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IC and the long-term performance of Japanese IPOs

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The effects of disclosing intellectual capital information on the long-term stock price performance of Japanese IPO's

Authors

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Structured abstract

Purpose – This article studies the effects of disclosure practices of Japanese IPO prospectuses on long-term stock performance and bid-ask spread, as a proxy for cost of capital, after a company is admitted to the stock exchange.

Design/methodology/approach – A disclosure index methodology is applied on 120 IPO prospectuses from 2003 to define the nature and extent of the disclosures concerning intellectual capital in order to study the effects of information asymmetries on stock price valuation.

Findings – Intellectual capital information leads to significantly better long-term performance against a reference portfolio, and is thus important to the capital market. Further, superior disclosure of IC reduces bid-ask spread in the long-term, indicating that such disclosures are important in an IPO setting

Research limitations/implications – There are some limitations to the findings. The data presented here reflects only one year of IPO's on the Tokyo Stock Exchange. Therefore, the results must be read with some caution, as the stock market environment in the particular year, 2003, may not reflect that of a normal “over the cycle” year.

Practical implications – Analysts and investors can attain higher long-term returns by understanding IC. Therefore, it seems to be contradictory that their interest in IC disclosure is so low.

Originality/value – This article is the first one to discuss interrelations between voluntary disclosure practices and the long-term effects of information asymmetry in the Japanese context.

Keywords: Voluntary disclosures, intellectual capital, IPO prospectuses, long-term performance, bid-ask spread, cost of capital, Japan

Paper type: Research paper

1. Introduction

The efficient functioning of capital markets is dependent upon information flows between companies and investors, either directly or indirectly through financial intermediaries e.g. analysts. Information reduces investors' perceived risk when predicting a company's future performance. Information asymmetry will always be present to some extent, as investors never have the same information as the top management team in a company. However, but good information disclosure practices have been shown to be advantageous both from investor and company perspectives.

In the last couple decades it has been hypothesized that accounting information is, although probably still the most important information, insufficient for investors and analysts when they are seeking to value companies. Furthermore, it has been indicated that this insufficiency is especially problematic when a company is unknown to the investor, i.e. not previously been publically traded. The ability to attract capital is vital for many industrial sectors today. Information disclosure can reduce the perceived risk of the investors. Therefore, this article studies disclosures made during the IPO process, where building investors' knowledge of the company is very active.

Studying voluntary disclosures in IPO prospectuses has a two-fold significance. It is not just crucial for academia, but also for stakeholders on the financial markets. Firstly, companies need to continuously pursue enhanced disclosure practices by minimizing, prioritizing and structuring the corporate information in relation to strategy, value creation, intellectual capital (IC) as well as environmental, social and governance factors. This is important because they are competing for attention in a global information environment addressing a multitude of different stakeholders that potentially will take interest in the message being conveyed. Secondly, a better understanding of which types of voluntary information disclosure that focus on valuation processes will positively affect the functioning of the capital markets by increasing transparency and decreasing information asymmetry (Jenkinson and Ljungquist, 2001).

The effects of voluntary disclosure in IPO prospectuses have been examined noticeably in recent years. Studies show that improved disclosure practices are good proxies for reducing *ex ante* uncertainty, e.g. information asymmetry (Jenkinson and Ljungquist, 2001). Of course, there exist a number of other metrics that may affect the stock price performance of new listings, e.g. retained ownership (Jog and McConomy, 2003), disclosure of earnings forecasts in IPO prospectuses (Clarkson and Merkley, 1994) and underwriter reputation (Megginson and Weiss, 1991). However, these factors are outside the main focus of this paper.

Schrand and Verrecchia (2004) argue that information asymmetry between corporate management and the financial markets at the time of the IPO lead to higher costs of capital. They argue that companies literally can apply voluntary disclosure as a tool to reduce these costs. Further, they find disclosure to be negatively associated with bid-ask spread as a proxy for a company's cost of capital. In the light of the findings of Schrand and Verrecchia (2004), this study therefore examines

the long-term stock price performance effects of intellectual capital disclosures on a sample of companies that were introduced to the Tokyo Stock Exchange in 2003.

Why is Japan an interesting disclosure-case to study?

Voluntary disclosure practices in Japanese annual reports had been studied at a time where Japanese industrial practices were forefront in production management (e.g. Cooke 1991). However, Japan's leadership in knowledge management and intellectual capital seems to have been caught up by the rest of the industrialized world in the last 15-20 years in line with the leading stock market index the Nikkei.

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

Although Japan historically has been strongly associated with the knowledge-society, Japanese studies regarding the importance of voluntary disclosure for the capital market have been very scarce. Aspects of Japanese IPO performance have previously been examined by Dawson and Hiraki (1985), Pettway and Kaneko (1996), and more recently by Pettway, Thosar and Walker (2008). To the authors' knowledge of this article, only one previous paper has examined the informational effects of the voluntary disclosures included in Japanese IPO prospectuses (Rimmel, Nielsen and Yosano, 2009). Therefore, the contribution of this study is to examine the effects of voluntary disclosures on intellectual capital and strategy on the underpricing of the stock price subsequent to the introduction on the stock exchange as well as the companies' cost-of-capital.

There are some limitations to the findings of this study. The data presented reflects only one year of IPO's on the Nikkei Stock Exchange. Hence, the results must be read with some caution. The stock market environment in 2003 may not reflect that of a normal "over the business cycle" year. In 2001 book building¹ was a considerably more applied method than other possible auction methods for IPO's in Japan. Consequently, market participants may have acted differently as otherwise or still in accordance with old rules of thumb.

The remainder of the paper is structured as follows. Section 2 describes the theoretical foundations of the study and leads to the formulation of the hypotheses concerning IPO's underpricing and cost of capital measured as bid-ask spread in stock across time. In section 3, the applied research

¹ In book building the underwriter seeks indications of interest from investors and sets a minimum and maximum price for the IPO. Institutional investors submit nonbinding price and quantity indications to the underwriter. The underwriter, in selecting the final offer price, can accept the quantity indications above the price and sells any remaining shares to the public (Kutsuna & Smith, pp. 1130-1140).

methods are explained, while section 4 contains the results of our analysis. Finally, the discussion and concluding remarks are contained in section 5.

2. Disclosure effects on initial valuation and cost of capital

Voluntary disclosures are expected to lower the cost of equity capital (see Verrecchia 2001) because increased disclosure reduces information asymmetry and to enhance stock market liquidity by increasing the demand for a company's stocks. (Botosan, 1997; Diamond and Verrecchia, 1991). This in turn, may facilitate a more precise valuation of the company. Both Botosan (1997) and Richardson and Welker (2001) confirm that the quantity and quality of disclosure is negatively related to the cost of equity capital for companies.

The academic literature is rich with contributions on IPO valuation (cf. Kim and Ritter 1999) examining IPO's long-term performance and their industrial sectors (Akhigbe *et al.* 2006). In Asia, especially the Chinese (cf. Kao *et al.* 2009, Wang 2004) and Japanese (cf. Yamamoto 2009, Nagata and Rhee 2009, Kutsuna *et al.* 2002) stock markets have recently been under scrutiny with regards to the performance related characteristics of IPO's. A specific stream of research has studied how informativeness of the IPO prospectus affect pricing of the IPOs. by examining characteristics of intellectual capital disclosures (e.g. Bukh *et al.*, 2005; Cordazzo, 2007; Xu and Xu, 2012) as well as on general information disclosure in the prospectus (Ström, 2006).. In an Asian setting, Singh and Van der Zahn (2007) found a positive association between underpricing and the extent of intellectual capital disclosures in Singaporean IPO prospectuses.

In the wake of this specific stream of literature, this study focuses on the performance related effects of voluntary disclosure levels of intellectual capital in Japanese IPO prospectuses and thus there lies a practical contribution in examining whether certain types of information helps Japanese investors in picking the stocks with the best possible long-term performance. Subsequently, a discussion outlines aspects of long-term performance and bid-ask spread in relation to voluntary disclosure in IPO's to develop this study's hypothesis.

2.1 Long-term performance of the stock

A substantial body of research conducted from an information-economics perspective has concentrated on studying why companies disclose more information than is required by regulation (cf. Jenkinson and Ljungquist, 2001).

Long-term performance of IPO's has been the subject of much research in recent years. A thorough review of this literature can be found in Ritter (1991), who also finds evidence that IPO's substantially under-perform a sample of matching firms from the closing price on the first day of public trading to their three-year anniversaries (about 29% in the three year period after their launch). Most long-term performance studies of IPO's have been conducted in the US and generally companies underperform the market benchmarks. For example, Rajan and Servaes (1997) showed

that in the long-term IPO's underperformed the market by between 17% and 47%. Additionally, Carter *et al.* (1998) showed that US firms underperformed the market by 19,9%. In the UK, , Kurshed *et al.* (1999) documented long-term underperformance of 17,8% using IPO's on the London Main Market from 1991-95.

Although US and UK studies reveal strikingly similar results, Kurshed *et al.* (1999) provide a brief review of the field, indicating that there are differences across countries. The degree of underperformance was found to be highest in Australia, namely 51,0 % (Lee *et al.* 1994) while Brazil follows with 47,0 % (Aggarwal *et al.*, 1993). Although underperformance seems to be the norm, some exceptions do exist. Country specific studies in Korea by Kim *et al.* (1995) and Sweden by Loughran *et al.* (1994) has shown that IPO companies outperformed the market by 91,6 % and 1,2 % respectively. Therefore, it is interesting to study this in the Japanese context, as Rimmel *et al.* (2009) showed that there is some ambivalence.

Typical explanatory factors of long-term performance include: underwriters' reputation (Carter *et al.*, 1998; Michaely and Shaw, 1994), ownership structure (Jain and Kini, 1994, 1999, 2000; Kutsuna *et al.* 2002), the pre-IPO performance of a company (Kurshed *et al.*, 1999), degree of multinationality of a company (Kurshed *et al.*, 1999) and industry differences (Brown, 1999; Ahmad-Zaluki *et al.*, 2009).

In relation to this study's focus on intellectual capital disclosure in IPO prospectuses, Bessler and Bittelmeyer (2008) find that innovation, patents, and intellectual capital are important factors that have a positive impact on the valuation and on the long-run financial performance of especially young technology firms. Guo *et al.* (2005) find similar evidence, R&D-intensity is positively related to both long-term performance and underpricing., There exist a multitude of studies concerning the value relevance of innovations and patents (cf. Al-Horani *et al.*, 2003; Deng *et al.*, 1999; Hirschey and Richardson, 2004).

For that reason, it can be expected that companies who disclose substantial amounts of information on intellectual capital will be associated with better transparency and therefore also better long-term performance.

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

H1b: The nature of voluntary disclosure in the IPO prospectuses does not affect the long-term performance of the stock price equally

2.2 Bid-ask spread as a proxy for the cost of capital

The previous section outlined that good disclosure practices leading up to the IPO is expected to affect investors' perceptions of the stock price value. This is because good disclosure practices reduce information asymmetry between company management and the investors (e.g. Joshi *et al.*,

2012; Lin *et al.*, 2012). Coller and Yohn (1997) conclude that better corporate disclosure leads to lower information asymmetry, which in turn reduce the ex ante uncertainty and thus both underpricing and bid-ask spreads. Such good disclosure practices with positive results on reducing information asymmetry may relate to the amount of information contained in the IPO prospectus (Cordazzo, 2007), the inclusion of voluntary information on risk factors (Beatty and Ritter, 1986) or e.g. management forecasts (Jog and McConomy, 2003).

Adverse selection theory states that information asymmetry between company management and the capital market manifests itself in the form of reduced liquidity in relation to the company's stocks (see Michaely and Shaw (1994) for a thorough review of adverse selection models). The effect of this would be that in order to convince investors to buy stocks in firms with lower levels of liquidity, the companies will be forced to release stocks with a discount, thereby creating a higher cost of capital. According to Diamond and Verrecchia (1991) the company can reduce its cost of capital by increasing the amount of information disclosed because this will increase interest in the stock and thereby also its liquidity. The bid-ask spread is a measure of liquidity companies' shares and is in this study applied to examine the relationship between cost-of-capital and disclosure levels.

There are a number of studies that attempt to link disclosure levels to cost of capital. Welker (1995) e.g. concludes that disclosure levels reduce information asymmetry and increases stock liquidity. Botosan (1997) expands this result by establishing that the above relationship between disclosure level and cost of capital is especially present for companies with infrequent analyst following. Both Healy *et al.* (1999) as well as Leuz and Verrecchia (2000) indicate similar conclusions. Although applying bid-ask spreads as a proxy for cost-of-capital this may not be as clean a measure as underpricing (Schrand and Verrecchia, 2004). Therefore, this study applied this variable as its strength is related to illustrating developments in information asymmetry over time.

The hypothesis is divided into an *a* and a *b* version. The *a* version of the hypotheses concerns the total extent of voluntary disclosure captured by applying the disclosure index. The *b* version concerns the nature of the voluntary disclosure captured by our disclosure index in the sense that it looks at differences according to the specific types of information that is disclosed:

- H2a: The extent of voluntary disclosure in the IPO prospectus is inversely associated with the bid-ask spread
- H2b: The nature of voluntary disclosure in the IPO prospectuses does not affect the bid-ask spread equally

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

3. Research method

There is an extensive amount of accounting literature concerned with providing frameworks for the study of the nature and extent of corporate disclosure (cf. Adrem, 1999; Cooke, 1989; Rimmel, 2004). The most frequently applied frameworks divide corporate disclosures into the categories mandatory disclosure studies (Wallace *et al.* 1994), voluntary disclosure studies (Gray *et al.*, 1995; Guthrie and Petty, 2000; Hossain *et al.*, 1994) and disclosure studies that consider both mandatory and voluntary disclosure items (Beattie *et al.*, 2002; Inchausti, 1997). Rather than considering whether a piece of information is mandatory or not, the present study focuses on the effect of all the types of information contained in the narrative sections of the IPO prospectus, in turn arguing that the value relevance of information must be seen from the user's perspective.

3.1 The disclosure index

This study applies a disclosure index for the quantification of information levels disclosed in IPO prospectuses. Following a common path of previous disclosure index studies, this study conducts a replication of the disclosure index used in a number of recent disclosure studies of IPO prospectuses by Bukh *et al.* (2005) in relation to Danish IPO prospectuses, Italian IPO prospectuses (Cordazzo, 2007), Japanese IPO prospectuses (Rimmel *et al.*, 2009) and Singaporean IPO prospectuses (Singh and Van der Zahn, 2007).

The particular research design was chosen for our study because application of the disclosure index approach on an IPO prospectus represents a proxy for the quality of the information level that the company supplies to the capital market in connection with the IPO (Bukh *et al.*, 2005). When applying such an approach, it is, however, important to consider the reliability of the results and the objectivity of the study (Unerman, 2000).

In the present study, these criteria are handled through a thorough literature review of underpricing and bid-ask spread studies, clear instructions in the coding process and verifying the coding through separate coding by multiple researchers (cf. Jones, 1994; Beattie, Mc Innes and Fearnley, 2004; Clathworthy and Jones, 2006). Beattie *et al.* (2004) argue that the amount of disclosure might not be an exact indicator of disclosure quality. The disclosure level may also be affected by factors such as the CEO's ability to communicate clearly or choice of accounting principles. However, as this study is concerned with the effects of the extent and nature of IPO prospectus disclosures, the disclosure index methodology fulfils the study's requirements satisfactorily.

There are no widely accepted theoretical guidelines for selecting the items that make up a disclosure index (Beattie *et al.*, 2004). Therefore, the successful use of the disclosure index methodology depends on critical and cautious selection of items (Marston and Shrivess 1991). According to Bukh *et al.* (2005) the choice of items in the applied disclosure index of this study was based on a

thorough inspection of the literature on corporate disclosure (cf. Eccles and Mavrinac 1995, AICPA 1994, Beattie and Pratt 2002) and intellectual capital reporting (Guthrie and Petty, 2000; Mouritsen *et al.*, 2003; Sveiby, 1997). Regarding intellectual capital statements, the experiences and results of the major Danish project concerning intellectual capital statements (Mouritsen *et al.*, 2003) were a major source of insight.

In this study of the extent of disclosure of non-accounting information – e.g. information on knowledge-based resources, strategy and processes – in Japanese IPO prospectuses, a disclosure index consisting of 78 items divided into 6 different categories was applied. All the items in the disclosure index are listed in Appendix 1. The descriptive statistics on the item-level of the disclosure index is not discussed further in this paper.

The contents of each IPO prospectus were compared to the items on the disclosure scoreboard and coded as 1 or 0, depending upon whether the IPO prospectus contained or did not contain the voluntary disclosure. Accordingly, the extent of disclosure was quantified as the percentage of 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:

$$\text{DISC}_i = \left(\sum_{i=1}^m d_i / M \right) \times 100\%,$$

where d_i expresses item $_i$ with the value found in the IPO prospectus in question otherwise 0. M expresses the maximum of information disclosed in the IPO, which could be 78 items. The analysis of the disclosure scoreboard for this study is additive and unweighted following the path of the studies conducted by Adrem (1999), Meek *et al.* (1995) and Cooke (1989). All three studies referred to Spero's (1979) empirical findings that weighting of information 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, as the user's preferences are unknown. Hence, either a company discloses a voluntary item in its IPO prospectus or not, which shows that the number of items measures the amount of disclosure. No ranking list for the importance of different items is applied nor is the number of words about an item used. This procedure is corroborated by the criticisms discussed in the study by Hackston and Milne (1996).

3.2 Data sample and descriptive statistics

For the purpose of this study of the effects of disclosure on long-term performance and bid-ask spread as proxies for information asymmetry and cost of capital a number of previous studies were

considered. Data from Professor Jay Ritter² showed that there is a marked difference between the general underpricing level of Japanese IPO's in the pre late 1980's period and post late 1980's period in relation to the amount of companies going public. From this study's dataset it was thus decided to focus on 2003, because it represents a stratified sample (cf. Konijn 1973) both in relation to the amount of IPO's³; and the general level of underpricing⁴. Finally, 2003 was a normal year according to the business cycle and not be affected by crisis effects.

The data for this study consists of all IPO prospectuses from stock exchange listings at the Tokyo Stock Exchange in the period 1 January 2003 to 31 December 2003. The 120 IPO prospectuses analyzed were obtained from EOL online systems. Prospectuses disclosed in connection with capital increases, cross-listing arrangements and companies issuing preferred shares only were excluded as well as stock index funds, life investment funds and real estate unit funds. The sample of IPO's is dispersed across a range of industrial classification. Table 1 below classifies the number of IPO prospectuses available for analysis by industrial classification. The table illustrates that technology companies comprise 33% of the sample, while consumer goods companies comprise 30% of the sample.

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, Glass & Ceramics, Steel, NonFerrous Metals, Trading Companies	17	14.17%
Capital	Construction, Machinery, Shipbuilding,		

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 of the 20 year period from 1987 to 2006 was 118

⁴ In 2003 the average level of underpricing was 45,1 % on the Tokyo Stock Exchange, while the average of the 20 year period from 1987 to 2006 was 38,3%

Goods/Others	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 as well as in six subcategories: Employees, Customers, IT, Processes, Research and Development, and Strategic Statements.
- 2) The first tertile number stretches over low and medium groups, therefore we assign the first tertile number into the low group if the first tertile number below 33.3% percentile is more than the one above 33.3% percentile. The second tertile number is also stretches over medium and high groups, therefore we assign the second tertile number into the medium group if the second tertile number below 66.7% percentile is more than the one above 66.7% percentile. Hence we ended up with 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, when testing the disclosure effects 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 applied by using the medium number of those three subcategories' items.

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.

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. These are described separately in the next two sections concerning long-term performance and bid-ask spreads.

Long-term performance

In table 5 below all the variables applied in the statistical testing of the relationship between disclosure and 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>i</i> , expressed as a percentage of the initial offering price
DISC_i	The total disclosure of firm <i>i</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	

For the purpose of answering hypotheses 1a and 1b, a two-sample t test with unequal variances for the total index (extent; hypothesis 1a) and for each sub-index (nature; hypothesis 1b) was applied. Testing for underpricing required 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 of the exchange's First Section and in the reference portfolio model the excess long-term stock returns would be compared against a reference portfolio.

Studies by Barber and Lyon (1997) or Kothari and Warner (1997) have previously indicated that the cumulative abnormal return (CAR) compared against market performance may 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 alone. In Japan, previous research has also indicated that using the abnormal return (AR) with the TOPIX benchmark often has a positive bias. Hence, it was chosen to calculate 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, namely book-to-market ratio and firm size. The procedures employed in the construction of the reference portfolio are as follows:

- (a) First all stocks were identified, which were 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 performance was compared to the average stock performance of firms in its corresponding cell, yielding its abnormal return.

Bid-ask spread

In order to answer hypotheses 2a and 2b, 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 testing for bid-ask spread we measured one-year average closing bid-ask stock-price contrast between high and low disclosure level firms, as depicted in section 3.2 after the IPO.

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

$$\text{Bid-ask spread} = (\text{closing bid price} - \text{closing ask price}) / \text{closing stock price}.$$

In table 5 below all the variables applied in the statistical testing of the relationship between disclosure and bid-ask spreads and their specific determination, 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

Long-term performance

Table 6 shows the three-year abnormal return of both high and low total disclosure group as well as the following subcategories: Employees, Customers, IT, Processes, Research and Development, and Strategic Statements. In regards to total disclosure level, the three-year abnormal return of the high disclosure group is 99.15%, which is larger than that of the low disclosure group that is equivalent to 28.78%, at a 5% significance level. This result supports the H1a, which addresses that the extent of voluntary disclosure level is positively associated with the long-term performance of the stock.

In regards to subcategory Employees, the three-year abnormal return of high disclosure group 111.24% is greater than that of low disclosure group, being 29.68%, with a 1% significance level. For subcategories IT and Process, the three-year abnormal return of high disclosure group 85.91% and 77.99% is insignificantly greater than that of low disclosure group 63.67% and 67.67%, respectively. However, in regards to subcategory Research and Development, the three-year abnormal return of high disclosure group 45.38% is smaller than that of low disclosure group 90.70%, with a 10% significance level. Additionally, for subcategories Customers and Strategic Statements, the three-year abnormal return of high disclosure group 63.07% and 60.85% is insignificantly smaller than that of low disclosure group 78.66% and 82.75%. Therefore, the results for the subcategories Employees, IT and Processes mean that H1b must be rejected. From the result of the total disclosure level, it can be concluded that employee related disclosure are the key factor of 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

Bid-ask spread

Table 7 shows the one-year average bid-ask spread of both the high and low total-disclosure groups as well as the following subcategories: Employees, Customers, IT, Processes, Research and Development, and Strategic Statements. In regards to total disclosure level, the one-year average bid-ask spread of high disclosure group 1.370% is smaller than that of low disclosure group 1.726%, with a 10% significant level. This result supports the H2a, which addresses that the extent of voluntary disclosure level is inversely associated with the bid-ask spread.

In regards to the subcategory Customers, the one-year average bid-ask spread of high disclosure group is calculated to 1.341%, and this is significantly smaller than that of low disclosure group, 1.642%, on a 5% significance level. For the subcategories Employees, IT, Research and Development, and Strategic Statements, the one-year average bid-ask spread of the high disclosure group 1.436%, 1.409%, 1.363% and 1.475% is insignificantly smaller than that of low disclosure group 1.701%, 1.500%, 1.486% and 1.564%, respectively. However, in regards to the subcategory Processes, the one-year average bid-ask spread of high disclosure group 1.476% is insignificantly greater than that of low disclosure group 1.473%. Therefore, it can be concluded that the result for the subcategories Customers (significant), Employees and IT (insignificant) imply that H2a must be rejected. Together with the result of the total disclosure level, it is possible to conclude that customer related disclosure is a key factor of reducing the information asymmetry problem surrounding IPO's.

	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

5. Discussion and concluding remarks

In the literature there has historically been some disagreement as to the relationship between disclosure levels and their effects on the performance of IPO's. While Loughran and Ritter (2004) argue that higher disclosure levels lead to poorer stock price performance for IPO's, Schrand and Verrecchia (2004) demonstrate that the opposite, namely that greater disclosure frequency in the period prior to the IPO is associated with lower cost of capital in the form of lower bid-ask spreads and lower analyst forecast dispersion. The focus in this paper is not so much concerned with the effects of voluntary disclosures on the short-term characteristics of IPO's like for example underpricing, This study's focus is on the value of a set of information that is concerned with the long-term value creation and financial sustainability of a company, namely intellectual capital. As such, this paper is concerned with understanding how to facilitate the capital market in picking the best stocks on the long-term; using long-term oriented data.

Discussion of long-term performance results

Intellectual capital was found to have a significant effect on the long-term stock price performance of our IPO population and as such hypothesis H1a holds. Hence, investing in companies that are transparent about their value creation and softer values including for example details about their strategy, business models, human resources and other parameters of intellectual capital through a more active disclosure policy will lead to a significant over-performance in returns in comparison to those companies that do not.

The analysis also reveals that with regard the nature of the disclosures, especially the employee category is the main driver of the significant result of hypothesis H1a. The composure of the disclosures concerning employee-related intellectual capital by the companies that have high disclosure ratios concentrate on aspects such as: Staff breakdown by department, employee expenses in relation to number of employees, statements of policy on competence development, recruitment policies, remuneration and incentive systems and finally dependence upon key personnel. As such it can be concluded that the resources described above are central elements of importance for companies in order to execute a long-term strategy. Typically IPO prospectuses contain a thorough description of strategic direction to reach the main financial goals of the company (cf. Bhabra and Pettway 2003, 370; Tokyo Stock Exchange 2012).

The results imply that companies who disclose the intellectual capital information relating to the employee category thereby signal to the capital market that they have a plan for managing these resources. As such this study confirms the conclusions of Sakakibara *et al.* (2010) whose findings confirm that analysts would find this data relevant and be prone to use it if it were provided. This also means that the results of this study are in opposition to the propositions of Healy and Palepu (2001, 426) who suggest that voluntary disclosures such as customer satisfaction and human capital

do not carry value by themselves and that only management forecasts as a voluntary item increases the predictability power of stock price returns. Normative researchers such as Healy and Palepu (2001) are missing the point that these types of disclosures concerning employees also play an important role in the creation of accountability of the signals from the management team (Murthy and Mouritsen, 2011). Furthermore, the findings from this study are also very much in line with the suggestions made by Mouritsen and Larsen (2005) who argue for the importance of creating levers of control on such unstable resources as human capital and competences. Indicating to have an understanding and a plan for managing these resources simultaneously signals the ability to overperform the market.

For analysts and investors this means that in order to identify stocks that outperform the market, they will need to gain insight into the companies' proposed platform for executing strategy, for example by asking themselves whether the company has the correct composition, alignment and incentivized human resources to leverage the described strategy? In addition, it is also imperative that the company has the right incentive systems for retaining these human resources from moving to competitors. In an acquisition setting, Ranft and Lord (2000) confirm that retention of specific types of human capital is critical for determining success in terms of 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 opposite sign than expected. The analysis revealed a significant difference where the low disclosure group had almost double the long-term performance of the high disclosure group, namely 90,7% versus 45,8%. This may indicate 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 as well as patents. This is interesting, as we initially expected a positive view of activities that have the objective to sustain corporate profitability in the long term. Previous evidence provided by Eberhart *et al.* (2004) in a non-IPO setting, suggest that increases in R&D spending are beneficial to investors although the market is slow at recognizing this information. The alternative explanation in the IPO setting of this study, however, may be that the companies included in this study are revealing too much information in their prospectuses and by doing so, they have pushed too much of this information into the stock price, in turn leaving no room for positive surprises. Companies that on the other hand do not reveal too much of this information will more likely experience that the information is incorporated into the stock price in a gradual manner, thus 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 the investors to understand the reasons behind these activities, this information is incorporated into the stock prices straight away.

This reveals that the capital market is very focused and perhaps also very bullish on information such as R&D spending, R&D strategy and patents. It may be speculated that it is in general easier for analysts and investors to understand and relate information on R&D, like for example patents and R&D spending to cash flow predictions than some of the other information categories of the intellectual capital index such as employee resources, internal processes, customer loyalty etc. At the same time, the fact might be weary that the analysts and investors may be prone to include this information in an uncritical manner. Perhaps they put too large values into their spreadsheets or not discounting enough for the risks ascertained to R&D uncertainties. Faulkner (1996) accentuates this view in his criticism of the use of DCF models for valuing R&D projects, and concludes that real options theory is a much more appropriate tool for such purposes

Discussion of results concerning bid-ask spreads

Higher disclosure of intellectual capital affects bid-ask spreads positively, when measured on the one-year average of trading. Thus indicating that information on intellectual capital is a significant component for investors when they are assessing information asymmetries. Accordingly, this voluntary information reduces *ex ante* uncertainty and thereby also the cost of capital of IPO companies. The fact that information on intellectual capital disclosed in the prospectus prior to the IPO has a significant long-term effect on the cost of capital must be 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. This has two possible explanations. The first one is that it takes time to change the information supply of a company, perhaps because it is strongly rooted in corporate culture as is vastly suggested in the corporate communications literature. The other explanation is the reputational effect of transparency and that it is difficult to alter the capital market's perception of this; at least in the short term.

Almost all of the subcomponents of the intellectual capital index had the correct sign in the bid-ask analysis. However, it was the customer component was the main driver of the overall index, it being both positive and significant. The primary types of information disclosed were customer segment information and information on customer intimacy. Customer segment information is important for creating transparency about the strength of the various segments and our findings contradict those of Ali *et al.* (2009) who indicate, that companies with strategic competitive advantages attempt to protect their market shares by disclosing less information. This segment information also conveys a more detailed understanding of how the company differentiates its offerings between customer groups, in turn illustrating the company's ability to fine-tune in its strategies to fit customer groups. This information is important for investors in estimating how the company will generate revenues in the future and thus also the future cash flow and particularly financial analysts spend time digging into such matters.

Customer intimacy, which here covers over aspects such as descriptions of customer relationships, customer involvement and dependence upon key customers, is also a part of making the analysts and investors feel secure about the future cash flow of the company, in turn reducing the cost of capital. This is because there are strong ties between sustained higher operating profitability and strong customer relationships and organizational structures that support these (cf. Gosman *et al.* 2004). Interestingly one component of the customer subcategory was surprisingly not disclosed upon to any extent, namely market share. Market share could be very useful for the capital market, because it is an easy way to estimate future revenues. However, the lack of this information could be due to two factors. Firstly, the IPO'ing companies may have difficulties in projecting their market share going forward as they are entering into a new era with the company. Secondly, this may be due to reasons of secrecy. Harris (1998) and Ali *et al.* (2009) confirm this speculation in finding that firms, regardless of the competitive landscape, are reluctant to provide e.g. segment disclosures for the fear of losing both abnormal profits and market share.

Concluding remarks

In summary, the contribution of this study was to examine the effects of voluntary disclosures on intellectual capital on the long-term performance of the stock price subsequent to the introduction on the stock exchange as well as the companies' cost-of-capital, estimated through statistical tests on bid-ask spreads. The findings are discussed above against recent findings and lead us to conclude that:

- IC voluntary disclosure is generally relevant information for investors who assess the company's long-term performance. If IC information were to be provided it would clearly be an advantage for investors to make use of it for their decision-making. In regards to total disclosure level, 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 being equivalent to 28.78%. We found the evidence consistent with Bessler and Bittelmeyer (2008) and Guo *et al.* (2005).
- Both employee and R&D related information are IC information. However, they are incorporated quite differently into long-term stock prices by investors. Employee-related intellectual capital are key resources for companies to execute their long-term strategy; therefore investors gradually evaluate this type of information and whether companies have an understanding and a plan for managing these resources to reach the strategic goal (Mouritsen and Larsen 2005). Our evidence shows if a company discloses more information about employees, it creates credibility for its competence of executing a long-term strategy. This signals the ability to over-perform 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, in turn leaving no room for positive surprises. Eberhart *et al.* (2004) showed 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.* (2004) and provide 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 disclosure generally reduces information asymmetries surrounding 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 is equivalent to 1.726%. This evidence is consistent with Diamond and Verrecchia (1991) and Verrecchia (2001).
- Customer related information is important for investors to estimate how a company will generate revenues in the future. Investors would gain confidence about future revenues if a company discloses information about its major customers as well as customer involvement and customer relationships. Gosman *et al.* (2004) 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.* (2004) and provide further evidence that if a company discloses more customer-related information, it enhances its transparency and narrows the bid-ask spread in turn lowering the cost of capital in the long run.

Looking at prospects for future research it seems potentially advantageous to study this phenomenon over the whole business cycle, i.e. to create a longitudinal database. This would enable us to determine whether there is a business cycle effect on the importance of IC for investment decisions and corporate transparency. Also, understanding the importance of IC from the perspective of capital markets is an important element of the on-going integrated reporting initiatives (cf. IIRC 2012). 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 the one conducted here would need to include a focus on the profit-formula of the company and how strategic partnerships are leveraged to create value across the value chain.

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Appendix 1

% of companies making disclosure		% of companies making disclosure	
Employees (27 items)	11,7	IT (5 items)	10,6
Staff breakdown by age	0,8	Description & reason for investments in IT	13,8
Staff breakdown by seniority	0,0	IT systems	22,0
Staff breakdown by gender	0,0	Software assets	10,6
Staff breakdown by nationality	0,0	Description of IT facilities	4,9
Staff breakdown by department	22,0	IT expenses	1,6
Staff breakdown by job function	8,9	Processes (8 items)	4,7
Staff breakdown by level of education	3,3		
Rate of staff turnover	1,6	Efforts related to the working environment,	0,0
Comments on changes in number of employees	8,1	Information and communication within the company	4,1
Staff health and safety	1,6	Working from home	0,0
Education and training expenses/number of employees	0,0	Internal sharing of knowledge and information	14,6
Staff interview	0,8	Measure of internal or external failures	0,0
Statements of policy on competence development	39,0	External sharing of knowledge and information	12,2
Description of competence development program and activities	14,6	Fringe benefits and company social programs	3,3
Education and training expenses	0,0	Environmental approvals and statements/policies	3,3
Absence	0,0	Research & Development (9 items)	17,6
Employee expenses/number of employees	67,5		
Recruitment policies	53,7	Statements of policy, strategy and/or objectives of R&D activities	47,2
HRM department, division or function	0,8	R&D expenses	35,0
Job rotation opportunities	1,6	R&D expenses/sales	2,4
Career opportunities	2,4	R&D invested in basic research	12,2
Remuneration and incentive systems	49,6	R&D invested in product design/development	20,3
Pensions	0,8	Future prospects regarding R&D	7,3
Insurance policies	2,4	Details of company patents	9,8
Statements of dependence on key personnel	33,3	Number of patents and licenses etc,	10,6
Revenues/employee	3,3	Patents pending	13,8
Value added/employee	0,8	Strategic statements (15 items)	18,1
Customers (14 items)	14,2		
Number of customers	2,4	Description of new production technology	35,0
Sales breakdown by customer	24,4	Statements of corporate quality performance	11,4
Annual sales pr, segment or product	88,6	Strategic alliances	40,7
Average customer size	7,3	Objectives and reason for strategic alliances	26,0
Dependence on key customers	39,8	Comments on the effects of the strategic alliances	9,8
Description of customer involvement	6,5	Description of the network of suppliers and distributors	74,8
Description of customer relations	17,1	Statements of image and brand	23,6
Education/training of customers	3,3	Corporate culture statements	0,8
Customers/employees	0,8	Best Practise	5,7
Value added pr, customer or segment	0,8	Organisational structure	27,6
Market share (%)	1,6	Utilisation of energy, raw materials and other input goods	0,8
Relative market share	0,8	Investment in the environment	5,7
Market share, breakdown by country/segment/product	4,1	Description of community involvement	3,3
Repurchase	0,8	Information on corporate social responsibility and objective	4,9
		Description of employee contracts/contractual issues	0,8

Appendix 1: The disclosure index with corresponding disclosure percentages per item