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Does Individual Investors' Sentiment Explain Japanese IPO Aftermarket Performance?

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Abstract

This study examines the influence of individual investors' sentiment on Japanese IPO aftermarket performance (measured by return and trading volume on the first trading day and return on the first trading year). This study proposes that IPOs will be, on average overpriced on the listing day when individual investors' sentiment is highly optimistic. Higher initial return and trading volume are expected in IPOs with higher investors' optimism. Further, the positive initial return will occur in the short term as individual investors usually are uninformed investors who demand shares based on their personal preferences, which will last only in a short period. Following the overvaluation hypothesis, price reversals should be predicted once the effect of individual investors' optimism has disappeared, causing the IPOs to underperform in the long term. Using 520 Japanese IPOs issued from January 2010 to December 2019, this study reveals that individual investors' sentiment is positively and significantly related to returns and trading volume on the first trading day. Return reversals are found on the first trading year despite the insignificant influence of individual investors' sentiment on IPO return on the first trading year.

Keywords: Initial Public Offerings (IPOs), Search Volume Index (SVI), Individual Investors' Sentiment, Aftermarket Performance, Japanese Market

JEL Classification Code: G12, G31

1. Introduction

IPO aftermarket performance has been studied extensively in finance literature. A high return on the first trading day is a universal and persistent phenomenon in the IPO market, which on average, the first-day closing price of an IPO share is high above its offer price. Studies have attempted to explain this phenomenon, among others, based on the information asymmetry and reputation hypotheses. Given the presence of information asymmetry in the IPO

markets, the former hypothesis proposes that IPO issuer is better informed on the intrinsic value of its shares than investors. An IPO issuer usually will set a lower offer price to recompense for high information asymmetry and will induce sufficient demand for its IPO from the investors (Chung et al., 2017), while the reputation hypothesis posits the existence of agency conflict between underwriters and IPO issuer that requires the underwriters to set IPO offer price lower than its perceived intrinsic value. Regardless, information asymmetry and reputation hypothesis posit that issuers and underwriters should play a dominant role in explaining initial returns (caused by the intentionally underpriced IPOs during the offering stage). Both hypotheses suggest a minimal presence of investors' sentiment in explaining high IPO initial returns.

In contrast, Cook et al. (2006), Dorn (2009), Song et al. (2014) suggest that high IPO initial returns can be explained by overvaluation, caused by investors' sentiment in the pre-market and post-market. Ljungqvist et al. (2006) supported high IPO initial returns are not a conclusive outcome of information asymmetry that investors' sentiment may be related to this phenomenon. Derrien (2005) and Dorn (2009) equally conjecture that investors' sentiment should result in high or low IPO initial returns as investors' trading behavior

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will be affected by a certain perception about quality and risk of an IPO and information available to them (Sha & Ismail, 2021). Hence, IPO initial returns should be explained not only by the intentionally underpriced IPOs during offerings but similarly by investors' sentiment in the pre-market (Derrien, 2005; Cornelli et al., 2006). Investors' sentiment can be described as the investors' overall optimism or pessimism about a stock market (Brown & Cliff, 2004). Liu et al. (2017) define investors' sentiment as a market feeling or crowd psychology that is generally categorized into two classes; bullish (optimism) and bearish (pessimism). Investors will influence initial returns as their sentiment should result in the IPO price movement (Baker & Wurgler, 2007; Anusakumar et al., 2017). The supports are provided in Derrien (2005), Chan (2010), Da et al. (2011), and Song et al. (2014) that high positive investors' sentiment attributes high initial returns.

Despite the claims in past studies on the influence of investors' sentiment in the pre-market, one argues that the influence of investors' sentiment interfered with the revision practice in IPO's offer price during the book-building process. This is because underwriters can intentionally set an IPO priced at the lowest possible level to induce demand for higher initial returns. Similar practice should also be expected when an IPO is accompanied by high investors' optimism. The underwriters can exploit the highly positive investors' sentiment by setting the highest IPO price. In such instances, the initial returns level will be clouded by the IPO's offer price finalized during the price revision stage. That is, the level of investor's demand or sentiment in the pre-market cannot fully explain their sentiment as well as initial returns (Chung et al., 2017). However, the case may not be totally similar in the Japanese IPO market. This is because the offer price of Japanese IPOs will always be finalized at a price within the filling range even if there is a substantially high or low demand from investors for an IPO during the book-building process. In other words, in usual cases, the final offer price of Japanese IPOs will not be set higher (lower) than the highest (lowest) price bound in the filling range. This indicates that investors' sentiment, particularly the individual investors, cannot fully explain IPO pricing during the book-building process. Thus, IPO prices in the aftermarket, which will be observable earliest at the time of IPO offering, should be considered as the initial implication of investor sentiment on IPO pricing. Hence, price revision in the book-building stage provides the Japanese market a unique setting for this study.

Further, the participation of individual investors in the Japanese IPO market is significant as at the highest, 80 percent of the new shares offered will be apportioned to individual investors (Global Legal Insights, 2019). The government policy that encourages extensive participation of individual investors not only helps to broaden the individual investors base in the market but also helps relatively small or medium-sized firms, which institutional investors tend not to invest

due to their investment portfolio policy, acquiring sufficient amount of proceeds from the issuance of IPOs. In a way, small and medium-sized firms in Japan can go public mainly through the support of individual investors (Hayase & Goto 2015). In another way, tailoring to the objective of this study, extensive participation of individual investors in the Japanese IPO market also supports this market as a suitable avenue for studies on individual investors' sentiment as individual investors are also the main participants that should not be left behind when one understands the investor sentiment. Overall, this study examines the influence of individual investors' sentiment on Japanese IPO aftermarket performance.

2. Related Literature and Hypothesis Development

2.1. Institutional Setting of Japanese IPO Market

The Japanese IPOs procedure starts with the issuance of Preliminary Prospectus, which includes information on the initial offer price set by underwriters, distributed about 25 days before an IPO listing. The initial offer price is set based on the intrinsic valuation analysis of the issuer. Japanese IPOs usually will undergo three phases via two price revisions (Figure 1). During the first phase of their IPO issuance, IPO firms will initiate a roadshow that targets selected investors (i.e., large institutional investors) to capture the demand and price the selected investors are willing to pay for the IPO. The second phase allows individual investors and other institutional investors to reveal their interest through bid price. Unlike in the first price revision, which mainly reflects selected institutional investors' demand for an IPO, the participation of individual investors in the book-building process equally reflects their interest as the main element to the second price revision in Japanese IPOs. Importantly, estimations of the individual investors' sentiment in the Japanese market can be considered early as the book-building process starts (15 days before the listing). The final offer price is set in the Second Revised Prospectus upon completing the book-building process, about 7 days before the IPO listing. Regardless, the offer price of Japanese IPOs will always be finalized at a price within the filling range even if there is a substantially high or low demand received for the IPO during the book-building process. In other words, the filing range (lowest and highest price bound) will not be adjusted. The last phase on the issuance of Japanese IPOs shows the period from the end of the book-building process until the IPO listing.

2.2. Google Trends and Individual Investors Sentiment

Da et al. (2011) is acknowledged as the pioneering study that applies Google Trends or Search Volume Index

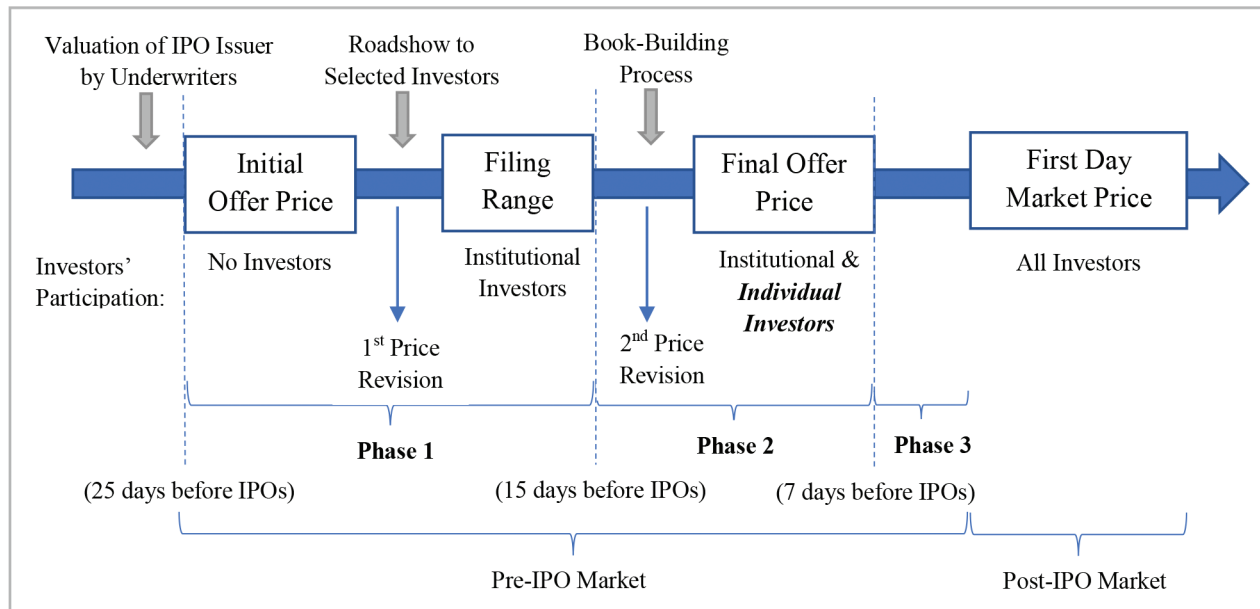


Figure 1: Listing Procedure of Japanese IPOs

(SVI) as a proxy for retail or individual investor attention to link investors' sentiment to IPO prices and returns. Using a sample of firms of the Russell 3000 index from 2004 to 2008, they find an increase in individual investors' attention causes a positive price movement. However, the favorable price movement occurs only in the short term as price reversals are found in the long term. In specific, the study finds a significant upward trend in SVI during the two to three weeks before an IPO followed by a significant jump in SVI during the IPO week, indicating an increase in retail attention towards the stock. The SVI reverts to its initial level two to three weeks after listing the IPO, a suggestion that individual sentiment is not permanent.

Da et al. (2011) infer SVI as a plausible proxy to measure sentiment (or "attention") of individual investors. This is because, while discussing on IPO participants and the platforms that they access information, institutional investors are likely to have access to paid databases (e.g., Bloomberg and Thomson Reuters) and primarily rely on such databases to search for information on security in the secondary market or a security that is newly issued. In other cases, Google users for security information are most likely to be those who do not have access to any of the specialist databases. This group can be described collectively as individual investors. Thus, the observation of SVI to measure individual investor's interest and sentiment can be made without a significant interference of sentiment from institutional investors. Lim and Stridsberg (2015) support that beyond the finding shown in Da et al. (2011), the intuition behind the interpretation offered in Da et al. (2011) on the use of Google Trends as

data that reveals individual investor sentiment and interest is reasonably acceptable.

2.3. Individual Investors Sentiment and IPO Aftermarket Performance

Derrien (2005), using French IPOs, reports that book-building demand by individual investors causes a significant increment in IPO prices on a listing day and is negatively related to long-term performance. Using 486 IPOs listed in 12 European countries, Cornelli et al. (2006) report that high grey market prices (which indicates over-optimism of individual investors) lead to high IPO prices on the first trading day and a long-term price reversal. Offering support to the findings in Derrien (2005) and Cornelli et al. (2006), Dorn (2009), using trade size transaction during the book-building process to proxy for individual investors' sentiment, find that individual investors' sentiment in the Germany market pushes IPO aftermarket prices above fundamental levels such that results into high first-day returns. In the U.S market, Chan (2010), using trade size to measure investors' participation in the IPO market, finds that IPO aftermarket prices are related mainly to the sentiment of individual investors.

Da et al. (2011), using SVI as a measure of investor attention, report a positive association between investors' attention and initial returns but a negative relationship to long-term returns. Jiang and Li (2013), using the subscription rate for public tranche to proxy investors sentiment of 567 IPOs listed from 1999 to 2009, further prove that individual investor sentiment explains Hong Kong's IPO

pricing during both pre-market and aftermarket stages. Further, Song et al. (2014) demonstrates that overvaluation by individual investors plays a significant role in explaining high IPO initial returns in the Chinese market. Using 948 Chinese IPOs between 2006 and 2011, the study suggests that first-day closing price was overvalued by investors more than the offer price underpriced by the underwriter. Zuo et al. (2010), Jiang and Li (2016) also show that investors' sentiment is positively associated with initial returns. The past studies' finding seems to support the overvaluation hypothesis that IPOs are overly priced in the initial aftermarket due to high investors' optimism. Meanwhile, IPOs will experience price reversals in the long-run due to the disappearance of high investor optimism.

In this study, three hypotheses are developed. *Hypothesis 1* is based on the argument that IPOs will be, on average overpriced on the listing day when individual investors' sentiment is highly optimistic. Further, a positive initial return depends on the intensity of individual investors' sentiment. Higher initial returns are expected in IPOs with higher investors' optimism. Thus, this study expects a positive relationship between individual investors' sentiment and Japanese IPO returns on the first trading day as follows:

H1: *IPO return on the first trading day is positively and significantly related to individual investors' sentiment.*

In this study, the influence of individual investors' sentiment in the pre-market on initial returns is assumed to be completely observable at the day of IPO listing. Suppose individual investors are highly optimistic about an IPO. In that case, they are likely to participate in the IPO even after few days of listing, particularly in cases where they were not allocated a desired proportion of shares during the book-building process. If this assumption is true, investors who have received an allocation of the IPOs will be at the advantage of making a short-term profit by flipping their IPO shares as early as on the first trading day in the aftermarket. The possibility of flipping activity should cause a positive movement in trading volume. Consistent with Derrien (2005), individual investors (particularly over-optimistic traders) who paid a high price for IPOs in the pre-market are expected to be sentimentally persistent even in the aftermarket. These investors will buy the shares flipped by institutional investors or any other existing shareholders and cause higher trading transactions or volume for an IPO. Thus, high individual investors' optimism during the pre-market is hypothesized to be positively related to trading volume on the first trading day as developed in *Hypothesis 2*.

H2: *IPO trading volume on the first trading day is positively and significantly related to individual investors' sentiment.*

The following hypothesis (*Hypothesis 3*) is built based on the proposition that high initial returns occur only in the short term as individual investors usually are treated as uninformed or irrational investors who will demand shares only based on their personal preferences, which will last in a short period after the IPO listing. Supporting the overvaluation hypothesis, price reversals should be predicted once the effect of individual investors' optimism on the price of the IPO has disappeared (Dorn, 2009; Song et al., 2014). Hence, attempting to offer empirical support to Zarafat and Vejzagic (2014) that IPO will usually experience long term underperformances, this study hypothesizes that individual investors' sentiment is negatively associated with long term IPO performance as follows:

H3: *IPO return on the first trading year is negatively and significantly related to individual investors' sentiment.*

3. Methodology

3.1. Sample Size and Procedures

The final sample of this study consists of 520 IPOs listed in Tokyo Stock Exchange from January 2010 to December 2019. This study's final sample is reached out after excluding IPOs issued by financial institutions and insurance companies due to different formats of financial statements. The exclusion extends to IPO firms with the missing value of SVI. According to Da et al. (2011), the missing value of SVI might be due to at least two reasons: (1) individual may not use the same company name when searching for the stock in Google and (2) Google Trends truncates the output and return missing values for SVIs with insufficient searches. Data for this study are hand-collected and sourced from securities registration statements of the IPO companies retrieved from Electronic Disclosure for Investors' Network (EDINET), Japanese Exchange Group (JPX) website, databases of Eikon Thompson Reuters, and Needs-Financial Quest.

3.2. Definition and Measures

3.2.1. IPO Aftermarket Performance

The IPO aftermarket performance in this study is captured from three perspectives; return on the first trading day, trading volume on the first trading day, and the cumulative average return on the first trading year. Following Anderloni and Tanda (2017), Anwar and Mohd Rashid (2021), this study measures returns on the first trading day based on the percentage change between the offer price and closing price of an IPO on the first trading day. This study re-measures returns on the first trading day using the percentage change

in opening price and offer price on the first trading day to reduce market interference and noise on the return of a stock (Che-Yahya et al., 2017; Mohd-Rashid et al., 2014). The measurements are shown in the following equation.

$$\text{InReturn}_i = \frac{P_{\text{close}_i} - P_{\text{offer}_i}}{P_{\text{offer}_i}} \times 100 \quad (1)$$

$$\text{InReturn}_i = \frac{P_{\text{open}_i} - P_{\text{offer}_i}}{P_{\text{offer}_i}} \times 100 \quad (2)$$

Where,

- InReturn = return on the first trading day of i^{th} firms.
 P_{close} = closing price of the first trading day of i^{th} firm.
 P_{offer} = offer price of i^{th} firm.

The trading volume on the first trading day is defined as share turnover and is measured based on the total to the number of shares traded divided by the number of shares issued (Chung et al., 2017; Jiang and Li, 2013).

$$\text{VOL}(i)_i = \frac{\text{NOSH}}{\text{NOSHI}_i} \quad (3)$$

Where,

- $\text{VOL}_{i,t}$ = trading volume of the i^{th} issuer on the first trading day.
 $\text{NOSH}_{i,t}$ = trading volume of the i^{th} issuer on the first trading day.
 NOSHI_i = number of shares issued for the i^{th} issuer at the IPO.

According to Cirillo et al. (2017), the performance of IPOs in the long-term can be measured at the earliest from the first year to five years after listing in an IPO market. The long-term performance can be measured by the cumulative average returns (CAR) (Chi et al., 2010). Specifically, this study first calculated the monthly returns (the difference in price from the first trading closing day to the last trading closing in a month). To sum up, this study calculates the average one-year using the total of twelve months' returns divided by twelve following Yong et al. (2011).

$$\text{LoReturn}_i = \frac{\sum \left(\frac{P_t - P_{t-1}}{P_{t-1}} \right)}{n} \times 100 \quad (4)$$

Where,

- LoReturn = Cumulative average return on the first trading year of i^{th} firms.
 t = price at time t .
 $t-1$ = price at $t-1$.
 n = number of months.

3.2.2. Individual Investors' Sentiment

This study uses SVI, captured through Google Trends, to measure individual investors' sentiment (Nguyen and Pham, 2018). Google Trends produce daily, weekly, and monthly SVI data. Unlike Da et al. (2011), this study uses weekly data to capture daily SVI as the use of weekly SVI might expose the data to a period around the initial filing date. The participation of individual investors in the Japanese IPO market is yet to realize. As shown in Figure 1, the individual investors start to participate in the book-building process only 15 days before the listing of Japanese IPOs. As such, the use of weekly data will not enable this study to capture an accurate SVI or a plausible range to estimate individual investors' sentiment as it will trespass into the first price revision stage (i.e., a period prior to the book-building stage). The average daily SVI data will be captured from 15 days to 1 day prior to the listing of an IPO (Equation 5).

$$\text{INVSENT}_i = \sum \text{SVI}/n \quad (5)$$

- INVSENT_i = individual investors sentiment of the i^{th} firm.
 SVI_i = total search volume index from 15 days to 1 day before listing of the i^{th} firm.

3.2.3. Control Variables

This study controls for a set of other independent variables (Table 1) in examining the influence of individual investors' sentiment on Japanese IPO aftermarket performance. The following regression models are developed in this study to examine the influence of individual investors' sentiment on Japanese IPO aftermarket performance.

$$\text{InReturn}_i = \alpha_t + \beta_1 \text{INVSENT}_i + \beta_\delta \sum_{l=1}^L \text{CV}_{i,l} + \varepsilon_i \quad (6)$$

$$\text{VOL}_i = \alpha_t + \beta_1 \text{INVSENT}_i + \beta_\delta \sum_{l=1}^L \text{CV}_{i,l} + \varepsilon_i \quad (7)$$

$$\text{LoReturn}_i = \alpha_t + \beta_1 \text{INVSENT}_i + \beta_\delta \sum_{l=1}^L \text{CV}_{i,l} + \varepsilon_i \quad (8)$$

Where,

- α = constant term,
 β = estimated coefficient or factor loading,
 InReturn_i = return on the first trading day of the i^{th} firm,
 LoReturn_i = return on the first six months of the i^{th} firm,
 Vol_i = trading volume on the first trading day of the i^{th} firm,
 INVSENT_i = individual investors sentiment of the i^{th} firm,
 $\text{CV}_{L,i}$ = control variables L , which are discussed earlier in Section 3.2.4, and
 ε = error term.

Table 1: Summary of Control Variables and Expected Signs

No.	Control Variables	Measurement	Exp. Sign	Past Studies
1.	Size of IPOs (ISSIZE)	Natural log of the total number of shares offered for an IPO multiplied by its offer price.	–ve	Asem et al. (2016), Chung et al. (2017)
2.	Underwriter Reputation (UNDREP)	Underwriter dummy equals one if the lead underwriter includes one of the big three Japanese securities companies, “Nomura,” “Daiwa,” or “Nikko,” and zero, otherwise.	+ve	Tsukioka et. al (2018), Colaco et al. (2017).
3.	Intended Use of Proceeds (PROCEED)	PROCEEDS dummy equals one if proceeds of IPO are used for business expansion and zero, otherwise.	+ve	Asem et al. (2016), Abd Rahman & Che-Yahya (2019)
4.	Reciprocal Offer Price (OFPRICE)	Reciprocal offer price for an IPO in Yen.	–ve	Mohd-Rashid, Abdul-Rahim, and Che-Yahya (2016), Tajuddin, Mohd-Rashid, Abdullah, and Abdul-Rahim (2015)
5.	High range Price (HIPRICE)	Price at the highest filing range of an IPO	+ve	Chung et al. (2017)
6.	Over-allotment (ALLOT)	Natural log of the total number of shares additionally offered for an IPO	+ve	Kerins et al. (2007)
7.	Firm Size (FISIZE)	Natural log of total net assets a firm	+ve	Asem et al. (2016), Sundarasan et al. (2017)
8.	Age (AGE)	Year of establishment prior to the listing of a firm	+ve	Asem et al. (2016), Chung et al. (2017), Colaco et al. (2017)
9.	Industry (INDUSTRY)	Industry dummy equals one if a firm is categorized as a technology firm and zero otherwise.	+ve	Gao et al. (2016)
10.	Return on Equity (ROE)	Total equity divided by sales of a firm	+ve	Anusakumar et al. (2017), Jewartowski and Lizinska (2012)
11.	Stock Market Condition (MKTCON)	Market condition dummy variable equals one if a company is categorized under a hot market where the total issuing size exceeds the mean of the sample issue size.	+ve	Colaco et al. (2017), Deng & Zhou (2016)

Notes: +ve (–ve) indicates an expectation on the positive (negative) relationship. The Expected signs are consistent with InReturn, VOL, and LoReturn.

4. Empirical Results

4.1. Preliminary Analysis and Findings

Table 2 (Panel A and Panel B) reports the summary of descriptive characteristics of this study. Panel A provides the distribution of IPOs, from January 2010 to December 2019, used as a final sample of this study. The table reports that there is a total of 707 Japanese IPOs from the Main Section, Second Section, JASDAQ, and MOTHERS issued during the period of this study. A total of 187 IPOs are excluded from the initial sample to minimize the effect of outliers in

the sample as well as due to data unavailability, producing a final sample of 73.55 percent of the total population to be examined in the regression analyses.

Panel B of Table 2 presents the summary of descriptive statistics of the variables in the final sample. As shown, the mean return on the first trading day is 9.90 percent ranging from a minimum –97.21 percent to a maximum of 454.82 percent. The average return on the first trading year (23.28 percent) is 2.5 times higher than the mean return on the first trading day with a larger dispersion of the return values (from a minimum of –84.36 percent to a maximum of 1683.56 percent) and standard deviation value of 138.94 (comparing

Table 2: Summary of Descriptive Characteristics

Panel A: Distribution of IPOs											
Year	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	Total
Population	22	39	45	51	70	94	93	97	107	89	707
Sample	12	24	40	45	62	69	68	69	66	65	520
Percentage	54.55	61.54	88.89	88.24	88.57	73.40	73.12	71.13	61.68	73.03	73.55
					Mean		Std. Dev.		Min.		Max.
Panel B: Sample (N = 520)											
Return on the first trading day (%)					9.90		90.96		−97.21		454.82
Return on the first trading year (%)					23.28		138.94		−84.36		1683.56
Trading Volume on the first trading day (%)					0.61		1.11		0.00		14.92
Individual Investors Sentiment (Index)					398.56		253.12		0.00		1,166.00
Size of IPOs (million, Yen)					17,700.00		136,000.00		150.00		2,650,000.00
Offer Price (Yen)					2,001.90		1,120.90		280.00		6,060.00
High Range Price (Yen)					1,923.92		1,026.42		100.00		6,060.00
Over Allotment (million, units)					0.66		7.08		0.00		160.00
Net Assets (million, Yen)					53.31		2,070.00		46,600.00		3,290.00
Company age (years)					23.65		19.12		2.00		123.00
Return on Equity (%)					−247.68		265.72		−582.70		990.05

to the dispersion value of 90.36 on the first trading day). This signifies that share prices in one year are more volatile, indicating a higher level of risk. These dispersions align with the basic theory of investment that holding shares for a longer period will expose investors to a higher degree of uncertainty and volatility in share prices. That is, a higher return should compensate investors for a higher risk. Meanwhile, the mean trading volume or shares turnover on the first trading day is only 0.61 percent, ranging from a minimum of 0 percent to a maximum of 14.92 percent.

Table 3 reports the Pearson correlation coefficient analysis to observe the correlation pattern as well as the potential of severe multicollinearity problems among independent variables. As reported, the strength of correlation between two independent variables is not severely correlated as all correlation values are overall lower than 0.90, satisfying the cut-off point of 0.90 (Asteriou & Hall, 2007). Following the examination of the multicollinearity issue, other diagnostics tests that include a test on data normality (Jarque-Bera value test), heteroskedasticity (White's General Test), auto correlation (Durbin-Watson d), and model specification (Ramsey's Regression Specification Error Test) are performed to ensure that the models satisfy the OLS assumptions. Equation (3i), Equation (3ii), and Equation (3iii) are regressed upon the completion of all diagnostic tests.

4.2. Main Analysis, Findings, and Discussion

The central examination of this study is on the influence of individual investors' sentiment on aftermarket performance. The regression results on the examination are presented in two tables (Table 4 and Table 5). Table 4 reports regression results using return and trading volume on a listing day as dependent variables (i.e., Model A (*InReturn (i)*), Model B (*InReturn (ii)*), and Model C (*VOL*)). Table 5 reports regression results using the return on the 365th day or the first trading year as the dependent variable. Model A, Model B, and Model C of Table 4 report an adjusted R^2 of 10.36 percent, 10.62 percent and 13.57 percent, accordingly. The adjusted R^2 reported in Model A, Model B, and Model C indicates that 10.36 percent, 10.62 percent, and 13.57 percent of the variations in *InReturn (i)*, *InReturn (ii)*, and *VOL* are explained by variables used in this study. In terms of the main regression results of this study, Model A and Model B of Table 4 present that *INVSENT* is significantly and positively related to return on the first trading day, albeit the measurement (*InReturn (i)* or *InReturn (ii)*), at 95 percent confidence level. The positive coefficient of *INVSENT* implies the ability of the individual investors' sentiment in driving IPO aftermarket prices above the offer price, such that results in high first-day return. Meanwhile,

Table 3: Pearson Correlation Coefficients among Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. InReturn	1	−0.284	0.130	−0.216	0.015	−0.051	−0.217	−0.118	0.017	0.019	−0.081	−0.097	0.006	−0.015
2. LoReturn		1	0.027	0.050	0.027	−0.008	−0.048	−0.105	−0.033	0.005	0.003	0.028	−0.003	−0.063
3. INVSENT			1	0.078	−0.019	0.078	−0.013	−0.032	−0.007	0.041	0.107	−0.003	−0.027	0.087
4. ISSIZE				1	0.130	0.048	0.198	0.150	0.375	−0.172	0.007	0.029	0.021	0.200
5. UNDREP					1	0.130	−0.036	−0.044	0.229	−0.028	−0.003	0.030	0.046	0.059
6. PROCEED						1	0.063	0.150	−0.059	−0.015	0.007	0.019	−0.019	0.013
7. OFPRICE							1	0.875	−0.154	0.022	−0.161	0.015	0.029	0.072
8. HIPRICE								1	−0.112	0.025	−0.147	0.020	0.030	−0.008
9. ALLOT									1	−0.161	0.008	0.025	0.001	0.071
10. FISIZE										1	−0.020	0.001	0.000	−0.067
11. AGE											1	−0.038	−0.020	0.045
12. INDUSTRY												1	0.000	−0.026
13. ROE													1	−0.044
14. MKTCON														1

Notes: InReturn = return on the first trading day, LoReturn = return on the first six trading months, VOL = trading volume on the first trading day, INVSENT = individual investors sentiment, ISSIZE = issue size, UNDREP = underwriter reputation, PROCEED = intended use of proceeds, PUOFFER = size of public offerings, HIPRICE = high range price, ALLOT = size of over allotments, FISIZE = firm size, AGE = age, IND = dummy industry, NPM = average 3 years net profit margin prior listing, ROE = average 3 years return on equity prior to listing and MKTCON = market condition.

the significant relationship (t -statistics of 2.929 and 2.388 in Model A and Model B) indicates the ability of individual investors to explain returns on the first trading day through their sentiment (or at least attention) on an IPO. In a way, this finding provides initial support to the overvaluation hypothesis that investors' optimism will push the price of IPOs higher than intrinsic values responding to the high demand of the IPOs (Baker & Wurgler, 2007; Anusakumar et al., 2017). The finding in Model A and Model B of Table 4 enables this study to support its *Hypothesis 1* that returns on the first trading day are positively related to individual investors' sentiment. This study is also able to offer support to the finding reported in (Cornelli et al., 2006; Da et al., 2011; Derrien, 2005; Dorn, 2009; Jiang & Li, 2016; Tsukioka et al., 2018; Song et al., 2014; Zuo et al., 2010).

Another main regression result of this study, as depicted in Model C of Table 4, presents that individual investors' sentiment is significantly positively related to trading volume on the first trading (VOL). The positive coefficient of INVSENT shows the intensity of the individual investors' sentiment in departing aftermarket prices above the offer price that motivates shareholders (i.e., those who already hold ownership of the IPOs) to sell their shares as such increases share turnover during the listing day. Meanwhile, in a way,

the significant relationship (looking at the t -statistics of 2.159 in Model C) indicates the ability of individual investors to explain trading volume on the first trading day through their sentiment or attention on an IPO. In another way, the postulation that the informed or institutional investors and other investors have received an allocation of the IPOs in the pre-market to make a short-term profit by flipping their IPO shares as early as in the first trading day seems to be supported. Overall, the finding reported in Model C of Table 4 enables this study to support its *Hypothesis 2* that trading volume on the first trading day is positively related to individual investors' sentiment.

In the earlier section, this study proposes that the positive mean return will last only within the first few days after IPO listing as individual investors usually are uninformed or irrational investors who will demand shares only based on their personal preferences. Their preferences are argued not to persist to period months after the IPO listing mainly due to their nature of being profit-oriented investors seeking quick capital appreciation and returns. That is, individual investors will prioritize to short-term investment horizon for maximization of their return objectives. Following the overvaluation hypothesis, shares' price reversals should be predicted once the effect of individual investors' optimism

Table 4: Regression Results on IPO Return on First Trading Day

Dependent Variable	Model A: InReturn (i)	Model B: InReturn (ii)	Model C: VOL
Main Independent Variable			
INVSENT	46.627 (2.929)***	35.861 (2.388)**	0.044 (2.159)**
Control Variables			
ISSIZE	−27.577 (−4.834) ***	−27.991 (−5.201) ***	−0.175 (−5.435) ***
UNDREP	1.657 (0.201)	2.227 (0.286)	0.026 (0.252)
PROCEED	−2.775 (−0.273)	−0.047 (−0.005)	0.159 (2.317)**
OFPRICE	20.724 (1.613)	19.402 (1.601)	9.187 (0.111)
HIPRICE	0.002 (0.407)	0.002 (0.352)	0.000 (3.591)***
ALLOT	16.880 (2.678)***	17.182 (2.889)***	−0.083 (−1.825)*
FISIZE	−0.000 (−2.533)**	−0.000 (−2.597)***	−0.000 (−4.292)***
AGE	−0.624 (−3.088)***	−0.469 (−2.459)**	−0.004 (−2.729)***
INDUSTRY	23.058 (0.271)	16.676 (0.208)	−0.472 (−5.222)***
ROE	−0.000 (−0.967)	−0.000 (−1.046)	0.000 (0.675)
MKTCON	0.000 (2.040)**	0.000 (2.417)**	−0.000 (−3.929)***
R^2	0.125	0.127	0.156
Adjusted R^2	0.104	0.106	0.136
Δ Adjusted R^2	0.021	0.021	0.020
F -statistics	5.905	6.040	7.661
p -value (F -stats)	0.000	0.000	0.000
Durbin-Watson	1.588	1.601	1.762

Notes: InReturn = return on the first trading day, InReturn (i) = return on the first trading day measured by the percentage change between offer price and closing price of an IPO on the first trading day, InReturn (ii) = return on the first trading day measured by the percentage change between offer price and open price of an IPO on the first trading day VOL = trading volume on the first trading day, INVSENT = individual investors sentiment, ISSIZE = issue size, UNDREP = underwriter reputation, PROCEED = intended use of proceeds, OFPRICE = reciprocal of the offer price, HIPRICE = high range price, ALLOT = size of over-allotments, FISIZE = firm size, AGE = age, INDUSTRY = dummy industry, ROE = average 3 years return on equity prior to listing and MKTCON = market condition. Sample size, $n = 520$. The t -statistics are reported in 'parentheses.'

on shares price has disappeared (Song et al., 2014). This proposition leads this study to hypothesize a negative relationship between individual investors' sentiment in the pre-market and long-term IPO performance (i.e., return on the first trading year).

As shown in Table 5, Model A and Model B reported an adjusted R^2 of 8.90 percent. Overall, the regression models produce a slightly lower adjusted R -squared with a difference of 5 percent when LoReturn (i) and LoReturn (ii) are employed as the measurement for IPO aftermarket return compared to 13.70 percent and 13.50 percent of adjusted R -squared when InReturn (i) and InReturn (ii) are used.

Despite the difference, the values indicate that collectively all explanatory variables Table 5 can explain at least 8.90 percent of the variation in *LoReturn*. Model A and Model B of Table 6 reports that *INVSENT* is negatively related to return on the first trading year for both measurements (LoReturn (i) and LoReturn (ii)). The negative coefficient of *INVSENT* implies the potential ability of the individual investors' sentiment in pushing long-term aftermarket prices lower than those in the short term. Nonetheless, this study is unable to confirm the significant influence of *INVSENT* on *LoReturn* as both models show the t -statistics value of -0.737 (Model A) and -0.515 (Model B), which the values are lower than the cut-

Table 5: Regression Results on IPO Return on First Trading Year

Dependent Variable	Model A: LoReturn (i)	Model B: LoReturn (ii)
Main Independent Variable		
INVSENT	−0.015 (−0.737)	−0.006 (−0.515)
Control Variables		
ISSIZE	12.597 (3.322) ***	12.517 (3.327) ***
UNDREP	5.281 (0.461)	5.154 (0.441)
PROCEED	−22.067 (−1.000)	−22.071 (−0.999)
OFPRICE	0.015 (0.854)	0.015 (0.854)
HIPRICE	−0.031 (−1.695) *	−0.031 (−1.689) *
ALLOT	−5.663 (−1.804) *	−5.688 (−1.814) *
FISIZE	−1.232 (−0.703)	−1.258 (−0.723)
AGE	−0.142 (−0.801)	−0.143 (−0.814)
INDUSTRY	1.345 (0.657)	1.223 (0.556)
ROE	−0.000 (−0.680)	−0.000 (−0.672)
MKTCON	−1.140 (−2.318) **	−1.140 (−2.341) **
R^2	0.093	0.093
Adjusted R^2	0.089	0.089
Δ Adjusted R^2	0.024	0.024
F -statistics	1.822	1.803
p -value (F -stats)	0.048	0.051
Durbin-Watson	1.986	1.985

Notes: LoReturn (i) = return on the first trading year measured by the percentage change between the closing price on the first trading day and the closing price of an IPO on the first trading year. LoReturn (ii) return on the first trading year measured by the percentage change between opening price on the first trading day and opening price of an IPO on the first trading year. INVSENT = individual investors sentiment, ISSIZE = issue size, UNDREP = underwriter reputation, PROCEED = intended use of proceeds, OFPRICE = reciprocal of offer price, HIPRICE = high range price, ALLOT = size of over-allotments, FISIZE = firm size, AGE = age, IND = dummy industry, ROE = average 3 years return on equity prior to listing and MKTCON = market condition. Sample size, $n = 454$. The t -statistics are reported in 'parentheses.' The potential of autocorrelation is reduced using the Newey- West test. Asterisks***, ** and * indicate significance at 1%, 5%, and 10%, respectively.

off point of 10 percent significant level. In other words, this study is not able to support its Hypothesis 3 that IPO return on the first trading year is negatively and significantly related to individual investors' sentiment, at least from the view of 520 Japanese IPOs issued from January 2010 to December

2019 and employed as a sample of this study. In spite of the insignificant relationship between *INVSENT* and *LoReturn*, to a certain extent, this study is able to offer supports to the proposition that IPO aftermarket performance is explained by the presence of the individual investors' short-term overreaction, at least from the perspective of IPO initial aftermarket performance (i.e., return on the first trading day as well as trading volume on the first trading day. Nonetheless, the finding of Model A and Model B of Table contradicts that found in Tsukioka et al. (2018) on the significant influence of individual investors' sentiment on return on the first trading year. The difference in the sample of IPOs and measurement of individual investors sentiment used in the study could be of the rationale to this different result.

5. Conclusion and Recommendation

This study investigates the ability of individual investors' sentiment in explaining Japanese IPO aftermarket performance (measured by return and trading volume on the first trading day and return on the first trading year after listing), using a sample of 520 IPOs issued from January 2010 to December 2019. This study observes the individual investors' sentiment 15 days prior to the listing of an IPO using Google's Search Volume Index in its attempt to capture the investors' participation from the starting day of the book-building stage. The main contribution of this study is the emphasis on the influence of individual investors sentiment, particularly from a market where the individual investors' participation is large and can be estimated at a suitable time (i.e., as early as during the book-building stage or on the day when revised prospectus starts to be distributed to individual investors making the listing of an IPO firm known by individual investors).

The main findings of this study reveal that individual investors' sentiment is positively and significantly related to returns and trading volume on the first trading day. This finding enables this study to offer initial support to the overvaluation hypothesis that individual investors' optimism will push the price of IPOs on the first trading day higher than intrinsic values, responding to the high favoritism from investors and demand to the IPOs. Following the increment in the price of the shares, higher return and share turnover on the first trading day is found, statistically. Nonetheless, the influence of individual investors' optimism on long-term aftermarket performance is rather complex and unclear, at least from the perspective of 520 IPOs issued in the Japanese market during the sample period. This study is unable to support further that the short-term overreaction or optimism of individual investors will lead to significant price reversals over the long term (i.e., one year) despite the negative coefficient value reported for individual investor sentiment in the regression analysis.

In brief, this study provides additional findings concerning how the return and trading volume of IPOs are influenced, particularly in a market where starting day of the participation of individual investors can be captured, precisely. This is expected to be a piece of contribution in the literature of individual investors' sentiment on IPO markets. More extensive examinations are still demanded prior to any concrete conclusion on the influence of individual investors' sentiment on IPO aftermarket performance. This study examines a direct relationship between individual investors' sentiment and IPO aftermarket performance. However, the direct relationship could be dynamically extended by considering interacting effects between investor sentiment and the offer price at the filling range's maximum point. It can be argued that there is an existence of a dual effect of investors' sentiment and offer price at the filling range on IPO aftermarket performance as the offer price to be set during the book-building stage will be influenced by investors' optimism. In contrast, in the meantime, positive investors' sentiment can be created when an IPO is offered strategically at a price similar to the one at the highest value in the filing range. A proper understanding of how investors' sentiment and offer price concurrently can influence IPO aftermarket performance should be a direction for future studies. Further, employment of different proxies for individual investor sentiment as well as the observation of investors' sentiment after IPO listing could also offer future studies an opportunity to detect dynamic changes in the relationship between investor sentiment and price as well as return trends after IPOs.

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