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Abstract

This article studies the disclosure practices of Japanese IPO prospects as a proxy for the capital cost after a company is admitted to the stock exchange, and the subsequent effect on their long-term stock performance and the bid-ask spread. A disclosure index methodology was imposed on 120 IPO prospects in 2003 in order to define the nature and extent of intellectual capital disclosures and study the effects of the asymmetrical information on stock price valuation. Intellectual capital information is important for the capital market, because it often leads to significantly better long-term performances compared to reference portfolios. Furthermore, the initial disclosure of IC is important in an IPO setting, because it reduces the long-term bid-ask spread. However, there are some limitations to our findings. The data presented here in reflects only one year of IPO's on the Tokyo Stock Exchange. Therefore, the results must be read with consideration specifically to the stock market environment in 2003, and may not reflect the normal cyclical market year. Analysts and investors, however, can still attain higher long-term returns by understanding IC. This seems contradictory to the fact that their interest in IC disclosure is low. This article is the first to discuss the correlation between voluntary disclosure practices and the long-term effects of asymmetrical information in Japan.

Paper Type: Research paper

Highlights: (3-5 bullet points with 85 characters max each)

- We study the effects of IPO prospect disclosure practices on the long-term stock performance.
- We used the disclosure index methodology applied on 120 prospects in 2003.
- Intellectual capital information leads to significantly better long-term performance.
- Analysts and investors can attain higher long-term returns by better understanding IC.

Keywords (6 max): Voluntary disclosures, intellectual capital, IPO prospects, long-term performance, bid-ask spread, Japan

Abbreviations

Ministry of Economy, Trade, and Industry (METI)
Intellectual Asset-based Management (IAbM)

1. Introduction

Capital markets depend on the flow of information between companies and investors directly and indirectly through financial intermediaries, such as analysts, to function efficiently. Asymmetric information will always be present to some extent because investors will never have the same information as the company's top management team. However, good information disclosure practices have shown to be advantageous for both investors and companies.

The general hypothesis in the last couple of decades is that accounting information is probably still the most important information, but insufficient for investors and analysts when they are evaluating companies. Additionally, this insufficiency is especially problematic when the investor is not familiar with a company, such as companies that have not previously been traded publicly. The ability to attract capital is vital for many industrial sectors in today's market. Therefore, this article studies disclosures made during the initial public offering (IPO) process when investors' are actively building their knowledge of the company.

Studying voluntary disclosures for IPO prospects has a two-fold significance. It is not only crucial for academia, but also for stakeholders in financial markets. Firstly, companies need to constantly pursue enhancing disclosure practices by minimizing, prioritizing, and structuring corporate information according to strategy, value creation, intellectual capital (IC), and environmental, social, and governing factors. This is important because it will help them be more transparent in a competitive global informative environment that addresses a multitude of different stakeholders who can potentially show interest in the company's message. Secondly, a better understanding of the types of voluntary information disclosures focusing on the valuation process will also positively affect the capital markets ability to function effectively, because it increases transparency and decreases asymmetrical information [1]. Many intellectual capital disclosures are voluntary while the measurement and recognition of intangible assets is limited (e.g. [2,3,4]).

There has been a noticeable examination of voluntary disclosure affects on IPO prospects. Studies show that improved disclosure practices are good proxies for reducing *ex ante* uncertainty, e.g. asymmetric information [1]. There of course, does exist a number

of other metrics that may affect the stock price performance of new listings, such as retained ownership [5], disclosure of earning forecasts for IPO prospects [6], and the reputation of the underwriter [7]. However, these factors are not within the main focus of this paper.

[8] argue that information dissonance between corporate managements and the financial markets at the time of the IPO will lead to higher capital costs. They argue that companies can literally use voluntary disclosure as a tool to help mitigate these costs. Furthermore, they also found that disclosure has a negative association with the bid-ask spread, which is also a proxy for a company's cost of capital. In light of these findings from [8], we will use this study to examine the long-term stock price performance effects from intellectual capital disclosures on a sample of companies that were introduced to the Tokyo Stock Exchange in 2003.

Voluntary disclosure practices in Japanese annual reports were studied before when Japanese industrial practices were at the forefront of production management (e.g. [9]). However, it seems that the Japanese leadership of knowledge management and intellectual capital have caught up to the industrialized world in the last 15-20 years, which is in line with Nikkei, the leading stock market index.

The timing of our dataset corresponds to a rising focus from the government on managing knowledge and intellectual capital. The "Intellectual Asset-based Management (IAbM) was developed under the direction of the Japanese Ministry of Economy, Trade, and Industry (METI) in October 2005. Additionally, METI started to play a central role in the World Intellectual Capital Initiative.

Japanese studies on the importance of voluntary disclosure for the capital market has been scarce even though Japan has historically been strongly considered a knowledge-based society. Researchers Dawson and Hiraki [10], Pettway and Kaneko [11], and more recently by Pettway, Thosar, and Walker [12] had previously examined the aspects of Japanese IPO performance. However, to our knowledge, there has only been one previous paper that examined the informational effects of voluntary disclosures for Japanese IPO prospects [13]. Therefore, this study contributes an examination of the effects of voluntary disclosures on intellectual capital and strategies for under-pricing the company's capital cost and stock prices after introduction on the stock exchange.

However, there are some limitations to this study that should be noted. The data presented here is only representative of one single year of IPO's on the Nikkei Stock Exchange. Therefore, the results must be taken under that consideration. The stock market environment in 2003 may not reflect the normal cyclical economic year appropriately. In 2001, more IPO's used book building[1] considerably more than other possible auction methods in Japan.

The remainder of this paper is structured as follows. Section 2 describes the theoretical foundations of the study and proposes the formulation of the hypotheses concerning IPO under-pricing and capital cost measured through the bid-ask spread in stock over time. In section 3, we explain the applied research methods, and section 4 showcases the results of the analysis. Section 5 will finally discuss the concluding remarks.

2. The Effects of Disclosure on the Initial Valuation and Capital Cost

Voluntary disclosures are expected to lower the cost of equity capital (see [15]), because an increase in disclosures reduces asymmetric information and enhances stock market liquidity by increasing the demand for a company's stocks [16,17]. Consequently, this may facilitate a more precise valuation of the company. Both Botosan [16] and Richardson and Welker [18] confirm that the quantity and quality of disclosures has a negative correlation to the cost of equity capital for companies.

The academic literature that contribute to IPO valuation is rich (cf. [19]) and usually examine the long-term performance of IPO's according to their industrial sectors [20]. In Asia, especially China (cf. [21, 22]) and Japan (cf. [23, 24, 25]), the stock markets have recently come under scrutiny with regards to the performance related characteristics of IPO's. A specific stream of research has studied how the quality of IPO prospect information affects the pricing of the IPO's examining characteristics of intellectual capital

[1] The underwriter in book building looks for interest from investors and sets a minimum and maximum price for the IPO. Institutional investors submit nonbinding price and quantity interests to the underwriter. The underwriter can accept the quantified interests above the price and of the final offer price and then sells any remaining shares to the public ([14], pp. 1130-1140.)

disclosures (e.g. [26, 27, 28]) and general information disclosures [29]. Singh and Van der Zahn [30] found a positive association between under-pricing and the extent of intellectual capital disclosures in Singaporean IPO prospects.

In the wake of this specific stream of literature, this study focuses on voluntary disclosures of intellectual capital for Japanese IPO prospects that have a performance related effect. Therefore, there is a practical contribution from examining whether certain types of information help Japanese investors pick stocks with the best long-term performance. Subsequently, a discussion is outlined to determine the voluntary IPO disclosures that are correlated with long-term performance and the bid-ask spread, and leads to this study's hypothesis.

2.1 A Stock's Long-term Performance

A substantial informational-economics body of research has concentrated on why companies disclose more information than required by regulations (cf. [1]).

A lot of recent research has focused on the long-term performance of IPO's. A thorough review of this previous literature can be found in Ritter [31], who also found evidence of IPO's under-performing substantially compared to a matching sample of firms measured from the closing price on the first day of public trading to their three-year anniversaries (about 29% in the third year after launch). Most long-term IPO performance studies have been conducted in the U.S. where companies generally underperform compared to market benchmarks. For example, Rajan and Servaes [32] show that long-term IPO's underperform by 17-47% compared to the market standard. Additionally, Carter *et al*. [33] shows that U.S. firms underperform by 19.9%. In the U.K., Kurshed *et al.* [34] found that IPO's on the London Main Market from 1991-1995 underperformed by 17.8%.

Although the U.S. and U.K. studies reveal strikingly similar results, Kurshed *et al.* [34] provides a brief overview of the field, and indicates that there are differences between countries. Australia was found to have the highest degree of underperformance at 51.0% [35] followed by Brazil at 47% [36]. Even though underperformance does seem to be a norm, there are some exceptions. Country specific studies in Korea done by Kim *et al.* [37] and Loughran *et al.* [38] in Sweden show that IPO companies outperform the market

by 91.6% and 1.2% respectively. Therefore, it is interesting to study the IPO performance in the Japanese context, because [13] shows that there can be some ambivalence with the results.

The typical explanation factors for long-term performance often include the following: the underwriters' reputation [33, 39], the structure within ownership [40, 41, 42, 25], the pre-IPO performance of a company [34], the degree to which the company is multinational [34], and the industry disparities [43].

Bessler and Bittelmeyer [44] found that innovation, patents, and intellectual capital are important factors that have a positive impact on the valuation and long-term financial performance of especially young technology firms. Guo *et al.* [45] found similar evidence where the R&D intensity factor is positively related to both long-term performance and under-pricing. Both of these results are directly relevant to this study's focus on intellectual capital disclosure for IPO prospects, and shows that there are a multitude of studies concerning the value relevance of innovations and patents (cf. [46, 47, 48]).

Therefore, it can be expected that companies who disclose a substantial amount of intellectual capital information will be associated with greater transparency and better long-term performances.

H1a: The extent of IPO prospect voluntary disclosure is positively associated with the long-term performance of the stock price.

H1b: The nature of IPO prospect voluntary disclosure does not have an effect on the long-term performance of the stock price equity.

2.2 The Bid-ask spread as a Proxy for the Capital Cost

The previous section set the expectation that good disclosure practices leading up to the IPO will affect the investor's perceptions of the stock price value, because good disclosure practices reduce asymmetric information between the company's management and investors (e.g. [46, 47]). Coller and Yohn [48] conclude in their study that better corporate disclosure leads to lower information asymmetry, which in turn reduces the ex-ante uncertainty, under-pricing, and the bid-ask spread. Good disclosure practices with positive results on reducing information asymmetry may be related to the amount of

information available for the IPO prospects [27], the inclusion of voluntary information on risk factors [49], or management forecasts [5].

The adverse selection theory states that information asymmetry between company management and the capital market manifests in reduced liquidity with relation to the company's stocks (see [39] for a thorough review of adverse selection models). This has the effect of companies being forced to release discounted stocks in order to convince investors to buy stocks for firms with lower levels of liquidity. This creates a higher capital cost for these companies. According to Diamond and Verrecchia [17], companies can offset this capital cost by increasing their information disclosures and thereby increase the interest in the stock and its liquidity. The bid-ask spread is a measure of the company liquid shares and is applied in this study as a proxy to examine the relationship between capital costs and disclosure levels.

There are a number of studies that attempt to link disclosure levels to the cost of capital. Welker [50], for example, concludes that disclosure levels reduce information asymmetry and increases stock liquidity. Botosan [16] expands these results by establishing that the relationship between disclosures and capital costs is especially present in companies with infrequent follow-up and analysis. Leuz and Verrecchia [51] (2000) further indicate similar conclusions. Although applying bid-ask spreads as a proxy for capital costs may not be as direct of a measure as underpricing [8], this study uses this variable because its strength is related to illustrated developments in information asymmetry over time.

The hypothesis is divided into two versions: a and b. Version a is in regards to the total extent of voluntary disclosure captured using the disclosure index. Version b looks at the nature of the voluntary disclosure through the disclosure index with special regard to the disparities according to the specific types of information that are disclosed.

H2a: The extent of voluntary IPO prospect disclosure is inversely associated with the bid-ask spread.

H2b: The nature of IPO prospect voluntary disclosure does not affect the bed-ask spread equally.

The next section describes the construct of the disclosure index and the statistical tests applied to analyze the data.

3. Research Method

There is an extensive amount of accounting literature that provides a framework for studying the nature and extent of corporate disclosure (cf. [52, 53, 54]). The most frequently applied frameworks divide corporate disclosures into the following categories: mandatory disclosure studies [55], voluntary disclosure studies [56, 57, 58], and disclosure studies that consider both mandatory and voluntary disclosure items [59, 60]. Rather than considering the mandatory or voluntary nature of information, this present study focuses on the effect of all information types inherent in the narrative sections of IPO prospects, and argues that the user must understand the value relevance of information.

3.1 The Disclosure Index

This study applies a disclosure index for the quantification of information levels disclosed by IPO prospects. In line with previous disclosure index studies, this study replicates the disclosure index used in a number of recent disclosure studies on IPO prospects done by Bukh *et al.* [26] who studied the Danish IPO's, Italian IPO's [27], Japanese IPO's [13], and Singaporean IPO's [30].

The particular research design was chosen for this study, because the application of the disclosure index on an IPO prospect is representative of the quality of the information that the company supplies to the capital market with relation to the IPO [26]. It is important to consider the reliability of the results and the objectivity of the study when applying such an approach [61].

In the present study, these criteria are handled through a thorough literature review of under-pricing and bid-ask spread studies. There are also clear instructions for the coding process and verifying the coding through separate codes from multiple researchers (cf. [62, 59, 63]). Beattie *et al.* [59] argues that the amount disclosed might not be an exact indicator of the quality of disclosures. The disclosure extent may also be affected by factors, such as the CEO's ability to communicate clearly or accounting principle choices. However, since this study is concerned more with the effects of the extent and nature of

IPO prospect disclosures, the disclosure index methodology is a satisfactory option for fulfilling the study's requirements.

There are no widely accepted theoretical guidelines for selecting the items that make up a disclosure index [59]. Therefore, the successful use of the disclosure index methodology depends on a critical and cautious selection of items [64]. According to Bukh *et al.* [26], the items in the disclosure index were chosen based on a thorough inspection of the literature on corporate disclosure (cf. [65, 66, 67]) and intellectual capital reporting [57, 68, 69]. In regards to the intellectual capital statements, the experiences and results of the major Danish project concerning intellectual capital statements [68] were used as a major resource for insight.

This study looking at the extent of disclosure for non-accounting information, such as knowledge-based resources, strategy, and processes, for IPO prospects has a disclosure index that consists of 78 items divided into 6 different categories. All of the items in the disclosure index are listed in Appendix A. The descriptive statistics for each item is not discussed further in this paper.

The contents of each IPO prospect was compared to the items on the disclosure scoreboard and coded as 1 or 0, depending on whether the IPO contained or did not contain voluntary disclosure. The extent of disclosure was quantified accordingly as a percentage of the recorded information items found in the prospectus. This can be seen in the following formula, which was used to calculate the index score of each IPO prospectus:

$$DISC_i = (\sum_{i=1}^{m} d_i / M) \times 100\%$$

The D_i expresses $item_i$ with the value found in the IPO prospectus otherwise it was a 0. M expresses the maximum of information disclosed in the IPO, which could be up to 78 items. The analysis of the disclosure scoreboard for this study is additive and unweighted, which is in line with studies conducted by Adrem [52], Meek *et al.* [89] and Cooke [53]. All three studies refer to Spero's [70] empirical findings that give weight to information that is not relevant for several reasons. The most important one is to decrease subjectivity, which would be the case if applying special weights for different items, because the user's

preferences are not known. Hence, either a company discloses a voluntary item in its IPO prospectus or not, which show that the number of items measures the amount of disclosure directly. There is no ranking list given for the importance of different items to avoid the subjectivity of weight given to certain items. This procedure is corroborated by the criticisms discussed in the Hackston and Milne [71] study.

3.2 Data Sample and Descriptive Statistics

A number of previous studies were considered for this current study. Data from Professor Jay Ritter[2] shows that there is a marked difference between the general under-pricing of Japanese IPO's in the pre-late 1980's and post-late 1980's in relation to the amount of companies going public. We decided to focus on 2003 out of Ritter's dataset, because it represents a stratified sample (cf. [72]) both in relation to the number of IPO's[3] and the general level of under-pricing[4]. Additionally, 2003 was a normal year according to the business cycle and was not otherwise affected by a crisis.

The data for this study consists of all IPO prospects from the Tokyo Stock Exchange from January 1, 2003 to December 31, 2003. The 120 IPO prospects analyzed were obtained from the EOL online systems. Prospects disclosed in connection with capital increases, cross-listing arrangements, and companies issuing preferred shares only were excluded along with stock index funds, life investment funds, and real estate unit funds. The sample of IPO's is dispersed across a range of industrial classifications. Table 1 below classifies the number of IPO prospects available for analysis according to industrial classification. The table illustrates that technology companies comprise 3% of the sample, while consumer good companies comprise 30% of the sample.

[2] Jay Ritter's website contains a multitude of background information on global IPO's and background statistics. See: http://bear.warrington.ufl.edu/ritter/

[3] In 2003, there were 120 IPO's on the Tokyo Stock Exchange, while the average over the 20-year period from 1987 to 2006 was 118.

[4] In 2003, the average level of under-pricing was 45, 1% on the Tokyo Stock Exchange, while the average over the 20-year period from 1987 to 2006 was 38.3%.

Six-sector breakdown	Nikkei Industrial classification	N	Percentage of sample
Technology	Pharmaceuticals, Electric Machinery, Automobiles & Auto parts, Precision Instruments, Communications	37	30.83%
Financials	Banking, Other Financial Services, Securities, Insurance	4	3.33%
Consumer Goods	Fishery, Foods, Retail, Services	40	33.33%
Materials	Mining, Textiles & Apparel, Pulp & Paper, Chemicals, Petroleum, Rubber, Class & Ceramics, Steel, NonFerrous Metals, Trading Companies	17	14.17%
Capital Goods/Others	Construction, Machinery, Shipbuilding, Transportation Equipment, Other Manufacturing, Real Estate	21	17.50%
Transportation/ Utilities	Railway & Bus, Land Transport, Marine Transport, Air Transport, Warehousing, Electric Power, Gas	1	0.83%

Table 1: Industrial classification of data sample

Due to the statistical test performed below, the companies were divided into three groups according to the level of disclosure as follows:

1) The first and second tertile number of total index level was identified, measuring the extent of total disclosure and in 6 subcategories: Employees, Customers, IT, Processes, Research and Development, and Strategic Statements
2) The first tertile number stretches over low and medium groups. Therefore, the first tertile number was assigned into the low group if the first tertile number was below 33.3 percentile and more than the one above the 33.3%. The second tertile number also stretches over medium and high groups, and therefore, the second tertile number was assigned into the medium group if the second tertile number was below 66.7% but more than the one above 66.7%. Hence the dataset was divided into a high, medium, and low disclosure group.

3) The number of items disclosed in the sub-indices customers, IT, and processes were generally smaller, and therefore, it was necessary to divide these into only two separate side groups characterized by high and low disclosure according to the number of disclosed items. The identical dividing method is also applied by using the medium number of those three subcategories.

Type	**Total**	**Employee**	**Customer**	**IT**	**Processes**	**R&D**	**Strategic Statements**
Low disclosure	42	43	53	85	91	56	43
Medium disclosure	47	50	-	-	-	14	23
High disclosure	31	27	67	35	29	50	54
Total sample	120	120	120	120	120	120	120

Table 2: The number of companies in each disclosure group

In table 3 below, the descriptive statistics for the population is shown.

Type	Total			Employee			Customer		
	Mean	Medium	Standard Deviation	Mean	Medium	Standard Deviation	Mean	Medium	Standard Deviation
Low disclosure	8.95	9	2.84	1.23	1	0.68	0.81	1	0.39
Medium disclosure	17.34	17	2.61	3.34	3	0.48	-	-	-
High disclosure	28.19	27	5.61	5.70	5	0.95	2.79	2	1.05

Type	IT			Processes			R&D			Strategic Statements		
	Mean	Medium	Standard Deviation	Mean	Medium	Standard Deviation	Mean	Medium	Standard Deviation	Mean	Medium	Standard Deviation
Low disclosure	0	0	0	0	0	0	0	0	0	0.56	1.00	0.50
Medium disclosure	-	-	-	-	-	-	1	1	0	2	2	0
High disclosure	1.57	1.00	0.98	1.41	1.00	0.57	3.44	3.00	1.40	4.13	4.00	1.10

Table 3: Descriptive statistics of overall disclosure

3.3 Statistical Model

In order to answer the hypotheses set out in the theoretical section of this paper, two types of tests were applied to the data set. These are described separately in the next two sections concerning the long-term performance and bid-ask spreads.

3.3.1 Long-Term Performance

In Table 5 below, all the variables applied in the statistical correlation testing between disclosure and the long-term performance are described in detail.

Variable	**Description**
LTP_i	Difference between the initial offering price and the closing price on the day of the three-year anniversary for firm i, expressed as a percentage of the initial offering price
$DISC_i$	The total disclosure of firm i, expressed as a percentage of the total disclosure index
$CARRP_i$	Cumulative Average Returns, Reference Portfolio

Table 4: Summary variables and their proxy measure determination

In order to answer hypotheses 1a and 1b, a two-sample t test was applied with unequal variances for the total index (extent hypothesis 1a) and for each sub-index (nature; hypothesis 1b). Testing for under-pricing requires measuring the three-year stock-price performance variance between high and low disclosure level firms. For the analysis, there was an initial choice between calculating the abnormal long-term stock performance by using both the standard market model and the reference portfolio model. In the standard market model, the excess long-term stock returns would be compared against the Tokyo Stock Price Index, commonly known as TOPIX, which tracks all domestic companies on the First Section of the exchange. In the reference portfolio model, the excess long-term stock returns would be compared against a reference portfolio.

Barber and Lyon [73] or Kothari and Warner [74] studies have previously indicated that the cumulative abnormal return (CAR) compared against the market performance can result in misspecification. This problem implies that the statistical Type I error is more likely, or that the null hypothesis (that the abnormal return equals zero) is rejected more frequently by chance along. In Japan, previous research has also indicated that using the abnormal return (AR) with the TOPIX benchmark often has a positive bias. Hence, we chose to calculate the AR against the mean return of the reference portfolio in order to avoid misspecification problems. This reference portfolio is based on two major risk factors found in the stock samples: the book-to-market ratio and the firm size. The procedures employed in the construction of the reference portfolio are as follows:

(a) First, all stocks were identified, and listed during the same month that each IPO occurred. These stocks were divided into five groups based on firm size to define the boundaries of each quintile.

(b) Within each quintile, the stocks were further sorted into five groups based on the book-to-market ratio to define the boundaries of the inner quintile, creating twenty-five cells. Each IPO firm’s stock perfomance was compared to the average stock performance of firms in its corresponding cell, yielding its abnormal return.

3.3.2 Bid-ask Spread

A two-sample t test was applied with unequal variances for the total index (extent; hypothesis 2a) and for each sub-index (nature; hypothesis 2b) in order to answer hypotheses 2a and 2b. When testing for the bid-ask spread, we measured the one-year average closing bid-ask stock-price contrast between high and low level disclosure firms, as depicted in section 3.2 after the IPO.

The bid-ask spread is calculated with the following formula:

Bid-ask spread = (closing bid price – closing ask price) / closing stock price.

Table 5 below shows all of the variables applied in the statistical testing for the correlation between disclosure and bid-ask spreads according to their specific determination, and they are described in detail.

Variable	**Description**
$DISC_i$	The total disclosure of firm i, expressed as a percentage of the total disclosure index
$BAS1YRAVG_i$	The one-year average bid ask spread

Table 5: Summary variables and their proxy measure determination

4. Results

4.1 Long-Term Performance

Table 6 shows the three-year abnormal return for both high and low total disclosure groups and the following subcategories: Employees, Customers, IT, Processes, Research and Development, and Strategic Statements. In regards to the total disclosure level, the three-year abnormal return of the high disclosure group is 99.25%, which is larger than that of the low disclosure group at 28.78% at a 5% significance level. These results support H1a, which addresses the issue of to what extent voluntary disclosure is positively associated with the long-term stock performance.

In regards to the Employees subcategory, the three-year abnormal return of the high disclosure group is 111.24 % greater than that of the low disclosure group at 29.68% at a 1% significance level. For the IT and Processes subcategories, the three-year abnormal return for the high disclosure group is 85.91% and 77.99% respectively. These numbers are insignificantly greater than the percentages for their low disclosure group counterparts at 63.67% and 67.67% respectively. However, in regards to the Research and Development subcategory, the three-year abnormal return for the high disclosure group is 45.83%, which is smaller than the low disclosure group at 90.70% with a 10% significance level. Additionally, the Customers and Strategic Statements subcategory, have a three-year abnormal return of 63.07% and 60.85% for the high groups respectively. These numbers are insignificantly smaller that the low disclosure group at 78.66% and 82.75%. Therefore, the results for the Employees, IT, and Processes subcategories are a rejection of H1b. It can therefore be concluded from the total disclosure level results that employee related disclosures are the key factor in predicting the long-term performance of IPO's.

	Average low disclosure group	**Average high disclosure group**	**Significance**	**Comments**
Total index	28.78%	99.15%	Pr(T < t)=0.0072	Very significant and a positive relation
Employees	29.68%	111.24%	Pr(T < t)=0.0038	Very significant and a positive relation
Customers	78.66%	63.07%	Pr(T < t)=0.5065	No difference, slightly opposite sign
IT	63.67%	85.91%	Pr(T < t)=0.4238	No difference, slightly positive sign
Processes	67.67%	77.99%	Pr(T < t)=0.7390	No difference, slightly positive sign
R&D	90.70%	45.38%	Pr(T < t)=0.0332	Significant and opposite sign than expected
Strategic statements	82.75%	60.85%	Pr(T < t)=0.4302	No difference, slightly opposite sign

Table 6: Results of Cumulative Average Returns to Reference portfolio

4.2 Bid-ask Spread

Table 7 shows the one-year average bid-ask spread of both the high and low total-disclosure groups according to the following subcategories: Employees, Customers, IT, Processes, Research and Development, and Strategic Statements. With regards to the total disclosure level, the one-year average bid-ask spread in the high disclosure group is 1.370%, which is smaller than that of the low disclosure group at 1.726% with a 10% significance level. These results supports H2a, which addresses to what extent voluntary disclosure is inversely associated with the bid-ask spread.

	Average low disclosure group	Average high disclosure group	Significance	Comments
Total index	1.726%	1.370%	Pr(T < t)=0.0603	Very significant and a positive relation
Employees	1.702%	1.436%	Pr(T < t)=0.1882	No difference, slightly positive sign
Customers	1.641%	1.341%	Pr(T < t)=0.0259	Very significant and a positive relation
IT	1.500%	1.410%	Pr(T < t)=0.5638	No difference, slightly positive sign
Processes	1.473%	1.476%	Pr(T < t)=0.9888	No difference, slightly opposite sign
R&D	1.486%	1.363%	Pr(T < t)=0.3493	No difference, slightly positive sign
Strategic statements	1.564%	1.475%	Pr(T < t)=0.5574	No difference, slightly positive sign

Table 7: Results of One-year Average Bid-Ask Spread

Considering Customers subcategory, the one-year average bid-ask spread in the high disclosure group is 1.341% and is significantly smaller than in the low disclosure group at 1.642% at a 5% significance level. For the Employees, IT, Research and Development, and Strategic Statements subcategories, the one-year average bid-ask spread in the high disclosure group is 1.436%, 1.409%, 1.363%, and 1.475% respectively. These are insignificantly smaller than the average bid-ask spread found in the low disclosure groups

where the percentages are 1.701%, 1.500%, 1.486%, and 1.564% respectively. However, in the Processes subcategory, the one-year average bid-ask spread in the high disclosure group is 1.476%, which is insignificantly greater than that of the low disclosure group at 1.473%. Therefore, it can be concluded that the results for the Customers (significant), Employees and IT (insignificant) subcategories reject H2a. Together with the results from the total disclosure level, it is possible to conclude that customer related disclosures are the key factor for reducing the information asymmetry problem surrounding IPO's.

5. Discussion and Concluding Remarks

There has historically been some disagreement concerning the relationship between disclosure levels and their effects on the performance of IPO's. While Loughran and Ritter [75] argue that higher disclosure levels lead to poorer stock price performance for IPO's, Schrand and Verrecchia [8] demonstrate that the opposite is true and that more frequent disclosures before IPO's is associated with a lower capital cost through lower bid-ask spreads and analyst forecast dispersion. The focus in this paper is not the effects of voluntary disclosures on the short-term characteristics of IPO's such as under-pricing. Rather, it focuses on the voalue of certain information that has a correlation with the long-term value creation and financial sustainability of a company specifically through intellectual capital. Therefore, this paper seeks to understand how to help the capital market use long-term data to pick the best stocks for the long-run.

5.1 Discussion of Long-Term Performance Results

Intellectual capital was found to have a significant effect on the long-term stock price performance in our IPO sample, and therefore hypothesis H1a is upheld. Investing in companies that are more transparent about their value creation and softer values through a more comprehensive disclosure policy, such as strategies, business models, human resources, and other intellectual capital items, will lead to a significant over-performance in returns.

Our analysis also reveals that the employee category is the main driver of significant results that support hypothesis H1a with regards to the nature of the disclosures. The main elements of employee-related intellectual capital include aspects such as, departmental staff breakdown, employee expenses with consideration to the number of employees, policies on competence development, recruitment policies, remuneration and incentive systems, and the dependence on key personnel. Therefore, we can conclude that the resources described above are central elements of importance for companies that want to execute a long-term strategy. IPO prospects typically contain a thorough description of strategies for reaching main financial goals of the company (cf. [76, 77]).

The results also imply that companies who disclose the employee related intellectual capital information are signaling that they have a plan for managing these resources to the capital market. Therefore, this study confirms the findings of Sakakibara *et al.* [78] that analysts find this data relevant and they would be prone to use it if it were available. Furthermore, this means that the results of this study are in opposition with the propositions of Healy and Palepu [79] suggesting that voluntary disclosures, such as customer satisfaction and human capital, do not carry value independently and only management forecasts increase the predictability of stock price returns. Normative researchers, such as Healy and Palepu [79] miss the point that employee types of disclosures play an important role in the creation of accountability for management team signals [80]. Additionally, the findings from this study are also very much in line with the suggestions made by Mouritsen and Larsen [81] who argue for the importance of creating levers of control on unstable resources, such as human capital and competencies. An understanding and plan for managing these resources simultaneously signals to investors the ability to over-perform in the market.

Analysts and investors need to gain insight into the company's proposed platform for executing strategy in order to identify stocks that will outperform in the market. For example, they will need to ask themselves whether the company has the correct composition, alignment and incentivized human resources to leverage the proposed strategy. In addition, it is also imperative that the company has the right incentive programs for retaining these human resources from moving on to competing companies. In an acquisition setting, Ranft and Lord [82] confirm that the retention of specific types of human capital is critical for determining success in future performance. More interestingly,

they stress that soft incentives, such as autonomy, status and commitment, significantly affect retention, but economic incentives do not.

Surprisingly, the R&D category had an inverse effect than originally expected. The analysis revealed a significant difference where the low disclosure group had almost double the long-term performance of the high disclosure group, 90.7% versus 45.8% specifically. This may be an indication that there is a higher risk ascertained to R&D disclosures, such as statements of policy, strategy, and objectives of R&D, R&D expenses and R&D investments in product development and design and patents. This is interesting because we initially expected a positive view toward activities that are meant to sustain corporate profitability in the long term. Previous evidence presented by Eberhar *et al.* [83] of a non-IPO setting suggests that increases in R&D spending are beneficial to investors even if the market is slow to recognize this information. The alternative explanation for the IPO setting of this study is that the companies included reveal too much information in their prospectuses and too much of it is pushed into the stock price leaving no room for positive surprises. Companies, on the other hand, that do not reveal too much of this kind of information will more likely experience a lack of incorporation of this into the stock price in a gradual manner and increasing stock price returns. The synthesis of this discussion is that if companies only reveal R&D expenditures, then the market will incorporate them gradually. However, if the company discloses sufficient information for investors to understand, then this information is incorporated into the stock prices immediately.

The capital market is very focused and perhaps also very bullish on information, such as R&D spending, R&D strategy, and patents. We can speculate that it is in general easier for analysts and investors to understand and relate R&D information. For example, patents and R&D spending to cash flow predictions rather than some other information categories in the intellectual capital index, such as employee resources, internal processes, customer loyalty, etc. Meanwhile, we should also be wary that analysts and investors might be prone to include this information in an uncritical manner. They might put too large of values into their spreadsheets or fail to discount enough for the risks ascertained to R&D uncertainties. Faulkner [84] accentuates this perspective in his criticism of the use of DCF models to value R&D projects, and concludes that real option theories are a much more appropriate tool.

5.2 Discussion of Results Concerning Bid-ask Spreads

Generally, higher disclosure of intellectual capital affects the bid-ask spreads positively when it is measured according to the one-year average trading. This indicates that intellectual capital information is a significant component for investors when they are assessing information asymmetries. Accordingly, this voluntary information disclosure reduces *ex ante* uncertainty and thereby the capital cost of IPO companies. The fact that disclosed intellectual capital information before the IPO has a significant long-term effect on the capital cost is explained by the higher transparency of the company. It is interesting that the companies in the high disclosure group are able to sustain this advantage over such a long period. There are two possible explanations for this. The first one is that it takes time to change the information supply of a company, because it is strongly rooted in the corporate culture as suggested by a vast number of corporate communication literatures. The other explanation is the reputation effect of transparency and the difficulty of altering the capital market's perception of transparency in the short term.

Almost all of the subcomponents in the intellectual capital index had the predicted sign in the bid-ask analysis. However, it was the customer component that was the main driver of the overall index, because it was both positive and significant. The primary types of disclosed information were customer segment information and customer intimacy. Customer segment information is important for creating transparency about the strength of various segments and our findings contradict those of Ali *et al.* [85] who indicated that companies with strategic competitive advantages attempt to protect their market shares by disclosing less information. This segment information also conveys a deeper understanding of how the company differentiates its offerings between customer groups, and illustrates the company's ability to fine-tune its strategies to fit various customer groups. This information is important for investors to estimate how the company will generate revenue in the future and create future cash flow. Financial analysts spend a particular amount of time digging into these matters.

Customer intimacy, which covers customer relationship, customer involvement, and dependence on key customers, is also a part of giving analysts and investors a feeling of security concerning the future cash flow of the company and reducing the cost of capital.

This is because there are strong ties between a sustained higher operating profitability and strong customer relations and organizational structures (cf. [86] Gosman *et al.* 2004). Interestingly, one component of the customer subcategory was surprisingly not disclosed to any extent, the market share. Market share can be very useful for the capital market, because it is an easy way to estimate future revenue. However, the lack of this information can be caused by two factors. Firstly, the IPO companies may have difficulties projecting their market share moving forward as they enter a new era. Secondly, this may be due to reasons of intentional secrecy. Harris [87] and Ali *et al.* [85] confirm this speculation finding that firms, regardless of the competitive landscape, are reluctant to provide segment disclosures for the fear of losing both abnormal profits and potential market share.

5.3 Concluding Remarks

Summarily, this study contributes an examination of the effects of intellectual capital voluntary disclosures on the long-term performance of the stock price after the introduction on the stock exchange and the company's capital cost estimated through statistical tests on the bid-ask spread. The findings are discussed above against recent findings and lead us to conclude the following:

- IC voluntary disclosures are generally relevant pieces of information for investors who assess the company's long-term performance. If IC information were to be provided it would clearly be advantageous for investors to make use of it in their decision-making. In regards to total disclosure, the three-year abnormal return of the high disclosure group is 99.15%. This result is significantly larger than that of the low disclosure group at 28.78%. We found this evidence to be consistent with Bessler and Bittelmeyer [44] and Guo *et al.* [45].
- Both employee and R&D related information is considered to be IC information. However, investors incorporate them differently into the long-term stock prices. Employee-related intellectual capital is a key resource for companies to execute their long-term strategy, and therefore, investors gradually evaluate this type of information and whether companies have an understanding and a plan for

managing these resources to reach a strategic goal [81]. Our evidence suggests that if a company discloses more information about its employees, it creates credibility for its competence for executing a long-term strategy. This signifies the ability to over-perform in the market. On the other hand, R&D information is also a core element for companies. However, this type of information helps investors estimate cash flow or revenue predictions. Therefore, investors might have pushed too much of this type of information into the stock price in the short term, and leaves no room for positive surprises. Eberhart *et al.* [83] show that the market is slow at recognizing the extent of beneficial R&D investment when a company only discloses R&D cost information. Our findings are consistent with Eberhart *et al.* [83] and provides further evidence that if a company discloses more R&D information, it might help investors estimate R&D driven cash flow predictions in the short term.

- Voluntary IC disclosures generally reduce information asymmetries surrounding the IPO and this effect is persistent in the long term. In regards to total disclosure levels, the one-year bid-ask spread of the high disclosure group is 1.370%. This result is smaller than that of the low disclosure group that reports a 1.726%. This evidence is consistent with Diamond and Verrecchia [17] and Verrecchia [15].
- Customer related information is important for investors to estimate how a company will generate revenue in the future. Investors will gain confidence about future revenue if a company discloses information about its major customers and customer involvement and relationships. Gosman *et al.* [86] showed that the pricing of major customers is consistent with the market recognition of sustainable operating profitability. Our findings are consistent with Gosman *et al.* [86], and provides further evidence that if a company discloses more customer-related information, it will enhance its transparency and narrow the bid-ask spread by lowering the capital cost.

Looking at prospects for future research it seems potentially advantageous to study this phenomenon over the entire business cycle, such as a longitudinal database. This would enable us to determine whether there is a business cycle affect on the importance of IC in investment decisions and corporate transparency. Additionally, understanding the

importance of IC from the capital market perspective is an important element of the on-going integrated reporting initiatives (cf. [88]). Finally, there is a stream of upcoming research on the importance of business models for capital allocation and investment decisions. In order to contribute meaningfully to this field, studies, such as this one, would need to include a focus on the profit-formula of companies and how strategic partnerships are leveraged to create value across the value chain.

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