

# PRIVATE INFORMATION TRADING AND ENHANCED ACCOUNTING DISCLOSURE OF BANK STOCKS

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## Abstract

In this study, price-volume patterns of traded bank stocks in 47 countries around the world are examined, to study whether enhanced accounting information disclosure is associated with lower information asymmetry between informed and uninformed investors in the trading of bank stocks, as measured by Llorente et al. (2002)'s private information trading (PIT) indicator. The study finds that, the second pillar of Basel II, stronger supervisory power, is surprisingly associated with *more* private information trading (although we do not argue for causality in either direction). In contrast, the third pillar (information disclosure) of Basel II is found to be quite effective in reducing private information trading in bank stocks. We find that bank-level enhanced disclosures of accounting information (such as classification of loans or deposits by maturity), as defined by a composite index proposed by Nier (2005), is associated with significantly less PIT, and the magnitude of the effect is large enough to counteract the influence of existing national policies. Finally, we also find that level of PIT is *not* higher in bank than in their size-matched nonfinancial stocks, which suggests that banks may not be special when it comes to information asymmetry.

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## **1. Introduction**

All firms, both financial and nonfinancial ones, suffer from some degree of information asymmetry between informed investors (insiders, related and connected parties, tippees, investigative institutional investors, etc) and other market participants (such as small outside retail investors). Many of these information asymmetry problems can be resolved by market-based mechanisms such as the company management's enhanced disclosure of accounting information to outside investors, but some of them may have to be resolved through government regulations or even direct interventions, as many believe. To accommodate both of the two opposite schools of thoughts on whether government intervention is necessary, the new Basel accord (Basel II) has named official oversight and information disclosure as the second and third pillars of the framework in effectively managing bank risks.

Banks have been subject to stricter regulation and government official oversight than non-financial firms in part because of allegedly greater information asymmetry problems. For example, Morgan (2002) shows that bond rating agencies are more likely to disagree in their credit assessments of U.S. financial firms than non-financial firms. Stronger supervisory power however has its positive and negative sides in dealing with information asymmetry of banks. On the one hand, if supervisors are empowered with strong authority to force banks to share more inside information with them, and thus are able to communicate to the public any material information discovered in on-site examinations or off-site surveillance which is not volunteered by banks in their publicly-available financial reports, they may help mitigate information asymmetry between large informed investors and small investors.

On the other hand, however, government interventions may add information asymmetry rather than reduce it. In emerging markets, stronger supervisory power intertwined with corruption can give some connected investors informational advantage over small outside investors. In developed markets where government officials are less likely to corrupt, stronger

authority of supervisors and regulators can also add information asymmetry, because like any other heavily-regulated industries, regulations make political and legal factors vis-à-vis normal business operations more important in the valuation of bank stocks, which create opportunities for some better equipped and better connected investors to have unfair information advantage over small investors.

The second pillar proposed by Basel II instead emphasizes the role of information disclosure that enhances transparency and enables market discipline. Information disclosure can work better than official oversight if market failure in monitoring banks is not more severe than in monitoring nonfinancial firms. Empirically, the results are mixed on whether it is more difficult to evaluate and trade bank than nonfinancial stocks. Morgan (2002) show that U.S. banks are more opaque than non-financial firms, but there is contradictive evidence from other studies. Iannotta (2004), for example, examining bonds issued by European firms, find that financial bonds (compared to non-financial bonds) are actually less likely to have split ratings. Flannery, Kwan, and Nimalendram (2004), examining trading properties of bank stocks, show that bank holding companies in the United States are not more opaque (if not more transparent) than nonfinancial firms of similar size. These results are not surprising. Bank assets may be difficult to evaluate for outside investors because of lack of active secondary markets for loans, but neither are there liquid markets for industrial assets such as factories, equipment, and patents. Why don't we regulate industrial firms then? Benston and Kaufman (1988) for example argue that market value accounting actually is actually much more feasible and inexpensive for financial institutions to adopt than for most other enterprises, because banks have relatively small investments in assets for which current market values are difficult to measure.

The third pillar of New Basel Capital Accord as well as Basel Core Principles No.21 has explicitly asked for better disclosures by banks to allow the market to have a better picture of the overall risk position of the banks and to allow the counterparties of the bank price and deal appropriately. According to McKinsey's "Global Investor and Emerging Market Policymaker

Opinion Surveys on Corporate Governance”, accounting Disclosure is ranked as the number one important factor by (71%) investors. More disclosure should reduce information asymmetry between those with privileged information and outside small investors, and facilitate more efficient monitoring because sufficient information is necessary for market participants to exert effective disciplinary roles ( e.g., Diamond and Verrecchia [1991], Kim and Verrecchia [1994], Easley and O’Hara [2004]). Empirically, studies by both Gelb and Zarowin (2002) and Lundholm and Myers (2002) find that firms with high disclosure ratings have high stock price associations with contemporaneous and future earnings relative to firms with low disclosure ratings. Hope (2003) in 22 countries shows that better disclosure increase accuracy of analyst forecasts. Haggard et al. (2006) find that higher level of disclosure contributes to higher stock price informativeness. Francis et al. (2005) find that firms with more expansive voluntary disclosure practices also have better accruals quality. Healy and Palepu (2001) provide a good review of the empirical disclosure literature, on the determinants and consequences of corporate information disclosure.

*Enhanced* accounting disclosure is raised to particularly high level of importance for banking organizations (compared to other industries) for several reasons. First, accounting reports are almost the sole source of information for bank investors and other stakeholders. Banks own few physical and visible assets and investors can only have a sense of a bank’s performance and asset quality from accounting numbers. Second, earnings numbers alone are not adequate for assessing the valuation of banks, the main business of which is to take risks and to provide liquidity. A bank can always inflate profit by providing more of these services, and thus profitability alone does not give investors the full picture of the bank’s performance, until risk profile of the bank is comprehensively assessed and disclosed. Third, balance sheet and income statement information at aggregated level (e.g., total profit before tax, total asset, and total deposits) is less informative for banks than it is for industrial firms, because the useful information lies in the details and breakdowns of these items.

Nevertheless, it still remains an empirical question whether information disclosure should certainly help increase transparency of banks. The link between disclosure and transparency is not theoretically unambiguous (Coffee, 1984). As suggested by the theory of Boot and Thakor (2001), disclosure of complementary information (both information that only complements information available to only informed investors and information that is orthogonal to what any investors can acquire) may strengthen investors' private incentives to acquire information. For banks, as summarized by Baumann and Nier (2004), there are several reasons why information disclosure may not always equal transparency. First, if banks are inherently opaque and unfathomable, then increase in disclosure may not be able to materially change this (Morgan [2002]). Second, it is difficult to for bank investors to place information into context that makes it meaningful (Greenspan [2003]).

Given the systematic importance of banks in the economy, it is crucial to understand whether information disclosures can reduce information asymmetry of banks, and whether official oversight may add additional values. This paper studies more than 300 commercial banks in 47 countries around the world to shed some lights on the question, exploiting the variations of the official power of bank supervisors across countries, and quality of information disclosure practices across individual banks. We use an international sample of bank stocks to study the effect of enhanced disclosure on information asymmetry, because in international sample we can exploit greater degree of measurable variations in disclosure practices. In the U.S., because of the standardized regulatory filing requirement, it is already mandatory for banks to disclose most of the basic items, and the remaining differences in disclosure practices are more likely to be at the very advanced level and more difficult to quantify. In many foreign countries, however, disclosures of some very basic accounting items are not necessarily universal.

The research question is approached from the perspective of outside investors in bank stocks. Banks listed on stock exchanges are the object of study because the wealth of publicly available information related to them facilitates investigation of private information trading. To

measure information asymmetry in the trading of bank stocks, this study uses Llorente et al. (2002)'s private information trading (PIT) measure, which is based on dynamic relations between stock price and volume and captures trading patterns created by some traders knowing more and earlier than others (or in other words, information asymmetry between informed traders and other market participants such as small outside investors). The difference between this private information trading (PIT) indicator and another common-used measure of information asymmetry, bid-ask spread, is that PIT captures the actual occurrence of informed trade by identifying certain detectible price-volume patterns, while bid-ask spread is determined by both the perception of information asymmetry and liquidity risk, and liquidity component of bid-ask spread may dominate particularly in emerging markets. Furthermore, the PIT indicator is grounded on both theory and empirics, and less expensive to implement in countries where data are not as rich as in the US market. Bharath, Pasquariello, and Wu (2005) construct a composite indicator incorporating four different measures of informed trading from market microstructure literature (including very expensive indicators derived from high-frequency tick data, such as the PIN indicator used by among others Easley, Hvidkjaer and O'Hara [2002]), and they find that the correlation of it with Llorente et al.'s (2002) measure is as high as 0.875.

Based on a sample of more than 300 banks in 47 countries, and their matched industrial firms of similar market capitalization, we first observe that, surprisingly, stronger supervisory power is actually associated with more private information trading. We are not arguing for causality here, because we never know what will be the counterfactual level of private information trading under a hypothetical change of national polices. Rather, we are using the size of the effect to benchmark the magnitude of the effect of actions by individual banks vis-à-vis effects of national polices. In contrast, the third pillar (information disclosure) of Basel II is found to be more effective in reducing information asymmetry. We find that enhanced disclosure of accounting information (such as classification of loans or deposits by maturity) by individual banks, as defined by an index proposed by Nier (2005), is associated with lower PIT. The

magnitude of the effect suggests that actions by individual banks are as influential as changes in national policies, and can counteract the effects of existing national policies. A hypothetical enhancement of disclosure practices of individual banks from the first quartile level to the third quartile level can almost reduce the higher information asymmetry typically seen in a third quartile country *in terms of supervisory power* to the level typically associated with a first quartile country. The results suggest that the third pillar of the Basel accord, i.e. information disclosure, is more effective and has more potential than the second pillar, i.e., official oversight. Finally, we also find that PIT is *not* more prevalent in banks than in their matched nonfinancial stocks, which suggests that banks are not more opaque compared to industrial firms.

The rest of the paper is organized as follows. Section 2 introduces the specification of the regression model, and the variables used in the model, including (1) the measure of private information trading, which is used to proxy for information asymmetry in trading; (2) country-level legal and regulatory variables; and (3) bank-specific variables including those that are self-constructed by the authors (e.g., Disclosure Index, Accounting Quality Index, Asset Diversification Index, and Ownership Structure). Utilizing this information, Section 3 uses this information to study whether power of official oversight and/or enhanced information disclosure by individual banks is associated with lower level of private information trading in bank stocks. Section 4 summarizes the findings and discusses policy implications.

## **2. Empirical Model and Data Sources**

To examine the relation between enhanced information disclosures and Private Information Trading (PIT), the indicator of information asymmetry in the trading of bank stocks, we study price-volume patterns of bank stocks in 47 countries in the world. The level of official oversight of banks differs across countries, and individual banks also vary in terms of information disclosure practices. The study will exploit these variations to shed light on the research question.

The baseline regression model to explain level of private information trading is specified as follows:

$$\text{Private Information Trading} = \beta_1 * \text{Power of Official Oversight} + \beta_2 * \text{Bank Disclosure Index} + \beta_3 * \text{Other country-specific regulatory and legal factors} + \beta_4 * \text{Other bank-specific information environment factors} + \beta_5 * \text{bank-specific balance sheet characteristics} + \text{constant}$$

The study covers forty-seven countries. The choice of countries included in the sample is determined by the availability of daily stock prices and turnover data in the Datastream system. In each country, the largest ten (based on total asset) publicly traded commercial banks are studied. The names of the banks are listed on the back of the paper in the Appendix. As suggested by Caprio et al. (2003), focusing on the largest banks enhances comparability across countries, and the largest banks tend to have the most liquid shares, reducing the concerns that liquidity differences drive the results. In most countries, the largest ten banks already account for 70-80% of the system's asset. The final sample includes about 300 banks, because in some countries there are less than ten publicly traded commercial banks.<sup>2</sup> Daily stock price and volume data are obtained from DataStream, for a 3-year period between 2003 and the end of 2005, to match the vintage of most of the control variables used in this study, such as ownership structure, accounting standards, credit ratings, for which only current data are able to be found in electronic

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<sup>2</sup> In most countries, restricting the sample to publicly-traded banks does not exclude any large banks. There are very few large banks that are not yet listed on stock exchanges, although many of them have majority blockholders and float only a minority share of outstanding stocks to outside public investors. There are several exceptions where the banks in our sample may not be representative of the banking sector landscape of the countries. In Mexico, all of the largest five commercial banks (controlling 80% of the system asset) were 100% acquired by foreigners (Citibank, BBVA, BSCH, Scotiabank) and taken private. In China, the largest so-called Big Four banks (controlling c. 65% of the system's asset) were still fully state-owned, during the sample period of this study.



sources. Balance sheet and income statement information are obtained from the ICBA/BankScope database for the same sample period.

Below we will introduce how the variables used in the study are defined. We will first introduce (in Section 2A) a measure of information asymmetry in trading, which can be calculated for banks in countries lacking high frequency tick data that are usually needed to create more expensive indicator of information asymmetry based on market microstructure theories. Then (in Section 2B) we explain how national policies on bank supervision are measured and quantified. Finally (in Section 2C) we will introduce how disclosure practices of individual banks are measured and quantified using various self-constructed indices. Summary statistics of the variables are reported in Table 1 and Table 2.

[insert Table 1 and Table 2 about here]

## **2.A. Measure of Information Asymmetry in Stock Trading**

How should information asymmetry in trading be measured? Llorente et al. (2002) propose a private information trading (PIT) indicator based on a dynamic relation between price and volume, using return continuation following high-volume days as evidence of private information trading. They show that this measure increases with various measures of firm characteristics that are associated with information asymmetry, including small capitalization, high bid-ask spread, and fewer analyst following.

Grishchenko, Litov, and Mei (2003), using this measure, find that PIT is prevalent in emerging markets, and stocks that provide better protection and information disclosures exhibit less PIT. Durnev and Nain (2004) examine nonfinancial firms in 21 countries and find that insider trading laws help reduce PIT, but only when control rights are not concentrated. Gagnon and Karolyi (2006) using 556 foreign ADR stocks find that returns in the home market on high-volume days are more likely to continue to spill over into the U.S. markets for those stocks

subjects to the risk of greater informed trading. Finally, Bharath et al. (2005) construct a composite indicator incorporating four different measures of informed trading from market microstructure literature (including very sophisticated indicators derived from high-frequency tick data), and they find that the correlation of it with Llorente et al.'s (2002) measure is as high as 0.875.

An intuitive example on how information asymmetry between informed traders and other market participants such as small outside investors is reflected in price-volume patterns goes as follows. An investor named James, because of his close business relationship with the Bank of Universe, knows that the Bank has a large exposure to changes in short-term interest rates because of maturity mismatch between borrowing and lending. This is not disclosed to the public, and thus outside investors know little about it. The other day, short-term interest rates rose sharply. James knows immediately what this means to the bank's earnings, but most other people can realize it only much later when rumors spread. He thus sells out large block of shares immediately. The large sale creates abnormal trade volumes and pushes down the price (Meulbroek [1992] using SEC prosecution files finds that trading days with illegal insider trades typically exhibit higher abnormal return and volumes). The next day, when the bad news finally find its way to the public, the stock price drifts further downward toward the newly established value that incorporates the bad news (Muelbroek [1992] shows that that the abnormal volume in the day before is why other people notice the private information, and she also shows that non-“insiders” are not able to follow immediately on the same day when the insider trades take place because in the middle of the day they do not know whether the *total daily* volumes are abnormally high or not). Thus, when private information trading takes place, one would observe (1) abnormal volume on the first day and (2) autocorrelation of stock prices between the first day and the second day.

Such information asymmetry certainly exists in all industries, but bank stocks should exhibit more of such price-volume dynamics if their assets truly are more opaque than those of

industrial firms. If it is, however, not more difficult for outsiders to evaluate bank assets (either because banks are not more opaque or because the Bank of Universe maintains enhanced disclosures in its accounting reports to improve on transparency) , then James, although he still knows a little bit more, will not know that much more than outsiders, and opportunities for him to trade before others do will become relatively limited. In such a case, the price-volume dynamic pattern described in the story will become relatively rare, or at least less rampant than in stocks of other banks that make less information disclosures.

Following Llorente et al. (2002), the regression to obtain a measure of private information trading is specified as follows and estimated on each bank separately:

$$R_{i,t+1} = C_0 + C_1 R_{i,t} + C_2 R_{i,t} V_{i,t} + \varepsilon_{i,t+1}$$

Daily continuously compounded returns are used to measure stock returns, as defined by

$$R_{i,t} = \log\left(\frac{P_{i,t} + D_{i,t}}{P_{i,t-1}}\right). \text{ Detrended (20-day moving average) log turnovers are used as measures}$$

of volumes ( $V$ ) because times series of turnover are nonstationary.  $V$  is defined by

$$V_{i,t} = \log\left(\frac{VOL_{i,t}}{N_{i,t}}\right) - \frac{1}{20} \sum_{j=1}^{20} \log\left(\frac{VOL_{i,t-j}}{N_{i,t-j}}\right), \text{ where } P_{i,t} \text{ is the daily close price, } VOL_{i,t} \text{ is the daily}$$

number of shares traded, and  $N_{i,t}$  is the total number of outstanding shares on day  $t$  for bank  $i$ .

Zero trading volume is changed to a small constant, 0.00000255, before taking logs. Regressions are estimated based on the latest 3 years of daily data (Jane 2003- Dec 2005), including only firms for which price data are available for at least 250 trading days during the whole period, *and* for which in 50% of the trading days volume data are also available.

In the regression results, according to Llorente et al. (2002),  $C_1$  represents the unconditional return autocorrelation, thus implicitly controlling for microstructure effects such as bid-ask bounce and nonsynchronous trading.  $C_2$  indicates whether stocks are dominated by hedging trades or trades generated by private information. A positive  $C_2$  coefficient suggests

more informational trades (i.e., greater information asymmetry between the informed and the outsider investors [traders]), whereas a negative  $C_2$  coefficient indicates dominance of hedging trades (i.e., there are few investors who have informational advantage over others).

The vector of  $C_2$  coefficients from the regressions, one for each bank, are then multiplied by 1000 and used as the measure of the level of private information trading (PIT) in the trading of a bank stock. In the paper, the acronym PIT is interchangeable with the value of  $C_2$  coefficient. As the value of PIT is also driven by the illiquidity of the stock, in the regressions we always directly control for it using a common measure of market illiquidity: percentage of zero-return days. This helps us remove the illiquidity-driven component of the PIT measure, and capture more cleanly the information-asymmetry-driven component of the PIT measure. Nevertheless, as top ten bank stocks are usually among the largest and most liquid stocks in most local markets, in the results we find that market illiquidity has positive but not statistically significant effect on the value of PIT indicator.

## **2.B. Government Supervisory Power**

Cross-country data on banking regulation and supervision practices are obtained from a survey done by Barth, Caprio, and Levine (2005). They create many indices to quantify different aspects of bank regulatory and supervisory systems around the world. In selecting which of these regulatory indicators to examine, we used two criteria. First, we choose regulations stressed by the Basel committee on bank regulation. These will be regulations that emphasize government supervisory agencies' roles and involvement in the disciplining of banks. Second, we analyze regulations that theoretical models and past empirical work highlight as reducing information asymmetry.

The following indices measure regulations that are believed to potentially affect the level of private information trading in bank stocks, although different theories would give contrasting predictions on how they would affect private information trading.

**(1) Official Supervisory Power:** This index measures supervisors' authority and power to take specific actions to prevent and correct problems. This corresponds to the second pillar of the New Basel Capital Accord (or known as Basel II), which emphasizes supervisory review of banks. The index includes information on the rights of the supervisory agency to meet with, demand information from, and take legal action against auditors; to force a bank to change its internal organizational structure, management, directors, etc.; to oblige the bank to provision against potential losses and suspend dividends, bonuses, and management fees; and to supersede the rights of shareholders and intervene in a bank and/or declare a bank insolvent.

It is worth mentioning that, stronger supervisory power has its positive and negative sides, and they may offset each other. On the one hand, if supervisors are empowered with strong tools to force banks to share more information with them, and thus are able to communicate to the public material information discovered in on-site examinations or off-site surveillance which is not contained in publicly-available accounting reports, they may help mitigate information asymmetry between bank management and outside investors. On the other hand, stronger power of regulatory and supervisory agencies may contribute to information asymmetry. There are two explanations. First, regulations give supervisors plenty of opportunities for corruption. Supervisory officials may communicate the proprietary information first to selected group of related parties, who can trade before the information is made available to the public.<sup>3</sup> This will predict that the negative effect of supervisory power should be stronger in emerging markets where officials are more likely to be corrupted. Second, regulations increase the role of political and regulatory factors (vis-à-vis business operation factors) in the valuation of bank stocks (Carletti, Hartmann and Onega [2006] for example document that in nineteen industrialized countries bank stock prices responded strongly to regulatory changes), and these factors are

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<sup>3</sup> Beck et al. (2004) for example in a sample of 37 countries and 2,500 firms shows that empowering bank supervisors to directly monitor, discipline and influence banks increases the role of corruption in lending.

known to be very secretive and opaque, and certain group of people usually have unfair informational advantage related to these matters.

**(2) Effectiveness of External Audit:** This index, also from Barth et al. (2005), measures the effectiveness of external audits of banks. It is worth mentioning that the index emphasizes the role of supervisory agencies in regulating external auditors, *assuming* that this increases effectiveness of external audit. The index is constructed based on answers to questions related to how much external auditors need to cooperate with supervisors. Stronger regulation of the auditing process and direct engagement of supervisors with external auditors may improve the reliability of accounting reports, but it remains an empirical question whether it is indeed the case in data.

**(3) Financial Statement Transparency:** This index measures the *regulated* use of certain accounting policies, which are presumably quality-enhancing. The value of the index depends on, among other things, whether accrued, although unpaid, interest/principal enter the income statement while a loan is still performing, whether banks are required to produce consolidated accounts covering nonbank subsidiaries, and whether off-balance sheet items are disclosed to the public. These are, unsurprisingly, minimal requirements, in order for one size to fit all. Again, it is worth mentioning that this index measures the regulation of financial statement, which may or may not materially increase transparency of financial statement.

**(4) Insider Trading Laws:** Insider trading laws that restrict informed insiders from benefit at the cost of uninformed outsider investors should help mitigate private information trading problems for both bank stocks and industrial stocks. Also, stringent insider trading laws may have stronger effects on bank stocks, if bank stocks are more opaque and more prone to information asymmetry. We use Beny (2002, 2003)'s indices to measure stringency of insider trading laws. She surveyed securities laws in 50 countries and created an "insider trading law stringency index", after examining securities laws in relation to insiders' explicit trading of their own company stocks. The index is formed by adding one if (1) violation of the insider trading law

is a criminal offense, (2) tippees are prohibited from trading on material nonpublic information, (3) insiders are prohibited from tipping outsiders about material nonpublic information and/or encouraging them to trade on such information for personal gain, (4) monetary penalties are proportional to insiders' trading profits, and (5) investors have a private right of action.

**(5) Self-Dealing Laws:** Directly trading in the stock market is not the only way insiders can benefit from private information. Djankov, La Porta, Lopez-de-Silanes, and Shleifer(2005) make a more comprehensive study of self-dealing laws in relation to more complicated means of profiting from private information, noting that insiders have many other ways to actively divert resources from publicly listed firms, other than trading on some exogenously given private information. By reading securities laws, Djankov et al. they create several indices, reflecting legal practices in relation to ex ante disclosure, ex post disclosure, punishment, and public enforcement of self-dealing activities, respectively. In the regression, we will use the sum of these four indices to measure the stringency of self-dealing laws.

## **2. C. Information Disclosure Practices of Individual Banks**

The third pillar of New Basel Capital Accord explicitly asks for better disclosures by banks to allow the market to have a better picture of the overall risk position of the banks and to allow the counterparties of the banks price and deals appropriately. More disclosure should reduce information asymmetry between those with privileged information and outside small investors ( e.g., Diamond and Verrecchia [1991], Kim and Verrecchia [1994], Gelb and Zarowin [2002], Easley and O'Hara [2004]; Healy and Palepu [2001] provide a good review of the empirical disclosure literature). If banks are not much more complex than nonfinancial firms, then the same group of information disclosure mechanisms that work in industrial firms should work in banks too. Below we introduce a series of self-constructed measures of information disclosure practices; some are specific to banks, while others suit all industries.

(1) **Disclosure Index:** Following Nier (2005), a composite Bank Disclosure index is created for each bank in the sample, based on inclusions/omissions of a checklist of seventeen dimensions of accounting items in a bank's annual financial report. Each of these disclosure items is related to one or more dimensions of the bank's risk profile (interest rate risk, credit risk, liquidity risk and market risk) or the capital/reserves the banks hold to back the risk. These include, for example, whether loans are classified by maturity or by types of borrowers. The methodology to construct Nier's (2005) composite index is described in details in the Appendix of this paper. Nier et al. in various papers (2003, 2004, 2005, 2006), based on this Index, find that enhanced disclosures reduce banking sector risks.

Certainly, disclosure practices are not only reflected in the presentation of financial reports, but also reflected in many other aspects (e.g., prompt release of material information in the interval between two filing date, use of conference calls to communicate with investors). The Disclosure Index we create cannot capture these aspects of variations. Nevertheless, level of disclosure in annual financial report is likely to be a good proxy for a bank's commitment to transparency. Lang and Lundholm (1993) for example show that annual report disclosure levels are positively correlated with the amount of disclosure provided via other media. Botosan (1997) shows that disclosure level in annual reports is positively correlated with analyst following as well news coverage by the Wall Street Journal. Moreover, prior research has documented that the annual report is a key source of information for analysts (e.g., Chang and Most [1985], Vergoossen [1993], Epstein and Palepu [1999]).

The distribution of Disclosure Index across individual banks is illustrated in Exhibit 1 in the form of a histogram. There are variations of Disclosure Index both across and within countries. In our sample, it is found more than half ( 52%) of the variations in Disclosure Index cannot be explained by country factors, suggesting substantial within-country variation in disclosure practices (with the exception that in Italy there is no variation in Disclosure Index among its banks), and thus scope for individual banks to voluntarily improve on disclosure practices.



Standard & Poor's (2005), in a transparency and disclosure survey of Russian banks, finds that, for a common list of material items, Russian banks make much less disclosure than do nonfinancial Russian corporations, which suggests that banks may not be intrinsically opaque, but that insiders for some reasons choose to withhold information and reduce transparency. Also, Chen, DeFond, and Park (2002) show that managers are more likely to volunteer to disclose more balance sheet information when the earnings numbers work against their favor.

[insert Exhibit 1 about here]

(2) **Accounting Quality Index:** High quality of accounting reports is important in reducing information asymmetry for all firms, not only banks. We measure general accounting quality using an "Accounting Quality Index" proposed by Aggarwal, Klapper, and Wysocki (2005). They create this four-point index to measure accounting quality for all industries, not specific to banks. A firm gets one point of each of the following four practices: (1) firm uses an international Big-5 accounting firm; (2) firms presents fully consolidated financial statements; (3) firm receives a clean opinion from its auditor; (4) firm uses internationally recognized accounting standards (IAS, IFRS, or US GAAP). Thus the index ranges from 0 to 4.

(3) **ADR Cross-Listing:** Banks cross-listed in the United States have to comply with U.S. disclosure standards, which are more stringent, and thus may provide fewer opportunities for people with private information to profit before others. A firm scores one if it has an ADR program. Ammer, Clinton, and Nini (2004), for example, find that European banks cross-listed in the United States are more transparent in various aspects than other European banks.

(4) **Ratings by Reputable International Agencies:** Ratings issued by international credit rating agencies may allow banks to incorporate inside information into the assigned ratings without disclosing specific details to the public at large. Kliger and Sarig (2000) for example show that ratings do indeed contain information over and above other public known information.

This study identifies Moody's, Standard & Poor's, and Fitch as internationally reputable credit rating agencies, and a firm scores 1 if it receives at least one rating from one of the three agencies.

(5) **Agency problems related to ownership structure:** Ownership structure associated with more serious agency problem may increase information asymmetry of the bank. For example, Fan and Wong (2002) show that divergence of voting and cash flow rights (through pyramidal control structure) reduces informativeness of accounting earnings. Following the rule of Caprio, Laeven, and Levine (2005), ownership structure is documented based on information from the *BankScope* database, *Banker's Almanac*, *WorldScope*, as well as *IMI emerging markets*. Ultimate owners are traced through their control chains, and then voting rights is based on the weakest link of the control chain while cash flow rights is based on the product of the cash flow rights along the control chain. Then the wedge between voting rights and cash flow rights is calculated, to proxy for the scope for agency problems. Dual-class shares are widely used among Latin American banks, and this factor is also taken account into. Finally, a dummy variable is created for state-owned banks, because government ownership may add to the opacity of banks. State-owned banks are defined as banks with government as the largest owner and the voting rights exceed 10%.

## **2. D. Balance Sheet Characteristics**

Finally, some balance sheet characteristics may create inherent opacity for banks, and they need to be controlled for in order to estimate the actual impact of regulation and/or information disclosure on banks' pre-existing level of information asymmetry. We control for the following characteristics that are showed by previous literature (e.g., Morgan [2002], Flannery et al. [2004]) to have effects on information asymmetry.

(1) **Loan-to-Asset Ratio:** Value of loans are usually more difficult to evaluate than other forms of more liquid assets such as securities. Thus a high loan-to-asset ratio thus should be

associated with greater information asymmetry. The ratio is defined as total loan (net) divided by total book asset.

(2) **Equity-to-Asset Ratio:** More leveraged capital structure may increase information asymmetry, because asset quality uncertainty can be amplified proportionately to the leverage ratio, when it is reflected in valuation of equity. The ratio is defined as equity divided by total book asset value.

(3) **Loan Growth:** Faster credit expansion usually creates new and more risky asset and greater information asymmetry. The ratio is defined as annualized log growth rate between 2001 and 2004 (a three year period).

(4) **Asset Diversification Index:** Banks with more diversified assets are more difficult to evaluate. Diversification is measured here by calculating the index proposed by Laeven and Levine (2005), based on composition (interest-earning or non-interest-earning) of bank assets,

defined as  $1 - \left| \frac{(\text{Net Loans} - \text{Other earning assetse})}{\text{Total earning assets}} \right|$ .

### 3. Empirical Results

In this section, we will examine, whether official oversight and/or information disclosure is associated with lower level of private information trading. Supporters of banking supervision argue that government direct supervision can effectively address information asymmetry problems caused by market failure, and thus stronger power of supervisors should help mitigate information asymmetry. Supporter of market discipline however argue that a bank's enhanced accounting disclosures and other transparency-enhancing practices are more effective in mitigating information asymmetry problems, because making more and better information available to public investors at large is the best way to facilitate private monitoring without introducing government-related new problems.

In table 4 and 5, the regression results are reported. In the regressions reported in Table 4, we mainly examine the relations between national policies (in particular official oversight by bank supervisory agencies) and information asymmetry, exploiting the cross-country variations in the strength of authority of bank supervisors. In the regressions reported in Table 5, we use country dummy variables to remove the influences of country-specific factors and focus on the effect of individual banks' information disclosure practices on information asymmetry. In both cases, a battery of country-specific and bank-specific factors is included to check for the robustness of the results. All of the standard errors reported are already adjusted for clustering of residuals by country.

### **3.A. Does Official Oversight Help Reduce Information Asymmetry?**

We first examine whether stronger authority of bank supervisory agencies is associated with less private information trading. The regression results are reported in Table 4. The standard errors are adjusted for clustering of residuals by country. In all specifications, we control for size (measured by log of total asset) and (trade) illiquidity of the banks. They are found to be positively correlated with private information trading, although not statistically significantly. The finding that larger banks may have higher information asymmetry is consistent with the results of Ammer, Clinton, and Nini (2004) for European banks.

In Column (1), the results show that stronger power of bank supervisors, instead of reducing information asymmetry in trading, is actually associated with higher PIT of banks. In Column (2) – (7), the results remain virtually unchanged after we control for many other country-specific regulatory and legal factors that might also affect information asymmetry. In Exhibit 2, we present a bar chart for ten groups of countries with different level (based on the Official Supervisory Power Index) of supervisory power allocated to bank supervisory agencies. It is visually evident on the chart that higher supervisory power is associated with higher PIT of bank stocks, but *unrelated* to PIT of non-financial stocks.

[insert Exhibit 2 about here]

The magnitude of the coefficients suggests that, depending on specification, reducing the power and authority of bank supervisors by five index points (from the third quartile to the first quartile level) is associated with a drop of PIT indicator value by between 1.02 and 1.22 points. As the mean of country average PIT is 0.71, such a hypothetical reform has large enough effect to change the sign of PIT of an average country from positive to negative, and thus move her into the safe zone (because only positive PIT can be interpreted as caused by private information trading ).

[insert Tables 4 about here]

There are several explanations why stronger authority of bank supervisory agencies is associated with higher information asymmetry of bank stocks. The most obvious one is reverse causality that stronger power is allocated to supervisors when private information trading problems is more rampant in bank stocks. We think this is very plausible. We are not arguing for causality of this relationship in either direction, because it is hard to prove what should be the counterfactual level of private information trading for certain hypothetical change of supervisory power, although there are several convenient instrumental variables (such legal origin) that are used by many researchers. <sup>4</sup> Rather, we are (In Section 3.B.) using the magnitude of this

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<sup>4</sup> Nevertheless, it is indeed possible that the problems are actually caused by stronger supervisory power. In emerging markets, this could be easily explained by supervisors with access to superior information giving private information to friends or related parties, who then trade and profit on the information before the news becomes public to general outside investors. Empirical results (unreported) however show that the positive correlation is actually stronger in developed v.s emerging markets. In developed markets where such corruption problems are believed to be at worse isolated cases, the results may suggest that government intervention increase information asymmetry through different channels. For instance, regulations may increase the role of political and regulatory factors (vis-à-vis business operation factors) in

correlation to benchmark the magnitude of effect of actions by individual banks vis-à-vis effects of national policies, to find out whether actions by individual banks have the potential to offset and reverse the effects of existing national policies.

In Column (3), we report the result of a regression that also includes the “Effectiveness of External Audit” Index (Barth et al. 2005), which measure direct government engagement with external auditors. The index is *not* found to be negatively correlated with private information trading indicator. The index is named “Effective of External Audit” because it is assumed that stronger role of government in the process should empower the auditors and thus increase the effectiveness of external audit. The regression thus is a test on the joint-hypothesis that (1) government’s direct engagement with auditors makes external audit more effective; (2) more effective external audit help reduce information asymmetry. We believe that more effective external audit certainly should be able to help mitigate information asymmetry problems (Fan and Wong [2004]), and the result is more likely to be a rejection of the hypothesis that governments have a useful role here. Later we will show that credit ratings issued by reputable international credit agencies (Moody’s, Standard and Poor’s, Fitch) can effectively reduce information asymmetry, which are not regulated by the government.

In Column (4), we include the “Financial Statement Transparency” index (Barth et al. 2005) in the regression. This index is not found to be negatively correlated with information asymmetry, either. Higher quality financial reporting is supposed to be able to help mitigate information asymmetry, but we realize that the results are not surprising after examining the components that form Barth et al. (2005)’s financial statement transparency index. Accounting information at aggregated level (e.g., total profit before tax, total asset, total deposits) is inadequate in assessing the current and future performance of banks because of the special nature

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the valuation of bank stocks (Carletti, Hartmann and Onega [2006] for example document that in nineteen industrialized countries bank stock prices responded strongly to regulatory changes), and these factors are known to be very secretive and opaque, and certain group of people usually have unfair informational advantage related to these matters.

of banks' operation. Profitability and cash flow numbers alone are not very informative for a bank compared to an industrial firm, unless risk profile of the bank is comprehensively assessed and disclosed. The Financial Statement Transparency Index however captures mostly rather basic minimum requirements imposed by regulations, and it is doubtful that they can provide the market with substantially more material information. Later we will show that enhanced disclosures of balance sheet, income statement, and off-balance sheet information substantially mitigate information asymmetry. This suggests that better disclosures do reduce information asymmetry, but only when the disclosures go beyond basic items.

In Column (5), we study the effect of insider trading laws. Insider trading laws that restrict corporate insiders (but not informed outsiders) from benefiting at the cost of uninformed outsider investors should help mitigate private information trading problems for both bank stocks and industrial stocks, and they may have stronger effects on bank stocks, if bank stocks are more opaque and more prone to information asymmetry. In the regression, however, stringent insider trading laws is actually found to be positively correlated with private information trading of bank stocks. An explanation is given by Durnev and Nain (2004), who argue that when corporate insiders are not allowed to trade on their private information, better-informed institutional investors will come in and trade against *uninformed outsiders*<sup>5</sup> (because they are now not disadvantaged against the even-more-informed *insiders*).

Directly trading in the stock market is not the only way corporate insiders can benefit from private information. Insiders have many other ways to actively divert resources from publicly listed firms, other than trading on some exogenously given private information. By reading securities laws, Djankov et al. (2005) create four indices, reflecting legal practices that help restrict self-dealing, in relation to ex ante disclosure, ex post disclosure, punishment, and public enforcement of self-dealing activities, respectively. In Column (6) we report the regression

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<sup>5</sup> For example, Bushman, Piotroski, and Smith (2005) document that analyst following increases after initial enforcement of insider trading laws, and this increase is concentrated in emerging market countries.

results that include the sum of these four indices to measure stringency of self-dealing laws. The sum index however is found to be positively correlated with private information trading, although the result is not statistically significant. .

In Column (7), we include in one regression all the national policy variables discussed above, and the results remains unchanged. Finally, in Column (8), we include country dummies to find out the upper bound of explanatory power of country-specific factors. The R-squared value of the regression suggests that less than 20% of the variations in PIT can be explained by country-specific factors, a smaller share than that for non-financial stocks.<sup>6</sup> This suggests that the scope left for government intervention (created by market failures in monitoring and valuing bank stocks) is very limited, while individual banks within a country have ample scope to distinguish themselves from peers through for example better information disclosures (since 80% of the variations in PIT are within-country ones).

### **3.B. Does Information Disclosure Practices of Individual Banks Help Reduce Information Asymmetry?**

In Section 3.A. it is shown that country-specific regulatory polices are not effective in reducing information asymmetry of banks. It is also shown that most of the cross-bank variations in information asymmetry cannot be explained by country factors, or in other words, they have to be explained by within-country bank-specific factors. In this section, we explore, which bank-specific factors, and in particular whether enhanced information disclosure practices of individual banks, may help mitigate information asymmetry in trading.

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<sup>6</sup> In results unreported, we also find that cross-country difference in PIT is smaller for banks than for nonfinancial firms. The results suggest that, compared to nonfinancial firms, there actually is more scope for individual banks' voluntary actions in reducing information asymmetry, and there is more potential for market discipline, because domestic investor have more options when investing in local bank stocks. Investors can freely avoid stocks with higher private information trading, and a bank can distinguish itself by reducing private information trading through various bank-specific actions.



The results of these regressions related to bank-specific factors are reported in Table 5. The expected sign of each explanatory variable is also indicated under the variable name. Country dummy variables are included to remove the influence of country-specific factors completely and focus our analysis on bank-specific factors. These also make cross-country data more comparable because within a country market microstructure, national policies, regulations, laws etc are the same, and certain disclosure practices are more likely to mean the same thing across banks. Furthermore, the information asymmetry measure, the enhanced disclosure index, and the regression results will be relatively free from the influence of omitted country-specific factors. Czech Republic, Finland, and Russia are excluded from the regressions because there is only one bank in each country.

[insert Tables 5 about here]

From the regression results presented in Table 5, we find that enhanced accounting information disclosures by individual banks, as measured by Nier's (2005) composite Disclosure Index, is negatively correlated with the level of private information trading. The statistical significance of the results remains in Column (2) – (9), after we control for various other bank-specific factors that may also affect information asymmetry. In Exhibit 3, a bar chart is used to demonstrate the negative correlation between Disclosure Index and level of private information trading. Each pair of bars represents the average PIT scores for banks and their non-financial firms, for a certain group of banks that score the same value in Disclosure Index. The chart graphically illustrates that Disclosure Index is negatively correlated with PIT of bank stocks, but not with PIT of the banks' size-matched non-financial stocks.

[insert Exhibit 3 about here]

The effect of information disclosure in reducing private information trading is economically significant and substantial. Raising Disclosure Index from 0.65 to 0.8 (i.e., from the first quartile to the third quartile level in the sample) can reduce the value of PIT indicator by 0.94 -1.06 points, depending on which specifications of the regressions we are using. Such a hypothetical action by individual banks can almost offset the adverse effect associated with the increase of official bank supervisory power from the first quartile to the third quartile level in the sample. The policy implication is that, even if higher private information trading associated with high supervisory power is the result of high PIT prompting government to step up surveillance power of supervisory agencies, the results of this study suggest that improvement on individual banks' information disclosure practices may yield better results than changes in national policies in addressing the problem. The magnitude of the effect suggests that actions by individual banks have large enough effect to offset and reverse the effects of existing national policies.

For this result, there should be less likely to be reverse causality running from level of private information trading to disclosure practices, considering that the Disclosure Index measures how the banks choose to organize their financial reporting, instead of decision and discretion in the releases of specific pieces of inside information. Thus the Index measures what Leuz and Verrecchia (2000) call *commitment* as opposed to *voluntary* disclosure. The former is a decision by the firm about what it will disclose before it knows the content of the information (i.e. ex-ante), whereas the later is a *selective* decision by the firm made after it observes the content (i.e., ex post). Finally, there certainly are costs of disclosures for the banks or their entrenched managers, and this is why not all banks choose to disclose in full extent. This study is silent in measuring the costs of disclosures (for banks) as well as the motivation behind management's disclosure decisions, while trying to argue from the perspective of small investors and emphasize the transparency benefit of making more disclosures.

Combined with the results in Section 3.A. that financial transparency regulations at the country level usually do not help mitigate PIT, the evidence suggests that enhanced disclosures

by individual banks is indeed useful in mitigating information asymmetry problems in the trading of bank stocks. Country-level regulation of financial reporting usually have to settle for minimum requirements, which may not have material impact on the transparency of banks, considering that, unlike non-financial corporations, only very disaggregated level information can give investors a comprehensive overview of the risk profile and thus true valuation of a bank. Regulators may or may not understand which disclosures are relevant to outside investors, but it is always questionable whether they are able to mandate all banks to disclose all of these items even if they can identify the right ones. The results here may suggest that regulators should include, in mandatory disclosure requirements, all the seventeen dimension of disclosure items surveyed by Nier (2005). But such a proposal is never realistic given the inevitable strong resistance to mandatory disclosures over and above some minimum requirements. Individual banks that see the need and potential benefits and have the will, however, can always beef up their own disclosure practices over and above what are required by the regulations; and as shown by our evidence, the level of private information trading in their stocks will fall accordingly. This being said, disclosure regulation may still improve social welfare if disclosure by individual banks has positive externalities on the information environment of other banks and the financial system as a whole (Dye [1990], Fishman and Hagerty [1990], Admati and Pfleiderer [2000], Bushee and Leuz [2005], Einhorn [2005], Frost, Gordon, and Hayes [2006]).

In Column (3) to (9), we include a number of other bank-specific factors in the regressions, both to test for the robustness of the results, and to examine many other channels that are suggested by previous literature to be able to affect information asymmetry. We find that some of these hypotheses are supported by our data (although the results may not be statistically significant), but the others are not.

First, credit ratings issued by internationally reputable agencies may allow banks to incorporate inside information into the assigned ratings without disclosing specific details to the public at large. This study identifies Moody's, Standard & Poor's, and Fitch as internationally

reputable credit rating agencies, and a firm scores 1 if it receives at least one rating from one of the three agencies. In Column (4) and (9), it is indeed shown that credit ratings help reduce private information trading by between 0.87 to 1.05 points, although the result is statistically significant only when an extensive list of controls are included in the regression (results reported in Column [9]). This effect is quite large considering that the mean of PIT in the sample is about 0.93.

Second, previous studies (e.g., Morgan [2002] and Flannery et al. [2004] ) has found that certain balance sheet characteristics may create difficulties for outside investors in evaluating risk and value of bank assets. This is confirmed in our study. For example, in Column (5) and (9), higher loan-to-asset ratio and faster loan growth rate both are found to be positively related to PIT, although the results are not statistically significant.

Banks with more diversified assets (allocated between interest-earning and non-interest-earning) may be more difficult to evaluate. Diversification is measured here by calculating the index proposed by Laeven and Levine (2005), based on composition of bank assets, defined as

$$1 - \left| \frac{(\text{Net Loans} - \text{Other earning assetse})}{\text{Total earning assets}} \right|$$

In Column (6), it is indeed found that asset

diversification is positive associated with PIT, although the result is not statistically significant

Ownership structure associated with more agency problem may increase information asymmetry of the bank. We identify two types of ownership structure that may cause agency problems. One is pyramidal structure, in which ultimate owners are able to control the banks with cash flow rights smaller than voting rights, In this study, the wedge between voting rights and cash flow rights is calculated, to proxy for the scope for such an agency problem. The other type of problematic structure is government ownership. In this study, state-owned banks are defined as banks with government as the largest owner and the direct control rights exceed 10%. 20% of banks in the sample are government-owned, while 16% of banks have ownership structures that do not align voting and cash flow rights. In results reported in Column (7), it is found that both

types of ownership structures are associated with higher private information trading, although the results are not always statistically significant.

On the other hand, there also are results that reject hypotheses proposed by previous literature. For example, high quality of accounting reports should be able to reduce information asymmetry for all firms including banks. We measure general accounting quality using an “Accounting Quality Index” proposed by Aggarwal, Klapper, and Wysocki (2005), who show that foreign institutional investors overweight in their portfolio those firm with high “Accounting Quality Index”. In Column (2), we find the index is actually positively correlated with information asymmetry. Also, Banks cross-listed in the United States have to comply with U.S. disclosure standards, which are more stringent, and thus may provide fewer opportunities for people with private information to profit before outsiders. In the regression reported in Column (3), we however find that banks with ADR program actually exhibit more information asymmetry in trading (although we study only the trading in there home markets instead of in the US market).

### **3. C. Private Information Trading in Bank Stocks vs Non-Financial Stocks**

Level of private information trading may not be specific to bank but to all stocks (both financial and non-financial) in a country, determined by country-specific market micro-structure factors and these unobservable factors may correlate with the explanatory variables used in this study. Nevertheless, it is usually difficult to describe and control for the effect of market microstructure in such a diverse set of non-US markets. A less expensive solution to address this concern is to find for each bank stock a non-financial stock of similar size (market capitalization), and then control for, in the regressions, the level of private information trading in these size-matched non-financial stocks. More important, they can also help us find out whether private information trading is more prevalent among bank stocks, which is an important assumption (i.e., “Banks are special.”) that motives us to regulate banks but not other non-financial firms.

For each bank, an unregulated nonfinancial listed firm in the same country, of similar market capitalization (at the end of 2005), is identified as a matched control. Other than matching by size, we also impose the same trade volume data requirement on the matched stocks as what is imposed on banks (i.e., in at least 50% of the trading days where price information is available, trade volume data must be available). As commercial banks are usually among the largest cap stocks in most local markets, their size-matched non-financial stocks are also more likely to be large liquid blue-chips. The higher liquidity of these stocks saves us from dealing with empirical difficulty in estimating the private information trading (PIT) indicators for less liquid stocks.

The PITs of market-capitalization-matched industrial firms can be included as a control variable to capture unobservable factors that may affect trading properties of stocks of certain size in certain countries. The regression results, after including this variable as explanatory variable, will thus capture, relatively cleanly, the effects that are specific to banks, instead of those that affect all stocks in general.

A matched firm's market capitalization is on average 110% that of its corresponding bank. The sizes of nearly 87% of the matched firms, in terms of market capitalization, fall within the [75%, 125%] size range of their paired banks. The industry breakdown of the matched firms is reported in Table 3. Only 6.2% of them are information technology firms, and thus our sample of matched nonfinancial firms should represent firms of relatively lower opacity (compared to IT firms).

We will first discuss the difference in level of private information trading between bank stocks and their matched nonfinancial stocks. We define bank stocks with significantly positive  $C_2$  as plagued by information asymmetry between informed traders and other market participants, and confidence level of 95% is used as a cutoff point. Using this definition, it is found that about 10.7% of banks in the sample exhibit serious information asymmetry problems in the trading of their stocks. Using the same criteria, 11.8% of nonfinancial stocks of similar size exhibit significant private information trading. The ratio appears similar to that of banking sector. Three

formal tests are performed in relation to the difference in PIT between bank and matched non-financial stocks. The three tests are (1) a  $t$  test of equality for matched pairs, (2) a nonparametric equality test for matched pairs, and (3) a Wilcoxon signed-rank test that also utilizes the relative rankings in the control and treatment groups. The null hypothesis is that bank stocks exhibit the same level of PIT as their pair non-financial stocks, and the alternative hypothesis is that bank stocks exhibit higher PIT. None of the three tests can reject the null. The significance level (for wrongly rejecting the null) in the three tests are, 78%, 67%, 70%, respectively. These results suggest that private information trading (PIT) is *not* systematically more prevalent in bank stocks than in nonfinancial stocks.

In Column (8) and (9) of Table 5, results are reported for a regression of PIT on Disclosure Index, that also controls for PIT of non-financial stocks. The results still hold that enhanced information disclosures by individual banks does reduce information asymmetry in the trading of bank stocks, compared to non-financial stocks of similar market cap size.

### **3.D. The Curious Case of High Private Information Trading in US Bank Stocks**

In this study, it is found that U.S. bank stocks actually exhibit very high level of private information trading, which may surprise many market observers who strongly believe the integrity of the US market. Here we have to emphasize that private information trading is not necessarily linked to illegal insider trading. Instead, it simply measures whether some group of traders have better private information than other investors, i.e., information asymmetry between informed investors and outside uninformed investors. The informed investors could be institutional investors who have better resources in researching and analyzing bank stocks without resorting to illegal means, or even individuals who are more capable in putting pieces of seemingly unrelated data together and produce useful information. Nevertheless, it is important to realized that, the scope for private information production is determined by whether the information environment of the stocks allows research to produce value-relevant private

information at relatively low cost, which can be profitably traded upon. When a firm's business is relatively more transparent, there is less non-public information that is not yet incorporated in stock prices, and the remaining arbitrage opportunities are usually marginal and may not be able to compensate the costs of producing them through deliberate research.

As the results may seem surprising, we examine the data carefully and confirm that the U.S. results are not caused by data problems. We do not think the methodology is problematic. The Llorente et al. (2002) methodology has been used on U.S. data in many studies and it is shown to be a good measure of private information trading. We also calculate PIT for a sample of size-matched non-financial stocks for the same sample period, and the values seem very satisfactory (in the sense that the PIT values of the non-financial stocks place the U.S. among countries with the lowest PIT, which poses great contrast to the behavior of U.S. bank stocks). Thus, this seems to be a problem specific to U.S. banks, not to U.S. stocks in general.

We examine the data carefully, and we can confirm that it is indeed the case that for U.S. banks, after an abnormally high trade volume day, there is more likely to be return continuation. Take Washington Mutual (WM) Bank as an example, if we sort the three years of trading days by abnormal trade volume, then for trading days that fall into the highest decile basket in terms of high trade volume, in the next trading days there are nearly 60% chance that the direction of price movement will be the same as the day before. In normal days, in contrast, the chance usually stays at exactly 50%, which is what random walk characteristics of the stock price movement should predict. As WM is a large cap stock with plenty of liquidity, the price continuation after abnormally high trade volume days suggest that those who buy (sell) WM stocks in a high trade volume and positive (negative) return day must have some private information that other investors get to know only at least one trading day later. Thus the puzzle is real and indeed exists in the price-volume pattern.

There are several explanations why stocks of these large U.S. banks (especially Washington Mutual, National City Corp, JP Morgan, Citigroup) exhibit high private information



trading. One driver could be that these U.S. banks use off-balance-sheet instruments (securitization of assets through SPE and CP conduits, use of interest rate and credit derivatives, etc) very extensively (compared to other developed markets). Among the top ten most “securitized banks” in the world, eight are U.S. banks (the other two being ABN-AMRO and Deutsche Bank). After securitization of more transparent assets and migration of risks off balance sheet, what are left visible on the balance sheet for investors have to be the most opaque assets and the most subordinated tranches of the securitized instruments. This makes these banks truly “large complex banking organizations” very difficult for investors to understand. Furthermore, US banks are relying more on more on fee income vis-à-vis traditional lending business, which generate higher volatility in earning and bank stock prices (DeYoung and Roland [2001], Stiroh[2005]) and may reflect the importance of private information trading in US bank stocks. These could explain why the large U.S. banks we examine have very high level of PIT compared to non-financial U.S. stocks of similar size.

The second explanation is that government intervention and regulations create new kind of information asymmetry problems between different groups of investors. Let’s not forget that U.S. still remains the most heavily regulated banking market in the world. Not long ago, banks were not allowed to branch across state borders, and in some places not even county borders. Regulatory and political uncertainty and surprises have always been part of the important factors that drive returns of U.S. bank stocks, including the bail-out of US Banks from LDC crisis, the removal of interstate banking restriction, the partial repeal of Glass-Steagall Act, the potential increase of regulatory market share ceiling for large national banks such as Bank of America, etc. The effects of operational factors in contrast have become less and less important as most banks have already moved very close toward efficiency frontier in traditional lending businesses. Carletti, Hartmann and Onega (2006) for example document that in nineteen industrialized countries bank stock prices responded strongly to regulatory changes. The same as in other heavily-regulated industries, in banking industry there is ample scope for private information

production through deliberate research, and institutional investors assisted by their experienced and specialized research forces may understand these regulatory and political factors better, deeper and quicker than small retail investors do.

#### **4. Discussions**

Basel II proposes two additional pillars, official oversight and information disclosure, to more effectively managing bank risks. Official oversight can reduce information asymmetry of banks by direct government intervention into the detailed monitoring of banks, which acts as a public good to address the market failure caused by inherent opaqueness of financial institutions. This study, based on more than 300 large banks in 47 countries however shows that stronger power of bank supervisors is actually associated with more private information trading of bank stocks. We do not argue that stronger supervisory power causes higher information asymmetry, because it could well be that governments step up authority of bank supervisory agencies in response to more rampant private information trading in bank stocks.

The third pillar of Basel II, information disclosure, can help reduce information asymmetry, because by making comprehensive disclosures of a bank's risk profile and performance, market participants can have sufficient information to reach informed judgments on the valuation of banks (Diamond and Verrecchia [1991], Kim and Verrecchia [1994], Gelb and Zarowin [2002], Easley and O'Hara [2004]; Healy and Palepu [2001] provide a good review of the empirical disclosure literature). The results of this empirical study do provide support for this hypothesis. It is found that enhanced accounting disclosure by banks, as measured by Nier's composite Disclosure Index, as well as credit rating issued by internationally reputable agencies, both help mitigate information asymmetry in trading bank stocks. The effect of information disclosure on reduction of privation information trading is economically significant and substantial. Raising Disclosure Index from 0.65 to 0.8 (i.e., from the first quartile to the third

quartile level in the sample) can reduce the value of PIT indicator by 0.94 – 1.06 points. Such a hypothetical action by individual banks can almost offset the adverse effect associated with the increase of official bank supervisory power from the first quartile to the third quartile level in the sample, which suggests that effects of individual bank's actions are large enough to offset and even reverse the influence of *existing* national policies.

The policy implication is that, even if the higher private information trading associated with high supervisory power is the result of high PIT prompting government to step up surveillance power of supervisory agencies, the results of this study suggest that improvement on individual banks' information disclosure practices may be able to produce better results than empowering supervisory agencies not mentioning that national policies are usually very resistant to changes. That being said, a national level mandated disclosure regulation, which requires enhanced disclosures of items such as what are prescribed by the Disclosure Index use in this study, may be welfare-enhancing if disclosure by individual banks has positive externalities on other banks and on the financial system (Dye [1990], Fishman and Hagerty [1990], Admati and Pfleiderer [2000], Bushee and Leuz [2005]), although we believe that, even without government interventions, investors are able to discriminate between good and bad banks in terms of information asymmetry, if they are given the right incentives.<sup>7</sup>

The evidence provided by this study also suggests that banks are not special when it comes to information asymmetry, as private information trading is not found to be more rampant in bank stocks than in nonfinancial stocks. Benston and Kaufman (1988), for example, argue that market value accounting is actually much more feasible and inexpensive for financial institutions to adopt than for most other enterprise, because banks have relatively small investments in assets for which current market values are difficult to measure. In general, the results of this study do

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<sup>7</sup> Numerous event studies conclude that investors can fairly accurately discriminate troubled banks from healthy institutions, even during a financial crisis (e.g., Musumeci & Sinkey, 1990; Calomiris & Mason, 1997; Jordan, Peek, & Rosengren, 2000) and that the market prices for uninsured bank debts seem to reflect appropriate bank-specific information (Flannery, 1998).

not suggest more private information trading in bank stocks than in nonfinancial stocks, although in several individual countries, such as the United States, probably because the largest banks are intensively using off-balance sheet instruments (securitization of assets, use of derivatives, etc) they exhibit much higher level of private information trading than non-financial stocks in the same country. In most other countries, it is fair to say that, all firms suffer from some degree of information asymmetry between informed traders and other market participants, and banks are not particularly more opaque. We thus expect that the same set of information disclosure mechanisms that work in industrial firms should work in banks too.

Finally, individual banks, if they are willing, may distinguish themselves from their domestic peers by providing more information to investors (by enhanced disclosures and use of reputable credit rating agencies) and make their businesses more transparent. Transparency can not only bring benefit to the financial system, but also make transparent banks more competitive in attracting funding. Previous literature has shown that transparency is in general associated with lower cost of capital (e.g. Botosan [1997], Sengupta [1998], Piotroski [1999], Leuz and Verrecchia [2000], Botosan and Plumlee [2002], Lambert et al. [2005], Greenstone et al. [2006]). Outside uninformed investors will naturally prefer banks with less private information trading and accordingly offer capital at a lower cost. For example, Easley et al. (2002) and Easley and O'Hara (2004) already show theoretically and empirically that investors demand a higher return to hold stocks with greater private information trading because they find themselves informationally disadvantaged; they also show that firms can influence their cost of capital by choosing features like accounting treatments and analyst coverage. Healy and Palepu (2001) provide a good review on the empirical disclosure literature. This study supplies evidence that disclosure can enhance transparency. We hope future research can shed light on this topic by providing more detailed evidence on how the strength of actual market discipline mechanisms is enhanced by information disclosure, and how this has impact on overall stability and transparency of the banking sector.



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**Table 1: Country Averages**

**Tables Notes:** This table reports the country averages of a select group of important indicators. The definition of them are briefly introduced below

**PIT (for banks and for matched nonfinancial firms)** = Level of Private Information Trading (PIT), estimated using a methodology proposed by Llorente et al. (2002). PIT is estimated for both banks and their matched nonfinancial firms, for a 3-year period between 2003 and 2005. *The value of PIT is then multiplied by 100.*

**Supervisory Power** = Power of official bank supervisors, as defined in Barth, Caprio, and Levine (2005). Higher values indicate stronger authority of bank supervisory agencies.

**Disclosure Index** = Disclosure index measures enhanced accounting disclosures practices of individual banks, as defined in Nier (2005).

**Accounting Quality Index** = Accounting quality index reflects whether a bank uses big-5 accounting firms, presents fully consolidated financial statements, receives a clean opinion, and uses internationally recognized accounting standards. Originally used in Aggarwal et al. (2005)

**w/Credit Rating** = percentage of top ten banks receiving at least one credit ratings from Moody's, Standard and Poor's, or Fitch.

Country	PIT (banks)	PIT (non-fin)	Supervisory Power	Disclosure Index	Accounting Quality Index	w/ Credit Rating (%)	Number of banks
ARGENTINA	-1.18	1.16	8	0.61	1.8	80	5
AUSTRALIAN	2.04	1.40	10	0.75	2.9	90	10
AUSTRIA	0.37	0.55	13	0.85	4.0	67	3
BANGLADESH	-0.14	0.18		0.60	0.9	30	10
BELGIUM	-2.26	-0.13	10	0.68	3.3	100	3
BRAZIL	2.08	1.50	13	0.72	2.3	83	6
CANADA	3.50	0.66	10	0.73	2.9	78	9
CHILE	-3.81	0.87	11	0.55	2.4	80	5
CHINA	-0.60	0.20		0.84	2.6	100	5
COLOMBIA	1.11	-1.21	13	0.68	2.3	67	3
CZECH REP.	-4.13	0.76	8	0.70	4.0	100	1
DENMARK	2.11	2.03	9	0.72	3.1	30	10
FINLAND	-3.28	0.62	6	0.80	4.0	100	1
FRANCE	0.11	2.55	7	0.59	2.5	100	10
GERMANY	-1.10	4.52	9	0.82	3.3	88	8
GREECE	0.87	1.63	12	0.67	3.4	100	10
HONG KONG	-0.94	0.71	11	0.86	2.9	80	10
HUNGARY	-0.36	1.17	14	0.80	4.0	100	2
INDIA	0.96	1.06	10	0.74	1.2	100	10
INDONESIA	2.25	0.69		0.69	2.4	100	10
IRELAND	2.41	0.88	11	0.87	3.3	100	3
ISRAEL	-0.32	0.85	7	0.79	2.3	71	7
ITALY	-0.89	1.66	7	0.90	3.2	100	10
JAPAN	-1.41	0.19	12	0.81	1.5	70	10
KOREA	2.77	0.91	12	0.65	2.2	89	9
MALAYSIA	1.02	0.21	11	0.71	2.3	50	10
MEXICO	3.29	1.35		0.63	2.0	50	2
NETHERLANDS	-0.30	1.92	5	0.88	4.0	100	2
NORWAY	1.36	1.04	9	0.84	3.1	50	10
PAKISTAN	0.74	0.55	13	0.58	1.3	20	10

PERU	-2.45	1.38	12	0.60	3.0	100	2
PHILIPPINE	0.91	0.46	11	0.72	2.6	90	10
POLAND	0.03	1.85	8	0.76	3.3	88	8
PORTUGAL	2.45	1.80	14	0.74	3.6	60	5
RUSSIA	3.73	-0.10	10	0.65	3.0	100	1
SINGAPORE	4.29	0.53	13	0.82	2.7	67	3
SOUTH AFRICA	-0.12	1.14	6	0.72	3.5	50	6
SPAIN	2.12	1.75	9	0.79	2.6	100	10
SRI LANKA	1.38	0.42	7	0.72	2.7	43	7
SWEDEN	0.87	1.02	8	0.91	3.0	100	4
SWITZERLAND	2.93	1.73	14	0.79	3.0	43	7
TAIWAN	0.63	0.88	14	0.71	1.1	80	10
THAILAND	-0.10	0.67	10	0.78	2.4	89	9
TURKEY	1.09	1.40	14	0.81	3.5	100	10
UNITED KINGDOM	2.86	1.00	11	0.82	3.5	80	10
USA	3.75	0.39	13	0.82	2.2	100	10
VENEZUELA	3.34	0.78	11	0.63	2.3	75	4
Mean	0.71	1.02	10.37	0.74	2.75	79.32	6.83

## Table 2: Descriptive Statistics

**Table notes:** This table summarizes descriptive statistics of variables used in the study. The definition of them can be found in Section 2 of the paper.

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
Private Information Trading ( $\times 100$ )	320	0.93	1.07	3.73	-22.33	10.56
Log of Total Asset	320	16.80	16.65	2.09	7.18	21.27
Illiquidity: Zero Return Days (%)	320	0.19	0.15	0.16	0.00	0.75
Disclosure Index	320	0.74	0.75	0.12	0.15	1.00
Accounting Quality Index	320	2.59	3.00	1.02	0.00	4.00
ADR program (dummy)	320	0.23	0.00	0.42	0.00	1.00
Credit Rating by International Agencies (dummy)	320	0.78	1.00	0.42	0.00	1.00
Loan to Asset Ratio	320	0.58	0.59	0.16	0.00	0.91
Equity to Asset Ratio	320	0.08	0.07	0.08	-0.01	0.97
Annualized Loan Growth Rate (log difference)	316	0.18	0.19	0.14	-0.42	0.65
Asset Diversification Index	320	0.59	0.63	0.30	0.00	0.99
Concentration of Voting Rights	320	0.28	0.18	0.26	0.00	1.00
Wedge between Voting and Cash Flow Rights	320	0.02	0.00	0.05	0.00	0.27
<b>Ultimate owner type</b>	<b>Share</b>					
Industrial firms	0.07					
Employees	0.02					
Family	0.15					
Financial institutions	0.16					
Foundations/Trusts	0.05					
Government	0.20					
Widely-held	0.35					

### Table 3 : Breakdown of matched nonfinancial stocks by industry

**Tables notes:** for each bank we select a non-regulated and no-financial stock as matched control. The industry breakdown of these matched stocks are presented below.

<b>Industry</b>	<b>Number of Firms</b>	<b>Share in the sample (%)</b>
BASIC INDUSTRIES	50	15.63
CYCLICAL CONSUMER	21	6.56
CYCLICAL SERVICES	61	19.06
GENERAL INDUSTRIALS	40	12.50
INFORMATION TECHNO.	20	6.25
NON-CYCLIC CONSUMER	53	16.56
NON-CYCLICAL SERVICES	34	10.63
RESOURCES	40	12.50
UTILITIES	1	0.31
Total	320	100

**Table 4: Determinants of Private Information Trading: Country Specific Factors**

**Table notes:** the dependent variable is the level of PIT (private information trading) in a bank stock. In this table, results are reported for regressions of PIT against a number of country-specific regulatory and legal factors. The definition of the variables can be found in Section 2 of the paper. Underneath each variable name, the predicted sign of the coefficient is indicated within parenthesis. All of the standard errors are already adjusted for clustering of residuals by country as well as heteroscedascity of residuals. \*, \*\*, \*\*\* indicates statistical significant level at 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Total Asset	0.146	0.118	0.129	0.134	0.031	0.112	0.055	0.080
(?)	(0.116)	(0.123)	(0.116)	(0.121)	(0.125)	(0.122)	(0.119)	(0.159)
Zero Return Days (%)	2.397	1.645	1.813	1.851	1.670	1.857	1.839	3.518
(+)	(1.148)**	(1.186)	(1.203)	(1.187)	(1.568)	(1.173)	(1.660)	(2.072)*
<b>Official Supervisory Power</b>		<b>0.219</b>	<b>0.208</b>	<b>0.204</b>	<b>0.244</b>	<b>0.229</b>	<b>0.244</b>	
(-)		<b>(0.079)***</b>	<b>(0.085)**</b>	<b>(0.079)**</b>	<b>(0.094)**</b>	<b>(0.079)***</b>	<b>(0.091)**</b>	
Strength of External Audit			0.113				0.120	
(-)			(0.230)				(0.227)	
Financial Statement Transparency				0.427			0.266	
(-)				(0.279)			(0.306)	
Stringency of insider trading law					0.760		0.613	
(-)					(0.302)**		(0.323)*	
Stringency of Self-Dealing Laws						0.269	0.292	
(-)						(0.354)	(0.289)	
Constant	-1.994	-3.671	-4.459	-6.041	-4.720	-4.341	-7.495	-3.242
(?)	(1.934)	(2.556)	(2.578)*	(2.715)**	(2.616)*	(2.556)*	(3.116)**	(2.509)
Observations	320	293	293	293	240	293	240	320
R-squared	0.01	0.02	0.02	0.03	0.06	0.03	0.07	0.20

**Table 5: Determinants of Private Information Trading: Bank Specific Factors**

**Table notes:** the dependent variable is the level of PIT (private information trading) in a bank stock. In this table, results are reported for regressions of PIT against a number of bank-specific factors. Country dummy variables are always included (coefficients not reported for brevity reason), in order to completely remove the effect of country-specific factors, and focus the examination on the effects of bank-specific factors. The definition of the variables can be found in Section 2 of the paper. Underneath each variable name, the predicted sign of the coefficient is indicated within parenthesis. All of the standard errors are already adjusted for clustering of residuals by country as well as heteroscedascity of residuals. \*, \*\*, \*\*\* indicates statistical significant level at 10%, 5%, and 1%, respectively.

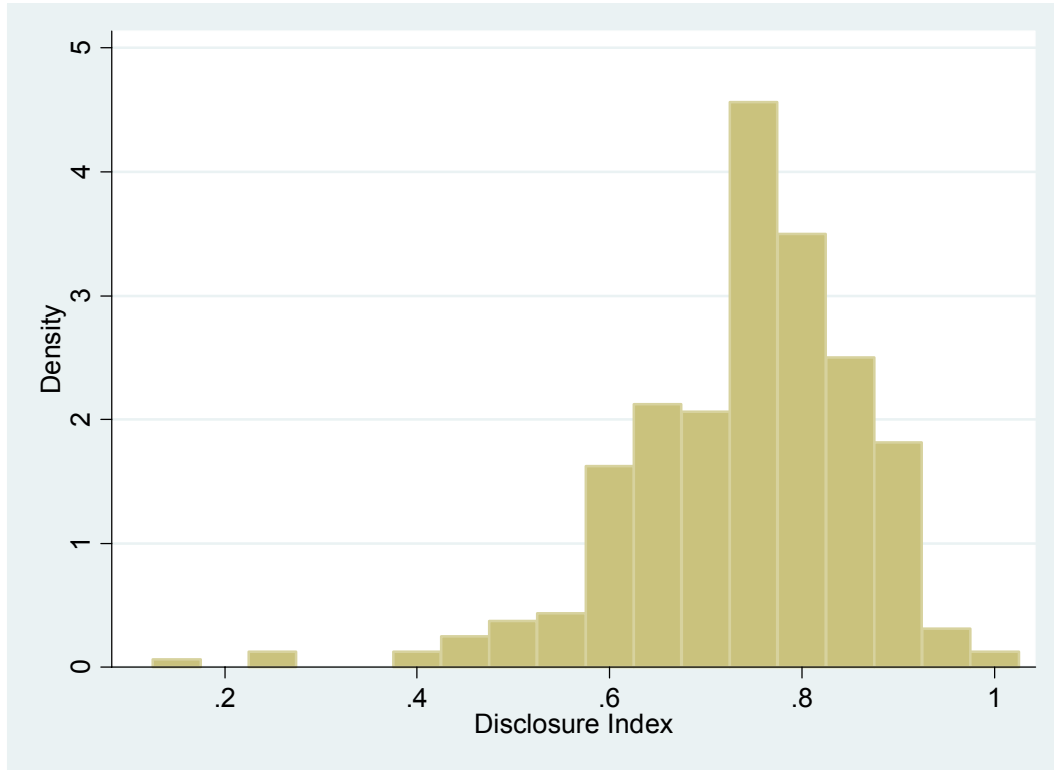
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Total Asset	0.315	0.298	0.275	0.375	0.457	0.311	0.306	0.337	0.490
(?)	(0.218)	(0.217)	(0.216)	(0.220)*	(0.215)**	(0.216)	(0.227)	(0.222)	(0.246)*
Zero Return Days (%)	3.596	4.471	3.694	3.112	4.394	3.584	3.580	3.725	4.710
(+)	(2.026)*	(2.433)*	(2.090)*	(2.055)	(2.350)*	(1.998)*	(1.992)*	(2.063)*	(2.916)
<b>Disclosure Index</b>	<b>-6.902</b>	<b>-7.306</b>	<b>-6.833</b>	<b>-6.268</b>	<b>-6.641</b>	<b>-6.911</b>	<b>-6.674</b>	<b>-7.070</b>	<b>-6.955</b>
(-)	<b>(3.080)**</b>	<b>(2.976)**</b>	<b>(3.070)**</b>	<b>(3.080)**</b>	<b>(3.702)*</b>	<b>(3.070)**</b>	<b>(3.170)**</b>	<b>(3.101)**</b>	<b>(3.679)*</b>
Accounting Quality Index		0.573							0.543
(-)		(0.412)							(0.426)
ADR program			0.339						0.450
(-)			(0.563)						(0.649)
Rated by Moody, S&P, or Fitch				-0.869					-1.051
(-)				(0.520)					(0.590)*
Loan-to-Asset Ratio					0.439				1.328
(+)					(2.830)				(3.154)
Equity-to-Asset Ratio					1.221				0.016
(-)					(4.523)				(5.043)
Growth Rates of Loans					2.123				2.149
(+)					(2.906)				(3.033)
Asset Diversification						0.066			0.435
(+)						(1.135)			(1.284)
Voting Rights							0.038		0.191



Concentration									
(?)							(0.990)		(0.988)
Wedge between voting and CF rights							7.567		10.190
(+)							(5.078)		(5.130)*
State-Owned							0.490		0.520
(+)							(0.558)		(0.565)
PIT (matched firm) x 100								0.148	0.192
(+)								(0.136)	(0.131)
Constant	-2.242	-3.041	-1.964	-2.611	-4.880	-2.220	-2.371	-2.650	-6.310
(?)	(2.332)	(2.688)	(2.316)	(2.314)	(3.929)	(2.228)	(2.489)	(2.481)	(4.734)
Observations	317	317	317	317	313	317	317	317	313
R-squared	0.21	0.22	0.21	0.21	0.22	0.21	0.22	0.21	0.25

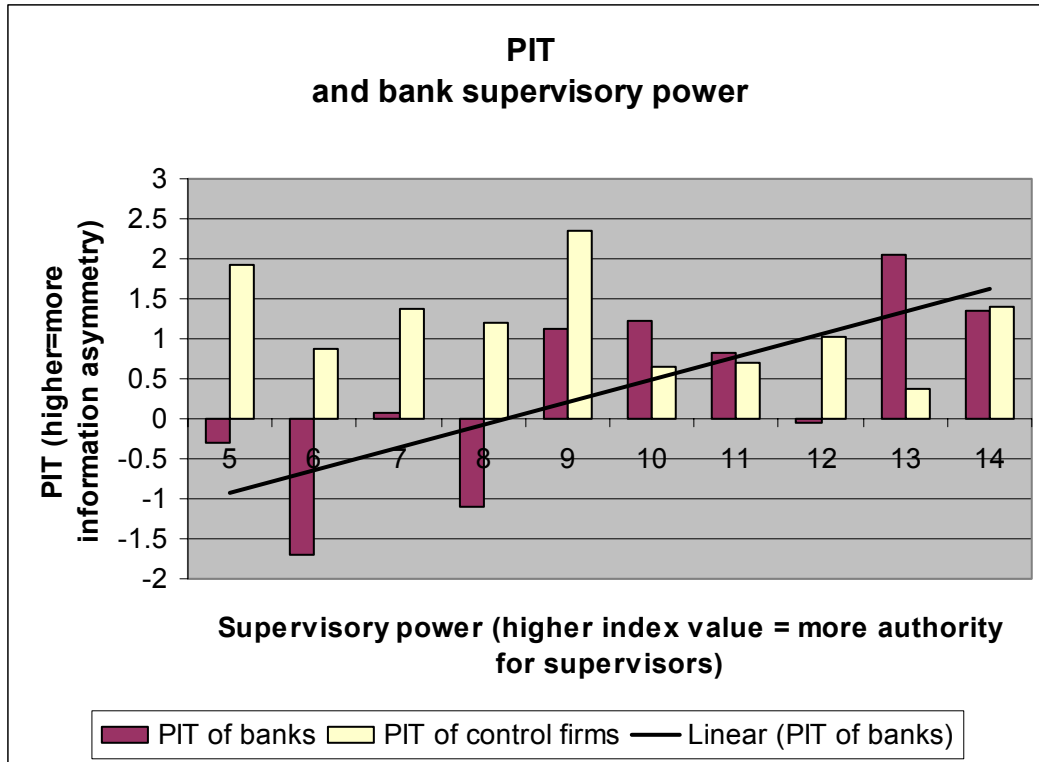
### Exhibit 1: Distribution of Disclosure Index across banks

**Notes:** the chart presents the distribution of Disclosure Index across banks in the form of a histogram



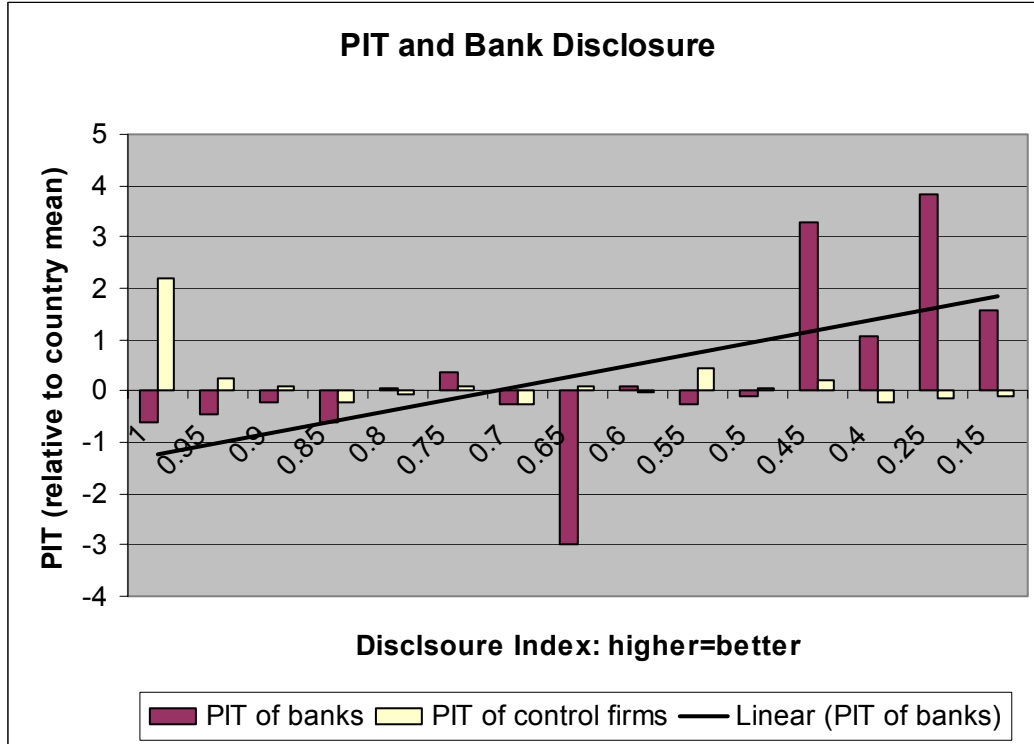
## Exhibit 2: Supervisory power and PIT

**Exhibit note:** This bar chart demonstrates the positive correlation between bank supervisory power and level of private information trading. Countries in the sample score between 5 and 14 points in the index of official supervisory power. PIT scores for banks and their matched non-financial firms are presented here side by side. Each pair of bars thus represents the average PIT scores (for banks and their matched non-financial firms, respectively), in a group of countries that are assigned the same Supervisory Power Index value. The chart shows that bank supervisor power is positively correlated with PIT of bank stocks, but not correlated with PIT of non-financial stocks. Note that we do not argue for causality in either direction.



### Exhibit 3: Information Disclosure and PIT

**Exhibit note:** This bar chart demonstrates the negative correlation between Disclosure Index and level of private information trading. Disclosure Indices of banks in the sample fall in the range between 0.15 and 1.00, in intervals of 0.05. PIT scores are adjusted for country averages to remove influence of country-specific factors (both observable and unobservable). Scores for both banks and their matched non-financial firms are reported. Each pair of bars represents the average PIT scores (for banks and their matched non-financial firms, respectively), in a group of banks that score the same value in Disclosure Index. The chart shows that Disclosure Index is negatively correlated with PIT of bank stocks, but not correlated with PIT of non-financial stocks.



## Appendix: Composite Disclosure Index for banks

The composite disclosure index proposed by Nier (2005) measures the level of detail which banks provide on 17 dimensions of accounting information in their published accounts. The table shown below lists the 17 sub-indices used in more detail. For each sub-index, a 0 was assigned if there was no entry in any of the corresponding categories and a 1 otherwise, except for the index for securities by type and the capital index. For the securities by type index, a 0 was assigned if there was no entry for any of the categories, a 1 if there was only an entry for the coarse breakdown and a 2 if there was an entry for the detailed breakdown. For the capital index, a 0 was assigned if there was no entry in any of the categories, a 1 if there was one entry only, a 2 if there were two entries and a 3 if there were three or four entries. Note that whenever a bank provides information on three of these items, one can infer the fourth. Providing three items was therefore viewed as informationally equivalent to providing four items.

Aggregating the information of the 17 sub-indices, we construct a composite disclosure index. The

composite index was defined as  $DISC = \frac{1}{20} \sum_{i=1}^{17} s_i \times 100$

### Disclosure indices

	Sub-index	Categories
Assets		
Loans	$s_1$ : Loans by maturity	Sub three months, three to six months, six months to one year, one to five years, more than five years
	$s_2$ : Loans by type	Loans to municipalities/government, mortgages, HP/lease, other loans
	$s_3$ : Loans by counterparty	Loans to group companies, loans to other corporate, loans to banks
	$s_4$ : Problem loans	Total problem loans
	$s_5$ : Problem loans by type	Overdue/restructured/other non-performing
Other earning assets		
	$s_6$ : Securities by type	Detailed breakdown: Treasury bills, other bills, bonds, CDs, equity investments, other investments
		Coarse breakdown: Government securities, other listed securities, non-listed securities
	$s_7$ : Securities by holding purpose	Investment securities, trading securities
Liabilities		
Deposits	$s_8$ : Deposits by maturity	Demand, savings, sub three months, three to six months, six months to one year, one to five years, more than five years
	$s_9$ : Deposit by type of customer	Banks deposits, municipal/government
Other funding		
	$s_{10}$ : Money market funding	Total money market funding
	$s_{11}$ : Long-term funding	Convertible bonds, mortgage bonds, other bonds, subordinated debt, hybrid capital
Memo lines		

	<i>s</i> <sub>12</sub> : Reserves	Loan loss reserves (memo)
	<i>s</i> <sub>13</sub> : Capital	Total capital ratio, tier 1 ratio, total capital, tier 1 capital
	<i>s</i> <sub>14</sub> : Contingent liabilities	Total contingent liabilities
	<i>s</i> <sub>15</sub> : Off-balance sheet items	Off-balance sheet items
Income statement		
	<i>s</i> <sub>16</sub> : Non-interest income	Net commission income, net fee income, net trading income
	<i>s</i> <sub>17</sub> : Loan loss provisions	Loan loss provisions

## Appendix: List of Banks included in the study

**Table notes:** the table lists the names of banks included in the research sample. In each country, if possible we include the ten largest publicly-traded banks, based on total asset at the end of FY 2004. For some countries however there are less than ten eligible banks and we have to settle for less.

Country	Bank Name
ARGENTINA	BBVA Banco Frances SA
ARGENTINA	Banco Rio De La Plata S.A.
ARGENTINA	Banco Hipotecario SA
ARGENTINA	Banco Macro BanSud SA
ARGENTINA	Grupo Financiero Galicia SA
AUSTRALIAN	National Australia Bank
AUSTRALIAN	Commonwealth Bank of Australia
AUSTRALIAN	Australia and New Zealand Banking Group
AUSTRALIAN	Westpac Banking Corporation
AUSTRALIAN	St. George Bank Limited
AUSTRALIAN	Suncorp-Metway Ltd
AUSTRALIAN	Bendigo Bank
AUSTRALIAN	Adelaide Bank Ltd.
AUSTRALIAN	Bank of Queensland Limited
AUSTRALIAN	Home Building Society
AUSTRIA	Bank Austria Creditanstalt AG
AUSTRIA	Erste Bank der Oesterreichischen Sparkas
AUSTRIA	Oberbank AG
BANGLADESH	Islami Bank Bangladesh Limited
BANGLADESH	Rupali Bank Limited
BANGLADESH	Pubali Bank Limited
BANGLADESH	Uttara Bank Limited
BANGLADESH	National Bank Limited
BANGLADESH	Southeast Bank Limited
BANGLADESH	A.B. Bank Ltd-Arab Bangladesh Bank Limit
BANGLADESH	Prime Bank Limited
BANGLADESH	International Finance Investment and Com
BANGLADESH	Dhaka Bank Limited
BELGIUM	Fortis
BELGIUM	Dexia
BELGIUM	KBC Group
BRAZIL	Banco do Brasil S.A.
BRAZIL	Banco Bradesco SA
BRAZIL	Banco Itau Holding Financeira S.A.
BRAZIL	Unibanco Holdings SA
BRAZIL	Banco Sudameris Brazil SA
BRAZIL	Banco da Amazonia SA
CANADA	Royal Bank of Canada RBC
CANADA	Toronto Dominion Bank
CANADA	Canadian Imperial Bank of Commerce CIBC
CANADA	Bank of Nova Scotia (The) - SCOTIABANK
CANADA	Banque de Montreal-Bank of Montreal
CANADA	Banque Nationale du Canada-National Bank
CANADA	Laurentian Bank of Canada
CANADA	Canadian Western Bank
CANADA	Pacific & Western Credit Corp
CHILE	Banco Santander Chile
CHILE	Banco de Chile
CHILE	Banco de Credito e Inversiones - BCI
CHILE	CorpBanca
CHILE	Grupo Security
CHINA	China Merchants Bank Co Ltd
CHINA	Shanghai Pudong Development Bank
CHINA	China Minsheng Banking Corporation
CHINA	Hua Xia Bank
CHINA	Shenzhen Development Bank Co., Ltd
COLOMBIA	Bancolombia
COLOMBIA	Banco de Bogota
COLOMBIA	Banco de Occidente SA
CZECH REPUBLIC	Komerčni Banka
DENMARK	Danske Bank A/S
DENMARK	Jyske Bank A/S (Group)
DENMARK	Sydbank A/S
DENMARK	Spar Nord Bank
DENMARK	Fionia Bank A/S
DENMARK	FB Bank Copenhagen A/S-Forstaedernes Ban
DENMARK	Amagerbanken, Aktieselskab
DENMARK	Roskilde Bank
DENMARK	Ringkjoebing Landbobank
DENMARK	Sparbank Vest A/S
FINLAND	OKO Pankki Oyj-OKO Bank plc
FRANCE	BNP Paribas
FRANCE	Crédit Agricole S.A.
FRANCE	Société Générale
FRANCE	Crédit Industriel et Commercial - CIC
FRANCE	Crédit Agricole d'Ile-de-France-Caisse r
FRANCE	Crédit Agricole Nord de France-Caisse ré
FRANCE	Crédit Agricole d'Aquitaine-Caisse régio
FRANCE	Crédit Agricole Atlantique Vendée-Caisse
FRANCE	Credit Agricole Centre Loire-Caisse Regi
FRANCE	Credit Agricole Alpes Provence-Caisse ré
GERMANY	Deutsche Bank AG
GERMANY	Bayerische Hypo-und Vereinsbank AG
GERMANY	Commerzbank AG
GERMANY	Eurohypo AG
GERMANY	Bankgesellschaft Berlin AG
GERMANY	Deutsche Postbank AG

GERMANY	IKB Deutsche Industriebank AG
GERMANY	UmweltBank AG
GREECE	National Bank of Greece SA
GREECE	Alpha Bank AE
GREECE	EFG Eurobank Ergasias SA
GREECE	Agricultural Bank of Greece
GREECE	Emporiki Bank of Greece SA
GREECE	Piraeus Bank SA
GREECE	General Bank of Greece SA
GREECE	Egnatia Bank SA
GREECE	Bank of Attica SA
GREECE	Aspis Bank SA
HONG KONG	BOC Hong Kong (Holdings) Ltd
HONG KONG	Hang Seng Bank Ltd.
HONG KONG	Bank of East Asia Ltd
HONG KONG	Industrial and Commercial Bank of China
HONG KONG	Wing Hang Bank Ltd
HONG KONG	CITIC International Financial Holdings L
HONG KONG	Dah Sing Financial Holdings Ltd
HONG KONG	Wing Lung Bank LTD
HONG KONG	Fubon Bank (Hong Kong) Limited
HONG KONG	Liu Chong Hing Bank Ltd.
HUNGARY	Országos Takarekpenztar es Kereskedelmi
HUNGARY	Inter-Europa Bank Ltd
INDIA	State Bank of India
INDIA	ICICI Bank Limited
INDIA	Punjab National Bank
INDIA	Canara Bank
INDIA	Bank of Baroda
INDIA	Bank of India
INDIA	Union Bank of India
INDIA	UCO Bank
INDIA	Oriental Bank of Commerce Ltd.
INDIA	Syndicate Bank
INDONESIA	Bank Mandiri
INDONESIA	Bank Central Asia
INDONESIA	Bank Negara Indonesia (Persero) - Bank B
INDONESIA	Bank Rakyat Indonesia
INDONESIA	Bank Danamon Indonesia Tbk
INDONESIA	Bank Internasional Indonesia Tbk
INDONESIA	Bank Permata Tbk
INDONESIA	PT Bank Niaga Tbk
INDONESIA	Bank Lippo Tbk.
INDONESIA	Panin Bank-Bank Pan Indonesia Tbk PT
IRELAND	Bank of Ireland
IRELAND	Allied Irish Banks plc
IRELAND	Anglo Irish Bank Corporation Plc
ISRAEL	Bank Hapoalim BM
ISRAEL	Bank Leumi Le Israel BM
ISRAEL	Israel Discount Bank LTD

ISRAEL	Mizrahi Tefahot Bank Ltd.
ISRAEL	First International Bank of Israel
ISRAEL	Union Bank of Israel Ltd
ISRAEL	Bank of Jerusalem
ITALY	Banca Intesa SpA
ITALY	UniCredito Italiano SpA
ITALY	San Paolo IMI
ITALY	Capitalia SpA
ITALY	Gruppo Monte dei Paschi di Siena-Banca M
ITALY	Banca Nazionale del Lavoro SpA - BNL
ITALY	BPU Banca-Banche Popolari Unite
ITALY	Banco Popolare di Verona e Novara
ITALY	Banca Antonveneta-Banca Antoniana Popola
ITALY	Banca Popolare Italiana-Banca Popolare I
JAPAN	Kabushiki Kaisha Mitsubishi UFJ Financia
JAPAN	Mizuho Financial Group
JAPAN	Sumitomo Mitsui Financial Group, Inc
JAPAN	Resona Holdings, Inc
JAPAN	Shinkin Central Bank
JAPAN	Sumitomo Trust & Banking Company Ltd
JAPAN	Mitsui Trust Holdings, Inc
JAPAN	Bank of Yokohama, Ltd (The)
JAPAN	Hokuhoku Financial Group Inc.
JAPAN	Chiba Bank Ltd.
KOREA	Kookmin Bank
KOREA	Shinhan Financial Group
KOREA	Woori Finance Holdings Co. Ltd
KOREA	Hana Bank
KOREA	Industrial Bank of Korea
KOREA	Korea Exchange Bank
KOREA	Daegu Bank Ltd.
KOREA	Pusan Bank
KOREA	Jeonbuk Bank
MALAYSIA	Malayan Banking Berhad - Maybank
MALAYSIA	Bumiputra-Commerce Holdings Berhad
MALAYSIA	Public Bank Berhad
MALAYSIA	RHB Capital Berhad
MALAYSIA	Hong Leong Credit Berhad
MALAYSIA	Hong Leong Bank Berhad
MALAYSIA	EON Capital Berhad
MALAYSIA	Affin Holdings Berhad
MALAYSIA	Southern Bank Berhad
MALAYSIA	BIMB Holdings Berhad
MEXICO	Grupo Financiero BANORTE
MEXICO	Grupo Financiero Inbursa
NETHERLANDS	ABN Amro Holding NV
NETHERLANDS	Van Lanschot NV
NORWAY	DnB Nor ASA
NORWAY	Sparebank 1 Rogaland SR-BANK-Sparebanken



NORWAY	Sparebanken Vest
NORWAY	Sparebank 1 Nord-Norge
NORWAY	Sparebanken Midt-Norge
NORWAY	Sparebanken More
NORWAY	Sparebanken Ost
NORWAY	Sandnes Sparebank
NORWAY	Sparebanken Pluss
NORWAY	SpareBank 1 Vestfold-SpareBanken Vestfol
PAKISTAN	National Bank of Pakistan
PAKISTAN	MCB Bank Limited
PAKISTAN	Bank Alfalah Limited
PAKISTAN	Askari Commercial Bank Ltd
PAKISTAN	Faysal Bank Ltd
PAKISTAN	Union Bank Limited
PAKISTAN	Metropolitan Bank Limited
PAKISTAN	Bank of Punjab
PAKISTAN	PICIC Commercial Bank Limited
PAKISTAN	Soneri Bank Limited
PERU	Banco de Credito del Peru
PERU	BBVA Banco Continental-Banco Continental
PHILIPPINE	Metropolitan Bank & Trust Company
PHILIPPINE	Bank of The Philippine Islands
PHILIPPINE	Equitable PCI Bank Inc
PHILIPPINE	Philippine National Bank
PHILIPPINE	Rizal Commercial Banking Corp.
PHILIPPINE	Banco de Oro Universal Bank
PHILIPPINE	China Banking Corporation - Chinabank
PHILIPPINE	Union Bank of the Philippines
PHILIPPINE	Security Bank Corporation
PHILIPPINE	International Exchange Bank
POLAND	Powszechna Kasa Oszczednosci Bank Polski
POLAND	Bank Pekao SA-Bank Polska Kasa Opieki SA
POLAND	Bank BPH SA
POLAND	ING Bank Slaski S.A. - Capital Group
POLAND	Bank Zachodni WBK S.A.
POLAND	Bank Millennium
POLAND	Bank Ochrony Srodowiska Capital Group-Ba
POLAND	Fortis Bank Polska SA
PORTUGAL	Millennium bcp-Banco Comercial Português
PORTUGAL	Banco Espirito Santo SA
PORTUGAL	Banco BPI SA
PORTUGAL	BANIF SGPS SA
PORTUGAL	Finibanco Holding SGPS SA
RUSSIA	SBERBANK-Savings Bank of the Russian Fed
SINGAPORE	DBS Group Holdings Ltd
SINGAPORE	United Overseas Bank Limited UOB
SINGAPORE	Oversea-Chinese Banking Corporation Limi
SOUTH AFRICA	Standard Bank Group Limited
SOUTH AFRICA	FirstRand Limited
SOUTH AFRICA	Nedbank Group Limited
SOUTH AFRICA	ABSA Group Limited
SOUTH AFRICA	RMB Holdings Limited
SOUTH AFRICA	Mercantile Bank Holdings Limited
SPAIN	Santander Central Hispano Group-Banco Sa
SPAIN	Banco Bilbao Vizcaya Argentaria SA
SPAIN	Banco Espanol de Crédito SA, BANESTO
SPAIN	Banco Popular Espanol SA
SPAIN	Banco de Sabadell SA
SPAIN	Bankinter SA
SPAIN	Banco Pastor SA
SPAIN	Banco de Valencia SA
SPAIN	Banco de Andalucia SA
SPAIN	Banco Guipuzcoano SA
SRI LANKA	Hatton National Bank Ltd.
SRI LANKA	Commercial Bank of Ceylon Limited
SRI LANKA	Seylan Bank
SRI LANKA	Sampath Bank
SRI LANKA	National Development Bank Limited
SRI LANKA	DFCC Bank
SRI LANKA	Nations Trust Bank Limited
SWEDEN	Nordea Bank AB
SWEDEN	Skandinaviska Enskilda Banken AB
SWEDEN	Svenska Handelsbanken
SWEDEN	Swedbank AB
SWITZERLAND	UBS AG
SWITZERLAND	Credit Suisse Group
SWITZERLAND	Valiant Holding
SWITZERLAND	Bank Coop AG
SWITZERLAND	Banque Privée de Gérance SA-Verwaltungs
SWITZERLAND	Bank Sarasin & Co Ltd.
SWITZERLAND	Bank Linth
TAIWAN	Taiwan Cooperative Bank
TAIWAN	Chang Hwa Commercial Bank Ltd.
TAIWAN	Taiwan Business Bank
TAIWAN	International Bank of Taipei
TAIWAN	Hsinchu International Bank
TAIWAN	EnTie Commercial Bank
TAIWAN	Ta Chong Bank Ltd.
TAIWAN	Bank of Overseas Chinese - BOOC
TAIWAN	Far Eastern International Bank
TAIWAN	Cosmos Bank
THAILAND	Bangkok Bank Public Company Limited
THAILAND	Krung Thai Bank Public Company Limited
THAILAND	Kasikornbank Public Company Limited
THAILAND	Siam Commercial Bank Public Company Limited
THAILAND	TMB Bank Public Company Limited
THAILAND	Bank of Ayudhya Public Company Ltd.

THAILAND	Siam City Bank Public Company Limited
THAILAND	Bankthai Public Company Limited
THAILAND	Tisco Bank Public Company Limited
TURKEY	Akbank T.A.S.
TURKEY	Turkiye Garanti Bankasi A.S.
TURKEY	Yapi Ve Kredi Bankasi A.S.
TURKEY	Finansbank A.S.
TURKEY	Denizbank A.S.
TURKEY	Turk Ekonomi Bankasi A.S.
TURKEY	Sekerbank T.A.S.
TURKEY	Industrial Development Bank of Turkey-Turkiye
TURKEY	Tekstil Bankasi A.S.-Tekstilbank
TURKEY	Alternatifbank A.S.
UK	Royal Bank of Scotland Group Plc (The)
UK	HSBC Holdings Plc
UK	Barclays Plc
UK	HBOS Plc
UK	Lloyds TSB Group Plc

UK	Standard Chartered Plc
UK	Northern Rock Plc
UK	Alliance & Leicester Plc
UK	Bradford & Bingley Plc
UK	EGG Plc
USA	Citigroup Inc
USA	JP Morgan Chase & Co.
USA	Bank of America Corporation
USA	Wachovia Corporation
USA	Wells Fargo & Company
USA	Washington Mutual Inc.
USA	US Bancorp
USA	SunTrust Banks, Inc.
USA	National City Corporation
USA	BB&T Corporation
VENEZUELA	Mercantil Servicios Financieros, C.A.
VENEZUELA	Banescobanco Universal CA
VENEZUELA	Banco Provincial
VENEZUELA	Venezolano de Credito SA, Banco Universa