

## Market Microstructure Effects of the Transparency of Indian Banks

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### Abstract

One of the primary objectives of the banking sector deregulation in India is to introduce an element of market discipline into the regulatory process. For the market's disciplining mechanism to operate, however, banks must provide transparent disclosures of their operations and risks in a timely fashion and must adopt prudent accounting policies. Transparency, though a costly endeavour for a bank, generates significant benefits at a firm-specific level. Previous empirical research has demonstrated that firms that provide higher quality of disclosures benefit by way of improved market liquidity and reduced cost of capital primarily because of the reduction in the level of information asymmetry among investors. This paper investigates whether enhanced transparency in the case of Indian banks is indeed rewarded with increased market liquidity by way of reduced bid-ask spreads. The paper also examines the market's reaction to the enhanced disclosure requirements as of March 31, 2000 as required by Reserve Bank of India guidelines. Finally, to verify the market's reaction to enhanced disclosures based on US GAAP requirements, the paper also examines the market's reaction to the Form 20F filing made by ICICI Ltd. with the Security Exchange Commission.

The results of the paper indicate that, in the Indian case, enhanced transparency had no significant impact on the market liquidity of private sector banks. In the case of public sector banks, it is observed that enhanced transparency is associated with *reduced* market liquidity. In addition, no significant change in the market liquidity was observed with the release of the additional disclosure information as of March 31, 2000 as required by the Reserve Bank of India. Finally, the market reacted favourably to the release of ICICI's Form 20F disclosure with the Security Exchange Commission containing market risk and segment information as per US GAAP not provided in the Indian annual report.

These results suggest that the market's disciplining mechanism does not seem to work at least in the case of Indian private sector banks because the disclosures are not of adequate quality, or, that investors find the enhanced disclosures relatively opaque. However, the favourable reaction to ICICI's Form 20F filing indicates that Indian investors do not find the enhanced risk-based disclosures relatively opaque. The results for the private sector banks point to a need to significantly improve the level and credibility of the accounting disclosures made by these banks. An explanation for the anomalous results in the case of the public sector banks, might be that enhanced disclosure levels are viewed as a sign of impending privatization and of a gradual withdrawal of the government's safety net in case of bank failure. Also, the enhanced information is possibly providing investors a glimpse into the lack of a sound corporate governance structure and the poor risk management strategies adopted by these banks.

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## **I. Introduction and Motivation**

As part of the financial sector deregulation process, the Government of India has proposed that it will eventually reduce its stake in the public sector banks to thirty-three percent. This will ultimately lead to the privatization of the large public sector banks that currently control most of the banking assets in the industry. One of the primary motives behind this drive is to introduce an element of market discipline into the regulatory process that will reinforce the supervisory effort of the Reserve Bank of India (RBI). It is believed that the market's disciplining mechanism will efficiently weed out the weaker players without triggering off a banking crisis like the sort seen in S. Korea and Thailand.

As banks turn to the equity markets for funds, they are required to report their performance to stockholders and creditors. This increased scrutiny from the equity markets forces improvements in corporate governance, in internal control structures, and in cost and the risk management processes. Banks need to do all this in order to obtain capital from the equity and debt markets at a competitive cost. According to the Basle Committee on Banking Supervision's report on *Enhancing Bank Transparency* issued in September 1998, a sound and well-managed bank is able to "obtain better terms and conditions in transactions with informed and rationally-behaving market counterparties. The market will require, on the other hand, a higher return from funds invested in, or placed with, a bank that is perceived as having more risk." It is in this context that the Basle Committee sees infusing market discipline as the third pillar in the capital adequacy framework. Market discipline, especially in the financial liberalization phase, reinforces regulatory and supervisory efforts (the second pillar in the capital adequacy framework) and provides a strong incentive to banks to conduct their business in a prudent and efficient manner and to maintain adequate capital (the first pillar) as a cushion against risk exposures. The absence of prudential supervision and market discipline is considered to be one of the primary reasons for the East Asian financial crisis in 1997.

The functioning of the market's disciplining mechanism and also the effectiveness of the supervisory process, however, is hindered by weak accounting and legal systems, and inadequate transparency of accounting disclosures. For the market's disciplining mechanism to operate, banks must provide full, reliable, and high-quality (i.e, transparent) disclosures of their operations and risks in a timely fashion and must use prudent accounting policies. Such transparency in bank disclosures (a) enables investors to more accurately assess a bank's financial strengths and performance; (b) increases the credibility of the information disclosed by the bank; (c) demonstrates the risk-management ability of the bank by disclosing relevant information about the quality and quantity of risks it faces and (d) reduces market uncertainty associated with its cash flow stream. Better quality public disclosures reduce the level of information asymmetry between bank managers and investors and thereby enhance investor confidence in a bank's stock and in the banking industry. Empirical research has demonstrated that high quality disclosures improve a firm's market liquidity (Welker, 1995; Welker, 2001) and reduces its cost of capital (Botosan, 1997).

From a central bank's perspective, such high-quality disclosures help the early detection of problem banks by the market and reduce the severity of market disruptions. Consequently, the RBI as part and parcel of the financial sector deregulation, attempted to enhance the transparency of the annual reports of Indian banks by, among other things, introducing stricter income recognition and asset classification rules, enhancing the capital adequacy norms, and by requiring a number of additional disclosures sought by investors to make better cash flow and risk assessments. One of the objectives of this study is to verify whether the incremental set of mandatory disclosures imposed by the RBI as of March 31, 2000 had any impact on the spreads and the depth of bank stocks. If the results indicate a positive reaction to such regulatory efforts, it will provide credence to the RBI's policy of reinforcing its supervisory efforts with a dose of market discipline.

Despite this regulatory effort, it is possible that the Indian banks in the rush to grab market-share have under-emphasized the need to voluntarily improve the transparency of their accounting disclosures. Hence, this paper initially examines the disclosure practices of a sample of Indian banks and examines whether the level of disclosure varies systematically with the pattern of share ownership, and the level of profitability and debt-leverage of banks. The paper will also examine the cross-sectional association between the level of accounting disclosure and market liquidity is examined. The primary hypothesis of this paper is that enhanced disclosures will result in an improvement in market liquidity, i.e., a firm's bid-ask spread will reduce and/or the depth of its order book will increase. A positive association between the level of disclosures and the liquidity of a bank's stock provides a sound market-based rationale for banks to voluntarily enhance the transparency of their disclosures despite the administrative costs. According to the empirical evidence, higher market liquidity will enable banks to add economic value by their lowering the cost of capital.

Finally, this paper will conduct an event study to examine the stock market's reaction surrounding the filing of ICICI's Form 20F report with the Security Exchange Commission (SEC) of the USA. This annual report filing is publicly available through the SEC's website and made available, for the first time, a large number of risk-based and segment related disclosures containing high-quality information not available in a typical Indian bank's annual report issued to domestic stockholders. The paper examines whether the market liquidity variables of ICICI reacted favourably to the release of such high-quality information on the date of the Form 20F filing.

The next section provides a survey of related literature. **Section III** states and explains the three hypotheses examined in this paper. **Section IV** describes the bank transparency measure utilized and **Section V** presents the sample selection procedures and the methodology adopted in the paper. The results are discussed in **Sections VI** and **VII**. Finally, **Section VIII** contains the study's conclusions.

## II. Literature Survey

The bid-ask (or, bid-offer) spread offers a useful market based metric to measure the impact of enhanced disclosure on the level of asymmetric information between managers and capital market investors<sup>1</sup> especially in an order-driven electronic market. According to Glosten and Milgrom (1985), even in the absence of inventory holding costs and order-processing costs (borne by market-makers in quote-driven markets), the bid-ask spread increases with the level of information asymmetry between investors. The National Stock Exchange (NSE) is an order book based electronic marketplace with no competing market makers as on the US NASDAQ market, and, no monopoly specialists as on the NYSE. In such order-driven markets, the spread for a firm is determined, therefore, primarily by the level of information asymmetry surrounding the firm from the investor's perspective and the immediacy with which the investor would like the trade to take place (Handa, et al 1998). Hence, the size of a firm's bid-ask spread on an order-driven market like the NSE, after controlling for other liquidity-related considerations, measures the perceived level of information asymmetry between investors. The lack of transparent public disclosures, it is conjectured, aggravates this asymmetric information problem and results in a wider bid-ask spread.

Diamond and Verrechia (1991) theoretically demonstrated that a firm by revealing public information that reduces information asymmetries between managers and investors could increase the demand from large investors and, thereby, increase the liquidity of its security and reduce the firm's cost of capital. Barclay and Smith (1988) use the theoretical framework of Glosten and Milgrom (1985) to demonstrate a positive association between the level of information asymmetry and the asymmetric information cost component of the bid-ask spread and the related cost of capital of a firm. This association between the level and quality of accounting disclosure and market microstructure variables like the bid-ask spread, depth and trading volume has been empirically researched in recent years mostly in the quote driven markets. However, there is sparse empirical work on this issue from the perspective of the banking industry.

Welker (1995) empirically demonstrated that better disclosure policies are associated with increased levels of market liquidity as measured by the size of the proportional bid-ask spread. Heflin, Shaw and Wild (2001) observe that *high quality* accounting information that is publicly available to all investors helps to reduce information asymmetry and thereby the size of the bid-ask spread. Lang and Lundholm (1996) provide evidence that firms with more informative disclosures have larger analyst following, more accurate analyst earnings forecasts, and less dispersion among individual analyst forecasts. Their results indicate that even sophisticated market participants like financial analysts perform better with firms that provide more

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<sup>1</sup> In quote driven markets, the market maker determines the quoted bid-ask spread after taking into account all the fixed and variable costs involved in market making. Typically, market makers face three types of costs namely, (a) order processing costs that represent the cost of processing a transaction, (b) inventory holding costs that represents the opportunity cost of holding inventory along with the associated price risk, and (c) the adverse selection costs that represents the cost associated with dealing with informed traders like insiders. The first two components decrease with increased liquidity and are negatively associated with trading volume. Also, inventory-holding costs increase with greater price volatility. Adverse selection costs increase with the presence of informed traders with superior information sets that place them at an advantage over the market maker. In the presence of informed traders, the market maker widens the spread so as to recover the losses suffered in the hands of the informed traders from the uninformed, liquidity traders.

transparent disclosures. Affleck-Graves, Callahan and Chipalkatti (2002) demonstrate that NASDAQ firms with lower earnings predictability based on their annual report disclosures have larger proportional bid-ask spreads than firms with higher earnings predictability. They also observe an increase in the asymmetric information costs of the spread the day before an earnings announcement for firms with less predictable earnings. No such increase was observed by the authors in the asymmetric information costs for firms with highly predictable earnings. Their results confirm that the public disclosure of low quality information, in fact, aggravates the asymmetric information costs and increases bid-ask spreads even around earnings announcements. Finally, Leuz and Verrecchia (2000) observed that the bid-ask spreads decreased and that the trading volumes increased for German firms that switched from a German to an international reporting regime (IAS or US GAAP) considered to be of a better quality.

There have been three studies that have examined the direct effect of disclosure adequacy on the cost of capital of firms. Botosan (1997) and Welker (2001) observe that for firms with low analyst following, greater disclosure is associated with a lower cost of equity capital. Similarly, Botosan and Plumlee (2000) find that the cost of equity capital is decreasing in annual report disclosure level. A related piece of work by Zarzeski (1996) demonstrates that enterprises operating in the international marketplace adopting a global culture tend to disclose higher levels of information than dictated by their local culture in order to obtain resources at reasonable costs.

The research findings mentioned above highlight the effect of corporate disclosure on a firm's market liquidity and its associated cost of capital. The fact that good quality corporate disclosure is associated with improved market liquidity and reduced cost of capital provides a market-based rationale to explain why a bank should choose better quality disclosures in an environment of financial deregulation and privatization. However, banking firms possess certain unique qualities that make them different from other industrial firms. Banks tend to have opaque assets like loans and volatile assets like trading securities. In addition, banks tend to rely on short-term liabilities and are highly leveraged (Flannery, Kwan and Nimalendran, 1998). A study by Morgan (2000) demonstrated that banks tend to be relatively more opaque than other firms as measured by the level of disagreement between bond rating agencies. If banks are relatively opaque even for sophisticated information processors, can the market disciplining mechanism work? In contrast to the results of Morgan (2000), Flannery, Kwan and Nimalendran (1998) observed no significant difference in the trading properties of large banks traded on the New York Stock Exchange (NYSE) as compared to a matched sample of non-financial NYSE firms. Also, they obtained no clear results on the impact of the book value of certain bank assets (loans, trading assets, etc.) on the size of the asymmetric information cost component of the bid-ask spread. In their study, Flannery, et al (1998) examined the association between proportion of the different assets owned by banks and the spread. They did not, however, examine the nature and quality of disclosures made by the banks regards these opaque or volatile assets.

In sum, there is no clear evidence whether the market rewards more transparent banks or whether market forces are in a position to discipline banks given the relative opacity and volatility of their assets and their debt structure. A study of Indian banks using NSE data especially in a period of financial liberalization will provide useful policy insights on this critical issue.

### III. Hypothesis Development

This study will examine the association between the nature and quality of annual report disclosures made by Indian banks and market microstructure variables like the bid-ask spread and order depth. One of the contributions of this research paper is the construction of an instrument to measure the transparency of a bank's disclosures. This instrument is used to evaluate the nature and adequacy of the annual report disclosures made by a cross-section of Indian banks and to compute a transparency score for each bank. The paper then examines the association between spreads, depth and the level of bank transparency at a cross-sectional level. The literature reviewed previously suggests a negative association between the transparency score and spreads (and a positive association between depths and the transparency score). This would imply that the market's disciplining mechanism will work even in the case of the banking firms despite the unique nature of their assets. Banks with more transparent disclosures will be rewarded by being able to obtain debt and equity funds at lower costs. The paper's first hypothesis is formally stated below.

**H1: It is hypothesized that banks that provide more transparent information to investors, as measured by the bank transparency score described subsequently, will have smaller spreads and/or greater depth.**

This paper will also examine the incremental effect of the Reserve Bank's stricter disclosure rules effective March 31, 2000 and whether these had any impact on the spreads and/or the depth of bank stocks. In 1992, the RBI had increased the capital adequacy standards to 8% to be consistent with international norms. Since 1992, it has also attempted to enhance the transparency of bank financial statements by requiring disclosures of additional items like the amount of subordinated debt, interest income as a percentage of working funds, and return on assets. Effective March 31, 2000, the RBI raised the capital adequacy standards to 9%. In addition, as of that date, it tightened the non-performing assets provisioning standards and required disclosures about movements in non-performing assets. Banks were also required to disclose (a) the maturity patterns of loans and advances, investment securities, deposits and borrowings, (b) their lending to sensitive sectors and (c) foreign currency assets and liabilities. The second hypothesis of the paper follows.

**H2: It is hypothesized that the enhanced transparency in the annual reports due to the RBI regulation will result in a decrease in the spreads of banks and/or an increase in the depths after July 31, 2000<sup>2</sup> by which time all annual reports would be distributed to bank stockholders.**

Hahn and Mishkin (2000) demonstrate that in the liberalization phase, the Korean banking industry faced rapidly increasing banking assets with a steady deterioration in balance sheet quality primarily through an increase in non-performing assets. Inadequate supervision and lax accounting and disclosure standards

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<sup>2</sup> Banks tend to distribute their annual reports between the months of April to July as per the date stamps placed by Disclosure India (a service that disseminates annual reports for a fee) for a sub-sample of the banks examined in this study. It is assumed that by July 31, 2000 all banks would have distributed their annual reports. In the absence of a "annual report filing date" as in the case of US companies filing with the SEC, this is the best available approximation of when annual report data has been made public.

contributed to an environment of heightened information asymmetries in the banking sector. The Indian banking sector faces a similar ballooning of non-performing assets as seen in the case of the Korean banks<sup>3</sup>. The East Asian crisis, while not felt so dramatically in India, has heightened the level of information asymmetry between investors and bank managers even in the Indian case. In such an environment, in an effort to stand out in a crowd of banks with standardized disclosures and to gain access to cheaper foreign equity capital, ICICI Ltd. became the first Indian bank that issued sponsored American Depositary Receipt (ADR) on the NYSE. Its ADRs started trading on the NYSE on September 22, 1999. All foreign banks that issue ADRs in the US are required by the SEC to provide additional detailed information about market risk, business segments and other disclosures as per US GAAP including a set of consolidated financial statements as part of their Form 20F annual report filing. As per this requirement, ICICI Ltd. made its first Form 20F filing on September 27, 2000.

The final objective of this paper is to conduct an event study to examine the Indian stock market's reaction surrounding the filing of ICICI's Form 20F report with the SEC. This annual report filing, which is publicly available through the SEC's website, provided for the first time a large number of additional disclosures containing high-quality information about ICICI Ltd. that was not available in its Indian annual report issued to domestic stockholders. The study examines<sup>4</sup> whether the market liquidity of ICICI increased favorably after the release of such high-quality information on the NSE trading day just after Form 20F filing, i.e. on September 29, 2000. The final hypothesis of the paper is formally stated below.

**H3: It is hypothesized that the bid-ask spread of ICICI Ltd. will significantly decrease and/or its depth will significantly increase on September 29, 2000 - the trading day just after the date of filing of its Form 20F with the SEC.**

#### **IV. Calculation of the Bank Transparency Score**

The measurement of the adequacy and the quality of a bank's annual report disclosures involves the construction of an instrument that measures the level of an individual bank's transparency.<sup>5</sup> The instrument is similar in concept to the disclosure score indices constructed for industrial companies by Botosan (1997) and Zarzeski (1996). It essentially is a list of disclosures that are considered to be useful in enhancing the transparency of bank's financial statements, the attached footnotes and the associated reports and analysis sections. Banks with higher transparency scores provide more investor-oriented annual report disclosures

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<sup>3</sup> *Outlook* July 2, 2001, "The Non-Performing Excesses", pp. 51-53.

<sup>4</sup> By comparing the behaviour of the market liquidity variables surrounding this event for ICICI Ltd. as compared to the reaction for the other banks, one can test the impact of additional disclosure using methodology similar to an event study. The strength of this technique is that, similar to an event study, the impact of other confounding variables is marginalized. However, the test just evaluates the short term reaction of market liquidity variables unlike the long-window cross-sectional test conducted for the first hypothesis.

<sup>5</sup> This is based on Chipalkatti (2001) Market Microstructure Effects of Bank Transparency: A Preliminary Examination, Proceedings of the 2001 Academy of Business and Administrative Sciences, Brussels, Belgium. The paper was also presented at the Capital Markets doctoral seminar on June 28, 2001 at the Indira Gandhi Institute of Development Research, Mumbai and the author thanks Dr. Ajay Shah and other participants for their valuable comments.



that permit investors to better assess with greater levels of certainty, the current financial conditions of a bank and its future performance and associated risk.

The bank transparency score (**BTS**) used in this study include the 1998 recommendations of the Transparency Sub-Group of the Basle Committee on Banking Supervision, Bank for International Settlements. Given the increasingly global nature of the Indian economy, the international industry recommendations mentioned above were considered relevant in the case of Indian banks. The recommendations of the International Accounting Standards Committee were also considered, given that the Indian accounting standards increasingly conform to international practices set by the same. Currently, the local standards conform in all material respects to international standards in most cases except in the case of banks. Hence, additional input was obtained from the International Accounting Standard No. 30, *Disclosures in the Financial Statements of Banks and Other Similar Financial Institutions*, and the illustrative bank financial statements as per International Accounting Standards available from the website of PriceWaterhouseCoopers, an international accounting firm with a significant presence in India. These standards are also relevant because in April 2000, after completing a comprehensive review of International Accounting Standards (IAS), the Basle Committee expressed its full support for the same. An assessment of the disclosure practices of Indian banks will provide an initial assessment of how the Indian standards and disclosure practices compare with international standards.

This study collates the recommendations from these two sources mentioned above to develop a bank transparency score for Indian banks. The framework of the instrument developed broadly adopts the categorization recommended by the Basle Committee in its report on enhancing bank transparency. The Committee identified six broad categories of information that a bank should address in clear and appropriate details in order to achieve a critical level of transparency. These categories were (a) financial performance, (b) financial position, (c) risk management policies, (d) risk exposures including credit risk, market risk, liquidity risk and legal and operation risk, and (e) accounting policies adopted. For each category, the Basle Committee described in some details a list of disclosures that it considered to be transparency enhancing. However, many of the risk exposure issues relating to trading and derivative-based activities were eliminated from consideration in the case of Indian banks as they were not relevant given nature and maturity of the Indian capital market.

The final instrument developed contains a list of ninety items that were considered to be transparency enhancing, high-quality public disclosures in the case of Indian banks. The detailed instrument used to assess the bank transparency scores has been provided in **Appendix 1**. The transparency score instrument contains ten sections (A to J) of which the first four relate to a bank's (a) financial statements, (b) corporate governance issues, (c) financial performance and (d) financial position related disclosures. The remaining six sections relate to risk management and risk component related disclosures. The higher the total

bank transparency score (**BTS**) obtained by a bank, the more transparent are its annual report disclosures. As per hypothesis 1, the higher the transparency score, the smaller will be the bid-ask spreads of banks and/or the higher will be the trading depths of these banks.

Initial scores of the banks included in the sample have been provided on **Table 1**. Additional univariate non-parametric tests were conducted to verify if there is any systematic association between the level of disclosure made by a bank and (a) the percentage of shares held by the government, (b) the percentage of shares held by foreign shareholders, (c) the market capitalization of the bank, (d) the financial strength of banks as measured by the capital adequacy ratio, (e) various profitability measures and (f) financial leverage. It is expected that better levels of disclosure will be associated with lower levels of governmental shareholding and higher levels of foreign shareholding. Finally, larger, stronger, better performing and less leveraged banks, respectively, will have better disclosures to signal the same to investors. In a competitive environment where a bank wants to stand out from a crowd of similar banks, improved transparency might be a signal that a weaker player would find too costly to issue. Finally, to eliminate the impact of other confounding variables on market liquidity, the study employs a multivariate control test. For these tests, the bank transparency score was split into two – one component score relating to the financial statements and its performance (**FIN** – based on the first four sections of the bank transparency score instrument) and other component relating to risk management and related disclosures (**RSK** – based on the last 6 sections of the instrument). Details about the multivariate test are provided below.

## **V. Sample Selection and Methodology**

An initial list of 37 banks was obtained from *Wiseguy*, ICICI's knowledge management portal<sup>6</sup>. This initial list of banks was further screened to include (a) banks that were traded on the National Stock Exchange (NSE) for at least 100 trading days in the year 2000 and (b) banks whose published annual reports for the year ended March 31, 2000 were readily available<sup>7</sup>. Only 17 banks (out of a total of 59 public and private sector banks) were left in the sample after these previous two screens. Foreign banks were not considered in this study. Details of the banks included in the sample are provided on **Tables 1 to 3**.

Market microstructure data was obtained from the National Stock Exchange of India. Intra-day trading data including bid and offer prices, transaction prices, daily volume and daily high and low prices from January 1, 2000 to October 31, 2000 were obtained from this dataset. The order data that was used in this study was restricted to include data with no quantity or price flags. This, as per the NSE documentation, represents the most common type of transactions on the database. The performance of various market microstructure measures including best bid -offer price based spread, weighted total spread, realized spread,

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<sup>6</sup> The author would like to thank Dr. Mathew Joseph and members of ICICI's Knowledge Management Group for their assistance with this project in July, 2000.

<sup>7</sup> The author would like to thank Mr. Arun Agrawal of ICRA, Mumbai for sending him the bank annual reports. This paper would not have been feasible without this invaluable service.

asymmetric information cost component of the spread and market depth was evaluated to ensure that the results were robust. A brief description of these variables follows.

The daily best bid-offer spread (**BBOSPD**) is computed for each bank based on order data received after 1 p.m. and is the difference between the lowest offer price and the highest bid price in effect at least five minutes after 1 p.m.

$$BBO_{T^? T1, d, i} = (O_{t, d, i} - B_{t1, d, i}) / M_{T^? T1, d, i} \quad (1)$$

In equation (1),  $t$  represents the time stamp for a lowest sell order (offer, O) price placed at least 5 minutes after 1 p.m. that involves a trade of at least 100 shares. Similarly,  $t1$  represents the time stamp for the highest buy order (bid, B) price placed at least 5 minutes after 1 p.m. that involves a trade of at least 100 shares. This best bid-offer price is in effect from time T (higher of  $t$  and  $t1$ ) to T1 till a better bid-offer price replaces it. This computation is done for each bank ( $i=1$  to 17 banks in the sample) for all 196 trading days ( $d=1... 196$ ). The best bid-offer is standardized by the mid-point (M) of the best bid and the best offer prices. The **BBOSPD**, therefore, represents the proportional spread from an investor's perspective and is a measure of the transaction costs incurred while trading in bank's stock. These transaction costs include all the real costs of transacting plus the asymmetric information costs of trading. In an order-based market, it is assumed that the real costs of holding inventory are minimal and that the spread essentially represents the order processing costs and, primarily, the asymmetric information costs borne by an investor. An additional measure of market liquidity, the market depth (**DPT**) of a bank's order book, is calculated to be the depth on the best bid price plus the depth on the best offer price similar to Lee, Mucklow and Ready (1993).

To verify the robustness of the results obtained for the **BBOSPD**, a weighted average spread (**WTSPD**) has been computed for all market orders received between 1 p.m. to 2 p.m. This variable computes the spread using the quoted depth of each order as a weighting factor. The weighted average bid price uses buy orders for price data and the weighted-average ask price uses sell orders for the same. The difference between the weighted ask price and the weighted bid price represents the weighted average spread, which is standardized by the mid-price (M) metric that has been defined previously.

$$WTSPD_{d,i} = (WA_{d,i} - WB_{d,i}) / M_{T^? T1, d, i} \quad (2)$$

In the above equation, for each bank  $i$  ( $i=1$  to 17) and for each day  $d$  ( $d= 1$  to 196), the following has been computed:

$$WA_{d,i} = \sum_{t=1}^n A_t * D_t / \sum_{t=1}^n D_t \quad (3)$$

$$WB_{d,i} = \sum_{t=1}^n B_t * D_t / \sum_{t=1}^n D_t \quad (4)$$

While the best bid-offer spread and the weighted average spread measure all the costs associated with transacting in a firm's shares, the realized spread metric measures only the real costs of transacting. The realized spread (Huang and Stoll, 1996) measures the post-trade revenues of any supplier of immediacy and is the change in the price of a stock over a specified time interval after a buy order or a sell order. The realized

spread is computed as the price change conditional on a purchase at the highest bid or, the negative of the price change conditional on a sale at the lowest ask. The daily weighted average realized spread (**WTRS**) for the time interval between 1 p.m. and 2 p.m. has been computed using the trading volume of each transaction as a weighting factor.

$$WTRS_{d,i} = (RS_{d,i}) / M_{T^? T1, d, i} \quad (5)$$

$$RS_{d,i} = \sum_{t=1}^n | (P_{t,i} - P_{t,i}) | * V_{t,i} / \sum_{t=1}^n V_{t,i} \quad (6)$$

In equation (6),  $P_{t,i}$  is the best bid price for all subsequent sales transactions (if the price of the subsequent transaction is greater than the mid-price (**M**) metric) and is the best offer price for all subsequent buy transactions. The best bid and offer price are all based on the **BBOSPD** computation. The subsequent transactions at  $P_t$  take place at time  $t$  after the **BBOSPD** has expired. The time subscript  $tt$  represents transactions after  $T1$ , i.e.,  $tt > T1$ , the time when the **BBOSPD** expires. The post-trade realization, i.e., the difference between the two prices ( $P_t - P_t$ ) has been weighted by the trading volume ( $V_t$ ) to derive the weighted average realized spread. The weighted average realized spread (**WTRS**) is a measure of the real costs of transacting in bank's stock, namely, the order processing plus inventory holding costs.

Finally, the difference between the best bid offer spread (**BBOSPD**) and the weighted average realized spread (**WTRS**) has been computed. This metric is taken to be a proxy for the asymmetric information costs (**AIC**) associated with transacting in a bank's stock (Stoll, 2000).

$$AIC_{d,i} = BBO_{T^? T1, d, i} - WTRS_{d,i} \quad (7)$$

An initial univariate non-parametric examination using the Mann-Whitney  $U$  test of the market liquidity variables was conducted. The sample of 17 banks was split into a two disclosure portfolios based on the median disclosure score – a high disclosure portfolio for banks with a greater than median score and a low disclosure portfolio. This was done to examine if there is any association between market liquidity and the level of disclosure. Additional non-parametric univariate tests were conducted to examine if there was any association between disclosure levels and the percentage of government ownership, the percentage of foreign shareholding, and the market capitalization of a bank.

To examine the impact of the disclosure variable on market liquidity at a multivariate level, a pooled cross-sectional time-series regression model<sup>8</sup> has been estimated after controlling for the impact of other variables that are associated with liquidity. Dummy variables were used to examine the behaviour of the market liquidity variables around critical events dates. The regression model that was estimated<sup>9</sup> is described next.

<sup>8</sup> The SUR weighted least squares estimation procedure has been used to account for any potential bias due to heteroskedasticity, first-order autocorrelation and cross-correlation in the pooled series.

<sup>9</sup> The cross-sectional and time-series subscripts have been omitted

$$\begin{aligned}
\text{LOG(ML)} &= C(1) + C(2)*\text{LOG(VOL)} + C(3)*\text{LOG(VLT)} + C(4)*\text{LOG(MCP)} + \\
&C(5)*\text{LOG(MKTINDEX)} + C(6)*\text{DT1} + C(7)*\text{LOG(GOV)} + C(8)*\text{LOG(FOR)} + \\
&C(9)*\text{ADR1} + C(10)*\text{ADR2} + C(11)*\text{LOG(ADQ)} + C(12)*\text{DT2} + \\
&C(13)*(DT2*\text{LOG(FIN)}) + C(14)*(DT2*\text{LOG(RSK)}) + C(15)*\text{DT3} + \\
&C(16)*(DT3*\text{ADR1}) + C(17)*(DT3*\text{ADR2}) + x \quad (8)
\end{aligned}$$

In the above equation, the dependent variable of market liquidity (**ML**) is measured, in turn, by the variables **BBOSPD**, **WTSPD**, **WTRS**, **AIC** and **DPT**. Market liquidity as measured by the spread and the depth of a stock maybe associated with other variables like trading volume, price risk, and market capitalization among others. To control the effect of these variables on market liquidity, ten independent variables have been included in the model. The variables include daily trading volume<sup>10</sup> (**VOL**), price risk as measured by daily volatility<sup>11</sup> (**VLT**), market capitalization (**MCP**) as of March 31, 2000, a market index variable<sup>12</sup> (**MKTINDEX**), percentage of a bank's shares held by the government (**GOV**), percentage of shares held by foreign shareholders (**FOR**), the capital adequacy ratio (**ADQ**) of the sample banks and three dummy variables.

It is well-documented in the market microstructure literature (Stoll, 2000) that spread (depth) is negatively (positively) associated with trading volume and positively (negatively) associated with price risk. The market capitalization variable serves as a proxy for the quantity of information about a bank's stock. It is assumed that larger banks get more extensive analyst and press coverage than smaller banks. The proportion of shares held by the government is used to measure the investing public's perception of the size of the government guarantee in case of bailout. The larger the proportion of a bank's stock that is held by foreign shareholders, the greater is the demand for more transparent accounting disclosures consistent with international or US accounting standards. Finally, low capital adequacy ratios signal greater risk of bank failure and will negatively impact market liquidity.

In addition to all these, three dummy variable **DT1**, **ADR1**, and **ADR2** have been included as control variables. The dummy variable for March 29, 2000 (**DT1**) has been included as that represents the day when ICICI Bank started trading on the NYSE. The other two dummy variables **ADR1** and **ADR2** take a value of '1' for ICICI Ltd and ICICI Bank Ltd., respectively. Both these banks had ADRs issued in the U.S. and hence, these control dummy variables. The dummy variable, **DT2**, takes on the value of '1' for all days after July 31, 2000 ('0' otherwise), representing the date by which all bank annuals reports are assumed to have been distributed to shareholders. The sign and the significance of **C(12)** will be used to test the second hypothesis (**H2**) that better disclosures imposed by the RBI as of March 31, 2000 have had a favourable

<sup>10</sup> The results with an instrumental variable based estimate of volume to remove any simultaneity bias were qualitatively the same and are not reported.

<sup>11</sup> Price risk is measured as daily high price minus daily low price divided by the mid-point of the BBO spread.

<sup>12</sup> This is proxied by the sum of the BBO spread of all 17 banks in the sample for the spread variables and the sum of the DPT variable for trading depth analysis.

impact on the stock market liquidity of banks. It is expected that the coefficient **C(12)** will be significantly negative.

The disclosure score variable **(BTS)**, described in a previous section, has been split into a two additional variables – one relating to disclosures about financial statements, corporate governance, financial performance and position **(FIN)** and the other relating to risk management and exposures **(RSK)**. The higher the two disclosure scores, the more transparent and investor-friendly are the accounting disclosures made by a bank in its annual report. It is hypothesized **(H1)** that greater transparency in accounting disclosures will be associated with more liquid stocks, or, smaller spreads and/or larger depths. As mentioned, the disciplining mechanism of the market can operate only if banks disclose high-quality information to its investors and if investors do, in fact, act upon it. To test whether better quality disclosures do in fact result in better market liquidity as hypothesized, the sign and the significance of the coefficients **C(13)** and **C(14)** are examined. It is expected that these will be significantly negative.

The dummy variable, **DT3**, is used to test the third hypothesis **(H3)** that the filing of ICICI's Form 20F disclosure on September 27, 2000 will favourably impact the market liquidity of ICICI Ltd. The Form 20F disclosure, as required by the SEC, contains additional detailed information about market risk not available in ICICI's annual report. It is expected that the coefficient **C(16)** (for the interaction term **DT3\*ADR1**) will be significantly negative. Additionally, it is expected that the coefficient **C(15)** will not be significant, reflecting no change in the market liquidity of the other banks. As ICICI Bank is a subsidiary of ICICI Ltd., the effect for ICICI Ltd. might leak to the subsidiary especially because the US GAAP financials provide consolidated information. Hence, the sign for **C(17)** is also expected to be significantly negative.

## **VI. Results of the univariate tests**

The results of the Mann-Whitney *U* test indicate **(Table 2A)** that there is no significant association between the level of disclosure and percentage of shares held by the government and the percentage of shares held by foreign shareholders, respectively. High government ownership, by itself, does not discourage banks from disclosing as much as any other private bank. The results also indicate that larger banks provide more transparent disclosures. It is possible that larger banks are motivated to disclose better as they are subject to greater scrutiny by the investment community and by the regulatory authorities. There is weak support **(Table 2B)** to indicate that banks with higher capital adequacy ratios provide more transparent disclosures. It is possible that in an environment of increased competition, stronger banks enhance their disclosure transparency as a signal to investors. Finally, while there was no significant difference in the disclosure scores of banks across profitability levels **(Table 2C)** but banks with lower levels of leverage did have significantly higher disclosure scores.

A second set of univariate non-parametric tests was conducted on the market liquidity variables **(Table 3)**. It was hypothesized that the higher the disclosure score of a bank, the smaller will be the size of

the spread variables and/or the higher will be the trading depths of the banks. The initial results support this expectation. The BBO spread<sup>13</sup>, weighted spread, and the weighted realized spread of banks with higher levels of disclosure are indeed smaller than those of banks with lower levels of disclosures. However, there was no significant difference in the size of the asymmetric information cost component and in the average daily trading depths of the banks. In addition, firms with higher levels of disclosure have higher prices, higher average daily volumes and a larger number of daily trades. In general, the results support the notion that higher disclosures are associated with greater market liquidity in the case of Indian banks. Surprisingly, these results are primarily due to the lower real costs of transacting for high disclosure banks and are not driven by lower levels of asymmetric information cost.

## VII. Multivariate test results

**Table 4** provides the results for all market liquidity variables. The signs and significance of the trading volume, volatility, market index and market capitalization variables are as per expectations. Surprisingly, both the Indian banks with ADRs (ICICI Ltd. and ICICI Bank) have significantly larger total and realized spreads, on an average, than other Indian banks. In the case of ICICI Ltd., this includes both the real costs as well as information costs of transacting in these stocks. However, both these stocks have larger trading depths than other Indian banks. All spread variables including the asymmetric information costs are significantly smaller for stocks with larger foreign holding. However, banks with larger foreign holding have significantly lower trading depths than the rest. Finally, stronger banks with higher capital adequacy ratios have significantly lower total costs of transacting than weaker banks with lower capital adequacy ratios primarily due to lower real costs.

The results for the transparency score variables are not as expected. The coefficient on the **DT2\*RSK** variable is significantly positive (and not negative, as expected) for the **BBOSPD**, the **WTDSP** and the **AIC** variables indicating that spreads increase with improved risk-based disclosures primarily due to increased asymmetric information costs.<sup>14</sup> The coefficient **C(14)** is positive but weakly significant in the case of the realized spread variable, suggesting that firms with better risk related disclosures face increased real costs too. The result that high transparency leads to low liquidity<sup>15</sup> can be explained by the following notion. It is possible that high transparency banks have more precise announcements and that gains to trading based on private information prior to earnings announcements are greater. The coefficient on the **DT2\*FIN** variable never achieves statistical significance except in the case of asymmetric information costs. Only here the results are as per expectation – better disclosures result in lowered information related transaction costs.

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<sup>13</sup> The analysis has been conducted using the average of the various variables over the sample time-period from January 1, 2000 to October 31, 2000.

<sup>14</sup> The regression was re-estimated without Bank of Madura and Bank of Rajasthan as suggested by the participants of the NSE seminar on October 25<sup>th</sup>, 2002. The results remained qualitatively the same and hence have not been reported.

<sup>15</sup> The author would like to thank the final referee for this insight.

The results for the depth variable are also not as per expectations; the higher the **FIN** score, the lower the trading depth of the banks.

To check if the results were driven by banks with high levels of government shareholding, the regression model was re-estimated on the sample after excluding banks with higher than median levels of governmental<sup>16</sup> shareholding. The results for the restricted sample that included all the private sector banks and ICICI Ltd. are on **Table 5**. The coefficient of the **DT2\*RSK** variable is not significant anymore indicating that the previous results were indeed driven by the large public sector banks. On the other hand, the results for the restricted sample indicate that for private sector banks, the market's disciplining mechanism that rewards better disclosures with higher liquidity is not operating in the case of the Indian banking industry.

The results do not support the second hypothesis that RBI's regulations increasing the level of disclosure as of March 31, 2000 increased the market liquidity of banks. The coefficient, **C12**, for the variable **DT2** is not significant in all cases except for the realized spread variable. These results were also obtained for the restricted sample of private banks with the difference that the asymmetric information costs significantly increased for these banks after the release of this incremental information. These regulations reduced the real costs of transacting in the shares of Indian banks but, in general, did not impact the asymmetric information costs of transacting in the same. The lack of an accurate date of receipt of bank annual reports by stockholders and the consequent reliance on a broad cut-off date of July 31, 2000 to test this hypothesis increases the likelihood of "noise" from other events confounding the results.

The full sample results indicate that the coefficient **C16** for the interaction variable, **DT3\*ADR1**, is significantly negative for **BBOSPD**, **WTSPD**, and **WTRS** and is weakly positive for the **DPT** variable. There is a significant reduction in the total spread especially in the real costs of transacting in the stock of ICICI Ltd. on the first trading day after it filed its Form 20F with the SEC. However, no such significant reduction was observed for the asymmetric information costs borne by investors. These results were also obtained for the restricted sample of private banks. The coefficient for **DT3** is not significant indicating no change in the market liquidity of other banks included in the sample. The Form 20F filing contains additional data about market risk not contained in ICICI's annual report. The results indicate that investors react favourably to the disclosure of incremental market risk data that boosts the transparency of a bank. These results are encouraging and different from the results obtained for the **RSK** variable. A possible explanation might be that the Indian investors reacted favourably to the better market risk disclosures made as per US GAAP and that were verified by the SEC. It is possible that Indian investors and/or foreign investors of ICICI Ltd. view the US GAAP-based disclosures as more transparent and the SEC's monitoring of these disclosures more stringent than Indian institutions. To keep things in perspective, the results indicate that the

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<sup>16</sup> The six public sector banks and the data for IFCI and IDBI were excluded. The regression was also re-estimated without Bank of Madura and Bank of Rajasthan. The results remained qualitatively the same and hence have not been reported.



spread of ICICI Ltd. is larger than the spread of an average public sector bank but not significantly different from the spread of an average private sector bank.

### **VIII. Conclusions**

Theoretically, the market's disciplining mechanism is supposed to reward banks that provide more transparent disclosures to their investors. The foregoing results indicate that, at least in case of Indian private sector banks, this is not the case. Also, contrary to expectations, the markets react unfavourably and reduce market liquidity in the case of public sector banks that disclose better. The results are puzzling considering that the univariate results indicate that stronger, bigger banks and less leveraged banks disclose better quality information than other banks. It is probable that the enhanced disclosures are not transparent to investors, given the complexity of the banking industry, or, that the enhanced disclosures lack credibility in the eyes of the Indian investing public. Another possible explanation for the anomalous results in the case of the public sector banks, might be that enhanced disclosure levels are viewed as a sign of impending privatization and of a gradual withdrawal of the government's safety net in case of bank failure. In other words, the enhanced risk-based exposures are taken to be proxies of heightened asymmetric information risk and not as indicators of better risk-management capabilities by these banks. Investors react unfavourably to this signal by reducing the liquidity of these banks. Possibly, the enhanced information is providing investors a glimpse into the lack of sound corporate governance structure and into the poor risk management strategies adopted by these banks. Finally, the result that high transparency leads to low liquidity may be explained by the notion that high transparency banks may provide more opportunity for trading gains based on private information prior to earnings announcements. To reduce such asymmetric information based gains, better monitoring of insider trading is called for.

The results also indicate that the RBI's regulations increasing the level of transparent disclosures as of March 31, 2000 were not favourably acted on by investors. Once again these results might be indicative of the relative opacity of these disclosures from the perspective of the investors. Alternatively, the results might imply that the incremental disclosures lack credibility in the eyes of the investing public possibly due to poor enforcement or slack accounting standards. The relative opacity argument, however, loses ground when one considers that the market reacted favourably to the release of the Form 20F information in the case of ICICI Ltd. The incremental market risk data as per US GAAP required (and verified) by the SEC were impounded by the market as evidenced by the reaction of the market liquidity variables. This seems to indicate that Indian investors found the marginal information content of these disclosures to be transparent and credible.

The study underscores the importance of creating an independent supervisory and monitoring institution for banking activity that is perceived to be free from governmental and bureaucratic interference. Accounting and disclosure standards especially with respect to risk exposures need to be enhanced to be at par with international levels. In addition, the independent supervisory body should be given the charge of monitoring these standards. Furthermore, capital adequacy norms should be strictly enforced and

investment by foreign investors or raising capital in foreign capital markets should be encouraged. According to the results of this study, all of these steps should have a favourable impact on the market liquidity of banks.

There are no easy solutions in the case of the public sector banks. According to the findings of this study, enhancing banks' transparency reduces their market liquidity. However, improved transparency is critical to infusing an element of market discipline into the banking sector and for the government to eventually divest its holding in this sector. It would be against the long-term interests of investors to reverse this process of enhancing the transparency of banking sector. For the long-term health of this sector, therefore, it is critical that there be strict enforcement of capital adequacy norms by an independent monitoring body as well as a clear indication of the government's unwillingness to bail out weaker banks. Weaker players should be encouraged to consolidate and merge with stronger players. In the long run, this will help prevent significant market disruptions due to failing banks. Public sector banks should be required to strengthen their corporate governance and risk-management structures. Innovative ownership structures like the one suggested by Rajan and Shah (2002), where the government's stake is allocated to ten separate funds, should be encouraged as an intermediate step before full privatization. This will allow the public sector banks to shelter themselves from government interference or crony capitalism and concentrate on the business of banking.

**Table 1****Banks Included In Sample With Details Of Their Bank Transparency Scores (Bts)****Bank Transparency Scores****SECTIONS**

<b>BANK NAME</b>	<b>BTS (90)</b>	<b>A (7)</b>	<b>B (15)</b>	<b>C (20)</b>	<b>D (15)</b>	<b>E (4)</b>	<b>F (15)</b>	<b>G (3)</b>	<b>H (6)</b>	<b>I (3)</b>	<b>J (2)</b>	<b>FIN</b>	<b>RSK</b>	<b>RANK</b>
<b>BANKBARODA</b>	38.0	5.0	3.0	11.0	9.0	1.0	7.0	0.0	0.0	1.0	1.0	28.0	10.0	15
<b>BANKINDIA</b>	29.0	6.0	7.0	2.0	6.0	1.0	5.0	0.0	0.0	1.0	1.0	21.0	8.0	11
<b>BANKMADURA</b>	23.0	5.0	4.0	1.0	7.0	0.0	4.0	0.0	0.0	1.0	1.0	17.0	6.0	4
<b>BANKPUNJAB</b>	22.0	5.0	2.0	2.0	6.0	0.0	5.0	0.0	0.0	1.0	1.0	15.0	7.0	2
<b>BANKRAJAS</b>	25.0	6.0	4.0	1.0	5.0	1.0	6.0	0.0	0.0	1.0		16.0	8.0	7
<b>CORPBANK</b>	26.0	5.0	4.0	1.5	8.0	1.0	4.5	0.0	0.0	1.0	1.0	18.5	7.5	8
<b>DENABANK</b>	26.0	4.0	6.0	2.0	8.0	0.0	4.0	0.0	0.0	1.0	1.0	20.0	6.0	9
<b>HDFCBANK</b>	34.0	4.0	4.0	10.0	7.0	1.0	6.0	0.0	0.0	1.0	1.0	25.0	9.0	14
<b>ICICI</b>	51.0	6.0	9.0	13.0	10.0	1.0	10.0	0.0	6.0	1.0	1.0	38.0	19.0	17
<b>ICICIBANK</b>	42.5	6.0	5.5	10.0	10.0	2.0	7.0	0.0	0.0	1.0	1.0	31.5	11.0	16
<b>IDBI</b>	31.5	5.0	6.0	11.0	4.0	1.0	4.5	0.0	0.0	0.0	0.0	26.0	5.5	12
<b>IDBIBANK</b>	31.5	5.0	5.5	5.0	8.0	0.0	6.0	0.0	0.0	1.0	1.0	23.5	8.0	13
<b>IFCI</b>	24.5	6.0	4.5	1.0	3.0	1.0	9.0	0.0	0.0	0.0	0.0	14.5	10.0	6
<b>J&amp;KBANK</b>	22.5	5.0	2.5	3.0	6.0	0.0	5.0	0.0	0.0	1.0	0.0	16.5	6.0	3
<b>SBIN</b>	27.0	5.0	5.0	5.0	5.0	1.0	4.0	0.0	0.0	1.0	1.0	20.0	7.0	10
<b>SOUTHBANK</b>	24.0	4.0	4.0	2.0	6.0	0.0	6.0	0.0	0.0	1.0	1.0	16.0	8.0	5
<b>SYNDIBANK</b>	20.0	5.0	2.0	1.0	6.0	4.0	0.0	0.0	1.0	1.0		14.0	6.0	1
Mean	29.3	5.1	4.6	4.8	6.7	0.9	5.5	0.0	0.4	0.9	0.8	21.2	8.4	
Median	26.0	5.0	4.0	2.0	6.0	1.0	5.0	0.0	0.0	1.0	1.0	20.0	8.0	
Std. Dev.	8.2	0.7	1.8	4.3	2.0	1.0	2.2	0.0	1.5	0.3	0.4	6.7	3.2	

**NOTES:****Section A:** Financial statements**Section B:** Basic business, management and corporate governance information Financial**Section C:** performance

Decision hazels

**Section D:** Financial position (including capital, solvency and

liquidity)

**Section E:** Risk management strategies and practices

**Section F:** Credit risk exposure

Market risk

**Section G:** exposures

**Section H:** Interest rate risk

**Section I:** Currency risk

**Section J:** Liquidity Risk

**Table 2A****Results of the Mann Whitney Non-parametric Test for Differences in Transparency Scores Across Grouping Variables**

NAME	BTS	BTS RANK	GROUPING VARIABLE FOR MANN-WHITNEY TEST					
			FOREIGN HOLDING (FOR %AGE)	Rank FOR	GOVERNMENT HOLDING (GOV %AGE)	Rank GOV	MKT. CAP. (MCP IN 000s)	
BANKBARODA	38.00	15	6.27	10	77.38	13	13616000	12
BANKINDIA	29.00	11	3.55	9	81.64	15	10000350	11
BANKMADURA	23.00	4	0.00	1	0.00	1	1194655	3
BANKPUNJAB	22.00	2	9.82	13	3.27	3	1491000	4
BANKRAJAS	25.00	7	0.47	6	0.39	2	1154821	2
CORPBANK	26.00	9	6.59	11	88.16	17	9168000	10
DENABANK	26.00	8	0.33	5	84.21	16	2337100	6
HDFCBANK	34.00	14	20.56	15	5.12	5	62571102	15
ICICI	51.00	17	48.06	17	34.23	9	105977719	16
ICICIBANK	42.50	16	36.08	16	6.22	6	52560514	14
IDBI	31.50	12	1.46	7	78.03	14	31803644	13
IDBIBANK	31.50	13	0.14	3	10.11	7	4137000	7
IFCI	24.50	6	0.24	4	67.23	10	5663903	9
J&KBANK	22.50	3	3.15	8	4.78	4	1753275	5
SBIN	27.00	10	18.79	14	72.45	11	107759720	17
SOUTHBANK	24.00	5	6.98	12	18.18	8	626500	1
SYNDIBANK	20.00	1	0.06	2	75.05	12	4719680	8
<b>MANN -WHITNEY U</b>			<b>1.54</b>		<b>0.00</b>		<b>3.08</b>	
<b>Signif. @ p &lt; 0.05 ?</b>			<b>Not Signif.</b>		<b>Not Signif.</b>		<b>Signif.</b>	

(To test if there is a significant difference in the disclosure scores across high levels of the grouping variable versus low levels of the grouping variable. The grouping variables have been ranked and the sample split into two portfolios based on the median value of the grouping variable.

The Mann-Whitney U test , a non-parametric test has been conducted to test the hypothesis, given the sample size)

**Notes:**

1. Data on Foreign shareholding and Government shareholding obtained from annual reports and from Hometrade.com website
2. Market capitalization data based on shares data in annual report and price data as of March 31, 2000 from NSE.

**Table 2B****Results of the Mann Whitney Non-parametric Test for Differences in Transparency Scores Across Grouping Variables**

NAME	BTS	BTS RANK	<b>GROUPING VARIABLE FOR MANN-WHITNEY TEST</b>					
			CAPITAL ADEQUACY RATIO (ADQ)	RANK ADQ	INTEREST MARGIN (IMGN %AGE)	RANK IMGN	NET MARGIN (NMGN %AGE)	RANK NMGN
BANKBARODA	38.00	15	12.1	10	3.32	11	8.58	8
BANKINDIA	29.00	11	10.57	6	9.44	16	3.13	3
BANKMADURA	23.00	4	15.83	14	2.86	5	9.72	9
BANKPUNJAB	22.00	2	9.81	4	2.77	4	10.78	11
BANKRAJAS	25.00	7	5.73	1	2.92	6	2.66	2
CORPBANK	26.00	9	12.17	11	4.99	14	12.40	13
DENABANK	26.00	8	9.41	3	2.96	7	3.49	4
HDFCBANK	34.00	14	12.19	12	3.14	9	14.91	17
ICICI	51.00	17	17.2	15	9.94	17	14.35	16
ICICIBANK	42.50	16	19.64	17	1.73	1	10.06	10
IDBI	31.50	12	14.5	13	6.00	15	13.07	15
IDBIBANK	31.50	13	11.8	9	2.35	3	12.73	14
IFCI	24.50	6	8.8	2	1.85	2	2.00	1
J&KBANK	22.50	3	18.82	16	4.59	13	12.14	12
SBIN	27.00	10	11.49	8	3.18	10	7.96	7
SOUTHBANK	24.00	5	10.41	5	3.03	8	4.76	5
SYNDIBANK	20.00	1	11.45	7	3.56	12	7.86	6
<b>MANN -WHITNEY U</b>			<b>1.83</b>		<b>0.58</b>		<b>1.35</b>	
<b>Signif. @ p &lt; 0.05 ?</b>			<b>Not Signif.</b>		<b>Not Signif.</b>		<b>Not Signif.</b>	

(To test if there is a significant difference in the disclosure scores across high levels of the grouping variable versus low level of the grouping variable. The grouping variables have been ranked and the sample split into two portfolio based on the median value of the grouping variable. The Mann-Whitney U test, a non-parametric test has been conducted to test the hypothesis, given the sample size )

**Notes:**

1. Capital adequacy ratios (Tier 1+ Tier 2) obtained from annual reports
2. Ratios calculated from annual report data.
3. Interest Margin =  $(\text{Interest Earned} - \text{Interest expenses}) / [\text{Balances with banks \& Money @ call \& Short Notice} + \text{Investments} + \text{Advances} - \text{Current Accounts}]$
4. Net Margin =  $(\text{Net Profit}) / (\text{Total Income Earned})$

**Table 2C**

**Results of the Mann Whitney Non-parametric Test for Differences in Transparency Scores Across Grouping Variables**

			<u>GROUPING VARIABLE FOR MANN-WHITNEY TEST</u>					
<b>NAME</b>	<b>BTS</b>	<b>BTS RANK</b>	<b>RETURN ON ASSETS (ROA %AGE)</b>	<b>RANK ROA</b>	<b>LEVERAGE (LEV)</b>	<b>RANK LEV</b>	<b>RETURN ON CAPITAL (ROC %AGE)</b>	<b>RANK ROC</b>
BANKBARODA	38.00	3	0.86	7	1.97	1	15.54	10.00
BANKINDIA	29.00	7	0.31	2	22.33	15	6.88	4.00
BANKMADURA	23.00	14	1.03	11	17.93	10	18.39	12.00
BANKPUNJAB	22.00	16	1.04	12	19.14	11	19.95	13.00
BANKRAJAS	25.00	11	0.29	1	16.10	8	4.71	3.00
CORPBANK	26.00	10	1.39	15	14.64	6	20.31	14.00
DENABANK	26.00	9	0.37	3	20.40	13	7.61	5.00
HDFCBANK	34.00	4	1.03	10	15.51	7	15.97	11.00
ICICI	51.00	1	1.84	17	7.01	3	12.92	8.00
ICICIBANK	42.50	2	0.87	8	10.50	5	9.16	6.00
IDBI	31.50	6	1.42	16	7.83	4	11.14	7.00
IDBIBANK	31.50	5	1.35	14	17.38	9	23.50	17.00
IFCI	24.50	12	0.99	9	2.99	2	2.96	2.00
J&KBANK	22.50	15	1.14	13	20.00	12	22.75	16.00
SBIN	27.00	8	0.78	5	21.53	14	2.12	1.00
SOUTHBANK	24.00	13	0.58	4	23.78	16	13.86	9.00
SYNDIBANK	20.00	17	0.79	6	25.91	17	20.57	15.00
<b>MANN -WHITNEY U</b>			<b>0.19</b>		<b>-2.70</b>		<b>-1.05</b>	
<b>Signif. @ p &lt; 0.05 ?</b>			<b>Not Signif.</b>		<b>Signif.</b>		<b>Not Signif.</b>	

(To test if there is a significant difference in the disclosure scores across high levels of the grouping variable versus low levels of the grouping variable. The grouping variables have been ranked and the sample split into two portfolio based on the median value of the grouping variable.

The Mann-Whitney U test , a non-parametric test has been conducted to test the hypothesis, given the sample size)



**Notes:**

1. All data for ratios obtained from bank annual reports
2. Return on Assets =  $(\text{Net Profit}) / (\text{Total Assets})$
3. Return on Capital =  $(\text{Net Profit}) / (\text{Capital} + \text{Reserves and Surplus})$
4. Leverage =  $(\text{Total Assets}) / (\text{Capital} + \text{Reserves and Surplus})$

**Table 3A****Results of the Mann Whitney Non-parametric Test for Differences in Market Liquidity Across High Transparency Score Banks Versus Low Transparency Score Banks**

	<b>MARKET LIQUIDITY VARIABLE</b>				
	<b>BEST BID-OFFER SPREAD</b>	<b>WEIGHTED SPREAD</b>	<b>WEIGHTED REALIZED SPREAD</b>	<b>ASYMMETRIC INFORMATION COSTS</b>	
<b>NAME</b>	<b>BBOSPD</b>	<b>WTSPD</b>	<b>WTRS</b>	<b>AIC</b>	
BANKBARODA	4.86	5.11	2.36	2.52	
BANKINDIA	6.33	7.25	2.73	3.59	
BANKMADURA	4.79	15.07	2.29	2.74	
BANKPUNJAB	5.44	6.56	2.47	2.97	
BANKRAJAS	7.56	8.49	3.32	4.23	
CORPBANK	4.22	5.21	1.79	2.42	
DENABANK	7.32	7.74	2.97	4.13	
HDFCBANK	4.21	4.79	2.20	2.04	
ICICI	3.87	5.14	1.91	1.92	
ICICIBANK	4.63	5.21	2.30	2.41	
IDBI	3.90	4.91	1.60	2.33	
IDBIBANK	5.53	6.23	2.51	2.92	
IFCI	6.69	10.47	2.36	4.32	
J&KBANK	4.92	6.11	2.45	2.66	
SBIN	2.30	3.45	1.26	1.13	
SOUTHBANK	7.32	7.52	3.21	4.04	
SYNDIBANK	5.52	7.30	2.43	3.01	
<b>Mann Whitney U</b>	<b>-2.21</b>	<b>-2.98</b>	<b>-2.60</b>	<b>-1.60</b>	
<b>Signif. @ p &lt; 0.05 ?</b>	<b>SIGNIF</b>	<b>SIGNIF</b>	<b>SIGNIF</b>	<b>Not Signif.</b>	

(To test if there is a significant difference in market liquidity variables across low bank transparency score banks versus high bank transparency score banks)

**Table 3B****Results of the Mann Whitney Non-parametric Test for Differences in Market Liquidity Across High Transparency Score Banks Versus Low Transparency Score Banks**

	<u>MARKET LIQUIDITY VARIABLE</u>					
	<b>MARKET DEPTH</b>	<b>PRICE</b>	<b>DAILY VOLUME</b>	<b>DAILY RUPEE VOLUME</b>	<b>DAILY TRADES</b>	
<b>NAME</b>	<b>DPT</b>	<b>MPCR</b>	<b>VOL</b>	<b>DOLVOL</b>	<b>TRDS</b>	
BANKBARODA	717	45	103934	4610388	403	
BANKINDIA	1306	14	74989	1064709	197	
BANKMADURA	416	93	9796	1052720	80	
BANKPUNJAB	1351	14	58929	960344	155	
BANKRAJAS	938	19	30670	674121	101	
CORPBANK	718	82	63087	5350530	349	
DENABANK	1160	12	14067	170520	43	
HDFCBANK	443	239	152917	36137909	1162	
ICICI	614	124	721575	95833728	3149	
ICICIBANK	463	185	177615	30199972	1122	
IDBI	954	38	190404	7933051	722	
IDBIBANK	989	25	97277	2698948	328	
IFCI	2173	8	94024	812498	190	
J&KBANK	1129	32	15095	522532	62	
SBIN	886	210	1850220	411682654	6974	
SOUTHBANK	609	18	7015	133582	32	
SYNDIBANK	1711	10	217129	2644227	463	
<b>Mann Whitney U</b>	<b>-1.25</b>	<b>2.21</b>	<b>2.79</b>	<b>3.08</b>	<b>2.98</b>	
<b>Signif. @ p &lt; 0.05 ?</b>	<b>Not Signif.</b>	<b>SIGNIF</b>	<b>SIGNIF</b>	<b>SIGNIF</b>	<b>SIGNIF</b>	

(To test if there is a significant difference in market liquidity variables across low bank transparency score banks versus high bank transparency score banks)

**Table 4****Pooled Cross-sectional Time Series Results: Full Sample****Model Estimated:**

$$\begin{aligned} \text{LOG(ML)} = & C(1) + C(2)*\text{LOG(VOL)} + C(3)*\text{LOG(VLT)} + C(4)*\text{LOG(MCP)} + \\ & C(5)*\text{LOG(MKTINDX)} + C(6)*\text{DT1} + C(7)*\text{LOG(GOV)} + C(8)*\text{LOG(FOR)} \\ & + C(9)*\text{ADR1} + C(10)*\text{ADR2} + C(11)*\text{LOG(ADQ)} + C(12)*\text{DT2} + \\ & C(13)*(\text{DT2}*\text{LOG(FIN)}) + C(14)*(\text{DT2}*\text{LOG(RSK)}) + C(15)*\text{DT3} + \\ & C(16)*(\text{DT3}*\text{ADR1}) + C(17)*(\text{DT3}*\text{ADR2}) + x \end{aligned}$$

<b>DEPENDENT VARIABLE (ML)</b>						
		<b>BBO</b>	<b>WTSPD</b>	<b>AIC</b>	<b>WTRS</b>	<b>DPT</b>
	<b>COEFF.</b>	<b>t-stats</b>	<b>t-stats</b>	<b>t-stats</b>	<b>t-stats</b>	<b>t-stats</b>
<b>CONSTANT</b>	<i>C(1)</i>	5.56	14.10	2.48	5.06	7.67
<b>VOL</b>	<i>C(2)</i>	-5.28	0.92	-1.16	-5.28	6.97
<b>VLT</b>	<i>C(3)</i>	9.93	13.41	7.93	8.31	-4.83
<b>MCP</b>	<i>C(4)</i>	-2.60	-5.90	-1.93	-2.83	-4.24
<b>MKTINDX</b>	<i>C(5)</i>	14.24	7.31	5.05	7.27	12.83
<b>GOV</b>	<i>C(6)</i>	0.22	0.43	-1.68	1.47	8.32
<b>FOR</b>	<i>C(7)</i>	-4.43	-7.30	-2.50	-3.34	-8.69
<b>ADQ</b>	<i>C(8)</i>	-3.82	-4.36	-0.74	-3.21	-6.98
<b>ADR1</b>	<i>C(9)</i>	5.81	10.35	3.11	4.70	3.20
<b>ADR2</b>	<i>C(10)</i>	4.58	6.97	1.57	3.82	5.56
<b>DT1</b>	<i>C(11)</i>	-0.57	-0.62	0.22	-1.10	-3.27
<b>DT2</b>	<i>C(12)</i>	-1.06	-1.72	1.15	-2.49	1.18
<b>DT2*FIN</b>	<i>C(13)</i>	-1.32	-0.75	-2.64	1.07	-2.12
<b>DT2*RSK</b>	<i>C(14)</i>	2.97	3.17	2.04	1.66	1.67
<b>DT3</b>	<i>C(15)</i>	0.80	1.88	-1.51	1.45	-0.76
<b>DT3*ADR1</b>	<i>C(16)</i>	-2.83	-2.46	-1.22	-2.01	1.75
<b>DT3*ADR2</b>	<i>C(17)</i>	0.48	-1.90	1.46	-0.10	1.46
<b>Observations</b>		2626	2626	2327	2310	2626
<b>Unweighted Adj. R-Square</b>		0.19	0.27	0.08	0.14	0.19
<b>F-statistic</b>		43.95	63.60	16.94	26.99	50.18
<b>Chi-square</b>		703.25	1017.67	271.07	431.85	802.86
<b>Signif. @ p &lt;0.05</b>		<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

**Table 5****Pooled Cross-sectional Time Series Results: Low Government Shareholding Sample****Model Estimated:**

$$\begin{aligned} \text{LOG(ML)} = & C(1) + C(2)*\text{LOG(VOL)} + C(3)*\text{LOG(VLT)} + C(4)*\text{LOG(MCP)} + \\ & C(5)*\text{LOG(MKTINDX)} + C(6)*\text{DT1} + C(7)*\text{LOG(GOV)} + C(8)*\text{LOG(FOR)} \\ & + C(9)*\text{ADR1} + C(10)*\text{ADR2} + C(11)*\text{LOG(ADQ)} + C(12)*\text{DT2} + \\ & C(13)*(\text{DT2}*\text{LOG(FIN)}) + C(14)*(\text{DT2}*\text{LOG(RSK)}) + C(15)*\text{DT3} + \\ & C(16)*(\text{DT3}*\text{ADR1}) + C(17)*(\text{DT3}*\text{ADR2}) + x \end{aligned}$$

<b>DEPENDENT VARIABLE</b>						
		<b>BBO</b>	<b>WTSPD</b>	<b>AIC</b>	<b>WTRS</b>	<b>DPT</b>
	<b>COEFF.</b>	<b>t-stats</b>	<b>t-stats</b>	<b>t-stats</b>	<b>t-stats</b>	<b>t-stats</b>
<b>CONSTANT</b>	<i>C(1)</i>	<b>3.09</b>	<b>7.95</b>	0.40	<b>2.13</b>	<b>7.67</b>
<b>VOL</b>	<i>C(2)</i>	-1.09	<b>3.52</b>	0.97	-1.60	<b>6.97</b>
<b>VLT</b>	<i>C(3)</i>	<b>6.69</b>	<b>8.69</b>	<b>4.76</b>	<b>5.96</b>	<b>-4.83</b>
<b>MCP</b>	<i>C(4)</i>	-1.75	<b>-5.25</b>	-1.03	<b>-2.15</b>	<b>-4.24</b>
<b>MKTINDX</b>	<i>C(5)</i>	<b>7.95</b>	<b>5.20</b>	<b>3.37</b>	<b>5.48</b>	<b>12.83</b>
<b>GOV</b>	<i>C(6)</i>	0.90	0.29	0.33	0.14	<b>8.32</b>
<b>FOR</b>	<i>C(7)</i>	-1.54	-1.68	-0.70	-1.08	<b>-8.69</b>
<b>ADQ</b>	<i>C(8)</i>	<b>-3.86</b>	<b>-3.37</b>	-1.45	<b>-2.52</b>	<b>-6.98</b>
<b>ADR1</b>	<i>C(9)</i>	0.74	<b>1.96</b>	0.07	1.41	<b>3.20</b>
<b>ADR2</b>	<i>C(10)</i>	<b>2.13</b>	<b>3.00</b>	0.92	1.82	<b>5.56</b>
<b>DT1</b>	<i>C(11)</i>	0.96	-0.50	0.86	-0.99	<b>-3.27</b>
<b>DT2</b>	<i>C(12)</i>	-0.08	0.22	<b>2.42</b>	-0.80	1.18
<b>DT2*FIN</b>	<i>C(13)</i>	0.12	-0.11	-0.16	0.17	<b>-2.12</b>
<b>DT2*RSK</b>	<i>C(14)</i>	-0.10	0.03	-0.81	0.24	1.67
<b>DT3</b>	<i>C(15)</i>	-0.09	1.90	-1.08	0.55	-0.76
<b>DT3*ADR1</b>	<i>C(16)</i>	<b>-2.45</b>	<b>-2.39</b>	-1.02	-1.71	1.75
<b>DT3*ADR2</b>	<i>C(17)</i>	0.81	<b>-1.96</b>	1.62	0.11	1.46
Observations		1237	1237	1060	1058	1237
<b>Unweighted Adj. R-Square</b>		0.16	0.24	0.07	0.13	0.15
<b>F-statistic</b>		16.29	25.03	5.74	10.40	14.43
<b>Chi-square</b>		260.63	375.39	91.87	166.48	216.41
<b>Signif. @ p &lt;0.05</b>		<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

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## **Appendix 1**

### **Bank Transparency: Computation of Disclosure Score**

**Name of Bank:**

**Accounting year ended:**

**Ticker:**

**Points:**

#### **A. Financial Statements: 7 points**

**(1)** Audited financial statements of parent bank:

Profit & Loss Account/ 1

Balance Sheet/ 2

Details of Changes in Capital & Reserves (Stockholders' Equity) 3

Statement of Cash Flows/ 4 (optional)

**(2)** Financials of unconsolidated subsidiaries provided/ 5

**(3)** Auditor's Report/ 6

**(4)** Consolidated financials/ 7

#### **B. Basic business, management and corporate governance information: 15 points**

**(1)** Management's discussion about the bank's position in the markets, its strategy and its progress towards achieving strategic objectives

1. Statement of corporate goals and objectives, strategy and progress

2. Competitive environment and industry trends

3. Principles lines of business, products and markets (overview)

4. Bank's position in markets (market share)

**(2)** The organization of the bank – its legal and management structure

5. Names, qualifications and experience of the board members

6. Senior management structure

7. Basic organization structure (legal entity)

**(3)** Management discussion and analysis:



8. The main factors that influenced a bank's financial performance for the year compared to past years
9. A discussion of net interest income, net non-interest income.
10. A discussion of factors that will have a significant influence on future performance with a profit forecast, cash projection, and revenue forecast
11. Discussion on major capital expenditure commitments
12. Impact of inflation on performance
13. Discussion of the bank's liquidity position and about additional financing
14. Discussion and analysis of a bank's financial position
15. Discussion on nature of foreign currency exposure, how exposure has changed on a yearly basis, foreign exchange translation effects, earnings impact of foreign exchange transactions

**C. Financial Performance: 20 points**

- (1) Income statement that groups income and expenses by nature or function within the bank, specifically (a) interest income and expense (b) dividend income (c) fee and commission income and expense (d) net gains/losses from securities dealings, investment securities, and foreign currency dealing, (e) other operating income, (f) loan losses, (g) general administrative expenses
- (2) Horizontal Analysis of Income Statement or equivalent/
- (3) Vertical Analysis of Income Statement or equivalent/
- (4) Disclosure of impact of acquisitions and lines of business discontinued/
- (5) Disclosure of key figures and ratios should include:

	Previous	
	2 years	5 years
return on average equity	5.	10.
return on average assets	6.	11.
net interest margin	7.	12.
efficiency ratio	8.	13.
net profit margin	9.	14.
revenue history	XX	15.
net income history	XX	16.
dividend record	XX	17.

(6) Information on contribution of business and geographical segments to overall financial performance./ 18, 19

(7) Nature and extent of transactions with affiliates and related parties./20

**D. Financial Position (including capital, solvency and liquidity): 15 points**

(1) Breakdown of balance sheet assets and liabilities in schedules

(2) Fair values of assets, liabilities and off-balance-sheet items /

(3) Commitments/

(4) Contingent liabilities /

(5) Disclosures about regulatory capital and its components:

5. Risk-weighted assets

6. /7. Risk-based capital ratio- Tier 1 and Tier 2

8. Leverage

(6) Information about equity capital:

9. Restrictions on distributions

10. Stock details

11. Number & type of shareholders

12. Large shareholders-name and size

13. Substantial interest shareholders-name and size

14. Details of Options, warrants, and conversion rights

(7) Information about nature and amount of secured liabilities/15

**E. Risk Management Strategies and Practices: 4 points**

(1) Discussions of overall risk management philosophy and policy and:

1. Methodology to assess risk, Risk measurement and monitoring (models, VAR, simulation, credit scoring, capital allocation)
2. How risks arise, how risks are managed and controlled
3. Whether & how hedges and derivatives are used to manage risks
4. Risk management structure

**F. Credit Risk Exposure: 15 points**

(1) Disclosure on the magnitude of an institution's credit exposure on an aggregate basis/1

(2) Descriptive information about credit risk management:

2. Credit risk management structure

3. Internal controls relating to activities that generate credit risk

(3) Quantitative information on Gross Loan Positions /4

(4) Disclosures about the quality of the current loan and other counter party exposures with quantitative information:

5. Exposure to banks, commercial, and government activities or major categories

6. Domestic and international exposure or by geographic area

7. Significant concentrations of credit exposures

By geographic region /8

By industrial sector/ 9

10. Amount and details of problem loans and other assets or details by internal risk ratings including shifts between rating categories, expected loss rates and probabilities of default in each category

11,12. Ageing schedule of past due loans and advances (NPAs) , gross and by major category

13. and 14. Allowance for credit losses and changes thereon, gross and by major category

(5) Disclosures about risk management process

Use of risk-mitigating tools (collaterals, guarantees, netting agreements, managing concentrations)/ 15

**G. Market Risk Exposures: 3 points**

(1) Disclosures on value-at-risk for interest rate exposure, foreign exchange exposure and trading and derivatives securities exposure; / 1,2,3

**H. Interest Rate Risk: 6 points**

(1) Detailed quantitative information about the nature and extent of interest rate-sensitive assets, liabilities and off-balance sheet exposures including (1) averages, (2) breakdown of fixed and floating rate items for liabilities and (3) assets and for (4) off balance sheet items (interest rate swaps

(2) Disclosures on the interest rate sensitivity of an institution's assets and liabilities

Effect on the value of assets, liabilities and equity given a specific change in interest rates/ 5,6

**I. Currency Risk: 3 points**

(1) Summarized data for:

Significant concentrations of foreign exchange exposure by currency / 1

Broken down by assets and liabilities/2

Maturity of foreign currency assets and liabilities/

**J. Liquidity Risk Exposure: 2 points**

(1) Information about the firm's available liquid assets as well as sources and uses of funds

Information on concentrations of depositors and other fund providers/1

Maturity information about deposits and other liabilities/2

