) are given by the standardized cross-sectional test (SCS Z) that was introduced by Boehmer, Musumeci and Poulsen (1991). \*, \*\* and \*\*\* denote significant at 10%, 5% and 1% levels, respectively.

Table 2 presents the event study results. According to Table 2, CAR[-1,1] for standalone warrant issues is 3.19% significant at 5% level. The positive announcement effect seems mainly driven by out of the money warrant issues when examining out of the money warrant and in/at the money warrant issues separately. The former elicits a positive CAR[-1,1] of 4.86% significant at 1% level, while the CAR[-1,1] for the latter is not significant, although positive. However, AR[0] for the latter is 1.55% significant at 5% level. The result is consistent with both hypotheses at this moment.

## B. Descriptive Statistics

**Table 3**  
Variable definitions

Variable	Definition
CAR	3 days cumulative abnormal return over day -1 to day 1
Discount Rate	For warrants: (closing price of day -2 - exercise price)/exercise price For SEOs: (closing price of the day before offering - offering price)/offering price
Out of the money dummy	Takes the value 1 if the warrant has an exercise price higher than the closing price of day -2 and 0 otherwise
Warrant dummy	Takes the value 1 if warrants and 0 if SEOs
ln Assets	The natural log of total assets of issuing firm
OIBDA	(Operating income + depreciation and amortization)/total assets
Leverage	Debt to assets ratio
Cash Holdings	Cash and deposits/total assets
Tangible Assets	Tangible assets/total assets
Tobin's Q	(Market value of equity + debt value)/total assets
Risk	Standard deviation of daily stock returns over day -120 to day -21
Firm Age	Years founded at the time of offering
Management Ownership	Number of shares held by management/number of shares outstanding
Dilution Rate	Number of new shares to be issued/number of shares outstanding
Underwriting Fee	For warrants: -warrant price/exercise price, the negative sign means issuers are paid for warrants For SEOs: underwriter spread in percentage of the offering price
Underwriter Rank	Ranking of underwriter based on market share range from 0 to 13, where 0 is the lowest and 13 is the highest rank
ln Proceeds	The natural log of total expected proceeds in million JPY
Run-up	Cumulative abnormal return over day -60 to day -2
Maturity	Warrants' duration from issuance to expiration

**Table 4**  
Descriptive statistics

Variables	All warrants (N=194)		Out of the money (N=79)		In the money (N=115)		SEO (N=224)	
	mean	median	mean	median	mean	median	mean	median
CAR (%)	3.19 ***	0.61 ***	4.86	1.74 *	2.04 ***	-0.82 ***	-4.48	-5.60
Assets (Million JPY)	18524.91 ***	5622.00 ***	33767.08 **	6629.00 *	8054.21 ***	4335.00 ***	54734.41	14372.00
OIBDA (%)	-2.91 ***	0.62 ***	0.49 **	4.73 ***	-5.24 ***	-2.11 ***	12.59	12.70
Leverage (%)	30.76	26.85	29.34	25.43	31.73	27.29	30.91	29.74
Cash Holdings (%)	24.77	18.74	29.27 ***	24.76 ***	21.69	16.89	23.60	15.78
Tangible Assets (%)	18.53 **	12.19 *	14.61 **	7.44 **	21.22	15.11	23.67	16.71
Tobin's Q	2.28	1.57	2.65 **	1.72	2.02 **	1.55 *	2.56	1.63
Risk	0.05 ***	0.05 ***	0.04 **	0.04 **	0.05 ***	0.05 ***	0.04	0.03
Firm Age (Years)	29.21 *	23.00 **	24.13 ***	20.00 ***	32.70 ***	27.00 ***	25.57	17.00
Management Ownership (%)	11.29 ***	2.35 ***	15.61 ***	7.43 ***	8.33 ***	0.94 ***	23.73	18.73
Dilution Rate (%)	66.18 ***	24.62 ***	44.27 ***	17.60 ***	81.24 ***	41.29 ***	22.52	11.79
Discount Rate (%)	2.67	2.35	-13.58 ***	-11.93 ***	13.83 ***	10.34 ***	2.31	1.78
Underwriting Fee (%)	-0.96 ***	-0.78 ***	-0.82 **	-0.61 **	-1.06 ***	-0.85 ***	4.89	5.16
Underwriter Rank	1.09 ***	0.00 ***	2.41 ***	1.00 ***	0.19 ***	0.00 ***	8.59	9.00
Proceeds (Million JPY)	3266.11 ***	1699.06 ***	4330.24 **	2168.77 **	2535.11 ***	1184.57 ***	5745.78	2854.46
Run-up (%)	-0.49 *	0.79 *	-1.96	0.43	0.51 **	1.27 *	-3.94	-2.70
Maturity (Years)	2.07	2.00	2.24	2.00	1.95	2.00		

Notes: All variables except CAR are winsorized at the 5th and 95th percentile. The asterisks after the left three columns represent the significance level of differences in means and medians between all warrants & SEO, out of the money warrants & in the money warrants and in the money warrants & SEO, respectively. The significance of the differences in the means is tested using the student's t-test. The significance of the medians' differences is tested using the Wilcoxon rank-sum test. \*, \*\* and \*\*\* denote significant at 10%, 5% and 1% levels, respectively. All variables are defined in Table 3.

Table 3 defines the variables in this study, and the descriptive statistics are summarized in Table 4. All variables except CAR are winsorized at the 5th and 95th percentile to deal with outliers. We test the significance level of differences in means and medians between all warrants & SEO, out of the money warrants & in the money warrants and in the money warrants & SEO, respectively.

Table 4 shows that standalone warrant issuers have lower total assets, tangible assets, OIBDA and higher riskiness compared to seasoned equity issuers. That means standalone warrant issuers have higher information asymmetry than seasoned equity issuers, consistent with both hypotheses. Consistent with the agency cost hypothesis, standalone warrant issuers have lower levels of management ownership and tend to use low-ranking underwriters.

### C. The Determinants of Announcement Effects

**Table 5**  
Cross-sectional regression of CAR

	Models					
	1. Out of the money warrants	2. In the money warrants	3. All warrants	4. All warrants & SEO	5. Out of the money & SEO	6. In the money & SEO
Discount Rate	-0.48 (-2.58)**	-0.15 (-0.91)	-0.14 (-1.01)			
Out of the money dummy			0.01 (0.17)			
Warrant dummy				0.09 (2.42)**	0.12 (3.02)***	0.07 (1.61)
In Assets	-0.02 (0.61)	0.04 (1.40)	0.02 (1.24)	0.02 (1.85)*	0.03 (1.85)*	0.02 (1.53)
OIBDA	-0.17 (-1.29)	-0.29 (-2.80)***	-0.15 (-1.85)*	-0.11 (-1.98)**	-0.10 (-1.37)	-0.12 (-1.82)*
Leverage	-0.02 (-0.17)	0.11 (1.26)	0.08 (0.92)	0.04 (0.82)	0.02 (0.52)	0.03 (0.74)
Cash Holdings	-0.06 (-0.54)	0.02 (0.18)	0.03 (0.34)	-0.01 (-0.14)	-0.05 (-0.78)	-0.02 (-0.30)
Tangible Assets	-0.19 (-1.59)	-0.01 (-0.15)	-0.08 (-0.97)	-0.00 (-0.03)	-0.02 (-0.62)	0.01 (0.25)
Total's Q	0.01 (1.39)	-0.00 (-0.26)	0.02 (2.17)**	0.01 (3.14)***	0.02 (3.61)***	0.01 (2.20)**
Risk	-5.56 (-0.46)	0.10 (0.13)	-0.37 (-0.53)	-0.15 (-0.32)	-0.28 (-0.42)	-0.04 (-0.68)
Firm Age	-0.00 (-0.17)	-0.00 (-2.26)**	-0.00 (-0.61)	-0.00 (-1.27)	0.00 (0.09)	-0.00 (-1.56)
Management Ownership	-0.14 (-1.34)	-0.21 (-1.99)**	0.07 (0.93)	-0.04 (-1.12)	-0.02 (-0.44)	-0.03 (-0.70)
Distance Rate	0.04 (1.15)	0.01 (0.39)	0.01 (0.45)	0.02 (1.02)	0.04 (1.57)	0.02 (0.82)
Underwriting Fee	-1.21 (-0.49)	-2.01 (-1.20)	-0.52 (-0.33)	0.58 (1.05)	0.87 (1.46)	0.73 (1.17)
Underwriter Rank	-0.01 (-1.04)	-0.02 (-1.22)	-0.00 (-0.51)	-0.00 (-1.08)*	-0.00 (-1.08)*	-0.00 (-2.29)**
In Proceeds	-0.05 (-1.79)*	0.01 (0.49)	-0.03 (-1.61)	-0.02 (-2.23)**	-0.03 (-3.24)***	-0.02 (-1.64)
Run-up	0.04 (0.58)	-0.03 (-0.44)	0.04 (0.92)	-0.01 (-0.49)	-0.02 (-0.77)	-0.03 (-0.80)
Maturity	-0.00 (-0.25)	-0.01 (-0.82)	-0.00 (-0.26)			
IBIT	0.33 (1.99)*	0.26 (0.63)				
Year dummy	No	No	Yes	Yes	Yes	Yes
Industry dummy	No	No	Yes	Yes	Yes	Yes
F statistics	2.00**	2.35***	1.62*	1.84***	1.90***	1.66***
Adjusted R <sup>2</sup>	0.08	0.04	0.04	0.10	0.14	0.08
Number of observations	79	115	194	418	365	330

Notes: The dependent variable is the three days cumulative abnormal return from day-1 to day1. The sample of Model 1 contains only out of the money warrant issues. The sample of Model 2 contains in and at the money warrant issues, where only nine cases are at the money warrants. Model 3 uses the whole sample of warrant issues. Model 4 adds SEO samples to the sample of Model 3. Model 5 excludes in and at the money warrants from Model 4, and Model 6 excludes out of the money warrants from Model 4. The inverse mills ratio (IMR) is calculated using probit regression in Table 6. Heteroskedasticity robust t-statistics are presented in the parentheses after the coefficients. \*, \*\* and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Table 3.

Table 5 presents the results of cross-sectional regression on CAR[-1,1]. Model 1 and Model 2 examines the determinants of announcement effects. The main variable discount rate proxies the management's confidence or unconfidence regarding their firms' future stock performance. Management with more confidence will set the exercise price higher; hence the discount rate will be lower and vice versa. The signaling hypothesis predicts negative relations between announcement effects and discount rates. The result of Model 1 is consistent with the prediction; therefore, out of the money warrants subject to the signaling hypothesis. The discount rate is not significant in Model 2, which means the discounted exercise price is not viewed negatively by the market. One interpretation is that the discount in exercise price is considered compensation for the underwriter's due diligence service. Another interpretation is that the higher warrant price compensates for the discount in exercise price. By setting the exercise price lower, management raises the warrant's price to raise more capital in the first stage. Consistent with this interpretation, we found the underwriting fee for in/at the money warrant issuers is significantly lower

than for out of the money warrant issuers. i.e., underwriters pay more for in/at the money warrant than for out of the money warrants.

The result of Model 2 shows in/at the money warrant issuers with worse OIBDA, shorter operating history and lower management ownership elicit higher announcement effects. One possible explanation is that the stock market reevaluates issuers' expected agency cost, and issuers with severer information asymmetry and prone to the free cash flow problem benefit more from the reevaluation. Therefore, the result of in/at the money warrants is consistent with the agency cost hypothesis. The different results between Model 1 and Model 2 suggest that most out of the money warrant issuers use standalone warrants for the signaling purpose, and most in/at the money warrant issuers use standalone warrants for agency cost consideration.

Model 3-6 examines whether different groups of issuers have significant differences in announcement effects after controlling for firm characteristics and issue details. The result shows no significant difference in announcement effects between different groups of warrant issuers (Model 3) or between in/at the money warrant issuers and seasoned equity issuers (Model 6). However, the announcement effects of out of the money warrant issuers significantly different from seasoned equity issuers (Model 5). Together with the IMR is significantly positive in Model 1, we can infer that out of the money warrant issuers have favorable private information that is not caught by other independent variables, leading to this difference.

#### D. Firm Characteristics of Standalone Warrant Issuers

**Table 6**  
Probit regression results

	Models							
	1.Warrants vs SEO		2.Out of the money vs SEO		3.In the money vs SEO		4.Out vs In the money	
In Assets	-0.44	(-2.57)***	-0.51	(-2.81)***	-0.36	(-1.12)	0.25	(1.58)
OIBDA	-3.81	(-3.16)***	-3.61	(-2.87)***	-7.08	(-2.99)***	-0.02	(-0.02)
Leverage	-0.91	(-1.21)	-1.04	(-0.99)	-0.24	(-0.17)	0.29	(0.40)
Cash Holdings	0.46	(0.55)	0.14	(0.15)	8.23	(2.88)***	0.92	(1.15)
Tangible Assets	-1.21	(-2.20)**	-1.17	(-1.81)*	-10.41	(-2.09)**	-0.69	(-0.88)
Tobin's Q	-0.14	(-1.07)	-0.12	(-0.74)	-0.91	(-3.36)***	0.09	(0.81)
Risk	-1.37	(-0.19)	-2.47	(-0.28)	42.40	(1.49)	-3.11	(-0.45)
Firm Age	0.00	(0.31)	0.00	(0.06)	0.00	(0.38)	-0.01	(-0.63)
Management Ownership	-2.63	(-3.79)***	-2.47	(-3.19)***	-9.98	(-2.29)**	-0.24	(-0.28)
Dilution Rate	0.25	(1.36)	0.03	(0.11)	0.63	(0.93)	-0.27	(-1.37)
Underwriter Rank	-0.34	(-5.68)***	-0.31	(-4.47)***	-1.62	(-3.38)***	0.22	(2.76)***
In Proceeds	0.20	(1.13)	0.41	(1.85)*	-0.44	(-0.80)	0.30	(1.69)*
Run-up	0.47	(1.16)	0.46	(0.93)	3.76	(1.92)*	-0.37	(-0.85)
Year dummy		Yes		Yes		Yes		Yes
Industry dummy		Yes		Yes		Yes		Yes
X <sup>2</sup> statistics		201.19***		120.21***		403.25***		84.01***
Pseudo R <sup>2</sup>		0.73		0.63		0.95		0.37
Number of observations		411		259		329		175

Notes: The dependent variable in Model 1 to 3 is warrant dummy. The dependent variable in Model 4 is out of the money dummy. The sample of Model 1 contains all warrant issues and SEO. Model 2 excludes in and at the money warrants from Model 1, and Model 3 excludes out of the money warrants from Model 1. Model 4 uses only warrant issues. Heteroskedasticity robust z-statistics are presented in the parentheses after the coefficients. \*, \*\* and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Table 3.

Table 6 shows that warrant issuers are generally smaller, with worse OIBDA, less tangible assets, lower management ownership, and tend to use low-ranking underwriters compared to seasoned equity issuers (Model 1). The result is consistent with both hypotheses. Moreover, in/at the money warrant issuers also have higher cash holdings and lower Tobin's Q than seasoned equity issuers (Model 3), which means the agency cost hypothesis is more applicable to in/at the money warrant issuers than to out of the money warrant issuers.

When comparing two types of warrant issuers, no significant difference in firm characteristics are found except underwriter reputation and proceed amount (Model 4). Two possible explanations for the first part of the result: 1) both the undervaluation and discount for potential agency costs happen under the existence of information asymmetry; therefore, two types of issuers share similar characteristics regarding information asymmetry. 2) The descriptive statistics show that variables regarding agency cost, such as OIBDA and management ownership, follow the pattern that in the money warrant < out of the money warrant < SEO; therefore, it is possible that in the money warrant significantly differs from seasoned equity issuers in these variables but out of the money warrant issuers are not statistically different from other two groups.

Regarding the determinants of what kind of warrant to issue, the significance of IMR in cross-sectional regression suggests that the private information, or the management's expectation, on the future stock performance matters at the time of decision making. If the management is confident in their future stock performance, they choose to issue out of the money warrants to signal undervaluation and enjoy the most favorable stock market response. Otherwise, they try to ensure the fundraising will succeed by issuing in the money warrants and enjoy a less favorable stock market response, which is still more favorable than SEOs. Because private information and management's expectations are unobservable, we may not differentiate between two types of potential issuers when the firm characteristics are not statistically different.

Related to the theory above, one possible explanation for the significant difference in underwriter reputation between two types of warrant issuers is that underwriters have better access to private information than outside investors because they perform due diligence on potential issuers. Therefore, prestigious underwriters avoid the possibility of staining their reputation by shutting out in the money warrant issuers. At the same time, low-rank underwriters care more about profit than reputation, so they choose to underwrite in the money warrants. Therefore, we observe that the mean of underwriter reputation is higher for out of the money warrant issues than in the money warrant issuers.

Regarding the difference in proceed amount, one possible reason is that firms raising a large scale of capital are not as tolerant of discounts as firms raising a small scale of capital. This is also true in daily life that one can accept a higher discount when selling used clothes than selling a used car. Therefore, firms with larger capital needs are more prone to issue out of the money warrants.

### **E. Additional Analysis**

Theoretically, warrants with exercise prices in or at the money can be exercised at once. Because the underwriters of warrants usually immediately resell common stocks after exercising their warrants, issuing in/at the money warrants can be seen as an indirect

public offering if the underwriters exercise all warrants soon enough. Unlike out of the money warrant issuers, in/at the money warrant issuers do not signal favorable inside information to the market, which raises the question of why they voluntarily choose a less predictable way to issue equity. As explained earlier, one possible reason is to reduce potential agency costs. Another explanation could be the flotation cost advantage.

One way to examine this theory is to compare the flotation cost of the flotation method chosen and the flotation cost if an alternative flotation method had been chosen instead. Because we only observe the flotation cost of the chosen method, directly compare the flotation costs between different flotation methods will suffer from self-selection bias. Although we have observations excluded from the sample announced both warrant issues and SEO on the same day, we could not differentiate how much announcement effects are caused by each event. We also have observations that issued warrants and conducted SEO at different times, but the comparison will also be biased if firms choose the timing and flotation methods to minimize flotation costs. Therefore, we use a propensity score matching method to deal with the self-selection bias. The results are shown in Table 7.

**Table 7**  
Propensity score matching results

	Discount Rate(%)	Underwriting Fee(%)	Flotation Cost(%)	CAR(%)	Wealth Effects(%)	N
In the money warrants	13.83	-1.06	12.71	2.04	-9.91	115
Matched SEOs	1.29	6.20	7.49	-8.11	-14.23	115
Difference	12.54 ***	-7.26 ***	5.22 ***	10.15 ***	4.32 *	

Notes: In this table, each in or at the money warrant issues is matched to one SEO that has the nearest propensity score calculated from Model 3 of Table 6. Flotation cost is the sum of discount rate and underwriting fee. Wealth effects is calculated by adding CAR to flotation cost multiplied by dilution rate. The differences in means are tested between in the money warrants and matched SEO using the student's t-test. \*, \*\* and \*\*\* denote significance at the 10%, 5% and 1% levels, respectively.

From Table 7, we know that for in/at the money warrant issuers, the discount rates will be lower, and the underwriting fees would have been higher if they had conducted SEO instead. The result is reasonable because in the money warrants usually offer a deeper discount than SEO and warrant underwriters bears lower risk, do less lobbying compared to SEO underwriters. The total flotation cost defined as the sum of discount and underwriting fee would have been 5.22% lower if warrant issuers had conducted SEO instead, which means issuers did not choose warrants to minimize flotation costs. We then adjust the total flotation cost by multiplying the dilution rate to be addable with CAR and consider the wealth effect defined as the sum of adjusted flotation cost and CAR. The wealth effect for in/at the money warrant issuers would have been 4.32% lower if they had conducted SEO instead. The result is consistent with the agency cost hypothesis, where standalone warrant issuers have lower expected agency costs than SEO.

We omit the examination of flotation costs for out of the money warrant issuers because out of the money warrants have the lowest expected flotation cost at the time of offerings. If issuers are trying to minimize the flotation cost, they should always issue out of the money warrants. The reason why only a small portion of firms choose to issue out of the money warrants is that out of the money warrants can only successfully raise capital if the future stock price rises above the exercise price. Therefore, how issuers

think of their future stock price performance dominates flotation cost consideration when deciding whether or not to issue out of the money warrants.

## V. CONCLUSION

This paper answers the question of why some Japanese firms prefer to issue equity with standalone warrants rather than conduct SEO. Using a data set of 194 standalone warrant issues and 224 SEO conducted by Japanese firms from 2002 to 2019, four main results are obtained.

First, standalone warrant issues generally elicit significant positive announcement effects. The positive announcement effects are mainly driven by out of the money warrant issues. The result is consistent with the signaling hypothesis that management use out of the money warrant to signal undervaluation. The result is also consistent with the agency cost hypothesis that standalone warrants reduce the expected agency cost from the free cash flow problem, and the market adjusts its expectation upwardly. The agency cost reduction motive is more substantial for in or at the money warrant issuers than for out of the money warrant issuers.

Second, the announcement effect of out of the money warrant issues is negatively related to the discount rate and positively related to the IMR. Because the discount turns to a premium when the exercise price is set higher than the current stock price, the sign of the discount rate is negative for all out of the money warrant issuers. That is to say, out of the money warrants are issued when the issuer has favorable private information, and the more confident the management is (proxied by the discount rate), the more positive the announcement effect is. The result is consistent with the signaling hypothesis. On the other hand, in/at the money warrant issuers with worse OIBDA, shorter operating history and lower management ownership elicits higher announcement effects. That is to say, the stock market reevaluates issuers' expected agency cost, and issuers with severer information asymmetry and prone to the free cash flow problem benefit more from the reevaluation. Therefore, the result of in/at the money warrants is consistent with the agency cost hypothesis.

Third, warrant issuers generally have less total assets, worse OIBDA, lower proportions of tangible assets, lower management ownership, and tend to use low-ranking underwriters compared to seasoned equity issuers. The result is consistent with both hypotheses. Moreover, in/at the money warrant issuers also have higher cash holdings and lower Tobin's Q than seasoned equity issuers, which means in/at the money warrant issuers are more subject to the agency cost hypothesis than out of the money warrant issuers.

Fourth, The flotation cost for in/at the money warrant issuers would have been lower, and the announcement effect would have been more negative if they had conducted SEO instead. The result does not support the reasoning of flotation cost minimization but consistent with the agency cost hypothesis, where standalone warrant issuers have lower expected agency costs than SEO. Overall, most out of the money warrant issuers use standalone warrants for the signaling purpose, and most in/at the money warrant issuers use standalone warrants for agency cost consideration.

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