A Study of the Disclosure Policy Effect on Information Asymmetry and Analyst Behaviour in South Africa

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Niels Nikolaus von Hase

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ABSTRACT

Corporate reporting is increasingly seen to be the result of an active managerial decision, the disclosure policy, as opposed to being traditionally considered a determinant of predominantly external factors. Naturally, the process giving rise to the disclosure policy should involve a cost-benefit analysis. While the costs of reporting are normally tangible, international research has found the benefits thereof not to be easily observed. This study focuses on the beneficial capital market effects of corporate disclosure policy of large South African firms listed on the JSE Securities Exchange (JSE).

Among the potential benefits is a reduction of information asymmetry. This relates to the misalignment of the amount of information held by different stakeholders, such as management and investors and is associated with adverse consequences such as lower equity valuations. Another related effect of disclosure policy is a positive change in the behaviour of earnings forecast analysts, such as more analysts following companies' performance.

In the near absence of local research, this study sets two primary objectives. The first objective is to investigate the disclosure policy effect on information asymmetry specifically the bid-ask spread and trading volume. The second objective is to research the disclosure policy effect on analyst behaviour, namely the analyst following, forecast dispersion, forecast accuracy and revision volatility.

The 100 largest companies, as measured by market capitalisation, make up the sample within this study. This sample was adopted from the Ernst & Young (E&Y) survey of Excellence in Corporate Reporting. The six cross-sectional regression models employed a total of eight independent variables. The analyses were repeated for each of the four survey years from 2001 to 2004.

The results suggest a statistically significant disclosure policy effect on information asymmetry as indicated by a negative relationship between disclosure policy and the bid-ask spread. The finding of a statistically significant positive relationship between disclosure and the number of analysts following a company indicates the existence of a limited disclosure policy effect on analyst behaviour in South Africa. In addition, it was found that a wider proxy for disclosure policy may be necessary, as suggested by prior research, to determine a broader disclosure policy effect on analyst behaviour.

PLAGIARISM DECLARATION

1. I declare that this research is my own, aided by my supervisor. It is submitted in fulfilment of the requirements for the degree of Masters of Commerce in the Department of Accounting at the University of Cape Town.

2. Plagiarism is to use another's work and pretend that it is one's own. I know that plagiarism is wrong.

3. I have used the Harvard convention for citation and referencing. Each significant contribution to and quotation in this project from the work, or works, of other people has been attributed and has been cited and referenced.

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5. I certify that this dissertation has not been submitted, in whole or part, as a submission for another degree at this or any other university.

Niels Nikolaus von Hase

September 2005

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GLOSSARY OF TERMS

Adverse Selection	-	The risk of trading shares with a better informed party; or in the absence of value-relevant information.
Analyst Behaviour	-	Number of analysts following a company, their EPS forecast accuracy, forecast dispersion and the volatility of their forecast revisions.
Annual Report	-	Annual stakeholder communication including all financial statements.
Bid-Ask Spread	-	The difference between quoted bid prices (buyers) and ask prices (sellers) on the Johannesburg Securities Exchange (JSE).
Corporate Reporting	-	Overall stakeholder communication including the annual report.
Cost of Capital	-	The rate of return a company must offer to obtain more funds.
Disclosure Policy	-	Deliberate managerial decision as to the level of detail, informativeness and quality of their company's reporting.
FASB	-	Financial Accounting Standards Board.
Information Asymmetry	-	Disparity between the amounts of value-relevant company information held by different market participants. This includes companies issuing information and any other investor.
IAS	-	International Accounting Standard.
IASB	-	International Accounting Standards Board.
IFRS	-	International Financial Reporting Standard.
GAAP	-	Generally Accepted Accounting Practice.
Proxy	-	A variable or surrogate for an underlying factor.

Noise	-	Non-specific influence weakening an anticipated relationship.
SEC	-	Securities and Exchange Commission.
Specialist	-	A stock exchange member who creates a market for certain shares and maintains an inventory of those shares.
Specialist Market	-	A market which arises when limit orders cannot be filed using available market orders, forcing the specialist to trade from his/her own account in order to complete transactions.
Market Maker	-	Person/Firm that buys and sells shares for her/its own account on a continuous basis to make a profit.
Order-driven Market	-	An order driven system of share dealing where buy and sell instructions are fed into a central computer and matched automatically.

GLOSSARY OF VARIABLES

Spread	-	Bid-Ask Spread
Vol	-	Trading Volume
Score	-	Disclosure Score
Size	-	Market Capitalisation
RetVol	-	Return Volatility
#Anlyst	-	Number of Analysts
ForDisp	-	Forecast Dispersion
ForAcc	-	Forecast Accuracy
RevVol	-	Revision Volatility
ROE	-	Return on Equity
HSDROE	-	Historic Standard Deviation of ROE
R-ECorr	-	Return Earnings Correlation
EarnSurp	-	Earnings Surprise

CHAPTER 1

INTRODUCTION

1.1 Background

Research into corporate disclosure has undergone a fundamental change within the last decade. Traditionally, research literature focused on company or capital market attributes (e.g. company size, industry type, stock market listing etc.) that may explain varying levels of corporate disclosure. The pioneer of this type of research was Cerf (1961), the first researcher to formally assess companies' annual reports.

The recognition that corporate reporting is not necessarily an exogenous determinant of various environmental factors but often appears to be used by companies as an instrument as part of their corporate strategy has begun to change contemporary disclosure research. Consequently, instead of researching the effect of various determinants on disclosure, today's research is investigating the effects that disclosure has on the environment, which is mainly the capital market. This notion was captured by Welker (1998: 539) who noted that "there is [a] growing recognition that disclosure can be viewed as an economic decision, carrying, perhaps, unique costs and benefits."

In South Africa, research on the disclosure effect on the capital market is limited. As a result, this study follows Welker's (1998) notion and investigates two broad capital market benefits of corporate disclosure. The first relates to information asymmetry, which exists whenever market participants are privy to different levels of information (Botosan, 2000). Such asymmetry is observable both between managers and investors and amongst investors. It has adverse capital market effects on companies such as lowering market liquidity and increasing their cost of capital. Reducing information asymmetry, through improved disclosure[1], may thus offset the above adverse effects and give rise to higher company valuations. The second capital market benefit relates to earnings-forecasting analysts who perform important functions as economic agents such as communicating value-relevant information and monitoring corporate management (Rock, Sedo & Willenborg, 2001). In performing

[1] "Improved disclosure" can be interpreted as both an increase in the *quantity* as well as an increase of the *quality* of disclosure (Leuz & Verrecchia, 2000). The use of the expression of "improved reporting" or "increased disclosure" is therefore for editorial convenience rather than to indicate the former or the latter.

such functions, analysts depend on corporate reporting and are exposed to information asymmetry similarly to ordinary investors[2]. Improving analysts' ability to perform their function is thus expected to benefit the market's understanding of companies' returns and their appeal as investment.

The link between the two areas of research is that both are measures of the information content available in the capital market. Whilst analysts are generally more advanced and resourceful in the process of information generation and gathering than the average investor, both parties rely on corporate reporting as a pivotal source of information. This view was supported by several researchers such as Lang and Lundholm (1993) who went as far as employing analyst behaviour as a proxy for information asymmetry. It follows that, although being researched as two separate topics within this report, there is a close theoretical connection between information asymmetry and analyst behaviour.

1.2 Research Objectives

The limited amount of South African empirical evidence as to a potential beneficial relationship between corporate disclosure and the level of information asymmetry and analyst behaviour represents the motivation for this study. Currently, it is unclear whether South African companies use their disclosure as an instrument to influence the capital market or not. To investigate the beneficial relationships between disclosure policy and the South African capital market is, therefore, an appealing research area.

Consequently, the objectives of this study are:

(a) to determine if disclosure policy bears an inverse relationship with the level of information asymmetry found in the South African capital market by

- reducing the bid-ask spread of the sample companies' shares,
- increasing the trading volume of the sample companies' shares and

(b) to investigate the existence of a positive relationship between companies' disclosure policy and analyst behaviour by

- increasing the number of analysts,
- reducing the forecast dispersion,
- increasing the forecast accuracy and
- reducing the volatility of forecast revisions.

[2] They may be affected to a lesser extent due to significant resources available to process and assess information.

1.3 Report Structure

The remainder of this study unfolds as follows:

Chapter 2 introduces the accounting disclosure environment, explains the terminology "disclosure policy" and provides an account of the costs and benefits associated with disclosure. Thereafter, a framework of disclosure research to date separates prior research into two classes and describes their different contributions. This is complemented by a discussion of the control variables employed within this study.

Chapter 3 details the data collection procedures and the calculation of the variables involved. It then introduces the statistical methodology used and discusses limitations to the scope of this study.

Chapter 4 presents and discusses the results of the statistical analyses performed. The results are integrated with international research findings and the South African commercial context. As all tests are performed individually for each of four consecutive years a trend analysis will be included.

Finally, in Chapter 5 conclusions are drawn and areas for future research work are suggested.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Chapter 2 provides an overview of international literature findings that allow for an understanding of how this study's research objectives have been derived. This requires a few preparatory sections. These begin with a discussion of the annual report within the wider horizon of corporate disclosure, which explains why it is considered to be a proxy for overall corporate disclosure. The second section describes the environment in which companies disclose, followed by a description of the term "disclosure policy". Thereafter, a framework of disclosure research is developed to outline the change that contemporary disclosure literature has undergone. This develops two groups of research literature, their different contributions and finally places this study within this framework.

The body of this chapter discusses the main costs and benefits attributable to corporate disclosure. This focuses only on those research findings that are directly related to the topics of information asymmetry and analyst behaviour or have an explicit link thereto. For example, the cost of equity capital is explained in detail because the level of information asymmetry is one of its main components. This knowledge is of particular relevance in the analysis of the empirical research findings of this study as they indicate that a disclosure policy effect may not be limited to the two research areas presented here.

Lastly, this chapter ends with a detailed exploration of each of the variables employed within this study.

2.2 Preparatory Sections

2.2.1 Annual Reports as Indicator of Overall Disclosure

This study employs the annual report as a proxy for companies' overall disclosure effort. This section explains the literature findings that form the basis of this approach.

Corporate disclosure can be categorised into three different classes: published information[3], investor relations[4] and annual reports. These are the categories ranked by the United States (U.S.) Association of Investment and Management Research (AIMR), one of whose objectives is to improve corporate communication[5]. The AIMR rankings have been used as a disclosure proxy in various prior research projects (Botosan & Plumlee, 2002; Lang & Lundholm, 1993,1996; Welker, 1995; Sengupta, 1998).

Whilst some international research examined all three categories[6], this study only considers the annual report[7]. Questions as to the annual report's relevance in the general disclosure environment were addressed by various recent studies. While Francis and Shipper (1999) produced little evidence as to financial statements' loss of relevance, Lev and Zarowin (1999) concluded that the usefulness of annual reports had declined over the past twenty.

Ignoring this issue, Michailesco (2001) concluded that annual reports are the major information source for investors who are unable to incur large expenditure in accessing investment relevant information. Similarly, Knutson (1992: 122) stated: "At the top of every analyst's list is the annual report to shareholders. It is the major reporting document and every other financial report is in some respect subsidiary or supplementary to it."

Furthermore, Hope (2003) concluded that annual reports are a vital source of information to analysts, especially where the number of analysts following a company is low. This stresses the importance of the annual report in South Africa where the average number of analysts following a company is lower than in the U.S.[8]

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[3] This consists of press releases and interim statements, excluding the annual report.

[4] This includes direct analyst communication.

[5] See Healy, Hutton and Palepu (1999) for a detailed description of AIMR analyst ranking guidelines.

[6] (Botosan & Plumlee, 2002; Healy *et al.,* 1999; Lang & Lundholm, 1996, 2000; Welker, 1995)

[7] This approach was also followed by: Botosan (1997, 2000); Leuz and Verrecchia (2000)

[8] The average number of analysts per company in this study is six compared to 12 in a U.S. study by Botosan (1997). The average analyst following in South Africa was extrapolated from the test data researched here.

Botosan (1997) noted that the annual report serves as a good proxy for the level of disclosure provided across all disclosure avenues. In support of this argument, Lang and Lundholm (1993) found that annual report disclosure is positively correlated with the other forms of disclosure. In short, the majority of contemporary research regards the annual report as an important indicator of companies' overall disclosure effort. As a result, this study employs annual reports as a proxy for companies' disclosure.

The following section introduces the environmental influences on companies' disclosure in South Africa.

2.2.2 The South African Disclosure Environment

This section presents a brief account of the regulatory environment in which South African companies report. In addition, it highlights several non-mandatory reporting guidelines.

In South Africa, corporate reporting is regulated by the Companies Act (1973), South African Generally Accepted Accounting Practice (GAAP) as developed by the South African Institute of Chartered Accountants (SAICA) but issued by the Accounting Practice Board (APB) and listing requirements issued by the Johannesburg Securities Exchange (JSE). In addition, there are several non-mandatory reporting frameworks such as the King II Report (2002), SAICA's Stakeholder Communication document (1997) and the Global Reporting Initiative. These will be discussed in the same order below.

In terms of Schedule 4 of the Companies Act, companies are required to disclose departures from GAAP and the reasons and effects thereof. In a legal opinion, issued by SAICA, this was understood as to indicate that non-disclosure of the particulars of any departure by directors does imply GAAP compliance. Recently proposed Companies Act amendments aim to make GAAP compliance a legal requirement.

To improve the quality of local reporting and make South African annual reports internationally comparable, South African statements of GAAP have been replaced by statements that are identical to International Accounting Standards (IAS). This convergence process was substantially completed during the late 1990's. From 1 January 2005, South Africa adopted IAS and is now fully compliant with all standards issued by the International Accounting Standards Board (IASB). Currently, change

in accounting standards is driven by two processes. Firstly, the IASB's Improvements Project aims to reduce or eliminate alternatives and conflicts within the standards and deal with some convergence issues. This process yielded revised IAS's. Secondly, the Harmonisation project of U.S. GAAP and IAS aims to resolve differences in treatments, which impair the comparability of financial statements. The standards that are drafted within this process and all other new standards issued by the IASB are named International Financial Reporting Standards (IFRS).

In terms of JSE listing requirements, all listed companies must comply, in full, with all statements of GAAP. Any non-compliance together with the financial effects thereof must be disclosed.

In November 1994, the Institute of Directors in Southern Africa published the first King Report on Corporate Governance. The Second King Report on Corporate Governance, King II, was published in March 2002 and offers more extensive guidelines on corporate governance. These cover board structures, recommendations on directors' functions, risk management, environmental disclosure and the reporting of social involvements. Compliance with King II is voluntary but listed companies are encouraged to implement the recommendations. The extent and the period of any deviations from the guidelines in King II are to be disclosed in terms of the JSE listing requirements.

In addition, SAICA have issued a document named "Stakeholder Communication" which offers guidelines on the structure and content of annual reports in order to improve stakeholder communication. This document aims to improve companies' recognition of the need to report to non-traditional stakeholders such as employees, customers and suppliers.

Another set of non-legislative, and thus voluntary, reporting guidelines is issued by the Global Reporting Initiative (GRI). The GRI's aim is to foster globally applicable sustainability reporting on economic, environmental and social issues of companies' activities.

This section provided a brief overview of the environmental factors that were previously considered dominant in determining company disclosure. The next section draws up a framework which shows how contemporary research has changed in favour of research addressing the impact of corporate disclosure rather than its determinants. In addition, it groups research studies and gives a graphical overview thereof.

2.2.3 A Framework of Literature to Date

Wiedman (2000) defined three broad areas of disclosure literature: the disclosure environment, the disclosure attributes and the disclosure impact. The first category, the disclosure environment, describes the characteristics of the environment in which the disclosure decision is made (see 2.2.2). The second category, the disclosure attributes, includes the nature of disclosures made, such as the type, frequency, timeliness, quality and credibility of reporting. Finally, the third category, the disclosure impact, addresses the disclosure effect on factors such as the cost of capital, liquidity, agency costs and shareholder mix.

Typically, research work investigates the associations between two of the three areas i.e. the relationship between disclosure attributes and the disclosure environment or disclosure attributes and the related impact. For the purpose of this study, the former branch will be categorised as Type I and the latter as Type II.

Type I work, which is the original and the older form of disclosure research, has contributed important knowledge. This includes that of the relationship between company size and the level of disclosure (Buzby, 1975; Firth, 1979, Lang & Lundholm, 1993; Raffournier, 1995). Another type is the association between disclosure and levels of information asymmetry (Lang & Lundholm, 1993; Marquardt & Wiedman, 1998). This research knowledge is essential as it allows contemporary studies to investigate relationships that go beyond the traditional question of what determines the level of disclosure. Type I research findings are mentioned in more detail in section 2.5, which discusses the choice of control variables.

As a result of Type I research findings, disclosure is now most often used as an explanatory variable rather than a dependent variable as in Type I studies. Figure 1 (next page) presents a graphical overview of Type I and Type II research. This classification may also serve as a starting point for future research in this field.

FIGURE 1. THREE COMPONENTS OF DISCLOSURE LITERATURE

Disclosure Environment ↔ Disclosure Attributes ↔ Disclosure Impact

Type I

Disclosure Environment ↔ Disclosure Attributes

Buzby, 1975
Chow & Wong-Boren, 1987
Cooke, 1989, 1991, 1992
Crosoer, 2003
Firer & Meth, 1986
Firth, 1979
Hossain & Adams, 1994
Inchausti, 1997
Jaggi & Low, 2000
Lang & Lundholm, 1993
Malone, Fries and Jones, 1993
Marquardt & Wiedman, 1998*
Michailesco, 2001
Owusu-Ansah, 1998
Patton & Zelenka, 1997
Raffournier, 1995
Singhvi & Desai, 1971
Wallace, Naser & Mora, 1994

Type II

Disclosure Attributes ↔ Disclosure Impact

Barron, Byard & Kim, 2002
Bens & Monahan, 2001
Botosan, 1997,2000
Botosan & Harris, 2000
Botosan & Plumlee, 2002
Diamond & Verrecchia, 1991
Duru & Reeb, 2002
Hail, 2001
Healy *et al.*, 1999
Healy & Palepu, 2001
Hope, 2003
Joos, 2000
Kim, Lim & Shaw, 2001
Lang & Lundholm, 1996, 2000
Leuz & Verrecchia, 2000
Lundholm & Myers, 2002
Marquardt & Wiedman, 1998*
Negash, 2001
Rock *et al.*, 2001
Welker, 1995
Zhang, 2001

Type I: Research on the relationship between the disclosure environment and disclosure attributes.

Type II: Research on the relationship between the disclosure attributes and disclosure impact.

* This study fits the criteria of both categories.

An inspection of Figure 1 confirms that Type I research appears to have commenced significantly earlier than Type II research.

In summary, Type I research provided much of the basic knowledge pertaining to companies' propensity to disclose. In doing so, it established relationships that are now accepted amongst contemporary researchers and contributed many of the control variables that are used in today's Type II studies on the disclosure effects. In its attempt to document a beneficial relationship between disclosure and the South African capital market this investigation should be classified as Type II research.

The following section illustrates how the recognition of disclosure as being the outcome of an economic decision leads to the use of the term "disclosure policy".

2.2.4 The Terminology: Disclosure Policy

Despite mandatory requirements, such as those found in annual reports, companies have considerable latitude in determining the informativeness of their disclosure and the level of detail provided (Lang & Lundholm, 1996). Welker (1995) expanded this by mentioning companies' discretion as to the timeliness, scope, content and form of disclosure. In the South African context, the variation in measured reporting levels from excellent to perfunctory[9] within the Ernst & Young (E&Y) survey of Excellence in Corporate Reporting appears to confirm this. The discretion as to the level of detail and informativeness is even more pronounced for published information and direct analyst communication (Botosan 1997), for which annual reports are a proxy within this study.

Over time, Lang and Lundholm (1993:253) found that disclosure levels are "sticky", suggesting that managers commit to certain levels of disclosure and seldom vary this level over time. In support of this, Botosan and Harris (2000) found no evidence of U.S. firms ceasing quarterly disclosure of segmented information once initiated. They concluded that the decision to initiate quarterly segmented reporting effectively commits to a disclosure policy. It thus appears that, despite mandatory reporting requirements, corporations have a considerable degree of freedom in determining their level of disclosure. This suggests that the observed level of corporate disclosure is the result of a conscious disclosure policy taken by management. Accordingly, this study uses the term "disclosure policy" to

[9] In the 2004 survey, 29% of all companies' annual reports were rated excellent, 33% good, 26% adequate and 12% perfunctory.

refer to the overall informativeness of a firm's disclosure as measured by the adjudicators of the E&Y survey of Excellence in Corporate Reporting.

The decision or policy to disclose at a certain level involves a certain commitment to report. The next section presents research findings supporting this notion.

2.2.4.1 Disclosure Policy – a Commitment to report

Botosan (1997) documented that disclosure scores are not independent from year to year, which lead her to conclude that disclosure policies are constant over time. Based on the finding of "sticky" disclosure levels, Lang and Lundholm (1993) referred to a commitment to increased levels of voluntary disclosure. Subsequent researchers distinguished between a commitment and voluntary disclosure by noting that the former is a decision taken before the content of the information is known, whereas the latter is a decision taken after the content is identified (Leuz & Verrecchia, 2000). Hence, disclosure policy appears to involve a commitment to report information regardless of content.

For disclosure policies to be effective in influencing the level of information asymmetry and analyst behaviour, the capital market has to perceive the actual disclosure as credible. The following section introduces this concept.

2.2.4.2 Disclosure Policy – Credibility

As managers have incentives to make self-serving disclosures (2.4.2 below), it is unclear whether disclosure in general is credible.

Lang and Lundholm (2000) documented that companies are generally rewarded for higher disclosure frequencies but penalised by the market if disclosure is increased with the sole intention to issue equity capital. This suggests that investors differentiate in their assessment of reporting credibility. Similarly, Healy et al. (1999) pointed out that companies' disclosure of bad news in order to correct overvaluation and potential resultant litigation (Skinner, 1997) is inherently credible while news to correct undervaluation is not. Frost (1997) added that credibility of disclosure declines for firms in financial distress. Botosan (2000) concluded that disclosure's perceived credibility and the subsequent disclosure policy should be based on a cost-benefit analysis. The costs associated with disclosure policy are introduced in the following section.

2.3 Costs of Corporate Disclosure

This section presents four significant costs associated with corporate disclosure. Although these represent the predominant research findings, this account is not comprehensive as this study focuses on beneficial capital market effects.

The obvious costs of corporate disclosure appear to be costs incurred in collecting, processing and publishing corporate information. Literature to date has documented a strong link between company size and the costs of corporate disclosure. This type of cost has a fixed component, so that the cost per unit of size decreases (Buzby, 1975; Lang & Lundholm, 1993). In addition, the notion of decreasing preparation costs with company size is embedded in the FASB's and the SEC's mandate of disclosure requirements[10].

Another cost is the loss of competitive advantage through the communication of proprietary information. Again, this cost appears to be negatively correlated to company size (Singhvi & Desai, 1971). Healy and Palepu (2001) observed that firms have an incentive not to disclose information that will reduce their competitive position even at the expense of higher marginal capital costs. However, they also cautioned that the sensitivity of the association between disclosure and competitive market forces depends on the nature of the competition, particularly, whether companies compete based on price or long-run capacity and on whether firms face actual competition or merely the threat of entry.

A third type of cost of corporate reporting identified in literature to date is related to potential litigation. The direction, however, is unclear. Some researchers such as Botosan (2000) held that litigation costs arise when companies are sued based on information disclosed whereas others (Healy & Palepu, 2001) acknowledged that legal action can both encourage disclosure as well as potentially reduce managers' incentives to disclose. Empirical evidence is mixed. Skinner (1997) found that firms with bad earnings news are more than twice as likely to pre-disclose poor earnings performance than are well-performing firms. In addition, he noted tentative evidence that legal costs are lower for firms that pre-disclose than for firms that do not. On the contrary, Francis, Philbrick and Shipper (1994) found that 62% of their litigation sample was sued as result of pre-emptive earnings announcements.

Lastly, political costs have been identified in connection with disclosure. Cooke (1989) mentioned that larger entities take a more prominent position and are therefore more likely to be subject to voters lobbying government for nationalisation, expropriation or break-up of the company. To frustrate such

[10] For example, small firms were exempted from *SFAS No. 89: Financial Reporting and Changing Prices.*

actions, corporations are supposedly more likely to increase their disclosure. Although nationalisation or expropriation appear unlikely in the South African context, large corporations are more likely to be the focus of black economic empowerment campaigns and employment equity quotas. To appease government and generate public goodwill, large companies can be expected to increase disclosure of their social involvement and the performance of their employment equity strategies and programs.

Hamann (2003) confirmed this in the South African environment by stating: "public reporting, in particular, is emerging as a key tool for companies to demonstrate their sustainability efforts and to respond to public and shareholder demands for transparency." He added that while South African companies trail international trends in the practice of sustainability reporting, they have led the way in terms of social reporting owing to their experience with supporting local development and providing for black economic empowerment in the national and local context.

Although the nature of the relationships between the above four costs and corporate reporting is not fully understood and contradictory at times, they do appear to impact on disclosure policies. The above issues form the thrust of the cost component of the cost-benefit analysis that should precede the disclosure policy decision. To allow for an understanding of this analysis, the following section continues with a discussion of the relevant benefits of corporate disclosure.

2.4 Benefits of Corporate Disclosure

This section explores the benefits attributable to corporate disclosure policy. Literature to date showed that, in theory, the different benefits are often closely linked or even components of each other (Botosan, 1997, 2000; Healy & Palepu, 2001; Lang & Lundholm, 1996). The most prominent example of this effect is seen in the cost of capital. A key component determining companies' cost of capital is the level of information asymmetry that affects the financiers and investors of a company. A study of the information asymmetry would thus be incomplete without a discussion of its possible effects. As a result, in spite of not directly researching the topic of capital costs, this study presents research relating to the topic. This facilitates the later analysis and interpretation of the empirical research findings of this study. Before describing the benefits of corporate reporting, this section introduces the challenges facing researchers of this area and the effect these have on research methodologies and findings.

Although the benefits from financial information are usually difficult or impossible to measure objectively (FASB)[11], considerable research efforts have been made to determine possible beneficial relationships between corporate disclosure and capital markets. Empirical results have yielded mixed evidence and in many cases researchers had to approximate economic indicators such as the cost of equity capital (Botosan 1997, Hail 2001), which are not easily observed. In other cases, researchers were forced to exploit certain economic anomalies to test their hypotheses. For example, Leuz and Verrecchia (2000) used firms that switched from the German to an international reporting framework to model sustained improvements of disclosure policy.

This highlights the difficulties experienced by empirical researchers of the disclosure policy effects. *Inter alia*, these can be attributed to the fact that the majority of disclosure research is undertaken using U.S. data, an environment that is information rich (Leuz & Verrecchia, 2000). Core (2001) considered it difficult to find strong disclosure-related effects in broad cross-sections of U.S. firms while Healy and Palepu (2001) suggested that there might be too much disclosure regulation and that market participants would be willing to accept less information in exchange for firms having to spend fewer resources on information production.

Part of the observed information richness can be attributed to information intermediaries such as analysts. Botosan (1997) could only document a disclosure policy effect on the cost of equity capital for companies with low analyst coverage. This implies that where a company interacts with a high number of analysts, the information available is so rich that measuring a disclosure policy effect on the equity capital cost becomes difficult. Lang and Lundholm (2000: 627) confirmed this and stated that "we limit our sample to small firms, given their limited analyst following, they are more likely to use their disclosure policy to influence market perceptions."

Hail (2001) provided more indirect evidence as to the difficulties experienced in measuring a disclosure policy effect. In order to test for the hypothesised effect on the cost of capital, she chose the Swiss capital market. This market was selected for the high degree of freedom in setting disclosure policy given the low levels of mandatory accounting standards and also for its small, illiquid and highly concentrated stock market. This suggests that her intention was to test her hypothesis in an environment that has a lower overall information content.

[11] SFAS No 1.

Notwithstanding the unfavourable research conditions examined above, research consensus is in favour of beneficial disclosure policy effects on capital markets. The remainder of this chapter introduces the theoretical framework and the empirical results of studies that researched these beneficial disclosure policy effects.

2.4.1 The Cost of Capital

In theory, providing more information to the market can lower capital costs. More information facilitates more accurate forecasting of future cash flows and reduces the uncertainty component of the discount rate applied to future earnings. It also decreases the risk premium charged on borrowed funds.

As providing more information is associated with costs (see 2.3 above), the disclosure decision should be based on a positive cost-benefit analysis (Botosan, 2000). However, the practical application of this is complicated and hence it appears rational that corporate management might tend to place undue emphasis on the costs of disclosure versus the benefits thereof. The rest of this section discusses the disclosure policy effect on the cost of equity and the cost of debt.

2.4.1.1 Cost of Equity

"The ultimate benefit of providing more information to the market is a lower cost of equity capital and thus a higher share price" (Botosan, 2000: 60). Botosan (1997), the research pioneer of the disclosure policy effect on the equity cost of capital, built a two-tiered framework showing the components of the cost of equity capital and the disclosure policy effects thereon.

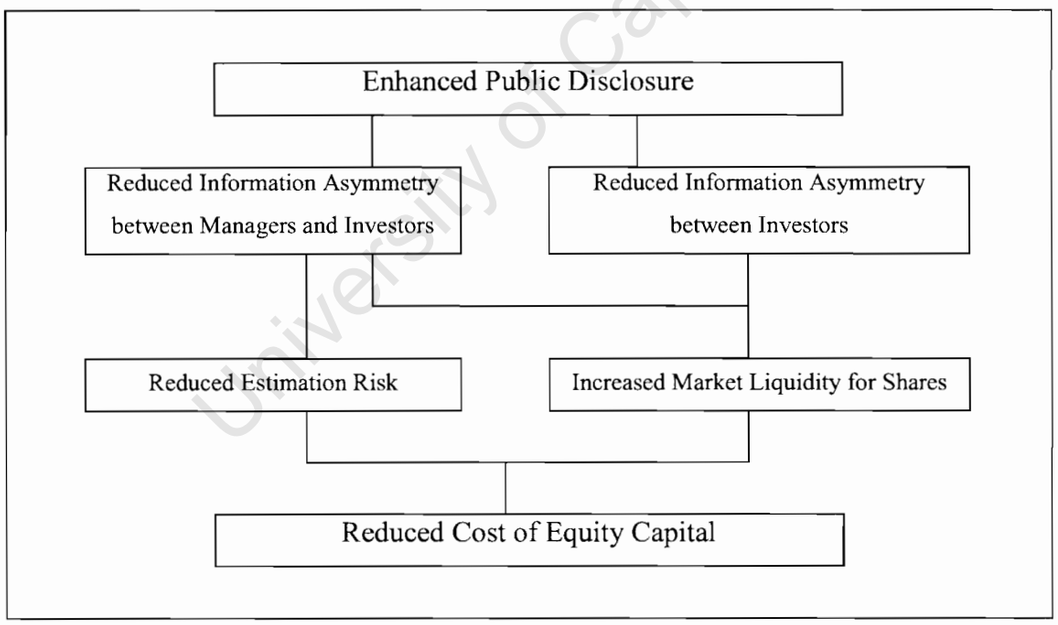
The first tier describes how greater disclosure enhances stock market liquidity, which will subsequently lower the cost of equity capital. This is achieved through either a reduction in transaction costs or an increase in the demand for the company's securities. *Inter alia*, Diamond and Verrecchia (1991) supported this claim by noting that disclosure improves the future share liquidity by reducing the adverse price impact of trades[12]. As a result, investors are willing to take larger stakes in a company than they would otherwise do, thereby increasing liquidity and reducing the cost of equity capital.

[12] Where information is low, a trade is expected to reveal private information. The existence of private information may act as a deterrent to trade to those without access to such information. Increasing the level of information available would thus reduce the information revealed by trades.

The second tier explains how greater disclosure reduces estimation risk arising from investors' uncertainty in making estimates of a company's return and its ability to generate returns in excess of its cost of capital. Amongst others, these are based on corporate history and disclosed information. Understandably, greater uncertainty regarding the true parameters exists where the available information content is low. If this estimation risk is non-diversifiable (Clarkson, Guedes & Thompson, 1996), investors require compensation for the additional risk to which they are exposed. Hence, assuming more available information would reduce the uncertainty experienced by investors in assessing future returns, a negative relationship between disclosure policy and estimation risk should exist. This would involve diminishing the discount required by investors and so facilitate higher valuations of a firm's share, which subsequently lowers the cost of equity capital. Lang and Lundholm (1993) confirmed this framework by mentioning the overcoming of adverse selection and the reduction of transaction costs, as described above, as theoretical motivators for disclosure.

In her later work, Botosan (2000) refined this framework to emphasise the effect of information asymmetry. Figure 2 presents a diagram of Botosan's (2000) two-tiered framework and shows how disclosure is linked to the cost of equity capital.

FIGURE 2. THE DISCLOSURE IMPACT ON THE COST OF EQUITY CAPITAL



The remainder of this section discusses empirical research methodologies and findings.

Botosan (1997) used a derivation of the dividend discount model. After documenting insignificant results for her entire sample, she divided her sample into one subset with a low analyst following (mean of 5) and one subset with a high analyst following (mean of 18). Upon this modification, she established a significant 9% cost of equity capital advantage for the most forthcoming company to disclose in the low analyst following group relative to less forthcoming companies. In a more recent study of the relationship between annual reports and analyst forecast accuracy across 22 countries, Hope (2003)[13] confirmed this result and remarked that annual report disclosure is more important for firms that are followed by fewer analysts. Hail (2001) applied a version of the accounting based valuation formula referred to as the residual income model and found a significant 1.9% cost of equity capital advantage for the most forthcoming firms to disclose relative to the least forthcoming firms.

This suggests an information rich environment for companies that are followed by significant numbers of analysts. Hence, a study examining all three categories of disclosure[14] should find a significant association between investor relations activities and the cost of equity capital. Contrary to this expectation, Botosan and Plumlee (2002) did not establish a significant link between investor relations activities and the cost of equity capital.

Zhang (2001) added to the complexity of cost of capital literature by building a model that predicts that the capital cost can react positively and negatively to firms' disclosure policies, depending on the specific factors responsible for the variation in the sample. He also pointed out that prior models treated disclosure as an exogenous parameter whilst his model treated company disclosure as endogenous choice.

In summary, Botosan (1997) was the pioneer of empirical research on the disclosure policy effect on the cost of capital. She documented a cost of equity capital advantage for firms with low analyst following. Another researcher, Hail (2001), documented more significant effects only by investigating an environment with a weaker reporting framework. Overall, both the difficulty in observing the cost of equity capital and the information richness of the U.S. capital market explain the small amount of direct research in this field. However, the broad consensus indicates a negative association between disclosure policy and the cost of equity capital.

In theory, the disclosure policy impact on the information asymmetry affecting the cost of debt capital should be similar to that on the cost of equity capital. This is explored further in the next section.

[13] Fore more detail on the findings of this study, refer to section 2.4.4.

[14] The three categories are annual reporting, other published information and investor relations. Refer to 2.2.1.

2.4.1.2 Cost of Debt

The disclosure policy effect on the cost of debt is little researched but, nevertheless, of importance as debt financing is a major type of financing for publicly traded firms. Research on this subject arose as a response to the work on the cost of equity finance (Sengupta, 1998).

Literature on the cost of debt generally describes a negative correlation between the cost of debt and the borrower's potential default risk (Fung & Rudd, 1986). Sengupta (1998) based his study on the assumption that lenders and underwriters consider a borrower's disclosure policy for their assessment of default risk. This suggests that firms with a policy of making adequate and timely disclosure are expected to withhold less value-relevant information and, as a result, should be charged a lower risk premium.

Sengupta (1998) acknowledged that companies' disclosures are at best a noisy measure of their performance and therefore concluded that the content of any specific disclosure could decrease as well as increase a firm's default risk. However, as he focused on the overall disclosure effect over a number of years he hypothesised an inverse relationship between the observed disclosure policy and the cost of debt. He found that lenders rely more on disclosure where more uncertainty about a firm's future earnings existed. Moreover, he documented that companies with high levels of disclosure enjoy a 1.2% lower yield to maturity and 2.1% lower interest cost than companies with the lowest level of observed disclosure. These findings provide empirical evidence to the claim that lenders consider corporate disclosure policy in their estimate of default risk.

The next section, a summary, concludes the review of the cost of capital.

2.4.1.3 Summary – Cost of Capital

Table 1 presents a tabular summary of the models suggested by contemporary researchers and their respective findings. The table shows all variables employed in order to facilitate the reader's understanding of the nature of control variables used by researchers to date. In addition, this enables a comparison with the approach taken within this study and may be useful for future research.

Table 1. Summary: Cost of Capital Research

Authors	Variable	Sign	Significance Level
Botosan, 1997,2000	Disclosure (annual report)	-	1%
	Size (Mcap)	-	5%
	Beta	+	1%
Botosan & Plumlee, 2002	Disclosure (annual report)	-	Insignificant
	Annual Report	-	5%
	Other Publication	+	5%
	Investor Relation	-	Insignificant
	Beta	+	1%
	Size (Mcap)	-	1%
Hail, 2001	Disclosure (annual report)	-	1%
	Size (Mcap, Tot. A)	+	Insignificant
	Beta	+	1%
	Leverage	-	1%
Sengupta, 1998	Disclosure (overall)	-	5%
	Size	-	Insignificant
	Years to Maturity	+	Insignificant
	Dummy: Debt Callable	+	Insignificant
	Dummy: Convertible	-	Insignificant
	Dummy: Subordinated	+	10%
	Debt/Equity (Mkt. Value)	+	1%
	Margin	-	10%
	Size (tot. Assets)	-	1%
	Std. Dev. Daily Stock Ret.	+	10%

This section examined how literature to date found that disclosure policy, through lowering information asymmetry, affects the cost of capital. Despite measurement problems, disclosure policy was shown to reduce both adverse selection and estimation risk which results in a lower cost of equity capital. Furthermore, empirical research findings suggest a negative relationship between disclosure policy and companies' cost of debt.

The following section explains the different ways in which information asymmetry arises and develops empirical findings on the associated disclosure policy effects.

2.4.2 Information Asymmetry

"Information asymmetry arises whenever market participants are privy to different levels of information" (Botosan, 2000: 61). There are two main categories of information asymmetry. Firstly, it exists between management and investors and, secondly, between investors. Both are symptoms of relative market inefficiency and found to diminish with improved disclosure.

The agency problem is the source of the first branch of information asymmetry in the market. It arises because savers who invest in business ventures typically do not play an active role in their management. This function is delegated to the entrepreneur, who, once in control of the invested funds, has an incentive to transfer wealth or utility to himself through perquisites, excessive remuneration and investments that are harmful to shareholders (Healy & Palepu, 2001; Jensen & Meckling, 1976). Thus, information differential arises, where investors lack private information held by managers, which creates uncertainty about future returns or pay-off pattern. It also introduces an uncertainty risk to the valuation done by investors, who rely on corporate history and other disclosed information to estimate firms' ability to generate returns in excess of their cost of capital (Botosan, 1997). It follows that increasing the information available should improve investors' ability to make precise forecasts of company returns and lower the estimation risk discount inherent in the cost of equity and debt capital (Diamond & Verrecchia, 1991; Leuz & Verrecchia, 2000; Marquardt & Wiedman, 1998; Welker, 1995).

The second category of information asymmetry, arising between investors, occurs where market participants gain access to private information (Botosan, 1997, 2000). Such information differentials between investors give rise to increased transaction costs as market participants price-protect[15] (Welker, 1995) against potential adverse selection, which manifests itself in market illiquidity. Improving disclosure and making some private information public, reduces the risk of price protection (Lang & Lundholm, 1993), and as such, the information revealed by trades (Diamond & Verrecchia, 1991). Zhang (2001) confirmed that private information based trades ultimately increase the cost of capital.

Welker (1995) concluded that simultaneity may well exist between information asymmetry and disclosure policy. Hence, disclosure policy may depend on the information asymmetry perceived by management. Marquardt and Wiedman (1998) supported this suggestion by observing a positive

[15] Price protection is seen as unwillingness to trade and the demanding of discounts to offset potential losses from trades with better-informed parties.

relationship between managers' secondary equity offerings[16] and the frequency of voluntary disclosure of earnings forecasts prior to the marketing of shares. In addition, they observed a significantly negative association between managerial participation and the two proxies of information asymmetry[17]. Thus, their research indicates that executives manage earnings forecasts and other disclosure in anticipation of selling shares. Therefore, managers act as if disclosure lowers information asymmetry. Botosan and Harris (2000) and Healy *et al.* (1999) documented an increase in information asymmetry and a corresponding decrease in liquidity in the period prior to a change of disclosure frequency or level. This suggests that managers anticipate a disclosure policy effect on information asymmetry and liquidity and use their disclosure policies to achieve a given level thereof.

In summary, disclosure policy appears negatively related to information asymmetry. Section 2.4.1 developed the link between disclosure, information asymmetry and the cost of capital. Literature to date strongly suggests that improved reporting narrows the information gap across investors and, hence, diminishes the cost advantage of the better informed investor (Zhang, 2001). As information asymmetry represents a key component of firms' capital costs, the above effect should result in a reduction of capital costs, which benefits investors and managers alike.

Empirically, different variables have been used to research information asymmetry. These are discussed in the next section.

[16] These offerings are sales of managers' personal equity holdings in their firms.

[17] The two proxies are analyst forecast accuracy and the timing of the equity offering registration relative to preceding quarterly earnings announcement.

2.4.3 Different Measures of Information Asymmetry

There is little research guidance as to the most appropriate proxies for the information asymmetry component of the cost of capital (Core, 2001). One way of addressing this problem is to repeat tests on different measures of information asymmetry (Healy *et al.,* 99; Leuz & Verrecchia, 2001; Marquardt & Wiedman, 1998). This section explores three dominant proxies for information asymmetry, which are, in order of prominence (assessed in terms of their empirical popularity): the bid-ask spread, the trading volume and share price volatility.

2.4.3.1 Bid-Ask Spread

The bid-ask spread is the difference between the bid price (the highest price a prospective buyer is willing to pay for a share) and the ask price (the lowest price at which a prospective seller is willing to sell a share). Because these two prices must meet for a transaction to occur, consistent large bid-ask spreads imply lower trading volume for a share and vice versa. Because it embodies the perceptions of both buyers and sellers, the use of the bid-ask spread as a "natural" (Bartov & Bodnar, 1996: 406) proxy for information asymmetry is widespread. Literature to date has established that information asymmetry manifests itself, *inter alia*, in transaction costs[18]. One way of measuring transaction costs is the bid-ask spread. In addition, the bid-ask spread is easily observed and accessible.

Another way of linking information asymmetry to the bid-ask spread is through share liquidity. As explained in section 2.4.2, information asymmetry gives rise to adverse selection (Diamond & Verrecchia, 1991) and, consequently, illiquidity, which is observable in bid and asks prices. As a result, the bid-ask spread is used as a proxy for market liquidity[19].

Empirically, the use of the bid-ask spread as a proxy for information asymmetry is not without criticism as it can be influenced by numerous determinants other than disclosure policy. Leuz and Verrecchia (2000) stated that the bid-ask spread is negatively related to trading volume, share price and market maker competition and positively related to share price volatility and the presence of insiders.

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[18] (Bens and Monahan 2001; Botosan 1997, 2000; Botosan and Plumlee 2002; Diamond and Verrecchia 1991; Healy *et al.* 1999; Healy and Palepu 2001; Lang and Lundholm 2000; Leuz and Verrecchia 2000; Negash 2001; Welker 1995)

[19] (Bens and Monahan 2001; Botosan 1997,2000; Botosan and Harris 2000; Healy *et al.* 1999; Joos 2000; Leuz and Verrecchia 2000; Welker 1995)

In the South African context, Negash (2001) explained that the bid-ask spread can be disaggregated into three components: order-processing costs, inventory holding costs and an information related element. Literature to date attributes about 40% of the spread to information asymmetry. In his own analysis, Negash (2001) observed that the spread's information component for JSE listed firms is between 54% and 71%. As such, the bid-ask spread should be suitable to the analysis of the disclosure policy effect on information asymmetry in South Africa.

In summary, the bid-ask spread is traditionally the most favoured proxy for information asymmetry despite an ongoing debate surrounding its appropriateness as a variable due to the influence of non-information factors such as share price volatility.

2.4.3.2 Trading Volume

As described above, information asymmetry manifests itself in adverse selection, which causes price-protection and decreases baseline market liquidity (Welker, 1995). Another frequently used proxy for liquidity is the trading volume of a firm's share (Healy *et al.,* 1999; Leuz & Verrecchia, 2000; Negash, 2001; Welker, 1995). Joos (2000) explained that this variable demonstrates investors' willingness to trade the shares of a firm, which in turn is influenced by the amount of information asymmetry (Welker, 1995).

As with the bid-ask spread, the trading volume of a firm's security can be affected by several other non-information related factors (Leuz & Verrecchia, 2000). These factors include portfolio rebalancing, liquidity shocks and changes in risk preferences. As a result, the trading volume may not exclusively capture adverse selection amongst investors. In support of this, Easley, Kiefer, O'Hara and Paperman (1996) provided empirical evidence that the probability of information-based trading decreases with trading volume. This indicates that the information asymmetry component of the trading volume falls as the volume of shares traded rises. Moreover, Bartov and Bodnar (1996) discussed how trading volume around information events can be positively related to disagreement between market participants regarding the firm's future. This disagreement can exist even where there is no information asymmetry.

Hence, despite its secondary nature as a proxy for information asymmetry relative to the bid-ask spread, it is a widely used variable of information differentials. Research indicates that there are several theoretical challenges to its use. However, the variables' popularity appears to suggest that these are controllable.

2.4.3.3 Share Price Volatility

A third and lesser-used proxy for information asymmetry is share price volatility (Bushee & Noe, 2000; Lang & Lundholm, 1993; Leuz & Verrecchia, 2000). In the absence of information asymmetry, share price movements should be smooth. Hence, low levels of volatility suggest little information asymmetry. Lang and Lundholm (1993) added that firms with volatile share prices might change their disclosure policy to address potential litigation costs that might arise from sudden price shocks. Bushee and Noe (2000) explained that share price volatility increases a firm's perceived investment risk and thereby increases its cost of capital. In addition, they found that it makes shareholder class-action lawsuits more likely. Hence, share price volatility can be regarded as being costly for firms and, therefore, that they would benefit from its reduction.

However, share price volatility, too, is subject to non-information related influence. In fact, out of the three proxies, it was assumed to be the noisiest measure of information asymmetry (Leuz & Verrecchia, 2000). In line with this expectation, Leuz and Verrecchia (2000) were unable to document a statistically significant disclosure policy effect on share price volatility. Furthermore, Bushee and Noe (2000) showed that the relationship between disclosure and volatility is complex and that too much disclosure can, in fact, cause greater share price volatility. Botosan's and Plumlee's (2002) findings, linking timely disclosure to a higher cost of equity capital, supported this.

Overall, share price volatility appears to be the least popular measure of information asymmetry due to the increased exposure to noise that is factored into firms' share prices.

The following section summarises the research findings on information asymmetry and its three most popular proxies.

2.4.3.4 Summary – Three Measures of Information Asymmetry

The following tabular summary (Table 2) illustrates the models and findings of contemporary researchers of information asymmetry. Again, all variables are shown for completeness.

Table 2. Summary: Information Asymmetry Research

Author	Model	Variable	Sign	Significance Level
Botosan & Harris, 2000	Segment Reports	Size (Mcap)	+	5%
		Info Asymmetry	-	Insignificant
		Analyst Following	+	Insignificant
		Trading Volume	+	Insignificant
		Acquisition	+	8%
		Issue Debt/Equity	+	Insignificant
Healy *et al.*, 1999	Share Returns	Earnings Change	+	Insignificant
		Earnings Level	+	1%
		Beta	+	1%
		Size (Total Assets)	-	Insignificant
		Disclosure Dummy	+	5%
	Institutional O/Ship	Earnings Change	-	Insignificant
		Earnings Level	+	Insignificant
		Sales Growth	+	Insignificant
		Size (Total Assets)	-	1%
		Disclosure Dummy	+	1%
	Bid-Ask Spread	Disclosure Dummy	-	10%
		Size (Total Assets)	-	1%
		Trading Volume	-	1%
		Share Price	-	Insignificant
Leuz & Verrecchia, 2000	Disclosure Dummy	Size (Mcap)	+	Insignificant
		Return on Assets	+	7%
		Free Float	-	Insignificant
		Capital Intensity	+	Insignificant
		U.K./U.S. Listing	+	1%
	Bid-Ask Spread	Disclosure Dummy	-	5%
		Size (Mcap)	-	1%
		Trading Volume	-	1%
		Share Price Volatility	+	1%
		Free Float	-	5%
	Trading Volume	Disclosure Dummy	+	1%
		Size (Mcap)	+	Insignificant
		Share Price Volatility	+	5%
		Free Float	+	1%
	Share Price	Disclosure Dummy	+	6%
		Size (Mcap)	-	1%
		Free Float	-	5%
		Beta	+	1%
Marquardt & Wiedman, 1998	Management	Disclosure	+	1%
	Participation	Analyst Forecast Acc.	-	Insignificant
		Days to Register	-	10%

		Size of Offering	-	1%
		Tot. Mngmt. Holding	+	1%
		Size (Mcap)	-	5%
	Disclosure	Mngmt. Participation	+	1%
		Size (Mcap)	+	5%
		Hist. Earnings Variance	-	Insignificant
		Tot. Mngmt. Holding	-	5%
		Analyst Forecast Acc.	+	5%
	Days to Register	Mngmt. Participation	-	1%
		Size (Mcap)	+	Insignificant
		Residual Variance	-	Insignificant
		Tot. Mngmt. Holding	-	Insignificant
		Size of Offering	-	10%
		Pre-Offer Return	+	5%
Negash, 2001	Weekly Spread	Std Dev. Spread	+	1%
		L-T Debt/Equity	-	5%
		Std Dev. Share. P.Δ	-	5%
		Avg. weekly spread	+	5%
		Adv. Sel. Component	+	5%
		Mkt Liquidity Shares	-	7%
		Asset Growth	+	10%
		Size (Total Assets)	-	10%
	Share Liquidity	EPS	-	Insignificant
		Tot. Debt/ Tot. Assets	+	Insignificant
Welker, 1995	Relative Spreads	Disclosure Score	-	5%
		Std. Dev. Daily Returns	+	Insignificant
		Trading Volume	-	1%
		Mean Average Bid & Ask	-	1%
		Dummy Var. High Price	-	1%
		Dummy Var. Low Price	+	1%
	Disclosure Score	Market-adjusted Return	+	5%
		Std. Dev. Daily Returns	-	Insignificant
		Relative Bid-Ask Spread	-	6%
		Mean Average Bid & Ask	-	Insignificant
		Issue Debt/Equity	+	5%

This section built on the reader's understanding of the concept of information asymmetry and explained the three most prominent measures thereof, namely the bid-ask spread, trading volume and share price volatility. This included a review of pertinent research findings as well as a discussion of the empirical challenges encountered by researchers employing the mentioned variables in their studies. Lastly, Table 2 served to depict a tabular summary of the related research together with an account of all control variables used and their subsequent statistical validity. In addition to allowing for a comparison between literature to date and this study, it may also be useful to future research. This completes the explicit review of literature on the first research area within this study. The following section introduces analyst behaviour, the second area of research addressed within this study.

2.4.4 Analyst Behaviour

Financial analysts play important capital market roles as information intermediaries, monitors of corporate performance and economic agents whose actions affect security pricing (Rock *et al.,* 2001). They engage in the production and communication of information that is not available or very costly to obtain for individual stakeholders. According to Lang and Lundholm (1996), U.S. analysts base their forecasts on the following factors: interviews with executives, reports to the SEC, annual financial statements, interim reports and, lastly, formal presentations by company executives. The processes underlying analyst behaviour have been the subject of various researchers' interest (Botosan, 1997, 2000; Bhushan, 1989; Hope, 2003; Kim *et al.,* 2001; King, Pownall & Waymire, 1991; Lang & Lundholm, 1993, 1996; Rock *et al.,* 2001; Zhang, 2001).

Within the framework of literature to date provided in section 2.2.3, the number of analysts' providing forecasts and their forecast accuracy have been analysed in Type I research as a proxy for information asymmetry (Lang & Lundholm, 1993; Marquardt & Wiedman, 1998). Analyst behaviour in response to corporate reporting has only become of interest to contemporary accounting literature once researchers started to look at the connection between disclosure attributes and their impact on capital markets (Type II research). This section develops the different fields of analyst behaviour, which have been the subject of Type II research. Within this study, the term "analyst behaviour" captures the number of analysts following a firm, their forecast dispersion, their forecast accuracy and, lastly, their forecasts' revision volatility. These will be discussed below in the same sequence.

2.4.4.1 Number of Analysts

The majority of research on the number of analysts following a company focuses on non-disclosure related factors (Lang & Lundholm, 1996). Bhushan (1989), for example, found that the analyst following increases with firm size, institutional ownership and return variability. Lang and Lundholm (1993) substantiated this and added that analysts are more likely to attend meetings of larger companies. In addition, the media is more likely to carry news about larger companies. Thus, analysts can be expected to follow firms, for which greater investment interest exists. As the investor pool generally increases with firm size, more analysts will follow large companies, as they will be able to market their services better.

Bhushan (1989) set out that the equilibrium number of analysts will be determined by the intersection of the aggregate demand and supply curves for analyst services. In this light, Lang and Lundholm (1996) examined how disclosure policy can be linked to the supply and demand curves and offered three different explanations of how more disclosure could affect the equilibrium number of analysts.

Firstly, if information becomes less costly because it is reported by the firm directly instead of having to be acquired independently, more disclosure should, *ceteris paribus*, result in an increase of the aggregated supply of analysts.

Secondly, assuming analysts act primarily as information intermediaries, an increase of information in the form of company disclosure would improve the economic value of analysts' reports and thus, *ceteris paribus*, result in an increase in aggregate demand for analyst services.

Thirdly, if analysts are information providers who compete with company disclosure, then an increase in corporate disclosure would replace the analyst service, *ceteris paribus*, causing a lower equilibrium number of analysts.

Overall, Lang and Lundholm (1996) expected a positive relationship between disclosure policy and the number of analysts. However, they cautioned that the net effect of the three competing theories would determine the outcome and that it could not be clearly predicted. Healy *et al.* (1999) confirmed this and expected the same positive association.

Furthermore, Lang and Lundholm (1996) addressed causality. While it is understandable to assume that more disclosure may yield a greater analyst following, more analysts could also induce firms to improve their reporting. The latter view is supported by Botosan and Harris (2000) who, using a survey, found that the most frequently mentioned reason for initiating quarterly segmental disclosure was analyst pressure. In contrast, Lang and Lundholm (1996) who investigated lead and lag number of analysts found that a change in disclosure policy preceded changes in the analyst coverage. Although a chronological ordering of events does not necessarily establish causality, it does lend tentative evidence that disclosure policy changes the number of analysts following a particular company.

All empirical researchers of companies' analyst coverage documented significant positive relationships between disclosure policy and analyst following. Healy *et al.* (1999) determined a significant increase in the median analyst following for their sample of companies, which exhibited sustained improvements in their disclosure policy. In addition, they found that the sample companies

had a lower average number of analysts before their disclosure improvement. Likewise, Botosan and Harris (2000) documented both higher information asymmetry prior to increases in disclosure frequency and increased analyst following in the financial period after the increase in disclosure. Thus, both studies underlined the relationship between information asymmetry and analyst following as suggested in Type I research.

Lang and Lundholm (1996)[20] documented a highly significant positive relationship between disclosure policy and the number of analysts, thus suggesting that analysts serve as information intermediaries who complement firm disclosure rather than act as a substitute for it. When the three disclosure categories were individually included in the regression model, annual reports did not add any explanatory power to the model, confirming that, as suggested by Botosan and Harris 2000, analysts rely more on personal communication with management than on annual reports.

In summary, research to date alludes to a strong positive relationship between disclosure policy and the observed level of analysts following a company. Although not conclusive, the available evidence indicates that changes in disclosure policy precede changes in analyst following.

The following section addresses the disclosure policy effect on forecast dispersion, i.e. the range of forecasts provided by individual analysts, which shows the extent to which analysts agree or disagree about future earnings.

2.4.4.2 Forecast Dispersion

The disclosure policy effect on forecast dispersion hinges on whether forecast variances amongst analysts are due to different information or different forecasting models (Lang & Lundholm, 1996). They put forward the following two alternative explanations.

On the one hand, if analysts used the same forecasting model and observed the same firm-provided information but held different private information, such private information would become less important as the informativeness of firm-provided disclosure increased. This would increase the consensus amongst analysts. A negative relationship between disclosure policy and forecast dispersion would capture this effect.

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[20] The researchers followed two parallel approaches: They ran one model with an aggregate disclosure proxy combining all three categories disclosure and one with all three as individual variables. This applied to all proxies for analyst behaviour.

On the other hand, if analysts observed the same firm-provided and private information but employed different forecasting models that are placing varying emphasis on the diverse components of firm-provided information, additional disclosure would increase the dispersion among analyst forecasts. A positive relationship between disclosure policy and forecast dispersion would capture this effect (Kandel & Pearson, 1995).

Healy *et al.* (1999) regarded forecast dispersion as a proxy for investor opinion. Their expectation of a negative relationship seems to conform to the belief that analysts use similar models but differ in the extent of private information held. Through studying firms exhibiting sustained disclosure improvements, they detected a statistically reliable decrease in median forecast dispersion.

Lang and Lundholm (1996) documented a highly significant negative relationship between disclosure policy and analyst forecast dispersion. Firstly, this indicates that analysts use substantially the same forecast models and, secondly, that improved disclosure reduces the uncertainty regarding future earnings and improves forecast consensus. In this model, the annual report did add explanatory power in the predicted negative direction. The "other publications" score was significantly positive, which suggests that forecast dispersion increases with the amount of timely disclosure provided. However, the fact that the overall disclosure score exhibited a negative sign suggests that the annual report and investor relations are more important media of firm disclosure when it comes to the dispersion of earnings forecasts.

Hence, despite the lack of wide research on the impact of disclosure policy on analyst forecast dispersion, empirical evidence suggests that analysts use similar models to predict future earnings and that there is a negative disclosure policy effect. This means that improved corporate reporting can be associated with greater forecast consensus among analysts.

The next section introduces the third aspect of analyst behaviour under consideration within this study, namely analyst forecast accuracy.

2.4.4.3 Forecast Accuracy

The theoretical relationship between disclosure policy and forecast accuracy is more straightforward than the first two relationships presented above. Analysts face uncertainties related to both economic affairs and the accounting alternatives used by firms (Hope, 2003). To the extent that corporate disclosure reveals information that is relevant to future earnings, forecast accuracy should increase with disclosure policy. Lang and Lundholm (1996) added that it is difficult to imagine scenarios, barring fraudulently misleading disclosure, where disclosure reduces analysts' forecast accuracy.

In line with this expectation, Lang and Lundholm (1996) documented significant positive results for the total disclosure score, implying that corporate disclosure policy is an important determinant of forecast accuracy. When individually regressed, the annual report category was not significant, which suggests that timely disclosures and direct analyst contact are more important factors in the determination of accurate forecasts.

Moreover, they found analyst forecast accuracy was positively correlated with company size which supports Healy *et al.* (1999) who expressed that larger corporations have more diversified operations, making it easier to predict earnings. Although literature to date indicates that geographic segmental reporting makes forecasts more accurate (Botosan & Harris, 2000), Duru & Reeb (2002) showed that internationally diversified firms can be associated with less accurate and more optimistic analyst forecasts. This indicates that international diversification brings about unique forecasting difficulties that have not been captured by prior literature. Lim (2001) added that earnings forecasts are more optimistically biased towards firms with less predictable earnings.

Across different countries, Hope (2003) documented that the observed level of company disclosure is significantly positively related to forecast accuracy.

In summary, literature to date indicates that disclosure policy is positively associated with accurate analyst forecasts. This was confirmed using various research designs, such as around the adoption of supposedly more stringent reporting standards or across different countries.

The following section discusses the volatility of forecast revisions. This completes the review of literature on the disclosure policy effect on analyst behaviour.

2.4.4.4 Volatility of Forecast Revisions

The volatility of forecast revisions during the period prior to the announcement of earnings is likely to be reduced by more forthcoming reporting policies (Lang & Lundholm, 1996). The same authors stated that the timeliness of the reporting of earnings-relevant news forms part of the informativeness of corporate disclosure.

Williams (1996) advocated that the magnitude of the adjustment of forecasts, which give rise to the revision volatility, is a function of the usefulness of the previous management forecast. Lang and Lundholm (1996) added that where companies release news as it occurs, the magnitude of revisions is likely to be smaller than when all news is released at once at a later stage.

According to expectation, Lang and Lundholm (1996) found that their total disclosure score was significantly negatively associated with forecast revision volatility. However, when individually regressed only the investor relations category was significant, thus confirming the notion that firms can reduce the probability of large revisions through investor relations efforts.

In summary, the volatility of forecast revisions is the least researched measure of analyst behaviour. According to research findings, disclosure policy exhibits a negative effect on it. It therefore appears as if more disclosure to the capital market reduces the likelihood of significant forecast revisions.

The following section summarises research findings of the disclosure policy effect on analyst behaviour.

2.4.4.5 Summary – Analyst Behaviour

Table 3 presents a tabular summary of the models and findings of researchers of analyst behaviour to date. For completeness, all models are shown with the accompanying control variables.

Table 3. Summary: Analyst Behaviour Research

Author	Model	Variable	Sign	Significance
Duru & Reeb, 2002	Forecast Accuracy	International Diversification	-	1%
		Industry Diversification	-	Insignificant
		Size (Mcap)	-	Insignificant
		Loss made in Fin Year	-	Insignificant
		Earnings Skewness	-	1%
		Change in Earnings	-	1%
		Earnings Volatility	-	10%
		Forecast Horizon	-	5%
		Number of Analysts	+	10%
		Forecast Dispersion	-	1%
	Forecast Bias	International Diversification	+	1%
		Industry Diversification	+	Insignificant
		Size (Mcap)	+	Insignificant
		Loss made in Fin Year	+	Insignificant
		Earnings Skewness	+	1%
		Change in Earnings	+	1%
		Earnings Volatility	+	Insignificant
		Forecast Horizon	+	Insignificant
		Number of Analysts	-	Insignificant
		Forecast Dispersion	-	1%
Healy *et al.*, 1999	Analyst Following	Disclosure Dummy	+	1%
		Earnings Level	+	5%
		Earnings Change	-	10%
		Size (Total Assets)	+	1%
		Share Returns	-	10%
		Sales Growth	-	Insignificant
	F'cast Dispersion	Disclosure Dummy	-	Insignificant
		Earnings Level	+	Insignificant
		Earnings Change	-	Insignificant
		Size (Total Assets)	-	Insignificant
		Beta	-	Insignificant
		Sales Growth	-	10%
Hope, 2003	Forecast Accuracy	Annual Report Disclosure	+	1%
	and Enforcement	Enforcement	+	1%
		Share Exchange Listings	+	1%
		Analyst following	+	1%
		Firm Size	-	5%
		Earnings Change	-	1%
		Negative Earnings	-	Insignificant
		Uncertainty Avoidance	+	5%

		Individualism	+	10%
		Domestic Listed Farms	-	Insignificant
		Common Law	+	10%
		Earnings Surprise Mngmt	+	5%
	Forecast Accuracy	Annual Report Disclosure	+	1%
	and Disclosure Qty	Enforcement	+	1%
		Share Exchange Listings	+	Insignificant
		Choice	-	1%
		Analyst following	+	1%
		Firm Size	-	Insignificant
		Earnings Change	-	1%
		Negative Earnings	-	Insignificant
		Uncertainty Avoidance	+	1%
		Individualism	+	Insignificant
		Domestic Listed Farms	-	10
		Earnings Surprise Mngmt	+	1%
Lang & Lundholm, 1996	Analyst Following	Annual Report	+	Insignificant
		Other Publication	+	5%
		Investor Relations	+	5%
		Total Disclosure Score	+	1%
		Size (Mcap)	+	1%
		Std Dev. ROE	-	Insignificant
		Return-Earnings Correlation	-	5%
	Std Dev Forecasts	Annual Report	-	1%
		Other Publication	+	Insignificant
		Investor Relations	-	5%
		Total Disclosure Score	-	1%
		Size (Mcap)	-	1%
		Std Dev. ROE	+	1%
		Return-Earnings Correlation	+	1%
		Earnings Surprise	+	1%
		%New Forecasts	+	1%
	Forecast Accuracy	Annual Report	-	Insignificant
		Other Publication	+	5%
		Investor Relations	+	1%
		Total Disclosure Score	+	1%
		Size (Mcap)	+	1%
		Std Dev. ROE	-	Insignificant
		Return-Earnings Correlation	-	Insignificant
		Earnings Surprise	-	1%
		%New Forecasts	-	1%
	Volatility Forecast	Annual Report	-	Insignificant
	Revisions	Other Publication	-	Insignificant
		Investor Relations	-	1%
		Total Disclosure Score	-	1%
		Size (Mcap)	-	1%
		Std Dev. ROE	+	1%
		Return-Earnings Correlation	+	Insignificant
		Earnings Surprise	+	1%
		%New Forecasts	+	1%

Marquardt & Wiedman, 1998	Forecast Accuracy	Management Participation	-	1%
		Size (Mcap)	-	5%
		Hist. Earnings Variance	-	Insignificant
		Std. Dev. F'cast/Avg. F'cast	+	1%
Rock *et al.*, 2001	Analyst Following	Number Inst. Shareholders	+	1%
		%Shares held by Institutions	+	5%
		Return Variance	+	5%
		R^2 Co Return on Mkt Model	+	1%
		Diversification	-	Insignificant
		Size (Mcap)	+	1%
		%Shares held by Insiders	-	6%

This section expanded the topic of analyst behaviour in response to disclosure policy. It was shown that for the purpose of this study, analyst behaviour relates to the number of analysts following a company, the dispersion of their forecasts, their forecast accuracy and the volatility of forecast revisions. Each of the four elements of analyst behaviour was presented separately and discussed in the context of literature to date and its empirical findings. It was found that the number of analysts and forecast accuracy are the most prominently researched variables. An inspection of Table 3 confirms this. It also shows the different models employed by researchers of analyst behaviour and disclosure policy together with the statistical validity of their specifications. It provides an overview of the approaches taken by contemporary researchers and may serve as a starting point for possible future research.

The remainder of this literature review is devoted to the development of the control variables necessary to single out the effect of the disclosure policy on information asymmetry and analyst behaviour. Both Table 2 and Table 3 indicate that this requires a number of control variables. As such, it becomes necessary to develop the purpose of each of these on the anticipated models described in Chapter 3.

2.5 Control Variables

2.5.1 Size - Overview

Of all control variables, size is the only one that affects both information asymmetry and analyst behaviour. Hence, to avoid repetition, the size effects applicable to both research areas are presented together whilst the findings specific to only one of the two research areas are described within their own sections.

As mentioned earlier, the research findings discussed in this section can be attributed to Type I research, which focussed on the relationship between the disclosure environment and disclosure attributes. The most significant and most established control variable from such Type I disclosure research is company size. Most researchers expect a positive relationship between company size and the level of disclosure[21]. It therefore follows that company size represents the primary control variable in the analyses conducted within this study.

Buzby (1975) put forward that small firms may not possess the necessary resources for collecting and presenting costly high quality information. Owusu-Ansah (1998) and Singhvi and Desai (1971) suggested that proprietary information, such as information regarding research and development, is more integral to their competitive advantage and corporate survival. In addition, they noted that the cost of collecting and presenting information is more onerous for small companies. Lang and Lundholm (1993) hypothesised that there is a fixed component to disclosure cost, so that the cost per unit of size decreases. This implies that reporting per unit of information is cheaper for larger firms

As corporations grow in size, their capital structure becomes more important to their goal of maximising shareholder value and they increasingly rely on public financing. Therefore, larger corporations become more active in capital markets (Inchausti, 1997). As companies become more dependent on public investment, increasing the marketability of their securities becomes more of an incentive to improve their disclosure (Lang & Lundholm, 1993, 2000; Botosan & Plumlee, 2002).

[21] Empirical findings in the following countries confirm this hypothesis: The USA (Buzby, 1975; Botosan, 1997, 2000; Botosan & Harris, 2000; Botosan & Plumlee, 2002; Healy & Palepu, 2001; Healy *et al.*,1999; Lang & Lundholm, 1993, 1996), the UK (Firth, 1979; Wallace, Choudhury & Adhikari, 1999); Sweden (Cooke, 1989); Spain (Wallace *et al.*, 1994; Inchausti, 1997); Japan (Cooke, 1991), Zimbabwe (Owusu-Ansah, 1998); Mexico (Chow & Wong-Boren, 1987), South Africa (Crosoer, 2003; Negash, 2001) and the Czech Republic (Patton and Zelenka, 1997).

In summary, the majority of researchers in this field assume a positive relationship between size and disclosure policy. The majority of contemporary researchers chose market capitalisation as their proxy for company size[22].

The remainder of this section details the hypothesised impact of company size and the remaining control variables on information asymmetry and analyst behaviour.

2.5.2 Information Asymmetry

2.5.2.1 Size

There are several size effects on information asymmetry. Bid-ask spreads, in general, diminish with size. This means that, expressed as a percentage of share price, bid-ask spread are smaller for large firms and are relatively smaller for larger share prices and vice versa (Joos, 2000). This effect should be controlled for as it persists even in the absence of information asymmetry (Welker, 1995).

Lang and Lundholm (1993) added that the cost of disseminating information is higher for smaller companies as the media are less likely to publish their news.

According to a study by Diamond and Verrecchia (1991), the reduction of information revealed by large trades and the reduction of adverse selection is greater for larger firms, which, hence, have a greater incentive to subscribe to higher levels of disclosure. In addition, large companies are more dependent on institutional investors (Healy *et al.,* 1999) who require more baseline market liquidity (Diamond & Verrecchia, 1991). As a result, they should be more inclined to disclose information than smaller firms that are less dependent on large shareholders.

In short, research conducted to date indicates that company size is an important explanatory variable of the information asymmetry component of the bid-ask spread. Therefore, omitting it from statistical analysis might give rise to spurious conclusions.

[22] (Botosan, 1997, 2000; Botosan & Plumlee, 2002; Bushee & Noe, 2000; Hail, 2001; Healy *et al.,* 1999; Lang & Lundholm, 1993, 1996; Leuz & Verrecchia, 2000; Lundholm & Myers, 2002; Marquardt & Wiedman, 1998; Negash, 2001; Owusu-Ansah, 1998; Sengupta, 1998; Wallace *et al.,* 1994)

2.5.2.2 Trading Volume

Diamond and Verrecchia (1991) described how share trades reveal value-relevant information to the market. To the extent that trades reveal information, adverse selection, which is the risk of trading with a better-informed party, exists (Botosan, 1997, 2000).

Easley *et al.* (1996) provided empirical evidence that the probability of information-based trading decreases in trading volume. Put differently, bid-ask spreads decrease with trading volume (Welker, 1995). In order to avoid attributing this effect to companies' disclosure policy, it is necessary to adjust for the level of trading volume. In addition, Welker (1995) used trading volume as an inverse variable for market makers' inventory holding period based on the assumption that as a share is traded more frequently, less inventory needs to be held to facilitate smooth matching of buy and sell orders.

2.5.2.3 Return Volatility

Bushee and Noe (2000) noted that share price volatility increases a firm's perceived investment risk and thereby increases its cost of capital. Although this type of risk relates to share returns, its effect is tantamount to uncertainty regarding a firm's payoff pattern. From this point of view, it has the same effect on the cost of capital as information asymmetry but possibly has different causes. Because it is negatively related to the bid-ask spread, it needs to be included in its regression models (Welker, 1995). This should avoid drawing incorrect conclusions based on an omitted variable bias.

2.5.3 Analyst Behaviour

2.5.3.1 Size

Lang and Lundholm (1993) noted that analysts are more likely to attend the meetings of larger companies. Analysts sell their services and are thus more likely to operate where the demand for their services is greater. As the number of analysts following a firm is set by the aggregate demand and supply for their services (Bhushan, 1989), corporate size needs to be adjusted for when investigating the disclosure effect on companies' analyst following.

In a later study, Lang and Lundholm (1996) argued that if size was excluded from the analysis, a significant relationship between analysts and disclosure could be established even if the real explanatory variable were to be firm size. Bhushan's (1989) empirical observation of a significant positive association between size and the number of analysts supports this view. Hope (2003) added that size is positively associated with the availability of information that does not stem from company disclosure.

Healy *et al.* (1999) noted that larger companies typically provide more information to analysts and have more diversified investments, which make their performance more predictable. This increases analyst consensus. Consequently, they integrate size as a control variable and expect a negative coefficient with forecast dispersion.

In summary, size remains an important control variable that is used by the majority of contemporary researchers of analyst behaviour to avoid an omitted variable bias based on non-disclosure information available in the market, which could cause spurious conclusions.

2.5.3.2 Historic Standard Deviation of Return on Equity

This variable is an indicator of the complexity of the forecasting task. Duru and Reeb (2002) concluded that, *inter alia*, the forecast accuracy and the number of analysts following a company are a function of the difficulty of the forecasting task. Their finding that internationally active firms are associated with less accurate forecasts seems to support this opinion.

Zhang (2001) determined earnings volatility to be one of the critical components of firms' analyst following. If variation in the observed level of companies' disclosure policies is due to earnings volatility, a positive relationship between disclosure and analyst following should occur.

2.5.3.3 Return-Earnings Correlation

This variable is an indicator of the relationship between share returns and earnings over the preceding ten years. It indicates to what extent earnings explain returns. King *et al.* (1990) argued that analyst following is likely to be positively associated with share-return-earnings correlations as it is easier to predict future share prices based on earnings forecasts for such firms. Expressed in terms of Zhang's (2001) model, this would mean that analysts are more likely to follow a firm where the information production cost is lower. Lang and Lundholm (1993) determined a negative correlation between the observed return-earnings correlations and firms' disclosure policies. They interpreted that low return-earnings correlations indicate that earnings do not capture value-relevant information and that more disclosure is necessary as a result.

2.5.3.4 Earnings Surprise

This variable was introduced by Lang and Lundholm (1996) and was included only in forecast characteristics models and not in models examining the disclosure policy effect on analyst following. It controls for the fact that earnings forecasts are affected by the magnitude of the earnings information to be disclosed. Lang and Lundholm (1996) illustrated this by means of a simple example where a company introduces a major new product. Realised earnings are likely to deviate substantially from expected earnings; consensus is likely to be low and significant revisions of earnings forecasts become probable. Including the earnings surprise in forecast characteristics models should thus adjust for such potential bias.

2.5.3.5 Number of Analysts

Hope (2003) showed that an important control variable in the analysis of analyst forecast accuracy is the number of analysts following a firm. Similar to Type I literature, the numbers of analysts are a proxy for the information environment in which forecasts are made. In addition, Hope (2003) included the number of analysts to control for their incentive to issue more accurate forecasts when greater competition exists amongst them. Duru and Reeb (2002) noted that the number of analysts is a measure of forecasting complexity.

Forecast accuracy was found to increase with the number of analysts (Duru & Reeb, 2002; Rock *et al.*, 2001).

2.5.3.6 Percentage New Forecasts

Lang and Lundholm (1996: 478) introduced this parameter to deal with potentially "stale" database entries. Analyst forecasts, which were not updated in a given month, are still included in the database accessed by the researchers. However, it is impractical to determine whether unchanged estimates reflect the analysts' best estimates or whether they simply opted not to re-estimate earnings. Controlling for the effect of new forecasts reduces any systematic variation across observations due solely to differences in the proportion of recently revised forecasts. Further tests suggested that "staleness" was not a problem and that tests including and excluding the variable were consistent. However, as the possibility of "staleness" cannot be ruled out, Lang and Lundholm (1996) included it in their model and found it to be highly significant. No other known researcher employed a similar factor.

2.6 South African Studies

Negash (2001) published what appears to be the only South African study on information asymmetry and uncertainty in the local capital market. His study investigated the relationship between corporate disclosure and the adverse selection component of the bid-ask spread of share prices. He decoupled the effect of order-processing and holding costs embodied in bid-ask spreads. Initial results suggested that there is some association between annual report disclosure and the size of the spread's information component. Further tests, however, showed that the putative relationship is not of strong linearity. In a later study, Negash (2002) found that changes in the bid-ask spread explain changes in the market (price) to book ratio and are correlated with proxies for intangible assets. However, because his later study ignored the effect of company disclosure it is of limited relevance to this study.

Crosoer (2003) conducted a study of company characteristics associated with the observed level of disclosure. Although his research should be classified as Type I and is, hence, different in nature to this study, he empirically confirmed prior literature's findings on the control variable size in the South African context.

Hamann (2003) researched corporate social responsibility in the South African context. Although he concluded that South African firms are active social reporters relative to international companies, he made no use of statistical analysis. In addition, his study did not examine any possible disclosure policy effect related to social reporting. Hence, his research is of limited relevance to this study.

Hope (2003) conducted an international study of the impact of disclosure practices and the enforcement of accounting standards on the accuracy of analyst forecast accuracy. Out of a sample of 22 countries, South African analysts took the ninth place in terms of forecast accuracy, ahead of developed countries such as Germany, Hong Kong, Denmark and Italy. However, his study's sample size per country was below 20 and no selection criteria were mentioned. Hence, due to the small sample size and methodology, the comparability between his study and this research is limited.

The South African literature presented above sheds only limited light on the research objectives pursued within this study. The first (Negash, 2001, 2002) reported a dearth of significant results, the second one (Crosoer, 2003) only provided more insight into one of the proposed control variables whilst the third (Hamann, 2003) added to our knowledge of social development reporting, which is not directly related to this study. Finally, the fourth and last study on the South African context (Hope, 2003) only considered a small sample with limited explanation as to the methodology followed.

2.7 Summary – Literature Review

Research on company disclosure has seen a fundamental shift in focus over the last decade. It has changed from the relationship between environmental factors and disclosure attributes (Type I) to that between disclosure attributes and their impact (Type II). Only the latter category was reviewed in depth as this study contributes to the research on the disclosure policy effect on capital markets.

Within this study, the observed level of disclosure is assumed to be due to an active choice rather than being an externally set parameter. Thus, the observed level of reporting represents a disclosure policy. While many contemporary researchers investigated all three categories of disclosure, the annual report remains the major component of company disclosure (Hope, 2003) and an accepted proxy for a company's overall reporting efforts (Botosan, 1997).

The ultimate disclosure policy effect was found to be a lower cost of equity capital (Botosan, 2000). The majority of all other effects are either subsidiary to the cost of capital or represent components thereof, such as the effect on information asymmetry (Diamond & Verrecchia, 1991; Healy & Palepu, 2001; Zhang, 2001). Despite detailed theoretical research, measurement challenges have hindered widespread empirical research on the disclosure policy effect on the cost of capital. Botosan (1997, 2000) was the first known empirical researcher to close this gap. She devised a two-tiered framework, which showed how disclosure reduces information asymmetry and thus gives rise to a lower cost of

equity capital. She then confirmed her framework empirically for firms with low analyst following. Hail (2001), found stronger evidence of the same effect in a less stringent reporting environment.

Other contemporary research showed that disclosure policy is negatively related to the level of information asymmetry, which is a key component of the cost of capital. It is commonly measured by bid-ask spreads, trading volume and return volatility. Research found that more disclosure reduces estimation risk (Botosan, 1997) and the amount of information revealed by large trades (Diamond & Verrecchia, 1991) and, so, increases market liquidity (Welker, 1995).

Financial analysts play an important role as economic agents that produce and disseminate company information (Rock *et al.,* 2001). Lang and Lundholm (1996) documented a positive disclosure policy effect on analyst following, suggesting that analysts act as information intermediaries rather than as competitors of company information.

They found a negative relationship between disclosure policy and analysts' forecast dispersion, which suggests that analysts use the same forecasting models.

In the field of forecast accuracy, Lang and Lundholm (1996) observed a positive disclosure policy effect. However, the evidence on the effect of company diversification on forecast accuracy remains mixed.

The volatility of forecast revisions is negatively related to disclosure policy (Lang & Lundholm, 1996) while timely disclosure was also found to result in reduced volatility.

Altogether, the above review of contemporary literature of the disclosure policy effect demonstrates several important capital market benefits. The majority of the above findings were made in international research. This study uses that international knowledge and tests whether similar disclosure policy effects can be determined empirically in the South African context. Chapter 3 presents the methodology adopted to study the existence of local disclosure policy effects on information asymmetry and analyst behaviour.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter explains the methodology chosen to achieve the objectives set out in Chapter 1. The objectives can be disaggregated into two groups. Firstly, this study examines the disclosure policy effect on the level of observed information asymmetry. Secondly, it investigates the existence of a disclosure policy effect on analyst behaviour.

Chapter 3 begins with a discussion of the sample selection process, which is based on an annual E&Y survey of Excellence in Corporate Reporting. This is followed by an overview and detailed description of all variables employed within this investigation. Each dependent variable is presented together with its related hypothesis. This is complemented by a description of the statistical procedures chosen to test the hypotheses embodying the research objectives. Lastly, Chapter 3 ends with an outline of the methodology's limitations.

3.2 Sample Selection: E&Y Excellence in Corporate Reporting

The obvious limitation to any study involving company disclosure is the availability of an objective rating thereof. This rating process is an onerous task that demands considerable time, knowledge, experience, care and objectivity. As such, it is seen as a significant impediment to disclosure related research and a limitation to possible findings, as sample sizes are naturally restricted (Botosan, 2000; Michailesco, 2001). Internationally, some researchers overcame this by designing and executing their own rating methodologies (Michailesco, 2001), a process which may expose subsequent findings to certain biases. This approach was more common amongst Type I researchers.

The majority of contemporary Type II researchers employ independent measures of disclosure policies (mostly AIMR ratings) to avoid any bias. In an effort to conform to this practice, this study is based on the annual E&Y survey of Excellence in Corporate Reporting[23]. The survey's objective is to

[23] Prior to that prior to 2003, the survey was named "Excellence in *Financial* Reporting".

encourage excellence in the quality of financial reporting which appears comparable to the AIMR ratings' objective which is to encourage improved reporting and disclosure.

The E&Y survey samples the largest 100 South African JSE listed companies as determined by their market capitalisation on 31 October. This study considers four years starting from 2000. It was impractical to extend the sample period to years dating before 2000, as a change to the rating methodology was made in that year. The fact that only four years of comparable data were available gave rise to the cross-sectional regression analyses discussed later in this Chapter. Although the sample is determined on 31 October of a given year, the survey results are only published in the first half of the following year to allow for the adjudication process to occur. As a result, the first survey year considered within this study is the 2001 year. A list of the sample companies is provided in Appendix A.

An inspection of Appendix A also reveals that the companies within the samples vary over the four years. This is because the deciding factor, market capitalisation, is subject to fluctuation. This is not expected to introduce a bias as no statistical analysis is performed over time (time-series testing). The proposed regression analysis is performed at one point in time (cross-sectional testing). For more detail, refer to section 3.8.1, which presents an overview of the statistical analyses.

For more information on the E&Y survey, refer to section 3.5.2.1, which describes the variable that was derived from the survey.

The next section presents an overview of the data and its sources.

3.3 Data – An Overview

The data required for this study was obtained from a variety of sources, some of which are (a) not public, such as the disclosure scores and (b) are only available to database subscribers, such as I-Net, McGregor and I/B/E/S. Data from I/B/E/S via Thomson Financial was obtained specifically for this research. For a variety of reasons, not all data was available for all companies. Some companies were delisted or deregistered between the applicable survey year and the time this study was conducted. Such companies were removed from the sample, as a result of data unavailability. Section 4.2.1 presents a reconciliation of the number of original sample companies and the final samples. Table 4 and Table 5 present summaries of the variables employed within the study, their measurement as well as their source. This is shown separately for each of the two areas of study: information asymmetry and analyst behaviour. A detailed account of how the individual variables were collected is presented together with the variable description in sections 3.4 to 3.6.

Table 4. Summary of Data: Information Asymmetry

Data utilised in Analysis	Abbreviation	Measurement	Data Source
Dependent Variables			
1. Bid-Ask Spread	*Spread*	Calculated	I-Net
2. Trading Volume	*Vol*	Calculated	I-Net
Independent Variables			
1. Disclosure Score	*Score*	Calculated	E&Y Survey
2. Company Size [30/10]	*Size*	Calculated	I-Net
3. Trading Volume	*Vol*	Calculated	I-Net
4. Return Volatility	*RetVol*	Calculated	I-Net

For a description of how variables are calculated, refer to the detailed description provided in this chapter.

Table 5. Summary of Data: Analyst Behaviour

Data utilised in Analysis	Abbreviation	Measurement	Data Source
Dependent Variables			
1. Number of Analysts	*#Anlyst*	Downloaded	I/B/E/S via Thomson
2. Forecast Dispersion	*ForDisp*	Calculated	I/B/E/S via Thomson
3. Forecast Accuracy	*ForAcc*	Calculated	I/B/E/S via Thomson
4. Forecast Revision Volatility	*RevVol*	Calculated	I/B/E/S via Thomson
Independent Variables			
1. Disclosure Score	*Score*	Calculated	E&Y Survey
2. Company Size [30/10]	*Size*	Calculated	I-Net
3. Hist. Std. Dev. ROE	*HSDROE*	Calculated	McGregor
4. Return-Earnings Correlation	*R-ECorr*	Calculated	McGregor & I/B/E/S
5. Earnings Surprise	*EarnSurp*	Calculated	I/B/E/S via Thomson
6. Number of Analysts	*#Anlyst*	Downloaded	I/B/E/S via Thomson

For a description of how variables are calculated, refer to the detailed description provided in this chapter.

The following section discusses the variables summarised above in more detail.

3.4 Variables Selected

This study employs eight explanatory variables to analyse the six dependent variables representing information asymmetry and analyst behaviour characteristics relating to the sample companies. All variables selected were previously researched internationally within the literature discussed in Chapter 2. Their selection should thus ensure comparability between this study's findings and those of international research. This section continues with a detailed review of how the dependent and independent variables were chosen, measured and obtained. This information is presented separately for information asymmetry and analyst behaviour.

3.5 Information Asymmetry

3.5.1 Dependent Variables

Out of the three general proxies for information asymmetry, namely the bid-ask spread, trading volume and share price volatility, only the former two were chosen. Share price volatility was excluded from the empirical analysis to avoid the effect of stock market noise. In addition, this decision was influenced by previous researchers' lack of significant findings (Leuz & Verrecchia, 2000; Welker, 1995). Lastly, this decision was driven by the conclusion drawn by Joos (2000) that share price volatility is the weakest proxy for information asymmetry.

3.5.1.1 Bid-Ask Spread (*Spread*)

The bid-ask spread represents the difference between quoted bid and ask prices. It is chosen as a measure of information asymmetry as it embodies the degree of price-protection (Welker, 1995) and market illiquidity due to adverse selection (Diamond & Verrecchia, 1991). As such, it is an explicit measure of information asymmetry (Leuz & Verrecchia, 2000). The choice of the bid-ask spread as a proxy for information asymmetry is consistent with Healy *et al.* (1999), Leuz and Verrecchia (2000), Negash (2001) and Welker (1995).

For the purpose of this study, monthly spreads are used. This is consistent with Leuz and Verrecchia (2000) and Welker (1995). Following Healy *et al.* (1999), Leuz and Verrecchia (2000) and Negash (2001), the spread is expressed as a percentage of the average bid and ask prices. This expresses the bid-ask spread as a ratio, which enhances cross-sectional comparability and achieves economic interpretability (Welker, 1995). To obtain an annual figure, the average spread over the twelve months

is determined (Leuz & Verrecchia, 2000). Negash (2001) suggests a procedure to extract the adverse selection component from the bid-ask spread. He finds that the adverse selection component accounts for between 54% and 70% of South African spreads in contrast to about 40% internationally. This is probably due to the order-driven nature of the JSE, which eliminates inventory holding costs. Consequently, Negash (2001) includes the unmanipulated spreads in his model. This study adopts the same approach. The variable (in each of the four years) is calculated as follows:

$$Spread = \left\{ \left[\left(Spread_t = \frac{Ask_t - Bid_t}{\frac{1}{2} * (Ask_t + Bid_t)} \right)_t + \ldots + \left(Spread_{t+12} = \frac{Ask_{t+12} - Bid_{t+12}}{\frac{1}{2} * (Ask_{t+12} + Bid_{t+12})} \right)_{t+12} \right] * 1/12 \right\}$$

(Equation 1)

Where:

$Spread_t$	=	Spread in month t
$Spread_{t+12}$	=	Spread in month t + 12
Ask_t	=	Asking Price in month t
Bid_t	=	Bidding Price in month t

The bid and ask prices necessary to calculate the bid-ask spreads used within this study were obtained from I-Net using the I-Connect function for direct volume downloads.

The following hypothesis is tested (stated in its alternative form):

H1: There is a positive relationship between disclosure policy and the bid-ask spread.

3.5.1.2 Trading Volume (*Vol*)

The trading volume represents the extent to which a company's shares are traded in the market. It is chosen as proxy for information asymmetry as it embodies the securities' liquidity (Diamond & Verrecchia, 1991; Leuz & Verrecchia, 2000; Negash, 2001; Welker, 1995). Such liquidity is negatively affected by adverse selection (Diamond & Verrecchia, 1991), which gives rise to price-protection (Welker, 1995).

The choice to use this variable as a proxy for information asymmetry and its measurement are consistent with Leuz and Verrecchia (2000) and Negash (2001). To achieve cross-sectional comparability, it is scaled by the respective market capitalisation and expressed as an average of the

twelve monthly observations (Healy *et al.*, 1999; Welker, 1995). The variable (in each of the four years) is calculated as follows:

$$Vol = \left\{ \left[\left(Vol_t = \frac{SP_t * NS_t}{Mkt\_Cap_t} \right) + ... + \left(Vol_{t+12} = \frac{SP_{t+12} * NS_{t+12}}{Mkt\_Cap_{t+12}} \right) \right] * 1/12 \right\} \quad \text{(Equation 2)}$$

Where:

SP_t	=	Share Price in month t
SP_{t+12}	=	Share Price in month t + 12
NS_t	=	Number of Shares traded in month t
NS_{t+12}	=	Number of Shares traded in month t + 12
Mkt_Cap_t	=	Market Capitalisation in month t
Mkt_Cap_{t+12}	=	Market Capitalisation in month t + 12

The data necessary to calculate this variable was obtained from I-Net using the I-Connect function for direct volume downloads.

The following hypothesis is tested (stated in its alternative form):

H2: There is a positive relationship between disclosure policy and trading volume.

3.5.2 Independent Variables

This section continues with a description of the explanatory variables chosen to model the disclosure policy effect on the observed information asymmetry.

3.5.2.1 Disclosure Score (*Score*)

The disclosure score is the average of the individual scores determined by three independent adjudicators within the E&Y survey of Excellence in Corporate Reporting. All three are South African chartered accountants and senior accountancy professors at the University of Cape Town. As such, the disclosure score is expected to have the necessary objectivity that is required for this study. Leuz and Verrecchia (2000) confirmed the validity of university staff as adjudicators for the purpose of assessing company disclosure.

In the rating process, the adjudicators assess each annual report in terms of its performance review, financial disclosure, forward-looking information and presentation. The final score, the average of the three ratings, is determined as a percentage of the items applicable to each company. This ensures that no company is penalised for failing to disclose items that are not relevant to it.

The mark plan and actual score achieved by companies are confidential to avoid gamesmanship on the part of companies and allow for professional judgment involved in deciding on the applicable mark plan sections. Consequently, neither the mark plan nor the actual scores will be published within this study.

Over this study's sample period the total number of marks available rose from 283 in the 2001 survey year to 441 in the 2004 survey year. Again, this appears comparable with the AIMR ratings which are used by most researchers. These are re-assessed in a similar way on an annual basis (Healy *et al.,* 1999). Nevertheless, this raises the question of comparability over time. However, the objective behind the assessment process does not change. Annual reports were rated according to current accounting standards and topical issues. In addition, this study does not draw time-series statistical inferences. Consequently, no bias is expected as a result of the change in the E&Y survey's mark plan. The variable is calculated as follows in each of the four years:

$$Score = \frac{(Score_1 + Score_2 + Score_3)/3}{TotMrks - NAMrks} \qquad \text{(Equation 3)}$$

Where:

$Score_1$	=	Score determined by adjudicator 1
$Score_2$	=	Score determined by adjudicator 2
$Score_3$	=	Score determined by adjudicator 3
$TotMrks$	=	Total marks available in terms of mark plan
$NAMrks$	=	Marks not applicable to specific company's annual report

The scores were obtained from the adjudicators of the E&Y survey of Excellence in Corporate Reporting.

3.5.2.2 Size (*Size*)

The relationship between an entity's disclosure and its economic size is possibly the most significant Type I research contribution to contemporary literature. *Inter alia*, it captures the influence of resources available to reporting (Buzby, 1975), competitive positions (Owusu-Ansah, 1998), fixed reporting component costs (Lang & Lundholm, 1993), legal costs (Healy & Palepu, 2001; Patton & Zelenka, 1997), incentives for information-based trades (Diamond & Verrecchia, 1991), aggregate demand for analyst services (Bhushan, 1989), information availability (Hope, 2003) and levels of diversification (Healy *et al.,* 1999; Duru & Reeb, 2002). In addition, some of these effects have been shown to hold in the South African context (Crosoer, 2003; Negash, 2001). In order to achieve comparability and to avoid erroneously attributing any of the above-mentioned effects to a company's disclosure policy, it was decided to include this variable in the models specifying the disclosure policy impact on information asymmetry and analyst behaviour.

Within this study, size is measured in terms of market capitalisation as at the beginning of each company's financial year. The choice of proxy for company size is consistent with Botosan (1997, 2000), Botosan and Plumlee (2002), Bushee and Noe (2000), Hail (2001), Healy *et al.* (1999), Lang and Lundholm (1993, 1996), Leuz and Verrecchia (2000), Lundholm and Myers (2002), Marquardt and Wiedman (1998), Negash (2001), Owusu-Ansah (1998), Sengupta (1998) and Wallace *et al.* (1994). The variable is calculated (in each of the four years) as follows:

$$Size = NS_t * SP_t \qquad \text{(Equation 4)}$$

Where:

NS_t	=	Number of shares outstanding at time t
SP_t	=	Market share price at time t

The data was obtained from I-Net using the I-Connect function for direct volume downloads.

3.5.2.3 Trading Volume (*Vol*)

As mentioned in 3.5.1.2, trading volume represents the extent to which a company's shares are traded in the market. Prior literature suggests that this variable exhibits a strong negative correlation with bid-ask spreads, i.e. as the trading volume of a share increases bid-ask spreads typically diminish (Welker, 1995). As such, it represents one of the non-information influences on the bid-ask spreads that cause some researchers' scepticism towards the bid-ask spread as a valid proxy for information asymmetry (Joos, 2000). To avoid an omitted variable bias, the trading volume of a share is included in the bid-ask spread model. This is consistent with Botosan and Harris (2000), Healy *et al.* (1999), Leuz and Verrecchia (2000), Welker (1995).

For a definition of the variable and the data's source, refer to 3.5.1.2.

3.5.2.4 Return Volatility (*RetVol*)

The return volatility measures firms' perceived investment risk (Bushee & Noe, 2000). Although it relates to share returns and not companies' ability to generate positive earnings returns it acts similarly on investors who are seeking capital gains. Investors will thus demand discounts in compensation for trading a share with greater return volatility. As such, it is one of the non-information influences on the baseline liquidity as measured per bid-ask spread or trading volume (Leuz & Verrecchia, 2000; Welker, 1995) and should thus be controlled for in order to avoid attributing undue effect to disclosure policies or omitted variable bias (Welker, 1995). Return volatility is measured as the standard deviation of monthly share returns. As such, it is a single observation and does not require aggregation to arrive at an annual figure. The variable is calculated as follows in each of the four years:

$$RetVol = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2} \qquad \text{(Equation 5)}$$

Where:

$n - 1$	=	Degrees of freedom
x_i	=	Observation number i
$\bar{x}$	=	Mean of all observations

The data required to calculate the return volatility used within this study was obtained from I-Net using the I-Connect function for direct volume downloads.

3.6 Analyst Behaviour

3.6.1 Dependent Variables

There are four main features of analyst behaviour examined in contemporary disclosure research. The only known researchers to address all four variables comprehensively are Lang and Lundholm (1996). Consequently, this study follows their approach in defining the variables used as proxies.

3.6.1.1 Number of Analysts (*#Anlyst*)

This variable is a measure of the analyst attention a particular company receives. More specifically, it stands for the number of analysts that make monthly forecasts of annual earnings. Bhushan (1989) suggested that the number of analysts is set by the aggregate demand and supply for their services. Research consensus demonstrates a positive relationship between disclosure policy and the number of analysts, indicating that when information extraction becomes cheaper, more analysts will make earnings forecasts (Lang & Lundholm, 1996). The choice of this variable is consistent with Healy *et al.* (1999), Lang and Lundholm (1996) and Rock *et al.* (2001). Consistent with Lang and Lundholm (1996), the average monthly number of analysts is used. This is considered superior to using the yearly sum of analysts, as it does not bias against companies with missing data points. The variable for each of the four years is calculated as follows:

$$\#Anlyst = \left(NAN_t + ... + NAN_{t+12}\right) * 1/12 \qquad \text{(Equation 6)}$$

Where:

NAN_t	=	Number of analysts providing EPS forecasts in month t
NAN_{t+12}	=	Number of analysts providing EPS forecasts in month t + 12

Note that, as mentioned above, if no forecasts were provided in any given month, such a month is excluded from the average in order to avoid a misstatement of the above variable.

The data was obtained from the I/B/E/S database via Thomson Financial as a research grant.

The following hypothesis is tested (stated in its alternative form):

H3: There is a positive relationship between disclosure policy and a company's analyst following.

3.6.1.2 Forecast Dispersion (*ForDisp*)

The forecast dispersion is a measure of the range of forecasts or, alternatively, the disagreement between different analysts. Although not conclusively researched, consensus indicates that analysts use substantially the same model and place less emphasis on private information as more information is made public (Healy *et al.,* 1999; Lang & Lundholm, 1996). This implies a negative relationship between disclosure policy and forecast dispersion. The degree of forecast dispersion is measured as the inter-analyst standard deviation, which is deflated by share price to achieve comparability (Lang & Lundholm, 1996). In order to obtain an annual aggregate, the median over the twelve months is calculated. This aggregate is less sensitive to outliers and thus considered more appropriate. The variable is calculated as follows in each of the four years:

$$ForDisp = \frac{\sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}}{SP_t} \qquad \text{(Equation 7)}$$

Where:

$n-1$	=	Degrees of freedom
x_i	=	Observation number i
$\bar{x}$	=	Mean of all observations
SP_t	=	Stock price at time t

The data was obtained from the I/B/E/S database via Thomson Financial as a research grant.

The following hypothesis is tested (stated in its alternative form):

H4: There is a negative relationship between disclosure policy and the standard deviation of analyst forecasts.

3.6.1.3 Forecast Accuracy (*ForAcc*)

Forecast accuracy is a factor of the extent to which a company reports information relevant to future earnings and therefore gauges the amount of pre-disclosure information available to investors. As more information is made public, earnings forecasts should become more accurate (Lang & Lundholm, 1996) by reducing uncertainties relating to both economic affairs and the accounting alternatives used by firms (Hope, 2003). The choice of this variable is consistent with Duru and Reeb (2002), Hope (2003), Lang and Lundholm (1996) and Marquardt and Wiedman (1998).

The definition of the variable used within this study follows Lang and Lundholm (1996) and Marquardt and Wiedman (1998) as the negative of the absolute value of the analyst forecast error, which is deflated by share price. The variable is expressed as a negative to make the least accurate forecast the smallest number. This allows testing for a positive association between disclosure and analyst forecasts. The accuracy is measured in the last month of companies' financial year, which is when information asymmetry should be lowest. In addition, using the last month's forecast maximises the chance that JSE Share Exchange News Service (SENS) announcements have been incorporated by analysts. As it is a yearly observation, no aggregation is required. In each of the four years, the variable is calculated as follows:

$$ForAcc = \frac{-(|EPS_t - AF_t|)}{SP_t} \qquad \text{(Equation 8)}$$

Where:

EPS_t	=	Earnings per share at time t
AF_t	=	Median analyst forecast at time t
SP_t	=	Stock price at time t

The components necessary to calculate this variable were obtained from the I/B/E/S database via Thomson Financial as a research grant.

The following hypothesis is tested (stated in its alternative form):

H5: There is a positive relationship between disclosure policy and the accuracy of analyst forecasts.

3.6.1.4 Revision Volatility (*RevVol*)

This variable is an indicator of the smoothness with which analysts revise their earnings forecasts. The volatility of revisions should decrease as the amount of earnings relevant information rises. The only known researchers to address this issue are Lang and Lundholm (1996). Consequently, this paper adopts their definition of revision volatility as the standard deviation of the changes over the fiscal year in the median forecast from the preceding month. It is deflated by the share price at the beginning of the financial year (Lang & Lundholm, 1996). As such, it is an annual observation and does not require aggregation. The variable is calculated as follows:

$$RevVol = \frac{\sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}}{SP_t} \qquad \text{(Equation 9)}$$

Where:

$n-1$	=	Degrees of freedom
x_i	=	Observation number i : (median forecast$_t$ – median forecast$_{t-1}$)
$\bar{x}$	=	Mean of all observations
SP_t	=	Stock price at time t

The components necessary to calculate this variable were obtained from the I/B/E/S database via Thomson Financial as a research grant. The share price is obtained from I-Net.

The following hypothesis is tested (stated in its alternative form):

H6: There is a negative relationship between disclosure policy and the volatility of analysts' forecast revisions.

3.6.2 Independent Variables

This section presents a description of each independent variable, explains its derivation and how the necessary data was collected.

3.6.2.1 Disclosure Score (*Score*)

A full discussion of this variable is provided under section 3.5.2.1.

3.6.2.2 Size (*Size*)

A full discussion of this variable is provided under section 3.5.2.2.

A size effect specific to analyst behaviour was documented by Healy *et al.* (1999), who noted that larger companies typically provide more information to analysts and have more diversified investments. They found that this makes their performance more predictable and increases analyst consensus. Rock *et al.* (2001) confirmed this and added that size may be a more important determinant of analyst following than was previously reported. In order to avoid attributing these effects to companies' disclosure policies, it was decided to integrate this variable in the analyst behaviour models.

For an explanation of how the variable is calculated and how it was obtained, refer to section 3.5.2.2.

3.6.2.3 Historic Standard Deviation of Return on Equity (*HSDROE*)

The historic standard deviation of returns on equity (ROE) measures the complexity of the forecasting task faced by analysts. The more volatile company returns, the harder it becomes to predict future earnings. This is likely to influence the number of analysts, their accuracy, revisions volatility and the disagreement amongst them (Duru & Reeb, 2002). In addition, it affects analysts' incentive to gather information about the company (Lang & Lundholm, 1996). Therefore, this variable accounts for non-information related influence on analyst behaviour and thus needs to be controlled for. The variable has previously been used by Duru and Reeb (2002), Lang and Lundholm (1996) and Zhang (2001). It is determined over the preceding ten years. As this variable is a yearly observation, no aggregation is necessary.

ROE is a measure of performance, which is considered superior to earnings per share (EPS) or revenue growth because it incorporates capital investment. However, it is not a good indicator of value creation, which is achieved only if returns are in excess of the cost of capital (Miller, 2003). Despite the fact that ROE does not demonstrate this, it is still widely used and therefore considered appropriate for the purpose of this study. In all four years, the variable is calculated as follows:

$$HSDROE = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2} \qquad \text{(Equation 10)}$$

Where:

$n-1$	=	Degrees of freedom
x_i	=	Observation number i: *ROE* (Equation 11)
$\bar{x}$	=	Mean of all observations

$$ROE = \frac{NPATSH}{OSC} \qquad \text{(Equation 11)}$$

Where:

NPATSH	=	Net profit attributable to ordinary shareholders
OSC	=	Ordinary share capital

The data used to calculate this variable was obtained using McGregors' Blink function for direct volume downloads.

3.6.2.4 Return-Earnings Correlation (*R-ECorr*)

This variable measures the relationship between earnings and share returns and, similarly to the historic standard deviation of ROE explained above, it is an indicator of the forecasting complexity. Zhang (2001) argues that a higher correlation would imply a lower cost of information production as the share return captures significant portions of future earnings. It has previously been employed by Lang and Lundholm (1993, 1996) and Zhang (2001). The choice of ROE was made to ensure comparability. The correlation is measured over the preceding ten years. As it is a yearly observation, aggregation is not necessary. The definition of this variable is adopted from Lang and Lundholm (1996). This variable is calculated as follows for each of the four years:

$$R-ECorr = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}} \qquad \text{(Equation 12)}$$

Where:

x_i	=	*ShareReturn* at time 1 (see Equation 13)
$\bar{x}$	=	Mean of all observations: *ShareReturn*
y_i	=	*ROE* at time 1 (see Equation 11)
$\bar{y}$	=	Mean of all observations: *ROE*

$$ShareReturn = \frac{SP_t - SP_{t-1}}{SP_{t-1}} \qquad \text{(Equation 13)}$$

Where:

SP_t	=	Stock price at time t
SP_{t-1}	=	Stock price at time t-1

The data used to calculate this variable was obtained using McGregors' Blink function for direct volume downloads.

3.6.2.5 Earnings Surprise (*EarnSurp*)

This variable controls for the magnitude of the unforeseen earnings information affecting the earnings forecasts. In other words, this variable explains the unexpected and unpredictable portion of the earnings announcement. It is included to remove the non-disclosure related effects from the analysis. Following Lang and Lundholm (1996) who introduced this variable, it is only included in the models measuring the impact of disclosure on forecast characteristics, not the number of analysts. This study adopts the definition used by Lang and Lundholm (1996). It is deflated by the share price to achieve comparability. As an annual figure, it does not require aggregation. The variable is calculated as follows for each year:

$$EarnSurp = \frac{|EPS_t - EPS_{t-1}|}{SP_{t-1}} \qquad \text{(Equation 14)}$$

Where:

EPS_t	=	Earnings per share at time t
EPS_{t-1}	=	Earnings per share at time t-1
SP_{t-1}	=	Stock price at time t-1

3.6.2.6 Number of Analysts (*#Anlyst*)

In addition to being a dependent variable the number of analysts is also employed as explanatory variable. It is a measure of the information asymmetry in which forecasts are made and functions as an indicator of peer pressure amongst analysts (Hope, 2003). Hope (2003) acknowledged that from a theoretical point of view, it is not obvious whether disclosure and the number of analysts are substitutes or complements for each other. Duru and Reeb (2002) noted that the number of analysts is a measure of forecasting complexity. The use of this control variable is adopted from Hope (2003), Duru and Reeb (2002) and Rock *et al.* (2001). This variable is only included in the three models studying the disclosure policy effect on forecast dispersion, accuracy and revision volatility as it may not be regressed upon itself.

For an explanation of the variable's calculation and for the source of the data, refer to section 3.6.1.1.

3.7 Variables Not Selected

3.7.1 Percentage new Forecasts

This variable, as suggested by Lang and Lundholm (1996: 478), addresses potentially "stale" or non-revised estimates. Controlling for the effect of new forecasts reduces any systematic variation across observations due solely to differences in the proportion of recently revised forecasts. However, further tests by Lang and Lundholm (1996) suggest that "staleness" is not a problem and that tests including and excluding the variable are consistent. Subsequent researchers do not appear to employ a similar factor. Lastly, the data obtained from I/B/E/S is not comprehensive enough to calculate the variable according to the definition used by Lang and Lundholm (1996). As a result, it was considered impractical to include the factor within this study.

3.7.2 Issue of Equity/Debt

The desire to issue equity or debt instruments to the public has been identified by several researchers as a strong motive for management to review their disclosure policies (Botosan & Harris, 2000; Healy *et al.,* 1999; Healy & Palepu, 2001; Lang & Lundholm, 1993, 2000). Subsequently, a variety of researchers used a control variable to adjust their models for companies' capital market activity. Amongst them are Botosan and Harris (2000), Marquardt and Wiedman (1998), Welker (1995) and Bushee and Noe (2000).

In order to replicate the same approach within this study, both the Bond Exchange of South Africa (Bondex) and the JSE were approached for the data necessary to determine this variable. Whereas the Bondex was able to supply data in a suitable format, the database maintained at the JSE was unable to supply a list of companies that issued shares to the public over the sample period in sufficient detail. Data maintained at the JSE does not distinguish between different types of share issues. As it is important to focus on share issues for value to the public, using the data obtained from the JSE was impractical. Consequently, this variable had to be excluded from the analysis in this study. As Negash (2001) was the only researcher of the bid-ask spread to include this variable in his analysis (refer to Table 2 in section 2.4.3.4), this should not pose a serious limitation.

The next section introduces the statistical analyses used to test the sample for the research objectives and subsequent hypotheses based thereon.

3.8 Statistical Analyses

3.8.1 Overview

This section discusses the methods of statistical analyses applied to the data. This study is conducted cross-sectionally as opposed to taking a time-series approach, as not enough data points are available[24] to follow the latter approach. However, this is a common approach as the reporting of accounting information within an annual report does not occur over time but at a single point (Botosan, 1997, 2000; Botosan & Harris, 2000; Hail, 2001; Hope, 2003; Lang & Lundholm, 1993, 1996, 2000; Marquardt & Wiedman, 1998; Welker, 1995). Suitability tests of the proposed vehicle of statistical analysis, multiple regression, yield that the data requires transformation in order to perform a methodology known as Rank Regression. This analysis is performed repeatedly for each year under consideration, namely the survey years 2001, 2002, 2003 and 2004. The results of these tests are presented and discussed in Chapter 4.

3.8.2 Descriptive Statistics

Standard descriptive statistics are applied to the four sample years to explore the data. Again, the results are produced in Chapter 4. This data exploration includes an analysis of Pearsons correlations among the variables.

3.8.3 Regression Model

3.8.3.1 Test for Normality & Constant Variances

Ordinary least squares (OLS) regression analysis relies on two important assumptions.

Firstly, the variables' error term ε is assumed to be normally distributed. Since the dependent variable (y) is a linear function of ε and since α_i are constants, y should also be normally distributed (van den Honert, 1999).

Secondly, the residuals are assumed to have constant variances.

If either of these two assumptions is violated, OLS regression analysis cannot be performed without prior transformation of the affected variables.

[24] A time-series approach would necessitate at least 30 years (van den Honert, 1999) of disclosure ratings.

Accounting data typically does not satisfy these requirements, making the application of OLS regression analysis on such data suspicious (Cooke, 1998). To assess the normality of variables suggested within this study, the following hypothesis is tested on the dependent variables using the Shapiro-Wilk and Lilliefors tests of normality (in its alternative form):

H7: The data is not normally distributed.

The results shown in Appendix B confirm Cooke's assumptions (1998) and show that, with the exception of the number of analysts in 2003 and 2004, the null hypothesis of a normal distribution can be rejected at conservative levels of significance for all dependent variables. Although these tests are not conclusive, they hint strongly at the non-normality of the error term. The fact that the Shapiro-Wilk test, a more conservative test of normality than the Lilliefors test (Derksen & Keselman, 1992), rejects the null hypothesis for the number of analysts in 2003 and 2004 supports the claim of non-normally distributed error terms. To confirm this, it is necessary to estimate a regression and test the error term for normality. This was done for the number of analysts for the 2003 and 2004 years. The results, presented in Appendix C, indicate that the error terms for both the 2003 ($p = 0.0005$) and 2004 ($p = 0.0032$) number of analyst regressions are not normally distributed.

In addition, Appendix C presents the test of the constant variances (C.II & C. IV). For both years, the residuals appear relatively evenly spread out, although not entirely randomly and thus allow for the conclusion of a constant variance.

However, as the normality assumption is not met for the two variables that appeared to have the greatest possibility of a normal error term, it is concluded that the dataset is unsuitable for regression analysis. This finding is consistent with Lang and Lundholm (1996), who researched comparable variables.

As a result of these findings, OLS regression analysis cannot be performed. The following section introduces an alternative regression analysis, as stipulated by a prior researcher of disclosure.

3.8.3.2 Rank Regressions

In the case of non-normal data, Cooke (1998) suggests a methodology called Rank Regression, which involves transforming all variables into ranks from smallest to largest and performing regression analysis on the ranks. As this method is distribution-free, the data does need not be normally distributed. Moreover, Cooke (1998) notes that Rank Regression is insensitive to outliers and that it can be used where the relationship between the dependent and explanatory variables is unknown or non-linear. However, as this method transforms all data into ranks, it may be difficult to interpret the regression coefficients α. In addition, the data becomes ordinal rather than interval and, therefore, the tests are effectively non-parametric and as such weaker than parametric tests (Cooke, 1998). Nevertheless, this method has been previously used by Lang and Lundholm (1993, 1996), Owusu-Ansah (1998) and Wallace *et al.* (1994).

Accordingly, the data was ranked using the sequential ranking function of Statistica 6.0, a statistical software package. This function was selected as it ranks tied values sequentially and does not allocate tied values the same rank (Miller, 2003). Following this transformation into ranks, multiple regression analysis was performed on the data. The results are reported in Chapter 4.

In this process, the estimated models are tested for multicollinearity, which exists where independent variables are highly correlated with one another (van den Honert, 1999). Multicollinearity is undesirable as it causes unreliable p-values and it is therefore preferable to use variables that are as uncorrelated as possible (van den Honert, 1999). This maximises the explanatory power offered by the regression model. It can be detected by testing for inflated variance factors using the current sweep matrix function offered by Statistica 6.0. In the case of multicollinearity, one of the affected variables is excluded from the model, which is subsequently rerun.

Moreover, no use of stepwise regression is made, as the number of independent variables is relatively small and the proposed models are pre-specified in terms of prior research (Derksen & Keselman, 1992).

The following regression models are estimated to test hypotheses H1 to H6:

Model 1: Bid-Ask Spread (*Spread)*

$$Spread = \alpha_0 + \alpha_1 Score + \alpha_2 Size + \alpha_3 Vol + \alpha_4 RetVol + \varepsilon \quad \text{(Equation 15)}$$

Model 2: Trading Volume (*Vol)*

$$Vol = \alpha_0 + \alpha_1 Score + \alpha_2 Size + \alpha_3 RetVol + \varepsilon \quad \text{(Equation 16)}$$

Model 3: Number of Analysts (*#Anlyst)*

$$\#Anlyst = \alpha_0 + \alpha_1 Score + \alpha_2 Size + \alpha_3 HSDROE + \alpha_4 R\text{-}ECorr + \alpha_5 EarnSurp + \varepsilon \quad \text{(Equation 17)}$$

Model 4: Forecast Dispersion (*ForDisp)*

$$ForDisp = \alpha_0 + \alpha_1 Score + \alpha_2 Size + \alpha_3 HSDROE + \alpha_4 R\text{-}ECorr + \alpha_5 EarnSurp + \alpha_6 \#Anlyst + \varepsilon \quad \text{(Equation 18)}$$

Model 5: Forecast Accuracy (*ForAcc)*

$$ForAcc = \alpha_0 + \alpha_1 Score + \alpha_2 Size + \alpha_3 HSDROE + \alpha_4 R\text{-}ECorr + \alpha_5 EarnSurp + \alpha_6 \#Anlyst + \varepsilon \quad \text{(Equation 19)}$$

Model 6: Forecast Revision Volatility (*RevVol)*

$$RevVol = \alpha_0 + \alpha_1 Score + \alpha_2 Size + \alpha_3 HSDROE + \alpha_4 R\text{-}ECorr + \alpha_5 EarnSurp + \alpha_6 \#Anlyst + \varepsilon \quad \text{(Equation 20)}$$

Where:

Spread	=	Bid-Ask Spread
Vol	=	Trading Volume
Score	=	Disclosure Score
Size	=	Market Capitalisation
RetVol	=	Return Volatility
#Anlyst	=	Number of Analysts
ForDisp	=	Forecast Dispersion
ForAcc	=	Forecast Accuracy
RevVol	=	Revision Volatility
ROE	=	Return on Equity
HSDROE	=	Historic Standard Deviation of ROE
R-ECorr	=	Return Earnings Correlation
EarnSurp	=	Earnings Surprise

3.9 Limitations

3.9.1 Annual Report as Proxy for Disclosure Policy

The success of a study of the disclosure policy effect hinges on the appropriateness of the measure of disclosure used. As reported in section 2.2.1, corporate disclosure consists of three general components[25]. Using the annual report as a measure of the disclosure policy introduces research limitations of various dimensions. Firstly, the annual report is a reporting document that is issued at a single point in time and should, therefore, naturally be a sub optimal proxy for companies' reporting efforts that occur over time. Secondly, a company may not have a consistent disclosure policy across all avenues of corporate reporting. In such a case, using the annual report would be misrepresentative of companies' real disclosure effort and would structurally flaw the statistical analysis. The latter view was confirmed by Botosan (1997).

In response to the first concern, Lang and Lundholm (1993) found that disclosure policies and thus reporting efforts are "sticky" over time. This indicates that using a one-off proxy for a continuous effect should not introduce an onerous bias. Similarly, they addressed the second issue and found that disclosure ratings across different avenues of reporting are highly correlated. Moreover, studies employing annual reports alone[26] appear consistent in their findings with studies of all disclosure avenues[27].

Consequently, it seems that employing the annual report as the only proxy is acceptable in contemporary research and that it should thus be appropriate for this study. Nevertheless, as this was found internationally, a residual chance of a bias as result of the chosen proxy remains for a South African based study.

[25] Annual reports, press releases (including interim reports) and investor relations (including analyst communication)

[26] (Botosan, 1997, 2000; Hail, 2001; Leuz & Verrecchia, 2000; Negash, 2001)

[27] (Botosan & Plumlee, 2002; Bushee & Noe, 2000; Healy *et al,*. 1999; Lang & Lundholm, 1993, 1996; Welker, 1995, Sengupta, 1998)

3.9.2 Large Company Selection Bias

This study addresses large companies listed on the JSE. As a result, the possibility exists that the findings of this investigation are not generally applicable to companies of different sizes. This effect is partly reduced by controlling for size but cannot be eliminated entirely. Therefore, in order to establish the validity of results, a similar study on smaller companies or a sample of companies with a greater variance in size should be conducted. In the South African context, this is limited by the non-existence of a survey of smaller companies' disclosure comparable to the one published by E&Y. Consequently, the results of this study should be interpreted as applying to large, listed companies. Furthermore, the power of statistical analysis is weakened to the extent that this selection bias dampens the variation of disclosure policy, relative spreads, trading volume and analyst behaviour. Lang and Lundholm (1996) agreed and concluded that disclosure policy is likely to have a greater impact for small firms than for large firms.

3.9.3 Survivorship Bias

In the analysis, a number of companies had to be removed from the sample as they have delisted or deregistered between the time that the annual surveys were published and this study was conducted. I-Net subsequently removes such companies from the database accessible via the I-Connect function for direct volume downloads. Although this represents a limitation to the strength of this study's findings, data unavailability and subsequent survivorship bias is a familiar effect across contemporary accounting disclosure research (Botosan & Plumlee, 2002; Hail, 2001; Healy *et al.,* 1999; Lang & Lundholm, 2000; Negash, 2001; Sengupta, 1998). It follows that the results of this investigation are affected by a certain degree of survivorship bias but remain comparable to those of other researchers. Additionally, the lack of contemporary researchers' explicit recognition of this effect possibly indicates that it is not perceived as a severe impairment to research findings.

3.10 Summary

Chapter 3 begins with an introduction of the sample selection process, which is based on an E&Y survey. This determines its sample of 100 companies according to their market capitalisation. The body of this chapter presents a description of the variables employed within this study. All of them were previously confirmed in the research that has led to this study's research objectives.

Two dependent variables, the relative bid-ask spread and trading volume, are chosen to analyse the impact of disclosure policy on information asymmetry. To achieve cross-sectional comparability, these variables are expressed as a percentage of share price and market capitalisation respectively. Four independent variables are proposed to explain the variation in the observed information asymmetry. These compensate for non-information influences such as size and trading volume. Four dependent variables, the number of analysts, forecast dispersion, forecast accuracy and revision volatility represent analyst behaviour within this study. Six independent variables[28] are employed to model the disclosure policy effect on the observed analyst behaviour. Again, variables such as size and the return earnings correlation adjust for non-information influences on analysts.

Thereafter, an explanation of the statistical analyses employed within this study is provided. The data is tested for its suitability to the proposed technique of analysis, OLS regression. Tests of normality are performed on the two dependent variables most likely, out of the entire sample, to have a normally distributed error term ε. After the null hypothesis of a normal distribution is rejected and the data is found to be unsuitable to OLS analysis an alternative, Rank Regression as advocated by Cooke (1998), is suggested and the necessary adjustments are explained.

Finally, several limitations affect the investigation. Firstly, company disclosure has been shown to consist of at least three categories, annual reports, other published information and direct investor relations. This study employs annual reports as proxy for all avenues of reporting. This is consistent with prior research but remains an approximation. Secondly, because only large companies are analysed, the results should be interpreted as applicable only to large companies. Lastly, a survivorship bias exists, as not all data was obtainable.

The next part of this study, Chapter 4, introduces the results of the statistical tests performed.

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[28] These are disclosure score, size, historic standard deviation of ROE, returns-earnings correlation, earnings surprise and the number of analysts.

CHAPTER 4

RESULTS

4.1 Introduction

his chapter presents the findings of the statistical analyses. A data exploratory section introduces the sample and reconciles the different sample sizes across the four years. This is followed by a brief analysis of the descriptive statistics. To preserve the meaningfulness of this section of the chapter, the descriptive statistics are presented for the unranked data. The univariate and multivariate analyses following the early sections of the chapter are presented for the data in ranked form to achieve consistency. Instead of presenting the results on a year by year basis, it was decided to provide and discuss each model individually. This allows for an overview of potential trends over the four years under consideration. The findings of each model are contrasted with relevant prior research.

4.2 Data Exploration

4.2.1 Descriptive Statistics

The unavailability of data for certain companies (as discussed in section 3.3) results in skewed sample sizes, the smallest of which is the 2001 survey year. No sample companies appear to have delisted or deregistered since the 2004 survey. Table 5 shows a reconciliation between the original number of sample companies and the actual number of companies that remain in the sample for the purpose of the statistical analyses. Despite the reduced sample sizes, enough data points remain to perform credible regression analyses. This requires a minimum of 30 observations (van den Honert, 1999). Moreover, as it is relatively small, the degree of variation in sample sizes over the four years should not impair the comparability of findings presented in this chapter other than to the extent of a potential survivorship bias as discussed in section 3.9.3.

Table 1. Reconciliation of Sample Companies

Reason for Data Unavailability	**2001**	**2002**	**2003**	**2004**
	100	100	100	100
Companies Delisted/Deregistered	(14)	(8)	(5)	-
Incomplete Data	(17)	(20)	(18)	(18)
Final Sample Companies	69	72	77	82

Table 7 shows more specific descriptive statistics for the 2001 year. Apart from the companies where no data was available at all, Table 7 reveals that for some companies one or two data points were missing. The *R-ECorr* variable has the least data points available as it extends back for a period of ten years and not all sample companies were listed over the entire period. To adjust for missing fields, Statistica's[29] mean substitution function was applied. Regressions were reperformed on the samples with eliminated missing fields in order to test the validity of this adjustment. The results of these tests were substantially consistent with the original models. However, as the original models achieved consistently higher adjusted R^2s, it was decided that including sample companies with a limited number of missing data points was acceptable.

Table 7. Descriptive Statistics 2001

	Unit Measure	Valid N	Mean	Median	Minimum	Maximum	Std. Dev.
#Anlyst	Absolute	65	8.463	8.917	1.5000	12.00	2.65
ForDisp	Absolute	63	0.009	0.006	0.0008	0.07	0.01
ForAcc	Percentage	62	-0.016	-0.009	-0.0802	0.00	0.02
RevVol	Percentage	62	0.000	0.000	0.0000	0.00	0.00
Size	R'000	63	9853.313	3759.8	900.39	54947.42	12798.04
Spread	Percentage	67	0.015	0.013	0.0023	0.07	0.01
Vol	Percentage	67	0.002	0.001	0.0001	0.01	0.00
RetVol	Absolute	67	0.123	0.113	0.0563	0.26	0.04
HSDROE	Absolute	69	0.463	0.072	0.0000	17.20	2.11
R-ECorr	Absolute	55	0.057	0.119	-1.0000	1.00	0.47
EarnSurp	Percentage	69	0.000	0.000	-0.0019	0.00	0.00
Score	Percentage	69	0.444	0.424	0.2147	0.73	0.13

As there is little variation over the 4 years, descriptive statistics for the years 2002 – 2004 are presented in Appendix D.

An inspection of Table 7 reveals that most figures are relatively small, with the exception of *Size*. This is due to fact that most variables are scaled by share price or market capitalisation to achieve cross-sectional comparability. With the exception of *Size*, *HSDROE* and *R-ECorr*, it appears that the median and means are relatively close together, implying that the overall data is not heavily affected by outliers. Interestingly, *#Anlyst* falls from a mean of 8.5 analysts per company in 2001 to 6.3 in 2004. The maximum number of analysts, however, remains relatively stable at 12, which suggests that the variation in the *#Anlyst* sample increased over the four years. Another variable exhibiting large variation is *Spread*. While the variable's standard deviation in 2001 approaches its mean, it is equal or greater than its mean in the years 2002-2004.

[29] Statistica 6.0 is the statistical software package used for the purpose of this study.

4.2.2 Correlation Matrices

The correlation matrices are shown separately for the variables specific to information asymmetry and analyst behaviour. Table 8 shows the correlation between the four independent variables and the two dependent measures of information asymmetry. The variables are correlated in ranked form to achieve consistency between the univariate and multivariate analyses.

Table 8. Correlation Matrices: Information Asymmetry 2001 - 2004

	2001		2002		2003		2004	
	Spread	***Vol***	***Spread***	***Vol***	***Spread***	***Vol***	***Spread***	***Vol***
Size	-0.76*	-0.35**	-0.78*	-0.31**	-0.85*	-0.25**	-0.76*	-0.14***
Vol	0.12	1	0.16	1	0.15	1	-0.08	1
RetVol	0.21***	0.07	0.11	0.08	-0.04	0.01	-0.09	0.08
Score	-0.41*	-0.17	-0.13	-0.09	-0.18	-0.05	-0.21***	-0.07

All correlations significant at 1% or less are marked with an asterisk (*).
All correlations significant between 5% and 1% are marked with a double asterisk (**).
All correlations significant between 10% and 5% are marked with a triple asterisk (***).

There are two persistent relationships evident from the above table. Firstly, there is a persistent, highly significant negative relationship between *Size* and *Spread* over the entire four years. This is evidence of a strong correlation[30] between the two variables and suggests that larger companies experience smaller bid-ask spreads as predicted by prior research (Healy *et al.,* 1999; Negash, 2001; Welker, 1995). Secondly, *Size* is significantly negatively correlated with *Vol.* As *Vol* is expressed as a percentage of market capitalisation, this indicates that a smaller percentage of a large company's total issued share capital is traded compared to a smaller company. This appears reasonable in South Africa, where significant institutional shareholdings exist and overall shareholding is significantly more concentrated than in a market such as the U.S. These two relationships seem to confirm the literature on information asymmetry and its non-information influences.

At a preliminary stage, the above table seems to confirm the choice of *Size* as a control variable within this study. Less obvious is the absence of any consistent pattern between *Score* and the two dependent variables. One explanation might be found in the fact that such a univariate analysis does not take into account the effect of the various control variables.

Table 9 presents the correlation matrices for the variables specific to the models analysing the disclosure policy effect on analyst behaviour.

[30] A perfect correlation would approach a value of 1 (van den Honert, 1999).

Table 9. Correlation Matrices: Analyst Behaviour 2001 - 2004

	2001				2002			
	#Anlyst	***ForDisp***	***ForAcc***	***RevVol***	***#Anlyst***	***ForDisp***	***ForAcc***	***RevVol***
#Anlyst	1	0.04	0.09	-0.32**	1	-0.07	0.04	0.12
Size	0.55*	-0.21	0.04	-0.45*	0.62*	-0.29**	0.22***	-0.26**
HSDROE	-0.14	-0.04	0.03	-0.01	-0.03	-0.16	0.03	-0.01
R-ECorr	-0.02	0.17	0.12	-0.02	-0.05	0.09	-0.16	0.11
EarnSurp	0.12	0.11	0.22	0.01	-0.05	-0.39*	0.49*	-0.20
Score	0.37*	0.07	-0.2	0.05	0.26**	-0.02	0.05	-0.08

	2003				2004			
	#Anlyst	***ForDisp***	***ForAcc***	***RevVol***	***#Anlyst***	***ForDisp***	***ForAcc***	***RevVol***
#Anlyst	1	-0.26**	0.17	-0.22***	1	-0.14	-0.23**	-0.05
Size	0.55*	-0.44*	0.25**	-0.17	0.62*	-0.08	-0.25**	-0.22**
HSDROE	-0.05	0.19	-0.04	0.24	-0.06	0.03	-0.25**	0.02
R-ECorr	-0.07	-0.02	0.05	0.17	-0.08	0.04	-0.14	0.01
EarnSurp	-0.02	0.06	0.02	0.05	-0.12	-0.07	0.48*	0.29**
Score	0.22***	-0.01	0.2***	-0.11	0.46*	0.05	-0.03	0.15

All correlations significant at 1% or less are marked with an asterisk (*).
All correlations significant between 5% and 1% are marked with a double asterisk (**).
All correlations significant between 10% and 5% are marked with a triple asterisk (***).

Table 9, presenting the correlations between the independent and the dependent variables of the analyst behaviour models, reveals two persistent relationships. *Size* is persistently and highly significantly correlated with *#Anlyst*. Although *Size* also exhibits correlations with the remaining dependent variables, the strength and significance of those relationships fluctuate. Despite this observation, *Size* appears to be the dominant explanatory variable of analyst behaviour on a univariate basis. The second association exists between *Score* and *#Anlyst*. In this case, a correlation is evident even though the significance varies over the time period. *EarnSurp* shows a highly significant correlation with *ForAcc* in 2002 and 2004, thus supporting its choice as control variable in the *ForAcc* models. The remaining correlations appear to be more haphazard and therefore no further trends are apparent based on this univariate analysis.

The following section presents and discusses the findings of the multivariate analysis, Rank Regression, as suggested by Cooke (1998).

4.3 Regression Models

As explained in section 3.8.3, the data's unsuitability to standard OLS regression led to the transformation of all variables into ranks. These were subsequently regressed, in ranked format, in terms of a method called Rank Regression (Cooke, 1998). This section outlines and discusses the results of the various models run for each of the four years. While the primary objective of this section is to validate the yearly results in terms of the contemporary research findings introduced in Chapter 2, the nature of the analysis requires an examination of whether or not such findings hold over the four years. Therefore, the subsequent discussion of results aims to detect both trends apparent from the four years of results as well as to integrate the findings with prior research.

The results for each model, as depicted in section 3.8.3, are examined individually. The analysis begins with the findings for the disclosure policy effect on information asymmetry.

4.3.1 Information Asymmetry

4.3.1.1 Information Asymmetry – Bid-Ask Spread

The hypothesis underlying this model is that of a negative relationship between disclosure policy (*Score*) and information asymmetry as measured by the bid-ask spread (*Spread*). Table 10 presents the statistical results of the Rank Regression performed in terms of the model described in section 3.8.3. As aforementioned, the model is reperformed for each year under consideration following the cross-sectional approach outlined in Chapter 3.

Table 10. Summary Regression Output: *Spread*

Variable		2001	2002	2003	2004
Score	Coefficient	-0.182	-0.025	-0.53	-0.59
	P-value	(0.043)	(0.07)	(0.01)	(0.087)
Vol	Coefficient	-0.071	-0.069	-0.064	-0.052
	P-value	(0.431)	(0.409)	(0.335)	(0.453)
RetVol	Coefficient	0.063	0.114	0.088	0.269
	P-value	(0.485)	(0.152)	(0.223)	(0.0005)
Size	Coefficient	-0.71	-0.808	-0.876	-0.821
	P-value	(0.00)	(0.00)	(0.00)	(0.00)
Std. Error		13.36	13.47	12.49	14.52
Adj. R^2		51.55%	56.78%	68.81%	62.83%

The above model appears to support the hypothesis of a negative relationship between *Spread* and *Score*. The two variables exhibit a negative relationship in each of the four years under consideration. As indicated by *Score*'s coefficient, this relationship becomes stronger over time, with the exception of the 2002 financial year. This suggests that disclosure policy increasingly affects companies' bid-ask spreads in South Africa and thus that the local capital market increasingly takes note of companies' reporting. Furthermore, it indicates that higher levels of disclosure are statistically significantly (1% - 10% level of significance) associated with less information asymmetry. This was linked to less adverse selection (Diamond & Verrecchia, 1991), less price-protection (Welker, 1995) and less estimation risk (Botosan, 1997). This implies that disclosure policy may be used as an economic instrument (Welker, 1998) to adjust the level of information asymmetry. The fact that companies' disclosure ratings vary between excellent and perfunctory (refer to section 2.2.4) supports this view and suggests that local companies might be managing their disclosure efforts to achieve acceptable levels of information asymmetry.

In a wider context, the above results hint at a connection between disclosure policy and the cost of equity capital, of which information asymmetry is a key component (Botosan, 1997, 2000). In the South African context, this could entail that companies may be in a position to reduce their cost of equity capital by means of their disclosure policies.

These findings agree to conclusions drawn, in different research environments, by Marquardt and Wiedman (1998) and Welker (1995). The significance of the above relationship varies between highly significant (1%) and significant (10%), which is consistent with international findings.

However, the scope for comparisons between this study and contemporary literature is limited. Two out of three disclosure policy effect studies on the bid-ask spread do not model disclosure policy directly. Healy *et al.* (1999), who documented a 10% level of significance, studied companies that exhibited sustained improvements in reporting. Leuz and Verrecchia (2000) studied firms that switched from the German to an international reporting framework and documented a relationship significant at the 5% level. Both research projects employed dummy variables[31] as a factor of disclosure whereas this study employs direct ratings of disclosure. The only directly comparable study, conducted by Welker (1995), documented a negative relationship at the 5% level of significance, which corresponds to this study.

[31] Healy *et al.* (1999): 1 if improved disclosure; 0 if no improvement
Leuz and Verrecchia (2000): 1 if switched to IAS/U.S. GAAP; 0 if still report under German GAAP

Vol and RetVol, two out of the three control variables, behave in the predicted direction. From the above table, it appears that the bid-ask spreads over the four years fall with trading volume and rise with increasing share return volatility. However, based on the variables' statistical insignificance in the above models there is no sufficiently strong evidence of this relationship in the chosen sample and the results are therefore only indicative.

This finding is in contrast to international research findings. Healy *et al.* (1999), Leuz and Verrecchia (2000) and Welker (1995) all determined highly significant relationships at the 1% level. The only other South African researcher on the effect of liquidity on the bid-ask spread, Negash (2001), documented a relationship between his modified measure of liquidity and relative bid-ask spreads, which was significant at the 10% level. The difference between his findings and those of this study may possibly be explained in terms of a sample selection bias. While his study focused on industrial companies only, this study comprises the largest 100 JSE listed companies, which include various sectors[32]. In addition, as the size of a company affects its trading volume (see 4.3.1.2) and as all sample companies are large, the possibility exists that their base levels of trading volume are too high to measure an incremental effect on the bid-ask spread. Hence, a trading volume effect may still hold for smaller companies with lower inherent trading volumes. The insignificance of *RetVol* is consistent with Welker (1995), the only other known empirical researcher of this variable.

In contrast, *Size* exhibits the clearest pattern in the model over the four years. It is statistically highly significant at the 1% level in the predicted negative direction and, by reference to its coefficient, has a strong relationship over the entire time frame. Thus, the results may be understood to imply that, in South Africa as internationally suggested by Healy *et al.* (1999) and Leuz and Verrecchia (2000), larger companies observe smaller bid-ask spreads. Negash (2001), who used total assets as proxy instead of market capitalisation, documented a relationship at the 10% level only. This might signal that a company's market capitalisation, which is forward looking, is a more appropriate measure of the size effect on the bid-ask spread than the historic total assets figure.

The adjusted coefficient of multiple determination (R^2), which adjusts for the number of explanatory variables, shows that the proportion of the variation in *Spread* explained by the model increases from 52% in 2001 to 63% in 2004. Negash (2001) achieved an adjusted R^2 of 92%. Again, his focus on industrial companies might account for the difference. In addition, he also included substantially more variables that measured risk inherent in companies. It was therefore expected to achieve a lower

[32] Prominent industries are the mining, banking, retail and industrial ones.

adjusted R^2 in this study. Healy *et al.* (1999) documented an adjusted R^2 of 28% while Leuz and Verrecchia (2000) explained 80% of the variation of the observed spread. This divergence may indicate that the proportion of variation of bid-ask spreads that can be explained by reference to disclosure policy is market specific. Crosoer (2003), in a Type I study of characteristics explaining levels of company disclosure in South Africa, concluded that his results were weaker than most international findings but consistent with those studies conducted in developing countries. As no comparable known study, besides that by Negash (2001), was conducted in a developing country this claim cannot be verified for the purpose of this study. A test for inflated variance factors using the current sweep matrix function offered by Statistica 6.0 showed no multicollinearity in this model.

In summary, the above model produces empirical evidence of a negative association between disclosure policy and information asymmetry as measured by the bid-ask spread. Consequently, disclosure policy also appears to be negatively associated with estimation risk, adverse selection and price-protection, which are all hypothesised to be components of the bid-ask spread. This may indicate that companies in South Africa manage their disclosure policy to control the amount of information asymmetry in the market. As information asymmetry is also a prominent component of the cost of equity capital, the above findings may be extended to tentatively suggest a negative relationship between disclosure policy and the equity capital cost. This may mean that South African companies are in a position to reduce their cost of additional equity finance by means of their disclosure policy. Out of the three control variables only size is consistently significant. Only weak evidence of the influence of return volatility on the bid-ask spread was found.

4.3.1.2 Information Asymmetry – Trading Volume

This model tests the hypothesis of a negative relationship between disclosure policy and information asymmetry as measured by trading volume. The results are shown in Table 11.

Table 11. Summary Regression Output: *Vol*

Variable		2001	2002	2003	2004
Score	Coefficient	-0.069	-0.057	-0.003	-0.072
	P-value	(0.565)	(0.611)	(0.98)	(0.565)
RetVol	Coefficient	0.057	0.102	-0.009	0.131
	P-value	(0.646)	(0.379)	(0.939)	(0.275)
Size	Coefficient	-0.314	-0.310	-0.256	-0.137
	P-value	(0.031)	(0.013)	(0.036)	(0.252)
Std. Error		18.43	19.78	21.65	23.85
Adj. R^2		7.79%	6.85%	6.32%	5.52%

Score exhibits the hypothesised negative direction but, contrary to expectation, is not statistically significant in the above model. The model therefore suggests that corporate disclosure policy does not influence investors' demand for large South African companies' shares (Diamond & Verrecchia, 1991). This contradicts Leuz and Verrecchia (2000), the only other known researchers of trading volume as a dependent variable representing information asymmetry.

The reason for this inconsistency may be found in the different samples. While Leuz and Verrecchia (2000) studied companies reporting under German GAAP and compared those to German corporations switching to U.S. GAAP or IAS, this study investigates a sample of companies setting their disclosure policy in a homogenous reporting environment. Thus, the scope for disclosure effects should be much greater following the research design of Leuz and Verrecchia (2000). A bias might also occur as economically successful companies are more likely to switch to another reporting framework, which often follows the desire to obtain foreign listings (Hail, 2001). Such companies may, due to their double listings and economic success, experience greater trading volumes irrespective of their disclosure policy. If uncontrolled for, researchers may subsequently attribute this effect to their sample companies' disclosure policy. Leuz and Verrecchia (2000) do not test for this effect. *Inter alia,* Hail (2001) addresses this issue when examining the disclosure effect on the cost of equity capital in Switzerland.

Another possible explanation may be this study's sample selection. This investigation only analyses large companies while other researchers investigate spreads of different company sizes (Hail, 2001) or specifically look at smaller companies (Lang & Lundholm, 2000). There is a possibility that large JSE listed companies' trading volumes are too high to measure an incremental disclosure policy effect as suggested in section 3.9.2. Lang and Lundholm (2000: 627) indirectly confirmed this by noting that "small companies are more likely to use their disclosure policy to influence market perceptions" while Lang and Lundholm (1993) mentioned that the amount of non firm provided information is much greater for large companies irrespective of disclosure policy.

Moreover, the above results appear consistent with Easley *et al.* (1996) who found that the probability of information based trades declines with trading volume (refer 2.4.3.2). All of this may explain the lack of a statistically significant disclosure policy effect in the above model. As a result, the above finding is not conclusive evidence of the non-existence of a disclosure policy effect on trading volume in South Africa.

Other researchers of the information asymmetry (Healy *et al.,* 1999; Welker, 1995) appear to employ trading volume as an explanatory variable only to control for the proportion of non-information influence on the bid-ask spread. This may possibly be an indicator that, despite a strong theoretical link, it is difficult to empirically extract the disclosure policy effect on trading volume.

Size is statistically significant from 2001 to 2003 between the 1% and 5% level of significance. However, contrary to the expected positive sign suggested by literature to date (Botosan, 2000; Diamond & Verrecchia, 1991; Healy *et al.,* 1999; Healy & Palepu, 2001; Leuz & Verrecchia, 2000; Welker, 1995), it is significantly negative. This implies that as JSE companies become larger, a smaller proportion of their total outstanding share capital is traded. This appears reasonable as ownership of JSE listed firms is more concentrated than share ownership in the U.S. market. This is part of South Africa's Apartheid legacy. Much of this concentrated investment is not traded actively.

RetVol is statistically insignificant over the four years with conflicting signs between the years. This seems to show that investors' demand for JSE listed shares is relatively insensitive to volatile share returns.

The adjusted coefficients of multiple determination (R^2) are below 10% in each of the four years, which indicates that the model explains only a small proportion of the variation observed in the sample companies' trading volume. Leuz and Verrecchia (2000) who researched companies' trading

volume using a similarly specified model achieved an adjusted R^2 of 34%. When compared to their bid-ask spread model[33], Leuz and Verrecchia (2000) experienced a large drop in the proportion of explained variation. In this regard, this study is consistent with prior research.

In the light of the above findings, the fact that only one known study empirically addresses trading volume as a dependent measure of information asymmetry may possibly indicate that, despite its popularity as an indicator of information differentials in theory (Joos, 2000), disclosure policy offers only limited amounts of explanation. The findings presented in Table 11 appear to support critics' claims that there is too much non information influence affecting trading volume for it to be a measure of information asymmetry (Joos, 2000; Welker, 1995). No multicollinearity was detected in the above model after testing for inflated variances.

In summary, the fitted model explains statistically insignificant amounts of the observed variation of trading volume. Consistent with international research a large decrease in adjusted R^2 was experienced when compared to the bid-ask spread model. The inconsistency of the above model with literature to date may possibly be explained in terms of differences in the research environment and sample selection. The fact that disclosure policy offers insignificant explanation regarding trading volume supports criticism that trading volume is affected by too many non-information factors to be used as measure of information asymmetry in disclosure related studies.

[33] Leuz and Verrecchia (2000) achieved an adjusted R^2 of 80%.

4.3.2 Analyst Behaviour

4.3.2.1 Analyst Behaviour – Number of Analysts

This section considers the statistical results relating to the model of the disclosure policy effect on the number of analysts following the sample companies. The hypothesis outlined in section 3.6.1.1 supporting this model is that of a positive relationship between disclosure policy and analyst following.

Table 12. Summary Regression Output: *#Anlyst*

Variable		2001	2002	2003	2004
Score	Coefficient	0.262	0.272	0.322	0.378
	P-value	(0.022)	(0.069)	(0.021)	(0.002)
HSDROE	Coefficient	-0.062	-0.127	-0.034	-0.057
	P-value	(0.521)	(0.483)	(0.715)	(0.484)
R-ECorr	Coefficient	0.176	0.089	-0.066	0.001
	P-value	(0.208)	(0.483)	(0.559)	(0.99)
Size	Coefficient	0.51	0.592	0.502	0.510
	P-value	(0.00)	(0.00)	(0.00)	(0.00)
Std. Error		15.59	16.21	18.46	17.14
Adj. R^2		27.7%	34.74%	36.3%	44.2%

According to expectation, *Score* exhibits a positive sign and is statistically significant between the 1% and the 10% level of significance. The strength of the relationship is moderate, but both the strength of the relationship and its significance, appear to be increasing on a yearly basis. It thus seems that analysts increasingly consider companies' disclosure policy when deciding whether to follow them or not. This finding is consistent with Healy *et al.* (1999) and Lang and Lundholm (1996) who similarly documented positive relationships between disclosure policy and analyst following.

Furthermore, the analysis appears to confirm findings by Lang and Lundholm (1996) who noted that disclosure and analysts are not substitutes for each other and that more analysts are likely to follow a company that makes sufficient information available. The above results may be understood to imply that, given the positive relationship documented, South African analysts rely on company disclosure and are attracted to companies that facilitate their information extraction process by means of disclosure. This may also indicate that companies have the ability to use their disclosure policy to affect the level of analyst attention they receive. This remains a tentative thought as this study does not address causality. Simultaneity, mentioned by Welker (1995) with regard to disclosure policy and

information asymmetry, may also affect the relationship between disclosure policy and analyst following.

HSDROE, the historic standard deviation of the return on equity, and *R-ECorr*, the returns-earnings correlation, behave in the predicted direction. *HSDROE* exhibits a negative sign, thus indicating that analysts are less likely to follow companies with an erratic earnings history, which complicates the forecasting process (Lang & Lundholm, 1996). The relationship is, however, not statistically significant. This finding is consistent with Lang and Lundholm (1996) and Marquardt and Wiedman (1998) who found negative but insignificant relationships. Healy *et al.* (1999) and Duru and Reeb (2002) documented a weakly significant relationship.

R-ECorr, as predicted, exhibits a positive sign in three of the four years, which implies that in the South African context, analysts are more likely to follow firms where earnings are a good indicator of share returns (King *et al.,* 1991). Therefore, the model appears to confirm that analysts tend to follow companies that have easily predictable earnings and share prices. The statistical insignificance of the variable over the four years, however, means that the above results offer no statistical support for such an inference.

As predicted by literature, *Size* is the dominant determinant of the observed analyst following. Its coefficient is stable at 0.5 and shows that the relationship between the size and the number of analysts following a company is moderate. Statistically, the relationship is highly significant at the 1% level over all four years. This lends support to the fact that analysts are more likely to follow larger companies, which is where demand for their services is greater (Bhushan, 1989; Lang & Lundholm, 1993). Size is also positively associated with information availability that does not stem from company disclosure.

The adjusted R^2 increases steadily over the four years and reaches 44% in the 2004 financial year. This is a reasonable proportion and is comparable to the 40% achieved by Healy *et al.* (1999) and the 45% determined by Lang and Lundholm (1996). As opposed to this study, Lang and Lundholm (1996) found the annual report to be statistically insignificant when regressing all three categories of disclosure separately. This contradiction may indicate that annual reports in South Africa play a more important role in determining the number of analysts than in the U.S. environment. Multicollinearity did not occur.

In summary, the results of the above model are according to expectation. The two statistically insignificant control variables (*HSDROE* and *R-ECorr*) have previously been found to be insignificant in similar international studies. Both observed disclosure policy and company size are positively associated with companies' analyst following and appear reliable. This indicates that, in South Africa, companies may be able to influence their analyst following by means of their disclosure policy and that analysts are more likely to follow large companies. The goodness of fit (R^2) is comparable to international studies and supports the soundness of the above model.

4.3.2.2 Analyst Behaviour – Forecast Dispersion

This model tests the hypothesis of a negative association between corporate disclosure policy and forecast dispersion amongst analysts. Table 13 presents the related statistical results.

Table 13. Summary Regression Output: *ForDisp*

Variable		**2001**	**2002**	**2003**	**2004**
Score	Coefficient	-0.150	-0.036	-0.062	-0.074
	P-value	(0.323)	(0.72)	(0.535)	(0.51)
HSDROE	Coefficient	-0.65	-0.071	0.171	0.016
	P-value	(0.537)	(0.493)	(0.086)	(0.881)
R-ECorr	Coefficient	0.177	-0.0008	-0.058	-0.042
	P-value	(0.250)	(0.995)	(0.617)	(0.716)
EarnSurp	Coefficient	0.079	-0.351	-0.04	-0.098
	P-value	(0.469)	(0.001)	(0.681)	(0.374)
Size	Coefficient	-0.227	-0.287	-0.389	-0.117
	P-value	(0.089)	(0.013)	(0.000)	(0.313)
Std. Error		17.053	17.85	19.06	22.408
Adj. R^2		2.75%	17.31%	14.81%	3.34%

As hypothesised, *Score* shows a negative sign, which indicates that the forecast dispersion diminishes with improvements of corporate disclosure. Adopting the terminology of Lang and Lundholm (1996), a negative association suggests that analysts use the same forecasting model and observe the same firm-provided information but hold different amounts of private information. This privately held information, however, tends to become less important as more firm provided information is made available. Despite this, the relationship is not statistically significant. This finding is inconsistent with Lang and Lundholm (1996) who documented a significant negative relationship. However, the researchers studied two regression models. One included an aggregate variable combining all three

categories of disclosure while the second considered all three individually. Annual report disclosure was not regressed on its own. Although it is unlikely to be the sole cause for the reported inconsistency, this moderates the direct comparability of the two studies.

Moreover, the results stipulate that, in South Africa, the forecast dispersion is driven by factors, which are not included in the above model. Additionally, local disclosure policy cannot be associated with dispersion in forecasts, which implies that other non-disclosure related factors may be the dominant cause. One possible explanation for this would be the research environment. While Lang and Lundholm (1996) researched the U.S. market, a large economy often referred to as the driver of the world economy, South Africa is a small, open capital market. As such it is affected significantly by economic changes in the world economy and crises in other emerging countries. An example of this may be the Asian Crisis of 1998. Moreover, the South African economy is much more susceptible to changes in economic parameters such as the ZAR/US Dollar exchange rate and commodity prices. Another possible explanation is a specification bias affecting *Score* which is approximated by the annual report instead of all three disclosure categories. This limitation was introduced in section 3.9.1 and is further discussed in section 4.3.2.5.

HSDROE, *R-ECorr* and *EarnSurp* exhibit erratic behaviour with changing signs, coefficients and statistical significance levels. In 2003, *HSDROE* is nearly significant, indicating that, as expected, high earnings volatility increases the dispersion of earnings forecasts. However, as this is only statistically reliable once, no trend can be deducted.

Size appears to be negatively associated with forecast dispersion. However, as with the previous variables, the significance levels vary. As this variable is significant in two years and nearly significant in one year, the assumption of a persistent negative size influence on analyst forecast dispersion seems to be reasonable. This finding confirms Healy *et al.* (1999) who proposed that earnings forecasts become easier for larger companies due to increased levels of diversification and a higher overall level of non company provided information.

The adjusted R^2, between 3% in 2001 and 17% in 2002, confirms the erratic and unreliable impression of the model. It also implies that the explanatory factors do not capture a stable influence on forecast dispersion and, that in the years with low observed R^2, other factors appear to dominate the dispersion of analyst forecasts. Multicollinearity occurred between *Size* and *#Anlyst*, which indicates that both variables explain similar amounts of variation. This led to the exclusion of *#Anlyst*.

In summary, the model of forecast dispersion does not lend itself to concrete conclusions. In South Africa, corporate disclosure policy does not appear to influence the observed forecast dispersion amongst analysts. This may be due to South Africa's susceptibility to economic factors such as the exchange rate of the Rand and world commodity prices. Company size was found to be a more reliable determinant of forecast dispersion.

4.3.2.3 Analyst Behaviour – Forecast Accuracy

The hypothesis underlying this model is that corporate disclosure policy is positively associated with forecast accuracy. Table 14 shows the results pertaining to this model over the four years.

Table 14. Summary Regression Output: *ForAcc*

Variable		**2001**	**2002**	**2003**	**2004**
Score	Coefficient	-0.245	0.011	0.153	0.948
	P-value	(0.035)	(0.905)	(0.156)	(0.958)
HSDROE	Coefficient	0.015	-0.115	-0.049	-0.16
	P-value	(0.885)	(0.232)	(0.642)	(0.10)
R-ECorr	Coefficient	0.125	-0.086	0.065	-0.214
	P-value	(0.40)	(0.51)	(0.602)	(0.044)
EarnSurp	Coefficient	0.191	0.44	-0.019	0.345
	P-value	(0.072)	(0.00)	(0.858)	(0.001)
Size	Coefficient	0.267	0.27	0.196	0.192
	P-value	(0.019)	(0.015)	(0.082)	(0.069)
Std. Error		16.71	16.59	20.37	20.35
Adj. R^2		4.32%	21.97%	2.67%	21.33%

Contrary to expectation, *Score* is statistically significant, at the 5% level, only in 2001. In that year, the direction is negative and therefore implies that more disclosure makes analyst forecasts less accurate. Despite this finding's apparent contradiction of theory and literature, it is similar to the negative coefficient for annual report disclosure found by Lang and Lundholm (1996). However, as their coefficient was statistically insignificant, the researchers did not offer an explanation. As *Score* is statistically significantly negative only in 2001 and since the adjusted R^2 only amounts to 4%, this finding should not be considered as conclusive. For these reasons, it appears more prudent to dismiss the 2001 finding.

Overall, the model's lack of statistically significant findings for the above hypothesis indicates that disclosure policy as measured by annual reports does not contribute to the accuracy of forecasts. This may be due to the fact that annual reports are issued at a single point in time and well ahead of the next forecasted earnings figure. This limitation was introduced in section 3.9.1 and is further discussed in section 4.3.2.5. It follows that under the given circumstances, more timely forms of disclosure such as interim reports and direct investor relations appear to be more important to the accuracy of analysts' forecasts. This conclusion was previously drawn by Lang and Lundholm (1996). In addition, the above results suggest that, for the purpose of analyst forecast accuracy, the annual report may not be appropriate as a proxy for disclosure policy. This is a speculative statement made in the absence of more testing, which would be necessary to validate such an assumption. It is, therefore, only considered to be a possible explanation.

As with the previous models, *Size* appears as the most reliable determinant of the observed analyst forecast accuracy and is statistically significant between 5% and 10%. As suggested by Healy *et al.* 1999, *Size* exhibits a positive sign, which implies that analysts offer more accurate forecasts for larger companies and that it becomes easier to predict earnings for larger companies. The main explanations offered are higher levels of diversification (Healy *et al.*, 1999) and greater overall information availability in the environment in which analysts publish forecasts (Hope, 2003).

EarnSurp is positively statistically significant between 1% and 10% in three years. This implies, as suggested by Lang and Lundholm (1996), that earnings forecast accuracies are influenced by unexpected earnings swings and that controlling for this helps to avoid erroneous conclusions. The variation in the significance does not allow for a definite conclusion as to the parameter's effect.

HSDROE exhibits a negative sign in the last three years under consideration, indicating that analyst forecast are less accurate where earnings are historically volatile. This finding is consistent with predictions made by Lang and Lundholm (1996) but, because the relationship is only nearly significant at the 10% level in 2004, it cannot be regarded as solid empirical evidence. *R-ECorr* displays erratic behaviour in the four individual regression models and, hence, does not lend itself to meaningful analysis. The results produced above regarding *HSDROE* and *R-ECorr* conform to those reported by Lang and Lundholm (1996).

Multicollinearity was detected between *Size* and *#Anlyst*. Consequently, *#Anlyst* was removed from the regressions. The adjusted R^2 fluctuates over the years. In 2001 and 2003, the model explains only

small amounts of variation whereas in 2002 and 2004 it explains 22% and 21% respectively. In the more significant years, *Size* and *EarnSurp* appear to account for the explanatory power of the model.

In summary, the above model allows some insight into the accuracy of South African analyst forecasts. The statistical insignificance of the proxy for disclosure policy is possibly due to a specification bias discussed in Chapter 3. The above results are largely consistent with prior research and suggest that, in South Africa, more timely forms of disclosure play more important roles in the determination of analysts' forecast accuracy. Company size and earnings surprises appear to influence local forecast accuracy in the predicted manner. The strong variation observed in R^2 over the four years, however, moderates the reliability of these findings.

4.3.2.4 Analyst Behaviour – Revision Volatility

The final model of analyst behaviour aims to test the hypothesis of a negative relationship between disclosure policy and the volatility of earnings forecast revisions. Table 15 presents the statistical results.

Table 15. Summary Regression Output: *RevVol*

Variable		2001	2002	2003	2004
Score	Coefficient	0.138	-0.027	-0.097	-0.266
	P-value	(0.205)	(0.786)	(0.367)	(0.01)
HSDROE	Coefficient	-0.044	0.015	0.141	0.038
	P-value	(0.654)	(0.886)	(0.185)	(0.71)
R-ECorr	Coefficient	-0.071	0.049	0.160	-0.001
	P-value	(0.614)	(0.727)	(0.203)	(0.71)
EarnSurp	Coefficient	-0.007	-0.15	-0.021	0.241
	P-value	(0.942)	(0.148)	(0.202)	(0.023)
Size	Coefficient	-0.484	-0.28	-0.142	-0.246
	P-value	(0.000)	(0.015)	(0.207)	(0.026)
Std. Error		15.79	17.8	20.49	21.11
Adj. R^2		15.78%	6.06%	2.5%	12.14%

In theory, more information should facilitate smoother revisions (Lang & Lundholm, 1996). Accordingly, the key variable *Score* shows a negative sign in the last three years under consideration. This hints at the existence of the hypothesised relationship in the South African capital market. However, as *Score* is statistically significant at the 1% level only in 2004, the empirical evidence does

not appear sufficient to support this case conclusively. As with forecast accuracy, the findings are consistent with Lang and Lundholm (1996) as the annual report did not show a significant relationship with the revision volatility. It thus appears that, locally, more timely forms of disclosure, such as direct investor relations are more important to the volatility of forecast revision. As this explanation was not tested empirically, it should be considered as tentative evidence only. Again, the cause of the statistically insignificant finding seems to be due to the specification of the annual report as the proxy for disclosure policy. This is explained in section 3.9.1 and further discussed in section 4.3.2.5.

The most dominating explanatory variable is *Size* with a negative sign. This agrees with the results reported by Lang and Lundholm (1996) and suggests that in South Africa, forecast revisions are smoother for large companies. It also confirms Healy *et al.* (1999) who noted that due to higher diversification and overall information availability, earnings prediction becomes easier with size.

HSDROE and *R-ECorr* appear erratic with inconsistent signs over the four years and both variables are statistically insignificant over all four years. This is partly consistent with Lang and Lundholm (1996) who found *HSDROE* to be highly significant while *R-ECorr* was reported as insignificant. A possible explanation for the insignificant finding regarding *HSDROE* could be the fact that a yearly figure may not be an appropriate explanatory variable for a monthly observation. However, this is contradicted by the highly significant (1% level) relationship documented by Lang and Lundholm (1996). Overall, the findings reported in Table 15 might indicate that in the South African context other variables that were not tested explain the volatility of forecast revisions more conclusively. The low and fluctuating adjusted R^2 supports this view. Multicollinearity between *#Anlyst* and *Size* led to the elimination of the former variable from the model.

In short, the model investigating the volatility of forecast revisions appears to be an imperfect fit. The amount of variation explained over the fours years fluctuates considerably and is small in two of the four years. Although there is some evidence of the hypothesised negative relationship between disclosure policy and the revision volatility, it is not observed persistently and is thus not conclusive without further testing. This finding is consistent with prior literature. As the proxy for disclosure policy is only the annual report, this may be attributed to a specification bias introduced in Chapter 3. Company size is shown to be an important determinant and revisions become less volatile for larger firms.

In the light of the above findings, the following section examines the validity of the annual report as a measure of overall disclosure policy in more detail.

4.3.2.5 Annual Reports as Disclosure Policy Proxy in Analyst Behaviour Research

Apart from the results produced by the model on *#Anlyst*, the above findings on the analyses of the disclosure policy effect on analyst behaviour are statistically weak. Short of concluding that the hypothesised effects do not exist in the local market, this calls into question the specification of the respective models. As the control variables have all been pre-specified by previous researchers, this leaves the appropriateness of the measure of companies' disclosure policy, *Score*, to be queried.

In the light of the above notion, this section discusses the appropriateness of the annual report as the proxy for companies' disclosure policies.

In section 2.2.1 of Chapter 2, it was found that the three categories of disclosure are highly correlated with one another (Lang & Lundholm, 1993) and that the annual report is a good proxy for companies' overall propensity to report to stakeholders via other avenues of corporate reporting (Botosan 2000). It is accepted practice to use the annual report as a measure of disclosure policy (Botosan, 1997, 2000; Leuz & Verrecchia, 2000) and, therefore, this approach was followed within this study. As reported in section 4.3.1, this produces results that are broadly comparable with similar studies. However, in the field of analyst behaviour, the findings of this study appear weaker than those reported internationally. Although this applies to the main independent variables and control variables and is likely to have more than one cause, it questions the approach taken to measure disclosure policy.

This is emphasised by the findings produced by Lang and Lundholm (1996) who estimated every model twice. Their first model was run with an aggregate disclosure variable, which is a weighted factor of all three disclosure categories. The second model was run with all three categories as individual explanatory variables. If the annual report was an acceptable proxy for the overall disclosure policy, the annual report category should yield the same findings as the aggregate variable both in the study conducted by Lang and Lundholm (1996) and this report. However, this was not the case.

Lang and Lundholm (1996) documented that the different individual categories of disclosure were statistically significant only in some models, while the overall variable was statistically significant in all of their models. The findings produced within this report show that, in the South African context, the proxy for disclosure policy is only consistently significant in the predicted direction in the first model on the number of analysts. This raises the possibility that for the purpose of the analysis of analyst behaviour, *Score* should be interpreted as a factor of companies' annual report disclosure

policy as opposed to their reporting effort across all three categories of disclosure. To test for the validity of this concern, however, was impractical as a result of the unavailability of objective ratings of the sample companies' disclosure policy in terms of their other published information and investor relations.

In summary, this section attempts a cautious approach to understand the differences in the R^2's documented between this study and international research. One possible explanation is found in the validity of the disclosure policy proxy chosen within this study. The results of this study appear to indicate that the annual report as a measure of disclosure policy is inappropriate for the purpose of analyst behaviour research. This section thus presents an alternative interpretation of the findings on analyst behaviour and argues that *Score* should be considered a measure of annual reporting only. Under this assumption, the results produced here appear more consistent with prior literature.

4.4 Summary – Research Findings

The findings presented in Chapter 4 are based on the methodology set out in Chapter 3, namely Rank Regression as proposed by Cooke (1998). This was adopted to deal with the data's unsuitability to OLS regression analyses. Overall, the results of the univariate analyses were confirmed in the multivariate analyses performed.

According to this study's results, South African companies with high levels of disclosure are associated with lower levels of information asymmetry as measured by the bid-ask spread. This confirms contemporary literature, which increasingly views corporate disclosure as an economic decision with cost and benefits attached to it rather than as an exogenous consequence of external and internal factors. It suggests that South African companies adjust their disclosure policies to achieve a desired level of information asymmetry. Moreover, this adds to the literature on companies' cost of capital. Information asymmetry is identified to be a dominant factor thereof, embodying itself in illiquidity and transaction costs as a result of adverse selection, estimation risk and price protection. Assuming that lower bid-ask spreads are associated with lower transaction costs and higher liquidity, as suggested by prior research, the findings of this study advocate, indirectly, a negative association between disclosure policy and companies' cost of capital.

The model studying trading volume as a measure of information asymmetry does not confirm this and no disclosure policy effect on South African companies' trading volume could be identified. Two plausible explanations exist. The first is popular criticism of the trading volume as being too highly

influenced by non-information events to be used as a measure of information asymmetry. Indirectly this is supported by the fact that only a small number of researchers studied this variable empirically but a large number of researchers mentioned the theoretical disclosure policy effect. This would promote the conclusion that there is no local disclosure policy effect on the trading volume.

The second, and more subtle, explanation is found in the sample selection process. In contrast to international research, this study focuses only on large companies as a result of the unavailability of disclosure ratings for a more diverse sample. This reduces the amount of variation in observed disclosure levels and increases the base trading volumes making it more challenging to document incremental disclosure policy effects.

In addition to the above findings, company size was identified as a reliable factor of both bid-ask spreads and trading volume. As predicted, larger companies experience smaller bid-ask spreads and higher trading volumes. This trend continues into the analyses of analyst behaviour.

The association between disclosure policy and analyst behaviour in South Africa is less clear, although largely consistent with prior literature in this field. Companies with higher levels of disclosure experience larger numbers of analysts following their operations. This indicates that South African companies may indeed utilise their disclosure policies to affect the analyst attention they receive. However, in contrast to prior findings, no such trend could be documented for dispersion of forecasts, their accuracy and volatility of earnings forecast revisions.

The specification of the measure of disclosure policy was identified as a possible cause. Although using the annual report as a proxy for companies' disclosure policy is internationally accepted, no clear results were documented within this study. Indeed, the results were more consistent with international researchers' models employing the annual report in its own name. As a result, an analysis assuming the disclosure variable represented annual reports only was attempted. This showed that forecast dispersion, forecast accuracy and revision volatility may be affected by more timely means of disclosure. This presumption could not be empirically tested as a result of data unavailability.

The following part, Chapter 5, concludes this study and presents areas for future research.

CHAPTER 5

CONCLUSIONS

5.1 Introduction

This chapter concludes the research study of the disclosure policy effect on information asymmetry and analyst behaviour. It revisits the objectives of this study and offers explanations for its findings. Finally, suggestions for future research are made.

5.2 The Research Study – Information Asymmetry

Information asymmetry exists where market participants hold different amounts of value-relevant information regarding a company's share. Such information differentials arise between the management of a company and its investors and among investors themselves. The consequences of both types of information asymmetry are price-protection as investors require compensation in the face of adverse selection, the risk of trading with potentially better informed investors, and estimation risk, as investors lack necessary information to make accurate forecasts of a company's future returns. These result in illiquidity. The information asymmetry giving rise to such illiquidity has been identified as a significant component of a company's cost of capital.

International research has shown that corporate disclosure policy is negatively associated with the observed levels of information asymmetry. Therefore, disclosure policy should also exhibit an indirect negative relationship with companies' cost of capital, which is confirmed by direct research on the disclosure policy effect on the cost of capital. Although international research evidence appears to be conclusive regarding the disclosure policy effect on information asymmetry, researchers occasionally differ with regard to their choice of proxies for information asymmetry.

Prior to this study, only limited research on the disclosure policy effect on information asymmetry had been conducted in South Africa. Hence, the objective of this study was to use two proxies of information asymmetry that, in theory, are closely linked to information availability and test whether a disclosure policy effect can be established. More specifically, the research objectives were to test for the existence of a negative association between disclosure policy and the bid-ask spread and a positive one with the trading volume of the sample companies.

To achieve these objectives, the largest 100 JSE listed companies on 31 October 2000 to 31 October 2003 were selected as sample. Their observed levels of bid-ask spreads and trading volumes were regressed against disclosure policy plus three additional control variables representing company size, share return volatility and the level of trading volume. This methodology was previously used by Healy *et al.* (1999), Botosan and Harris (2000), Leuz and Verrecchia (2000), Negash (2001) and Welker (1995). While bid-ask spreads and trading volumes are readily available data, a measure of companies' disclosure policy is not publicly available. To overcome this issue, the research sample was adopted from the E&Y survey of Excellence in Corporate Reporting in terms of which the annual reports of the 100 largest JSE listed companies are rated by three independent adjudicators. Their ratings were obtained and employed as a measure of the sample companies' disclosure policies. As the ratings are confidential, they were not published within this report.

The return volatility of the sample companies was computed as the standard deviation of their monthly stock returns and is a factor of non-information related uncertainty in the market. Company size was measured as the market capitalisation as at 31 October of each year. The inclusion of this variable represents a contribution of research knowledge from Type I disclosure research, which established that the level of disclosure policy and information asymmetry are affected by company size. Type I research found that company size positively affects disclosure policy and negatively affects the level of information asymmetry.

As a result of the data not meeting the assumptions necessary for OLS regression analysis, the data was transformed into ranks and regressed in such format in terms of a method called Rank Regression by Cooke (1998).

The results for the more prominent proxy, the bid-ask spread, suggest that a statistically significant negative relationship between disclosure policy and information asymmetry holds and that companies may be in a position to affect the amount of information asymmetry by altering their disclosure policies. Although testing for causality was beyond the scope of this study, the findings further suggest that disclosure policy may affect price protection and adverse selection as well as the transaction costs. As such, South African companies may be in a position to increase their share liquidity and lower their estimation risk. As both factors have been associated with the equity cost of capital, the results of this study imply that disclosure policy is negatively associated with South African companies' cost of equity capital.

The hypothesised size effect is statistically highly significant and implies that the level of information asymmetry is lower for larger companies, which is likely to be the cause of higher overall information availability. This is consistent with international research findings that larger companies experience greater information dissemination.

The statistically insignificant findings for the model employing trading volume as proxy for information asymmetry suggest that there is no disclosure policy effect. This is consistent with international findings and supports criticism of the variable as proxy for information asymmetry due to the significant degree of non-information influence to which a company's trading volume is exposed. Additionally, all sample companies are large which gives rise to the possibility of a sample-specific anomaly. A sample with greater diversity of company sizes may possibly render different results.

In summary, the findings of this study confirm international research and show that, in South Africa, a negative relationship between disclosure policy and information asymmetry exists. This may be extended to be seen as indicative of a negative relationship between disclosure policy and the equity cost of capital.

5.3 The Research Study – Analyst Behaviour

Financial analysts perform important capital market roles as information intermediaries, providers and monitors of corporate performance. An important source of analysts' knowledge is company provided information. International research has found that corporate disclosure policy, which can be disaggregated into three separate components, affects analyst behaviour. More specifically, it has been shown that positive associations exist between disclosure policy and the number of analysts following a company as well as the accuracy of analyst forecasts. Negative associations have been found between disclosure policy and forecast dispersion and the volatility of earnings forecasts revisions. This implies that, for companies with higher levels of disclosure policy, analysts provide a narrower range of forecasts and their forecast revisions are smoother.

In South Africa, limited research on analysts and no apparent research on the disclosure policy effect on their behaviour has been conducted. Consequently, the objective of this study was to determine whether a positive disclosure policy effect on the number of analysts and their forecast accuracy and a negative effect on the forecast dispersion and revision volatility exist.

The same sample companies as discussed in section 5.2 were chosen. Again, the data was tested and found unsuitable for OLS regression analysis, which motivated the same rank transformation as mentioned in section 5.2. The same methodology, i.e. Rank Regression, was employed to regress each of the four individual dependent variables against a measure of disclosure policy and five additional explanatory factors. These control variables include proxies for company size, the level of information asymmetry surrounding a company's share, the level of the forecasting process' complexity and a measure of the unexplained proportion of the forecasting error. This methodology was previously applied by Duru and Reeb (2002), Healy *et al.* (1999), Hope (2003), Lang and Lundholm (1996) and Marquardt and Wiedman (1998).

The same measures of disclosure policy and company size as discussed in section 5.2 were used, namely, the E&Y survey's rating of annual reports and market capitalisation respectively. In order to control for peer pressure amongst analysts, the number of analysts also served as a control variable in the analysis of the disclosure policy effect on analyst behaviour. Research indicates that such peer pressure may explain forecast accuracy. Forecasting complexity was approximated by the historic standard deviation of companies' return on equity and the historic correlation of return on equity and share returns. Lastly, the unexplained proportion of the forecast error was controlled for by including a factor of the earnings surprise, which measures the difference between the current and prior year's earnings.

The results found are statistically inconclusive. While there is statistical evidence that companies' analyst following is a function of their disclosure policy, no such conclusion could be drawn for the remaining three variables: forecast dispersion, forecast accuracy and forecast revision volatility. Clear and statistically significant relationships between all dependent variables and size were found in the predicted directions. More analysts tend to follow larger companies, analyst forecasts fall into a narrower range, their accuracy improves and revisions are smoother for larger companies. This shows that the proxies of analyst behaviour were correctly specified. The fact that explicit relationships between company size and analyst behaviour could be established but none between the three dependent variables and disclosure policy suggests the existence of a model specification problem.

This study, consistent with international researchers, approximated disclosure policy as rating of the annual report. While this approach yields results that are internationally comparable with regard to the level of information asymmetry as shown in 5.2, it appears too broad for analyst behaviour. This is supported by the statistical inconsistency of this study's results and an aggregate disclosure policy variable used by Lang and Lundholm (1996). Consequently, the results of this study advocate that the

chosen proxy for disclosure policy is inappropriate for the field of analyst behaviour. For the purpose of assessing the disclosure policy effect on analyst behaviour, it should, therefore, be considered a proxy for annual reporting policy only.

After adopting this approach, this study shows that, in contrast to international findings, the annual report is an important determinant of companies' analyst following in South Africa. More specifically, the annual report was found to be positively associated with analyst following. Moreover, the annual report was not found to influence forecast dispersion, forecast accuracy and the revision volatility in South Africa. This suggests that more timely means of company disclosure, such as other published information and investor relations, appear to be more important in the latter three forms of analyst behaviour. This finding is consistent with international research.

In summary, the results of this study indicate that the chosen proxy for disclosure policy was not sufficiently broad enough to embody the effect of more timely disclosure forms such as investor relations and other published documents. As a result, three out of four models were found to exhibit specification problems, as evidenced by the low proportion of explained variation (adjusted R^2). When assessed as a measure of annual reporting only, this study indicates that the annual report is important for the number of analysts following South African companies. However, the range of forecasts, forecast accuracy and the forecast revision volatility do not appear to be affected by the level of South African companies' annual reporting.

5.4 Future Research

The findings discussed above give rise to a number of possible future research projects. Four of these are discussed below.

In the field of information asymmetry, the results for the model of information asymmetry employing companies' trading volume as a proxy suggest that the sample of companies may have been responsible for the statistically insignificant findings. As a result, this study should be reperformed on a sample comprising a greater diversity in terms of company size. This is supported by sample selection processes favoured by contemporary researchers such as Hail (2001) and Lang and Lundholm (2000) who noted that smaller companies are more likely to use their disclosure policies to communicate with the market.

This study provides tentative evidence as to a disclosure policy effect on companies' cost of equity capital in the South African context. A study could be conducted to research the existence of such an effect in a more direct and explicit manner than was done by this study.

With regard to analyst behaviour, the findings of this study suggest that the measure of disclosure policy within this study may not be optimal. Consequently, the study should be extended to incorporate proxies for both investor relations and other published information. These should be rated in a manner compatible with the E&Y survey of Excellence in Reporting and the AIMR assessment of corporate disclosure. Additionally, an aggregate measure including the influence of all three forms of disclosure could be derived to test South African companies for a disclosure policy effect on analyst behaviour in a manner consistent with international research.

Lastly, as indicated in Table 1 – 3, contemporary researchers have studied various variables and alternative proxies that were not addressed within this study. There may thus be an opportunity to research the same fields as this study did by employing different proxies and variables.

APPENDICES

A. Appendix – Sample Companies 2000-2003 Financial Years

	2000	2001	2002	2003
1	ABSA Group Limited	Amalgamated	Amalgamated	ABSA Group Limited
2	Advanced Software	African Bank	African Bank	AECI Limited
3	AECI Limited	Aveng Limited	Aveng Limited	Afgri Limited
4	African Bank	Alexander Forbes	Alexander Forbes	African Bank
5	African Life Assurance	AECI Limited	AECI Limited	African Life Assurance
6	African Oxygen Limited	African Life Assurance	Afgri Limited	African Oxygen Limited
7	Alexander Forbes	African Oxygen Limited	African Oxygen Limited	Afrox Healthcare
8	Allied Technologies	Anglo American Plc	Anglo American Plc	Alexander Forbes
9	Amalgamated	Afrox Healthcare	Afrox Healthcare	Allan Gray Property
10	Anglo American	Allied Technologies	Allied Technologies	Allied Technologies
11	Anglo American Plc	Anglo American	Anglo American	Amalgamated
12	Anglogold Ashanti	Anglogold Ashanti	Anglogold Ashanti	Anglo American
13	Anglovaal Industries	Aspen Pharmacare	Aspen Pharmacare	Anglo American Plc
14	Aspen Pharmacare	ABSA Group Limited	ABSA Group Limited	Anglogold Ashanti
15	Aveng Limited	Anglovaal Industries	Assore Limited	Anglovaal Industries
16	Barloworld Limited	Barloworld Limited	Anglovaal Industries	Aspen Pharmacare
17	BHP Billiton Plc	BHP Billiton Plc	Barloworld Limited	Assore Limited
18	Bidvest Group Limited	Bidvest Group Limited	BHP Billiton Plc	Aveng Limited
19	Brait S.A.	Capital Alliance	Bidvest Group Limited	Barloworld Limited
20	Datatec Limited	Dimension Data	Capital Alliance	BHP Billiton Plc
21	Delta Electrical	Delta Electrical	Dimension Data	Bidvest Group Limited
22	Dimension Data	Distell Group Limited	Delta Electrical	Capital Alliance
23	Discovery Holdings	Discovery Holdings	Distell Group Limited	Delta Electrical
24	Edgars Consolidated	Durban Roodepoort	Discovery Holdings	Dimension Data
25	Firstrand Limited	Edgars Consolidated	Durban Roodepoort	Discovery Holdings
26	Foschini Limited	Ellerine Holdings	Edgars Consolidated	Distell Group Limited
27	Gold Fields Limited	Foschini Limited	Foschini Limited	Durban Roodepoort
28	Harmony Gold Mining	Firstrand Limited	Firstrand Limited	Edgars Consolidated
29	Highveld Steel and	Gold Fields Limited	Gold Fields Limited	Ellerine Holdings
30	Illovo Sugar Limited	Allan Gray Property	Allan Gray Property	Firstrand Limited
31	Impala Platinum	Harmony Gold Mining	Harmony Gold Mining	Foschini Limited
32	Imperial Holdings	Illovo Sugar Limited	Highveld Steel and	Gold Fields Limited
33	Investec Limited	Impala Platinum	Illovo Sugar Limited	Growthpoint Properties
34	JD Group Limited	Investec Limited	Impala Platinum	Harmony Gold Mining
35	Liberty Group Limited	Imperial Holdings	Investec Limited	Illovo Sugar Limited
36	Liberty International Plc	Johnnic	Imperial Holdings	Impala Platinum
37	Massmart Holdings	JD Group Limited	Johnnic	Imperial Holdings
38	Medi-Clinic Corporation	Liberty International Plc	JD Group Limited	Investec Limited
39	Metro Cash and Carry	Liberty Group Limited	Kumba Resources	JD Group Limited
40	Metropolitan Life	Mutual & Federal	Liberty Group Limited	Johnnic
41	Mutual & Federal	Medi-Clinic Corporation	Mutual & Federal	Kumba Resources
42	Nampak Limited	Metropolitan Life	Medi-Clinic Corporation	Liberty Group Limited
43	Naspers Limited	Massmart Holdings	Massmart Holdings	Liberty International Plc
44	Nedcor Limited	Metro Cash and Carry	Metro Cash and Carry	Massmart Holdings
45	New Clicks Holdings	Murray & Roberts	Murray & Roberts	Medi-Clinic Corporation
46	Northam Platinum	New Clicks Holdings	Mvelaphanda	Metro Cash and Carry
47	Old Mutual plc	Nedcor Limited	New Clicks Holdings	MTN Group Limited
48	Pick n Pay Stores	Northam Platinum	Nedcor Limited	Murray & Roberts
49	Rebserve Holdings	Nampak Limited	Northam Platinum	Mutual & Federal
50	Remgro Limited	Naspers Limited	Nampak Limited	Nampak Limited
51	Reunert Limited	Old Mutual plc	Naspers Limited	Naspers Limited
52	Richemont Securities	Pick n Pay Stores	Network Healthcare	Nedcor Limited
53	RMB Holdings Limited	Rebserve Holdings	Oceana Group Limited	Network Healthcare
54	Saambou Holdings	Richemont Securities	Old Mutual plc	New Clicks Holdings
55	SABMiller Plc	Remgro Limited	Palabora Mining	Northam Platinum
56	Sage Group Limited	Reunert Limited	Pick n Pay Stores	Oceana Group Limited

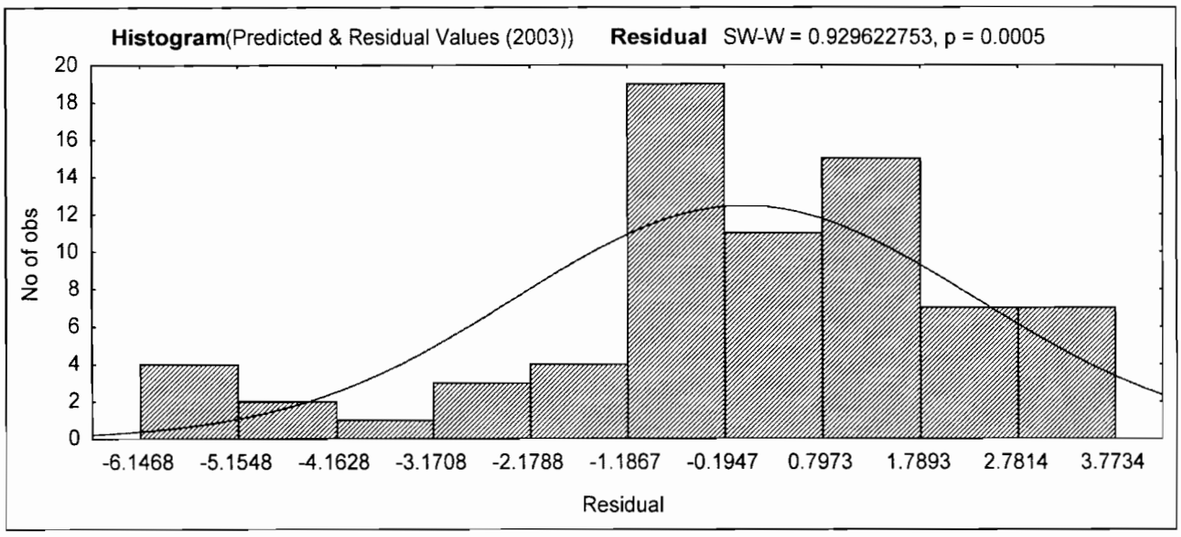
57	Sanlam Limited	RMB Holdings Limited	Richemont Securities	Old Mutual plc
58	Santam Limited	SABMiller Plc	Remgro Limited	Palabora Mining
59	Sappi Limited	South African Eagle	Reunert Limited	Pick n Pay Stores
60	Sasol Limited	Sappi Limited	RMB Holdings Limited	Remgro Limited
61	Shoprite Holdings	Steinhoff International	SABMiller Plc	Reunert Limited
62	Standard Bank Group	Shoprite Holdings	Sappi Limited	Richemont Securities
63	Steinhoff International	Sanlam Limited	Standard Bank Group	RMB Holdings Limited
64	Super Group Limited	Santam Limited	Steinhoff International	SABMiller Plc
65	Tongaat-Hulett Group	Sasol Limited	Shoprite Holdings	Sanlam Limited
66	Truworths International	Super Group Limited	Sanlam Limited	Santam Limited
67	Unitrans Limited	Tongaat-Hulett Group	Santam Limited	Sappi Limited
68	Western Areas Limited	Truworths International	Sasol Limited	Sasol Limited
69	Woolworths Holdings	Unitrans Limited	Super Group Limited	Shoprite Holdings
70		Venfin Limited	Tongaat-Hulett Group	Standard Bank Group
71		Western Areas Limited	Tourism Investment	Steinhoff International
72		Woolworths Holdings	Truworths International	Super Group Limited
73			Trans Hex Group	Sycom Property Fund
74			Unitrans Limited	Tongaat-Hulett Group
75			Venfin Limited	Trans Hex Group
76			Western Areas Limited	Trencor Limited
77			Woolworths Holdings	Truworths International
78				United Service
79				Unitrans Limited
80				Venfin Limited
81				Western Areas Limited
82				Woolworths Holdings

B. Test for Normality – Dependent Variables

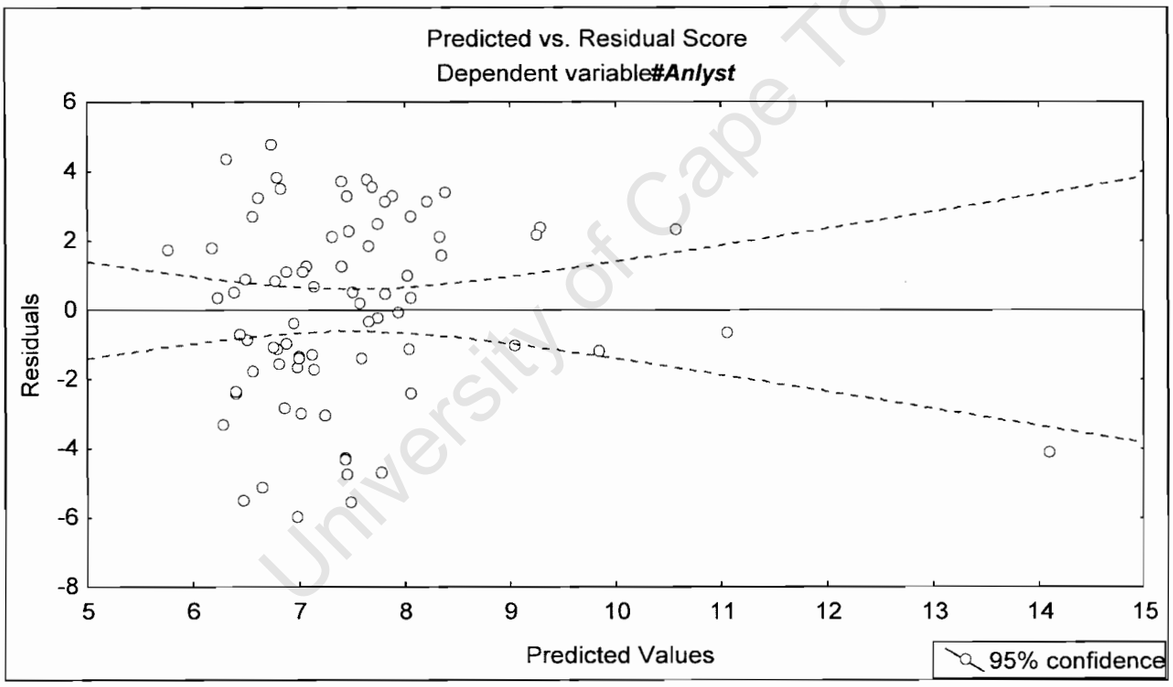
Variable	Year	Shapiro-Wilk	Lilliefors
Bid-Ask Spread	2001	p<.01	p<.01
	2002	p<.01	p<.01
	2003	p<.01	p<.01
	2004	p<.01	p<.01
Trading Volume	2001	p<.01	p<.01
	2002	p<.01	p<.01
	2003	p<.01	p<.01
	2004	p<.01	p<.01
Number of Analysts	2001	p<.01	p<.01
	2002	p<.01	p<.01
	2003	p<.05	p<.20
	2004	p<.05	p<.20
Forecast Dispersion	2001	p<.01	p<.01
	2002	p<.01	p<.01
	2003	p<.01	p<.01
	2004	p<.01	p<.01
Forecast Accuracy	2001	p<.01	p<.01
	2002	p<.01	p<.01
	2003	p<.01	p<.01
	2004	p<.01	p<.01
Revision Volatility	2001	p<.01	p<.01
	2002	p<.01	p<.01
	2003	p<.01	p<.01
	2004	p<.01	p<.01

C. Test of OLS regression assumptions - #*Anlyst* 2003 – 2004

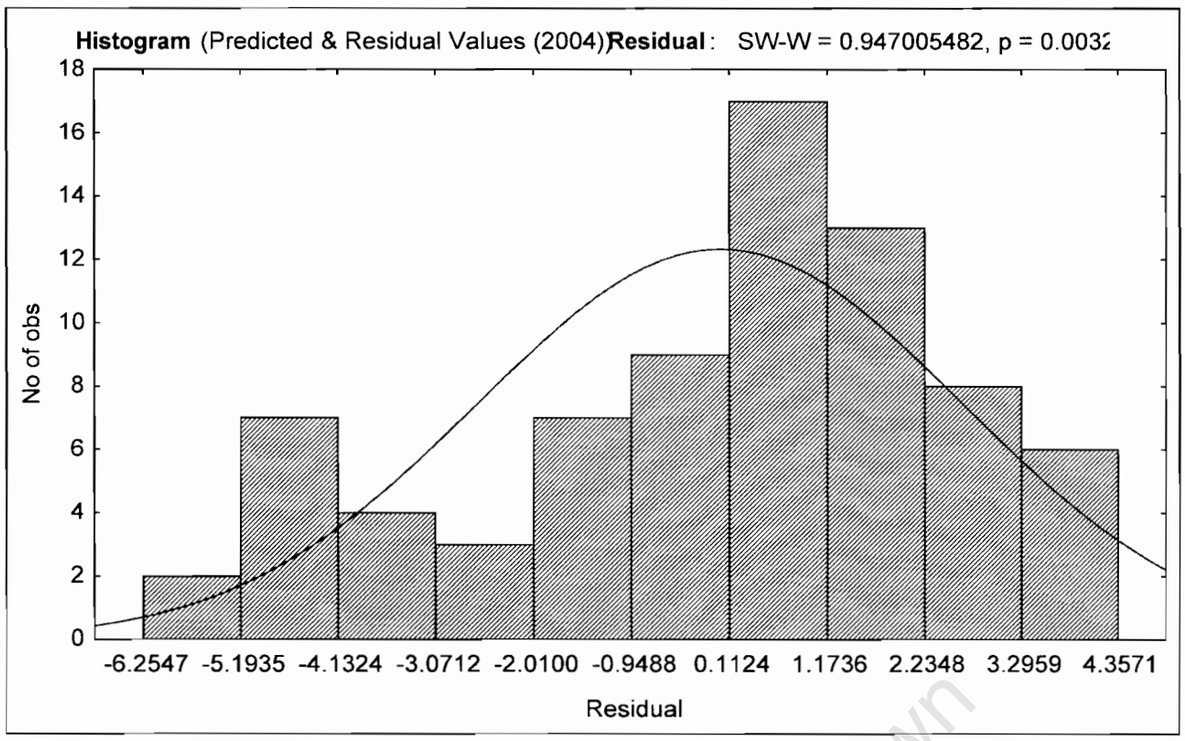
C.I Test of Normality: Residual #*Anlyst* 2003



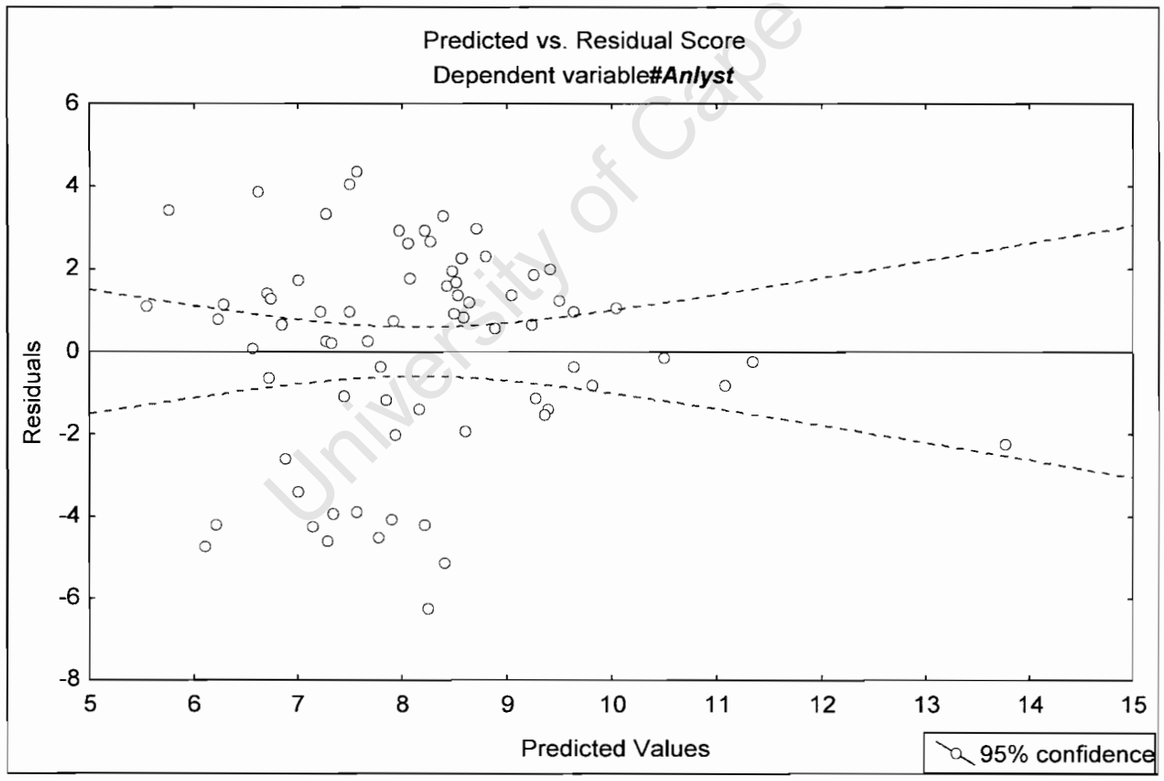
C.II Test of Constant Variance: #*Anlyst* 2003



C.III Test of Normality: Residual #*Anlyst* 2004



C.IV Test of Constant Variance: #*Anlyst* 2004



D. Descriptive Statistics 2002 - 2004

D. I Descriptive Statistics 2002

	Unit Measure	Valid N	Mean	Median	Minimum	Maximum	Std. Dev.
#Anlyst	Absolute	70	8.14	8.875	1.3636	11.9	2.91
ForDisp	Absolute	69	0.01	0.007	0.0006	0.1	0.01
ForAcc	Percentage	67	-0.04	-0.012	-0.4440	0.0	0.07
RevVol	Percentage	66	0.00	0.000	0.0000	0.0	0.00
Size	R'000	69	13737.00	3851.510	798.5300	144958.8	23703.74
Spread	Percentage	71	0.02	0.012	0.0030	0.1	0.02
Vol	Percentage	71	0.00	0.001	0.0000	0.0	0.00
RetVol	Absolute	71	0.10	0.094	0.0433	0.2	0.04
HSDROE	Absolute	72	0.47	0.084	0.0045	17.2	2.06
R-ECorr	Absolute	59	0.20	0.205	-0.6257	1.0	0.42
EarnSurp	Percentage	72	-0.00	0.000	-0.0024	0.0	0.00
Score	Percentage	72	0.47	0.479	0.2215	0.8	0.12

D.II Descriptive Statistics 2003

	Unit Measure	Valid N	Mean	Median	Minimum	Maximum	Std. Dev.
#Anlyst	Absolute	75	7.49	7.833	1.0000	12.9	2.99
ForDisp	Absolute	73	0.01	0.007	0.0010	0.1	0.01
ForAcc	Percentage	73	-0.06	-0.016	-1.9179	0.0	0.24
RevVol	Percentage	73	0.00	0.000	0.0000	0.0	0.00
Size	R'000	75	15515.89	3825.110	245.1700	196492.7	29743.99
Spread	Percentage	77	0.02	0.012	0.0030	0.1	0.02
Vol	Percentage	77	0.00	0.001	0.0001	0.0	0.00
RetVol	Absolute	77	0.09	0.087	0.0370	0.2	0.04
HSDROE	Absolute	77	0.94	0.094	0.0045	32.4	4.18
R-ECorr	Absolute	69	0.11	0.136	-1.0000	1.0	0.47
EarnSurp	Percentage	77	0.00	0.000	-0.0150	0.0	0.00
Score	Percentage	77	0.47	0.454	0.1584	0.7	0.12

D. III Descriptive Statistics 2004

	Unit Measure	Valid N	Mean	Median	Minimum	Maximum	Std. Dev.
#Anlyst	Absolute	80	6.34	6.417	1.000	11.7	2.99
ForDisp	Absolute	78	0.01	0.008	0.001	0.0	0.01
ForAcc	Percentage	80	-0.05	-0.025	-0.688	0.0	0.10
RevVol	Percentage	79	0.00	0.000	0.000	0.0	0.00
Size	R'000	82	17960.10	4214.300	1089.360	271475.9	37670.72
Spread	Percentage	82	0.02	0.015	0.005	0.2	0.02
Vol	Percentage	82	0.00	0.001	0.000	0.0	0.00
RetVol	Absolute	82	0.09	0.076	0.034	0.3	0.04
HSDROE	Absolute	82	0.99	0.094	0.005	32.4	4.12
R-ECorr	Absolute	78	0.14	0.189	-1.000	1.0	0.48
EarnSurp	Percentage	82	-0.00	0.000	-0.005	0.0	0.00
Score	Percentage	82	0.43	0.426	0.079	0.7	0.14

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