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IMPACT OF FINANCIAL SECTOR OPACITY ON THE CAPITAL STRUCTURE CHOICE OF ASIAN BANKS

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ABSTRACT

This study investigates the role of market imperfections on the optimal capital structure choice of value maximizing banks, by investigating the impact of information asymmetry on bank liabilities. Random effects estimation (GLS) is used to test the effect of market imperfections on the capital structure of banks by employing 7 years of unbalanced panel data from the largest 15 countries of Asia based on GDP. The study finds evidence of specific individual characteristics impacting the capital structure of Asian banks. However, banking sector market imperfections are also found to play a major role in the capital structure choice of banks. In the presence of a high level of information asymmetry between the bank and the depositor, the bank retains a lower than optimal capital ratio. Transparent banks may be successful in achieving the optimal leverage, consequently lowering their capital cost. Evidence suggests a need to reduce banking sector opacity regarding their risk exposures. To ensure banking sector stability, stronger capital requirements need to be imposed on banks in those Asian countries where information asymmetry is high. The limitations of the study include limited data and the choice of information asymmetry proxies. Future research can address this limitation by employing additional proxies for information asymmetry and increasing the number of countries.

Contribution/ Originality: This study is one of very few studies which have investigated the direct impact of information asymmetry on bank capital structure and found evidence for the need for capital regulation on the basis of information asymmetry and not as an indirect consequence of other factors, such as explicit deposit insurance.

1. INTRODUCTION

Capital structure theories date back to Myers and Majluf (1984) who identified information asymmetry as the main determinant for capital structure choice. Although banks exhibit large variability in their capital levels (Allen, Carletti, & Marquez, 2015; Brewer, Kaufman, & Wall, 2008; Sheikh & Qureshi, 2017), literature on the capital structure choice of financial firms is limited, as this decision making process has historically been attributed to the exogenous capital requirements (Gornall & Strebulaev, 2018). Recently however, empirical evidence has started to suggest otherwise. Gropp and Heider (2010) found that bank-specific characteristics determine capital structure decisions in European and American banks. They suggest that capital requirements do not play a major role in the decision. Hassan, Tran, Paltrinieri, and Nguyen (2020) suggest that, aside from bank-specific factors, the economic environment may also play a key role in capital structure decisions. The role of information asymmetry in

influencing the capital structure decisions of banks has still not been documented. Since, on the other hand, the effect of optimal capital structures on bank performance is well-documented, this is a gap in the research that needs special attention (Gale & Gottardi, 2020; Ibrahim, 2019; Serwadda, 2019; Sivalingam & Kengatharan, 2018).

Miles (1995) claims that banks maintain a lower than optimal capital to asset ratio if depositors are unable to assess them because of existing information asymmetry, thus providing the underpinning for the need for capital requirements on banks. More recent research argues that the process of intermediation is opaque and reduces the efficiency of financial markets (Blau, Brough, & Griffith, 2017; Fosu, Ntim, Coffie, & Murinde, 2017). These studies suggest an indirect influence of information asymmetry on capital structure decision making in banks. Information asymmetry has been shown to impact leverage deviations and adjustment speeds in nonfinancial firms (Aflatooni & Khazaei, 2020).

Although the capital structure decisions of firms have been studied extensively in literature, there is a dearth of concrete empirical evidence in the case of financial institutions. Is bank capital structure determined by bank specific factors or by capital requirements in Asia? If capital requirements are not of first-degree importance in deciding the liability side structure of banks, are they required?

There is limited empirical evidence that directly addresses the role of information asymmetry in bank capital structure decisions in Asian countries. This study is an attempt to test the impact of information asymmetry within the banking sector on the capital structure decisions of banks. This is accomplished by means of random effects estimation of a large, unbalanced panel of banks from 15 Asian countries. The result is important because it provides the missing empirical evidence in support of Miles (1995) and suggests the need for stronger capital requirements in banking environments where there is greater information asymmetry. It suggests that banking sector opacity should be a major factor in deciding capital requirements for banks.

2. LITERATURE REVIEW

"The Modigliani-Miller (MM) proposition is the first theory on capital structure" (Mostafa & Boregowda, 2014). Ahmadimousaabad, Bajuri, Jahanzeb, Karami, and Rehman (2013) provide a detailed account of different theories concerning capital structure. Myers and Majluf (1984), however, is the first study to incorporate information asymmetry in capital structure and proposes that the desirability of a firm's financing choices follows a specific order: internal financing, debt, and then equity. Companies maximize their value by minimizing financing costs (Sheikh & Wang, 2010). The firm's first choice is internal financing, rather than debt, and shares are issued only as the last resort. Information asymmetry results in leverage that negatively impacts the net worth of a company, and this effect is more prominent after a crisis (Fosu, Danso, Ahmad, & Coffie, 2016; Rathnasingha & Heiyanthuduwa, 2019).

Miles (1995) was the first study to focus specifically on capital structure and information asymmetry in banks and argues for the necessity of imposing minimum capital restrictions on banks. He claims that an information asymmetry between the depositor and bank manager warrants intervention into the financial system by the regulatory authorities because it risks leading to market failure. He argues that when depositors are unable to assess banks because of information asymmetry it results in the bank maintaining a capital to asset ratio that is lower than optimal. If information about a bank's financial stability can be accessed by its depositors, being more capitalized allows the bank to offer lower interest rates on its deposits. Bank opaqueness will cause it to keep a less then optimal capital ratio compared to a bank which can be accessed by depositors. The decrease in the capital to asset ratio inversely means that the deposit ratio for the bank would increase, thus suggesting the need for capital regulation on the basis of information asymmetry rather than as an indirect consequence of other factors, like explicit deposit insurance. Alkhazaleh and Almsafir (2015) find evidence in support of the hypothesis proposed by Miles (1995) while investigating the Jordanian banking sector. Dowd (1999), on the other hand, advocating in

favour of free banking, reasons that the argument that depositors cannot assess the capital being maintained by banks is farfetched and therefore there is no need for capital regulation as concluded by Miles (1995).

Consistent with Dowd (1999); Gertler and Kiyotaki (2010) propose an alternate hypothesis that focuses on the moral hazard component of information asymmetry. They hypothesize that a higher asymmetry of information between the depositor and the bank reduces the bank's ability to attract deposits. The depositors would prefer to invest in other alternatives rather than keeping their money in the bank. This would lead to shrinkage in the deposit ratio therefore contradicting Miles (1995). This hypothesis is supported by Shen (2014); Petacchi (2015).

Berg and Gider (2017) show that financial firms are more leveraged than nonfinancial firms, a fact which they attribute to asset risk. Gropp and Heider (2010), using data of banks and firms from the United States and Europe, find that the capital requirement for banks may not be of first order importance in capital structure decision making. Rather, individual features of banks determine their capital structure. The capital structure of banks is determined by typical bank-specific factors like profit, bank size, collaterals, deposit insurance, and investment opportunity. They show that their results are consistent both for US firms and for G-7 firms, proving that individual bank-specific characteristics determine capital structure (Frank & Goyal, 2004; Rajan & Zingales, 1995).

Sundaresan and Wang (2014) create of model for a bank optimizing its capital structure. They find that banks choose to maintain high leverage with more deposits and low subordinated debt when supervisory oversight is missing. The banks choice is based on the type of assets, non-interest incomes, and taxation. Increased risk-taking results in higher leverage. They predict that lower taxes reduce tax benefits and thus result in a decrease in subordinated debt causing the leverage to decrease. Mohammad and Nishiyama (2019) find empirical support for this hypothesis in the case of Asian banks. Their model, however, does not specifically consider bank opacity as a factor determining bank capital structure as predicted by Miles (1995) and this needs further investigation.

In short, there are conflicting views on the impact of information asymmetry on bank capital structure. Miles (1995) asserts that information asymmetry is directly related to the deposit ratio of banks, whereas Gertler and Kiyotaki (2010) hypothesize that higher information asymmetry will lower the deposit ratio.

Asongu, Nwachukwu, and Tchamyou (2016) find that information asymmetry has negatively impacted the financial development of the banking sector. Similar studies have found that greater information asymmetry results in higher short-term debt for firms, which leads to firms becoming more leveraged (Gao & Zhu, 2015; Petacchi, 2015; Shen, 2014). However, contrary to the Pecking Order Theory, Shen (2014) posits that information asymmetry leads to a decrease in debt for firms.

The literature shows that information asymmetry between a firm and its customers leads to problems of adverse selection and moral hazards. The literature on non-financial firms has largely divided information asymmetry measures into three types: Microstructure measures, Analyst Earning Forecast based measures and Firm Characteristic measures. Microstructure measures include measures such as bid-ask spread. Analyst forecast measures include increased accuracy of analyst forecasts of earning-per-share as well as dispersion among analyst forecasts, etc. These have been used by Krishnaswami and Subramaniam (1999); Easterwood and Nutt (1999). Firm characteristics proxies include measures like stock price volatility and standard deviations of daily stock returns and daily volume, volume of trade, firm size, leverage, intangible assets and ratio of the market value of equity to its book value. Other measures include institutional ownership and earnings to price ratio.

Allen, Carletti, and Marquez (2011) find evidence that banks keep more capital than the required regulatory minimums. Brewer et al. (2008) find similar evidence in European countries with risk-weighted capital positions as low as 6% and as high as 10%. Unlike the EU and US, Asian banking industries have a large amount of variability in their environments and therefore form an ideal case to extend the research (Gropp & Heider, 2010) to see if Asian banks exhibit similar behaviour and whether information asymmetry has a significant effect on the banks' capital structure. This study uses firm characteristics along with macroeconomic proxies for information asymmetry to investigate their impact on bank capital structure.

3. METHODOLOGY

Random effect estimation is used with robust standard errors and clustering at bank level in line with Gropp and Heider (2010); Bitar, Kabir Hassan, and Hippler (2018); Mohammad and Nishiyama (2019). Both market and book value measures of capital structure are used in the estimation. Since, unlike in the case of the USA and EU, in Asia the market and book value dependent measures of capital structure exhibit similar behaviours, future models are estimated using only the book value dependent variable. Descriptive statistics, correlations, fixed effect and random effect models were used for the data analysis and then with the results of Hausman Specification Test, a random effect model was considered.

The econometric model (1) is an extension of models used by Gropp and Heider (2010); Bitar et al. (2018); Mohammad and Nishiyama (2019) to include information asymmetry proxies as a measure of market imperfections.

$$L_{ict} = \beta_0 + \beta_1 Profit_{ict} + \beta_2 DepositIns_{ict} + \beta_3 Size_{ict} + \beta_4 Dividend_{ict} + \beta_5 GDP_{c,t} + \beta_6 Inflation_{c,t} + [Info\ Asym\ Proxies] + c_c + c_t + u_{ict} \quad (1)$$

The dependent variable L is the leverage ratio. It takes two forms, namely the market value dependent variable and the book value dependent variable. The book value leverage is (1- book value of capital/book value of total assets). The market value leverage is 1- (number of shares * end of year stock price) / ((number of shares * end of year stock price) + book value of liabilities). This ratio is well-defined and the data shows a correlation of 0.713 between the deposit ratio and leverage.

Bank specific control variables include Profit ((pre-tax profit + interest expenses) / book value of assets), Size (log of total assets) and Dividend (dummy variable). GDP growth rate, inflation rate, and explicit deposit insurance dummy are used as macroeconomic controls. The information asymmetry proxies can be described as:

$$[Info\ Asym\ Proxies] = \left[CorrIndex_{ct}\ ; MtoB_{c,i,t}; Listed_{c,i,t}; Herfindahl_{c,t}; DailyAverageVolume_{c,i,t}\right] \quad (2)$$

Equation 2 lists the matrix of proxies of information asymmetry used in the analysis. The first proxy used is the corruption perception index (CorrIndex). This is based on a ranking of countries compiled by Transparency International which scores countries based on the corruption in their public sectors using the informed views of analysts, businesspeople, and experts in countries around the world. Countries are given a score between 0 and 10, with 0 being the most corrupt. After scoring them, a ranking of countries' corruption perceptions is published. The hypothesis here is that the higher the score on the index, the more corruption-free and transparent the country is, leading to lesser information asymmetry. A similar proxy was used by Demirguc-Kunt, Detragiache, and Merrouche (2013) to proxy moral hazard.

The second proxy used is market-to-book value of equity. It is calculated as (number of shares x end of year stock price)/book value of equity. This proxy has been used in multiple studies (Al-Mulla & Bradbury, 2020; Barclay & Smith Jr, 1995; Barth & Kasznik, 1999; McLaughlin, Safieddine, & Vasudevan, 1998). However, Huddart, Steven, and Ke (2007) use the book-to-market value and hypothesize that lower values indicate asymmetry of information. Lee and Masulis (2009) argue that the Tobin's Q, although an indicator of investment opportunity, can be used to proxy for information asymmetry. Peyer and Vermaelen (2009) make use of an index that uses book-to-market, size, and prior returns. For comparability with Gropp and Heider (2010) the study chooses to use the inverse of the book-to-market value of equity used in Huddart et al. (2007).

Herfindahl is the proxy for the concentration of banks in a country and is a country specific variable. Nissan and Niroomand (2006) use the Herfindahl index as a proxy. They argue that an increased concentration of firms in the market will reduce the asymmetry of information. The daily average stock volume traded by a firm (DailyAverageVolume) is another firm-specific information asymmetry proxy. This proxy has been extensively used

in corporate finance studies (see Krishnaswami and Subramaniam (1999) and Easterwood and Nutt (1999)). The daily volume traded by the firm is directly proportional to the amount of information they reveal to outside stockholders and depositors. 'DailyAverageVolume' is defined as the daily average volume of stocks traded annually.

Feito-Ruiz, Fernández, and Menéndez-Requejo (2014) claim that non-listed firms are associated with being less transparent than listed firms. Once a firm is listed it is required to publish more information and exhibit more transparency, being under constant examination by financial analysts. Leuz, Nanda, and Wysocki (2003) also study how the disclosure of information affects the information environment of firms. This study hypothesizes that listed banks have a more transparent relationship with depositors and uses it as another proxy for information asymmetry.

4. DATA

The analysis has been carried out using banks from the 15 largest countries of Asia, based on their gross domestic product (see Table 1). The average capital position of banks in South Asia is lower compared to East Asian countries, which is indicative of less compliance with regulatory requirements. Miles (1995) predicts this. The South Asian banks exhibit higher profits on average than the East Asian banks in the sample.

Table-1. List of countries included in the study.

#	Country Name	Region	GDP ($Billion)	Observations
1	Japan	East Asia & Pacific	4515	3408
2	China	East Asia & Pacific	3550	819
3	India	South Asia	1217	555
4	Korea, Rep.	East Asia & Pacific	1123	203
5	Indonesia	East Asia & Pacific	432	433
6	Thailand	East Asia & Pacific	263	235
7	Hong Kong	East Asia & Pacific	212	377
8	Malaysia	East Asia & Pacific	194	256
9	Singapore	East Asia & Pacific	181	191
10	Pakistan	South Asia	152	249
11	Philippines	East Asia & Pacific	149	0
12	Bangladesh	South Asia	80	170
13	Vietnam	East Asia & Pacific	77	249
14	Sri Lanka	South Asia	32	111
15	Myanmar	East Asia & Pacific	20	0
16	Macao SAR, China	East Asia & Pacific	18	0
17	Brunei Darussalam	East Asia & Pacific	12	172
18	Nepal	South Asia	10	152

Source: The source of GDP data is World Bank databases.

Table-2. Comparison of South Asian and East Asian Banks from the sample.

	East Asia		South Asia	
Variable	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Market Value (1-KtoA)	0.8562679	0.1915283	0.833068	0.1516351
Book Value (1- KtoA)	0.8711034	0.1815934	0.8614186	0.1327602
Profit	0.022525	0.0436563	0.0699553	0.0372379
Size	15.20625	2.13798	14.27243	2.057442
Dividend	0.3915087	0.4881273	0.5027888	0.5001915
MtoB	1.009464	0.8093119	1.655412	1.59577
Corruption Perception	6.293048	2.082684	2.986614	0.5878726
Ln(DailyAverageVolumeStockTraded)	12.96534	3.21695	11.45391	2.434679
HHI	0.0088526	0.0112639	0.027933	0.0417859
GDP growth rate	2.747439	4.692154	5.907076	2.660986
Inflation Rate	1.886037	3.482968	9.925993	3.09985

Analysis of Table 2 reveals higher information asymmetry in the South Asian countries used in our sample. A CHOW test was done to see if the whole sample could be analysed as one group. Testing whether the coefficients are consistent across the two groups showed that the coefficients, or the effect of the proxy variables, do not exhibit a difference across the two groups, which is why the data is pooled together.

Table 3 presents the descriptive statistics. The bank-specific data and stock data have been taken from the Bankscope/Orbis database. The dataset covers the years 2009-2015. The sample contains both listed and non-listed banks, unlike the study by Gropp and Heider (2010) where only large banks in the USA and Europe were used. A total of 1,638 banks are used, out of which 462 are listed. Models that require stock market data use only banks that are listed. The corruption perception index data is from the Transparency International website. See Table 3 for descriptive statistics of the data. The data has been tested for multicollinearity. The type dummies do indicate VIF values about 8, but previous literature ignores VIF values for dummy variables. Serial correlation has not been found.

Table-3. Descriptive Statistics.

#	Variable	Mean	Std. Dev.	Min	Max	Observations
1	Market Value (1-KtoA)	0.847	0.178	0.016	1	2138
2	Book Value (1- KtoA)	0.869	0.174	0.0009	0.999	7426
3	Profit	0.030	0.046	-1.028	1.150	7243
4	Deposit insurance	0.756	0.429	0	1	7426
5	Size	15.048	2.153	5.250	22.218	7426
6	Dividend	0.410	0.491	0	1	7426
7	MtoB	1.245	1.200	0.001	10.337	2130
8	Corruption Perception	5.734	2.279	2	9.3	7426
9	Ln(DailyAverageVolumeStockTraded)	12.400	3.037	2.091	20.144	2110
10	HHI	0.012	0.021	0.0014	0.501	7426
12	GDP growth rate	3.279	4.571	-5.524	17.9	7384
13	Inflation Rate	3.240	4.556	-1.339	23.159	7384

Table-4. Estimating the Gropp and Heider (2010) model on capital structure for Asia.

Dependent Variable Book Value (1-K/A)	Model 1	Model 2
	Coef./(Std.Err)	Coef./(Std.Err)
Bank Specific Variables		
Profit	-0.2675**	-0.3919**
	(0.1329)	(0.154)
Size	0.0314***	0.0266***
	(0.0037)	(0.0037)
MtoB	0.0115***	-0.0520***
	(0.0031)	(0.0042)
Dividend	0.0139	0.0096
	(0.0089)	(0.0085)
Collateral	-0.1698***	-0.1378***
	(0.0414)	(0.0406)
Macroeconomic Variables		
GDP	-0.0067***	-0.0067***
	(0.0013)	(0.0013)
Inf	0.0072***	0.0073***
	(0.0013)	(0.0012)
Constant	0.3351***	0.4877***
	(0.0791)	(0.0748)
R-Squared	0.533	0.566
Adj. R-Squared	0.528	0.561
No. of Obs.	2086	2086

Note: * P<.1, ** P<.05, *** P<.001

5. RESULTS AND DISCUSSION

Table 4 answers the questions about what factors impact the capital structure decisions of banks. Gropp and Heider's (2010) model is applied to the Asian sample using both the book value and market value dependent variables. The results show lower explanatory power in the Asian sample.

Bank specific variables are found to have a significant impact on bank leverage in the case of Asia as well. This validates the findings of Gropp and Heider (2010). Frank and Goyal (2004) reported similar findings for nonfinancial firms. Higher leverages have a negative impact on bank profit. This could be due to interest payments on deposits and other liabilities. Larger banks are found to be more leveraged than small banks. These findings are consistent with previous findings. However, collateral reveals a significant and opposite effect in the Asian case. Higher collateral impacts bank leverage negatively. Alom (2013) assesses the capital structure choices of Bangladeshi firms and reports similar results. Dividend has a consistent but insignificant impact in the Asian case. The model is a good fit for Asian banks, considering the diverse banking environments across individual Asian countries. The sample is an unbalanced panel, and this might also be contributing to the lower explanatory power. The result finds that the difference in explanatory power of the market and book value capital is not as prominent as that reported by earlier studies in the EU/US case (Gropp & Heider, 2010). Therefore, only the book value dependent variable is carried forward in the analysis.

Table-5. Main Results.

The dependent variable is book value(1-K/A). The model is estimated using Random effect robust estimates. 15 Asian Countries are included. The lack of some proxies for unlisted banks results in the difference in number of available observations.

Dependent Variable Book Value (1-K/A)	(1) Coef./(Std. Err)	(2) Coef./(Std. Err)	(3) Coef./(Std. Err)	(4) Coef./(Std. Err)	(5) Coef./(Std. Err)
Information Asymmetry Proxies					
MtoB	0.0059***				
	(0.0011)				
CorruptionPerceptionIndex		-0.0133***			
		(0.0021)			
LnDAV			-0.0006		
			(0.0007)		
HHI				0.1280**	
				(0.043)	
ListedBanks					-0.0121**
					(0.0053)
Time Dummies	No	No	No	No	No
Bank Type Dummies	Yes	Yes	Yes	Yes	Yes
Country Dummies	No	No	No	No	No
Adj. R-Squared	0.463	0.419	0.460	0.233	0.417
No. of Obs.	2086	7201	2066	3167	7201
No. of Groups	457	1638	462	686	1638

Note: * P<.1, ** P<.05, *** P<.001

Do varying degrees of bank opaqueness and information asymmetry in the banking sector impact the capital structure decisions of banks and dictate the need for capital requirements? Table 5 shows the unbalanced panel random effect estimation results of Equation 1. The Gropp and Heider (2010) model is extended and proxies of information asymmetry are included into the model one at a time. Models 1 and 3 have smaller sample sizes because they use market value based independent variables. The main table does not control for time and country specific effects. The hypotheses are that lower information asymmetry is associated with lower market-to-book value of

equity, higher value of the corruption perception index, higher daily average trade volume, higher concentration in the industry, and listed banks.

The positive sign of market-to-book value of equity is indicative of a positive association between information asymmetry and bank leverage. This finding suggests that higher asymmetry will result in the leverage ratio of the bank increasing and the capital position weakening when the depositor is unable to assess the bank, as predicted by Miles (1995).

Model 2 uses the corruption perception index, which provides a value for the overall perception of how corrupt a country is. The hypothesis here is that the higher the rating of the country the less prevalent corrupt practices are in the country, and therefore the more transparent banks will be in the amount of information they present to the depositor. This results in more information sharing and less asymmetry of information. The result of a negative significant sign at less than 1 percent also suggests that increasing information asymmetry between the bank and the depositor will result in an increase in the deposit ratio and the leverage ratio. This results in a decrease in the capital to asset ratio, as predicted by Miles (1995).

Model 3 uses the log daily average volume traded (LnDAV). Firms that display a higher volume of shares traded are more transparent and have lower information asymmetry between themselves and their shareholders. The results show that a negative sign is consistent with Miles's (1995) hypothesis that higher information asymmetry causes an increase in the leverage ratio of the bank. The result, however, is not statistically significant.

Model 4 tests the effect using industry bank concentration by means of the Herfindahl index (HHI). Working from Nissan and Niroomand's (2006) hypothesis that a higher concentration of firms in the market will reduce the information asymmetry, the Herfindahl index is calculated for commercial banks only. Lower information asymmetry, due to a higher concentration, leads to higher leverage and lower capital positions, as was proposed by Miles (1995).

Model 5 uses a listed and non-listed banks dummy variable as an indicator of the bank's information environment. Listed firms are thought to be more public, and their information is more transparent. It is therefore assumed that the bank and depositor relationship of listed banks would be more transparent. The negative sign points in favour of Miles' (1995) hypothesis, showing that listed banks, which are hypothesized to be more transparent, have lower deposit ratios.

Overall, the findings contradict the hypothesis that higher information asymmetry would result in an increase in the bank capital ratio as has been suggested by Dowd (1999); Shen (2014); Petacchi (2015). The existence of an asymmetric information relationship between managers of intermediaries and depositors generates unregulated outcomes for bank leverage and equity capital. Higher information asymmetry incentivises risky behaviour in banks.

Gropp and Heider (2010) associate the high variability in capital ratios with bank specific factors. The results of this study show that the banking environment is also an important factor in determining bank capital structure decisions. To investigate time and country-specific effects, time and country dummies are used to see if they have an effect on the capital structure and the information asymmetry proxies used. Table 6 and 7 report the results of the estimation.

Table 6 shows estimation results after controlling for time-specific effects and demonstrates that the results are consistent with the main findings. The coefficient sizes show an expected decrease after controlling for time. The proxy log daily average volume traded becomes significant after controlling for time effects. The model fit does not, however, show a significant improvement after the inclusion of time-control dummies.

Table-6. Estimation results after controlling for time-specific effects.

Dependent Variable Book Value (1-K/A)	(6) Coef./(Std. Err)	(7) Coef./(Std. Err)	(8) Coef./(Std. Err)	(9) Coef./(Std. Err)	(10) Coef./(Std. Err)
Information Asymmetry Proxies					
MtoB	0.0050***				
	(0.0011)				
CorruptionPerceptionIndex		-0.0098***			
		(0.0021)			
LnDAV			-0.0013*		
			(0.0007)		
HHI				-0.0015	
				(0.0376)	
ListedBanks					-0.0086*
					(0.0052)
Time Dummies	Yes	Yes	Yes	Yes	Yes
Bank Type Dummies	Yes	Yes	Yes	Yes	Yes
Country Dummies	No	No	No	No	No
Adj. R-Squared	0.452	0.407	0.451	0.255	0.401
No. of Obs.	2086	7201	2066	3167	7201
No. of Groups	457	1638	462	686	1638

Note: * P<.1, ** P<.05, *** P<.001

Table-7. Estimation results after controlling for country-specific effects.

Dependent Variable Book Value (1-K/A)	(11) Coef./(Std. Err)	(12) Coef./(Std. Err)	(13) Coef./(Std. Err)	(14) Coef./(Std. Err)	(15) Coef./(Std. Err)
Information Asymmetry Proxies					
MtoB	0.0052***				
	(0.0011)				
CorruptionPerceptionIndex		-0.0196***			
		(0.0028)			
LnDAV			0.0009		
			(0.0007)		
HHI				0.1718*	
				(0.1022)	
ListedBanks					-0.0198***
					(0.0054)
Time Dummies	No	No	No	No	No
Bank Type Dummies	Yes	Yes	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes
Adj. R-Squared	0.575	0.458	0.573	0.361	0.466
No. of Obs.	2086	7201	2066	3167	7201
No. of Groups	457	1638	462	686	1638

Note: * P<.1, ** P<.05, *** P<.001

Table 7 controls for country-specific effects by including country dummies and demonstrates that the results are robust. Using country dummies in the regression improves the model fit and the evidence that information asymmetry causes leverage to increase is found to hold up. Gropp and Heider (2010) report similar results after

controlling for country and time-specific effects. As a final robustness test the data is pooled together and models are estimated using pooled OLS. The results are reported in Annex 1-4.

6. CONCLUSIONS

This study shows that bank capital structure is determined by bank-specific factors and that capital requirements are not of first-degree importance in deciding the liability side structure of banks, similar to the findings of Gropp and Heider (2010).

Do varying degrees of bank opaqueness and information asymmetry in the banking sector impact the capital structure decisions of banks and dictate the need for capital requirements? The results provide evidence that information asymmetry between the depositor and a value-maximising bank has a positive effect on the deposits-to-total-asset ratio of the bank and ultimately the leverage of the bank, as predicted by Miles (1995). This finding is consistent with Myers and Majluf (1984) for the behaviour of nonfinancial firms. High information asymmetry between the bank and the depositor results in a lower than optimal capital ratio as reserve because they do not have the incentive to charge lower deposit rates by keeping a stronger position. This finding contradicts evidence found by (Petacchi, 2015; Shen, 2014).

Empirical evidence suggests that banking sector information asymmetries incentivise risk taking and can lead to instability (Blau et al., 2017; Fosu et al., 2017) find similar evidence when investigating bank opacity.

As a policy implication, regulatory requirements need to be tailored on individual bases by central banks, rather than following a standard reserve requirement prescribed by organizations like Basel. Evidence suggests that in banking sectors with less transparency a stronger reserve requirement is needed to keep morally hazardous behaviour by the banks under control. Stronger regulatory and supervisory oversight may be required to ensure banks stay above the prescribed requirements.

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Annexure – 1

Annex-1. (Complete Results) Table 5 – Main Results.

The dependent variable is book value(1-K/A). The model is estimated using Random effect robust estimates. 15 Asian Countries are included. The lack of some proxies for unlisted banks results in the difference in number of available observations.

Dependent Variable Book Value (1-K/A)	(1)	(2)	(3)	(4)	(5)
	Coef./(Std.Err)	**Coef./(Std.Err)**	**Coef./(Std.Err)**	**Coef./(Std.Err)**	**Coef./(Std.Err)**
Bank Specific Variables					
Profit	-0.1641***	-0.1579**	-0.1593***	0.0641	-0.1522**
	(0.0429)	(0.0562)	(0.0457)	(0.1504)	(0.0573)
Deposit insurance	0.0196	0.0326***	0.0164	0.0134*	0.0376***
	(0.0178)	(0.0099)	(0.0175)	(0.0079)	(0.01)
Size	0.0371***	0.0460***	0.0364***	0.0305***	0.0430***
	(0.0057)	(0.0035)	(0.0055)	(0.0037)	(0.0033)
Dividend	0.0012	0.0004	0.0022	0.0004	0.0004
	(0.0025)	(0.002)	(0.0027)	(0.0013)	(0.002)
Information Asymmetry Proxies					
MtoB	0.0059***				
	(0.0011)				
CorruptionPerceptionIndex		-0.0133***			
		(0.0021)			
LnDAV			-0.0006		
			(0.0007)		
HHI				0.1280**	
				(0.043)	
ListedBanks					-0.0121**
					(0.0053)
Macroeconomic Variables					
GDP	0.0003	0.0001	0.0005*	0.0001	0.0001
	(0.0003)	(0.0001)	(0.0003)	(0.0002)	(0.0001)
Inf	0.0010**	0.0001	0.0010**	0.0003	0.0006*
	(0.0005)	(0.0003)	(0.0005)	(0.0004)	(0.0003)
Constant	0.1629	0.0975*	0.1876*	0.0517	0.0604
	(0.1078)	(0.0517)	(0.1043)	(0.0549)	(0.0544)
Time Dummies	No	No	No	No	No
Bank Type Dummies	Yes	Yes	Yes	Yes	Yes
Country Dummies	No	No	No	No	No
Adj. R-Squared	0.463	0.419	0.460	0.233	0.417
No. Of Obs.	2086	7201	2066	3167	7201
No. Of Groups	457	1638	462	686	1638
* P<.1, ** P<.05, *** P<.001					

Annex-2. (Complete Results) Table 6 – Randoms Effect Controlling for Time Effects.

The dependent variable is book value(1-K/A). The model is estimated using random effect and robust standard errors are reported . 15 Asian Countries are included. The lack of some proxies for unlisted banks results in the difference in number of available observations.

Dependent Variable Book Value (1-K/A)	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
	Coef./(Std.Err)	**Coef./(Std.Err)**	**Coef./(Std.Err)**	**Coef./(Std.Err)**	**Coef./(Std.Err)**
Bank Specific Variables					
Profit	-0.1749***	-0.1621**	0.078	-0.1602**	-0.1585**
	(0.0424)	(0.0560)	-0.1476	(0.0567)	(0.0567)
Deposit insurance	0.0147	0.0301**	0.0078	0.0331**	0.0334**
	(0.0186)	(0.0101)	-0.008	(0.0101)	(0.0103)
Size	0.0414***	0.0534***	0.0387***	0.0524***	0.0520***
	(0.0064)	(0.0042)	-0.0046	(0.0041)	(0.0041)
Dividend	0.0027	0.0003	0.0001	0.0004	0.0002
	(0.0027)	(0.0019)	-0.0012	(0.0019)	(0.0019)
Information Asymmetry Proxies					
MtoB	0.0050***				
	(0.0011)				
CorruptionPerceptionIndex		-0.0098***			
		(0.0021)			
LnDAV			-0.0013*		
			(0.0007)		
HHI				-0.0015	
				(0.0376)	
ListedBanks					-0.0086*
					(0.0052)
Macroeconomic Variables					
GDP	0.0004	0.0008**	0.0007*	0.0004	0.0008**
	(0.0004)	(0.0003)	(0.0004)	-0.0003	(0.0003)
Inf	0.0012**	-0.0001	0.0013**	0.0003	0.0003
	(0.0006)	(0.0004)	(0.0006)	-0.0004	(0.0004)
Constant	0.0967	-0.0383	0.1060	0.2740***	-0.0765
	(0.1187)	(0.0632)	(0.1158)	-0.0737	(0.0657)
Time Dummies	Yes	Yes	Yes	Yes	Yes
Bank Type Dummies	Yes	Yes	Yes	Yes	Yes
Country Dummies	No	No	No	No	No
Adj. R-Squared	0.452	0.407	0.451	0.255	0.401
No. Of Obs.	2086	7201	2066	3167	7201
No. Of Groups	457	1638	462	686	1638
* P<.1, ** P<.05, *** P<.001					

Annex-3. (Complete Results) Table 7 – Random Effect Controlling for Countries.

Dependent Variable Book Value (1-K/A)	(11) Coef./(Std. Err)	(12) Coef./(Std. Err)	(13) Coef./(Std. Err)	(14) Coef./(Std. Err)	(15) Coef./(Std. Err)
Bank Specific Variables					
Profit	-0.1788***	-0.1593**	-0.1774***	0.0258	-0.1685**
	(0.0396)	(0.0562)	(0.0417)	-0.1635	(0.0566)
Deposit insurance	0.1588***	-0.0609	0.1612***	0.1256**	0.0563
	(0.0402)	(0.0408)	(0.0403)	-0.0405	(0.0381)
Size	0.0480***	0.0485***	0.0486***	0.0347***	0.0467***
	(0.0072)	(0.0038)	(0.0070)	-0.0046	(0.0037)
Dividend	0.0005	0.0009	0.0014	0.0003	0.0004
	(0.0025)	(0.0020)	(0.0028)	-0.0013	(0.0020)
Information Asymmetry Proxies					
MtoB	0.0052***				
	(0.0011)				
CorruptionPerceptionIndex		-0.0196***			
		(0.0028)			
LnDAV			0.0009		
			(0.0007)		
HHI				0.1718*	
				(0.1022)	
ListedBanks					-0.0198***
					(0.0054)
Macroeconomic Variables					
GDP	0.0004	0.0002*	0.0006**	0.0001	0.0001
	(0.0003)	(0.0001)	(0.0003)	(0.0001)	(0.0001)
Inf	0.0004	-0.0001	0.0003	0.0003	0.0003
	(0.0005)	(0.0003)	(0.0005)	(0.0003)	(0.0003)
Constant	-0.0845	0.1272**	-0.1035	0.1893**	-0.0282
	(0.1186)	(0.0555)	(0.1167)	-0.0885	(0.0628)
Time Dummies	No	No	No	No	No
Bank Type Dummies	Yes	Yes	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes
Adj. R-Squared	0.575	0.458	0.573	0.361	0.466
No. Of Obs.	2086	7201	2066	3167	7201
No. Of Groups	457	1638	462	686	1638
* P<.1, ** P<.05, *** P<.001					

Annex-4. Robustness Check: Models estimated through Pooled OLS.

Dependent Variable Book Value (1-K/A)	Model 1 Coef./(Std.Err)	Model 2 Coef./(Std.Err)	Model 3 Coef./(Std.Err)	Model 4 Coef./(Std.Err)	Model 5 Coef./(Std.Err)	Model 6 Coef./(Std.Err)
Bank Specific Variables						
Profit	-0.3339**	-0.5523***	-0.3347**	-0.3993	-0.5532***	-0.2939**
	(0.1199)	(0.1545)	(0.1105)	(0.5592)	(0.1515)	(0.0993)
Deposit insurance	-0.2068**	0.0755**	0.1467***	0.1098***	-0.1065***	-0.0585
	(0.0657)	(0.037)	(0.0331)	(0.0323)	(0.0202)	(0.0975)
Size	0.0382***	0.0327***	0.0427***	0.0290***	0.0335***	0.0386***
	(0.0048)	(0.0025)	(0.005)	(0.0035)	(0.0025)	(0.0047)
Dividend	0.0085	0.0003	0.0077	-0.0065*	-0.0048	0.0038
	(0.0083	(0.0055)	(0.0083)	(0.0039)	(0.0052)	(0.0081)
Information Asymmetry Proxies						
MtoB	0.0056*					0.0066**
	(0.0034)					(0.0031)
CorruptionPerceptionIndex		-0.0130**				-0.0167*
		(0.0048)				(0.0098)
LnDAV			-0.0063**			-0.0061**
			(0.0021)			(0.0019)
HHI				0.3185***		0.2298
				(0.0898)		(0.6916)
ListedBanks					-0.0267***	
					(0.0079)	
Macroeconomic Variables						
GDP	0.0004	0.0005**	0.0006	0.0004	0.0004	0.0009**
	(0.0004)	(0.0002)	(0.0004)	(0.0003)	(0.0002)	(0.0004)
Inf	0.0007	0.0006	0.0005	0.0012	0.0009*	-0.0004
	(0.0007)	(0.0005)	(0.0007)	(0.0008)	(0.0005)	(0.0007)
Constant	0.3222***	0.3041***	0.1236	0.2749***	0.4082***	0.4179***
	(0.0687)	(0.0623)	(0.0981)	(0.0761)	(0.0392)	(0.118)
Time Dummies	No	No	No	No	No	No
Bank Type Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.587	0.487	0.596	0.372	0.49	0.631
Adj. R-Squared	0.582	0.485	0.590	0.368	0.488	0.625
No. Of Obs.	2086	7201	2066	3167	7201	2038
* P<.1, ** P<.05, *** P<.001						

Variable Definitions List

Dependent Variable: Book value leverage is (1- book value of capital/book value of total assets).

Dependent Variable: Market leverage is 1- (number of shares * end of year stock price) / ((number of shares * end of year stock price) + book value of liabilities).

Size is the log of total assets

Profit is (pre-tax profit + interest expenses) / book value of assets

Deposit Insurance is a dummy variable taking the value of 1 for existence of explicit deposit insurance in the country and 0 otherwise

Dividend is a dummy variable taking a value of 1 if dividend is given in a particular year.

LnDAV is log of daily average volume traded

Corr is the corruption perception index. Higher values indicate lower levels of corruption perception.

HHI is the Herfindahl index calculated to represent the concentration of banks in the market

Inf is the inflation rate

GDP is the GDP growth rate.