CHAPTER 5 : EMPIRICAL RESULTS AND ANALYSIS

This chapter presents the empirical results and analysis. It starts with the descriptive statistics and the test of the model, before discussing the results proper.

5.1 DESCRIPTIVE STATISTICS

This study uses a balance panel of 167 banks from 10 countries, namely, Malaysia, Thailand, Indonesia and Korea, Argentina, Brazil, Colombia, Mexico, Peru and Venezuela for the period 2003-2008. Wooldridge (2009) defined a data set to be a balanced panel when there are the same T periods for each of N cross-sectional units i.e. the same periods for all individuals, firms, cities and so on; and in our case, the same periods for all banks in sample. We apply panel least square technique on the fixed effects regression model, with White cross section standard errors & covariance (no d.f. correction) for a robust coefficient covariance to control for cross-section heteroskedasticity. Summary statistics for East Asia and Latin America (full sample), and two subgroups, East Asia and Latin America are presented in Tables 9 - 11.

Table 9 : East Asia and Latin America (Full Sample, 167 Banks) - Descriptive Statistics (%), 2003 – 2008 Period

	ROAA	NIM	EQAS	COST	LNDEP	LOSRES	SIZE	GDP	INF	CON3
Mean	2.73	7.20	12.24	54.83	70.77	4.49	7.84	5.42	7.49	62.79
Median	2.24	5.71	9.75	54.43	70.80	3.51	7.74	5.30	5.66	59.09
Maximum	21.73	47.20	49.41	99.73	199.32	52.38	12.45	18.30	31.09	90.03
Minimum	-8.62	-1.45	3.01	10.65	1.47	0.06	3.04	-7.80	0.99	45.09
Std. Dev.	2.34	5.87	7.28	14.72	28.39	3.84	1.94	3.13	6.22	11.86
Skewness	2.03	2.77	1.75	-0.04	0.37	4.17	0.14	-0.03	2.06	0.38
Kurtosis	14.60	14.41	6.58	3.24	4.18	37.82	2.22	10.89	7.60	2.24
Jarque-Bera	6309	6715	1046	3	81	53523	29	2598	1591	48
Probability	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00
Sum	2739	7213	12261	54941	70916	4498	7856	5426	7510	62917
Sum Sq. Dev.	5476	34523	53010	216804	806998	14767	3768	9797	38678	140696
Observations	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002

ROAA = Return on average assets; NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

Tables 9 showed that in this full sample of 167 banks, the mean return on average assets (ROAA) and net interest margins (NIM) of East Asia and Latin America (full sample) are 2.73% and 7.20% respectively. From the sub-group Tables 10 – 11, the ROAA (3.43%) and NIM (9.65%) mean for Latin America (sub-group) are higher than East Asia (1.93%: 4.40%). Latin America countries have relatively larger spread than East Asia countries. For Latin America, the maximum and minimum NIM is accounted for by a Brazilian bank which recorded a high NIM of 47.20% in 2006, while a bank in Colombia experienced NIM of -1.45% in 2004. Indonesia, in the East Asia region has a bank which showed NIM of 19.32% in 2003 (maximum), and a Thailand bank in 2006 recorded NIM of 0.92% (minimum). As for ROAA, the maximum and minimum are attributed to

Brazilian banks, ROAA of 21.73% is attributed to a Brazilian bank's performance in 2005, and the minimum ROAA of -8.62% to a bank in Brazil in 2007.

Table 10 : East Asia (Sub-group, 78 Banks) - Descriptive Statistics (%), 2003 – 2008 Period

	ROAA	NIM	EQAS	COST	LNDEP	LOSRES	SIZE	GDP	INF	CON3
Mean	1.93	4.40	11.08	49.56	74.70	4.16	8.36	5.27	5.44	55.05
Median	1.68	3.72	8.45	49.22	76.10	3.07	8.55	5.30	4.68	55.99
Maximum	8.28	19.32	46.43	99.73	170.02	52.38	12.38	7.10	13.11	64.65
Minimum	-1.97	0.92	3.24	10.65	1.47	0.74	4.32	2.20	0.99	45.09
Std. Dev.	1.45	2.29	7.16	14.56	25.59	4.17	1.87	1.07	3.42	5.30
Skewness	1.46	2.47	1.71	0.11	-0.02	5.71	-0.04	-1.02	0.81	-0.26
Kurtosis	6.40	12.37	5.88	3.55	4.11	54.28	2.02	4.13	2.67	2.52
Jarque-Bera	391.61	2188.09	388.19	6.96	24.12	53825.15	18.70	106.26	52.90	9.74
Probability	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.01
Sum	905	2060	5188	23193	34961	1945	3911	2467	2548	25762
Sum Sq. Dev.	984	2455	23935	99042	305922	8122	1638	535	5454	13126
Observations	468	468	468	468	468	468	468	468	468	468

ROAA = Return on average assets; NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

The maximum and minimum GDP growth of 18.30% and -7.80% respectively, as shown in Tables 9 - 11 is attributable to the Venezuela economy. Based on World Bank's statistics, Venezuela recorded a negative GDP growth of 7.8% in 2003, and a positive 18.3% in 2004. As for East Asia, the GDP range is narrower, the maximum GDP growth of 7.10% is contributed by Thailand's economic growth in 2003, and the minimum GDP of 2.20% reflect the Korean economy in the year 2008. As for inflation, Venezuela recorded the highest inflation rate of 31.09 in 2003, and the minimum of 0.99% is Malaysia's inflation

rate in the year 2003. Within East Asia, the highest inflation rate is 13.11% (Indonesia, 2006), while in Latin America, the lowest inflation rate is 1.62% (Peru, 2005).

Table 11 : Latin America (Sub-group, 89 Banks) - Descriptive Statistics (%), 2003 – 2008 Period

	ROAA	NIM	EQAS	COST	LNDEP	LOSRES	SIZE	GDP	INF	CON3
Mean	3.43	9.65	13.25	59.45	67.33	4.78	7.39	5.54	9.29	69.58
Median	2.96	8.36	10.92	59.69	65.67	3.88	7.21	5.10	6.60	72.74
Maximum	21.73	47.20	49.41	97.20	199.32	27.51	12.45	18.30	31.09	90.03
Minimum	-8.62	-1.45	3.01	12.75	1.92	0.06	3.04	-7.80	1.62	46.13
Std. Dev.	2.72	6.88	7.24	13.23	30.24	3.50	1.89	4.16	7.44	11.85
Skewness	1.69	2.23	1.89	-0.01	0.68	2.00	0.32	-0.09	1.61	-0.59
Kurtosis	12.59	10.33	7.33	3.20	4.43	9.64	2.54	6.51	4.92	2.73
Jarque-Bera	2299.81	1636.98	735.20	0.92	87.02	1337.81	13.68	274.13	313.71	32.45
Probability	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00
Sum	1834	5153	7073	31748	35955	2553	3946	2959	4961	37155
Sum Sq. Dev.	3931	25195	27910	93336	487524	6547	1896	9243	29535	74895
Observations	534	534	534	534	534	534	534	534	534	534

ROAA = Return on average assets; NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

5.2 MULTICOLLINEARITY

In this study, simple correlation coefficient between explanatory variables is used to test for multicollinearity. Generally, researchers are concerned about multicollinearity if the absolute value of simple correlation coefficients exceeds 0.80 (Studenmund, 2006). Tables 12 - 14 generated with Pairwise Correlation Matrix, available in Eviews 5.1, showed none exceeds 0.80. The highest value is -0.7110, the correlation coefficient between INF and CON3 (Latin America).

Table 12 : East Asia and Latin America (Full Sample, 167 Banks) - Independent Variables Correlation

	EQAS	COST	LNDEP	LOSRES	SIZE	GDP	INF	CON3
EQAS	1							
COST	-0.1852	1						
LNDEP	0.2128	-0.1835	1					
LOSRES	0.2589	0.1300	-0.1191	1				
SIZE	-0.5584	-0.1340	0.0133	-0.0654	1			
GDP	-0.0127	0.0583	-0.0925	-0.0577	-0.1200	1		
INF	0.0566	0.1348	-0.2212	-0.0574	-0.2759	-0.0417	1	
CON3	0.1441	0.2757	0.0562	0.1294	-0.2359	-0.0595	-0.2121	1

Table 13 : East Asia (Sub-group, 78 Banks) - Independent Variables Correlation

	EQAS	COST	LNDEP	LOSRES	SIZE	GDP	INF	CON3
EQAS	1							
COST	-0.3407	1						
LNDEP	0.0613	-0.1585	1					
LOSRES	0.3743	-0.0035	-0.0855	1				
SIZE	-0.6386	0.0046	0.1699	-0.0770	1			
GDP	0.2359	-0.0544	-0.1465	0.2121	-0.2887	1		
INF	0.1992	0.1359	0.0040	-0.1741	-0.4430	0.0460	1	
CON3	0.0214	0.2146	0.1424	-0.0563	-0.2235	-0.2679	0.4551	1

Table 14 : Latin America (Sub-group, 89 Banks) - Independent Variables Correlation

	EQAS	COST	LNDEP	LOSRES	SIZE	GDP	INF	CON3
EQAS	1							
COST	-0.1685	1						
LNDEP	0.3665	-0.1452	1					
LOSRES	0.1249	0.2390	-0.1342	1				
SIZE	-0.4635	-0.1129	-0.1595	-0.0159	1			
GDP	-0.0796	0.0824	-0.0872	-0.1515	-0.0941	1		
INF	-0.0623	-0.0059	-0.2681	-0.0586	-0.1441	-0.0695	1	
CON3	0.0926	0.0544	0.1918	0.1900	-0.0746	-0.0940	-0.7110	1

EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

We provide the result of testing our model first and then proceed to discuss the results.

5.3 TESTING THE MODEL

Our model is estimated using fixed effects regression, and to correct for cross-section heteroskedasticity, with White cross-section standard error (no d.f. correction). Before arriving at the final output, we run some additional test, based on the method in Sen and Oruc (2008). The following show an example, based on the ROAA equation for East Asia and Latin America (full sample of 167 banks).

5.3.1 STEP 1

We first run regression on ROAA for full sample (East Asia and Latin America) without cross-section fixed effects, and found the R^2 and adjusted R^2 to be low. The model only explains 42% of the variation in ROAA.

Dependent Variable: ROAA
Method: Panel Least Squares
Date: 04/23/10 Time: 15:15
Sample: 2003 2008
Cross-sections included: 167
Total panel (balanced) observations: 1002

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.391212	0.671748	0.582378	0.5604
EQAS	0.109495	0.010834	10.10639	0.0000
COST	-0.053012	0.004403	-12.04098	0.0000
LNDEP	9.30E-05	0.002169	0.042894	0.9658
LOSRES	-0.057326	0.016092	-3.562300	0.0004
SIZE	-0.038499	0.039967	-0.963252	0.3357
GDP	0.019402	0.018585	1.043944	0.2968
INF	0.147863	0.010402	14.21477	0.0000
CON3	0.051739	0.005438	9.514805	0.0000

R-squared	0.423728	Mean dependent var	2.733683
Adjusted R-squared	0.419085	S.D. dependent var	2.338838
S.E. of regression	1.782610	Akaike info criterion	4.002976
Sum squared resid	3155.456	Schwarz criterion	4.047076
Log likelihood	-1996.491	F-statistic	91.26801
Durbin-Watson stat	0.812447	Prob(F-statistic)	0.000000

5.3.2 STEP 2

The model is then estimated using fixed effects regression, and the R^2 and adjusted R^2 increased to 0.7347 and 0.6789 respectively.

Dependent Variable: ROAA
Method: Panel Least Squares
Date: 04/23/10 Time: 15:18
Sample: 2003 2008
Cross-sections included: 167
Total panel (balanced) observations: 1002

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.21507	1.618999	9.397823	0.0000
EQAS	0.074609	0.016354	4.562205	0.0000
COST	-0.088273	0.005817	-15.17622	0.0000
LNDEP	-0.002317	0.003536	-0.655255	0.5125

LOSRES	-0.063355	0.018497	-3.425099	0.0006
SIZE	-0.860137	0.111762	-7.696117	0.0000
GDP	-0.001362	0.018511	-0.073586	0.9414
INF	0.045467	0.016409	2.770925	0.0057
CON3	-0.026997	0.017190	-1.570538	0.1167

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.734760	Mean dependent var	2.733683
Adjusted R-squared	0.678953	S.D. dependent var	2.338838
S.E. of regression	1.325209	Akaike info criterion	3.558370
Sum squared resid	1452.359	Schwarz criterion	4.415862
Log likelihood	-1607.743	F-statistic	13.16624
Durbin-Watson stat	1.602291	Prob(F-statistic)	0.000000

5.3.3 STEP 3

We evaluate the model for the statistical significance of the estimated fixed effects using the redundant fixed effects-likelihood ratio. We test the following hypothesis on the fixed effect model:

H_0 = There is no fixed effects

H_1 = Fixed effect

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	5.842013	(166,827)	0.0000
Cross-section Chi-square	777.495395	166	0.0000

We reject the null hypothesis that there is no fixed effects, since the p-value = 0.0000 < 1%.

5.3.4 STEP 4

As the result is significant, we test our model with Hausman test to confirm on the choice between fixed effects and random effects model. We test the following hypothesis on the random effects model:

H_0 = random effects (individual effect uncorrelated)

H_1 = fixed effect

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	100.742450	8	0.0000

As the Chi-Sq value is greater than the critical Chi-Sq value, $\alpha = 0.05$, we reject H_0. The fixed effect model is the correct model.

The last step involve estimating the model with fixed effects and white standard error. The same results (Steps 1 – 4) are obtained when we estimate the model for ROAA sub-groups and for NIM equations.

5.4 FINDINGS AND RESULTS

This section presents the empirical results of the regression, and attempt to answer our research questions:

i) What are the determinants of bank profits and interest margins in East Asia and in Latin America, as a group ?;

ii) What are the determinants of bank profits and interest margins in East Asia and Latin America, as individual regions ?; and

iii) Whether the determinants of bank profits and interest margins in East Asia and Latin America differs ?

Our analysis is based on the following 5 groups:

i) East Asia and Latin America (Full sample, 167 banks) – Bank profits and net interest margins;

ii) East Asia (Sub-group, 78 banks) and Latin America (Sub-group, 89 banks) - Bank profits;

iii) East Asia (Sub-group, 78 banks) and Latin America (Sub-group, 89 banks) – Net interest margins;

iv) East Asia (Full sample, 167 banks) – Robustness checks, Ownership; and

v) East Asia (Full sample, 167 banks) – Robustness checks, Large and Small banks

5.5 EAST ASIA AND LATIN AMERICA (FULL SAMPLE, 167 BANKS) - BANK PROFITS AND NET INTEREST MARGINS

What are the determinants of bank profits and interest margins in East Asia and Latin America as a group?

Table 15 reports the empirical results of our model using ROAA (pre-tax profit/average assets) and NIM (net interest income/earning assets) as the measures of banks performance for the full sample of 167 banks operating in East Asia and Latin America. The explanatory power of the model (adjusted R^2) that examines the determinants of NIM (0.8322) is higher than ROAA (0.6790), while the F-statistics for all models is significant (p-value = 0.0000 < 1%). The determinants of ROAA and NIM are not the same. In particular, we find that inflation (INF) explain ROAA, while LNDEP impact NIM only. EQAS, COST, LOSRES and SIZE impact both equations.

Table 15 : East Asia and Latin America (Full Sample, 167 Banks) - Summary Results for ROAA and NIM

Method: Panel Least Squares
Sample: 2003 - 2008
White cross-section standard errors & covariance (no d.f. correction)

	East Asia And Latin America					
	ROAA	NIM	ROAA		NIM	
C	15.2151*** (4.6549)	20.2536*** (6.1864)	+	***	+	***
EQAS	0.07461*** (0.0250)	0.1414*** (0.03637)	+	***	+	***
COST	-0.0883*** (0.0061)	-0.0718*** (0.0085)	-	***	-	***
LNDEP	-0.0023 (0.0043)	0.0195** (0.0081)			+	**
LOSRES	-0.0634*** (0.0151)	0.0343* (0.0194)	-	***	+	*
SIZE	-0.8601** (0.3106)	-1.2738*** (0.4657)	-	**	-	***
GDP	-0.0014 (0.0226)	-0.1814 (0.1487)				
INF	0.0454*** (0.0143)	0.0636 (0.0547)	+	***		
CON3	-0.0269 (0.0294)	-0.0301 (0.0428)				
N	167	167				
Obs	1002	1002				
R^2	0.7348	0.8613				
Adj R^2	0.6790	0.8322				
F statistics	13.1662	29.5221				
Prob(F-stat)	0.0000	0.0000				

*** denotes significant at the 1% level (two-tailed)
** denotes significant at the 5% level (two-tailed)
* denotes significant at the 10% level (two-tailed)
Standard errors are given in parenthesis

ROAA = Return on average assets; NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

5.5.1 INTERNAL DETERMINANTS

EQAS (ratio of equity to assets) is positively related to the performance of banks (ROAA and NIM) operating in East Asia and Latin America. This result is consistent with the findings of previous studies (Berger, 1995a; Demirguc-Kunt

and Huizinga, 1999; Abreau and Mendes, 2001 and Kosmidou, 2008). This implies that well capitalized banks face lower bankruptcy cost, thus lower cost of funding and higher interest margins on assets. In addition, a bank is more able to achieve increased profitability, when it is in a sound capital position, which allows it to pursue business opportunities more effectively and has more time and flexibility to deal with problems arising from unexpected losses (Athanasoglou et al. (2008).

COST has negative impact on ROAA, which is the expected relationship. Poor management can result in poor profitability. The negative effect reflects banks inefficiency in managing their total cost relative to income. Surprisingly, contrary to previous studies (Demirguc-Kunt and Huizinga, 1999 and Brock and Suarez, 2000), we do not find evidence of the positive relationship between COST and NIM. According to Abreau and Mendes (2001), less efficiency banks (banks with higher operating costs) charge higher interest rates on loans (or pay lower rates on deposits), and these costs are pass to customers. The COST variable has an estimated low coefficient of -0.0718 in the NIM equation. This suggest that the banks may not be entirely transferring their operating cost to their borrowers and depositors, perhaps due to regulatory constraint or increased competition which does not allow banks to overcharge, or simply, the bank's strategy of allowing their good customers more favourable rates. The banks could pass the cost into implicit interest rates or non interest bearing assets.

Concerning **liquidity** (the ratio of net loans to customers and short-term funding, LNDEP), higher figure of LNDEP indicate lower liquidity. LNDEP impact NIM only; relation with NIM is positive and significant, which suggest that banks are able to charge higher interest rates on loans in times of illiquid market condition. We expect a positive relationship between ROAA and LNDEP. Our results however, indicate the relationship between this variable and ROAA to be negative, but not statistically significant (small coefficient of -0.0023). Bourke (1989) found a significant positive relationship between liquidity and bank profitability, contrary to other studies (example, Molyneux and Thornton; 1992). Conventional wisdom is that lower liquidity is associated with higher profitability (positive sign), as liquidity holdings represent a cost to banks.

The impact of loan loss reserves to loans (**LOSRES**) on ROAA is negative; positive and highly significant with NIM, consistent with earlier studies. Studies which support the negative relationship between this variable and ROAA include Kosmidou (2008) findings on the Greece banks during the period of EU financial integration. Kosmidou, Tanna & Pasiouras (2005) find positive relationship between this variable and NIM and suggest that higher risk result in higher margins for UK banks, thereby supporting the risk-return hypothesis. Loan loss reserves is the cumulative stock of loans loss reserves that changes according to the amount of new loan provisions added each year. Banks can use new loan provisions to smooth out profits. During favourable time, when net income and credit quality is high, banks can make higher provision to smooth out the variability of reported income. In this case, when credit quality deteriorate or

during less favourable economic conditions, provisions would not have to increase as high (Kosmidou, 2008). Generally, a higher level of loan provisions suggest poorer credit quality of loan portfolio, which lead to lower profits, as banks need to spend higher on operating cost relating to credit risk and loan management such as credit approval control, foreclosing bad loans, debt recovery expense, and other loan-restructuring expenses (Wong, Fong, Wong and Choi, 2007). An increase in credit risk (or reduction in asset quality) requires higher net interest margins to compensate for the higher risk of default, hence the positive relationship between LOSRES and NIM.

There is an inverse and statistically significant relationship between **SIZE** and ROAA and NIM. This suggest that larger (smaller) banks tend to have lower (higher) profits or margins and support studies that found either economies of scale and scope for smaller banks or diseconomies for larger institutions (Amel, Barnes, Panetta and Salleo, 2004). Our findings is consistent with the result of Ben Naceur and Goaied (2003) study which showed SIZE has negative and significant coefficients on NIM equations, similar to Pasiouras and Kosmidou (2007) findings on negative relationship of size and bank profits on banks in the European Union.

5.5.2 EXTERNAL DETERMINANTS

We now focus on the effects of external determinants on bank's performance. Referring to **Table 15,** our study showed that economic growth (real annual **GDP** growth) is not relevant for both ROAA and NIM. We find support in the findings of Demirguc-Kunt and Huizinga (1999) and Ben Naceur and Goaied (2003), as they reported that growth has no significant impact on ROA and NIM in their studies on banks in 80 countries by the former, and in Tunisia by the later.

There is a positive and significant coefficient on **INF** (inflation) in the ROAA equation but no significant relationship for the NIM equation. This implies that during the period of our study, the region bank's management was able to anticipate the level of inflation, and adjust the interest rates accordingly to have higher profits. The finding on positive correlation between ROAA and INF is consistent with earlier studies (Bourke, 1989; Molyneux and Thornton, 1992 and Athanasoglou et al., 2008). Surprisingly, inflation has no impact on NIM. NIM is a component of bank profits. This may mean that the banks may have gained higher profits from implicit interest rates, fees, or from non interest bearing assets, rather than adjustment through interest bearing assets.

CON3 (the ratio of the three largest banks' assets/total assets) is not significant in this sample of 167 banks operating in East Asia and Latin America. However, if we examine by sub-group, concentration has some relationship with the ROAA

equation of East Asia and Latin America, which we will discuss in the sub-group findings part.

Overall, the model variables generally present the expected sign, except for CON3. From our analysis above, banks characteristics or internal determinants have more influence on ROAA and NIM relative to external factors. Our results show that only bank-level factors have significant impact on NIM.

For robustness, we isolate the effects of external factors and regress ROAA/NIM on internal determinants only, and found the results to be the same Likewise, regressing ROAA/NIM on external factors only produced the same findings. Summary of the results are showed in **Table 16:**

Table 16 : East Asia and Latin America (Full Sample, 167 Banks) - Robustness Check, Isolate Internal and External Factors

Method: Panel Least Squares
Sample: 2003 - 2008
White cross-section standard errors & covariance (no d.f. correction)

Full Sample - East Asia And Latin America

	ROAA			ROAA			ROAA	
C	**+**	***	**C**	**+**	***	**C**	+	**
EQAS	**+**	***	**EQAS**	**+**	***			
COST	**-**	***	**COST**	**-**	***			
LNDEP			**LNDEP**					
LOSRES	**-**	***	**LOSRES**	**-**	***			
SIZE	**-**	**	**SIZE**	**-**	***			
GDP						**GDP**		
INF	**+**	***				**INF**	**+**	**
CON3						**CON3**		
N	167		**N**	167		**N**	167	
R^2	0.7348		**R^2**	0.7304		**R^2**	0.6290	
Adj R^2	0.6790		**Adj R^2**	0.6748		**Adj R^2**	0.5536	
	NIM			**NIM**			**NIM**	
C	**+**	***	**C**	**+**	***	**C**		
EQAS	**+**	***	**EQAS**	**+**	***			
COST	**-**	***	**COST**	**-**	***			
LNDEP	**+**	**	**LNDEP**	**+**	***			
LOSRES	**+**	*	**LOSRES**	**+**	***			
SIZE	**-**	***	**SIZE**	**-**	***			
GDP						**GDP**		
INF						**INF**		
CON3						**CON3**		
N	167		**N**	167		**N**	167	
R^2	0.8613		**R^2**	0.8503		**R^2**	0.8339	
Adj R^2	0.8322		**Adj R^2**	0.8195		**Adj R^2**	0.8001	

*** denotes significant at the 1% level (two-tailed)
** denotes significant at the 5% level (two-tailed)
* denotes significant at the 10% level (two-tailed)

ROAA = Return on average assets; NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

5.6 EAST ASIA (SUB-GROUP, 78 BANKS) & LATIN AMERICA (SUB-GROUP, 89 BANKS) - BANK PROFITS

What are the determinants of bank profits and interest margins in the individual regions of East Asia and Latin America; and whether the determinants of bank profits and interest margins in East Asia and Latin America region differs?

We shall now examine and compare the determinant of banking performance in East Asia region and Latin America region (sub-group). We first discuss on ROAA **(Table 17)** before moving to NIM.

The explanatory power of the model is much higher for East Asia than Latin America. The adjusted R^2 for East Asia equal to 0.8556 compare with 0.6269 for Latin America. The lower explanatory power for Latin America implies that there may be additional factors which influence the profitability of banks. In addition, it may have contributed to the overall lower adjusted R^2 of 0.6790 for ROAA equation in the full sample (Table 15).

For both East Asia and Latin America, four explanatory variables (out of eight explanatory variables) have impact on ROAA. The independent variables, EQAS, COST, LOSRES and INF effect the ROAA of both regions, with same signs. We found SIZE to have relationship with the ROAA of Latin America only, while GDP are relevant for explaining the ROAA of East Asia only. CON3 impact the ROAA of both East Asia and Latin America, although with different signs.

We shall now discuss in more detail. EQAS and INF have positive impact on the ROAA of operations of banks in East Asia and Latin America, while COST and LOSRES, negative relationship, as expected. When we examine the estimated coefficients, we find EQAS has stronger positive impact on the ROAA for East Asia. The estimated coefficient of EQAS in the ROAA equation of East Asia is 0.1407, higher than the estimated coefficient of 0.0480 in the ROAA equation of Latin America.

Of the two macroeconomics variables used, only INF has impact on the ROAA of East Asia and Latin America, while GDP influence positively the ROA of East Asia only, supporting the literature on the association between economic growth and the financial sector performance The estimated coefficient of INF in the ROAA equation of Latin America is higher at 0.0489 (East Asia: 0.0273). It is interesting to note the positive relationship of the INF variable in the ROAA equation for East Asia and Latin America. This would suggest that banks management in these two regions anticipate inflation and are able to somewhat forecast future inflation, which in turn implies that interest rates have been appropriately adjusted to achieve higher profits.

COST and LOSRES have stronger negative relationship with the ROAA of Latin America. In the ROAA equation for Latin America, COST and LOSRES have estimated coefficient of -0.1074 (East Asia:-0.0427) and -0.1466 (East Asia:-0.0362) respectively.

Turning now to the other variables, the coefficient of SIZE variable is highly negative and significant for Latin America but not relevant for East Asia. The negative coefficient suggests that larger banks in Latin America tend to have lower margins and is consistent with models that emphasis the negative role of size arising from scale inefficiencies.

The CON3 ratios reflect the oligopolistic structure of the market. We find a positive and statistically significant relationship between concentration, as measured by CON3, and the ROAA in East Asia. This finding is supported by earlier studies (Short, 1979; Bourke, 1989; Molyneux & Thornton, 1992 and Demirguc-Kunt and Huizinga, 1999). In contrast, CON3 enter the equation negatively for the ROAA in Latin America, consistent with Park and Weber (2006). Berger (1995b) finds that concentration is usually negatively related to profitability once the other variables are controlled for in the equation and state that the profit-concentration relationship is a spurious one, created by correlations with other variables. Alternatively, the negative coefficient (-0.0825) could also implies that concentration is not beneficial in terms of banks profitability for Latin America banks.

Table 17 : East Asia (Sub-group, 78 Banks) & Latin America (Sub-group, 89 Banks) – Summary Results for ROAA

Method: Panel Least Squares
Sample: 2003 - 2008
White cross-section standard errors & covariance (no d.f. correction)

	Return On Average Assets					
	EA	LA	East Asia		Latin America	
C	-2.0473*	23.8043***	-	*	+	***
	(1.2095)	(4.8431)				
EQAS	0.1407***	0.0480**	+	***	+	**
	(0.0179)	(0.0222)				
COST	-0.0427***	-0.1074***	-	***	-	***
	(0.0028)	(0.0074)				
LNDEP	0.0044	-0.0055				
	(0.0036)	(0.0077)				
LOSRES	-0.0362***	-0.1466**	-	***	-	**
	(0.0112)	(0.0584)				
SIZE	-0.0462	-1.1031***			-	***
	(0.0432)	(0.3568)				
GDP	0.1382***	-0.0201	+	***		
	(0.0219)	(0.0308)				
INF	0.0273***	0.0489**	+	***	+	**
	(0.0096)	(0.0233)				
CON3	0.0702***	-0.0825***	+	***	-	***
	(0.0112)	(0.0315)				
N	78	89				
Obs	468	534				
R^2	0.8819	0.6941				
Adj R^2	0.8556	0.6269				
F statistics	33.5520	10.3284				
Prob(F-stat)	0.0000	0.0000				

*** denotes significant at the 1% level (two-tailed)
** denotes significant at the 5% level (two-tailed)
* denotes significant at the 10% level (two-tailed)
Standard errors are given in parenthesis
A = East Asia
LA = Latin America

ROAA = Return on average assets; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

In conclusion, there are common explanatory variables (EQAS, COST, and LOSRES & INF) which impact both the ROAA in East Asia and Latin America, although the strength of the coefficients and significant level for these variables may vary. There are also explanatory variables which impact only a particular region (SIZE in Latin America, GDP in East Asia), and variables (CON3) which influence banks profits in both regions but in different sign.

5.7 EAST ASIA (SUB-GROUP, 78 BANKS) AND LATIN AMERICA (SUB-GROUP, 89 BANKS) - NET INTEREST MARGINS

We shall now touch on net interest margin of the sub-group, highlighting only the more relevant points. In our results, the two macroeconomic indicators (GDP and INF) and CON3 do not seem to be statistically significant in explaining the net interest margin equation for East Asia and Latin America region. Rather, 84% (R^2) of the variation in the NIM equation for East Asia and 79% of the variation in the NIM equation for Latin America are explained by internal factors, which are within the banks management control (**Table 18).**

Among the banks characteristics, EQAS and COST variables effect banks spreads in both regions (+ for EQAS and – for COST). In Brock and Suarez (2000) and Martinez and Mody (2004) studies on interest rate spreads in selected Latin America countries during the mid-1990s and late 1990s respectively, operating cost are positively related to spreads. Our study

conducted for the period 2003 -2008, show negative relationship between COST and net interest margins for banks in Latin America.

Table 18 : East Asia (Sub-group, 78 Banks) & Latin America (Sub-group, 89 Banks) - Summary Results for NIM

Method: Panel Least Squares
Sample: 2003 – 2008
White cross-section standard errors & covariance (no d.f. correction)

	NET INTEREST MARGINS					
	EA	LA	East Asia		Latin America	
C	5.8480***	23.4079***	+	***	+	***
	(1.4757)	(8.7116)				
EQAS	0.1205***	0.1414***	+	***	+	***
	(0.0311)	(0.0439)				
COST	-0.0150**	-0.1042***	-	***	-	***
	(0.0058)	(0.0094)				
LNDEP	0.0099***	0.0296***	+	***	+	***
	(0.0033)	(0.0113)				
LOSRES	-0.0250	0.1521*			+	*
	(0.0191)	(0.0784)				
SIZE	-0.3124**	-1.5926***	-	**	-	***
	(0.1549)	(0.4462)				
GDP	-0.0149	-0.1767				
	(0.0283)	(0.1507)				
INF	0.0126	0.0343				
	(0.0249)	(0.0699)				
CON3	-0.0011	0.0038				
	(0.0183)	(0.0861)				
N	78	89	*** denotes significant at the 1% level (two-tailed)			
Obs	468	534	** denotes significant at the 5% level (two-tailed)			
R^2	0.8691	0.8313	* denotes significant at the 10% level (two-tailed)			
Adj R^2	0.8400	0.7942	Standard errors are given in parenthesis			
F statistics	29.8474	22.4288	EA = East Asia			
Prob(F-stat)	0.0000	0.0000	LA = Latin America			

NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

LNDEP ratio (liquidity) is positive and statistically significant in both NIM equations. However, the estimated coefficient of LNDEP in the NIM equation for East Asia is small at 0.0099 compared with the higher estimated coefficient of 0.0296 for NIM equation in Latin America. The ratio of the LOSRES in the NIM equation for Latin America has a highly significant coefficient of 0.1521 and this may suggest risky loans which necessitate higher net interest margins to compensate for higher risk of default. SIZE variable has a negative relationship with NIM for both regions, which suggest scale inefficiencies.

In conclusion, only internal factors impact NIM for both regions. EQAS, COST, LNDEP and SIZE are the common explanatory variables for banks in East Asia and Latin America, while LOSRES impact only the NIM of banks in Latin America.

From the above analysis, only EQAS and COST effect both ROAA equations in East Asia and Latin America and like wise, the NIM equations in East Asia and Latin America. We summarized the results of both ROAA and NIM (sub-groups) in **Table 19.**

Table 19 : East Asia (Sub-group, 78 Banks) & Latin America (Sub-group, 89 Banks) – Summary Results for ROAA and NIM

Method: Panel Least Squares Sample: 2003 - 2008 White cross-section standard errors & covariance (no d.f. correction)								
	RETURN ON AVERAGE ASSETS				**NET INTEREST MARGIN**			
	East Asia		**Latin America**		**East Asia**		**Latin America**	
C	-	*	+	***	+	***	+	***
EQAS	+	***	+	**	+	***	+	***
COST	-	***	-	***	-	***	-	***
LNDEP					+	***	+	***
LOSRES	-	***	-	**			+	*
SIZE			-	***	-	**	-	***
GDP	+	***						
INF	+	***	+	**				
CON3	+	***	-	***				
N	78		89		78		89	
Obs	468		534		468		534	
R^2	0.8819		0.6941		0.8691		0.8313	
Adj R^2	0.8556		0.6269		0.8400		0.7942	
F statistics	33.5520		10.3284		29.8474		22.4288	
Prob(F-stat)	0.0000		0.0000		0.0000		0.0000	
*** denotes significant at the 1% level (two-tailed) ** denotes significant at the 5% level (two-tailed) * denotes significant at the 10% level (two-tailed)								
ROAA = Return on average assets; NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample								

5.8 SUMMARY AND DISCUSSION OF FINDINGS

We post eight hypotheses at the beginning of this paper, and based on the results discussed earlier, will now attempt to answer them.

H1 = Capital adequacy has no statistical significant relationship with banks performance

Capital adequacy is an important determinant of bank profits and interest margin, as it has significant positive impact in all the three groups, namely, the full sample (East Asia and Latin America) and the sub-groups of East Asia and Latin America. The impact of EQAS on bank profits is higher for banks in East Asia, as the estimated coefficient is 0.1407, compared with 0.0480 in Latin America, 0.0480. This implies that for every 1 percentage point increase in capital, banks in East Asia is able to enjoy higher banks performance than their counter-part in Latin America. This result is consistent with previous studies (Bourke, 1989; Demirguc-Kunt and Huizinga, 1999; Demirguc-Kunt et al., 2004; Abreau and Mendes, 2001 and Kosmidou, 2008).

H2 = Management efficiency/expense management has no statistical significant relationship with banks performance

COST is another important variable which impact banks performance. The sign is negative for all three groups, with COST having a greater impact on the ROAA of Latin America (high estimated coefficient of -1.074 compared with -0.0427 for East Asia). By improving on efficiency, thereby reducing COST, banks in both

regions, especially Latin America should be able to achieve higher profits. The negative relationship between COST and NIM for all three groups implies that banks may not be able to entirely transfer their cost to their customers, perhaps due to administrative rules imposed by their regulators, market competition or simply, the bank's strategy of allowing their good customers more favourable rates. The banks could pass the cost into implicit interest rates, fees, or for example, non interest bearing assets. The negative relationship between bank profits and COST is consistent with Bourke (1989), Abreau and Mendes (2001) and Athanasoglou et al. (2008). The negative correlation between interest margins and COST is not consistent with previous studies of positive relationship (Barajas et al., 1999; Demirguc-Kunt and Huizinga, 1999; Brock and Suarez, 2000; Abreau and Mendes, 2001 and Ben Naceur and Goaied, 2003).

H3 = Liquidity has no statistical significant relationship with banks performance

In our study, a higher LNDEP (the ratio of net loans to customers and short-term funding) reflect lower liquidity. LNDEP effect positively the net interest margin of banks in East Asia and Latin America. This suggest that banks are able to impose higher lending rates to borrowers in times of illiquid market conditions. In our study, there is no relationship between liquidity and bank profits. Results of previous studies (Molyneux & Thornton, 1992; Pasiouras & Kosmidou, 2007 and Kosmidou, 2008), show that the higher the liquidity, the lower the profits, while

Bourke (1989) found a significant positive relationship between liquidity and bank profitability.

H4 = Credit/asset quality has no statistical significant relationship with banks performance

Credit or Asset quality is an important determinant which influences banks performance in Latin America. Overall, for the full sample, credit risk is negatively related to ROAA, while there is a positive relation with NIM. For the sub-group, this relationship still holds, except the NIM for East Asia (no significant relationship). The estimated coefficient of LOSRES for Latin America in the ROAA (-0.1466) and NIM equation (0.1521) is much higher than the estimated -0.0362 in the ROAA equation for East Asia (NIM, -0.0250, not significant). This implies that banks in Latin America has higher level of loan provisions, which suggest poorer credit quality of loan portfolio, which lead to poorer profits. An increase in credit risk (or reduction in asset quality) requires higher net interest margins to compensate for the higher risk of default. For bank profits, the negative correlation result is consistent with Kosmidou (2008) and Athanasoglou et al. (2008), and for interest margins, the positive relationship is consistent with Angbazo (1997) and Kosmidou, Tanna & Pasiouras (2005).

H5 = Size has no statistical significant relationship with banks performance

SIZE does not have any impact on the ROAA equation for East Asia. SIZE impacts negatively the ROAA and NIM equations in Latin America, and the full

sample. It implies diseconomies of scale for the larger institutions operating in Latin America. SIZE negative relationship with profit is consistent with Kosmidou, Tanna, Pasiouras (2005); Pasiouras & Kosmidou (2007) studies, while the negative relationship with interest margins is consistent with Ben Naceur and Goaeid (2003) findings.

H6 = Economic activity has no statistical significant relationship with banks performance

Our results show that economic activity affect the profit of banks operating in East Asia only, which is consistent with the findings of Biker and Hu (2002) and Kosmidou (2008). There is no relationship between this variable and bank profits in Latin America, and the interest margins of banks in East Asia and Latin America, consistent with Demirguc-Kunt and Huizinga (1999) and Ben Naceur and Goaied (2003) findings.

H7 = Inflation has no statistical significant relationship with banks performance

Inflation has positive impact on ROAA and no relationship with NIM equations, for all three groups. The significant impact on ROAA suggests that during the period of our study, the region bank's management were able to anticipate the level of inflation, and adjust their rates accordingly to have higher profits. However, surprisingly, inflation has no impact on NIM. This may mean that the banks may have gain higher profits from implicit interest rates, fees, for example, or other non interest bearing assets, rather than adjustment through interest bearing

assets. The positive impact of inflation on profit is consistent with the studies of Bourke (1989), Molyneux and Thornton (1992), Demirguc-Kunt & Huizinga (1999); Biker and Hu (2002); and Athanasoglou et al. (2008). The insignificant impact of inflation on net interest margin is not consistent with previous studies of positive (Demirguc-Kunt & Huizinga, 1999) or negative correlation (Abreau and Mendes, 2001).

H8 = Concentration has no statistical significant relationship with banks performance

Concentration has positive effect on the ROAA equation of East Asia, which is consistent with previous research findings (Short, 1979; Bourke, 1989; Molyneux & Thornton, 1992 and Demirguc-Kunt and Huizinga, 1999). The positive relationship may mean that there is lack of competition in banks operating in East Asia, which allows these banks to achieve higher profits. The negative concentration effect on the ROAA equation of Latin America is consistent with Park and Weber (2006) findings. Concentration for Latin America does not seem to bring any benefit, which suggests that the banks in Latin America should focus on efficiency. In the full sample, concentration is not significant in the ROAA equation, which may be caused by the opposite signs in ROAA of East Asia and Latin America. There is no relationship between concentration and NIM for all three groups.

5.9 ROBUSTNESS CHECK

In this session, we test the robustness of the model based on ownership structure and large and small banks.

5.9.1 EAST ASIA AND LATIN AMERICA (FULL SAMPLE, 167 BANKS) - ROBUSTNESS CHECK, OWNERSHIP

With financial liberalization, regulators in most countries have relaxed restriction on foreign ownership during the last few years. As such, it would be beneficial to examine whether the internal and external determinants of domestic and foreign banks are different. The foreign ownership dummy variable equals to 1 if at least 50% of the shares is in foreign hands and equals 0 if otherwise (Demirguc-Kunt and Huizinga, 1999), and according to the authors, foreign banks in developing economies realized higher interest margin and profits.

Based on this criterion, we generated a list of foreign owned banks from Bankscope and identify and match each of these foreign-owned banks against the full sample of 167 banks. The full sample is divided into two sub-groups of locally-owned banks (73 banks) and foreign-owned banks (94). CON3, based on total assets, is recalculated for each of the sub-group. .

The explanatory power (adjusted R^2) of the ROAA model for locally (0.6737) and foreign-owned banks (0.7076) are quite close. For the NIM equation, the adjusted R^2 for foreign-owned banks are much higher (0.8811) compared with

0.7770 for locally-owned banks. F-statistics for all four models is significant at the 1% level **(Table 20 & 21).**

Equity to assets (EQAS) ratio is positively related to NIM, whether we examine locally or foreign-owned banks, but is only positively related to ROAA for locally-owned banks. Capital strength is the main determinants of ROAA for locally-owned banks, as the relatively high significant coefficients (0.1201) indicate. EQAS do not have a relationship with the ROAA of foreign-owned banks, which do not seem to be consistent with earlier findings (Berger, 19959(a); Demirguc-Kunt & Huizinga, 1999; Abreu & Mendes, 2001). However, when we drop SIZE variable (which has a highly negative coefficient) from the ROAA equation for foreign-owned banks, EQAS enter the equation positively and is significant at the 1% level. The coefficient of COST is negative for both locally and foreign-owned banks in the ROAA and NIM equations. As for LNDEP, the variable is significant and has a positive sign for the NIM of foreign-owned banks only.

As for external factors, inflation impact positively both the ROAA and NIM equations of foreign owned banks. No significant impact for locally owned banks for both ROAA and NIM equation. This may mean that foreign owned banks may have more research and analytical capabilities, backed by parent company abroad, to anticipate inflation, and adjust rates accordingly, to gain higher profits. GDP growth has positive impact on ROAA of locally owned banks only, and concentration negatively impact the ROAA and NIM of locally owned banks only.

We now compare the full sample of 167 banks with locally owned and foreign owned banks and suggest that the model is a reliable model, as the results are somewhat consistent with the full sample results.

For the ROAA equation in the full sample, EQAS (+), COST (-), LOSRES (-), SIZE (-) and INF (+) have significant relation with ROAA. The determinants for bank profits in the foreign owned banks are the same (with same sign as well) with the full sample, except that EQAS is not significant for foreign owned banks. As for the locally owned banks, EQAS, COST and LOSRES variables are consistent with the full sample. GDP and CON effect the ROAA of locally owned banks but not SIZE and INF (which impact the ROAA in full sample).

EQAS (+), COST (-), LNDEP (+), LOSRES (+) and SIZE (-) are the variables that influence the NIM of the full sample. All the five independent variables in full sample are applicable also to the NIM of foreign owned banks. However, for the NIM in foreign owned banks, there is an additional INF variable which impact NIM. EQAS, COST and SIZE which impact the NIM equation in full sample, are also variables which influence locally owned banks. SIZE negatively impacts the NIM equation in locally owned banks, while LNDEP and LOSRES are not significant.

Table 20 : East Asia and Latin America (Full Sample, 167 Banks) – Robustness Check, Ownership

Method: Panel Least Squares
Sample: 2003 - 2008
White cross-section standard errors & covariance (no d.f. correction)

	ROAA		NIM	
	Local	**Foreign**	**Local**	**Foreign**
C	17.7346***	16.8113***	33.1579***	15.9658***
	(6.4736)	(2.7107)	(3.5577)	(4.2164)
EQAS	0.1202***	0.037885	0.1752***	0.1139***
	(0.0327)	(0.0295)	(0.0561)	(0.0366)
COST	-0.0749***	-0.0983***	-0.0601	-0.0775***
	(0.0126)	(0.0045)	(0.0156)	(0.0118)
LNDEP	-0.002797	-0.002683	0.023	0.0165***
	(0.0112)	(0.0031)	(0.0172)	(0.0061)
LOSRES	-0.0237*	-0.1212***	0.0035	0.0613**
	(0.0131)	(0.0449)	(0.0526)	(0.0295)
SIZE	-0.428407	-1.2037***	-1.6046***	-0.9912*
	(0.3824)	(0.2618)	(0.3449)	0.531372
GDP	0.0414*	0.00081	-0.1558	-0.1429
	(0.0228)	(0.0242)	(0.1681)	(0.1181)
INF	0.030568	0.0777***	0.0617	0.0813**
	(0.0232)	(0.0149)	(0.0789)	(0.0372)
CON3	-0.1065**	-0.0016	-0.1507**	-0.0010
	(-0.0449)	(0.0038)	(0.0635)	(0.0131)
N	73	94	73	94
Obs	438	564	483	564
R^2	0.7335	0.7601	0.8179	0.9024
Adj R^2	0.6737	0.7076	0.7770	0.8811
F statistics	12.2792	14.4902	20.0367	42.3161
Prob(F-stat)	0.0000	0.0000	0.0000	0.0000

A bank is classified as foreign-owned if 50% or more are owned by foreign residents
*** denotes significant at the 1% level (two-tailed)
** denotes significant at the 5% level (two-tailed)
* denotes significant at the 10% level (two-tailed)
Standard errors are given in parenthesis

ROAA = Return on average assets; NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

Table 21 : East Asia and Latin America (Full Sample, 167 Banks) – Robustness Check, Ownership (Sign/Significant Level)

Method: Panel Least Squares
Sample:2003 - 2008
White cross-section standard errors & covariance (no d.f. correction)

	ROAA Local		ROAA Foreign		NIM Local		NIM Foreign	
C	+	***	+	***	+	***	+	***
EQAS	+	***			+	***	+	***
COST	-	***	-	***	-	***	-	***
LNDEP							+	***
LOSRES	-	*	-	***			+	**
SIZE			-	***	-	***	-	*
GDP	+	*						
INF			+	***			+	**
CON3	-	**			-	**		
N	73		94		73		94	
Obs	438		564		483		564	
R^2	0.7335		0.7601		0.8179		0.9024	
Adj R^2	0.6737		0.7076		0.7770		0.8811	
F statistics	12.2792		14.4902		20.0367		42.3161	
Prob(F-stat)	0.0000		0.0000		0.0000		0.0000	

A bank is classified as foreign-owned if 50% or more are owned by foreign residents
*** denotes significant at the 1% level (two-tailed)
** denotes significant at the 5% level (two-tailed)
* denotes significant at the 10% level (two-tailed)
Standard errors are given in parenthesis

ROAA = Return on average assets; NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

5.9.2 EAST ASIA AND LATIN AMERICA (FULL SAMPLE, 167 BANKS) – ROBUSTNESS CHECK, LARGE AND SMALL BANKS

In determining whether a bank is large or small, we adopt the criteria in Allen and Raj (1996) study on banking operational efficiency. Banks are classified as "large" if their asset size for any given year falls above the median for all banks in their country. All other banks are considered "small". Based on this criterion, the full sample is divided into two sub-groups of large and small banks. There are 90 banks in the large bank group, with average asset of US$22,851 million and median of US$8,389 million. In comparison, the small bank group comprises of 77 small banks with average assets of US$2,457 million and median of US$594 million. CON3 is recalculated for these two sub-groups.

The explanatory power (adjusted R^2) of the ROAA model for the large group banks is 0.7596, higher than the 0.6604 recorded for the small group banks. As for the NIM equation, the adjusted R^2 for the two sub-groups are quite close, 0.8013 for large bank group and 0.8479 for the small bank group. F-statistics for all models is significant at the 1% level **(Table 22 & 23).**

The independent variable that effect the ROAA of the large group banks are EQAS, COST, LNDEP, LOSRES, SIZE and INF, while COST, SIZE and CON3 have effect on the ROA of small group banks. The sign for COST and SIZE for both sub-groups are the same, i.e. negative significant relationship. The negative coefficient in SIZE for the large group banks indicate that as size

increased, banks tend to earn lower profits, reflecting diseconomies of scale for larger banks. Similarly, the significant negative effect on small group banks suggest also that as the small banks grow larger, or as size increase, there would be scale inefficiencies for the small group banks. LNDEP and LOSRES have significant negative impact on profits, while INF positively effect the ROAA of large group banks.

We now turn to the NIM for the large and small bank groups. EQAS (positive relationship) and COST (negative) influence NIM in both sub-groups. LNDEP has a positive significant relationship with the NIM of large group banks, while the relationship with SIZE is negative. As for the small group banks, LOSRES correlates positively, while CON3 negatively. The positive significant relationship of LOSRES with NIM could indicate that smaller banks may be at a disadvantage in terms of "good" customer base relative to the larger banks. As such, the credit risk may be higher, requiring higher net interest to compensate for higher risk of default.

We now compare the full sample of 167 banks with large and small banks sub-groups, and again suggest that the model is reliable as the results are somewhat consistent with full sample results.

For the ROAA equation in the full sample, EQAS (+), COST (-), LOSRES (-), SIZE (-) and INF (+) have significant relation with ROAA. The determinants for bank profits in the large group banks are the same (with same sign as well) with

the full sample, except for the extra explanatory LNDEP variable in the sub-group. Only COST and SIZE are the same for both small group banks and the full sample.

EQAS (+), COST (-), LNDEP (+), LOSRES (+) and SIZE (-) are the variables that impact the NIM of the full sample. Except for LOSRES, the other four independent variables also influence the NIM in the large bank group. EQAS, COST and LOSRES have relationship with the NIM in both small group banks and the full sample.

Table 22 : East Asia and Latin America (Full Sample, 167 Banks) – Robustness Check, Large and Small Banks

Method: Panel Least Squares
Sample: 2003 - 2008
White cross-section standard errors & covariance (no d.f. correction)

	ROAA		NIM	
	Large	**Small**	**Large**	**Small**
C	10.8000***	18.0413***	20.2217***	24.7883***
	(3.3129)	(3.7903)	(3.8932)	(4.6485)
EQAS	0.2113***	0.0354***	0.2889***	0.1099***
	(0.0213)	(0.0337)	(0.0541)	(0.0269)
COST	-0.0792***	-0.0967***	-0.0737***	-0.0713***
	(0.0040)	(0.0094)	(0.0112)	(0.0120)
LNDEP	-0.0114***	0.0023	0.0185***	0.0229
	(0.0031)	(0.0077)	(0.0071)	(0.0104)
LOSRES	-0.1325***	-0.0233	-0.0645	0.0901***
	(0.0188)	(0.0143)	(0.0707)	(0.0175)
SIZE	-0.6494**	-0.8463***	-1.6813***	-0.6683
	(0.2688)	(0.2965)	(0.3731)	(0.4165)
GDP	0.0158	-0.0326	-0.173068	-0.1972
	(0.0138)	(0.0400)	(0.1542)	(0.1455)
INF	0.0327**	0.0452	0.101946	-0.0055
	(0.0150)	(0.0399)	(0.0714)	(0.0480)
CON3	0.0124	-0.0791***	0.02405	-0.1779***
	(0.0146)	(0.0226)	(0.0253)	(0.0324)
N	90	77	90	77
Obs	540	462	540	462
R sq	0.8029	0.7223	0.8371	0.8756
Adj R sq	0.7596	0.6604	0.8013	0.8479
F statistics	18.5585	11.6713	23.4140	31.6024
Prob(F-stat)	0.0000	0.0000	0.0000	0.0000

Banks are large, if their assets size fall above the median for all banks in a particular country

*** denotes significant at the 1% level (two-tailed)

** denotes significant at the 5% level (two-tailed)

* denotes significant at the 10% level (two-tailed)

Standard errors are given in parenthesis

ROAA = Return on average assets; NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

Table 23 : East Asia and Latin America (Full Sample, 167 Banks) – Robustness Check, Large and Small Banks (Sign/Significant Level)

Method: Panel Least Squares
Sample:2003 - 2008
White cross-section standard errors & covariance (no d.f. correction)

	ROAA		ROAA		NIM		NIM	
	Large		Small		Large		Small	
C	+	***	+	***	+	***	+	***
EQAS	+	***			+	***	+	***
COST	-	***	-	***	-	***	-	***
LNDEP	-	***			+	***		
LOSRES	-	***					+	***
SIZE	-	**	-	***	-	***		
GDP								
INF	+	**						
CON3			-	***			-	***
N	90		77		90		77	
Obs	540		462		540		462	
R sq	0.8029		0.7223		0.8371		0.8756	
Adj R sq	0.7596		0.6604		0.8013		0.8479	
F statistics	18.5585		11.6713		23.4140		31.6024	
Prob(F-stat)	0.0000		0.0000		0.0000		0.0000	

Banks are large, if their assets size fall above the median for all banks in a particular country
*** denotes significant at the 1% level (two-tailed)
** denotes significant at the 5% level (two-tailed)
* denotes significant at the 10% level (two-tailed)
Standard errors are given in parenthesis

ROAA = Return on average assets; NIM = Net interest margins; EQAS = Equity/Total Assets; COST = Cost/Income; LNDEP = Net Loans/Customers and Short-term funding; LOSRES = Loan loss reserves/Gross loans; SIZE = LNSIZE; GDP = Real gross domestic product annual growth rate; INF = Inflation; CON3 = Assets of 3 largest banks/assets of all banks in sample

5.10 CHAPTER SUMMARY

Bank characteristics or internal determinants have more influence on ROAA and NIM of banks operating in East Asia and Latin America, relative to external factors. In the full sample, EQAS, COST, SIZE and LOSRES effect both the ROAA and NIM equations, while LNDEP and INF influence NIM and ROAA respectively. External factors do not influence the NIM equations in the full and sub-group samples.

For ROAA on East Asia and Latin America sub-groups, EQAS, COST, LOSRES & INF are the common variables which effect both the ROAA in East Asia and Latin America, though the strength of the coefficients and significant level for these variables may vary. There are also explanatory variables which effect only a particular region (SIZE in Latin America, GDP in East Asia), and variables (CON3) which effect both regions but in different sign. For NIM on East Asia and Latin America sub-groups, EQAS, COST, LNDEP and SIZE are the common explanatory variables for banks in East Asia and Latin America, while LOSRES impact only the NIM of banks in Latin America.

From the above analysis, it is clear that there are determinants of bank profits in East Asia and Latin America which are common to both regions, and determinants which are unique to that particular region only. This applies also to the determinants of net interest margin in East Asia and Latin America, some independent variables are common to both regions, while there are also

explanatory variables unique to the region. Only EQAS and COST effect both ROAA and NIM equations in East Asia and Latin America. We summarized the results of both ROAA and NIM (sub-groups) in Table 19.