Cross-Sectional Analysis of Asian Bank Stock Returns

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Abstract

We examine the relationship between expected bank stock returns and fundamental variables, for a sample of seven Asian countries. Our empirical evidence shows that the popular asset pricing factors such as local market risk, exchange rate risk and firm size are important in predicting expected stock returns. Bank-specific variables such as the ratios of net loans to total assets, non-interest income to total assets, and ROA explain the cross-sectional stock returns of commercial banks. Country-specific factors such as economic growth and the level of financial openness reduce country risks and lead thereby to lower expected bank stock returns. Moreover, we find that commercial banks with small sized, higher percentages of loans, and higher percentages of off-balance sheet activities, were risky during the Global Financial Crisis. Thus, monitoring of the proportion of illiquid assets such as loans, promoting lower levels of non-interest income and managing bank performances are thus keys to reducing potential risks for Asian banks.

Keywords: Asian Banks, Cross-sectional asset pricing tests, Expected returns, Bank accounting ratios, Global Financial Crisis
JEL classification: G12, G15, G21

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1. Introduction

Mohanty and Turner (2010) evaluate Asian banks to have become better capitalized, reduced their external exposures, and been more effectively managing their credit risks since the 1997 Asian currency crisis. Moreover, with the help of favorable macroeconomic conditions the structure of Asian banking assets and income statements have changed significantly during the recent decade. The quality of assets held by banks has improved, for example, as banks hold more cross-border claims and their shares of liquid assets have grown rapidly. To ensure financial system stability and economic growth, however, further efforts for the restructuring and reform of banks are still needed. The financial system in Asia remains weak to external shocks, as shown by its highly volatile stock and foreign exchange markets. In particular, the global economic slowdown and the ongoing European crisis have raised uncertainties concerning Asian economic growth. Given Asian banks' historical characteristics and the state of the current global economy, the challenge is to determine the risk factors that Asian banks are particularly more vulnerable and exposed to.

In line with this discussion, this paper provides empirical evidence of the risk factors that Asian banks are more sensitive to. We mainly examine the relationship between expected bank stock returns and fundamental variables, for a sample of seven Asian countries[1] in the period from January 2005 to December 2011. Expected bank stock returns reflect investors' expectations of the future prosperity of banks, and variables related to stock returns contain information as to the risks that banks are exposed to. Utilizing an empirical asset pricing model, bank-specific and country-specific variables are explored to test whether they have predictability to explain the cross-sectional differences in expected bank stock returns at the firm level. Traditionally, beta (market risk), firm size, and the book-to-market ratio have been considered factors explaining cross-sectional stock returns. However, as it has higher leverage and is more strictly regulated than other sectors, the banking sector has been excluded

[1] The People's Republic of China, India, Indonesia, the Republic of Korea, Malaysia, the Philippines, and Thailand.

in the traditional asset pricing analysis.[2] In addition to traditional factors, therefore, we consider bank-specific fundamental variables that can show the bank capital and income structures, such as their ratios of net loans to total assets, equity to total assets, and non-performing loans to total assets. Country-specific variables are moreover also considered, such as the levels of financial openness, savings rates, and rates of GDP growth.

In this study we also attempt to show how the Global Financial Crisis affected the relationship between expected stock returns and fundamental variables. During the crisis investors required greater risk premiums on risk assets than during normal periods. In this regard, we conjecture that the relationship between expected returns and fundamental variables changed during the crisis. Our conjecture is also related to the findings of Cole et al. (2008), that this relationship becomes stronger in the case of a negative external shock.

This paper provides a comprehensive evaluation of cross-sectional asset pricing tests in the Asian banking sector using both traditional asset pricing factors together with bank- and country-specific factors with a recent data sample. There are a few other papers that have studied cross-sectional bank stock returns. While Cooper et al. (2003) analyzed U.S banks, Drobetz et al. (2008) concentrated on European banks. Recently, Yang and Tsatsaronis (2012) have studied bank stock returns of advanced economies.

The remainder of this paper is organized as follows. Section 2 reviews the related literature, after which Section 3 details the data and the empirical methodology. Section 4 then discusses the summary statistics as well as the cross-sectional regressions, and Section 5 concludes.

2. Literature Review

Financial institutions were not included in the asset pricing model in the seminal study of Fama and French (1992), because they have higher leverage and are subject to a higher level of industry

[2] Fama and French (1992, 1993)

regulation. However, there have been a number of studies exploring the fundamental variables that determine the market value of banks, the most important financial institutions in the modern financial system. Given the special nature of banks, as reviewed by Diamond (1984, 1991), it seems likely that bank-specific fundamental variables may have an important relationship with banking institutions' market values.

Earlier research focused mainly on traditional banking practices. Thakor (1987), Grammatikos and Saunders (1990), Madura and Zarruk (1992), Kim and Santomero (1993), and Docking et al. (1997) concentrated on the loan portfolio quality, market valuation of fundamental soundness, and performance of banks. Kane and Unal (1990) on the other hand discussed the relationship between the market values of banks and their off-balance sheet items. This research suggested that the fundamental variables inherent in banks' activities contain important information that can help to determine the cross-sections of their expected returns.

Recent studies have focused on more various bank factors. Using data from 213 US banking firms between 1986 and 1999, Cooper et al. (2003) found that variables related to the percentage changes in the ratios of non-interest income to net income, loan loss reserves to total loans, earnings per share, equity book value to total assets, and standby letters of credit to total loans are univariately important in predicting the cross-sections of bank stock returns. Book-to-market value and firm size, which are well known to explain the cross-sections of stock returns, cannot explain bank stock returns. In a multivariate test, increases in bank earnings, decreases in non-interest income, and increases in the book value of equity-to-total assets ratio have positive relationships with the cross-section of bank stock returns. Leledakis and Staikouras (2004), studying 193 European banks between 1997 and 2004, found that the book-to-market ratio and loan quality are important in explaining the cross-sections of bank stock returns. Bessler et al. (2008) tested the impacts of fundamental variables of banks on stock market returns using a sample of 235 European banks from 1991 to 2005, and found the ratios of loans to total assets, non-interest income to total assets, and off-balance sheet items to total assets to all have positive impacts on the subsequent stock returns of banks. The ratios of loan loss provisions

to net interest revenue and of book value equity to total assets on the contrary have negative impacts on subsequent stock returns.

Besides fundamental variables, researchers have recently studied the impacts of country-level risk factors on stock returns. Fama and French (1998), Patel (1998) and Rouwenhorst (1999) maintained that risk premiums in emerging economies have the same characteristics as those in developed economies. However, Claessens et al. (1998), Lyn and Zychowicz (2004) and Ramcharran (2004) uncovered mixed results concerning the relationships between fundamental variables and stock returns in emerging markets. Using a wide range of country risk-rating databases, Erb et al. (1995) found that a country risk-rating model can better explain the return generating process in the world market. They showed that a lower rating, indicative of higher risk, has a positive relationship with expected returns. Erb et al. (1996b) found that economic and financial risks contain information about expected returns in developed markets, while in emerging economies political risk also has a link to expected stock returns. La Porta et al. (1998) showed that countries with lower qualities in terms of legal rules and law enforcement have smaller and narrower capital markets. Perotti and Oijen (2001) suggested that changes in political risk are priced, engendering a strong effect on local stock markets and excess returns in emerging countries.

Several studies have shown that bank stock returns include information regarding economic growth, sovereign ratings and business cycles. Cole et al. (2008) demonstrated that there is a positive link between bank excess returns and future economic growth – which is strengthened by the enforcement of insider trading laws, banking crises, bank disclosure standards and financial development, but weakened by government bank ownership. Correa et al. (2012) found changes in sovereign ratings to have had significant impacts on bank stock returns in 36 countries between 1995 and 2011. These impacts have been nonlinear, and have varied across banks and countries. They have also been asymmetric, and stronger for downgrades than for upgrades, and sizeable sovereign rating downgrades have had greater negative impacts on bank stock returns. Notably, the findings have also been more statistically significant concerning banks with greater ex-ante government support. In a

recent BIS report, Yang and Tsatsaronis (2012) meanwhile showed that bank equity prices rise and fall with the business cycle. They interpreted that, during the recession, the increases in rates of default on loans to households and firms reduce bank earnings, leading investors to require higher returns on bank stocks.

Studies on emerging markets' bank stock prices have been few. Most of these prior to the 1990s focused on the relationship between debt crises and bank stock returns: Cornell and Shapiro (1985) and Smirlock and Kaufold (1987) for the 1982 Mexican debt crisis, and Musumeci and Sinkey (1990) for the 1987 Brazilian crisis. Recently, Girard et al. (2010) investigated the impacts of both fundamental factors and country risk factors on bank stock returns in emerging markets. Their sample covered commercial banks in 53 emerging markets from 1986 to 2004, meaning that the Global Financial Crisis period was however not included. The related previous literature is summarized in Table A2.

3. Data and Model

3.1 Data

Our initial list of banks in seven Asian countries is derived from the Bankscope database. We select active and inactive banks listed on major stock exchanges in their countries during the period, and limit them to only commercial banks, investment banks and bank holding companies.[3] The Bankscope database, the most widely-used one for obtaining bank information, provides individual bank stock valuations and accounting items. It has limitations, however, as its stock price data is poorly collected compared to the Bloomberg data for the same bank lists, and it starts only from the

[3] The selected countries (and their major stock exchanges) are China (Shanghai/Shenchen), India (Bombay), Indonesia (Indonesia), Korea (Korea), Malaysia (Bursa), the Philippines (Philippines) and Thailand (Bangkok).

year 2005. We therefore download our daily and monthly stock price data from Bloomberg, instead of the Bankscope database.

We match the accounting data for the most recent fiscal year-end in calendar year t-1 with the returns for July of calendar year t through June of year t+1, as described in Fama and French (1992). In this way we ensure that the accounting information is publicly known. We then require that stocks should have book-to-market value ratios and market capitalizations, and we treat any negative values of various bank accounting items such as equity-to-total assets ratios as missing observations. The final data sample consists of 144 banks in seven Asian countries, and the sample period is from January 2005 to December 2011.[4] Table 1 shows the numbers of banks considered, broken down by country and type.

Bank stock returns, RET_t, are calculated as the log price differences, $\ln\left(\frac{Price_{t+1}}{Price_t}\right)$, and Ince and Porter's (2006) extreme and reversal filters for treating measurement errors are applied. Daily stock returns of less than -100% are treated as missing, and those above 100% are as well if they are completely reversed on the following day. All stock returns in local currencies are converted to U.S. dollars, with the exchange rates to the dollar also obtained from Bloomberg. In the main analysis, one-year-ahead bank stock returns are used as a proxy for expected returns.

3.2 Univariate Portfolio Tests

We sort the one-year-ahead bank stock returns based on bank-specific fundamental variables, and form quintile portfolios. We calculate average returns for each portfolio in each month, and test whether there are differences in average returns between the highest and lowest quintile portfolios. Newey-West (1987) t-statistics with one-month lags are calculated to take into account serial correlations. This analysis shows a simple linear relationship between the sorting variable and future returns.

[4] Due to Bankscope's limited data sample period, our sample begins from 2005.

3.3 Multivariate Cross-Sectional Regressions

To determine the variables explaining the cross-sectional differences in Asian bank returns, we assume that Asian bank stock returns are sensitive to local stock market and exchange risks. Investors require higher risk premiums when stock returns are more correlated to local stock market and exchange risks, and expected returns for those stocks are thus higher. Local market beta ($beta\_loc_t$) and currency beta ($beta\_curr_t$) proxy the local stock market and exchange risks, respectively. Beta for each bank stock is calculated using Equation (1), and is monthly time-varying to account for the difference in risk across time (a more detailed explanation is found in the section in Lee et al. (2009) on empirical international asset pricing models)[5]:

$$RET_{\mathrm{i,t}} - \mathrm{rf_t} = a_i + \mathrm{beta_{i,loc}} \times (\mathrm{RETloc_t} - \mathrm{rf_t}) + \mathrm{beta_{i,curr}} \times (\mathrm{RETex_t} - \mathrm{rf_t}) + \mathrm{u_{i,t}} \quad (1)$$

where $\mathrm{rf_t}$ is the three-month U.S. Treasury bill rate, $\mathrm{RETloc_t}$ the MSCI country stock market index returns, and $\mathrm{RETex_t}$ the trade-weighted exchange rate returns of the Trade Weighted U.S. Dollar Index. Important trading partner data is obtained from the Federal Reserve Board. The subscript i indicates an individual bank.

Bekaert et al. (2007) showed that stock liquidity risk significantly explains emerging market stock returns. Stocks with high transaction costs have difficulty being liquidated, and investors perceive them as risky stocks. And since Asian stock markets are well known for having high liquidity risks, we include stock liquidity risk as another systematic risk in our empirical model. This liquidity risk ($Zerotradingdays_t$) is measured as the proportion of days with zero returns during a month, based on the assumption that zero returns indicate no trading on that day. This measure shows the trading liquidity of a stock; if it is close to one, for example, that stock is extremely illiquid.

[5] Lee et al. (2009) also include a world market beta. However, Asian stock markets are more explained by local factors. Furthermore, our local betas are highly correlated to a world market beta. These results indicate that our local betas could represent both local and world effects.

The basic empirical model uses Equation (2) with three systematic risks—local market, currency, and stock liquidity risks:

$$RET_{i,t+1} = \alpha + \gamma_{loc} \times beta_{i,loc_t} + \gamma_{curr} \times beta_{i,curr_t} + \delta \times Zerotradingdays_{i,t} + e_{i,t} \quad (2)$$

The main objective of this paper is to determine which bank-specific accounting items or country-specific variables explain the cross-sectional differences in expected bank stock returns, and several such potential variables will thus be added to Equation (2). The description of these variables will be discussed later in this section. The cross-sectional regressions with panel fixed effects are used in the empirical methodology, and Driscoll and Kraay (1998) standard errors are reported to take care of the heteroscedasticity, autocorrelation and special correlations in the international bank data. Drobetz et al. (2007) showed that the Driscoll and Kraay (1998) standard errors provide conservative figures, and are more reliable than Fama and MacBeth (1973) regressions.

We also test the hypothesis that expected bank stock returns are more sensitive to some fundamental variables during the Global Financial Crisis, using a Chow test approach. Interaction terms with the Global Financial Crisis for all variables are calculated, and the terms are included in the cross-sectional regressions in Equation (3):

$$RET_{t+1} = \sum_i \rho_i \times Variables_{i,t} + \sum_i \rho_i \times Variables_{i,t} \times Global\ financial\ crisis\ dummy + e_t \quad (3)$$

Differences in business models among banks may lead to differences in exposure to risk, and this is something that should be reflected in our cross-sectional testing. We thus disaggregate banks into commercial banks, bank holding companies and investment banks, and run the regression analysis for each type separately.

3.4 Expected Bank Stock Returns and Fundamental Variables

Since Fama and French (1992, 1993), much of the previous empirical asset pricing literature has shown that individual firms' sizes and book value-to-market value ratios explain cross-sectional differences in stock returns. In addition to these variables, bank accounting ratios and country characteristics are examined to see whether they are also related to expected bank stock returns.

Equity to total assets (equity_totassets)

The equity-to-total assets ratio, as a leverage variable, shows the capital structure of banks. A lower ratio indicates a higher use of debt, and banks thus face higher costs of capital. Increases in banks' risks raise the risk premiums that investors require. Therefore, expected stock returns become higher.

Loans to total assets (loans_totassets)

Loans are less liquid assets on the bank's balance sheet. The loans-to-total assets ratio is a proxy for liquidity risk. A bank is tied up by loans, and a higher percentage of loans means more difficulties in liquidating assets. In the other words, when this ratio is low a bank has excess lending capacity, enabling it to reduce its risks. As the ratio increases, therefore, the expected return becomes higher as well.

Non-interest income to total assets (nonintinc_totassets)

Interest income has been the traditional income source of banks. However, banks have recently diversified their income sources to include fees and other income. The non-interest income-to-total assets ratio represents the diversified income structure of banks. Cooper et al. (2003) stated that the diversification effect reduces the expected costs of financial distress, and will therefore have a positive impact on banks' valuation. However, reliance on fee-based revenues could cause greater volatility in banks' incomes and higher levels of risk. In our cross-sectional analysis, we explore both

views.

Net income to total assets (netinc_totassets, ROA)

ROA is the return generated from the assets invested in by a bank, and represents the bank's profitability and performance. The higher this ratio, the lower the expected returns.

Off-balance sheets items to total assets (offbal_totassets)

Off-balance sheet activities include transactions in derivatives, options and structured products such as swaps, letters of credit, loan commitments and credit default swaps. These items could be used as instruments for hedging risk but could also impose additional risk exposures. Their role as it impacts expected returns is explored in our analysis.

Country-specific variables

Country-specific characteristics are very likely to influence banks' expected returns. The existence of macroeconomic conditions and institutional characteristics favorable to banks will reduce their risks, and their expected returns will also become lower. In this paper we consider the individual country's economic growth, savings ratio, level of lenders' legal rights, degree of corruption, and level of financial openness as comprising these variables. Increasing economic growth and a higher savings ratio lead to easier financing conditions for banks, while stronger legal rights for lenders and a less corrupt environment reduce expected returns. Banks often do financing outside their own countries as well, and the level of financial openness will make such external financing easier. Correa et al. (2012) show that sovereign debt ratings significantly affect bank stock returns. Sovereign debt ratings are assessments of the probability of default on government debt; when they are high investors have incentives for holding bank stocks, and expected returns are lower. More detailed definitions of these variables are described in Table A2.

4. Empirical Results

4.1 Univariate Sorting and Fundamental Variables

Table 3 shows the differences in average returns as well as in average fundamental variables between the highest and the lowest quintile portfolios. To form five quintile portfolios banks are ranked based on their value of each fundamental variable for each month. Average returns are calculated using one-year-ahead bank stock returns as a proxy for expected returns. This table shows the linear relationship between expected stock returns and each fundamental variable. Beta_loc, beta_currency and zerofreq represent systematic risks from the previous asset pricing literature, and their significantly positive differences in returns imply that banks are sensitive to market risk, exchange rate risk and stock liquidity risk.

The difference in return of the portfolios ranked by the equity_totoassets ratio shows a negative sign. However, the t-statistics shows that this difference is not significant. On the other hand, bm, netloans_totassets and netinc_totassets show the expected signs in the return differences, with significance. There are thus significant linear relationships between expected returns and these variables. The significantly negative sign in the return difference based on netintinc_totassets may suggest that non-interest income has the effect of a diversified income structure.

We also find that the levels of the equity_totassets, netloans_totassets and netintinc_totassets ratios are not uniformly distributed, and only the lowest (netloans_totassets) or the highest levels (equity_totassets, netintinc_totassets) matter in the linear relationships with expected returns. The average return in Quintile 1 based on the netloans_totassets ratio is -0.24%, much lower than the average returns in Q2 (10.05%) to Q5 (10.82%). The opposite happens in the case of the nonintinc_totassets ratio. The average return of the highest quintile (Q5) is 0.21%, while those of the other quintiles are distributed from 8.02% to 12.92%.

4.2 Cross-Sectional Regressions and Predictability of Variables

Table 4 shows the cross-sectional regressions using bank-specific variables. After controlling for systematic risk factors, the coefficient of lnsize_us becomes significantly negative. We confirm that, as found in the empirical asset pricing literature with financial institutions excluded, the size factor matters in predicting expected returns. In the banking sector as well, therefore, the smaller banks are riskier than the bigger ones. The sign of the equity_totassets ratio coefficient flips from positive in column (5) to negative in column (6), and the role of the leverage ratio thus seems to be insignificant in our analysis. Assumed reason for this is that the capital structures of banks have been heavily monitored in recent years, and most banks are above or close to the standard minimum safe threshold. Empirically, therefore, bank stock returns may not be sensitive to changes in the equity_totassets ratio in our sample. The coefficient of the netloans_totassets ratio shows consistently positive signs with significance at the 5% level, confirming our conjecture that investors require higher returns as the percentage of loans rises. For other variables such as the nonintinc_totassets and roa ratios, the signs of the coefficients vary across from (5) to (6) columns. Meanwhile, as the sample in Table 4 includes investment banks and bank holding companies, it is possible that these types of banks may have skewed the results. In Table 5, therefore, we run regressions for each bank group.

In Table 5, across all types of banks the beta_currency, lnsize_us and netloans_totassets ratio show the expected signs. For commercial banks, the coefficient of nonintinc_totassets is significantly positive, while for bank holding companies it is significantly negative. The positive sign in the commercial bank sample implies that non-interest income such as fee income is volatile and a higher ratio is considered risky. The negative sign in the bank holding companies sample can meanwhile be interpreted as a diversification effect. Given the small number of banks analyzed, however, these results cannot be considered strong evidence.

Finally, the country characteristics in Table A2 are included in the regressions, and we find that only the GDP growth rate (gdpg) and the financial openness index (kaopen) provide consistently

significant coefficients. A good performance of the macro-economy and high degree of financial openness are thus important in predicting bank stock returns. We are not however insisting that the other variables are unimportant, but just that in our empirical methodology we cannot find strong relationships between them and expected stock returns. This may be due to the high correlations among the country characteristic variables.

4.3 Changes in Predictability during Global Financial Crisis

Table 7 adds all interaction terms with the period of the Global Financial Crisis, in order to verify the crisis's effects on the predictive powers of the fundamental variables on bank stock returns. The Global Financial Crisis originated in the United States with the bankruptcy filing of Lehman Brothers Corp. in 2008, and in this analysis we are thus examining the effects of an external crisis on Asian stock markets.

The interaction term of the local market beta and the crisis (crisis_beta_loc) shows a negative sign. Our conjecture as to the reason is that, since the crisis is an external shock, investors have incentives to hold bank stocks that are less correlated (more correlated) to the world (local) market. The negative sign of the crisis_zerofreq coefficient fits in with this explanation as well; investors have more incentives to hold stocks with high trading costs, which will not be volatile during a period of crisis due to their more infrequent trading.

Our results also suggest which commercial banks are more risky during the crisis. Commercial banks with small sized, higher percentages of loans, and higher percentages of off-balance sheet activities, were risky during the Global Financial Crisis. Interestingly, expected bank stock returns during the crisis were not sensitive to the greater financial openness of countries. This suggests that a more open economy can have buffers against negative shocks, so that its banks are considered to be less risky.

5. Conclusion

This paper has examined which fundamental factors are related to expected bank stock returns in Asia. Overall we find that the popular asset pricing factors such as local market risk, exchange rate risk and firm size are important in predicting expected stock returns. Moreover, bank-specific variables such as the ratios of net loans to total assets, non-interest income to total assets, and ROA explain the cross-sectional stock returns of commercial banks. Country-specific factors such as economic growth and the level of financial openness reduce country risks and lead thereby to lower expected bank stock returns. Monitoring of the proportion of illiquid assets such as loans, promoting lower levels of non-interest income and managing bank performances are thus keys to reducing potential risks for Asian banks. When external negative shocks hit the economy, commercial banks that are smaller-sized and have higher percentages of loans and of off-balance sheet activities should be carefully monitored, as they are more vulnerable to risk.

Appendix Tables

Table A1. Previous findings related to bank stock returns/variables

Study	Findings related to bank- / country-specific variables	Data
Cooper, Jackson III and Patterson (2003)	*Important* Changes in non-interest income to net income Loan loss reserves to total loans Changes in earnings per share Book value of equity to total assets *Not important* Book-to-market, Firm size	213 US banks, 1986-1999
Drobetz, Erdmann and Zimmermann (2007)	*Positive signs* Loans to total assets Non-interest income to total income Off-balance sheet items to total assets *Negative signs* Loan loss provisions to net interest revenue Book value of equity to total assets	235 European banks 1991-2005
Cole, Moshirian and Wu (2008)	*Country-specific and institutional characteristics* Bank-accounting disclosure standards Banking crises Enforcement of insider trading laws Government ownership of banks	38 countries 1973-2001
Girard, Nolan and Pondillo (2010)	*Firm/country risks* Firm size Price-to-book Duration gap Bank concentration Corruption Debt servicing socio-economic conditions GDP per capita	30 emerging and 20 frontier markets 343 banks 1986-2004

Table A2. Definitions of Variables

Variables	Description	Source
Systematic risk variables		
Market Beta Currency Beta	Systematic risk(market risk and currency risk) measures(detailed explanation in paper)	Bloomberg, MSCI, FRB,
Zerotradingdays	Ratio of zero return trading days over a month	Authors' calculation
Bank-specific variables		
LnSize	Market capitalization of a stock in USD	Bankscope
Book-to-market	Book value per share / Market value per share	Bankscope
Equity_totassets	Book value of equity / Total assets	Bankscope
Netloans_totassets	Net loans / Total assets	Bankscope
Nonintinc_totassets	Non-interest income / Total assets	Bankscope
Netinc_totassets	Return on assets (ROA), Net income / Total assets	Bankscope
Offbal_totassets	Off-balance sheet items / Total assets	Bankscope
Country-specific variables		
Sovereign credit rating	S&P sovereign credit rating observed on last day of month; numbers from 1 to 19 assigned to credit ratings from CCC to AAA (0 for SD)	S&P
GDP growth rate	Annual percentage rate of GDP growth in constant 2000 U.S. dollars	World Bank
Financial openness index	Degree of capital openness (indicating how a financial market has been deregulated)	Chinn-Ito
Anti-corruption index	Anti-corruption index ranging from 1 to 10 (the higher the number is, the less the degree of corruption)	Transparency International
Legal rights index	Strength of legal rights index (0 = weak to 10 = strong) (degree of legal protection of rights of borrowers and lenders)	World Bank

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Table 1. Numbers of Banks, by Country and Type

Country	Commercial Banks	Investment Banks	Bank Holding Companies	Total
China	8	1	0	9
India	40	8	0	48
Indonesia	15	1	1	17
Korea	4	18	4	26
Malaysia	3	3	9	15
Philippines	8	2	0	10
Thailand	9	9	1	19
Total	87	42	15	144

Table 2. Descriptive Statistics of Variables

Panel A. Bank-specific Variables

Firm Variables	Firm-month obs.	Total		Commercial Banks		Investment Banks		Bank Holding Companies	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
mret_us (%)	8443	0.62	12.69	1.12	12.51	-0.50	13.42	0.60	11.71
beta_loc	8443	0.58	0.59	0.55	0.53	0.61	0.68	0.69	0.67
beta_currency	8443	-0.76	2.36	-0.82	2.26	-0.90	2.66	-0.09	1.96
zerofreq (%)	8443	11.32	14.58	10.81	15.25	10.73	13.29	15.34	13.14
lnsize_us	8443	13.57	1.71	13.89	1.61	12.59	1.56	14.16	1.58
book-to-market (%)	6282	121.50	146.23	117.07	161.76	124.38	94.74	143.62	129.40
equity_totassets (%)	6780	16.35	18.51	8.26	3.58	37.09	24.34	23.79	22.96
netloans_totassets (%)	6733	48.44	19.00	55.20	12.10	31.60	23.90	40.09	18.71
nonintinc_totassets (%)	6734	4.18	6.83	1.69	1.70	10.73	10.37	6.26	7.95
netinc_totassets (%)	6443	1.99	3.44	1.24	0.68	4.40	6.74	2.14	1.99
offbal_totassets (%)	5232	42.17	62.16	46.26	67.17	16.98	19.80	28.04	12.58

Panel B. Country-specific Variables

Country	S&P Sovereign Credit Rating	GDP Growth Rate (%)	Financial Openness Index	Anti-Corruption Index	Legal Rights Index	Savings Rate (%)
China	14.53	10.56	-1.16	3.50	5.56	52.27
India	9.75	8.19	-1.16	3.33	7.64	34.44
Indonesia	6.92	5.73	1.13	2.53	3.00	28.38
Korea	13.92	3.80	0.19	5.30	8.00	31.04
Malaysia	13.00	4.69	-0.09	4.86	10.00	35.04
Philippines	7.03	4.87	-0.16	2.43	4.00	26.10
Thailand	12.00	3.75	-0.69	3.51	5.00	30.48

Table 2. Descriptive Statistics of Variables (cont'd.)

Panel C. Correlations among Bank-specific Variables

Firm Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) beta_local	1.00									
(2) beta_currency	0.25	1.00								
(3) zerofreq (%)	0.36	0.24	1.00							
(4) lnsize_us	0.16	0.01	-0.11	1.00						
(5) book-to-market (%)	0.08	0.04	0.01	-0.30	1.00					
(6) equity_totassets (%)	0.21	0.13	0.20	-0.19	0.04	1.00				
(7) netloans_totassets (%)	-0.11	-0.14	-0.29	0.19	0.03	-0.42	1.00			
(8) nonintinc_totassets (%)	0.05	-0.05	0.02	-0.16	-0.04	0.61	-0.47	1.00		
(9) roa (%)	0.09	0.08	0.05	0.03	-0.17	0.53	-0.29	0.64	1.00	
(10) offbal_totassets (%)	-0.13	-0.25	-0.25	0.26	-0.11	-0.10	0.17	0.09	0.01	1.00

Panel D. Correlations amongCountry-specific Variables

Country Variables	S&P Sovereign Credit Rating	GDP Growth Rate	Financial Openness Index	Anti-Corruption Index	Legal Rights Index	Savings Rate (%)
S&P Sovereign Credit Rating	1.00					
GDP Growth Rate	-0.23	1.00				
Financial Openness Index	-0.08	-0.42	1.00			
Anti-Corruption Index	0.87	-0.33	0.18	1.00		
Legal Rights Index	0.60	0.01	-0.31	0.72	1.00	
Savings Rate (%)	0.41	0.49	-0.45	0.14	0.33	1.00

Table 3. Bank Stock Returns and Firm Fundamental Variables

(unit: %)

Ranked by	Averages of Variables	Smallest Q1	Q2	Q3	Q4	Largest Q5	Q5-Q1 Diff.	t-stat
beta_loc	beta_loc	-0.15	0.21	0.52	0.94	1.40	1.55	36.09***
	RET	*-5.99*	*-0.16*	*6.40*	*15.01*	*15.55*	*21.54*	*3.25****
beta_currency	beta_currency	-3.90	-1.87	-0.71	0.41	2.44	6.34	22.82***
	RET	*-4.90*	*0.39*	*5.24*	*11.32*	*18.73*	*23.63*	*5.55****
zerofreq	zerofreq	0.00	5.64	7.96	17.11	36.37	36.37	33.78***
	RET	*-0.23*	*10.69*	*3.23*	*10.82*	*14.79*	*15.02*	*1.91**
lnsize_us	lnsize_us	11.20	12.71	13.58	14.57	15.79	4.60	69.73***
	RET	*3.90*	*6.47*	*6.68*	*7.34*	*6.18*	*2.28*	*1.62*
bm	bm	39.90	68.11	90.90	126.78	261.51	221.61	12.62***
	RET	*3.53*	*5.14*	*1.71*	*8.13*	*14.79*	*11.26*	*2.99****
equity_totassets	equity_totassets	4.77	7.01	9.04	14.01	46.90	42.13	79.16***
	RET	*5.47*	*9.96*	*13.37*	*11.52*	*-0.49*	*-5.96*	*-0.92*
netloans_totassets	netloans_totassets	16.32	41.97	54.92	60.35	67.70	51.39	133.21***
	RET	*-0.24*	*10.05*	*9.13*	*10.03*	*10.82*	*11.06*	*3.68****
nonintinc_totassets	nonintinc_totassets	0.78	1.15	1.55	3.03	14.60	13.82	53.36***
	RET	*8.49*	*10.83*	*12.92*	*8.02*	*0.21*	*-8.28*	*-2.07***
netinc_totassets	netinc_totassets	0.53	0.96	1.30	1.89	5.27	4.74	14.97***
	RET	*12.71*	*11.09*	*5.67*	*9.06*	*4.13*	*-8.58*	*-2.99****
offbal_totassets	offbal_totassets	3.42	14.67	25.63	38.62	132.83	129.41	22.48***
	RET	*10.49*	*14.37*	*11.00*	*7.84*	*9.07*	*-1.42*	*-0.26*

Table 4. Cross-Sectional Regressions with Bank-specific Variables

VARIABLE	Expected Sign	Basic Model (1)	(2)	(3)	With Bank-specific Information (4)	(5)	(6)
beta_loc	+	10.07	9.32	9.195	15.212*	17.599*	22.640**
		(7.57)	(7.45)	(7.41)	(8.65)	(8.84)	(8.85)
beta_currency	+		1.659*	1.659*	2.976***	3.256***	3.655***
			(0.98)	(0.98)	(1.01)	(1.05)	(1.16)
zerofreq	+			0.161*	0.048	0.043	-0.024
				(0.09)	(0.10)	(0.10)	(0.08)
lnsize_us	-				-23.264***	-23.383***	-22.184***
					(6.43)	(6.65)	(7.76)
bm	+				0.031***	0.024**	0.018
					(0.01)	(0.01)	(0.01)
equity_totassets	-				0.023	0.128	-1.007*
					(0.39)	(0.46)	(0.52)
netloans_totassets	+				0.454*	0.598**	0.920*
					(0.26)	(0.28)	(0.49)
nonintinc_totassets	?				0.065	-1.252**	0.978
					(0.41)	(0.52)	(1.29)
roa	-					0.624**	-8.039***
						(0.27)	(2.20)
offbal_totassets	?						0.038
							(0.09)
Constant		0.595	2.285	0.532	290.772***	289.488***	271.980**
		(6.29)	(6.27)	(6.71)	(90.78)	(93.88)	(107.43)
Observations		8443	8443	8443	6189	5918	4645
Number of groups		144	144	144	121	121	98
Within R-squared		0.151	0.151	0.151	0.151	0.151	0.151

*Note: Driscoll-Kraay (1998) standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Table 5. Cross-Sectional Regressions, by Bank Type

VARIABLE	Expected Sign	All Sample (1)	Commercial Banks (2)	Investment Banks (3)	Bank Holding Companies (4)
beta_loc	+	22.640**	23.908**	6.496	-39.698**
		(8.85)	(9.50)	(6.33)	(17.33)
beta_currency	+	3.655***	3.649***	3.971**	4.368*
		(1.16)	(1.20)	(1.72)	(2.47)
zerofreq	+	-0.024	-0.006	0.337*	-0.421**
		(0.08)	(0.10)	(0.18)	(0.17)
lnsize_us	-	-22.184***	-21.481***	-24.705**	-59.052***
		(7.76)	(7.99)	(10.70)	(11.70)
bm	+	0.018	0.019	0.572***	-0.182***
		(0.01)	(0.01)	(0.19)	(0.06)
equity_totassets	-	-1.007*	-1.012	-0.447	2.583***
		(0.52)	(1.46)	(0.34)	(0.97)
netloans_totassets	+	0.920*	1.333**	0.444	2.954**
		(0.49)	(0.58)	(0.45)	(1.16)
nonintinc_totassets	?	0.978	5.889***	-2.3	-7.142***
		(1.29)	(1.76)	(2.24)	(1.99)
roa		-8.039***	-10.451***	7.014	2.23
		(2.20)	(2.96)	(6.03)	(4.20)
offbal_totassets		0.038	0.022	0.862	-0.085
		(0.09)	(0.09)	(0.92)	(0.22)
Constant		271.980**	234.080**	220.442	769.160***
		(107.43)	(107.24)	(155.04)	(172.20)
Observations		4645	3950	294	401
Number of groups		98	79	10	9
Within R-squared		0.411	0.411	0.411	0.411

*Note: Driscoll-Kraay (1998) standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Table 6. Cross-Sectional Regressions with Country-specific Variables

VARIABLE	Expected Sign	All Sample (1)	All Sample (2)	Commercial Banks (3)	Investment Banks (4)	Bank Holding Companies (5)
beta_loc	+	19.957**	19.292*	22.592**	9.456*	-63.702***
		(9.65)	(9.84)	(10.45)	(5.52)	(12.55)
beta_currency	+	3.612***	3.544***	3.579***	3.819***	2.103
		(1.18)	(1.19)	(1.21)	(1.19)	(2.36)
zerofreq	+	-0.009	0.048	0.057	0.339**	-0.404**
		(0.09)	(0.09)	(0.09)	(0.16)	(0.17)
lnsize_us	-	-20.806***	-22.715***	-22.107***	-36.145***	-72.123***
		(7.47)	(7.58)	(8.12)	(8.78)	(9.57)
bm	+	0.009	-0.003	0.006	-0.035	0.024
		(0.01)	(0.01)	(0.01)	(0.14)	(0.06)
equity_totassets	-	-0.943*	-0.723	-0.577	-0.865	0.034
		(0.54)	(0.47)	(1.28)	(0.58)	(1.21)
netloans_totassets	+	0.795*	0.74	1.199**	-1.015*	-0.225
		(0.44)	(0.45)	(0.58)	(0.55)	(0.44)
nonintinc_totassets	+	0.931	2.223**	5.763***	3.426	-0.652
		(1.27)	(0.85)	(1.69)	(2.61)	(1.02)
roa	-	-7.097***	-6.763***	-9.573***	2.428	8.691***
		(1.93)	(2.06)	(2.67)	(6.20)	(2.73)
offbal_totassets	?	0.044	0.033	0.021	2.480***	0.08
		(0.09)	(0.10)	(0.09)	(0.90)	(0.21)
gdpg	-	(1.60)	-2.321*	(1.07)	-3.284***	-3.845***
		(1.33)	(1.20)	(1.52)	(0.75)	(0.93)
kaopen	-		-19.622**	-17.277**	-44.571***	-30.015***
			(7.91)	(8.53)	(10.30)	(7.62)
Constant		270.640**	290.655***	244.465**	436.286***	1,130.423***
		(102.61)	(105.19)	(108.41)	(132.27)	(138.35)
Observations		4645	4645	3950	294	401
Number of groups		98	98	79	10	9
Within R-squared		0.580	0.580	0.580	0.580	0.580

*Note: Driscoll-Kraay (1998) standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Table 7. Interaction Terms with Global Financial Crisis

VARIABLE	All Sample	Commercial Banks	Investment Banks	Bank Holding Companies
beta_loc	14.107	14.748	19.088***	-44.652***
	(10.96)	(11.16)	(5.35)	(12.88)
crisis_beta_loc	-20.836***	-13.381*	-49.666**	25.285*
	(7.12)	(7.33)	(20.16)	(13.26)
beta_currency	2.948**	3.028**	1.82	-4.569***
	(1.16)	(1.20)	(1.49)	(1.71)
crisis_beta_currency	1.873	1.438	0.488	10.635***
	(1.45)	(1.50)	(4.58)	(2.65)
zerofreq	0.310***	0.265**	0.227*	-0.173*
	(0.10)	(0.11)	(0.13)	(0.09)
crisis_zerofreq	-0.858***	-0.769***	0.407	-0.076
	(0.20)	(0.18)	(0.41)	(0.23)
lnsize_us	-19.971***	-19.368***	-12.752*	-104.468***
	(6.26)	(6.48)	(6.54)	(12.83)
crisis_lnsize_us	-6.919***	-7.595***	-14.275	-20.740***
	(2.15)	(2.40)	(8.97)	(6.14)
bm	0.001	0.003	0.045	-0.049
	(0.01)	(0.01)	(0.15)	(0.11)
crisis_bm	-0.004	0.014	-0.428	0.196
	(0.01)	(0.01)	(0.27)	(0.12)
equity_totassets	-0.43	0.425	-1.471**	6.597***
	(0.41)	(1.21)	(0.70)	(1.68)
crisis_equity_totassets	-0.377	-1.559	0.316	-11.630***
	(0.31)	(0.99)	(0.80)	(3.34)
netloans_totassets	0.631	1.153**	-0.582	-2.901***
	(0.38)	(0.48)	(0.93)	(0.98)
crisis_netloans_totassets	0.515***	0.652***	0.159	2.344***
	(0.15)	(0.18)	(0.37)	(0.58)
nonintinc_totassets	1.588*	5.164***	7.203**	-45.089***
	(0.94)	(1.57)	(2.80)	(11.02)
crisis_nonintinc_totassets	2.558***	2.612	-1.326	31.184***
	(0.86)	(1.60)	(3.80)	(9.26)
roa	-3.935**	-10.396***	-0.991	9.136**
	(1.85)	(3.68)	(4.37)	(3.85)
crisis_roa	-9.970***	-3.86	-7.969	31.641***
	(2.91)	(4.16)	(16.19)	(8.53)
offbal_totassets	0.013	-0.004	2.715***	-0.543***
	(0.08)	(0.08)	(0.91)	(0.16)
crisis_offbal_totassets	0.079	0.093*	0.864	0.369
	(0.06)	(0.05)	(0.64)	(0.31)
gdpg	-3.304***	-2.801***	-2.707***	-7.072***
	(0.62)	(0.79)	(0.73)	(0.84)
crisis_gdpg	2.912	4.902*	0.109	-0.246
	(2.05)	(2.47)	(2.03)	(1.73)
kaopen	-17.756***	-13.874*	-39.928***	-81.207***
	(5.82)	(7.00)	(9.82)	(11.53)
crisis_kaopen	6.702	7.818	-23.834	81.557***
	(6.53)	(5.72)	(15.87)	(14.30)
crisis_global	89.210***	71.911**	265.833**	124.334*
	(29.48)	(34.62)	(127.14)	(73.38)
Constant	261.433***	219.827**	91.479	1,749.593***
	(89.20)	(92.36)	(105.12)	(227.16)
Observations	4645	3950	294	401
Number of groups	98	79	10	9
Within R-squared	0.798	0.798	0.798	0.798

*Note: Driscoll-Kraay (1998) standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*