Disclosure of information on intellectual capital in Danish IPO prospectuses

Per Nikolaj Bukh
Aarhus School of Business, Aarhus, Denmark
Christian Nielsen
Copenhagen Business School, Frederiksberg, Denmark
Peter Gormsen
Novozymes Ltd, Bagsvaerd, Denmark, and
Jan Mouritsen
Copenhagen Business School, Frederiksberg, Denmark

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Abstract

Purpose – The purpose of this paper is to examine whether information on intellectual capital (non-financial information on knowledge based resources) is disclosed in Danish IPO prospectuses. Further, to analyse whether this voluntary disclosure has changed in the period from 1999 to 2001 and to analyse what factors can explain the amount of disclosure in the prospectuses.

Design/methodology/approach – The paper uses content analysis to compile a measure of disclosure on each prospectus and statistical analysis to test whether there is an association between disclosure and company type, the existence of managerial ownership before the IPO, the size of the company or the age of the firm.

Findings – Based on statistical analysis, it is concluded that the extent of managerial ownership prior to the IPO and industry type affects the amount of voluntary intellectual capital disclosure, while company size and age do not affect disclosure. The results are interpreted in the light of the increasing importance of disclosing information on value drivers, strategy and intellectual capital to the capital market and constitute a contribution to the ongoing debate on corporate reporting practices.

Practical implications – Since information on intellectual capital is already disclosed in IPO prospectuses this reporting form can be used as inspiration when an intellectual capital report is developed. The results also indicate that companies and their advisers believe that this type of information is important in the capital market's assessment of the company's value. Further, it is suggested that intellectual capital reports should be read in the context of the firm's strategy in the same manner as an prospectus is read.

Originality/value – Very few papers have analysed disclosure in prospectuses and it has been from a different perspective from this paper. Further, this paper analyses a time series of data and demonstrates how the amount of disclosure has developed over the years. Finally, the paper contributes to the body of literature on what factors explain disclosure in general.

Keywords Disclosure, Intellectual capital, Prospectuses, Denmark

Paper type Case study

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Introduction

In recent years, companies' disclosure of information has gained increased attention due to globalisation and integration of capital markets, greater mobility of monetary and actual goods, tougher competition, new dominating industries, and developments in IT and the internet. Reports (e.g. Eustace, 2001; FASB, 2001; Upton, 2001) and academic contributions (e.g. Lev, 2000; Beattie and Pratt, 2002a, b) have argued that demand for external communication or information on knowledge-based resources is growing as companies increasingly base their competitive strength and thus the value of their company on know-how, patents, skilled employees and other intangibles. This demand for external communication applies to both traditional annual reporting and newer types of reporting such as intellectual capital statements, supplementary business reporting and prospectuses.

The Scandinavian countries are often noticed for their practices with respect to disclosure of intellectual capital (e.g. Holland, 2004, p. 11). Especially the Danish Government initiatives with publishing a guideline for intellectual capital statements (DATI, 2001; DMSTI, 2003) has been highlighted as an example of state-of-the-art disclosure models and business reporting (e.g. DiPiazza and Eccles, 2002, pp. 72-73; Fincham and Roslender, 2003, p. 71).

In this paper, we analyse the disclosure of information in Danish initial public offering (IPO) prospectuses from the last 12 years, primarily with respect to voluntary disclosure of non-accounting information on knowledge-based resources – also called intellectual capital. The methodology used in the analysis is a disclosure index consisting of 78 items. Disclosure index research in accounting and business reporting practices has been widely applied (Marston and Shrives, 1991; Guthrie *et al.*, 2004), because such studies represent an aspect of disclosure quality that can be captured by summary measures (Beattie *et al.*, 2002a).

The remainder of the paper is structured as follows. First recent trends in business reporting are discussed and it is argued that the IPO prospectuses should be studied in order to gain insight into the need for disclosure. Further, the section presents the factors that will be taken into consideration in explaining differences in disclosure. In the following, two sections the methodology and the available data is described. Then, the results are presented and analysed and the paper is concluded with suggestions for further research.

Business reporting and companies' external communication

The relative importance of physical assets such as plant, equipment and stocks, compared to, for example, patents, skilled employees and strategic relationships, are declining. These changes in value creation have led many companies to experiment with new modes of external communication – modes that convey information not presently incorporated in financial reports. The alternatives vary from mass media communication, via business reporting models and internet reporting to a wide spectrum of stakeholders, to disclosure through investor relations meetings and private meetings between company management and institutional investors and analysts (Holland, 1997; Beattie, 1999; Beattie and Pratt, 2001).

Among others Blair and Wallman (2001, p. 59) have argue for the necessity of a model for business reporting that reflects the dynamics of wealth creation and Gelb (2002) have indicated that supplementary disclosure is an important medium for firms

with significant levels of intangible assets. In relation to this, Galbraith and Merrill (2001) suggest that information on company strategy is incorporated into investors' decisions, and that information on intellectual capital – especially management experience – does have an effect on the valuation of the company. One of the instruments that have been suggested as a tool both for identifying, managing and reporting intellectual capital and intangibles is the intellectual capital statement (see DMSTI, 2003; Zambon, 2003).

Even though the precise definition of a report on intellectual capital in the literature is connected with some ambiguousness, the statements that have been disclosed in Denmark since 1998 where Coloplast as the first firm issued an intellectual capital statement have many similarities. Most often intellectual capital is defined as knowledge resources, in the form of employees, customers, processes or technology, which the company can mobilize in its value creation processes. In practice intellectual capital statements contain various financial and non-financial information, i.e. staff turnovers and job satisfaction, in-service training, turnover split on customers, customer satisfaction, precision of supply etc. (see Bukh *et al.*, 2001; Mouritsen *et al.*, 2001), as well as a substantial narrative part positioning the indicators within a strategic framework.

There is no doubt that the general reporting practices with respect to voluntary disclosures is especially well-developed in Denmark and it might be argued that studying the disclosure of intellectual capital in a Danish or Scandinavian context would be misleading if generalized to a wider institutional context. However, this does not necessarily indicate that the practices have influenced the decision-makers with respect to disclosures in IPO prospectuses, namely the investment banks. Furthermore, it should be taking into account that the first Danish IC reports were published in 1998 while our sample spans more years. Another interpretation of the results from studying a Danish context could be that is presently the Danish case may be the future in other countries.

Various studies of investors' and analysts' information demands indicate a substantial difference between the types of information found in companies' annual reports and the types of information demanded by the market (Eccles *et al.*, 2001; Eccles and Mavrinac, 1995). In cooperation with the Institute of Chartered Accountants of Scotland (ICAS), Beattie (1999) studied the ability of financial reporting to satisfy users' demands. The results illustrated that although non-financial information still has lower priority than traditional financial information; users consider disclosure regarding risk factors and quality of management to be insufficient.

Theoretically, additional relevant non-financial information is expected to lower the cost of equity capital (see Verrecchia, 2001) because increased disclosure lowers investor uncertainty about the future prospects of the company and facilitates a more precise valuation of the company (Botosan, 1997). Related to this argument, the disclosure of information on intellectual capital is expected to reduce information asymmetry and to enhance stock market liquidity and increase demand for companies' securities (for example Diamond and Verrecchia, 1991). Both Botosan (1997) and Richardson and Welker (2001) confirm this in that they conclude that the quantity and quality of financial disclosure is negatively related to the cost of equity capital for companies.

The IPO prospectus

The IPO prospectus has by Beattie (1999) as well as Cumby and Conrad (2001) been suggested as a "role model" for future reporting because companies are typically more open and future-oriented in their IPO reporting. It has also been claimed by Daily *et al.* (2003) that IPO prospectuses are likely to be especially accurate because companies are liable for any misleading or inaccurate information. Although the same could be said about other reporting media including the annual report it can be observed that the prospectus usually contains more information about future expectations regarding market developments and earnings, strategic direction and intent, management and board composition, etc., compared to the annual report from the same firm. This is at least the case for a number of Scandinavian prospectuses that have been examined by the authors of this paper. However, there are likely to be substantial differences in national legislation and traditions with respect to disclosure in prospectuses. In a recent study of disclosure in interim report of Greek firms by admission of securities to Athens Stock Exchanges, Mavridis (2002) noted for instance that annual reports as they are used in other countries are not very common among Greek medium-sized firms.

At the time of admission for listing on the stock exchange, the company publishes its IPO prospectus in order to market the share to investors. An admission to listing on the stock exchange offers a unique opportunity to study the amount and type of voluntary information considered for disclosure to the capital market. Thus, Mather *et al.* (2000) argue that management has an incentive to present the company in the best possible light in order to maximise the proceeds of the share issue (see also Aharony *et al.*, 1993). Although this could lead to earnings management, managers of companies involved in taking a company public have incentives to present the underlying information in the most favorable light possible (Mather *et al.*, 2000). Thus, the IPO prospectus provides insight into which types of information are selected by a company and its advisors for presenting the company in relation to investors and analysts.

Admission for listing on the stock exchange requires the company to report about its achievements, skills and growth potential in a reliable and sober manner, in order to demonstrate to investors that investing in the company will most likely generate a competitive return. This effort to attract investors is centred on the IPO prospectus, which clarifies the company's financial capability, performance, operation, skills, and the resources through which it intends to prove continued growth and increased shareholder wealth. With regard to this aspect, Ang and Brau (2002) show that greater company transparency before the initial issue decreases the flotation costs of the IPO, and Schrand and Verrecchia (2004) find that greater disclosure frequency in the period prior to the IPO is associated with less underpricing.

The annual report has not only investors as its readers as it also conveys information to employees, potential employees, customers, the press and other stakeholders. Compared to that the IPO prospectus have a more limited group of readers than annual reports, and some differences in extent of disclosure can be expected. Compared to annual reports, prospectuses can be expected to provide additional disclosure of the company's long-term strategy, a specification of leading non-financial indicators relevant in assessing the effectiveness of the strategy implementation, comprehensive disclosure on company risks, and a discussion of the relation between leading indicators and future profits (Cumby and Conrad, 2001).

Disclosure

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. In relation to IPO prospectuses, Jenkinson and Ljungquist (2001) provides a comprehensive review of the literature. In general, proxies for *ex ante* uncertainty such as, underwriter reputation (Megginson and Weiss, 1991) as well as disclosure of earnings forecasts in IPO prospectuses (Clarkson and Merkley, 1994) have been shown to reduce under-pricing. Most under-pricing models (see Jenkinson and Ljungquist, 2001) predict that reducing *ex ante* uncertainty, for example by improved disclosure, and reduces under-pricing. Thus, by increasing voluntary disclosure, the *ex ante* uncertainty surrounding an issue is reduced and thus the firm's need for under-pricing also lessens.

In this paper, we study the extent of voluntary disclosure in Danish IPO prospectuses and investigate whether this can be explained by four control variables – industry differences, managerial ownership before the IPO, company size and company age. The first factor, industry differences, has previously been used to explain differences in disclosure in annual reports by Adrem (1999) and Cooke (1989) because there are differences in industry disclosure norms (see Gibbins *et al.*, 1990). As intellectual capital is regarded as being especially important in high-tech industries, it is anticipated that IT and biotechnology companies will disclose more information than traditional manufacturing and commercial companies. Further, since the market-to-book values of IT and biotechnology companies are generally higher, the disclosure of measures that lie outside the traditional accounting realm is likely to be relatively more important.

Turning to a corporate governance perspective, the second factor, managerial ownership before the IPO, may influence companies' disclosure practices and thus the extent of disclosure in the IPO prospectus. The existence of some degree of managerial ownership in the company is a mechanism for ensuring management – shareholder alignment of interests (Demirag *et al.*, 2000, p. 348). According to O'Sullivan (2000, p. 409), we can expect less disclosure from management if there is significant managerial ownership. In accordance with this line of argument, directors of the board who themselves do not own a substantial portion of the company can be expected to encourage more intensive auditing and disclosure because they are more likely to perceive them-selves as fulfilling a monitoring role. Similarly, Hossain *et al.* (1994), in a study of listed Malaysian companies, conclude that the amount of voluntary disclosure varies with ownership structure.

Other factors such as firm size and internationalization are also likely to influence disclosure. Robb *et al.* (2001), for instance, find that larger firms and firms with a global focus provide higher levels of both forward-looking and historical non-financial disclosures in their annual reports than other firms, while they in the same study only find minimal industry and country effects.

This leads us to the third category of research, where company size has been related to the amount of voluntary disclosure. Empirical studies date back to the 1950s, where, for example, Anton (1954) concluded that one-third of large American and Canadian companies regularly present results to stockholders while the corresponding figures for small companies are one out of 20. Among the explanations are that larger companies are more likely to have a wider ownership base, and that the costs of

providing information are more prohibitive for small companies. The latter problem tends to grow with increased disclosure.

However, another factor to be considered is that larger companies, when compared to smaller ones, seem less risky to investors and have better access to resources. Small companies thus have greater incentives to reduce uncertainty by disclosure. This argument presumes that a small company – all other things being equal – should disclose more information and more details on competitors than is the case for a large company. These implications have been supported in studies by, for example, Ahmed and Courtis (1999) and Adrem (1999). However, not all studies conclude that the size of the company is a significant factor in explaining voluntary publication of information. For instance, Wallace (1988) and Stanga (1976) who conclude that size is not a significant factor in explaining differences in companies' reporting between Nigeria and the USA.

Finally, company age has often been seen as a proxy for risk in the sense that the more established companies are less risky. From this perspective, the extent of a company's disclosure is expected to be related to how many years it has been in business. For example, Kim and Ritter (1999, p. 430) provide evidence that non-financial information is of greater importance in the valuation of younger companies because forecast earnings work better for assessing younger companies than historical earnings do (see Klein, 1996; Amir and Lev, 1996). Furthermore, Jaggi (1997, p. 314) demonstrates that the number of years the company has been in business influences the accuracy of the forecasts disclosed in IPO prospectuses. These results indicate that there might be a negative relationship between the age of the company and the extent of its disclosure.

From the prior empirical research outlined above, the four hypotheses below are developed. As none of the literature reviewed above relates directly to disclosures in connection with IPO's, and because there are varying competing explanations the hypotheses are stated in the null form:

H1. *Industry differences.* There is no association with respect to disclosure of information on intellectual capital between companies in high-tech industries (IT and biotechnology) and traditional manufacturing and commercial companies.

H2. *Managerial ownership.* There is no association between the amount of disclosure on intellectual capital and the existence of managerial ownership before the IPO.

H3. *Company size.* There is no association between the amount of disclosure on intellectual capital and the size of the company.

H4. *Company age.* There is no association between the amount of disclosure on intellectual capital and the age of the firm.

These factors have been raised and studied in the disclosure literature and can contribute with insights with respect to understanding the mechanisms of disclosure in connection with an IPO. While *H1* might be explained by industry norms and institutionalized disclosure practices and furthermore that there are significant differences in competitive aspects across industry groups, the three latter control variables (*H2, H3, H4*) primarily concern the minimization of risk from the investors

perspective. Pre-IPO managerial ownership is an important factor, because it indicates to potential investors whether the people who know the most about the future prospects of the company, namely its present management team, considers the company a good investment. Age and size are proxies for the chance of the company going bankrupt, i.e. age concerns the history of the company and size relates to whether it has critical mass to survive a fierce competitive environment over time.

Methodology

In the empirical part of this paper, a disclosure index is used to quantify the amount of information regarding intellectual capital included in the prospectuses. This tool has most often been applied to quantify the extent of disclosure in annual reports (e.g. Hossain *et al.*, 1994; Adrem, 1999). However, its application is not limited to annual reporting, although it has also in been applied to IPO prospectuses by Cumby and Conrad (2001) as well as Guo *et al.* (2004), who studied product-related IPO disclosure in biotechnology companies.

The disclosure index methodology consists of the calculation of the number of information-related items that a given report contains, based on a predefined list of the possible index items. Items such as the distribution of turnover between geographical segments, number of patents, and influence of research on staff satisfaction are examples of items, which could be included in the index. The number of items included in the index varies between the specific studies. Barrett (1976), for example, includes only 17 items in his index and in Cooke's (1989) study as many as 224 items were included.

Further, the disclosure index can include only voluntary information (Adrem, 1999; Hossain *et al.*, 1994; Gray *et al.*, 1995; Guthrie and Petty, 2000), mandatory information (Wallace *et al.*, 1994), or both voluntary and mandatory information (Inchausti, 1997; Beattie *et al.*, 2002b). See also Marston and Shrives (1991) for a more detailed description of the use and methodology of disclosure indices. The particular research design was chosen for our study because the disclosure index approach represents a proxy for the quality of disclosure of intellectual capital in IPO prospectuses. 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, clear instructions in the coding process and verifying the coding through separate coding by multiple researchers.

It can be argued that the amount of disclosure might not be an exact indicator of disclosure quality (Beattie *et al.*, 2004, p. 210). However, as we are concerned with extent of disclosure, we find the disclosure index method to fulfill our requirements satisfactorily. Beattie *et al.* (2004, p. 213) also express concerns in relation to the ability of a "one-dimensional" approach to the study of a complex, multi-faceted concept. Thus, their reservations relate to losses of detail in the data that such methods lead to. Despite this, Guthrie *et al.* (2004) suggest this method as a fruitful avenue for future research into voluntary disclosures in business reporting.

The disclosure index

There are no widely accepted theoretical guidelines for selecting items; therefore, the successful use of the disclosure index methodology depends on critical and cautious

selection of items (Marston and Shrives, 1991). As the focus of this article is voluntary information, the choice of items was based on a thorough inspection of the literature on corporate disclosure (see Eccles and Mavrinac, 1995; AICPA, 1994; Blair and Wallman, 2001; Beattie *et al.*, 2002b; Beattie and Pratt, 2002a) and intellectual capital reporting (Guthrie and Petty, 2000; DATI, 2001; Sveiby, 1997). Regarding intellectual capital statements, the experiences and results of the major Danish project concerning intellectual capital statements (DATI, 2001; DMSTI, 2003) were a major source of insight. Since the analysis focuses on the voluntary extent of disclosure in IPO prospectuses, information required by the authorities was not included in the index.

In our study of the extent of voluntary disclosure of non-accounting information –, e.g. information on knowledge-based resources, strategy and processes – in Danish IPO prospectuses, a disclosure index consisting of 78 items was applied. Table I show that these items were divided into six different categories and provide information on the number of items in each category. All items in the disclosure index are listed in Table II.

The extent of disclosure was quantified as the percentage of recorded information items found in the prospectus. In other words, the IPO prospectus is given one point if a given index item is found in the prospectus and no points if the given item is not found in the prospectus. This can be seen in the following formula, which was used to calculate the index score of each IPO prospectus:

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

where d_i expresses item$_i$ with the value 1 if the item$_i$ was found in the IPO prospectus in question and otherwise 0. M expresses the maximum amount of information contained in a prospectus, i.e. 78 items. However, if the index of items is sufficiently comprehensive, every company is ranked equally whether the items are weighted or not because an extensive list of items implies gradual equalization (see Firth, 1979). For example, Chow and Wong-Boren (1987) applied both weighted and non-weighted indices and reached the same results.

Data

The data consist of the IPO prospectuses from all stock exchange listings at the Copenhagen Stock Exchange from 1990 until 2001, excluding the listings that pertain to increases in share capital and the listings of unit trusts. Unit trusts are also not included as their objectives are significantly different from those of other companies. No firm were introduced on the Copenhagen Stock Exchange in 2002-2003.

Table I.
The disclosure index (78 items)

	Items
Employees	27
Customers	14
IT	5
Processes	8
Research and development	9
Strategic statements	15

Table II.
The disclosure index

	Percentage of companies making disclosure		Percentage of companies making disclosure
Employees (27 items)	17.8	*IT (five items)*	16.8
Staff breakdown by age	25.0	Description and reason for investments in IT	10.3
Staff breakdown by seniority	19.1	IT systems	47.1
Staff breakdown by gender	2.9	Software assets	5.9
Staff breakdown by nationality	5.9	Description of IT facilities	7.4
Staff breakdown by department	70.6	IT expenses	13.2
Staff breakdown by job function	17.6		
Staff breakdown by level of education	25.0	*Processes (eight items)*	15.3
Rate of staff turnover	7.4	Information and communication within the company	19.1
Comments on changes in number of employees	19.1	Efforts related to the working environment	22.1
Staff health and safety	7.4	Working from home	0.0
Absence	1.5	Internal sharing of knowledge and information	25.0
Staff interview	4.4	External sharing of knowledge and information	17.6
Statements of policy on competence development	30.9	Measure of internal or external failures	8.8
Description of competence development program and activities	26.5	Fringe benefits and company social programs	1.5
Education and training expenses	4.4	Environmental approvals and statements/policies	27.9
Education and training expenses/number of employees	1.5		
Employee expenses/number of employees	8.8	*Research and development (nine items)*	22.7
Recruitment policies	14.7	Statements of policy, strategy and/or objectives of R&D activities	41.2
HRM department, division or function	4.4	R&D expenses	39.7
Job rotation opportunities	8.8	R&D expenses/sales	20.6
Career opportunities	10.3	R&D invested in basic research	4.4
Remuneration and incentive systems	67.6	R&D invested in product design/development	7.4
Pensions	10.3	Future prospects regarding R&D	26.5

(*continued*)

Table II.

	Percentage of companies making disclosure		Percentage of companies making disclosure
Insurance policies	25.0	Details of company patents	27.9
Statements of dependence on key personnel	44.1	Number of patents and licenses etc.	22.1
Revenues/employee	13.2	Patents pending	14.7
Value added/employee	2.9		
		Strategic statements (15 items)	27.9
Customers (14 items)	27.5	Description of new production technology	35.3
Number of customers	47.1	Statements of corporate quality performance	41.2
Sales breakdown by customer	7.4	Strategic alliances	69.1
Annual sales per segment or product	80.9	Objectives and reason for strategic alliances	35.3
Average customer size	2.9	Comments on the effects of the strategic alliances	30.9
Dependence on key customers	41.2	Description of the network of suppliers and distributors	66.2
Description of customer involvement	25.0	Statements of image and brand	38.2
Description of customer relations	47.1	Corporate culture statements	8.8
Education/training of customers	13.2	Best practice	2.9
Customers/employees	1.5	Organizational structure	45.6
Value added per customer or segment	14.7	Utilisation of energy, raw materials and other input goods	4.4
Market share (%)	47.1	Investment in the environment	10.3
Relative market share	32.4	Description of community involvement	4.4
Market share, breakdown by country/segment/product	19.1	Information on corporate social responsibility and objective	1.5
Repurchase	5.9	Description of employee contracts/contractual issues	25.0

The full list of IPOs was obtained from the Stock Exchange, and the actual 68 IPO prospectuses were obtained either from the companies themselves or from the underwriting banks. For the purpose of our analysis, we only considered the disclosure in the IPO prospectuses. The average disclosure of all the indicators included in our disclosure index is 22 per cent, varying from Lundbeck's (Danish pharmaceutical company, IPO in 1999) prospectus, which discloses 51 per cent of the proposed voluntary information items, to Sparekassen Svendborg's (Danish bank, IPO in 1990), which does not disclose any of the items at all. Of the overall categories of the disclosure index, "strategic statements" and "customers" are the information categories where most information is disclosed, both averaging 28 per cent across the total sample (see Table II for all sub-totals and disclosure percentages).

Table III classifies the IPO prospectuses by industry. It shows the increasing importance of IPO's within the IT and pharmaceutical sectors in most recent years. However, when the time period is taken as a whole, it is still the production and trading companies that dominate listings on the stock exchange, encompassing 44 IPO listings out of 68.

Descriptive statistics for the three continuous variables "age", "size", and "managerial ownership before the IPO" are shown in Table IV. In most cases the data for these variables were contained in the prospectus but otherwise the firms were contacted or the data were obtained from the Danish register of firms with limited liability.

Results

In Table V, the average disclosure per prospectus has been calculated as described above and divided into the six different categories depicted in Table I. In interpreting the data, it should be kept in mind that although all Danish IPO prospectuses over a

	Pharmaceutical and research[a]	IT and technology[b]	Trade and service[c]	Production	No. of IPOs
2001		3	1		4
2000	3	3	1		7
1999	1	4			5
1998	1	4	4	4	13
1997	1	1	1	1	4
1996	1		1	4	6
1995		2	4	4	10
1994			4		4
1993			1	1	2
1992				2	2
1991			3	2	5
1990			4	2	6
No. of IPOs	7	17	24	20	68

Notes:
[a] Pharmaceutical companies, biotechnological companies and other types of research companies; [b] software companies, hardware companies, internet companies and other kinds of IT and high-technological companies; [c] trade companies, wholesalers, banks and other kinds of service companies

Table III.
Number of prospectuses classified by type of business

12-year period have been included the small number of observations limits the conclusions that can be drawn.

Table V shows that the total amount of information has increased during the overall period within all categories. This development is especially predominant for the categories employees, strategic statements and R&D.

There is, however, a break point in the trend. Across all categories, there is a decrease in disclosure from 1999 to 2001. Using standard regression analysis and applying a trend dummy variable for the last two years, we found a significant difference in the slope. The regression analysis yields the equation:

$$\text{Disclosure}(Y_t) = 3.48 + 2.08^{*}t - 6.52^{*}D^{*}t + \varepsilon_t,$$

$$\text{T-test values}: \quad (7.00) \quad (-2.47)$$

$$\text{where}: D = 0(t = 1990\text{-}1999) \text{ and } D = 1(t = 2000\text{-}2001)$$

A possible explanation is that until 1999 disclosure of information on intellectual capital was a simple way of signalling an attractive IPO in the same way that that the mere naming of companies as "dot.com" attracted investors (see Lee, 2001). However, after the tech stock crash, behavioural patterns might have changed so radically that even though there was not a great difference in the types of companies going public before and after the break point, after the break point there was measurable reluctance in disclosing the types of information that the "dot-com's" used to disclose.

Table IV.
Descriptive statistics

Variables	Mean	Std. deviation	Min	Max	Variance
Disclosure	16.94	8.65	0	40	74.74
Size (no. of employees)	1,017.82	2,502.86	7	17,064	6,264,298
Age (years)	27.54	27.77	1	149	771.31
Managerial ownership prior to the IPO (%)	22.75	34.84	0	100	1,213.82

Table V.
Average number of items per prospectus for each year

Max. items Year	Employees (27)	Customers (14)	IT (5)	Processes (8)	R&D (9)	Strategic statements (15)	Total[a] (78)
2001	4.8	3.8	0.8	0.8	3.5	5.5	19.0
2000	7.3	3.0	0.3	1.9	4.0	5.0	21.4
1999	8.8	5.8	1.2	2.0	5.8	7.0	30.6
1998	6.6	4.8	0.8	1.6	1.8	5.4	21.1
1997	4.3	4.5	1.3	1.3	2.3	4.8	18.3
1996	4.2	3.5	1.2	1.5	2.2	4.3	16.8
1995	3.0	4.4	0.8	1.4	1.6	3.7	14.9
1994	5.0	3.5	1.3	0.3	0.5	2.5	13.0
1993	1.5	3.5	1.0	1.0	0.0	4.0	11.0
1992	2.0	4.0	0.5	0.5	1.5	3.0	11.5
1991	2.0	2.0	0.6	0.4	0.0	1.6	6.6
1990	2.3	2.2	0.8	0.3	0.3	1.8	7.8

Note: [a] There are some minor variances in the cross-totals because of rounding errors

As indicated in Table VI, there is a difference in the level of information between the different industry categories. The number of observations is rather small, but the difference with respect to disclosure between so-called traditional sectors, i.e. manufacturing, commercial and service companies, and high-tech sectors, i.e. IT, technology, pharmaceutical and biological engineering is statistically significant. These differences are consistent with the studies by Cooke (1989, 1991) and Meek *et al.* (1995) who also concluded that the ratio of voluntary disclosure varies across industries. Since the number of Danish IPO prospectuses is limited it was decided to aggregate the initial four industries into two main sectors, the high-tech comprising and low-tech sectors for the remainder of the analysis.

Analysis of company characteristics influencing disclosure

An analysis of variance (ANOVA), controlling for technological type of the company (high-tech/low-tech), was used to test if the extent of managerial ownership before the IPO, company age and company size influenced disclosure. In order to conduct the ANOVA analysis, we divided the data on the independent variables into discrete groups in order to determine whether there is an effect on disclosure as the presumed dependent variable.

The extent of "managerial ownership before the IPO" was classified according the existence of such managerial ownership in the company at the time of IPO or not. This variable was thus measured as either "no pre-IPO managerial ownership" or "pre-IPO managerial ownership" in the cases where this was present. The variable 'company age' was measured in years and operationalised by distinguishing between young companies and old companies where enterprises aged less than 20 years were considered as young companies. Lastly, "company size" was treated by dividing the data into small companies – of less than 250 employees – and large companies – of 250 employees or more.

H1. *Industry differences*

The independent variable "technology type" has a significant influence on the extent of disclosure, high-tech companies disclosing almost twice as much information (31.7 per cent) as low-tech companies (16.4 per cent). It is not surprising that this variable is significant, as we were able to group our industrial categories according to this characteristic in the previous section. Moreover, this result may be compared to those of other studies indicating that investors and analysts engaged in knowledge-intensive industries – for example technological and pharmaceutical companies – find

	Employees	Customers	IT	Processes	R&D	Strategic statements	Total	Disclosure (%)
IT and technology ($n = 17$)	7.6	5.5	0.7	1.9	3.7	6.3	25.7	33.0
Pharmaceutical and research ($n = 7$)	5.3	2.0	0.7	1.3	6.8	5.3	21.5	27.6
Production ($n = 20$)	3.1	4.2	1.0	1.5	1.5	4.4	15.6	20.0
Trade and service ($n = 24$)	3.8	2.8	0.9	0.5	0.1	2.3	10.4	13.3

Table VI. Average amount of disclosure by industry and category

non-financial information especially relevant for estimating the value of these types of companies (Mavrinac and Boyle, 1996; Mavrinac and Siesfeld, 1997).

The difference between sectors also supports that companies with more intellectual capital need to disclose more voluntary non-financial information because increased information can help to reduce investors' uncertainty and, thereby, ensure that the company in question does not have to pay a high premium due to investors' perceived information risk. However, the difference could also be that industry norms for disclosure (see Gibbins *et al.*, 1990) affect the firm's disclosure as is suggested by Mather *et al.* (2000) who find industry differences in the use of graphs in Australian IPO prospectuses.

H2. *Managerial ownership*

The extent of management ownership before the IPO was also found to have significant influence on the amount of disclosure. Companies where management had an ownership share in the company at the time of listing on the stock exchange disclosed more information on intellectual capital. Note that this result is quite surprising and contrary to the literature previously cited (Demirag *et al.*, 2000; O'Sullivan, 2000). Our statistical analysis indicated that managerial ownership prior to the IPO had a positive effect on the companies' disclosure. A company where managerial ownership was present prior to the IPO disclosed on average 26.4 per cent as opposed to 17.1 per cent for the companies without managerial ownership before the IPO. The question of why this was the case cannot be answered within the context of this study. One possible explanation, however, might be that managers have a greater incentive to market the company, as the resulting lower cost of capital will directly affect their profit from the offering.

H3. *Company size*

The analysis did not find significant correlation between "company size" expressed in terms of number of employees and the extent of disclosure Since the number of observations is limited, the possible disconfirmation of Verrecchia's (1983) proprietary costs theory, furthermore confirmed by, e.g. Inchausti (1997), should be taken as a tentative conclusion. However, the results should be viewed in the light of the specific situation of the companies at the time of the publication of their IPO prospectuses. The companies in our study are about to be listed on the stock exchange, hence although they inevitably differ relative to company size, regardless of the size of the company, the flotation costs are very similar.

H4. *Company age*

Also, our analysis did not find any significant difference with respect to the independent variable "age". In relation to the perceived risk of investing in a company, age is a part of documenting that the company has been, and therefore in the future will be, able to sustain itself. Our results thus indicate that the history of the company does not matter to the capital market, although the track record of companies is continuously emphasized by capital market actors. This might indicate that it is the track record of present management team or the managing director, rather than the age of the company that matters. No previous studies have elaborated further on this aspect, wherefore it is an interesting avenue for further investigation.

Discussion

The results of our analyses lead us to three tentative conclusions. First, the results regarding industry differences supports the proposition that intangibles-intensive companies need to disclose more non-accounting information (*H1*). Possibly, in order to lower their risk premium. Second, there was an indication that management ownership creates incentives for greater disclosure (*H2*). This result was in opposition to previous findings, but could, possibly, be explained by the fact that the time of IPO, which is our specific focal point, is a unique case. The reasoning behind this is that management has a greater incentive to disclose information when they too will profit from the stock market listing. They are thus more interested in conveying the intrinsic value of the company to the stock market. Interestingly, this difference does not prevail for the high-tech companies – something that could have been expected – as the IPO profits generally are assumed to be greater there. Thus, we can also conclude that the technology factor weighs more than the ownership factor when it comes to the extent of disclosure.

The result that "size" (*H3*) and "age" (*H4*) are not significant individually contradicts a number of earlier studies (Ahmed and Courtis, 1999; Adrem, 1999; Kim and Ritter, 1999; Jaggi, 1997). Although it is important to note that our conclusion is based on a rather small dataset, it could indicate that there are other organizational characteristics, which are more decisive. Our analysis indicates that industry characteristics play a greater role in the assessment of how much information companies should disclose in order to facilitate the capital market's valuation analyses. The results indicate here that it is the old/large low-tech companies, which distinguish themselves from the other three possible categories. This result is in accordance with the cost of disclosure theory, which states that the costs for this type of company will be relatively lower.

Concluding remarks

Voluntary disclosure of information on intellectual capital in Danish IPO prospectuses has increased substantially in the last decade. This development can partly be related to the fact that relatively more IT and pharmaceutical companies have been listed on the Copenhagen Stock Exchange in the later years covered by our study, but also that the prospectuses of these types of companies generally include more information on intellectual capital. These results correspond to the suggestion in the literature that companies relying mainly on intangible assets for value creation – for example highly-educated staff, R&D, patents etc. – have to disclose more varied non-accounting information in order to reduce information asymmetry between management and external stakeholders.

Our analysis showed that grouping the companies into high-tech and low-tech sectors, revealed significant differences between high-tech and low-tech sectors with regard to the disclosure of voluntary non-accounting information. Likewise, the extent of management ownership before the IPO had a significant influence on the extent of voluntary non-accounting disclosure in the IPO prospectuses. On the other hand, age and company size were found insignificant. The four control variables included in the study relate to hypothesis regarding industry norms (*H1*) and the minimization of investor uncertainty (*H2, H3, H4*).

In relation to the future development of business reporting practices, DiPiazza and Eccles (2002) advocate for an approach that considers differences in relevance of information across industries as is also reflected in the industry differences that we find. Pre-IPO managerial ownership (*H2*) concerns the minimizing of uncertainty for potential investors as it indicates whether management has money on the line too. Our results indicate that when management has money on the line, they tend to disclose more information on intellectual capital.

An influence of size on the extent of disclosure could be evidence of the much-cited cost of disclosure theory (see Verrecchia, 1983). However, as our results were indecisive, they might indicate that the cost of disclosure theory does not have a significant importance in the present era of more advanced accounting systems and instant reporting. Finally, the variable age was indecisive as well. This might be attributed to the fact that analysts and investors do not regard the too distant past of the company important. Furthermore, the suggestion was made that perhaps it was not the age or track record of the company itself that mattered, but rather it was the track record of the existing management team that was the focus of the capital market. As these possible explanations could not be tested using the approach adopted in the study they can be suggested as areas for future research.

It is often stated that the current level of mandatory disclosure of information is not sufficient to convey a true picture of the company's present value and future prospects and that supplementary information on, e.g. intellectual capital should be disclosed. However, at the same time, there are reservations as to whether supplementary business reporting is a credible means of voluntary disclosure and whether indicators of such information are relevant. Therefore, this paper has focussed on the reporting of such non-accounting information in IPO prospectuses as information disclosed here was suggested to comprehend information that the capital market would find important. As firms issuing the IPO prospectus attempt to address the needs of the capital market, we believe that the actual disclosure practises in IPO prospectuses give insights into the capital market's need for information.

The disclosure of information on intellectual capital in IPO prospectuses, which has been the focus of this paper, indicates that companies and their advisors believe that this type of information is important in the capital market's assessment of the company's value. However, in order to be more specific about the motives behind the disclosure of intellectual capital, in IPO prospectuses and other supplementary reports, for example, intellectual capital statements, and about how this information will form the basis of the market's assessment of the company, it is necessary to look more directly at the work of the analysts and investors. This could be done using research interviews as was done, e.g. by Holland (2004) who provides evidence that both analysts and fund managers consider information on intellectual capital in their fundamental mosaic of information, which is the cornerstone of their discussions with and about the company.

Finally, a more detailed understanding of companies' motives for disclosure as well as analysts' and investors' need for information should make the link to the companies' cost of equity capital. Schrand and Verrecchia (2004) have demonstrated that greater disclosure frequency in the period prior to the IPO is associated with lower under-pricing as well as some of the more traditional measures of a companies' cost of capital such as bid-ask spread and analyst forecast dispersion also will be lower.

Moreover, Guo *et al.* (2004) provide evidence that the disclosure of information related to product development, patent protection and venture capital backing in biotech IPO prospectuses subsequently lowers bid-ask spread and share return volatility.

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Investor Interests and Government Accounting Disclosure

Gary Giroux
Texas A&M University, College Station, Texas, USA, and
Donald Deis
Louisiana State University, Baton Rouge, Louisiana, USA

The purpose of this article is to analyse the financial information needs of bond investors based on disclosures from US municipal annual reports and budgets. Investors are considered the primary user group of commercial financial information (FASB, 1978) and, along with citizen groups and oversight organizations, a major user group of governmental financial disclosures (GASB, 1986). Disclosure indexes are developed based on information available from annual reports and budgets as measures of disclosure quality. The indexes are measured against surrogates for information incentives of municipal bond investors and related organizations (including bond raters and underwriters). These disclosure incentives will be based on information incentives between bond investors and municipality administrators.

The focus of this project is financial disclosures beyond minimum generally accepted accounting principals (GAAP) requirements. Why do some large municipalities present considerable non-GAAP information and some do not? It is posited that incentives of key actors involved in the process determine disclosure levels, after controlling for structural and regulatory differences. The article concentrates on the incentive structures of (1) municipal bond investors versus (2) professional and elected administrators.

This project uses the same database and is an extension of Giroux (1989). Giroux (1989) used public choice theory to test political disclosure incentives associated with voter and bureaucratic behaviour. Empirical results provided support for both perspectives, especially associated with budget disclosures. The variables associated with the current project consider investor/creditor needs rather than political processes.

Investor Incentives and Economic Theory

The limited accounting literature focusing on municipal disclosure indicates positive disclosure incentives. Municipalities with superior financial characteristics

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can signal this information through the financial reporting process, including additional disclosures beyond minimum GAAP requirements (Evans and Patton, 1983). Under an agency framework, principals have the necessary incentives to monitor agents. However, the incentives for gathering information associated with political processes are less than for market processes. The reason is that there is less ability to capture benefits from political processes (Watts and Zimmerman, 1986). Thus, voters may pay little attention to financial information of governments (a concept called "rational ignorance"), but municipal bond dealers and investors should be very interested in financial information. Government administrators are responsible for public accountability including financial credibility. From the perspective of the investors the ability of the government to pay its debts is crucial. Thus, disclosure is important to government administrators to maintain the credit rating, the ability to tap credit markets in the future, and keep interest rates on new debt as low as possible[1].

Baber and Sen (1984) identified contracting and regulation incentives for adequate disclosure. Contracts require agents (e.g. bureaucrats) to disclose financial information reflecting the agents' actions. Baber and Sen also posited the use of standard reporting practices to reduce information costs. Regulation of financial reporting reduces the liability of the government to the private sector associated with misleading or inadequate disclosure.

Evans and Patton (1983) focused on management incentives (especially the city manager) for disclosure. Certificate of Conformance (now Certificate of Achievement) participation was hypothesized to relate to the recognition of high quality management and lower cost of debt. Evans and Patton viewed the Certificate as an individual accomplishment of the chief executive (especially the city manager). One result of quality management was posited to be a lower interest rate on new borrowing.

The analysis of long-term debt has been an important disclosure factor in the accounting literature. A survey of commercial bankers indicated that total debt outstanding was the most important factor in evaluating municipal securities (Boyett and Giroux, 1978). The user needs survey conducted by the Governmental Accounting Standards Board (GASB) demonstrated the importance of debt-related disclosures by governments, such as historic trends in borrowing and future debt service requirements (Jones, 1985). In a study of the municipal bond market, Ingram and Copeland (1982) found long-term debt per capita a significant indicator of systematic risk and change in yield premium. The bond indenture is an arms-length contract, which may require debtor compliance and bond investor-related monitoring. Bondholders price debt consistent with risk characteristics. High risk should be associated with higher interest rates and, perhaps, more monitoring/control mechanisms such as required financial ratios (e.g. required levels of cash or debt) or financial audits. Municipalities may receive lower interest rates with standardized or complete reporting, which emphasizes quality management and facilitates the analysis of fiscal stress (Zimmerman, 1977).

Bondholders are external to the political process and depend on contractual relationships with municipalities to protect their interests[2]. The primary concern of investors is the financial viability of the government to ensure the uninterrupted receipt of interest and principal payments. Considerable evidence exists that investors base their analysis on financial disclosure and the risk premium that investors demand for increased bond default potential is based, in part, on the quality of financial disclosures[3]. It is expected that investor-related disclosure will be directly related to the level of importance of long-term debt to the municipality, the need for future bond issues, structural characteristics of the government, the regulatory environment including the existence of financial monitoring techniques, and independent external evaluations of the government's financial condition.

Ingram (1984) used an index of disclosure quality of state governments to analyse the association of economic factors to accounting practices[4]. Factor analysis identified eight variables including income, revenue, salaries, urbanization, population and debt. Regression analysis indicated that disclosure quality related to political competition, newspaper circulation, urbanization, and when the accounting administrator is selected by the governor.

In an earlier study Giroux (1989) tested the hypothesis that voters dominate political processes (based on the median voter model – MVM) versus the hypothesis that bureaucrats dominate the processes (bureaucratic model – BM). The median voter domination requires access to key financial information, while bureaucratic power stresses the monopoly position of bureaucrats over information and the likelihood that the bureaucracy would provide data strategically to voters and elected officials based on their own incentives. Testing was based on disclosure indexes from annual reports and budgets of large cities. Results provided support for both models. Budget disclosures provided some support for the MVM, consistent with the political nature of the budget process. The disclosure indexes associated with the annual report generally supported BM incentives (i.e. lower disclosure levels) and less support for MVM. One interpretation of these results is that political decisions are based on budget information, while the annual report disclosures do not focus on political considerations. This interpretation suggests that the investor model developed in this article may be a better fit to the annual report disclosure indexes than the budget index.

Accounting Disclosure

Giroux (1989) modelled the disclosure practices of large US cities relative to the key actors involved in political processes: voters, elected officials, bureaucrats and public employees. The present study uses the same database to make comparisons between the investor-based incentives and the incentives of key political actors from the earlier study. Annual reports and budgets were requested from the 167 large cities and one or both were received from 133 cities.

This study uses fiscal year 1983 annual reports and budgets to prepare three disclosure indexes. The rationale for this approach was presented in Giroux (1989, p. 9):

At that time generally accepted accounting principles (GAAP) for state and local governments were based on pronouncements of the National Council on Governmental Accounting (NCGA). Financial disclosure was primarily based on NCGA Statement 1 (1979), which identified the criteria for the comprehensive annual financial report (CAFR) and general purpose financial statements. The CAFR provided for both aggregate reporting (combined financial statements) and detailed financial analysis (e.g. combining and individual fund statements). In addition to these integrated statements, NCGA Statement 1 recommends (but does not require) a set of 15 statistical tables. Municipalities also prepared annual reporting budgets before the start of the fiscal year. However, there was no budget-related "GAAP". Therefore budget disclosure format and quality should have been based on bureaucracy-city council negotiations. High quality budgets were expected only if council members had the incentives to demand them.

Disclosure indexes were prepared for:

(1) typical characteristics in the annual operating budget;

(2) pension and employee benefit disclosures in the annual report; and

(3) typical disclosures presented in the statistical section of the annual report.

The budget index was based on eight 0-1 factors of disclosure quality, including whether or not a variance analysis was included, programme descriptions, line item summary data and a budget message. This information could be useful to investors to estimate future cash flows,. but seems particularly important to voters and other constituents to determine public output. The budget is considered an expression of public policy by the GASB (GASB, 1990).

The pension and employee benefits discloser index was based on 19 pension-related items and eight employee benefit factors (e.g. vacation and sick pay disclosures). The data base precedes GASB Statement No. 5 (1986) on pension disclosures. Therefore, disclosure scores should be dependent on disclosure incentives associated with key users rather than GAAP requirements.

Twenty-two statistical section disclosure items are measured, based primarily on the disclosure recommendations of NCGA Statement 1. Since these recommendations are not GAAP, disclosure levels should be based on the incentives of governments. A summary of the disclosure indexes is presented in Appendices 1 and 2. (See Giroux 1989 for a detailed analysis of the disclosure indexes.)

Investor Incentives

It is posited that issuing long-term debt at the lowest possible interest rate is important to municipalities. Therefore, municipal managers would be responsive to investor demands for financial information. The importance of the annual report in this regard has been well established:

> Investors and creditors use governmental financial reports for one primary purpose: to ascertain the ability of a government to repay its debt... Investors and creditors are particularly interested in the amount of debt and its structure, litigation, other actual and contingent liabilities, and cash available to pay obligations. In addition, investors and creditors compare budgeted revenues and expenditures to evaluate the ability of a governmental unit to live within its means (Jones, 1985, pp. 30-31).

Since budget to actual comparisons are available in the annual report, it is not known whether the annual budget is important for financial analysis by investors.

The three disclosures indexes are based on non-GAAP disclosures. The 22 factors related to statistical tables focus on items most likely to be of interest to investors. The items include several debt-related calculations (e.g. overlapping debt, debt per capita, annual debt service percentage), information related to cash flow trends (e.g. property tax levied and collected, 10 years; expenditures by functions, 10 years), as well as economic conditions (e.g. personal income, unemployment rate, contingencies). It is posited that this index most closely matches expected disclosure needs of investors. This interpretation is based on survey information on investors (see, especially Jones (1985) and Boyett and Giroux (1978)). The pension and employee benefit index includes salary-related items not required under GAAP at the time. Since salary represents the major expenditure category of municipalities and influences the amount of cash available for future debt service, sophisticated investors are expected to evaluate this technical information. The existence of major pension and other employee-benefit liabilities may impact on the availability of future cash flows to service debt. Therefore, investors are posited to demand disclosures beyond minimum GAAP requirements. The budget index considers only eight basic characteristics of typical budget disclosures, but should capture general investor interest in budget analysis. It provided the highest level of explanatory power based on R^2 in Giroux (1989).

The primary and secondary municipal bond market are competitive and municipalities that issue significant amounts of general obligation bonds and other long-term debt have incentives to disclose information of interest to bond underwriters and investors to obtain the lowest possible interest rates and maintain their creditworthiness. However, bureaucrats have incentives to limit financial disclosures (Giroux, 1989). Therefore, the extent of disclosure should depend on relative incentives. For example, as the level of debt increases the incentives to increase investor-related disclosure should be greater.

Four categories of variables will be used to analyse disclosure levels in the context of investor needs:

(1) financial ratios;

(2) structural factors;

(3) regulation; and

(4) external evaluation of disclosure and creditworthiness.

These represent factors related to investor incentives and control variables. Financial variables connect to potential investor evaluation of financial disclosure. Structural and regulation variables are control variables that can affect disclosure levels. External evaluation may be a surrogate for management signalling.

Three financial variables will be tested: total long-term debt outstanding per capita (DEBT), intergovernmental grants as a percentage of total revenues (IG), and general fund balance per capita (FB). As pointed out by Ingram (1984, p. 130): "Larger dependency on external funding sources could lead to increased disclosure". Debt and intergovernmental grants represent the major categories of external funding. The level of debt outstanding should be the primary incentive

for investor-related disclosure levels (that is, the ability of governments to issue new debt at the lowest possible interest rate depends, in part, on full disclosure of information demanded by investors). As DEBT rises, municipalities have greater incentives to increase disclosure levels. A positive coefficient is expected. IG represents the bulk of non-local revenues. Intergovernmental grants often represent the largest single revenue source for cities actively seeking state and local funding. This variable is used as a surrogate for state or federal government regulation (Ingram, 1984). No sign is predicted. A positive coefficient would suggest superior government regulation and monitoring to increase the level of financial disclosure (e.g. auditing requirements). A negative sign would suggest that high intergovernmental grant levels would replace the need to issue additional long-term debt, thus reducing disclosure incentives to investors. FB is a measure of available operating equity, a "cushion" available for future spending. General fund equity can be used for ordinary operating purposes and normally is available to cover interest and principal payments through operating transfers to debt service funds. It is unknown how FB affects disclosure incentives and the direction of the sign is unknown. A negative sign may indicate that the government is "insulated" from pressures associated with the need for additional debt. A positive sign may represent a signal of high quality financial management (Evans and Patton, 1983).

Structural factors relate to characteristics of individual municipalities that may impact on disclosure levels. The chief executive may be either a mayor or city manager, i.e. an elected official or a professional manager. This is measured as a dummy variable (G), where a 1 represents a city manager chief executive. A 0 represents a mayor as chief executive. A positive sign is predicted.

A city manager has bureaucratic incentives to limit disclosure, but as a professional manager should be influenced by investor incentives (e.g. as the level of debt and concomitant interest payments increase) (Evans and Patton, 1983). A strong agency relationship exists between the appointed city manager and the city council. Council members have the authority to fire the city manager and may also attempt to manoeuvre the manager into taking the blame for controversial decisions. Hence, the city manager may resort to extensive information disclosure to thwart such council member strategies[5]. A mayor is expected to be more interested in political factors. Mayors are elected managers who, like the city manager, must work with the council. However, the dominant agency relationship in this form of government is between the mayor and the voters (Ingram and DeJong, 1987). Mayoral effectiveness is associated with maintaining a constituent base; that is, the ability to be re-elected (Mayper, *et al.*, 1991).

The total number of funds used by a city (FUND) is a measure of operating complexity and control imposed by a city administration. No sign is predicted. A large number of funds increases reporting complexity, which may be difficult for users to evaluate. On the other hand, a major reason for using multiple funds is to increase accounting control. This may provide political and regulatory benefits, as well as additional information to specific investors (e.g. on various outstanding debt issues).

A scaled variable is established to estimate the magnitude of auditor exceptions (AO). A 0 represents an unqualified opinion. A 3 is a major exception (such as a missing statement or inability to audit specific funds or fixed assets). A 1 is a technical exception such as a change in accounting principle for which the auditor concurs. A 2 is a relatively minor exception. A positive coefficient is expected. Investors should demand greater disclosure levels when auditor exceptions are reported.

Municipalities can be highly regulated by states, although regulation intensity varies across the 50 states. Various state laws require specific accounting and auditing practices and may mandate a balanced budget. These regulations influence the disclosure environment. Three variables are included in the model to control for regulation. Most municipalities are subject to either or both state laws or city ordinances requiring some form of balanced budget. These range from no regulation through moderate requirements (e.g. expenditures must equal revenues plus existing fund balance) to stringent (revenues must be equal or greater than expenditures). A categorical variable on budget laws (BL) was scaled from 1 (no regulation) to 7 (revenues equal expenditures) representing increasingly severe balanced budget requirements. No sign is predicted for BL. BL is an important factor in the operations of a city, but the impact on financial disclosure is unknown. GAAP is a dummy variable where 1 represents a state law requiring financial statements presented according to GAAP, while AUD is a state law dummy variable where 1 is an audit requirement. The regulations should be associated with higher disclosure scores; therefore, positive coefficients are expected for GAAP and AUD.

Finally, two variables represent external valuations of financial health and disclosure. The bond rating (BR) of a municipality is a general measure of financial health (often identified with fiscal stress), with higher bond ratings associated with stronger economic and financial conditions. BR is a dummy variable where 1 is an A1 or higher Moody's rating. Since disclosure levels are evaluated by the rating agencies, a higher rating should be associated with higher disclosure levels. The Government Finance Officers Association (GFOA) Certificate of Achievement (CA) is awarded to state and local governments after a review team determines that they meet minimum disclosure standards of the annual report in accordance with GAAP. Evans and Patton (1983) associated the CA with quality management and lower interest rates on new debt. A positive sign is anticipated. Investors that analyse an annual report with a CA know that disclosure is complete and in accordance with GAAP. The external evaluation variables also can be interpreted as alternative disclosure "indexes" rather than monitoring devices. Consequently, separate regressions will be run both with and without these factors.

Sample/Data Selection

This project analyses financial disclosures of US cities over 100,000 in population. The primary sources of information are the annual financial report and the annual operating budget, which were requested by letter from all 167 large cities for the fiscal year ended in 1983. Additional data sources include the 1984 *Municipal*

Year Book, Surveying the States, and Bureau of the Census publications. Either or both annual reports or budgets were available from 133 large cities. No published sources were available for budget laws; consequently, this information was obtained from telephone calls to the individual cities. Complete data were available for 110 cities. Descriptive information was analysed based on available data; however, regression runs were based on the 110 cities with complete data.

Results

The variables used are summarized in Table I, along with descriptive information. This includes both the disclosure indexes and independent variables. The statistical index had an average score of 13.6 of 22 items tabulated. One city disclosed no items, while several had 20 or 21 (none of the cities had all 22 items). The employee index was the most complex, with a range of 0 to 70. The average was almost 38. The budget index scores were larger than anticipated (since there are no budget disclosure standards), with an average score of 5.4 out of a possible 8. All of the indexes had moderate standard deviations, despite the large ranges. This suggests that most observations clustered around the midpoint and the endpoints were indeed extreme values.

Average debt was $655 per capita, with a range of $0 to $3,220 and a substantial standard deviation. The large cities relied heavily on intergovernmental grants, an average 31 per cent of total revenue. This was another item with a large range, from zero to over two-thirds of total revenue. General Fund balance averaged $50 per person, with six cities recording deficits.

There was an almost equal split in type of chief executive with 53 per cent of the cities using city managers. The average city had 35 separate funds, while four cities had more than 100 funds and seven cities had ten or fewer. El Paso had only six and New York City managed with 35 funds. The average AO score was 1.6. Only 28 cities had unqualified opinions, while 22 cities had only technical qualifications. The remainder had minor to severe qualifications.

Accounting regulations proved to be fairly common. The average city had moderate balanced budget requirements at 3.3 (scaled from 1 to 7). About half the states required large municipalities to follow GAAP and more than three-quarters of the cities were required to have financial and compliance audits.

The average city had an A1 bond rating and 76 per cent of the cities had an A1 or higher rating. More than half the cities had a CA. The CA is relatively rare (at the time only about 600 certificates were issued to state and local governments – out of 80,000+ US governments). Large cities apparently have greater incentives to receive the CA, perhaps because of larger debt issues outstanding. That is, expected interest cost savings are greater than the perceived cost of obtaining the CA.

Regression results are presented in Table II. The models were run with and without the external evaluation variables. CA could be interpreted as an alternative disclosure measure. In addition, CA and BR were correlated with each other as well as several other variables. Although an analysis of variance inflation factors indicated no problems with multicollinearity, it was felt useful to determine if

	Expected sign	Mean	Standard deviation	Minimum	Maximum
Disclosure indexes					
Statistical		13.6	6.5	0	21
Employee		37.7	12.8	0	70
Budget		5.4	1.6	1	8
Independent variables					
Financial					
DEBT	+	$655.3	587.4	0	3,220.0
IG	?	28.1%	13.8	0	69.0
FB	?	$50.2	49.8	-40.3	353.3
Structural					
G	+	0.53	0.50	0	1
FUND	?	35.4	23.3	6	173
AO	+	1.63	1.0	0	3
Regulation					
BL	?	3.3	2.0	1	7
GAAP	+	0.52	0.50	0	1
AUD	+	0.77	0.42	0	1
External evaluation					
BR	+	0.76	0.43	0	1
CA	+	0.53	0.50	0	1

DEBT: total long-term debt per capita
IG: intergovernmental grants/total revenue
FB: general fund balance per capita

G: chief executive dummy, 1 = city manager
FUND: number of separate funds used
AO: auditor's opinion, 0 = unqualified, 3 = major exception

BL: budget law, 1 = none, 7 = revenues greater than or equal to expenditures
GAAP: state law dummy, 1 = GAAP required
AUD: state law dummy, 1 = audit required

BR: *Moody's* bond rating dummy, 1 = A1 or higher rating
CA: Certificate of Achievement dummy, 1 = city awarded CA

Table I.
Disclosure Indexes and Investor Incentives Variables

model results differed if these variables were removed. Other regression diagnostics included the analysis of residual plots, stem and leaf and box plots of residuals, and Cook's D. No severe violations were detected.

As expected, the statistical index best represented investor incentives empirically. The explanatory power of the full model was 44 per cent (R^2) and significant at 0.0001. CA, FB, FUND, and BL were significant, representing each category in

Independent variables	Statistical index		Employee index		Budget index	
Financial ratios						
DEBT	0.19	0.80	1.33	1.91	0.10	0.11
	(0.43)	(1.63)**	(1.32)	(1.87)**	(0.75)	(0.85)
IG	-2.48	-3.74	-9.22	-10.78	-0.27	-0.43
	(-1.40)	(-1.89)**	(-2.32)**	(-2.68)*	(-0.51)	(-0.83)
FB	0.02	0.03	0.02	0.03	-0.005	-0.003
	(1.89)**	(2.39)**	(0.65)	(1.13)	(-1.42)	(-1.09)
Structural						
G	-0.21	2.55	-0.94	2.30	0.98	1.18
	(-0.17)	(1.98)**	(-0.34)	(0.88)	(2.73)*	(3.52)*
FUND	0.05	0.04	-0.01	-0.01	0.01	0.01
	(2.21)**	(1.84)**	(-0.18)	(-0.17)	(1.09)	(1.19)
AO	-0.15	-0.65	-0.02	-0.59	0.10	0.08
	(-0.27)	(-1.04)	(-0.01)	(-0.45)	(0.60)	(0.51)
Regulation						
BL	-0.65	-0.40	-0.22	0.06	0.02	0.02
	(-2.38)**	(-1.34)	(-0.35)	(0.09)	(0.26)	(0.22)
GAAP	-0.37	-0.47	2.33	2.34	-0.09	-0.10
	(-0.30)	(-0.33)	(0.84)	(0.81)	(0.21)	(-0.27)
AUD	2.01	3.42	-1.11	0.78	0.25	0.35
	(1.40)	(1.89)**	(-0.31)	(0.22)	(0.54)	(0.75)
External evaluation						
BR	1.65		2.65		0.48	
	(1.26)		(0.88)		(1.09)	
CA	5.97		6.67		(0.22)	
	(5.18)*		(2.55)**		(0.68)	
R^2	0.440	0.260	0.209	0.141	0.158	0.139
Adj R^2	0.376	0.193	0.117	0.060	0.064	0.062
F value	6.85	3.38	2.26	1.74	1.68	1.79
Significance	0.0001	0.0004	0.017	0.089	0.090	0.078

* Significant at 0.01
** Significant at 0.1

Table II.
Regression Results by Disclosure Index Coefficients (*t*-values)

the model. The positive coefficients for FB and FUND suggest a strong equity position and complex reporting associated with an increased number of funds are associated with higher supplementary disclosure levels, i.e. high equity cities and those with complex fund structures provide more complete statistical disclosures. The negative sign of BL may represent investors favouring less

restrictive budget control, i.e. greater restriction may increase the probability for default on interest and principal payments at least in the short-term. When BR and CA are dropped from the model R^2 falls to 26 per cent; however, six variables are significant, including all three financial ratios, G, FUND, and AUD. The expected relationship of DEBT to disclosure levels is apparent in the reduced model. The negative coefficient for IG suggests that cities which rely more heavily on intergovernmental grants rather than debt have lower disclosure incentives and provide less statistical information. City manager cities provide more complete statistical disclosures than mayoral cities, as do cities that were required by state law to be audited.

The results of the employee index were rather disappointing. The explanatory power was considerably less than the statistical index for both the full and reduced models and only two variables were significant in each. This suggests that investors are more interested in statistical section tables than employee-related disclosures. IG and CA were significant in the full model, while DEBT and IG were significant in the reduced model. As with the statistical index the relationship of DEBT to disclosure levels is only apparent in the reduced model.

As expected the budget index was a poor predictor of investor incentives. Only G was significant; that is, city manager cities produced higher disclosure budgets (a structural factor). There was no indication that investor incentives had any impact on the budget document. This is consistent with the interpretation that the budget is a political document (the major finding of Giroux, 1989), while the annual report is primarily associated with investor analysis.

Conclusions

The purpose of this article was to analyse bond investor incentives for municipal disclosures as measured by three indexes of financial information available on the annual report and budget. These indexes measured:

(1) tables present in the statistical section of the annual report;

(2) pension and other employee benefit information present in the notes to the financial statements; and

(3) basic budget disclosures.

The model included financial ratios associated with other factors of possible interest to investors; structural factors associated with the management of the cities, fund accounting, and auditing results; state regulation of municipal accounting and budgeting items; and external measures of fiscal stress and disclosure quality.

The existence of a Certificate of Achievement was a significant variable in both annual report indexes, but not the budget index. The CA seems to be the best indicator of supplementary disclosure levels. When CA was excluded from the model DEBT became significant for both the statistical and employee indexes. DEBT would seem to provide the greatest incentives for disclosure levels beyond

those required by GAAP, and this relationship is substantiated in the reduced model for the annual report indexes.

The statistical index was the most successful for measuring investor incentives, both in terms of explanatory power and number of significant variables (six in the reduced model). On the other hand, the budget index was not associated with investor incentives.

Giroux (1989) used the same sample and the same indexes to measure financial disclosure in the context of public choice theory, comparing the incentives of both politicians and voters versus the bureaucrats. The budget index yielded the best results, suggesting that the budget is primarily a political document. One interpretation of these results would be that most political decisions of a financial nature are based on the budget process. In a political context relatively little interest was associated with the annual report, a document that could be important for both feedback and control.

Although both the annual report and budget are political documents, the present study suggests that investor incentives are more closely related to the annual report than the budget. The annual report is historical and can be interpreted as a technical document on actual financial results of particular interest to investors and creditors. These results must be considered preliminary, but suggest future research on these two financial documents. The budget is a planning, control and public policy-related document. The annual report also has political implications, but is more closely related to investor incentives.

An Alternative Perspective

The mode of interpretation used in this study makes the claims and evidence used to support the claims both partial and restrictive. We can summarize this partiality and restrictiveness in three related ways.

First, and most broadly, the rationality criteria used are economic (also called technico-administrative). We assume that the incentives of self-interested economic agents help predict the accounting phenomena under study. Such an approach is partial and a somewhat contrived reduction of the empirical domain in which governmental accounting exists. This results in the setting aside or bracketing of broader social, political, institutional, technical and moral spheres of governmental accounting's force within human experience[6].

Second, we used a dichotomy between economic and political interests as a way to interpret differences between the processes that result in municipal financial statements and the processes involved in municipal budgeting. This is a contrived split, but perhaps a necessary one given the limits on what a single study can accomplish. Clearly, the production of financial statements is strongly influenced by political processes. These processes have to do with the political nature of accounting institutions and rules as well as the processes of governance that are at work in specific governments. Thus, our conclusion that the budgeting process is more "political" than the annual financial reporting process is partial outside the confines of the dichotomy used.

Third, our methodology and language are reductively empirical. We are analysing quantitative indices through a language of linear variance splitting driven by the rationality of inductive reasoning. There is nothing about our paradigm that makes it a "better" way of describing accounting phenomena. Other approaches (e.g. hermeneutical, critical, casuistic, ethnographic) are equally capable of contributing to social science efforts to understand the complex environment of accounting.

Notes

1. A delimitation of this study is the focus on investors. Voters and oversight bodies also may be interested in the financial analysis from the financial reporting process, but this is not specifically addressed in this article.
2. As defined by Giroux (1989) the political process includes voters, elected officials, and the bureaucracy. Special interests are also considered in the process. Other factors including investors and creditors are considered outside the process.
3. Ingram (1985) found that risk measures of municipal bond securities were associated with financial reporting disclosures as well as several financial ratios. Wallace (1981) and Howard (1982) discovered that municipal bond interest rates (as measured by net interest cost) are affected by bond ratings and various accounting and auditing characteristics.
4. Ingram (1985) considered 29 accounting practices based on annual report information within five categories: current assets, fixed assets, liabilities, financial reports, and general.
5. The city-manager form of government was developed as part of the National Municipal League's efforts to reform local government by making it more "businesslike" (Banfield and Wilson, 1966). Thus, the reformers sought to replace politics with business management approaches including detailed information for planning annual budgets, special reports as requested by the council, and to keep the public informed. The first city managers were mostly engineers and most city managers today have more an engineer's mentality than a politician's (Banfield and Wilson, 1986).
6. See Arrington and Puxty (1991) for a broader interpretation of accounting's rationality. See Cooper and Sherer (1984) as well as Tinker (1980) for similar arguments having to do with accounting's relation to political economy.

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Appendix 1. Pension and Employee Benefits Index Composition

Disclosure item		Mean	Standard deviation	Minimum	Maximum
P1.	Identification of employee coverage	2.82	0.72	0	3
P2.	Actuarially determined city contributions	1.35	1.30	0	3
P3.	Annual city contribution	2.53	1.07	0	3
P4.	Annual employee contribution	0.95	1.23	0	3
P5.	Amount of expense or expenditure	2.64	0.96	0	3
P6.	Statement of pension expenses/expenditures	1.90	1.43	0	3
P7.	Amount of unfunded prior service cost	1.76	1.45	0	3
P8.	Amortization of unfunded liability	1.68	1.48	0	3
P9.	Disclosure of funding policy	2.45	1.15	0	3
P10.	Market value of pension assets	0.71	1.28	0	3
P11.	Amount of vested benefits	1.69	1.43	0	3
P12.	Date of latest actuarial valuation	2.22	1.30	0	3
P13.	Significant actuarial assumptions	1.49	1.31	0	3
P14.	Net change in market value of assets	0.24	0.80	0	3
P15.	Investment earnings	0.13	0.61	0	3
P16.	Benefits paid	0.29	0.84	0	3
P17.	Plan management	1.70	1.32	0	3
P18.	Portfolio of plan assets	0.47	1.06	0	3
P19.	Actuarial value of assets	1.75	1.43	0	3
	Pension index	31.63	11.97	0	53
EB1.	Vacation pay disclosure	0.80	0.40	0	1
EB2.	Sick pay disclosure	0.82	0.38	0	1
EB3.	Number of sentences to explain sick/vacation pay	0.77	1.09	0	4
EB4.	How many numbers to explain vacation/sick pay	1.19	2.53	0	16
EB5.	Compensated absences recorded	1.07	0.82	0	3
EB6.	Amount incurred for vacation/sick pay recorded	0.01	0.09	0	1
EB7.	Liability for accrued vacation/sick pay recorded	0.51	0.52	0	2
EB8.	Portion of liability that is long-term recorded	0.21	0.41	0	1
	Employee benefits index	5.39	4.08	0	24
	Composite index	37.69	12.84	0	70

Appendix 2.
Statistical and Budget Index Composition

Disclosure item		Mean	Deviation	Minimum	Maximum
I1.	Government expenditures by function, 10 years	0.80	0.40	0	1
I2.	General revenues by source, 10 years	0.80	0.40	0	1
I3.	Property taxes levied and collected, 10 years	0.82	0.38	0	1
I4.	Assessed and actual value of property, 10 years	0.62	0.49	0	1
I5.	Property tax rates	0.82	0.39	0	1
I6.	General obligation debt to assessed value	0.73	0.45	0	1
I7.	Debt per capita	0.72	0.45	0	1
I8.	Legal debt margin	0.63	0.48	0	1
I9.	Overlapping debt computation	0.60	0.49	0	1
I10.	Annual debt service percentage	0.71	0.46	0	1
I11.	Revenue bond coverage	0.59	0.49	0	1
I12.	Population	0.77	0.42	0	1
I13.	Personal income	0.54	0.50	0	1
I14.	Unemployment rate	0.51	0.50	0	1
I15.	Bank deposits	0.60	0.49	0	1
I16.	Building permits	0.57	0.50	0	1
I17.	Retail sales	0.18	0.39	0	1
I18.	Number of employees	0.48	0.50	0	1
I19.	Insurance in force	0.36	0.48	0	1
I20.	Principal taxpayers	0.70	0.46	0	1
I21.	Capital leases	0.20	0.40	0	1
I22.	Contingencies	0.88	0.33	0	1
	Statistical index	13.63	6.49	0	21
B1.	Budget message	0.74	0.44	0	1
B2.	Table of contents	0.92	0.27	0	1
B3.	Summary tables	1.00	0	1	1
B4.	Variance analysis	0.81	0.40	0	1
B5.	Program descriptions	0.64	0.48	0	1
B6.	Performance measurement	0.16	0.36	0	1
B7.	Line item summary data	0.68	0.47	0	1
B8.	Budgets for other funds	0.45	0.50	0	1
	Budget index	5.40	1.55	1	8

Sources: Annual reports and budgets from each city.