

Determinants of Operational Risk Reporting in the Banking Industry ^{*}

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Abstract

Recognizing the crucial importance of operational risk management in banks and of adequate reporting for enhancing market discipline and the soundness of the banking system, the present paper investigates operational risk disclosure practice in the 1998 to 2001 period. Whereas reporting was not mandatory at the time, disclosure increased in both extent and content. The evidence on disclosure motives indicates that financial institutions with lower equity/assets and/or profitability ratios give greater importance to disclose their assessment and management of operational risk whereas those with lower equity or profitability ratio choose a lower disclosure stance.

Keywords: operational risk, banking, Basel II, discretionary disclosure, disclosure index, information risk, agency costs, political costs, random effects ordered logit model

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1 Introduction

Although operational risk is by itself not a new concept, it has by far not received the same amount of attention as credit and market risk until recent years. Fundamental changes in financial markets, increasing globalization and deregulation, as well as corporate restructuring had a large impact on the magnitude and nature of operational risks confronting banks. Following severe operational failures resulting in the restructuring of the affected financial institutions (e.g. Natwest, Allied Irish Bank, LTCM) or in the sale of the entity (e.g. Barings), the emphasis on operational risk within banks has increased, leading regulators, auditors, and rating agencies to expand their focus to include operational risks as a separate entity besides market and credit risk. Operational risk was for the first time treated as a self-contained regulatory issue in the ‘Operational Risk Management’ document published by the Basel Committee on Banking Supervision in 1998. ‘The New Basel Capital Accord’ was first formulated in a proposal in 1999, released in 2001 and will become effective in 2007; within the framework, operational risk was integrated in the so called Pillar 1 which implies its inclusion in the calculation of a banks’ overall capital charge. Within Pillar 3 of the Basel document, the related rules on disclosure aiming at enhancing transparency and market discipline are presented. Besides bank regulators also accounting and corporate governance standard setters as well as rating agencies and auditors seek to encourage improved risk management disclosure. However, at present, no formal reporting requirements with respect to operational risk exist. This paper investigates operational risk disclosure practices in the banking industry for a sample period in which the concern about operational risk started to increase, by analyzing the 1998 to 2001 annual reports. Despite the fact that reporting on operational risk was not mandatory at that time, disclosure surveys published by the Basel Committee provide evidence that banks started to include operational risk issues in their annual reports. Motivated by the Basel Committee’s emphasis on the importance of disclosure for promoting transparency and market discipline and given that the Committee’s disclosure surveys mainly focus on market and credit risk, the first aim of the present paper is to give a more comprehensive overview of

banks' practices related to operational risk reporting. We find that the extent of disclosure, as measured by word count, and the information content of reports as measured by a disclosure index, increased significantly over the survey period.

The voluntary nature of operational risk reporting in the first years following the proposition of the New Basel Accord allows for the investigation of potential motives for managers to disclose. Based on previous research we provide arguments that disclosure on operational risk might have the potential to reduce the cost of capital, agency costs, the expected cost of financial distress and political costs arising from regulatory actions. Specifically, we hypothesize that banks with a relatively low capital ratio and/or relatively low return on assets choose a higher level of disclosure on operational risk. The rationale is that outsiders may perceive the impact of an operational loss event to be higher for financial institutions which are lower capitalized and less profitable. Thus, they would be more concerned about operational risk management in such banks and hence provide a higher incentive to ease the worry through enhanced disclosure. We find evidence supporting this hypothesis.

The remainder of this paper is organized as follows. Section 2 introduces the regulatory framework for operational risk management and related reporting requirements and outlines potential motives for discretionary reporting on operational risk. In Section 3, the data sample and the methods for measuring the extent and content of operational risk reporting as well as the determinants for the disclosure decision are presented. We report the empirical results in section 4 and conclude in section 5.

2 Operational Risk: Regulation and Disclosure

The first part of this section surveys the forthcoming regulatory framework for the management of operational risk as well as related reporting requirements and recommendations. In the second part we provide arguments as to why banks may choose to voluntarily disclose information on operational risk.

2.1 Regulation of Operational Risk Management and Reporting Requirements

In 1988, the Basel Committee on Banking Supervision (henceforth Basel Committee or BCBS) released a document entitled ‘International Convergence of Capital Measurement and Capital Standards’, BCBS (1988). The focus was directed towards assessing capital in relation to credit risk pointing out however the importance of taking other risks such as interest rate risk and investment risk on securities. Operational risk was not mentioned explicitly within this document.

In September 1998, the Basel Committee released the ‘Operational Risk Management’, BCBS (1998), document, which summarizes the results of interviews with various bank officials on operational risk management. The survey revealed that although in 1998 no universal definition of operational risk existed, following widely publicized operational risk events, the board of directors’ and senior management’s awareness of operational risk had increased. Some institutions declared to have developed a framework for the management of operational risk; nevertheless, monitoring and quantification of operational risk was rare. Most financial institutions associated operational risk with weakness of internal controls or lack of compliance with existing internal control procedures. In general, banks welcomed the regulatory concern about operational risk; still, the interviewees cautioned that it was too early for mandatory guidelines or a quantitative limit in the form of a capital charge.

The 1999 proposal for ‘A New Capital Adequacy Framework’, BCBS (1999), pointed out the importance of operational risk in banking and proposed to develop a capital charge for this risk category. Within the second consultative paper to ‘The New Basel Capital Accord’, BCBS (2001a), - in short Basel II - and the ‘Operational Risk Supporting Document to The New Basel Capital Accord’, BCBS (2001b), operational risk is treated as a separate risk category beside credit risk and market risk, and moved to Pillar 1 implying a capital charge. A standard industry definition of operational risk was presented: Operational risk is defined as “the risk of direct or indirect loss resulting from inadequate or failed internal processes,

people, and systems or from external events”¹. With respect to the capital charge a so called ‘continuum concept’ was proposed whereby banks can choose among a range of approaches to calculate minimum regulatory capital charges for operational risk. The continuum consists of three approaches for which the capital charge decreases as the degree of sophistication and thus qualification criteria increase.

Along with the capital requirement, corresponding disclosure issues have been addressed by the Basel Committee within the rules related to market discipline (Pillar 3). This reflects the Basel Committee’s emphasis on promoting transparency and effective market discipline through improved disclosures. As a general principle “banks should have a formal disclosure policy approved by the board of directors that addresses the bank’s approach for determining what disclosures it will make and the internal controls over the disclosure process”² as well as a process for assessing the appropriateness of their disclosures. Disclosures related to risk management have to include the risks to which banks are exposed and the techniques used to identify, measure, monitor, and control those risks. For operational risk in particular, further reporting requirements in terms of qualitative disclosure consist on (i) the statement of the approach(es) for operational risk capital assessment for which the bank qualifies and, if used by the bank (ii) a detailed description of the Advanced Measurement Approach (AMA). In terms of quantitative disclosure, banks applying the AMA should indicate the operational risk charge before and after any reduction in capital resulting from the use of insurance. Besides Pillar 3, the framework of ‘The New Basel Capital Accord’ also includes the ‘Sound Practices for the Management and Supervision of Operational Risk’ containing standards and requirements, which will form the basis of operational risk disclosure.

Apart from bank regulators, accounting and corporate governance standard setters as well as rating agencies and auditors address risk reporting issues in banking. The Basel Committee’s explicitly states that its requirements are not intended to conflict with broader disclosure rules

¹See BCBS (2001a), p.94. the definition has been updated in the BCBS (2003a) document and does not distinguish between direct and indirect losses anymore.

²See BCBS (2003a), p.156f.

but rather seek to harmonize standards with respect to disclosures in financial statements of banks.

Accounting standards setters encourage incentives for improved risk management and its disclosure. Both International Accounting Standards (IAS)³ and the Statements of Financial Accounting Standards (FASB Statements)⁴ contain extensive standards on the treatment of credit risk (IAS 30; FASB Statements 5, 15, 114, and 118), while disclosure on operational risk is not explicitly regulated today. The increasing awareness of other risks beside credit risk is reflected in IAS 30 paragraphs 50 to 52, dealing with general banking risks under which operational risk can be assumed. These rules demand banks to report the amount set aside for future losses and other unforeseeable contingencies due to general banking risks as well as to abstain from including credits or reductions in such amounts in the net profit/loss.

Corporate governance standards and recommendations which have emerged recently in most financial markets aim to increase disclosure in order to provide investors with a fuller picture of embedded risks and conflicts of interests within publicly quoted firms. In the United States, the Sarbanes-Oxley Act of 2002, United States (2002), establishes clear standards for management's accountability arising from disclosures and dictates consequences for non-compliance. In the United Kingdom, the Combined Code set out by the Financial Services Authority, FSA (2003), as well as in Germany the Banking Act Section 25a, Germany (1998a), and the Law on Control and Transparency in Business, Germany (1998b), emphasize that all staff members should be made aware of their risk management responsibilities and specifically point to the senior management's overall responsibility for risk management and relevant disclosures.

Furthermore, rating agencies are starting to incorporate banks' operational risk management approaches into their rating decision being specifically interested in whether banks have collected a history of loss data. Operational risk is starting to influence rating decisions and thus its cost of capital. An increasing influence of auditors on the disclosure of looming operational

³Issued by the International Accounting Standards Board; see IASB (2003).

⁴Issued by the Financial Accounting Standards Board; see FASB (1975), FASB (1977), FASB (1993), FASB (1994).

risks can be seen for example in the inclusion of disclosures of pending lawsuits in share issue prospectus.

2.2 Literature on Operational Risk Reporting and Motivation for Discretionary Disclosure

Following the widespread recognition of the importance of operational risk in banking and the knowledge that operational risk exhibits characteristics fundamentally different from those of other risks, an increasing amount of academic research has been devoted to this issue. For a general paper see e.g. Power (2002), for approaches to measure and manage operational risk see e.g. Ebnöther, Vanini, McNeil, and Antolinez (2003) and Leippold and Vanini (2005). Furthermore, a large body of disclosure literature exists, for a survey see e.g. Healy and Palepu (2001), and research on banks' risk reporting has been conducted; for a recent theoretical model see e.g. Homölle (2005), for empirical work see e.g. Jorion (2002). Over the sample period studied in this paper, no formal reporting requirements for operational risk existed. Nonetheless, the surveys of public disclosures by banks published by the Basel Committee, see BCBS (2001c), BCBS (2002), BCBS (2003b), reveal that discretionary disclosure on operational risk issues in the banking industry occurred. The surveys analyze and identify trends in disclosure practices across 54 financial institutions from 13 countries for which the year 1999, 2000, and 2001 annual reports are investigated using 104 quantitative and qualitative questions. The studies mainly focus on risk management in general; credit risk and market risk are investigated in separate sections. Operational risk is not investigated in detail, being addressed in only one question. In 1999 only 63% of the surveyed banks "disclosed information about the main types of operational risk and identified and discussed specific issues considered to be significant"⁵ ; this figure increased to 82% in 2000 and to 91% in 2001. Thus banks appear to respond in their disclosure behavior to future disclosure requirements.

Motivated by the Basel Committee's emphasis on the importance of disclosures to enhance market discipline and guarantee a sound banking system, we provide a comprehensive survey of

⁵See BCBS (2003b), p. 23.

financial institutions' operational risk reporting practices and aim at investigating why banks choose to provide such discretionary disclosure. Drawing on arguments based on information risk and, as suggested by Linsley and Shrivess (2000), agency theory, signaling theory, and political cost theory, we derive potential implications for a bank's operational risk reporting policy.

From an information risk perspective, the return investors demand depends on the level of information provided to them through a firm's disclosure; in turn, the demanded return determines a firm's cost of capital. Based on the theoretical framework of Easley and O'Hara (2004) in which firms can influence their cost of capital through disclosure, Botosan and Plumlee (2005) provide an empirical test of the implications of this model, finding that the cost of capital is decreasing with increased disclosure. Their results are consistent with previous research on the effect of disclosure on the cost of capital, see e.g. Lang and Lundholm (1996) and Botosan (1997). In the context of the present paper, providing no or only little information about a bank's operational risk management, i.e. not assuring a proper risk management, might lead outsiders to overestimate the expected loss from the realization of an operational risk event and consequently result in investors demanding a higher return. Hence, it can be argued that in such a setting, disclosure would be beneficial in particular for banks which are concerned with their cost of capital which are typically banks with a lower capital ratio⁶.⁷

Based on agency theory as put forward by Jensen and Meckling (1976) in general and Berger, Udell, and Udell (1995) for financial institutions in particular, we provide arguments in the context of operational risk disclosure. Standard agency theory suggests that higher leverage and thus higher risk of bankruptcy leads to more effective incentives for managers to avoid loss of benefits. On the contrary, costs arising from conflicts between shareholders and creditors due to risk shifting increase with leverage. Hence, a tradeoff between the costs arising from

⁶See e.g. Gebhardt, Lee, and Swaminathan (2001) for empirical evidence that higher leverage leads to a higher cost of capital

⁷Furthermore, evidence suggests that a reduction in information asymmetries makes investors more confident to trade at a fair price and thus leads to higher stock liquidity; see e.g. Diamond and Verrecchia (1991) and Welker (1995).

conflicts between shareholders and creditors on the one hand and shareholders and managers on the other hand exists.⁸ Reporting on operational risk management might lower outsiders' expectations related to operational risk caused losses thereby reducing the perceived probability of bankruptcy and therefore influencing outsiders' actions undertaken to reduce incentive conflicts. As a consequence, providing disclosure may reduce the costs due to conflicts between shareholders and creditors while increasing those arising from incentive problems with managers, again resulting in the aforementioned tradeoff. However, given the above arguments and empirical evidence that the leverage ratio has predictive power for bank failure⁹, outsiders might be more concerned about conflicts between creditors and shareholders for highly levered banks while for high capitalized banks the conflict with managers might be considered more important. Therefore, highly levered banks might give priority to trying to lower conflicts between creditors and shareholders, i.e. choose to disclose, while high capitalized banks, which outsiders believe unlikely to fail, may give a higher priority to reducing the incentive conflicts with the owners, i.e. choose not to disclose.

Related to this discussion, the issue of financial distress arises. Berger, Herring, and Szegő (1995) suggest measuring the cost of financial distress as the loss that a levered bank suffers from economic distress, which results in our setting from operational losses deteriorating asset quality, in excess of the loss of a comparable unlevered bank. They stress that the cost of financial distress is higher for low capitalized financial institutions “because of the increased risk of bankruptcy, greater uncertainty that the bank will honor its commitments to other stakeholders, and the increasing costs of controlling conflicts of interest between shareholders and creditors”¹⁰. This would suggest that financial institutions with a lower capital ratio have a higher incentive to assure the market that operational risks are properly managed since they could achieve a comparably larger reduction in the perceived costs of financial distress.

⁸The extent of the tradeoff depends on the functional form of these costs related to the equity-ratio respectively the probability of bankruptcy. However, as e.g. Berger, Herring, and Szegő (1995) state, the literature so far has not been able to convincingly quantify the tradeoff between the two sources of costs, thus the net impact is ambiguous.

⁹See e.g. Estrella, Park, and Peristiani (2000).

¹⁰See Berger, Herring, and Szegő (1995), p. 396.

Another main influence on disclosure arises from the rules and regulations issued by the supervisory bodies. Following the idea of the political cost theory advanced by Watts and Zimmerman (1986), banks disclose information to ward off unwanted attention by the supervisor. Given supervisors' role in ensuring the stability of the banking system, regulators must specifically focus on undercapitalized banks which are less likely to withstand a potentially large capital absorbing operational loss, thus providing an incentive for more disclosure to such banks.

From a signaling perspective, disclosure would be expected by banks wishing to distinguish themselves by signaling competence to the market. Under this scenario well performing banks would be expected to be early adopters of operational risk disclosure. It is, however, plausible, that past operational risk events, although they have not necessarily become public, may have triggered an increased emphasis on operational risk within banks which may not be able to withstand a large operational risk event. It is thus argued here that specifically financial institutions which have less capacity (i.e. equity) to absorb major operational risk losses might be more concerned about the existence and relevance of operational risk within their institutions. These institutions are argued to have a particularly high incentive to voluntarily disclose information about their capabilities and sophistication with respect to operational risk management in order to assure the market that major losses severely affecting their capital base are less likely to occur.

In summary, by relying on arguments based on information risk, agency theory, financial distress, and political costs we have identified the equity-ratio as a potential variable in the operational risk disclosure decision process. The implications derived above suggest that the benefits of reporting are increasing with leverage, hence, we expect the choice of disclosure level to be inversely related to the equity-ratio. Analogously, we argue that the ratio of net profit to total assets may be important for the operational risk disclosure choice as well, since this profitability ratio can be viewed as the capability of the institution to generate capital and to restore the bank's equity. Accordingly, we formulate the following hypothesis.

HYPOTHESIS: *A bank's operational risk reporting level is an inverse function of the bank's equity-ratio and its profitability.*

3 Sample Selection and Research Design

This study covers banks from North America, Asia, and Europe. Within those regions we select financial institutions with more than USD 40 billion in total assets in the financial year 2000¹¹ from the Bankers' Almanac database, ReedBusinessInformation (2001)¹². Non-commercial banks are excluded¹³. The resulting list of 141 institutions was crosschecked with the 'Bank Atlas' from the June 2001 issue of the Euromoney magazine, (2001), which led to the addition of one bank. Thus, the scope of our study covers 142 institutions.

The minimum data requirement was the availability of electronic annual reports in English for the years 1998 until 2001, for which internet portals have been searched and investor relations offices have been contacted. For 59 banks the annual reports were available for the 4 years observation period. For the analysis of the effect of the equity and profitability ratios on bank managements' disclosure decisions the figures for equity, net profit and total assets have been retrieved from the Bankers' Almanac database¹⁴.

The full annual reports published by banks form the basis of our research. A first analysis shows that almost all annual reports contain a separate risk report, i.e. a separate section in the annual report that is dedicated to risk management issues. Within the risk report one usually finds separate sections for credit and market risk whereas other risks are usually captured in a residual section. We find a trend towards inserting a separate section for operational risks over time, a trend which highlights the increasing awareness of the

¹¹In this paper the financial year was determined to comprise annual reports for business years ending from 1st of April of that year until 31st of March of the next year.

¹²Bankers' Almanac (<http://www.bankersalmanac.com/>) by Reed Business Information. Data was provided for 1999 to 2001.

¹³The following types of financial banks were excluded: central banks, development banks, financial regulators, foreign exchange banking, holding companies, Islamic banking, offshore banking, restricted license banks, stock exchanges, and stock institutions.

¹⁴The data was only available starting from the year 1999. For the year 1999, four banks had to be excluded due to missing data. Thus, the sample for the econometric analysis contains 173 observations.

importance of operational risks in banks over the survey period. For all annual reports we find that all relevant information with respect to (operational) risk management is given in the risk report, no additional information is found in other parts of the annual report. Those annual reports which do not have a separate risk section do not contain any information on operational risk within the full annual report.

In Table 1, examples of operational risk disclosures are provided. The first two extracts serve to show how disclosure on operational risk can change in terms of depth and materiality over time within one institution. The third extract is a good example of a bank putting thought behind the concept of operational risk as early as 1998 by referring to specific future risks. The last two extracts reveal very little development from 1999 to 2001 and may lead a reader of the annual report to the opinion that operational risk first and foremostly is a regulatory requirement to be considered. Overall the disclosure extracts indicate that occupation with and disclosure stances towards operational risks clearly differ over time and across financial institutions.

3.1 Extent and Content of Operational Risk Disclosure

This section introduces the methods used to evaluate the extent and content of disclosure on operational risk, aiming at providing a comprehensive survey of banks' operational risk reporting practices.

Firstly, we provide descriptive statistics to reveal how many banks disclose information on operational risk at all and compare the importance financial institutions give to operational risk in terms of disclosure relative to credit and market risk. Given that awareness about operational risk increased in general, we expect both an increase in the number of banks that disclose on operational risk and an increase in the importance given to reporting on operational risk relative to credit and market risk. The analysis is performed on the banks' annual report of the survey period using a simple procedure that was proposed by Copeland and Fredericks (1968) by counting the number of times a specific topic is mentioned. Specifically,

we compare the number of times the different three risk types are mentioned to get a proxy for the relative importance given to the individual risk categories.

Subsequently, the extent of operational risk disclosure, i.e. the amount of information that is provided, and its change over time controlling for changes in the risk report and the complete annual report is investigated. This allows us to draw conclusions about the development of the extent of disclosure on operational risk over the survey period. Again we expect to find an increase in disclosure quantity over the survey period. The analysis is performed by counting both the number of words and the number of pages which contain information about operational risk. The word count criterion was proposed by Copeland and Fredericks (1968) and is frequently used in the disclosure literature. We believe counting the number of pages to be a good proxy for the effect the operational risk section has on the recipient of the annual report. The whole risk report is used in order to control for the possibility that changes in disclosure quantity of the full risk report over time drive the extent of disclosure within the operational risk section.

Thirdly, reporting on operational risk is investigated using a disclosure index. This approach was developed by Cerf (1961) and has been frequently applied in research on disclosure ever since. Marston and Shrivies (1991) discuss the usefulness of and potential problems related to disclosure indices, stressing that a disclosure index does not necessarily allow for measuring the quality of disclosure. However, despite the fact that the index itself is still a measure of the extent of disclosure, we try to extract information about the content of the report under investigation by constructing a disclosure index as outlined below.

In order to construct the disclosure index, we first identify three main conceptual matters within the overall concept of operational risk. These have been identified as: (i) the definition of operational risk, (ii) the risk management process, and (iii) regulatory issues. By disaggregating the concept of operational risk into what we believe to be the three most relevant aspects, it is possible to obtain a deeper insight into the development of operational risk disclosure over the reference period. We thus construct three sub-indices, to capture the three

issues: in each sub-index, items are chosen on the basis of an extensive review of previous literature, supervisory documents, and documents provided by banks, with the purpose of capturing the major aspects outlined by regulators as regards the requirements which will apply in the future. In particular, applying the disclosure sub-indices allows to analyze the relative importance that each matter has played in determining the overall development of the attitude towards operational risk shown by our sample banks. Additional to the three sub-indices mentioned above a residual sub-index is added to capture those banks which do not score in any of the three main sub-indices but nevertheless at least mentioned the topic. The scope of the four sub-indices is outlined below:

- **Operational Risk in general:** This category indicates whether a bank disclosed information about operational risk in its risk report at all. The purpose of including this item in the index is to prevent the case that a bank discloses on operational risk but does not meet any of the items that follow and would thus be neglected.
- **Definition (DEF):** Prior to the release of the Basel Accord, literature provided numerous definitions for operational risk, ranging from broad approaches assuming that operational risk is everything except for market and credit risk to narrow ones that relate operational risk only to the operations department of the bank. However, with Basel II a consensus definition was achieved. The items in this category are intended to cover the risk types suggested in the Basel II definition of operational risk.
- **Risk Management (MGT):** In this sub-index we aim at capturing and extent of operational risk management within banks. The Basel Committee has released a document outlining Sound Practices for the Management and Supervision of Operational Risk on which the choice of disclosure items was based.
- **Regulatory Issues (REG):** Items in this category reflects the banks' awareness of supervisory issues concerning operational risk.

Overall, we identify 7 items for the sub-index ‘Definition’, 10 items for ‘Risk Management’, and 4 items for ‘Regulatory Issues’. Thus, together with the ‘Operational Risk in general’ sub-index, the index consists of 22 items, as displayed in Table 2. In order to limit subjectivity, an unweighted score scheme is used in the evaluation of the index. Thus for each year and each bank in the sample, the four sub-indices are aggregated into a disclosure index by calculating the unweighed sum of all items in each sub-index, whereby each item is treated as a binary variable taking value ”0” if not included in the report, and ”1” if mentioned in the report, irrespective of the frequency.

The concerns raised by Marston and Shrivess (1991) with respect to the choice of disclosure items due to different disclosure needs should only be of minor importance in our study since all outsiders share the same interest, namely being assured that operational risks are managed properly. Furthermore, since our sample consists of internationally active banks which will all be subject to forthcoming regulations on operational risk management and disclosure, no problems with respect to the applicability of the chosen index items across banks should arise.

[insert Table 2 about here]

Finally, we compare the measures of the extent and the overall content of disclosure. Therefore, we classify banks into three groups corresponding to their level of operational risk disclosure. In our analysis we distinguish between financial institutions which choose not to include operational risk in their annual reports ($Disc = 0$), banks with a low disclosure level ($Disc = 1$), and banks with a high disclosure level ($Disc = 2$). The categorization is done on the basis of the disclosure score developed above, i.e. groups are created for banks with scores being zero, scores below the median score, or scores above the median score in the respective years. Analogously, financial institutions are classified based on the number of words contained in the operational risk section in the annual report.

3.2 Effects of the Equity Ratio and Profitability on Operational Risk Disclosure

As outlined above, for the sample period investigated in this paper, no formal disclosure requirements with respect to operational risk existed. Nevertheless, the Basel Committee's surveys reveal that reporting on operational risk occurred. The effects of the capital ratio and profitability on the disclosure decision are investigated using the categorization of banks with respect to their disclosure level as described at the end of the previous section. Starting with reporting some simple descriptive statistics we subsequently estimate an econometric model. Based on the threefold categorization of banks' disclosure levels, random effects ordered logit models¹⁵ are estimated by maximum likelihood to analyze the influence of the equity-assets-ratio and profitability on managements' decisions with respect to the levels of disclosure¹⁶. The model is formulated as

$$Disc_{it} = \beta_1(E/A)_{it} + \beta_2(NP/A)_{it} + \alpha_i + \varepsilon_{it},$$

where $\alpha_i \sim \text{iid } N(0, \sigma_\alpha^2)$ and $\varepsilon_{it} \sim \text{iid } \text{Logistic}(0, \pi^2/3)$.

$Disc_{it}$ takes the value of 0 for banks which do not publish any information about operational risks at all, 1 for a low disclosure level, and 2 for a high disclosure level. β_1 and β_2 denote the coefficients for the equity/assets-ratio (E/A) and profitability (NP/A). $\alpha_i + \varepsilon_{it}$ is treated as an error term where α_i is a bank specific component which is not time varying and ε_{it} is a remainder component which is uncorrelated over time and independent of α_i .

In practice we can only observe the disclosure behavior of banks but we do not know why

¹⁵As our cross-sectional sample is drawn from a large population and we are not necessarily interested in the firms per se but rather in the population characteristics we choose a random effects model. We also estimated a random effects ordered probit model; the difference in the results compared to the logit model is (as usual) negligible. Additionally we modelled fixed effects for binary disclosure level decisions; however, apart from concerns about biasedness when using fixed effects however, apart from the biasedness issues when using fixed effects in logit models, estimation of fixed effects multi-response limited dependent variable models is problematic since there are no sufficient statistics for the ancillary parameters.

¹⁶Since we have (censored) count data, we also estimated a model using negative binomial regression analysis; the results are consistent with our findings in the ordered logit model and are available from the authors. However, we are reluctant to use negative binomial regressions for the purpose of analyzing managerial disclosure behavior since we believe that a bank's characteristics do not lead its managers to exactly publish a certain number of words or disclose on a specific number of items but rather to choose a level of disclosure.

they choose a certain disclosure level since this decision depends on unobservable factors. We thus interpret the latent variable behind a limited dependent variable model as utility, i.e. banks attach different levels of utility to different levels of disclosure. Being rational, financial institutions choose their disclosure policy with respect to the utility thresholds for the different disclosure levels such that utility is maximized. The latent variable model underlying our ordered logit model can be formulated as

$$\begin{aligned}
 u_{it} &= \beta_1(E/A)_{it} + \beta_2(NP/A)_{it} + \gamma_i + \nu_{it}, \\
 Disc_{it} &= 0 \text{ if } u_{it} \leq \mu_1, \\
 Disc_{it} &= 1 \text{ if } \mu_1 \leq u_{it} \leq \mu_2, \\
 Disc_{it} &= 2 \text{ if } u_{it} \geq \mu_2,
 \end{aligned}$$

where u_{it} denotes the latent variable. The betas represent the coefficients for the independent variables. The error term consists again of a firm-specific factor (γ_i) and a time-varying remainder component (ν_{it}). μ_1 and μ_2 denote the cut points, i.e. the thresholds for the different disclosure levels.

We first determine the level of disclosure denoted $Disc_{it}$ as the overall score and the word indicator as outlined for the descriptive statistics analysis. Secondly we investigate the disclosure level by the sub-indices which capture the definition of operational risk (DEF), management of operational risk (MGT) as well as regulatory issues (REG). Finally, we estimate the models including only one of the independent variables a time.

4 Results

In this section we provide the results of our empirical analysis. We show that extent and content of operational risk disclosure increased substantially over the survey period and provide evidence that the disclosure level chosen by a bank is inversely related to its capital ratio and return on assets.

4.1 Analysis of the Extent and Content of Disclosure on Operational Risk

Table 3 Panel A shows the percentage of banks in our sample that mention operational risk in their risk reports: it can be inferred that those financial institutions which wish to communicate to the market are aware of the relevance of operational risk. Over the survey period from 1998 to 2001 the coverage of operational risk in annual reports more than doubled from 41% over 63% (1999) and 73% (2000) to 92%, a result which is significant at the 1%-level. Thus in 2001, 54 out of 59 banks give reference to operational risk in the risk section of their annual reports. The result clearly indicates the growing importance of operational risk and is consistent with the Basel Committee surveys' results on operational risk disclosure in 1999 (63%), 2000 (82%), and 2001 (91%). Table 3 Panel B reports the results on the extent of operational risk disclosure relative to credit and market risk. In 2001, the disclosure on operational risk comprises 22% of all these risks, which is a significant increase relative to the 10% found in 1998.

[insert Table 3 about here]

Table 4 reports the results of the analysis on the extent of disclosure on operational risk. Considering first the disclosure on operational risk itself, the amount of information given in the operational risk section increased substantially over the 1998 to 2001 period. Both the number of words and the number of pages indicators increased by a factor of four. In detail, the disclosure on operational risk in 2001 contains on average 397 words and one page of the annual report whereas in 1998 it covered a quarter of a page containing on average 97 words. The reported increase in the extent of operational risk disclosure is over-proportional relative to the complete risk report. Looking at the number of pages published, the space given to the operational risk section within the risk report is 10.07% in 2001 relative to 5.43% in 1998, which is an increase significant at the 5%-level. The outcomes from the number of words analysis confirm this.

Overall, the reporting within the section on operational risk increased in size and substance for every single year, both in absolute terms as well as relative to the overall risk report and

complete annual report. Thus the attention towards risk management in general grew from 1998 to 2001 and that there was a particular focus on operational risk.

[insert Table 4 about here]

The results of the disclosure index analysis are displayed in Table 5. The reported figures show that the banks' average disclosure ratios, i.e. the percentage of index items for which banks score, increased from 15% in 1998 to 56% in 2001 indicating that the depth of disclosure on operational risk increased significantly at the 1%-level over the survey period.

Disclosure ratios are also reported for the sub-indices. Our findings point to an increase in the level of disclosure content for the three issues investigated. For the categories 'Definition' and 'Risk Management' the disclosure level triples from the initial 15% to 46% respectively 47%. The disclosure on 'Regulatory Issues' is at the end of the survey period almost six times as high than in the beginning, changing from 6% to 34%, indicating a particular rise in the sophistication of reporting on supervisory issues. These findings indicate that the disclosure sub indices convey information about the changes in the qualitative dimension of disclosure.

[insert Table 5 about here]

The distribution of banks when categorized by their disclosure level based on the extent or the content of disclosure is displayed in Table 6, Panel A and B respectively. We report a substantial decrease in the number of banks in the 'no disclosure' category and correspondingly a trend toward higher disclosure levels. This development is significant at the 1% level using a chi-square test. Finally, a Spearman rank correlation test is performed to investigate the closeness between the score based and number of word based classifications. The results provided in Panel C indicate that the disclosure index, like the word count measure, capture the quantitative dimension of disclosure with a correlation above 0.90 reported in three out of four years.

[insert Table 6 about here]

4.2 Effects of the Equity Ratio and Profitability on Operational Risk Disclosure

The descriptive statistics for the extent of disclosure are displayed in Panel A of Table 7, the figures for disclosure content are given in Panel B. The results point to the hypothesized inverse relationship between banks' disclosure and its equity ratio and profitability, i.e. lower capitalized or less profitable banks seem to choose higher levels of operational risk disclosure. The findings for the capital ratio are significant at 1%-level based on the number of words indicator and at 5%-level using the disclosure index score. The profitability figures are significant at the 5%-level for both extent and content of reporting.

[insert Table 7 about here]

The results for the random effects ordered logit models are displayed in Table 8. Panel A contains the estimates for the disclosure levels being determined by the number of words indicator and the overall disclosure score as dependent variable, Panel B displays the results for the sub-indices of the disclosure score analysis. The reported results contain the estimated coefficients, marginal effects, as well as measures for the goodness-of-fit. For the last we report the likelihood ratio index (LRI), the pseudo- R^2 and a measure for predictive power (PP)¹⁷ indicating the fraction of banks being correctly classified using the model estimates of the coefficients and the cut points.

For all models estimated, the coefficients for the capital ratio and return on assets are correctly signed. The significance of the individual coefficients is always higher when when the related variable is the only independent variable included in the model. This is due to the fact that collinearity between the capital ratio and return on assets exists, which itself does not pose a problem for the econometric procedure but affects the estimates. Furthermore, the marginal effects suggest for all models that the probability for high disclosure decreases with an increase in the capital or profitability ratio and the opposite for a decrease in the ratios.

¹⁷See McFadden (1974) for the LRI and Estrella (1998) for the pseudo- R^2 and a measure for predictive power (PP).

The goodness-of-fit measures indicate satisfactory explanatory power for all estimated models. When using the indicators for the extent of disclosure (WORDS) or for the overall content (SCORE), we find that both the capital ratio and return on assets are significant when considered individually, with the significance being higher in the analysis based on the extent of disclosure. Including both independent variables yields only a significant coefficient for the equity ratio when the disclosure level is determined by the number of words. The marginal effects suggest that the probability for a high level of disclosure declines significantly when the capital ratio and /or return on assets increase. The goodness-of-fit-measures for these models are approximately 0.15 for the LRI, 0.30 for the pseudo- R^2 , and 0.80 for the predictive power. Investigating the content of disclosure in more depth using the sub-indices of the disclosure score analysis, we find that for the models based on the definition of operational risk (DEF), while the coefficients themselves are not significant, the results for the marginal effects clearly support our hypothesis. The results of the models based on the score in the risk management category (MGT) suggest that the capital ratio has a substantial influence on the reporting policy, while profitability exhibits significance only in the marginal effects. Finally, when considering the influence of the capital and profitability ratio on reporting on regulatory issues (REG), both independent variables are highly significant. This finding supports our hypothesis that both low capitalized and less profitable banks have a high incentive for assuring supervisors that there is no need for supervisory action.

Overall, the empirical evidence presented suggests that the equity ratio and return on assets affect reporting on operational risk, with lower capitalized and/or less profitable institutions choosing higher levels of operational risk disclosure.

[insert Table 8 about here]

5 Conclusion

Until recent years, the risk management spectrum of banks mainly covered market and credit risk whereas a commonly accepted definition of operational risk did not exist. However,

following major loss events and fundamental changes in the operating environment of financial institutions, banks and supervisors started to revise their approaches to define, measure, and manage operational risks. The Basel Committee stresses the importance of disclosure for promoting transparency and effective market discipline. Apart from bank regulators, accounting and corporate governance standard setters as well as rating agencies and auditors seek to encourage improved risk management disclosure.

The present paper investigates banks' operational risk reporting practices for the years 1998 to 2001, a sample period in which the concern about operational risk started to increase but related disclosure was not mandatory. By analyzing financial institutions' annual reports, we provide evidence that both extent and content of banks' disclosure on operational risk increased substantially, reflecting the intensified risk management efforts of banks, supervisors, and other agents.

Since banks enjoyed a large degree of freedom with respect to reporting on operational risk, the issue of potential motives for discretionary disclosure is investigated. We provide evidence that the extent and content of disclosure on operational risk are negatively related to a bank's equity-ratio and profitability. Consistent with arguments based on information risk, agency theory, financial distress and political costs, our findings indicate that institutions with a lower equity-ratio and/or are less profitable choose a higher level of disclosure with respect to operational risk in order to assure the market that operational risks are well managed.

For the future we expect banks to converge to a higher disclosure equilibrium due to the advancing implementation of Basel II and the emergence of global disclosure standards and transparency requirements. As a consequence of this development, we expect a less pronounced relationship between banks' disclosure and equity-ratio and profitability in the future, at least when measuring disclosure by the index applied in this paper. However, a higher level of disclosure would allow for an evaluation using a more detailed index specifically quantitative disclosures related to operational risk could provide a fruitful basis for future research.

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Table 1: Extracts of operational risk disclosure

Bank	Disclosure Extract
Tokai Bank (Annual Report, 1998)	<p>The changing financial environment and expansion in business volume have led to increased operating risk. To raise quality and eliminate irregularities, we have implemented a business procedures system, strengthened guidelines and training, and assigned operational supervisors to each branch. [...]</p> <p>To further raise the efficiency and effectiveness of operations management, from April 1998 we have placed bank publications, including operational guidelines, online so that employees have quick access to the latest materials for reference. [...]</p> <p>Operating risk management procedures have been standardized for overseas operations as well, and we plan to replace branch-by branch operating risk management with a centralized system.</p>
Tokai Bank (Annual Report, 2001)	<p><i>Quantification of Operational Risk</i></p> <p>The UFJ Group began efforts to measure its operational risk exposure quantitatively in 1998, firstly with processing risk and system risk. The UFJ Group is currently improving the method used to quantify processing risk and system risk. The method incorporates historical loss experience in the occurrence of processing errors, accidents and computer malfunctions. It also formulates scenarios by evaluating the nature of each processing and IT system based on the assessment by Processing Workflow Charts and System Risk Evaluation Sheets described above. Combining the internal loss data and the scenario-based loss possibilities, the UFJ Group calculates the operational risk amount by VaR methodology. Results of these quantitative analyses are also used to calculate the operational risk capital, to efficiently allocate resources among the group's operating activities.</p>
Standard Chartered (Annual Report, 1998)	<p><i>Operational risk management</i></p> <p>Operational risks are managed within a policy framework set by the Directors. This covers operations risk, protective security and business continuity planning and is structured upon well-established control procedures that take a proactive approach to the minimisation of fraud and operational loss. Policy sets minimum standards and requires all business units to identify and assess risks at least quarterly and to address and resolve operational risk issues quickly. Group Executive Directors receive quarterly reports on key operational risk issues and a summary is presented annually to the Audit and Risk committee.</p>

Table continued on next page.

Table 1: Examples of Operational Risk Reporting (continued)

Bank	Disclosure Extract
<p>continued ... Standard Chartered (Annual Report, 1998)</p>	<p>The Group Operational Risk department ensures these policies are relevant, current and encompass all significant operational risk exposures. It is also responsible for highlighting operational risk issues in major projects such as Year 2000 and Euro and for migrating best practice across the Group. The implementation of Operational Risk Policy is subject to regular audit and underpins corporate governance. During 1998 the Group's operational risk exposure increased due to turbulence in many of its core markets. However, overall the impact was minimal because of the emphasis placed by the Group on sound control management and the application of sound operational risk policies.</p> <p>The Group is recognised as a market leader within the financial services industry on operational risk management, and its policy and organisation compare favourably with the standards set out in the Basle Committee discussion paper on Operational Risk issued in September 1998.</p>
<p>Rabobank, (Annual Report, 1999)</p>	<p><i>Operational risk</i></p> <p>Operational risk is sometimes regarded as a 'remaining risk' involving all risks other than market, interest rate or credit risk. More precisely defined, it is the risk of any direct or indirect losses arising from deficiencies in procedures and systems and from human failures.</p> <p>Managing operational risk is primarily the responsibility of line management. Rabobank Group is currently preparing a more detailed approach aimed at reducing operational risks on the basis of self-assessments. Events will also be recorded more systematically, given the essential need to quantify operational risk.</p> <p><i>Statement by head of audit department</i></p> <p>"Of course we have always managed operational risks. We are an AAA bank and also for that reason we cannot afford to neglect internal controls and procedures. Recently, these risks have received more attention on a central level on a more systematic basis, from the supervisor as well as from us. In the future, we want to express the operational risk as a single index. This demands considerable co-ordination, as practically all departments are exposed to operational risk."</p>
<p>Rabobank (Annual Report, 2001)</p>	<p><i>Operational risk</i></p> <p>Operational risk is the risk of direct or indirect losses arising from deficiencies in procedures and systems and from human failures or from external events. As a matter of policy, the management of the individual Rabobank Group entities is responsible for developing policy, processes and procedures to manage operational risk. All banking products, activities, processes and systems are affected. Operational risk awareness within the Group increased further during the year, in part because of regulations set by the Dutch central bank.</p>

Table 2: Disclosure Index for Evaluating the Extent Disclosure on Operational Risk ^a

Operational Risk in general	1
Definition (DEF)	
Direct / indirect loss	2
Technology and system risk	3
Risk of human error	4
Legal risk	5
Catastrophes	6
External events	7
Criminal actions	8
Risk Management (MGT)	
Risk management (general)	9
Exposure	10
Bank-wide	11
Identification	12
Measurement	13
Monitoring	14
Controlling	15
Database	16
Internal communication / Reporting	17
Audit	18
Regulatory Issues (REG)	
Supervision (general)	19
Basel Committee	20
Capital charge and provisions	21
Unexpected loss	22

Notes:

^a The disclosure index consists of three sub-indices: definition of operational risk (DEF), management of operational risk (MGT), and regulatory issues (REG). Furthermore, the item ‘Operational Risk in general’ serves as a residual category, to ensure that banks which report on operational risk but do not score in any of the sub-indices are not considered to be non-disclosing.

Table 3: Extent of Operational Risk Disclosure relative to Other Risks ^a

Panel A: Fraction of banks disclosing information on operational risk ^b

	1998	1999	2000	2001
This sample	41%	63%	73%	92%***
BCBS surveys		63%	82%	91%

Panel B: Relative importance of operational risk compared to other risks ^c

	1998	1999	2000	2001
Operational risk	10%	17%	18%	22%***
Market risk	47%	46%	43%	42%
Credit risk	43%	37%	39%	36%

Notes:

^a The analysis is performed for all commercial banks with USD 40 billion assets in 2000 from the Banker's Almanac database (2000), and crosschecked with the 'Bank Atlas' in (2001) and english annual reports available for the financial years 1998 to 2001. 59 financial institutions, 236 observations.

^b The first row gives the fraction of banks in our sample that report on operational risk, while the second displays the respective disclosure rates with respect to operational risk reported in the Basel Committee's surveys (BCBS, 2001c; BCBS, 2002a; BCBS, 2003b)

^c The relative importance given to reporting on operational risk compared to market and credit risk is measured by counting the number of times operational risk, credit risk and market risk are mentioned within the risk reports of a bank's annual report and calculating the proportions.

*** indicates that the change from 1998 to 2001 is significant at the 1% level.

Table 4: Evaluation of the Extent of Operational Risk Disclosure
^a

Panel A: Evaluation of the extent of disclosure as measured by the number of words ^b

WORDS	Risk Report			Operational Risk Section			Operational Risk / Risk Report					
	1998	1999	2000	2001	1998	1999	2000	2001	1998	1999	2000	2001
Average Value	2457	3323	4485	5252***	97	178	290	397***	4.33%	6.02%	6.75%	7.35%***
Median Value	1526	3032	3596	4882	0	126	158	273	0.00%	4.13%	5.74%	6.15%
Standard Deviation	2488	2166	3791	3468	146	240	380	394	7.90%	8.10%	7.04%	5.28%

Panel B: Evaluation of the extent of disclosure as measured by the number of pages ^c

PAGES	Risk Report			Operational Risk Section			Operational Risk / Risk Report					
	1998	1999	2000	2001	1998	1999	2000	2001	1998	1999	2000	2001
Average Value	4.97	7.03	9.05	10.27***	0.26	0.5	0.74	1.00***	5.43%	7.37%	9.10%	10.07%***
Median Value	3.5	6	7	8	0	0.5	0.5	0.5	0.00%	6.25%	8.33%	10.00%
Standard Deviation	4.75	4.96	7.46	7.16	0.35	0.75	0.89	0.85	8.98%	8.83%	9.24%	6.15%

Notes:

^a The analysis is performed for all commercial banks with USD 40 billion assets in 2000 from the Banker's Almanac database (2000), and crosschecked with the 'Bank Atlas' in (2001) and english annual reports available for the financial years 1998 to 2001. 59 financial institutions, 236 observations.

^b WORDS is defined as the number of words .

^c PAGES is defined as the number of pages.

** The change from 1998 to 2001 is significant at the 5% level.

*** The change from 1998 to 2001 is significant at the 1% level.

Table 5: Content of Operational Risk Disclosure as Measured by the Disclosure Index ^a

		1998	1999	2000	2001
SCORE	Average	15%	25%	36%	46%***
	Median	0%	27%	36%	50%
DEF	Average	15%	23%	37%	46%***
	Median	0%	29%	43%	43%
MGT	Average	15%	26%	35%	47%***
	Median	0%	30%	40%	50%
REG	Average	6%	14%	25%	34%***
	Median	0%	0%	25%	25%

Notes:

^a The analysis is performed for all commercial banks with USD 40 billion assets in 2000 from the Banker's Almanac database (2000), and crosschecked with the 'Bank Atlas' in (2001) and english annual reports available for the financial years 1998 to 2001. 59 financial institutions, 236 observations. SCORE is defined as the unweighted disclosure score from 22 items in categories Operational Risk, DEF, MGT and REG where

DEF is the subindex for operational risk definition,

MGT is the subindex for management of operational risk and

REG is the subindex for regulatory issues.

*** The change in the average disclosure ratio from 1998 to 2001 is significant at the 1% level.

Table 6: Comparison of the Extent and Overall Content of Disclosure ^a

Panel A: Banks categorized based on the number of words indicator ^b

	1998	1999	2000	2001
Disc=0	59.32%	37.29%	27.12%	8.47%
Disc=1	20.34%	30.51%	35.59%	45.76%
Disc=2	20.34%	32.20%	37.29%	45.76%

Panel B: Banks categorized based on the overall disclosure score ^c

	1998	1999	2000	2001
Disc=0	59.33%	37.29%	27.12%	8.48%
Disc=1	18.64%	25.42%	32.20%	44.07%
Disc=2	22.03%	37.29%	40.68%	47.46%

Panel C: Spearman rank correlation between the words indicator and the overall score

	1998	1999	2000	2001
Rank correlation	0.9612	0.8932	0.9432	0.9094

Notes:

^a The analysis is performed for all commercial banks with USD 40 billion assets in 2000 from the Banker's Almanac database (2000), and crosschecked with the 'Bank Atlas' in (2001) and english annual reports available for the financial years 1998 to 2001. 59 financial institutions, 236 observations.

^b *Disc* = 0 no disclosure, *Disc* = 1 number of words below the yearly median, *Disc* = 2 number of words above the yearly median.

^c *Disc* = 0 no disclosure, *Disc* = 1 disclosure score below the yearly median, *Disc* = 2 disclosure score above the yearly median.

Table 7: Descriptive Statistics of the Relationship between Banks' Disclosure and Equity- and Profitability-Ratios ^a

Panel A: Average capital and profitability ratios based on the number of words indicator ^b

WORDS	Equity Capital/Total Assets			Net Profit/Total Assets		
	Disc=0	Disc=1	Disc=2	Disc=0	Disc=1	Disc=2
Overall	5.56%	4.60%	3.91%***	0.73%	0.63%	0.33%**
1999	5.12%	4.19%	3.96%	0.78%	0.60%	0.48%
2000	5.83%	4.78%	3.43%	0.77%	0.62%	0.39%
2001	6.75%	4.72%	4.28%	0.50%	0.65%	0.17%

Panel B: Average capital and profitability ratios based on the overall disclosure score ^c

SCORE	Equity Capital/Total Assets			Net Profit/Total Assets		
	Disc=0	Disc=1	Disc=2	Disc=0	Disc=1	Disc=2
Overall	5.55%	4.60%	4.00%**	0.73%	0.52%	0.44%**
1999	5.11%	4.17%	4.02%	0.78%	0.49%	0.57%
2000	5.83%	4.80%	3.53%	0.77%	0.52%	0.48%
2001	6.89%	4.76%	4.40%	0.43%	0.54%	0.31%

Notes:

^a The analysis is performed for all commercial banks with USD 40 billion assets in 2000 from the Banker's Almanac database (2000), and crosschecked with the 'Bank Atlas' in (2001) and english annual reports available for the financial years 1998 to 2001. Equity capital / total assets ratio and net profit / total assets ratio are available from Banker's Almanac database (2000) database for 1999, 2000, 2001. 59 financial institutions, 173 observations.

^b *Disc* = 0 no disclosure, *Disc* = 1 number of words below the yearly median, *Disc* = 2 number of words above the yearly median.

^c *Disc* = 0 no disclosure, *Disc* = 1 disclosure score below the yearly median, *Disc* = 2 disclosure score above the yearly median.

** The difference between disclosure levels is significant at the 5% level.

*** The difference between disclosure levels is significant at the 1% level.

Table 8: Determinants of the Disclosure Level ^a

Panel A: Coefficient estimates, marginal effects and goodness of fit of random effects ordered logit model relating the disclosure level (WORDS or SCORE) to equity ratio (E/A) and profitability ratio(NP/A). ^b

DEP	INDEP		Marginal Effects						Goodness-of-fit		
	E/A		E/A		NP/A		NP/A		LRI	Pseudo-R ²	PP
	Disc=0	Disc=1	Disc=0	Disc=1	Disc=0	Disc=1	Disc=0	Disc=1			
WORDS	-25.13*	-48.78	2.49	0.67	-3.16*	4.84	1.3	-6.14*	0.161	0.317	0.798
	(14.15)	(35.32)	(1.72)	(2.96)	(1.72)	(3.34)	(5.74)	(3.34)			
SCORE	-36.31***		3.61	1.07	-4.67*				0.158	0.31	0.821
	(12.12)		(2.47)	(4.22)	(2.45)						
		-77.85**				7.76	1.93	-9.69*	0.156	0.306	0.786
		(32.67)				(5.45)	(9.31)	(5.36)			
	-20.46	-35.8	2.02	0.65	-2.67*	3.53	1.14	-4.67*	0.156	0.304	0.803
	(13.9)	(33.1)	(1.53)	(2.54)	(1.40)	(2.68)	(4.44)	(2.45)			
	-27.71**		2.77	0.92	-3.69**				0.153	0.3	0.809
	(12.46)		(2.07)	(3.42)	(1.88)						
		-54.41*				5.39	1.62	-7.01*	0.152	0.298	0.809
		(31.62)				(4.13)	(6.76)	(3.73)			

Table continued on next page.

Table 8: Determinants of the Disclosure Level (continued)

Panel B: Coefficient estimates, marginal effects and goodness of fit of random effects ordered logit models
P relating the sub-indices DEF, MGT, and REG to equity ratio (E/A) and profitability ratio(NP/A).

DEP	INDEP		Marginal Effects						Goodness-of-fit		
	E/A		E/A		NP/A		LRI	Pseudo- R^2	PP		
	E/A	NP/A	Disc=0	DEP=1	Disc=1	Disc=2					
DEF	-4.56 (15.4)	-17.4 (33.16)	0.52* (0.32)	0.13 (0.52)	-0.65** (0.30)	1.98 (1.21)	0.49 (2.00)	-2.47** (1.16)	0.12	0.243	0.775
	-8.63 (13.64)		0.99* (0.59)	0.25 (0.98)	-1.24** (0.57)				0.12	0.242	0.769
		-22.27 (28.39)				2.52 (1.55)	0.61 (2.56)	-3.13** (1.49)	0.12	0.243	0.775
MGT	-29.19* (14.97)	-27.31 (31.63)	3.03 (2.08)	0.58 (2.99)	-3.62** (1.93)	2.84 (1.94)	0.55 (2.79)	-3.39** (1.81)	0.156	0.306	0.798
	-34.93*** (13.31)		3.67 (2.49)	0.75 (3.58)	-4.42* (2.30)				0.155	0.303	0.809
		-45.27 (29.93)				4.79 (3.37)	0.72 (4.68)	-5.51** (2.87)	0.151	0.296	0.792
REG	-17.43 (13.03)	-99.76** (41.19)	2.71*** (0.94)	0.02 (1.10)	-2.73** (1.14)	15.49*** (5.36)	0.12 (6.30)	-15.61** (6.53)	0.114	0.218	0.723
	-35.70*** (11.87)		5.87*** (1.77)	0.02 (2.21)	-5.90*** (2.23)				0.099	0.193	0.746
		-124.64*** (38.01)				18.59*** (6.89)	0.29 (7.84)	-18.88** (8.50)	0.11	0.212	0.723

Notes:

^a The analysis is performed for all commercial banks with USD 40 billion assets in 2000 from the Banker's Almanac database (2000), and crosschecked with the 'Bank Atlas' in (2001) and english annual reports available for the financial years 1998 to 2001. Equity capital / total assets ratio (E/A) and net profit / total assets ratio (N/A) available from Banker's Almanac database (2000) database for 1999, 2000, 2001. 59 financial institutions, 173 observations.

^b WORDS is defined as the number of words in the operational risk section of the annual report.

SCORE is defined as the unweighted disclosure score from 22 items in categories Operational Risk, DEF, MGT and REG. DEF is the subindex for operational risk definition, MGT is the subindex for management of operational risk, REG is the subindex for regulatory issues.

^c $Disc = 0$ no disclosure, $Disc = 1$ number of words /score below the yearly median, $Disc = 2$ number of words / score above the yearly median.

^d The likelihood ratio index (LRI), pseudo- R^2 and a measure for predictive power (PP), indicating the fraction of banks being correctly classified using the model estimates are reported.

* The coefficients or marginal effects are significant at the 10% level.

** The coefficients or marginal effects are significant at the 5% level.

*** The coefficients or marginal effects are significant at the 1% level.