

Market Microstructure Effects of Bank Transparency:

A Preliminary Examination

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ABSTRACT

After the Asian crisis in 1997, the IMF stressed the importance of bank transparency as a critical element of financial reforms. Greater transparency in a bank's disclosures reduces the level of information asymmetry between managers and investors and increases the liquidity while reducing the price volatility of a bank's stock. The purpose of this paper is to assess the effectiveness of such strategies at the firm-specific market microstructure level. The paper constructs an index to measure the transparency score of (a) foreign banks with American Depositary Receipts (ADRs) in the US, and (b) a matching sample of US banks. It then examines the association between the transparency score and the relative bid-ask spread and price volatility of the banking firms. The results provide evidence that increased levels of transparency is negatively associated with the relative spread and price volatility. As increased disclosures and reduced relative spreads are associated with lowered cost of capital levels, this provides a market-based rationale for banks to voluntarily enhance the quality of their disclosures.

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Introduction

In most countries the long-term stability of the banking sector is promoted by using a dual system of prudential supervision and regulation as well as market discipline. The efforts of banking supervisors are complemented by the disciplinary action of the market that rewards firms that perform better and manage risks effectively. The need for market discipline is especially critical today when the activities of banks have become more complex, and their product lines have become more intricate. The banking sector is a vital element of the financial infrastructure of an economy and bank failures or problems can generate significant economy wide shocks. In the aftermath of various emerging market based financial crises, the banking industry is under considerable pressure from politicians, regulators, and markets to improve the level of transparency in their activities and their risk exposures.¹ These public policy initiatives are driven by the insight that the effectiveness of the market as a disciplining mechanism depends on the quality of public disclosures made by banks and the level of transparency that they promote. Sound financial reporting policies that improve disclosure levels of banks are an important element of the financial infrastructure of a capital market and help reduce the level of information asymmetry between managers and capital market participants.

Clearly there are public-policy benefits in regulating and enforcing a higher level of financial disclosure in the banking industry as a whole. However, the provision of such enhanced disclosures will increase administrative costs for the banks. In an industry that prides itself on its culture of secrecy and the maintenance of client confidentiality,

banks may be unwilling to disclose strategically sensitive information regards financial position and performance and proprietary information regards risk management. Hence, this paper addresses the issue of whether there are market forces that reward more transparent disclosures and encourage voluntary improvements in the quality of disclosures by banks themselves.

As defined by the Basle Committee on Banking Supervision (1998) in its report on same issue, transparency is the public disclosure of reliable and timely information that enables users of that information to make an accurate assessment of a bank's financial condition and performance, business activities, risk profile and risk management activities. Capital market participants benefit from the disclosure of high-quality information that promotes transparency as it permits them to more accurately assess a bank's financial strength, its risk profile and future cash flow performance. Transparency in its risk management practices promotes confidence in the bank's ability to monitor and manage its risk exposures and helps reduce market uncertainty.

In other words, improved and more transparent public disclosure by banks, in theory, should enable them to obtain quicker and cheaper access to the capital market. Better quality public disclosure reduces the perceived level of information asymmetry between managers of a bank and the investors and ameliorates the level of market uncertainty faced by the latter group. This in turn reduces the susceptibility of a bank's stock price to market over-reactions and increases the liquidity of a bank's stock. Increased liquidity make take of the form of enhanced levels of trading volume and/ or reduced transaction costs as measured by the relative bid-ask spread. Collectively, this reduces the cost of capital associated with the bank's stock and in turn increases its stock

price. Conversely, the market will require a higher return from funds invested with, or placed with, a bank that is perceived as having more risk (Basle Committee on Banking Supervision, 1998). One of the primary motivations for foreign banks to list on the New York Stock Exchange and issue sponsored (Level II or III) ADRs is to obtain cheaper access to the world's largest capital market. The increased levels of disclosures imposed on these banks as per the Security Exchange Commission's Form 20F requirements and especially the GAAP reconciliation² are a costly and time-consuming burden. Despite this, banks list on the NYSE to efficiently access the largest equity capital market in the world. According to Mc Connell (1993), "the more information provided to the investment community, the clearer the information is presented, the more transparent the company becomes to national and international investors, making a more attractive investment, which in turn raises its stock price and lowers its cost of capital."

This paper empirically explores the market microstructure outcomes that provide incentives to individual banks to improve the quality of their annual report disclosures. The paper examines whether better quality and more transparent annual report disclosures by US banks and foreign bank ADRs translates into reduced bid-ask spreads and price volatility. In addition, the paper examines whether the Form 20F GAAP reconciliation provides any incremental information to investors over above the other accounting financial performance and risk management disclosures made in the annual report filings (Form 20F) made by foreign banks. The next section provides a background to the research and also describes the factors motivating the hypotheses. The paper then describes the bank transparency index that was constructed to assess the disclosure adequacy of banks utilized in this study, lists the hypotheses, and describes the

methodology and sample selection procedure. After discussing the results obtained, the paper provides some policy conclusions.

Background and Motivation

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 between market participants due to the arrival of informed investors, the adverse selection cost component of the bid-ask spread and the cost of capital of a firm. However, there is sparse empirical research evidence on the association between levels of disclosure and market microstructure variables like trading volume, price volatility and the bid-ask spread.

The bid-ask 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. The specialist 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. Hence, the size of the bid-ask spread of a company, after controlling for the daily trading volume and price volatility, measures the perceived level of information asymmetry between investors. The lack of transparent public disclosures aggravates this asymmetric information problem and results in a wider bid-ask spread.

This association between the level of disclosure and the bid-ask spread has been subject to some research scrutiny in recent years. 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. These two studies use analysts' disclosure quality scores prepared annually by the Corporate Information Committee of the Financial Analysts Federation. Affleck-Grave, Callahan and Chipalkatti (2000) 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 adverse selection costs the day before an earnings announcement of firms with less predictable earnings based on their annual report disclosures and no such

increase in the adverse selection costs for firms with highly predictable earnings. Their results confirm that the public disclosure that is of low quality in fact aggravates the asymmetric information costs and increases bid-ask spreads even around earnings announcements. 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 transparent disclosures.

There have been two studies that have examined the direct effect of disclosure adequacy on the cost of capital of firms. Botosan (1997) observes that for firms with low analyst following, greater disclosure, as measured by an annual report based disclosure analysis constructed by the author, 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. According to their results, the magnitude of the difference in the cost of equity capital between the most and the least forthcoming firms is approximately 0.5 to 1 percentage points.

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 firm should choose better quality disclosures in a capital market environment. This study focuses on association between the nature and quality of annual report disclosures made by banks and market microstructure variables like the bid-ask spread and price volatility. 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; Morgan, 2000). 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, is the task of monitoring best left to bank supervisors? Can the market disciplining mechanism work in the case of the banking industry? 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 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 adverse selection cost component of the bid-ask spread. There is no clear evidence on 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.

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 examine the nature and quality of disclosures made by the banks regards these opaque or volatile assets. In this paper, a bank transparency index has been constructed that evaluates the nature and adequacy of the annual report disclosures made by a sample of US banks and foreign bank ADRs traded on the NYSE. One of the contributions of this paper is the construction of the bank transparency index that permits such an assessment across a

cross-section of banks. The paper then examines the association between the spread, market volatility and the level of bank transparency. If a negative association is observed, the results would suggest that market disciplining mechanism will work even in the case of the banking firms despite the unique nature of their assets.

This paper also examines the incremental impact of the Form 20F GAAP reconciliation disclosure on the market microstructure of bank ADRs. Zarzeski (1996) observed that enterprises operating in a global culture in the international marketplace tend to disclose higher levels of information than dictated by their local culture in order to obtain resources at reasonable costs. Banks from risky economies may list on the NYSE, given the Form 20F disclosure requirements, to obtain cheaper funds from the US markets. This study also examines whether foreign banks that agree to list on the NYSE and reconcile GAAP differences benefit by way of a reduction in the size of the spread and level of price volatility.

Bank Transparency Index

The measurement of the adequacy and quality of a bank's annual report disclosures involves the construction of an index that measures the level of an individual bank's transparency. The index is similar in concept to the disclosure score indices constructed for industrial companies by Botosan (1997) and Zarzeski (1996). The index 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 Management Discussion and Analysis section. Banks with higher transparency scores provide more investor-oriented annual report disclosures that permit investors to assess

with greater levels of certainty the current financial conditions of a bank, and its future performance and associated risk.

The Bank Transparency Index (BTI) used in this study has been constructed based on the 1998 recommendations of the Transparency Sub-Group of the *Basle Committee on Banking Supervision*. The Basle 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 are:

- Financial performance
- Financial position
- Risk management policies
- Risk exposures
- Accounting policies adopted

The risk exposures category is further sub-divided into the following three categories:

- Credit Risk exposure
- Market Risk exposure
- Liquidity Risk exposure
- Operational and Legal Risk exposure

For each category, the Basle Committee describes in some details a list of disclosures that it considers to be transparency enhancing. The list was supplemented by additional items of disclosure that related to trading and derivative-based activities of banks provided by the *Basle Committee. The Basle Committee on Banking Supervision* and the *Technical Committee of the International Organization of Securities Commission* obtained these latter items from a survey of public disclosures in 1998 annual reports of banks.

In addition, the Board of Governors of the *US Federal Reserve System* published in March 2000 a Staff Study on improving public disclosure. This study was also reviewed to obtain additional items of disclosure that promote transparency. This Staff Study incorporated the Basle Committee's recommendations mentioned previously and also the results of a series of interviews conducted with securities analysts, institutional investors, and rating agencies to determine what additional disclosures would enhance the transparency of the bank's published financials. Very broadly, in addition to the Basle Committee's recommendations, hat these market participants wanted to see the following:

- Improved disclosures of credit risk including
 - Risk retained in securitization
 - Reporting of assets by risk-rating categories
 - Explanations for contributions to loan-loss reserves
 - Information on credit concentrations
- Improved usefulness of market risk disclosures like VaR, stress-testing, etc.
- Additional disclosures at the bank level and by lines of business

All these items were collated to form a list of one hundred and fifty three items that were considered to be transparency enhancing, high-quality public disclosures for banks. A summarized version of the bank transparency index used to evaluate the transparency scores for firms included in this study has been provided in Appendix 1.

For each bank included in the study, the annual report or 20F filing is examined in details to determine whether these items were specifically disclosed or not. A score of one is given to each item that is disclosed. The bank transparency index score (BTI) used

in this study is essentially the sum of the number of items disclosed. No attempt was made to assign a weight to each of the categories or items based on a judgment of relative importance vis-à-vis assessment of future cash flows and risk profile.

Sample Selection, Hypotheses and Methodology

An initial list of foreign banks with ADRs listed on the New York Stock Exchange (NYSE) was obtained from the Bank of New York web site and from the Morningstar database *Principia Pro*. Only banks with a December 31 year-end, except for one Australian bank, were included in the sample. This yielded a sample of eleven ADRs (Table 1). From a list of US banks that traded on the NYSE, a set of eleven (Table 1) with exposures to foreign exchange risk was obtained. While the initial list of US banks was extensive, the numbers dropped considerably once the annual reports were examined to determine whether the banks were exposed to foreign exchange risk. Many US banks have no non-US exposure and hence, were not suitable for a comparison with non-US based banks with significant foreign exchange exposure. Annual reports and/or 20F filings for the year ended December 31, 1999 were obtained from the company's web sites or from the Disclosure Global Access database.³.. The final list of banks included in the study is on Table 1.

Market microstructure data was obtained from the Trades Activities and Quotations (TAQ) database from the NYSE. Intra-day data from the trading period starting from June 17, 1999 to June 30, 1999 (ten days of trading data) was obtained from this dataset. Based on the intra-day quotations for the primary market (the NYSE), the mean absolute bid-ask spread for each day was estimated. This number was divided by

the daily mean price computed as the average of the daily mean ask price and the daily mean bid price to obtain the mean daily relative spread (RSPRD). The relative spread was expressed as a percentage to assess the impact of the transaction costs to an investor for a \$100 round-trip trade in a stock. Similarly, the daily price volatility (VOLAT) measure was obtained by taking the difference between the daily high price and the daily low price and dividing it by the daily mean price. The more volatile a bank's stock price, the larger will be the gap between the daily high price and the daily low price. Data for daily trading volume (VOL) was also obtained from this database.

As outlined previously, this paper examines the association between a bank's financial disclosures and the size of the bid-ask spread and the degree of daily price volatility. It is hypothesized that banks that provide more transparent information to investors and obtain higher transparency scores (BTI) will have smaller spreads and less volatile prices. Theoretically these market microstructure results imply that such banks will obtain debt funds at lower costs and will have lower equity costs of capital. Further, it is hypothesized that for foreign ADRs the Form 20F GAAP reconciliation disclosure provides useful information to analysts and investors over above the annual report disclosures.

The following two pooled cross-section time series regression models⁴ (time and cross-section subscripts have been suppressed) were run to test the above two hypotheses:

$$\begin{aligned} \text{RSPRD} = & C(1) + C(2)*\text{BTI} + C(3)*(\text{BTI}*\text{D20F}) + C(4)*\text{VOL} + C(5)*\text{VOLAT} + \\ & C(6)*\text{CR} + C(7)*\text{MCAP} + C(8)*\text{CH} \\ & + \text{random error term} \end{aligned} \quad (1)$$

$$\begin{aligned} \text{VOLAT} = & D(1) + D(2)*\text{BTI} + D(3)*(\text{BTI}*\text{D20F}) + D(4)*\text{VOL} + D(5)*\text{CR} + \\ & D(6)*\text{MCAP} + \text{random error term} \end{aligned} \quad (2)$$

As mentioned before, the above models test whether the level and quality of bank disclosures as measured by the bank transparency index (BTI) is negatively associated with the size of the bid-ask spread and the degree of price volatility. Hence, both C(2) and D(2) are expected to have negative coefficients. The variable 'D20F' is '0' for US stocks, '1' for an ADR with a 20F GAAP reconciliation and '2' for ADRs with no 20F GAAP reconciliation. It is expected that the 20F GAAP reconciliation will provide significant information over above the annual report disclosures and hence, the coefficients C(3) and D(3) will be significantly negative.

The regression equation for relative spread also includes other control variables. As previous empirical literature on the bid-ask spread has documented that the relative spread is negatively associated with trading volume and positively associated with price volatility (Stoll, 1976; Branch and Freed, 1977), control variables for daily trading volume (VOL) and daily price volatility (VOLAT) were also included in equation (1). In addition, there is ample evidence in the literature (Amihud and Mendelson, 1980, for e.g.) of a firm size effect on spread- larger firms with better quantity and quality of information tend to have narrower spreads than smaller firms with more illiquid markets. Hence, the log of the market capitalization (LMCAP) of the firms in the sample was obtained from *Principia Pro* and introduced as a control variable in the regression. Data on the percentage of shares that was closely held (CH) was obtained from *Principia Pro*. The larger the percentage that is closely held, the greater the asymmetric information problem due to the presence of informed traders. This implies that the greater the proportion that is closely held, the larger will be adverse selection costs and therefore, the bid-ask spread. Finally, to capture the impact of country risk (CR) on the adverse

selection costs of the spread and the bid-ask spread, country ratings as of March 31, 1999 were obtained from *Institutional Investors*. As higher ratings imply lower country risk, it is expected that the country risk variable (CR) will be negatively associated with the bid-ask spread.

Similar control variables have also been included for the daily price volatility equation. It is assumed that country risk will be negatively associated with price volatility. The lower the country risk and the higher the CR score, the lower will the level of price volatility for a bank. Similarly, the better the quality and quantity of information that is available for a firm, the lower will the volatility of a firm's stock price. Hence, it is expected that the firm size variable (LMCAP) will be negatively associated with daily price volatility. In addition, the more liquid the stock, the greater will be the volatility of the underlying stock price. Illiquid stocks that trade infrequently tend to be less volatile in nature. This implies that volume (VOL) will be positively associated with daily price volatility.

Results

Initial sample descriptive statistics are provided on Tables 2A and 2B. The US firms in the sample have a higher market capitalization, higher dollar volume and trading volume as well as lower relative bid-ask spreads. Interestingly, the bank transparency index score is marginally lower for the US banks primarily due to better scores obtained by the foreign ADRs on the disclosures related to credit risk and market risk exposure (See Tables 3A and 3B). Not surprisingly, the average country risk rating for the foreign ADRs is also much lower than the rating for the US. The foreign banks and the US

banks are matched in terms of their daily price volatility. The relative spread is, on an average, 0.26 percent for a US bank as compared to 2.77 percent for a foreign ADR. While a US investor will have to pay an average of 0.26 cents for every hundred dollars worth of transactions in a US stock, the same investor will have to pay an average of \$2.77 for every hundred dollars worth of transactions in a foreign ADR

Table 4 provides details on the correlation between various variables used in the regression models. The firm size variable (LMCAP) is highly correlated with various variables including daily trading volume (VOL), percentage closely held (CH), and the country risk variable (CR). Given the small sample size and the presence of multicollinearity, the regression results that follow should be interpreted with some caution.

The results for the first regression model with relative spread as the dependent variable (Table 5) indicate that the coefficient on the bank transparency index variable is significantly negative as expected. The results emphasize that as the quality and level of financial disclosures increase, i.e. with more transparency in the annual report disclosures provided by banks, the size of the relative bid-ask spread decreases. The computed elasticity for the bank transparency variable is -0.31 , which implies that a 1% increase in the bank transparency score will result in a 0.3% decrease in the size of the relative spread. However, the coefficient for the D20F variable interactive term is not significant indicating that, for foreign bank ADRs, providing Form 20F GAAP reconciliation for does not incrementally decrease the size of the relative bid-ask spread. Possibly the Form 20F GAAP reconciliation does not provides incremental information to US investors over and above the other annual report disclosures.

For regression model 1, as expected, the size of the relative bid-ask spread is negatively associated with trading volume and is positively associated with daily price volatility. Similarly, the size of the bid-ask spread is negatively associated with the country risk, i.e. as the country risk increases and the CR score decreases, the relative spread decreases. The coefficient on the firm size variable (LMCAP) is not significant and this result may be driven by the high correlation between the independent variables. However, the results for the other variables do not change even when the firm size variable is dropped from the regression.

Table 6 provides the results for the second regression model with price volatility as the dependent variable. The results are equally unambiguous with regards to the impact of the bank transparency on the price volatility of a bank's stock. The variable BTI is significantly negative indicating that as the level and quality of a bank's annual report disclosure increase, the volatility of its daily stock price decreases. The computed elasticity for this variable is -2.06, which implies that a 1% increase in the bank transparency index score will result in a 3% decrease in the level of daily price volatility. The coefficient on the Form 20F GAAP reconciliation term is not significant indicating that this reconciliation does not incrementally reduce the volatility of the stock price over and above the effect of the bank transparency index variable. As expected, greater liquidity by way of higher daily trading volume is associated with greater volatility in a firm's stock price. However, none of the other control variables are significant.

Conclusions and Implications

The results clearly indicate that investors will reward banks for an improvement in the level and quality of annual report disclosures. Based on a sample of twenty-two banks, it is observed that the relative spread is significantly and negatively associated with level of bank transparency as measured by the bank transparency index constructed for this study. In addition, the results indicate that an enhancement in the transparency of a bank's disclosures will reduce the volatility of its stock prices and hence, the price risk associated with holding a position in the bank's stock. The findings imply that more transparent disclosures will permit investors to better assess the future cash flows of a bank, its strategies and associated risks, and also will reduce the transactions costs they face. Banks will be rewarded for the better disclosures with a reduction in the volatility in their stock price and a lowered cost of capital. Hence, a reduction in the investor perception of the riskiness of bank's stock, the enhancement in the transparency of a bank's disclosure will be associated with increase in its economic value. Such increases in economic value provide a market-based incentive for banks to enhance the transparency of their annual report disclosures that will supplement the efforts of bank supervisors.

A second interesting conclusion that needs further exploration is the result that the Form 20F GAAP reconciliation does not provide any incremental information to US investors over and above the annual report disclosures. This has important policy implications for the Security Exchange Commission that requires such a disclosure for all foreign companies listed on the NYSE. The results indicate that the reconciliation may be an unnecessary burden on foreign companies.

ENDNOTES

¹ The South Korean crisis in 1996 highlighted the importance of this issue for, both, the banking sector and the Korean *chaebols*. The IMF pushed for banking sector reforms including those that would enhance the transparency of bank disclosures to investors in order to restore investor confidence in the Korean stock market. Subsequent to the crisis, government regulators stepped in to improve the quality of accounting standards in the Korean economy by adopting International Accounting Standards in order to ameliorate some of the information asymmetry problems that had precipitated the stock market crisis in the first place.

² All foreign companies that list on US stock exchanges and/or make a public offering in the US have to file a Form 20F annual report filing with the Security Exchange Commission which requires complying or reconciling to US GAAP accounting. Typically all such foreign firms reconcile their net income and stockholders' equity as per their home country GAAP to US GAAP equivalents.

³ An initial attempt to match the sample based on revenues was shelved because of the foreign exchange exposure requirement. It was observed that most of the 20F filings made by the foreign banks were clustered around end May and early June. The delayed filing may also be a reason for the increase in the asymmetric information component of the bid-ask spread as compared to US banks.

⁴ The model was run assuming heteroscedasticity of the error-terms across cross-sectional units, non-zero contemporaneous correlation between error-terms in different units, and no auto-correlation of these error-terms.

Table 1: US Banks and Foreign Banks ADRs included in Sample

US Companies					Foreign ADRs				
Company Name	Ticker	FYE	Revenue	Assets	Company Name	Ticker	FYE	Revenue	Assets
Bank of America	BAC	December	51632	656113	ABN Amro Holding NV ADR	ABN	December	34827	506481
Bank of New York	BK	December	6966	76041	Banco de A. Edwards ADR A	AED	December	710	4887
Chase Manhattan	CMB	December	33710	391484	Allied Irish Banks ADR	AIB	December	5559	63146
Firststar	FSR	December	6424	73060	Banco Bilbao Vizcaya ADR	BBV	December	14482	157344
MBNA	KRB	December	6470	31420	Barclays PLC ADR	BCS	December	21133	410957
Mellon Financial	MEL	December	5986	47381	Banco Ganadero ADR	BGA	December	1197	3813
Bank One	ONE	December	25986	273008	Banco Latinoamericano de Exportaciones SA E	BLX	December	395	5588
SunTrust Banks	STI	December	7620	96041	Banco Comercial Portugues ADR	BPC	December	2754	33718
UnionBanCal	UB	December	2749	33616	Banco Wiese ADR	BWP	December	473	3266
Wachovia	WB	December	6288	68818	Espirito Santo Financial Holding SA ADR	ESF	December	3160	33169
Wells Fargo	WFC	December	21795	222276	National Australia Bank ADR	NAB	September	12667	165980
<i>Mean</i>			<i>15966</i>	<i>179023</i>				<i>8851</i>	<i>126213</i>
<i>Standard Deviation</i>			<i>15560</i>	<i>196108</i>				<i>11040</i>	<i>175725</i>
Revenues and Assets in									
Dollars millions December 31, 1999									

Table 2A: Sample Description of US Banks

TICKER	MCAP	REV	CH	BTI	RECON	CR	Relative Spread	Dollar Volume	Volatility	Volume	Daily Price
BAC	78512	51632	2.3	94	0	92.2	0.16	240000000	0.03	3356530	71.25
BK	34526	6966	14.2	78	0	92.2	0.31	44010341	0.03	1218740	36.18
CMB	61606	33710	0.1	100	0	92.2	0.14	206000000	0.02	2515050	81.72
FSR	19144	6424	7.3	57	0	92.2	0.37	40693775	0.03	1487210	27.26
KRB	26760	6470	17.1	66	0	92.2	0.42	44910923	0.04	1512050	29.58
MEL	18513	5986	1.1	71	0	92.2	0.30	49473890	0.03	1419310	34.73
ONE	36670	25986	3.4	101	0	92.2	0.19	138000000	0.03	2413560	57.00
STI	14480	7620	1.8	60	0	92.2	0.19	23504772	0.02	347680	67.44
UB	3086	2749	65	80	0	92.2	0.37	6016638	0.03	165650	36.45
WB	11135	6288	0.1	81	0	92.2	0.21	19561189	0.02	230940	84.76
WFC	66865	21795	0	63	0	92.2	0.23	143000000	0.02	3357550	42.60
<i>Mean</i>	<i>33754</i>	<i>15966</i>	<i>10.22</i>	<i>77</i>		<i>92.20</i>	<i>0.26</i>	<i>86833775</i>	<i>0.03</i>	<i>1638570</i>	<i>51.72</i>
<i>SD</i>	<i>24905</i>	<i>15560</i>	<i>19.09</i>	<i>16</i>		<i>0.00</i>	<i>0.09</i>	<i>81004145</i>	<i>0.01</i>	<i>1155667</i>	<i>21.41</i>

Notes:

MCAP: Market capitalization in dollars million

REV: Revenues in dollars million

CH: Percentage closely held

BTI: Bank Transparency Index score

RECON: '0', US company, '1', Foreign ADR with GAAP reconciliation, '2', Foreign ADR with no reconciliation

Table 2B: Sample Description of Foreign Bank ADRs

TICKER	MCAP	REV	CH	BTI	RECON	CR	Relative Spread	Dollar Volume	Volatility	Volume	Daily Price
ABN	35320	34827	7.5	85	1	91.7	10.81	5602	0.08	15370	0.37
AED	430	710	73	84	1	61.8	1.35	423800	0.01	27950	14.94
AIB	6987	5559	0.1	86	1	81.8	1.17	1757822	0.04	65170	27.15
BCS	33965	21133	0	108	1	90.2	1.00	263247	0.01	2140	122.79
BGA	136	1197	50	69	1	44.5	2.40	22423	0.01	1171	19.28
BPC	5023	2754	14.5	75	1	76.1	0.69	116511	0.00	4540	25.55
BWP	77	473	17.1	73	1	35	9.48	16428	0.05	15980	1.04
BBV	30012	14482	0	69	2	80.3	1.22	414014	0.02	28380	14.57
BLX	533	395	0.1	98	2	39.9	0.92	725594	0.02	27880	26.27
ESF	837	3160	42.7	48	2	76.1	1.17	1278867	0.02	80900	15.60
NAB	21156	12667	0	95	2	74.3	0.30	976287	0.01	11560	84.09
<i>Mean</i>	<i>12225</i>	<i>8851</i>	<i>18.6</i>	<i>81</i>		<i>68.34</i>	<i>2.77</i>	<i>545509</i>	<i>0.03</i>	<i>25549</i>	<i>31.97</i>
<i>SD</i>	<i>14767</i>	<i>11040</i>	<i>25.3</i>	<i>17</i>		<i>20.09</i>	<i>3.69</i>	<i>580205</i>	<i>0.02</i>	<i>25743</i>	<i>37.47</i>

Notes:

MCAP: Market capitalization in dollars million

REV: Revenues in dollars million

CH: Percentage closely held

BTI: Bank Transparency Index score

RECON: '0', US company, '1', Foreign ADR with GAAP reconciliation, '2', Foreign ADR with no reconciliation

Table 3A: Bank Transparency Index Scores for US Banks

	TOTAL	BAC	UB	FSR	MEL	BK	CMB	ONE	KRB	WB	STI	WFC	AVG.
Basic Business, Management & Corporate Governance Information	12	6	6	3	6	6	5	8	6	6	4	8	6
Financial Performance	22	16	17	19	14	15	14	17	15	16	10	13	15
Financial Position	18	11	12	10	10	9	11	16	11	14	11	10	11
Risk Management Strategies and Practices: General	9	6	7	0	7	6	8	8	0	7	5	3	5
Credit Risk Exposure	29	18	9	11	13	9	17	18	14	19	14	10	14
Market Risk Exposure	36	18	12	1	5	18	25	16	3	5	1	0	9
Liquidity Risk Exposure	7	3	1	3	1	1	2	3	3	2	3	3	2
Operational and Legal Risk Exposure	3	2	2	1	2	2	3	2	2	2	1	1	2
Disclosure of Accounting Policies	17	14	14	9	13	12	15	13	12	10	11	15	13
TOTALs	153	94	80	57	71	78	100	101	66	81	60	63	77

Table 3B: Bank Transparency Index Scores for Foreign Bank ADRs

	TOTAL	BLX	BBV	AIB	ABN	AED	ESF	BCS	NAB	BPC	BGA	BWP	AVG.
Country		Panama	Spain	Ireland	Netherlands	Chile	Portugal	UK	Australia	Portugal	Columbia	Peru	
Basic Business, Management & Corporate Governance Information	12	6	12	8	6	11	8	11	8	6	7	9	8
Financial Performance	22	14	13	16	17	16	4	14	14	15	13	16	14
Financial Position	18	14	12	12	9	11	7	13	12	11	11	12	11
Risk Management Strategies and Practices: General	9	0	4	6	6	5	2	8	8	8	1	2	5
Credit Risk Exposure	29	12	12	14	15	14	12	17	17	16	15	16	15
Market Risk Exposure	36	34	4	12	19	15	1	26	14	4	4	4	12
Liquidity Risk Exposure	7	7	1	5	3	2	1	4	4	3	2	3	3
Operational and Legal Risk Exposure	3	2	2	2	0	2	0	2	2	2	1	2	2
Disclosure of Accounting Policies	17	9	9	11	10	8	13	13	16	10	15	9	11
TOTAL	153	98	69	86	85	84	48	108	95	75	69	73	81

Table 4: Correlation Structure of the Variables

	<i>RSPRD</i>	<i>BTI</i>	<i>D20F</i>	<i>VOL</i>	<i>VOLAT</i>	<i>CR</i>	<i>CH</i>	<i>LMCAP</i>
<i>RSPRD</i>	1							
<i>BTI</i>	-0.01896	1						
<i>D20F</i>	0.23107	0.049929	1					
<i>VOL</i>	-0.28584	0.060049	-0.58063	1				
<i>VOLAT</i>	0.549001	-0.06506	-0.10538	0.035457	1			
<i>CR</i>	-0.35826	-0.00446	-0.6006	0.427938	0.058911	1		
<i>CH</i>	0.05727	-0.25341	0.086022	-0.28668	-0.07343	-0.31536	1	
<i>LMCAP</i>	-0.32157	0.216942	-0.4415	0.532079	0.031781	0.880234	-0.61792	1

Table 5: Pooled Cross-sectional Time Series Results:

Relative Bid-Ask Spread

Regression Model:

$$\text{RSPRD} = C(1) + C(2)*\text{BTI} + C(3)*(\text{BTI}*\text{D20F}) + C(4)*\text{VOL} + C(5)*\text{VOLAT} + C(6)*\text{CR} + C(7)*\text{MCAP} + C(8)*\text{CH} \\ + \text{random error term} \quad (1)$$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.708940	0.448288	8.273568	0.0000
BTI	-0.006468	0.002767	-2.337901	0.0203
BTI *D20F	-3.98E-05	0.001050	-0.037953	0.9698
VOL	-1.40E-07	5.00E-08	-2.794141	0.0057
VOLAT	18.41925	3.084366	5.971810	0.0000
LMCAP	0.129416	0.072888	1.775543	0.0773
CR	-0.048476	0.008156	-5.943489	0.0000
CH	0.002803	0.002983	0.939546	0.3485
Observations:	217	22 companies		
R-squared	0.632660	Mean dependent var		2.068871
Adjusted R-squared	0.620357	S.D. dependent var		2.163943
S.E. of regression	1.333318	Sum squared resid		371.5471
F-statistic	51.42214	Durbin-Watson stat		0.451660
Prob(F-statistic)	0.000000			

Table 6: Pooled Cross-sectional Time Series Results:

Daily Price Volatility

Regression Model:

$$\text{VOLAT} = D(1) + D(2)*\text{BTI} + D(3)*(\text{BTI}*D20F) + D(4)*\text{VOL} + D(5)*\text{CR} + D(6)*\text{MCAP} + \text{random error term}$$

(2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.031889	0.010039	3.176588	0.0017
BTI	-0.000104	5.06E-05	-2.057002	0.0409
BTI *D20F	-3.69E-05	2.33E-05	-1.583978	0.1147
VOL	2.44E-09	9.57E-10	2.551959	0.0114
CR	0.000131	0.000149	0.874020	0.3831
LMCAP	-0.001320	0.000915	-1.443473	0.1504
Observations:	220	22 companies		
R-squared	0.567616	Mean dependent var		0.043307
Adjusted R-squared	0.557370	S.D. dependent var		0.033255
S.E. of regression	0.022125	Sum squared resid		0.103284
F-statistic	55.39836	Durbin-Watson stat		1.503284
Prob(F-statistic)	0.000000			

Appendix 1

Bank Transparency Index: Computation of Disclosure Score

A. Basic business, management and corporate governance information: 12 points

- (1) Management's discussion about the bank's position in the markets, its strategy and its progress towards achieving strategic objectives
- (2) The organization of the bank – its legal and management structure
- (3) Information about the incentive structure within the bank including its remuneration policy
- (4) Nature and extent of transactions with affiliates and related parties

B. Financial Performance: 22 points

- (1) Income statement that groups income and expenses by nature or function within the bank
- (2) Horizontal Analysis and Vertical Analysis of Income Statement or equivalent
- (3) Disclosure of key figures and ratios for previous two years and five
- (4) Information on contribution of business and geographical segments to overall financial performance
- (5) Management discussion and analysis with detailed past performance information and forecast of future performance

C. Financial Position: 18 points

- (1) Breakdown of balance sheet assets and liabilities
- (2) Disclosure of off-balance sheet items
- (3) Disclosures about regulatory capital and its components:
- (4) Information about equity capital
- (5) Management discussion and analysis of a bank's financial position and changes therein
- (6) Information about nature and amount of secured liabilities/18

E. Risk Management Strategies and Practices: 9 points

- (1) Discussions of overall risk management philosophy and policy and methodology to assess risk, use of derivatives, risk measurement and monitoring, use of risk-mitigating tools, and periodic review of exposures.

F. Credit Risk Exposure: 29 points

- (1) Disclosure on the magnitude of an institution's credit exposure on an aggregate basis
- (2) Descriptive information about the business activities that create credit risk, business strategies for those business activities and related internal controls
- (3) Quantitative information on Gross Positions (Loans, Investments, Trading, Off-Balance Sheet exposures)

Appendix 1 (Contd.)

Bank Transparency Index: Computation of Disclosure Score

- (4) Exposure from derivatives including determining and reporting non-performing derivative contracts
- (5) Disclosures about the quality of the current loan exposures and concentrations with quantitative information about categories. Information on amount and details of problem loans, ageing schedule of past due loans, allowance for credit losses and changes thereon.
- (6) Disclosures about risk management process

G. Market Risk Exposures: 36 points

- (1) Detailed quantitative information about the nature and extent of interest rate-sensitive assets, liabilities and off-balance sheet exposures
- (2) Disclosures on the interest rate sensitivity of an institution's assets and liabilities
- (3) Summarized data for significant concentrations of foreign exchange exposure by currency, including a 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
- (4) Disclosures on value-at-risk or earnings at risk and foreign exchange risk / 18

H. Liquidity Risk Exposure: 7 points

- (1) Information about the firm's available liquid assets as well as sources and uses of funds including maturity information about deposits and other liabilities; the amount of securitized assets including risk retained

I. Operational and Legal Risks Exposure: 3 points

- (1) Disclosures about the main types of such risk and those that are individually significant (e.g., Year 2000)
- (2) Legal contingencies and pending legal actions including discussion and estimate of potential liability;
- (3) Qualitative information on how bank manages and controls these risks/ 3

J. Accounting Policies: 17 points

Information about the accounting policies employed in the preparation of financial report including general accounting principles and GAAP used, principles of consolidation, methods for determining impaired assets, recognizing income on impaired assets and recognizing losses on non-performing credits, policies to establish specific and general loan loss allowances and for income recognition, valuation policies, securitizations, foreign currency translations, loan fees, accounting for derivatives, repurchase agreements, premises and fixed assets, and income taxes

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