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The Determinants of Future Bank Stock Returns in Eight Asian Countries*

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We examine which traditional asset pricing variables together with bank-specific accounting variables explain the cross-sectional variation of future bank stock returns, using a firm-level data of eight Asian countries. Our empirical evidence shows that exchange rate risk, firm size, the book-to-market ratio, and the net income ratio are important in explaining future bank stock returns during normal times. However, during the Global Financial Crisis period, different variables such as local market beta, illiquidity risk, equity ratio, and off-balance sheets ratio were statistically significant. Thus, researchers and policy practitioners should monitor these variables during normal times as well as during times of crisis.

Keywords: Asian Banks, International asset pricing tests, Cross-sectional variation of expected returns, Bank accounting ratios, Global Financial Crisis
JEL Classification: G12, G15, G21

I. Introduction

Cross-sectional asset pricing studies often treat financial institutions as outliers as they have higher leverage and are subject to a higher level of industry regulation than other sectors.[1] Thus, information sources of the cross-sectional differences in future bank stock returns have not been explored much. For example, the popular three factor model by Fama and French (1992, 1993) demonstrates that the market

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[1] The most influential study by Fama and French (1992) also exclude financial institutions in their data sample.

risk, firm size, and book-to-market (BM) ratio explain the cross-sectional variation of stock returns. However, previous literature focusing on banking sector shows inconsistent results. Bessler et al. (2008) find that firm size and BM ratio are significant factors in future bank stock returns, while Cooper et al. (2003) show the opposite result.[2] Moreover, when focusing on banking sector, exploring the link between bank-specific fundamental variables and the cross-section of expected bank stock returns was the main subject in the previous studies because bank-specific fundamental variables such as their ratios of net loans to total assets, equity to total assets, and non-performing loans to total assets show the bank capital and income structures. However, the previous studies reached no consensus on empirical methodology and results using these variables.[3]

In particular, studies on emerging markets bank stock returns have been few. Most of the studies conducted before the 1990s focused on the relationship between debt crises and bank stock returns.[4] In a more recent paper, Girard et al. (2010) analyze the impacts of both fundamental factors and country risk factors on bank stock returns in emerging markets. But they do not consider Asian banks' special characteristics and recent changes made around the Global Financial Crisis period. First, compared to advanced countries' banks, Asian banks have unique characteristics: they are highly dependent on domestic market; their major income source is interest income; and they are vulnerable to external shocks (Mohanty and Turner, 2010). Second, the Global Financial Crisis quickly spread to the world through increased interconnectedness in banking sector, especially, between European banks and the U.S. banks. Initially, the impacts of the negative shock from the crisis were relatively weak in Asian banks, which were not as integrated with the United States as European ones. However, as Rosengren (2012) pointed out in his speech, the correlation with the U.S. and European bank stock returns has increased overtime and Asian banks have certainly been impacted by the global slowdown since the crisis as Asian banks are in the transition to being integrated to the global financial markets. Their characteristics and increased correlation with the global market require that Asian banks be studied separately from banks in developed countries such as the United States and European countries.

[2] In empirical studies, future stock returns are used for a proxy for expected stock returns. Thus, we use "expected stock returns" and "future stock returns" interchangeably.

[3] See Thakor (1987), Grammatikos and Saunders (1990), Madura and Zarruk (1992), Kim and Santomero (1993), and Docking et al. (1997).

[4] Cornell and Shapiro (1986) and Smirlock and Kaufold (1987) study for the 1982 Mexican debt crisis, and Musumeci and Sinkey (1990) for the 1987 Brazilian crisis.

Asian banks also have another distinct characteristic compared to other emerging market banks. Mohanty and Turner (2010) evaluate that Asian banks not only have lower external exposures but also become better capitalized and more effective in managing their credit risks following the 1997 Asian currency crisis. With the help of favorable macroeconomic conditions, the structures of Asian banking assets and income statements have changed significantly over the past decade. The quality of assets held by banks has improved as the banks started to hold more cross-border claims, prompting their shares of liquid assets to grow rapidly. All these improvements in bank-specific fundamentals surely have impacts on the link with future bank stock returns.

In this regard, this study examines the relationship between the cross-section of future bank stock returns and general asset pricing factors as well as bank-specific fundamental factors for a sample of eight Asian countries[5] during the period from January 2000 to December 2010. Expected bank stock returns reflect investors' expectations for the future prosperity of banks. And variables related to stock returns contain information about the risks that banks are exposed to. By utilizing an empirical asset pricing model, bank-specific variables are explored to test whether they provide statistically useful explanation of the cross-sectional differences in expected firm-level bank stock returns or not. Traditionally beta (market risk), firm size, and BM ratio have been considered as factors explaining cross-sectional stock returns. We also attempt to discover how the Global Financial Crisis affected the relationship between expected stock returns and these variables. During the crisis, investors required greater risk premiums on risky assets than during normal periods. Therefore, the relationship between expected returns and fundamental variables changed during the crisis. This hypothesis is also related to the findings of Cole et al. (2008), showing that the relationship becomes stronger in the case of a negative external shock.

Our empirical results and methodology contribute to international asset pricing literature in several aspects. First, our model includes world market risk, local market risk, exchange rate risk, and illiquidity risk together with bank specific factors. Most previous studies have omitted international factors such as exchange rate risk in their models and applied the market segmentation assumption in their model. However, as the correlation between Asian banks and advanced countries has

[5] The People's Republic of China, India, Indonesia, the Republic of Korea, Malaysia, the Philippines, Taiwan, and Thailand. The selection of countries is based on data availability among Asian countries. We exclude Japan in the sample as Japan is advanced economy and our focus is on Asian banks in emerging economies.

increased, it is necessary to consider global as well as local factors together. According to our results, firm-level analysis using highly regulated and leveraged banking sectors shows that exchange rate risk is a key variable, which explains cross-section of bank stock returns. Second, this study using the sample with emerging Asian countries' banks provides out-of-sample tests to confirm previous findings, which focused only on advanced economies, and emphasizes differences of Asian banks that experienced the 1997 Asian currency crisis. For example, Cooper et al. (2003) analyze the U.S. banks and Bessler et al. (2008) concentrate on European banks. Yang and Tsatsaronis (2012) study bank stock returns of advanced economies. Third, our empirical model provides a basis for future research, which would study Asian banks and their fundamental variables since the empirical asset pricing analysis using Asian banks is an early stage to the best of our knowledge. Future research could focus on more various issues with being built on our model which can provide a guide as a starting point. Our findings also provide suggestions to cope with systematic risks in the global/domestic banking sector during the crisis period.

Several studies have shown that bank stock returns include information regarding economic growth, sovereign ratings, and business cycles. Cole et al. (2008) demonstrate a positive link between bank excess returns and future economic growth. Correa et al. (2014) find that changes in sovereign ratings have nonlinear impacts on bank stock returns, and become stronger for downgrades than for upgrades. When a sovereign rating is drastically downgraded, banks with greater ex-ante government support are hit harder than the ones with less support. Yang and Tsatsaronis (2012) suggest 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. This study is different from the previous studies mentioned above as the main focus is on finding determinants of cross-sectional variation of future bank stock returns. Further research can be built on our empirical results and can explore more various topics.

The remainder of this paper is organized as follows: Section 2 details the data and the empirical methodology. Section 3 discusses the summary statistics as well as the cross-sectional regressions. Section 4 concludes.

II. Data and Model

1. Data

Our initial list of banks in the eight Asian countries is derived from the Bankscope database. We select active and inactive banks listed on major stock exchanges in their countries from 2000 to 2010 and limit them to commercial banks, investment

banks, and bank holding companies.[6] 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 list of bank, and it starts only from the 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. Then, we require that stocks should have BM ratio and sizes, and we treat any negative value of various bank accounting items such as equity-to-total assets ratios as missing observations. The final data sample consists of 176 banks in eight Asian countries, and the sample period is from January 2000 to December 2010.[7]

Table 1. The number of banks, by country and bank type

Country	Commercial Banks	Investment Banks	Bank Holding Companies	Total	
China	8	1	0	9	(5%)
India	40	8	0	48	(27%)
Indonesia	17	2	1	20	(11%)
Korea	4	18	4	26	(15%)
Malaysia	3	3	10	16	(9%)
Philippines	9	2	1	12	(7%)
Taiwan	10	3	13	26	(15%)
Thailand	9	9	1	19	(11%)
Total	100	46	30	176	(100%)

Note: Numbers in parenthesis are percentage of the number of banks among the total number.

[6] The selected countries (and their major stock exchanges) are China (Shanghai/Shenchen), India (Bombay), Indonesia (Indonesia), Korea (Korea), Malaysia (Bursa), the Philippines (Philippines), Taiwan (Taiwan) and Thailand (Bangkok). Bankscope assigns 'general specialisation code' to each bank based on the annual report. The codes are grouped into 12 categories: Commercial Banks, Savings Banks, Co-operative Banks, Real Estate/Mortgage Banks, Medium and Long Term Credit Banks, Investment Banks/Securities Houses, Islamic Banks, Non Banking Credit Institutions, Specialised Governmental Credit Institutions, Bank Holdings and Holding Companies, Central Banks, and Multi-lateral Governmental Banks. Among these 12 categories, 86% are concentrated on commercial banks, investment banks, and bank holding companies in eight countries.

[7] For accounting variables, the earliest period begins from 1995. However, to ensure enough data reporting and to avoid abrupt changes since the Asian currency crisis period, we limit our sample from 2000. In our analysis, the sample period ends in 2010 as we use one-year ahead stock returns. We initially download the stock return data until December, 2011 and calculate one-year ahead stock returns. Thus, the future stock returns as of December, 2010 needs December, 2011 data.

Table 1 shows the number of banks considered which are broken down by country and type. In our data sample, banks are categorized into three types: commercial bank, investment bank, and bank holding companies. The reason why we include three different types of banks is as in the following. First, though an investment bank can have a wider range of business activities than a commercial bank, both of two banks play similar roles as the financial intermediary in the broad definition of a bank. Second, as the Bankscope database compiles its data by distinguishing a commercial bank from a bank holding company, we had to consider a bank holding company separately to include large banks such as Shinhan Financial Group in Korea. In the sample, 100 out of 176 banks (57%) are commercial banks. India accounted for the largest number of the banks in the sample listed with 48 (27%), followed by Korea and Taiwan with 26 (15%) and 26 (15%), respectively. Bank stock returns, RET_t, are calculated as the log price differences, $\ln(\frac{price_t}{price_{t-1}})$, and Ince and Porter's (2006) extreme and reversal filters for treating measurement errors are applied.[8] Daily stock returns of less than -100% are treated as missing. And those above 100% are also considered as missing 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.

2. Traditional and bank-specific fundamental variables

1) Traditional variables

Traditional asset pricing models such as Capital Asset Pricing Model (CAPM) and Fama-French three factor model have shown that expected returns are more sensitive to systematic risks such as market risks. When considering international markets, both world market risk and local market risk are important. Moreover, firm size and BM ratio have been known for significantly important factors although their sources of risks have not been fully discovered. Thus, this study includes world/local market risks, exchange rate risk, illiquidity risk, size, and BM ratio as traditional variables.

[8] Ince and Porter (2006) suggest extreme and reversal filters for daily stock price data to correct reporting errors in database providers such as Datastream. Although our daily stock price is downloaded from Bloomberg, we apply their filters to correct possible reporting errors.

World, local, and exchange betas

To determine the variables explaining the cross-sectional differences in Asian bank returns, we assume that Asian bank stock returns are sensitive to world stock market, local stock market and exchange risks. Investors require higher risk premiums when stock returns are more correlated to world stock market, local stock market, and exchange risks. Naturally, expected returns for those stocks are thus higher. World beta ($wld\beta_i$), local beta ($loc\beta_i$) and exchange beta ($ex\beta_i$) for firm *i* represent the world stock market, local stock market and exchange risks, respectively. Betas for each bank stock are calculated using Equation (1), and are monthly time-varying to account for the difference in risk across time. Equation (1) estimates world beta ($wld\beta_i$), local beta ($loc\beta_i$) and exchange beta ($ex\beta_i$) for firm *i* for each month with five-year rolling window. Thus, excess returns over the risk-free rate are regressed on excess world stock market returns, excess local stock market returns, and excess exchange rate returns over the U.S. risk-free rate. A more detailed explanation is found in the data section in Lee et al. (2009) on empirical international asset pricing models:

$$RET_{i,t} - rf_t = \alpha_i + wld\beta_i(RETwld_t - rf_t) + loc\beta_i(RETloc_t - rf_t) + ex\beta_i(RETex_t - rf_t) + u_{i,t} \quad (1)$$

where rf_t is the three-month U.S. Treasury bill rate, $RETwld_t$ and $RETloc_t$ are the MSCI world and country stock market index returns, and $RETex_t$ is 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.

Illiquidity measure

Bekaert et al. (2007) show that stock liquidity risk significantly explains stock returns in emerging markets. 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 ($illiquidity_t$) is measured as the proportion of days with zero returns during a month, based on the assumption that zero return indicates 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.

Size and the BM ratio

Since Fama and French (1992, 1993), much of the previous empirical asset pricing literature has shown that sizes and BM ratios of individual firms explain cross-sectional differences in stock returns. Firm size is measured by the log of market capitalization of outstanding stocks and the BM ratio is the book-value over the market value for a stock. In addition to these variables, bank accounting ratios are examined to see whether they are also related to expected bank stock returns or not. Bank-specific fundamental variables are explained below.

2) Bank-specific fundamental variables

Recent studies have widened the range of variables of banks. Cooper et al. (2003) find that non-interest income, loan loss reserves, earnings per share, and equity book value are important in predicting the cross-sections of bank stock returns. In Leledakis and Staikouras (2004), loan quality is important in explaining the cross-sections of bank stock returns. Bessler et al. (2008) indicate that the ratios of loans, non-interest income, and off-balance sheet items to total assets have positive impacts on the subsequent stock returns. This study adopts previous findings and determines which variables explain the cross-sectional variation of future Asian bank stock returns.

Equity to total assets (Equity ratio)

The equity-to-total assets ratio, as a leverage variable, shows the capital structure of banks. A lower ratio of the equity-to-total assets indicates a higher use of debt. Namely, banks with lower ratio face higher interest expense. The increase in banks' risks raises the risk premiums that investors require. Therefore, expected stock returns become higher.

Loans to total assets (Net loans ratio)

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

Non-interest income to total assets (Non-interest income ratio)

Interest income has been the traditional income source for 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) state that the diversification effect reduces the expected costs of financial distress, and will, therefore, have a positive impact on their valuation. However, banks' reliance on fee-based revenues could cause a greater volatility in their incomes and higher levels of risk. In our cross-sectional analysis, we explore both views.

Net income to total assets (Net income ratio, ROA)

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

Off-balance sheets items to total assets (Off-balance sheets ratio)

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 banks to additional risk exposures. As they also have an impact on expected returns, their role is explored in our analysis.

Table 2 shows descriptive statistics of bank-specific variables. The total number of firm-month observations from January 2000 to December 2010 is 18,830. The average of annualized stock returns (RET) is around 0.68%. Size and the BM ratio have the smallest number as their series begin from 2005. The Bankscope reports them only from 2005.[9] Across bank types, averages of traditional variables show little differences, while averages of bank-specific variables are clearly differently shown. For example, the average of non-interest income ratio for investment banks is 10.88%, which is 2.5~6.4 times higher than other bank type.

3. Empirical methodology

Univariate sorting

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 or not. Newey-West (1987) t-statistics with a one-month lag are calculated to take into account serial correlations.[10] This analysis tests whether a group of stocks with higher sorting

[9] When including the BM ratio and size variables, the analysis period is from 2005 to 2010.

Table 2. Descriptive Statistics of Variables

Firm Variables	Firm-Month Obs.	Total	Commercial Banks	Investment Banks	Bank Holding Companies
		Mean	Mean	Mean	Mean
Monthly returns (USD)					
RET (%)	18,830	0.68	0.86	0.46	0.41
Traditional variables					
World beta	18,830	0.26	0.21	0.24	0.45
Local beta	18,830	0.47	0.45	0.49	0.53
Exchange beta	18,830	-0.85	-0.94	-0.57	-0.99
Illiquidity (%)	18,830	11.99	12.17	10.61	13.45
Size	10,125	13.68	13.82	12.63	14.59
BM ratio (%)	8,247	119.22	115.77	127.48	121.72
Bank-specific variables					
Equity ratio (%)	13,424	16.43	7.75	37.75	19.09
Net loans ratio (%)	13,111	47.03	53.68	28.90	44.71
Non-interest income ratio (%)	13,193	4.21	1.70	10.88	4.44
Net income ratio (%)	11,938	1.84	1.20	4.12	1.47
Off-balance sheets ratio (%)	10,211	35.74	39.01	15.78	28.82

Note: Size and BM ratio variables begin from 2005 year due to the Bankscope data coverage for these variables.

variable has higher average future returns than those with lower sorting variable or not. With this analysis, Fama and French (1992, 1993, and 1998) successfully show that stocks with higher BM ratios or with smaller sizes provide higher average returns than those with lower BM ratios or with larger sizes. We also apply this sorting method to verify whether there is a link between a sorting variable (here, a bank accounting ratio) and future stock returns or not.

Multivariate Cross-Sectional Regressions

The first empirical model uses Equation (2) with traditional variables—world/local market, exchange, stock illiquidity risks, size, and the BM ratio.

[10] One month lag is generally used in empirical asset pricing models with monthly frequency data. See Lee et al. (2009).

$$RET_{i,t+11} = \alpha + \sum_{k} \gamma_k Traditional\ Variable_{k,i,t} + e_{i,t} \quad (2)$$

where $RET_{i,t+11}$ is one-year ahead stock returns. We regress the future returns on traditional asset pricing variables and examine whether their coefficients (γ_k, for k=world/local market, exchange illiquidity betas, and so on) are statistically significant with expected signs or not. The cross-sectional regressions with panel country-firm 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. Bessler et al. (2008) show that the Driscoll and Kraay (1998) standard errors provide conservative figures, and are more reliable than Fama and MacBeth (1973) regressions.

The second model tests the hypothesis that expected bank stock returns are more sensitive to some traditional variables during the Global Financial Crisis by employing the Chow test approach. Interaction terms with the Global Financial Crisis dummy variable ($Crisis_t$)[11] for all variables are calculated, and the terms are included in the cross-sectional regressions in Equation (3):

$$\begin{aligned} RET_{i,t+11} = \alpha &+ \sum_{k} \gamma_k Traditional\ Variable_{k,i,t} \\ &+ \sum_{k} \phi_k Traditional\ Variable_{k,i,t} \times Crisis_t + Crisis_t + e_{i,t} \end{aligned} \quad (3)$$

The third model adds several potential bank-specific variables to Equation (2). The model will help determine which bank-specific accounting variables explain the cross-sectional differences in expected bank stock returns in addition to traditional variables.

[11] The crisis dummy is one if the period is from August 2007 to April 2009, and zero otherwise. When defining the Global Financial Crisis period, we follow the phase definition by Elliott (2011). Since the date, August 9, 2007, the global economy was hit by the financial crisis originated from the United State. After April 2009, the global economy has begun to show signs of recovery from the crisis.

$$RET_{i,t+11} = \alpha + \sum_{k} \gamma_k Traditional\ Variable_{k,i,t} + \sum_{h} \lambda_h Bank\text{-}specific\ Variable_{h,i,t} + e_{i,t} \quad (4)$$

As confirmed in Table 2, bank-specific variables are various across bank type. Differences in business models among banks may lead to differences in their levels of exposure to risk, and this is something that should be reflected in our cross-sectional testing. We thus classify banks into commercial banks, bank holding companies, and investment banks, and then run the regression analysis only for commercial banks sample which is the largest group in the sample.

Lastly, like Equation (3), this study proceeds with the Chow test by including all interaction terms with the Global Financial Crisis dummy variable. The fourth model is only for commercial banks as in the third model.

$$RET_{i,t+11} = \alpha + \sum_{k} \gamma_k Traditional\ Variable_{k,i,t} + \sum_{h} \lambda_h Bank\text{-}specific\ Variable_{h,i,t} + \sum_{k} \phi_k Traditional\ Variable_{k,i,t} \times Crisis_t + \sum_{h} \eta_h Bank\text{-}specific\ Variable_{h,i,t} \times Crisis_t + Crisis_t + e_{i,t} \quad (5)$$

III. Empirical Results

1. Univariate sorting and traditional variables

Table 3 shows the differences in average returns between the highest and the lowest quintile portfolios. To form five quintile portfolios, banks are ranked based on their value of each variable for each month. Average returns are calculated using one-year-ahead bank stock returns as a proxy for expected returns. Panel A of Table 3 reports average returns for each quintile portfolio formed based on each traditional variables. In order to verify if there is a different relationship between the whole period and the crisis period, we proceed to conduct the same analysis using two sample periods: the whole sample period, from January 2000 to December 2010; and the Global Financial Crisis period, from August 2007 to April 2009. This table shows a linear relationship between expected stock returns and each sorting variable. For example, if future stock returns are higher for a stock with high BM ratio, then the group of stocks in the highest quintile BM portfolio generally shows higher average returns than those in the lowest quintile

Table 3. Univariate sorting

Panel A. Traditional variables

Sample	Ranked by	Smallest				Largest	Q5-Q1		
		Q1	Q2	Q3	Q4	Q5	Diff.	t-stat	
The whole period	World beta (+)	5.73	6.61	10.57	11.05	11.82	6.09	1.25	
	Local beta (+)	7.48	8.03	10.28	9.40	10.55	3.08	0.61	
	Exchange beta (+)	1.91	4.52	8.18	15.43	15.85	13.94	5.02	***
	Illiquidity (+)	9.10	11.65	6.09	9.07	11.93	2.82	0.62	
	Size (-)	4.65	4.66	6.46	5.98	3.53	-1.12	-0.65	
	BM ratio (+)	5.75	6.85	3.70	12.01	16.67	10.91	3.57	***
The crisis period	World beta	18.91	13.37	4.97	4.05	7.84	-11.08	-0.88	
	Local beta	4.19	15.14	12.48	11.24	6.32	2.13	0.19	
	Exchange beta	3.76	7.96	11.99	16.49	8.97	5.21	1.77	*
	Illiquidity	18.07	36.69	5.58	-0.66	2.55	-15.52	-1.43	
	Size	3.90	11.06	15.85	7.97	10.33	6.43	1.64	
	BM ratio	9.37	11.64	10.12	19.18	11.33	1.96	0.33	

Panel B. Bank-specific variables

Sample	Ranked by	Smallest				Largest	Q5-Q1		
		Q1	Q2	Q3	Q4	Q5	Diff.	t-stat	
The whole period	Equity ratio (-)	8.47	10.03	9.03	14.27	16.22	7.75	2.31	**
	Net loans ratio (+)	13.55	10.97	11.65	10.58	10.93	-2.62	-0.96	
	Non-int. income ratio (?)	7.44	15.39	11.07	12.29	11.83	4.39	1.84	*
	Net income ratio (-)	13.84	10.81	11.68	13.69	13.19	-0.65	-0.28	
	Off-balance sheets ratio (?)	12.19	16.00	8.76	8.72	12.23	0.04	0.01	
The crisis period	Equity ratio	24.54	25.44	29.75	12.95	2.74	-21.80	-2.74	**
	Net loans ratio	4.13	24.30	34.34	21.24	11.51	7.37	1.55	
	Non-int. income ratio	13.86	30.42	23.16	14.53	11.97	-1.89	-0.43	
	Net income ratio	21.25	26.48	19.45	22.33	9.22	-12.03	-2.35	**
	Off-balance sheets ratio	4.44	22.02	16.70	23.64	28.06	23.61	2.54	**

Note: Reported numbers are the average of monthly returns for each quintile. Each quintile (Q1~Q5) is formed based on the ranked by variable. Units are in percentage. The whole period indicates the sample from January 2000 to December 2010, and the crisis period indicates the sample from August 2007 to April 2009. The signs in parenthesis are expected signs of Diff. column. Diff. presents the difference between Q5 and Q1 column and t-stat column shows Newey-west (1987) t-statistics. * indicates statistical significance: *** $p<0.01$, ** $p<0.05$, and * $p<0.1$. Panel A reports results with traditional variables using the sample of all three types of banks. Panel B reports results with bank-specific variables using the sample of commercial banks.

BM portfolio. The statistical significance of the differences can be confirmed using t-test. Diff column (Q5 minus Q1) shows that all traditional variables for the whole period sample have expected signs. However, exchange beta (13.94%) and BM ratio portfolios (10.91%) only show statistical significance at 1% level. When comparing average returns in each quintile, average returns gradually increase from 1.91% (5.75%) to 15.85% (12.01%) in exchange beta (BM ratio). The crisis period sample shows that in the Diff. column (Q5-Q1), the signs change in world beta, illiquidity, and size compared to the whole period sample. However, they are not statistically significant and each quintile provides neither gradual increases nor decreases. Only the exchange beta shows the similar results to the whole period sample. It implies that exchange rate risk includes important information on cross-sectional variation of expected Asian bank stock returns. The BM ratio results with the whole period sample have been known as value premium anomaly. Like other non-financial institution firms, it seems that bank stocks also present this anomaly. We will confirm the relationship in the cross-sectional regressions in Table 4 and 5. However, we do not reject the hypothesis that other variables such as the size might explain the cross-section as they also show expected signs during the whole sample period.

2. Univariate sorting and bank-specific variables

Panel B of Table 3 presents the univariate sorting results with bank-specific variables including equity ratio, net loans ratio, non-interest income ratio, net income ratio, and off-balance sheets ratio. As shown in Table 2, levels of bank-specific variables are different by bank types. Thus, the roles of bank-specific variables may be different in relation with future stock returns. Some previous studies focused only on commercial banks. Given the highest percentage of commercial banks and the small percentage of banks for other types in our sample, the results can be considered informative by considering only commercial banks. Thus, from now on, when including bank-specific variables in the analysis, we only present the results using commercial banks data to ensure enough data observations. The signs of Diff. column for bank-specific variables flip from the whole period to the crisis period sample except for off-balance sheets ratio. The flipping signs imply that bank-specific variables may have different relationship with future stock returns in the crisis period from the one they have with the returns in the non-crisis period. The difference in return of the portfolios ranked by equity ratio shows a positive sign using the whole period, while showing a negative sign using the crisis period. The expected sign for equity ratio is negative as a higher percentage of equity

Table 4. Cross-sectional regressions with traditional variables

Variables	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE	(7) FE	(8) FE
World beta (+)	6.17*						1.48	-3.18
	(3.25)						(2.86)	(4.55)
Crisis_World beta	-4.57						1.44	1.14
	(6.26)						(5.57)	(6.68)
Local beta (+)		4.00					2.80	14.31
		(7.78)					(6.63)	(8.77)
Crisis_Local beta		-13.03					-9.09	-23.24**
		(11.11)					(9.20)	(9.83)
Exchange beta (+)			1.69**				1.49**	4.20***
			(0.65)				(0.63)	(1.20)
Crisis_Exchange beta			-0.80				-0.92	-2.21
			(1.14)				(1.57)	(1.76)
Illiquidity (+)				0.26***			0.29***	0.38***
				(0.09)			(0.07)	(0.10)
Crisis_Illiquidity				-0.51			-0.50**	-1.02***
				(0.40)			(0.21)	(0.22)
Size (-)					-16.57***			-20.16***
					(3.28)			(4.08)
Crisis_Size					-0.42			-3.51***
					(1.27)			(0.90)
BM ratio (+)						0.07***		0.03***
						(0.01)		(0.01)
Crisis_BM ratio						0.00		-0.01
						(0.01)		(0.01)
Crisis	3.86	9.27*	0.24	7.37	12.75	7.60	11.73***	74.32***
	(9.05)	(5.21)	(9.53)	(6.86)	(23.20)	(9.25)	(4.28)	(12.60)
Constant	6.86**	7.14	10.58***	5.62*	229.87***	-2.55	5.13	271.90***
	(2.73)	(4.77)	(2.36)	(3.06)	(44.43)	(3.48)	(5.00)	(58.37)
Observations	18,830	18,830	18,830	18,830	10,125	8,247	18,830	7,568
Number of banks	176	176	176	176	170	155	176	150
within R^2	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19

Note: This table shows country and firm fixed effects regression results with Driscoll-Kraay (1998) standard errors. Signs under variable names indicate expected signs of coefficients. The variables with prefix, Crisis_, are the interaction terms with the global financial crisis dummy variable. The standard errors are reported in parentheses; *** p<0.01, ** p<0.05, * p<0.1

ratio to total assets implies lower level of debts and low risks. The significant negative sign during the crisis period would make sense as investors became more aware of level of debts. In particular, during the crisis period, the return differences (Q5-Q1) for off-balance sheets ratio and equity ratio are 23.61% and -21.80%, respectively, which are fairly large average return differences. It implies that future bank stock returns are more sensitive to risks presented by these variables during the crisis period. Net loans ratio shows no significant and consistent signs. Non-interest income ratio shows a statistically significant positive sign during the whole period, and net income ratio shows a negative sign during the crisis period as expected. Results in Panel B suggest that non-interest income ratio is important during the overall period, while equity ratio, net income ratio, and off-balance sheets ratio have become important for the cross-section of future commercial bank stock returns during the crisis period. Again, their relation will be confirmed with the cross-sectional regressions in Table 4 and 5.

3. Cross-sectional regressions and traditional variables

Table 4 shows the cross-sectional regressions with traditional variables as in Panel A of Table 3. Coefficients of exchange beta in column (3), (7), and (8) and of BM ratio in column (6) and (8) show statistically significant positive signs, which confirm the results in Panel A of Table 3. In the cross-sectional regressions, illiquidity and size have become significant after controlling for country and firm fixed effects. Coefficients of illiquidity variable in column (4) and (7) are 0.26 and 0.29, respectively with the 1% significance level. Coefficients of size variable in column (5) and (8) are -16.57 and -20.16, respectively with the 1% significance level. This confirms that, as found in the empirical asset pricing literature with financial institutions excluded, the exchange rate risk, illiquidity risk, size, and BM ratio matter in explaining expected returns. Therefore, in the banking sector as well, banks, which are more exposed to exchange rate risk and have higher transaction costs, smaller size, and higher BM ratio, provide higher expected returns.

Table 4 also adds all interaction terms with the period of the Global Financial Crisis in order to verify the crisis effects on the predictive powers of traditional variables on bank stock returns. The Global Financial Crisis originated in the United States with the bankruptcy filing of Lehman Brothers. Thus we examine the effects of an external crisis on Asian stock markets in this analysis. The interaction term of the local market beta and the crisis (Crisis_Local beta) shows a negative sign with -23.24 in column (8). 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

Table 5. Cross-sectional regressions with bank-specific variables

Variables	(1) FE	(2) FE	(3) FE	(4) FE	(5) FE	(6) FE	(7) FE
Equity ratio (-)	-0.27					-0.17	0.59
	(0.35)					(0.49)	(1.31)
Crisis_Equity ratio	-2.81***					-1.71**	-3.29***
	(0.35)					(0.72)	(0.80)
Net loans ratio (+)		-0.23				-0.15	1.33**
		(0.23)				(0.25)	(0.51)
Crisis_Net loans ratio		0.72***				0.57**	0.24
		(0.19)				(0.23)	(0.16)
Non-int. income ratio (?)			-0.12			1.30	5.71***
			(1.51)			(1.45)	(1.73)
Crisis_Non-int. income ratio			-2.61			0.11	2.27
			(1.67)			(1.62)	(1.38)
Net income ratio (-)				-4.33**		-5.41***	-14.56***
				(1.74)		(1.76)	(4.50)
Crisis_Net income ratio				-11.31***		-5.10	4.08
				(2.89)		(3.61)	(4.64)
Off-balance sheet ratio (?)					-0.02	-0.06	-0.01
					(0.05)	(0.06)	(0.07)
Crisis_Off-balance sheets ratio					0.06*	0.05	0.08*
					(0.04)	(0.04)	(0.04)
Crisis	46.52***	-17.08	30.85***	40.89***	23.67***	9.44	134.85***
	(7.86)	(11.12)	(8.41)	(9.47)	(7.13)	(15.79)	(23.64)
Constant	10.39	20.03	8.2	11.94*	7.26	23.59**	192.72**
	(7.94)	(12.17)	(6.82)	(7.12)	(5.45)	(10.69)	(91.28)
Observations	8,015	8,092	7,977	7,343	7,783	7,065	4,189
Number of banks	94	95	94	92	94	91	87
within R^2	0.24	0.24	0.24	0.24	0.24	0.24	0.24

Note: Coefficients with traditional variables are not reported for a simple presentation. Their signs and statistical significance are similar to those in Table 4. The variables with prefix, Crisis_, are the interaction terms with the global financial crisis dummy variable. Driscall-Kraay (1998) standard errors are reported in parentheses; *** p<0.01, ** p<0.05, * p<0.1

correlated (more correlated) to the world (local) market. The negative sign of the Crisis_Illiquidity coefficient fits into this explanation as well; investors have more incentives to hold stocks with high transaction costs which will not be volatile during a period of crisis due to their less frequent trading. Moreover, the crisis_size coefficient in column (8), -3.51, is statistically significant at 1% level and it implies that investors put more risks on smaller banks during the crisis period.

4. Cross-sectional regressions and bank-specific variables

Table 5 shows cross-sectional regression results including traditional variables together with bank-specific variables. Among bank-specific variables, only coefficients of net income ratio (ROA) show statistically significant negative signs (-4.33, -5.41, and -14.56) in column (4), (6), and (7). The results are consistent with findings from univariate sorting, in Panel B of Table 3. Therefore, the consistent results tell us that investors require higher risk premiums for Asian banks with lower profitability. Other variables provide inconsistent results.

However, coefficients of some variables become significant or insignificant during the crisis period as in Table 5. The interaction term of equity ratio with the crisis dummy variable (Crisis_Equity ratio) shows statistically negative coefficients in column (1), (6), and (7). It means that the crisis made investors put more risk on the capital structure of Asian banks. The wake-up call hypothesis falls into this changing relationship. During the crisis time, investors become more aware of fundamental variables and suddenly put more risk on fundamental variables than in normal times. The interaction term of off-balance sheets ratio with the crisis dummy variable (Crisis_Off-balance sheets ratio) also shows significantly positive signs (0.06 and 0.08) in column (5) and (7). Off balance sheets items include volatile derivatives and options as additional risk exposures during the crisis period. Thus, banks with lower equity ratio and higher off-balance sheets items ratio provided higher expected returns during the Global Financial Crisis period.

5. Policy Implications

Our results have important policy implications for the banking sector. For a commercial bank, which takes up the largest number of the bank type that the eight Asian countries have, policies to give banks incentives to grow their sizes, such as M&A, can lower their risk levels in respect of investors. During the Global Financial Crisis, the effect of the size continued whereas the effects of other traditional variables were not consistent. And in case of commercial banks, the size effect would be strengthened if an increase in the net income ratio (ROA)

is accompanied.

Because a positive relationship between exchange beta and bank stock returns shows that banks of the eight Asian countries are exposed to exchange risks, it is expected that policies to mitigate exchange risk are needed. For example, currency swap contract among Asian counties can be effective to reduce exchange risk by guaranteeing the currency exchange in advance.

IV. Conclusion

This paper has examined which fundamental factors are related to expected bank stock returns in the eight Asian countries. Overall, we find that exchange rate risk, firm size, and BM ratio are important in explaining expected stock returns. Moreover, the net income ratio explains the cross-sectional stock returns of commercial banks. However, during the Global Financial Crisis period, local market beta, illiquidity risk, firm size, equity ratio, and off-balance sheets ratio additionally explained the future stock returns.

Our findings suggest that investors mainly consider information sources included in exchange rate risk, firm size, and BM ratio, and net income ratio in their risk evaluation. Monitoring the exchange rate risk, and managing bank performances are thus the keys to lowering potential risks for Asian banks. When negative shocks hit the economy, commercial banks that are smaller-sized, have higher debt level, and have higher percentages of off-balance sheet activities should be carefully monitored as they are more vulnerable to risk. Moreover, large negative external shocks such as the Global Financial Crisis upset general expectations that banks which are more exposed to local risks and have higher transaction costs are less risky.

However, our study has some limitation. Researchers have studied the impacts of country-level risk factors on non-financial institutional stocks. Erb et al. (1995, 1996) show that a lower country risk rate has a more positive relationship with expected returns and the political risk has an additional link to expected stock returns in emerging economies.[12] La Porta et al. (1998) show that countries with lower qualities of legal rules have less developed capital markets. Considering that Asian economies have a high level of political risks and are volatile to negative shocks, the relationship between country-level risk factors — political risk and business cycle — and Asian bank stocks should be explored with a sample of more countries.

[12] Perotti and Oijen (2001) also study the relationship between expected returns and political risk.

Our study is only limited only to firm-level characteristics as we just open discussions on determinants of Asian bank stock returns in international asset pricing literature. Also, our sample is limited to a relatively short time period for size and BM variables. Moreover, according to our results, world beta does not show consistently significant coefficients across Tables. That might be a problem caused by the short-sample period. Interconnectedness of Asian banks with advanced countries has increased over time. Hence, the relationship between world market risk and Asian bank stock returns could be better explored by using a longer sample. Future research should extend the sample period for those variables with other database and include more Asian countries.

Appendix

Table A1. Definitions of Variables

Variables	Description	Source
Traditional variables		
World beta	World market risk measure	Bloomberg, MSCI, FRB, Authors' calculation
Local beta	Local market risk measure	
Exchange beta	Exchange rate risk measure	
Illiquidity	Ratio of zero return trading days over a month	
Bank-specific variables		
Size	Market value of a stock in USD	Bankscope
BM ratio	Book value per share / Market value per share	Bankscope
Equity ratio	Book value of equity / Total assets	Bankscope
Net loans ratio	Net loans / Total assets	Bankscope
Non-int. income ratio	Non-interest income / Total assets	Bankscope
Net income ratio	Return on assets (ROA), Net income / Total assets	Bankscope
Off-balance sheets ratio	Off-balance sheets item / Total assets	Bankscope

Note: Calculation methods for systematic risk measures (world beta, local beta, exchange beta, and illiquidity) are in data explanation section.

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