

What is the Key for Sustainable Development in the Banking Sector for Latin American Emerging Countries?

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ABSTRACT

What is the Key for Sustainable Development in the Banking Sector for Latin American Emerging Countries?: The objective of this study is to analyze the effectiveness of financial reform policies. We examine six Latin American emerging financial markets (Argentina, Brazil, Chile, Colombia, Mexico and Peru), and four Asian countries (South Korea, Indonesia, Thailand, and Malaysia) that introduced substantial financial reforms after the Asian financial crisis and compared them to assess the effectiveness of the reforms and make some policy suggestions for emerging Latin American financial markets. We perform an ordinary least squares analysis and compare the market performance of financial institutions in the four Asian countries with that of other emerging markets. A set of panel data was constructed for the period from 2011 to 2018. Our primary findings include: (i) the financial reform measures suggested by the IMF resulted in significantly better financial management efficiency in the four Asian countries targeted in this study than in other countries with emerging markets; (ii) the effects of the financial reform measures are continuous, and even today, the financial management efficiency of these four Asian countries remains comparatively sound.

Keywords: Financial reforms, Asian financial crisis, Panel data, Latin American emerging financial markets

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INTRODUCTION

According to an analysis conducted by the IMF, banking system fragility is one of the primary causes of financial crises. The IMF thus requires that nations going through a financial crisis introduce financial reform as one of their main loan conditions. Various nations have become aware that their banking systems are facing issues such as too many banks, deteriorating credit quality, relatively high non-performing loan ratios, reduced bank profitability, inadequate disclosure of financial information, and lack of financial supervision.

First of all, we collected some financial information what they faced by six Latin America emerging financial markets (Argentina¹, Brazil², Chile³, Colombia⁴, Mexico⁵ and Peru⁶), which governments have sought to examine the problems in the operations and designs of their banking systems, worked to solve the problems faced by domestic banks, improved their management efficiency, enhanced bank competitiveness, and enabled the financial system to coordinate with what is needed for economic development in order to become a driving force of economic development.

Meanwhile, we examined four Asian countries (South Korea, Indonesia, Thailand, and Malaysia) that introduced substantial financial reforms after the Asian financial crisis and compared them to assess the effectiveness of the reforms and making some policy suggestions to Latin-emerging financial markets. The main financial reform measures adopted by Asian countries were as follows: (i) Promotion of mergers and acquisitions of financial institutions; (ii) Accelerate the processing of problematic financial institutions; (iii) Reduction of non-performing loan ratios of banks; (iv) Enhance financial supervision.

LITERATURE REVIEW

Hardy and Pazarbasioglu (1999) obtained samples from 50 countries from the period between 1980 and 1997, 38 of which had gone through a total of 43 banking crises. Using a multinomial logit model, they investigated whether any macroeconomic or financial variables could serve as leading indicators of banking crises and whether the causes of the Asian financial crisis in 1997 were any different from those of other financial crises. They divided the possible leading indicator variables into three groups, namely real sector variables, banking sector variables,

and potential shock variables, and the time periods into the pre-crisis year and the crisis year. The empirical results indicated the following: (1) declines in GDP growth rates play an important role during financial crises but cannot indicate that a banking system is under stress before a crisis arises; (2) during the Asian banking crisis in 1997, the proportions of the real effective exchange rate and gross foreign liabilities with regard to the GDP had a significant correlation, and it is worth noting that these two variables did not have a significant impact on banking crises in other regions; (3) the occurrence of banking crises is associated with real GDP growth declines, the boom and bust of inflation, credit expansion, increased real interest rates, decreased incremental capital-output ratios, steep drops in real exchange rates, and adverse trade shocks in the same year. Furthermore, characteristics specific to a country or region should also be taken into consideration.

Demirgüç-Kunt and Detragiache (1998) examined the possible leading factors of banking crises using 65 countries over the period from 1980 to 1994, in which of 29 of the developed or developing countries had suffered from a total of 31 banking crises. They defined a banking crisis as (a) a banking system with a non-performing ratio exceeding 10%, (b) the bailout cost for banks exceeding 2% of the GDP, (c) issues in the banking sector causing banks to be nationalized on a large scale, and (d) numerous cases of bank runs, emergency measures such as deposit freezes or prolonged holidays in banks, or deposit guarantees offered by the government. Based on banking crisis theories and the availability of variables, they divided the explanatory variables into macro variables, financial variables, and institutional variables. Their empirical results indicated that (1) banking crises tend to occur when the macroeconomic environment is fragile, and particularly when GDP growth rates are low; (2) increased risk in the banking sector may arise from the high inflation caused by high real interest rates; (3) the presence of deposit insurance increases the systematic risk in banks; (4) some empirical data showed that a higher degree of financial liberalization tends to increase the likelihood of banking crises; and (5) the entry of foreign banks is beneficial because they increase competition.

Bongini, Claessens, and Ferri (2001) investigated 238 financial institutions in five countries in East Asia in 1996, including South Korea, Malaysia, Thailand, the Philippines, and Indonesia. The proxy variables they examined included CAMEL, bank ownership, and whether the bank was controlled by a family. Their empirical findings revealed that financial information

such as CAMEL can serve as effective predictors of the bankruptcy or closure of banks during financial crises in Asia.

The Executive Board of the IMF launched the Financial Stability Indicators (FSIs) in 2003. The CAMEL variables not only serve indicators that can be used to monitor the stability of financial systems in various countries but also constitute the core set of indicators of sound deposit-takers as defined by the IMF.

The empirical results obtained by Kaminsky and Reinhart (1999) indicated that since the emergence of the financial liberalization trend, banking crises and currency crises have become more closely connected to each other in emerging countries. The initial stage of a banking crisis often precedes a currency crisis, and once the currency crisis breaks out, it will further worsen the banking crisis, thereby resulting in an all-out financial crisis. Claudia B. Peretto (2008) using supervised logistic regression to express about 66 bank entities of the Argentine Republic in order to explore the causes that divide the classification in efficient or inefficient.

Mishkin (2001) pointed out that under the impact of financial liberalization and open international capital market financing channels, the financial institutions in countries with emerging markets can use higher interests to attract foreign investment, particularly when the exchange rate of the U.S. dollar is fixed. This can easily mislead foreign investors to overlook exchange-rate risk, and the massive influx of foreign investment (especially short-term funds) can lead to the excessive expansion of domestic credit, which can ultimately produce a huge surge in overdue loans, balance sheet deterioration, and the increased likelihood of banking crises. The accompanying credit crunch then severely affects the country's economic growth.

The above strand explores the effect of macroeconomic factor and financial stability indicators CAMEL (Capital, Asset quality, Management, Earnings, Liquidity) to investigation in developed or developing countries of financial institution performance. These literature does not consider the effects of Latin-emerging, while our study examines between four Latin-emerging countries and Asian countries and discussing what lesson of financial reform on Latin-emerging countries.

METHODS AND DATA SAMPLING

Methods

Demirgüç-Kunt and Huizanga (2000) used some bank specific variables and macroeconomic variables used by methodology of ordinary least squares (OLS) to evaluate performance of bank. We extended the study of Demirgüç-Kunt and Huizanga to using the methodology to first be analyzed linear panel data, then applied OLS regression to assess the performance of banks in 10 emerging markets for the period from 2011 to 2018. The variables of the regression model were defined as follows:

$$BP_{i,t} = f(\text{makro}_t, \text{Bank}_{i,t}) + e_{i,t}$$

where

- $BP_{i,t}$: performance of bank i in year t
- makro_t : macroeconomic variables in year t
- $\text{Bank}_{i,t}$: specific variables for bank i in year t
- $e_{i,t}$: idiosyncratic error term

Data Sampling and Descriptive Statistics

We investigated four Asian countries following the Asian financial crisis that were affected the most severely and compiled the measures that they took to reform financial institutions. Panel data combining horizontal cross-sectional and time series analysis was used to test the significance of variables on bank performance in emerging markets. Profitability ratios (ROA) indicating the efficiency of the banking system were considered dependent variables.

Based on the literature review presented in the previous section, we included in our analysis the net interest margin ratio (NIM) and the five CAMEL indicators, i.e., capital adequacy ratio (capital adequacy, CAP), non-performing loan ratio (asset quality, AST), cost-to-income ratio (management capability, MAN), pre-tax operation income divided by average assets (earnings quantity, EAR), and net loans divided by deposit and short-term funding (liquidity, LIQ).

Miguel, Francisco and Victor (2014) assess empirically the effects of inflation on private sector bank credit and economic growth in Mexico over the period 1969–2011. They estimated the long-run effects of inflation rates through bank loans on real output in the long run.

We also included gross domestic product (GDP) growth rate and

consumer price index (CPI) for the period from 2011 to 2018. Capital adequacy, asset quality, management capability, earnings quantity and quality, and the adequacy of liquidity were obtained from the BankScope database. Macroeconomic variables (GDP growth rate and CPI) were obtained from the Global Insight database.

A total of 10 countries were included in this research: Argentina, Brazil, Chile, Colombia, Thailand, Indonesia, Korea, Malaysia, Mexico, Peru.

The sample comprised annual data for the period from 2011 to 2018. Table 1 lists descriptive statistics for overall data. The profitability indicators were the median ROA of the selected 10 countries which included all banks (1.49%). The skewness coefficient of GDP growth rate and MAN were below zero, indicating a leftward skew, whereas the other indicators were skewed to the right. The kurtosis coefficients of LIQ and MAN were less than 3 (platykurtic), whereas the other indicators were leptokurtic. The median value of the capital adequacy ratio embodying the financial power for shock absorption and credit activity was above the minimum requirements determined by Basel.

Table 1. Descriptive statistics- Overall data

	ROA	NIM	CAP	AST	MAN	EAR	LIQ	GDP	CPI
Mean	1.49	5.50	17.00	2.97	58.95	1.99	89.56	3.18	5.16
Median	1.42	5.00	16.12	2.64	59.76	1.66	87.67	3.19	3.44
Maximum	3.71	15.07	42.50	9.01	70.92	5.23	118.49	7.24	37.52
Minimum	0.35	0.58	11.18	1.16	47.42	0.55	61.66	-3.77	-0.90
Std. Dev.	0.64	3.63	4.65	1.52	6.45	1.00	12.59	2.30	6.45
Skewness	1.48	1.10	3.27	1.75	-0.04	1.48	0.07	-0.96	3.46
Kurtosis	5.57	3.38	16.70	6.49	2.19	4.65	2.76	4.17	15.64
Jarque-Bera	51.26	16.58	768.30	81.41	2.23	38.14	0.25	16.70	691.77
Probability	0.00	0.00	0.00	0.00	0.33	0.00	0.88	0.00	0.00
Sum	118.87	439.79	1360.37	237.66	4716.34	159.35	7164.75	254.46	413.18
Sum Sq. Dev.	32.31	1038.73	1705.28	182.67	3289.11	78.71	12531.82	416.29	3289.24
Observations	80	80	80	80	80	80	80	80	80

Note: variables: ROA =Return on Asset, NIM =Net Interest Margin, CAP= Total Capital Ratio, AST = Impaired Loans Ratio, MAN = Cost to Income Ratio, EAR = Pre-Tax Operation Income / Average Assets, LIQ = Loans / Dep & ST Funding Ratio, GDP= Gross Domestic Product growth rate, CPI= Consumer Price Index.

Table 2 lists descriptive statistics for Latin American countries in this study. The profitability indicators were the median ROA of the selected 6 countries which included all banks (1.71%). The skewness coefficient of GDP growth rate and MAN were below zero, indicating a leftward skew, whereas the other indicators were skewed to the right, this is consistent with the overall ten data countries. The kurtosis coefficients of NIM, MAN, EAR and LIQ were less than 3 (platykurtic), whereas the other indicators were leptokurtic.

Table 2. Descriptive statistics- Latin American countries

	ROA	NIM	CAP	AST	MAN	EAR	LIQ	GDP	CPI
Mean	1.71	7.16	16.75	3.45	60.57	2.31	89.85	2.51	6.85
Median	1.47	5.66	15.61	3.12	61.18	1.78	86.92	2.53	3.80
Maximum	3.71	15.07	42.50	9.01	70.92	5.23	118.49	6.59	37.52
Minimum	0.73	2.71	11.18	1.28	47.42	0.99	61.66	-3.77	1.32
Std. Dev.	0.68	3.66	5.70	1.72	5.08	1.13	13.73	2.49	7.78
Skewness	1.51	0.77	3.10	1.34	-0.31	1.05	0.24	-0.72	2.72
Kurtosis	4.24	2.33	12.97	4.54	2.85	2.95	2.60	3.45	9.84
Jarque-Bera	21.30	5.66	275.50	19.10	0.82	8.79	0.79	4.59	152.63
Probability	0.00	0.06	0.00	0.00	0.66	0.01	0.67	0.10	0.00
Sum	81.93	343.48	803.88	165.60	2907.44	110.75	4312.60	120.24	328.98
Sum Sq. Dev.	21.62	630.44	1529.02	139.47	1212.00	59.96	8863.46	290.68	2844.39
Observations	48	48	48	48	48	48	48	48	48

Note: variables: ROA =Return on Asset, NIM =Net Interest Margin, CAP= Total Capital Ratio, AST = Impaired Loans Ratio, MAN = Cost to Income Ratio, EAR = Pre-Tax Operation Income / Average Assets, LIQ = Loans / Dep & ST Funding Ratio, GDP= Gross Domestic Product growth rate, CPI= Consumer Price Index.

Table 3 lists descriptive statistics for Asia countries in this study. The profitability indicators were the median ROA and NIM of those Asia countries which below to Latin American countries in this study, however, the median value of the capital adequacy ratio of Asia countries in this study higher than Latin American countries in this study, it is shows that Asian banks are more focused on capital adequacy and risk management.

Table 3. Descriptive statistics- Asia countries

	ROA	NIM	CAP	AST	MAN	EAR	LIQ	GDP	CPI
Mean	1.15	3.01	17.39	2.25	56.53	1.52	89.13	4.19	2.63
Median	1.21	2.72	17.88	1.97	57.13	1.58	89.88	4.46	2.15
Maximum	1.80	5.77	21.73	3.97	70.87	2.46	104.90	7.24	6.41
Minimum	0.35	0.58	13.66	1.16	48.07	0.55	64.47	0.84	-0.90
Std. Dev.	0.39	1.59	2.33	0.71	7.54	0.47	10.86	1.51	1.82
Skewness	-0.21	0.55	0.13	0.41	0.63	-0.07	-0.56	-0.33	0.53
Kurtosis	2.13	2.01	2.04	2.23	2.24	2.63	2.59	2.66	2.81
Jarque-Bera	1.25	2.90	1.32	1.68	2.87	0.21	1.87	0.73	1.57
Probability	0.53	0.23	0.52	0.43	0.24	0.90	0.39	0.69	0.46
Sum	36.94	96.31	556.49	72.06	1808.90	48.60	2852.15	134.22	84.20
Sum Sq. Dev.	4.83	78.23	168.33	15.64	1763.18	6.81	3658.52	70.81	102.52
Observations	32	32	32	32	32	32	32	32	32

Note: variables: ROA =Return on Asset, NIM =Net Interest Margin, CAP= Total Capital Ratio, AST = Impaired Loans Ratio, MAN = Cost to Income Ratio, EAR = Pre-Tax Operation Income / Average Assets, LIQ = Loans / Dep & ST Funding Ratio, GDP= Gross Domestic Product growth rate, CPI= Consumer Price Index.

Table 4 shows the correlation matrix describing the correlation among the independent variables. The correlation coefficients were used to reveal the relationships and manifest problems in the case of high multicollinearity. A high correlation (+- 0.90 and higher) among variables indicates that they cannot be estimated using the same equation. As shown in Table 2, there was no multicollinearity among the independent variables, which indicates that they can be used in the estimation of dependent variables.

Table 4. Explanatory variables correlation analysis

	ROA	NIM	CAP	AST	MAN	EAR	LIQ	GDP	CPI
ROA	1.00								
NIM	0.35	1.00							
CAP	0.01	-0.09	1.00						
AST	-0.12	0.30	0.10	1.00					
MAN	0.05	0.20	-0.14	0.08	1.00				
EAR	0.85	0.43	0.23	-0.02	-0.03	1.00			
LIQ	-0.23	-0.18	-0.29	-0.17	0.00	-0.29	1.00		
GDP	-0.23	-0.10	0.32	-0.36	-0.31	-0.10	0.07	1.00	
CPI	0.73	0.28	-0.09	-0.03	0.28	0.63	-0.36	-0.50	1.00

ANALYSIS OF EMPIRICAL RESULTS

Our objective was to compare the effects of the financial institutional reforms that these four Asian countries introduced after the Asian financial crisis with Latin America-emerging financial markets to assess the effectiveness of the reforms and to make some policy suggestions to Latin America-emerging financial markets. The four main financial reform measures adopted by Asian countries were described as below:

1. Promotion of mergers and acquisitions of financial institutions
2. Accelerate the processing of problematic financial institutions
3. Reduction of non-performing loan ratios of banks
4. Enhance financial supervision

Tables 5 lists estimates of the OLS regression model used to identify performance determinants in Latin America-emerging market banks and emerging-market banks in four Asian countries.

Table 5. OLS regression model estimates Performance Determinants of Banks for Latin America and four Asian countries in emerging-market

ROA				
	Emerging-market banks in six Latin America countries		Emerging-market banks in four Asian countries	
NIM	-0.022*	(0.096)	0.072**	(0.045)
CAP	-0.017*	(0.064)	-0.040**	(0.016)
AST	-0.093***	(0.003)	-0.011	(0.781)
MAN	0.020**	(0.039)	-0.018***	(0.002)
EAR	0.395***	(0.000)	0.635***	(0.000)
LIQ	-0.001	(0.721)	0.004	(0.269)
GDP	0.002	(0.924)	0.064***	(0.004)
CPI	0.023**	(0.019)	-0.056***	(0.003)
β_0	0.311	(0.713)	1.247*	(0.091)
R^2	0.864		0.943	
Adj- R^2	0.836		0.923	
F-statistics	30.897		47.705	

Note: ***, **, * represent 1%, 5%, 10% significant level

Tables 6, 7 lists estimates of the OLS regression model on fixed effects (Cross-section and Period) for six Latin America countries and all ten countries. This model takes into account that the differences between countries in the explained variables will cause explanatory variables and error terms the relevance of, which in turn causes estimation inefficiency. Therefore, the differences between countries will be excluded, so that the differences between countries will not change due to changes in time.

Table 6. OLS regression model on fixed effects (Cross-section and Period) for six Latin America countries

ROA				
	Cross-section fixed effects		Period fixed effects	
NIM	-0.026	(0.323)	-0.023	(0.129)
CAP	-0.012*	(0.067)	-0.014	(0.166)
AST	-0.053*	(0.094)	-0.109***	(0.005)
MAN	0.006	(0.546)	0.014	(0.212)
EAR	0.191***	(0.002)	0.409***	(0.000)
LIQ	-0.001	(0.847)	-0.001	(0.768)
GDP	0.006	(0.778)	-0.011	(0.724)
CPI	0.007	(0.458)	0.020*	(0.070)
β_0	1.469**	(0.089)	0.688	(0.500)
R ²	0.941		0.879	
Adj-R ²	0.918		0.822	
F-statistics	41.618		15.508	

Note: ***, **, * represent 1%, 5%, 10% significant level

Table 7. OLS regression model on fixed effects (Cross-section and Period) for all ten countries

ROA				
	Cross-section fixed effects		Period fixed effects	
NIM	-0.016	(0.472)	-0.001	(0.911)
CAP	-0.015***	(0.008)	-0.013	(0.178)
AST	-0.042*	(0.096)	-0.044	(0.159)
MAN	0.004	(0.573)	0.004	(0.557)
EAR	0.208***	(0.000)	0.455***	(0.000)
LIQ	-0.003	(0.342)	0.002	(0.533)
GDP	0.015	(0.326)	-0.012	(0.607)
CPI	0.005	(0.508)	0.028***	(0.008)
β_0	1.994***	(0.001)	0.865	(0.105)
R ²	0.942		0.815	
Adj-R ²	0.976		0.771	
F-statistics	59.272		18.752	

Note: ***, **, * represent 1%, 5%, 10% significant level

Robust regression is an alternative to least squares regression when data is contaminated with outliers or influential observations and it can also be used for the purpose of detecting influential observations. However, if there is no error in the data after verification, and this study expects to learn during this period (2011-2018) whether the financial system of the six emerging market countries in Latin America has any reference for the four Asian countries in this study, all the data should be retained for analysis after the author of this study compares the data one by one and finds no error. On the other hand, there is no so-called extreme value problem in this paper, so there is no need to judge whether the individual data or variable case is extreme value, so there is no doubt about robustness test.

The empirical results of four main financial reform measures adopted by Asian countries were described as following:

Promotion of mergers and acquisitions of financial institutions (MAN)

A lower cost-to-income ratio indicates that the enterprise has greater control over operating costs and presents higher operational efficiency. Promoting financial institution mergers and acquisitions represents an increase in operational efficiency, so we used the cost-to-income ratio as the proxy variable for the promotion of the mergers and acquisitions of financial institutions.

As shown in Table 5, the cost to income ratio (MAN) seems to be statistically significant determinant of ROA in four Asian-emerging market countries and Latin America-emerging market countries at 1% and 5% level respectively, it seems to be more statistically significant with Asian-emerging market countries.

Appendix presents the statistics of the nine major variables during the study period from 2011 to 2018. The mean cost-to-income ratio of the four countries investigated in this study was 56.53% and lower than Latin America-emerging market countries in 60.57%. This shows that when the governments of the four investigated countries encouraged banks to undergo mergers and acquisitions, they achieved economies of scale and increased their operational performance.

Accelerate the processing of problematic financial institutions

The capital adequacy ratio (capital adequacy, CAP) refers to the ratio of total capital to total risk-weighted assets. The financial authorities in each country generally exercise control over the capital adequacy ratios of commercial banks so as to monitor the ability of the banks to withstand risks. This study used the capital adequacy ratio as the proxy variable for swifter handling of problematic institutions.

As shown in Table 5, the capital adequacy ratio (CAP) seems to be statistically significant determinant of ROA in four Asian-emerging market countries and Latin America-emerging market countries at 5% and 10% level respectively.

As shown in Appendix, the mean capital adequacy ratio of 10 countries was 17%. Following the Asian financial crisis in 1997, the South Korean government took over two large-scale banks (one of which was sold to foreign investors), closed five small- and medium-scale commercial banks, prompted the mergers of eight commercial banks, and ordered to closures of over 30 non-banking financial institutions. The Thai government ordered the closures of 56 problematic financial institutions and took over six commercial banks through financial development foundations. The Indonesian government revoked the licenses of 66 private financial institutions, 12 of which were taken over by the government. These were all swift measures to handle problematic financial institutions to enhance the ability of the banks to withstand risk. During the study period, the mean capital adequacy ratios of these three countries that implemented swifter handling of problematic financial institutions (South Korea, Indonesia, and Thailand) were all higher than 14%. According to the stipulation that the capital adequacy ratios of banks be no less than 8.5% in Basel III in 2019, swifter handling of problematic financial institutions can effectively improve the ability of banks to withstand risk.

Reduction of non-performing loan ratios of banks

The non-performing loan ratio (asset quality, AST) is the ratio of loans with overdue payments to total loans and presents the amount of loans made by a financial institution that clients may be unable to repay. A higher non-performing loan ratio indicates poorer loan quality, which means that the deposits made by depositors are less secure and is likely to induce bank runs. Generally speaking, financial institutions

with non-performing loan ratios less than 3% also have better credit quality. In this study, we used the non-performing loan ratio as the proxy variable for asset quality of banks.

As shown in Appendix, the mean non-performing loan ratio of 10 countries was 2.97%. The main purpose of the organizations established by the four targeted countries in this study (South Korea, Indonesia, Thailand, and Malaysia) to handle non-performing loans is to acquire and more quickly handle the non-performing loans of financial institutions so as to reduce their non-performing loan ratios and assist financial institutions in resuming normal loan services. The experiences of these countries show that, except for IBRA, the asset management companies in Thailand, Malaysia, and South Korea are all serving their function in dealing with non-performing loans quickly, thereby producing marked declines in their non-performing loan ratios.

During the study period, the non-performing loan ratios of the four Asia targeted countries were all less than 2.3% and lower than Latin America-emerging market countries in 3.45%. This shows that when the governments of the four investigated countries encouraged banks to serve their function in reducing non-performing loan ratios during the study period. However, the results in Tables 5 indicate that AST was not significantly effective in improving bank performance.

Enhance financial supervision

To strengthen the supervision system for financial supervision and management and to improve their financial supervision performance, the Asian countries affected by the financial crisis unified financial supervision, adopted strict regulations for capital adequacy ratios, loan assessment and classification, and loan loss provisions, and enhanced their internal control and audit systems. We therefore used the non-performing loan ratio and the cost-to-income ratio as the proxy variables for strengthening of financial supervision. As described in Sections 4.2, the policies to strengthen financial supervision in the four targeted countries of this study (South Korea, Indonesia, Thailand, and Malaysia) indeed improved the management efficiency of their financial industries. Although it has been more than two decades since the Asian financial crisis in 1997, the management efficiency of the financial institutions in these countries remains sound.

Our study finds that these six banking systems in Latin America are better placed to manage risk in the event of a global financial and economic

downturn similar to that experienced in 2008–2010. Regulatory frameworks are stronger than in 2008 with improved risk management and transparency. The financial condition of these banking systems remains solid while currency risks have declined. Most regulators have implemented or are in the process of implementing Basel III capital guidelines. This has contributed to improvements in both the level and quality of capitalization. Regulators have improved their oversight of bank liquidity and currency exposure as well. These markets' banks generally have sufficient loss absorption buffers and liquidity, bolstered by sustained profitability.

CONCLUSIONS

The objective of this study was to present the financial institution reforms that four Asian countries introduced after the Asian financial crisis and compare them with countries with Latin America-emerging financial markets to assess the effectiveness of the financial institution reforms that they implemented. We performed a detailed OLS analysis and compared the financial market performance of the financial institution reforms in these four Asian countries with that in Latin America-emerging market countries. Our primary findings were as follows: (i) the financial reform measures suggested by the IMF resulted in significantly better financial management efficiency in the four Asian countries targeted in this study than those in other countries with emerging markets; (ii) the effects of these financial reform measures are continuous, and even today, the financial management efficiency in these four Asian countries remain comparatively sound.

For Latin America-emerging emerging markets policy maker, which ought to choose clear and reasonable financial policies to promote both stability and development in the financial market. In times of high fluctuations, economic decisions should be made to control market risk, and policy interventions must be made at the right time with the right amount of force so as to bring stable markets and increase bank competitiveness.

DECLARATIONS

Abbreviations IMF: International Monetary Fund; NIM: net interest margin ratio; CAP: capital adequacy ratio; AST: non-performing loan ratio; MAN: cost-to-income ratio; EAR: pre-tax operation income divided by average assets; LIQ: net loans divided by deposit and short-term funding; GDP: gross domestic product growth rate; CPI: consumer price index.

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Ethics approval and consent to participate Not applicable.

Competing interests The authors declare that they have no competing interests.

APPENDIX

1. According to INDEC, the national Argentina statistics institute, real GDP fell by 0.3% in seasonally adjusted, quarter-on-quarter terms in April-June 2019. However, a low base of comparison meant that year-on-year growth was mildly positive at 0.7%. Exports disappointed, contracting by 0.6% in sequential terms, although they grew by 15% year on year. The weakness relates largely to weaker external demand for Argentina's industrial manufacturing exports. However, the net external sector contributed positively to GDP as imports contracted more sharply, by 2.7% in sequential terms and by 23% year on year.
2. On October 30th 2019, the monetary policy committee (Copom) of the Banco Central do Brasil (BCB, the central bank), unanimously decided to reduce the Selic policy rate by 50 basis points to 5%, an all-time low. Policymakers have said that there were upside and downside risks to the path of inflation. On the one hand, a high level of spare capacity and inflation inertia may lead to undershooting. On the other hand, the current degree of monetary stimulus—which works on a lagged basis—increases uncertainty over transmission channels and could cause inflation to rise above the mid-point target over the medium-term forecasting horizon. Furthermore, this upside risk would be heightened, should emerging-market conditions deteriorate and/or the (post-pension) economic reform agenda disappoints.
3. Chile president, Sebastián Piñera, has signed a new banking bill into law after 18 months of legislative work that spanned two administrations. The law seeks to bring financial regulation on par with Basel III standards through institutional changes and tapered implementation of recommended capital buffers and liquidity requirements. The reform will help to modernize the financial system, and a long roll-out period gives banks ample time to incorporate additional requirements and regulations into pricing and strategic planning. Compliance costs will differ across the industry, but there is general agreement in the system that updating to Basel III standards was a necessary step to ensure the long-term viability of the sector. Even though debt levels have increased steadily over recent years, the Chilean banking system appears stable and well protected: non-performing loans remain low and buffers are adequate.
4. OECD recommendations can be passed by government decree or executive action, but some of them will require additional funding

and will take time to come to fruition. These include, for example, measures to improve logistics and connectivity, to reduce the costs involved in setting up a business, to improve digitalization, to enhance competition in heavily concentrated industries (such as transport and telecommunications), to lower banking margins, to reduce tariff and non-tariff trade barriers, and to improve the quality of education. Colombia is likely to make progress in some of these areas, chiefly those pertaining to road infrastructure, custom procedures, digitalization, business set-up costs, education quality, and tax evasion.

5. On October 20th 2019, the IMF managing director, Kristalina Georgieva, met with Mexico's finance minister, Arturo Herrera, and the governor of the Banco de México (the central bank), Alejandro Díaz de León. The Fund also released its concluding statement following its annual Article IV visit. It praised Mexico's overall policy mix but highlighted several medium-term challenges, including the need to increase non-oil revenue, ease monetary policy, boost financial inclusion and reduce crime. We expect Mexico to maintain its orthodox policy mix, while making little progress on the longer-term challenges.
6. On November 7th 2019, the Banco Central de Reserva del Perú (BCRP, the central bank) cut its benchmark interest rate by 25 basis points, to 2.25%. The rate cut was the second this year; the previous reduction, also of 25 basis points, came in August. The BCRP is looking to stimulate the economy at a time when fiscal levers are proving to be less than effective. Public investment, although recovering, has underperformed substantially this year owing to a change of authorities at local government level. A recently announced fiscal package by the central government is expected to have only a marginal impact on growth.
7. Nine major variables summary statistics sheet on six emerging Latin-American markets

Country	2011	2012	2013	2014	2015	2016	2017	2018
ROA(%)								
Argentina	2.75	2.91	2.83	3.71	3.34	3.18	3.19	2.86
Brazil	1.51	1.26	1.10	1.20	1.36	0.73	1.40	0.99
Chile	1.53	1.51	1.55	1.42	1.26	1.52	1.69	1.92
Colombia	1.28	1.54	1.31	1.45	1.41	1.52	1.23	1.30
Mexico	1.46	1.35	1.25	1.43	1.34	1.34	1.55	1.52
Peru	2.02	1.85	1.70	1.37	1.91	1.18	1.48	1.42

Country	2011	2012	2013	2014	2015	2016	2017	2018
NIM(%)								
Argentina	4.99	5.66	5.07	5.01	4.52	10.95	10.48	10.38
Brazil	4.99	5.66	5.07	5.01	4.52	4.13	4.93	3.92
Chile	3.48	3.48	3.56	3.02	3.30	2.91	2.73	2.71
Colombia	5.43	5.18	5.29	6.52	6.15	5.69	6.55	6.42
Mexico	4.63	5.90	10.72	10.24	8.98	8.21	9.58	9.61
Peru	11.12	12.42	13.66	12.90	14.52	15.07	14.98	13.32
CAP(%)								
Argentina	42.50	13.02	14.28	15.91	13.38	15.00	12.73	13.79
Brazil	17.58	16.17	17.50	17.77	17.34	19.15	18.00	17.51
Chile	15.07	14.13	13.82	13.32	12.98	13.96	14.54	13.91
Colombia	28.89	36.80	25.19	11.76	11.18	12.49	13.74	14.40
Mexico	16.16	16.35	15.72	15.66	15.61	15.60	16.62	16.08
Peru	17.20	18.13	16.71	14.83	14.72	15.48	16.21	14.99
AST								
Argentina	1.59	2.05	1.97	2.35	1.74	2.42	2.06	3.60
Brazil	3.50	3.78	4.13	3.67	4.15	9.01	8.05	6.48
Chile	1.35	1.28	1.89	2.10	2.25	3.82	3.56	3.32
Colombia	4.53	4.72	4.93	4.65	3.76	2.31	3.48	4.47
Mexico	2.39	2.22	2.97	2.71	2.23	2.27	3.00	2.73
Peru	1.80	2.31	2.30	3.30	3.23	6.08	6.49	6.60
MAN								
Argentina	63.92	62.11	61.70	60.37	62.45	65.95	66.55	67.75
Brazil	55.21	58.59	62.31	61.21	60.20	59.76	67.65	65.33
Chile	53.01	57.38	57.94	56.61	55.32	61.58	63.32	59.24
Colombia	60.27	54.16	59.84	54.38	59.78	50.98	59.75	61.47
Mexico	64.56	62.66	61.61	65.02	66.24	70.92	69.72	67.06
Peru	56.37	54.90	55.64	51.06	47.42	64.98	62.04	61.15
EAR								
Argentina	3.30	3.79	3.93	5.23	4.51	4.01	4.12	4.23
Brazil	1.84	1.54	1.23	1.60	1.06	0.99	1.71	1.02
Chile	1.81	1.64	1.61	1.49	1.32	1.73	1.71	1.50
Colombia	3.58	5.05	1.66	1.98	2.10	2.17	1.34	1.54
Mexico	1.64	1.77	1.45	1.50	1.40	1.78	1.71	1.41
Peru	2.72	3.32	2.95	2.95	3.24	1.88	2.02	2.67

Country	2011	2012	2013	2014	2015	2016	2017	2018
LIQ								
Argentina	76.36	81.06	83.10	83.37	81.20	75.43	76.49	65.50
Brazil	83.35	91.46	84.49	87.24	74.57	80.33	61.66	63.21
Chile	104.49	110.59	114.44	112.65	111.27	114.79	113.68	118.49
Colombia	85.95	94.64	86.59	93.37	100.57	98.06	100.81	98.46
Mexico	94.31	93.73	98.69	93.98	97.21	76.84	79.32	78.17
Peru	83.43	80.19	82.97	85.54	82.89	90.87	94.40	92.39
GDP								
Argentina	6.05	-0.90	2.34	-2.47	2.59	-2.20	2.67	-2.48
Brazil	3.99	1.93	3.01	0.50	-3.77	-3.60	1.06	1.12
Chile	6.02	5.42	4.12	1.87	2.21	1.53	1.47	4.05
Colombia	6.59	4.04	4.87	4.39	3.05	1.96	1.35	2.57
Mexico	4.05	3.78	1.61	2.27	2.65	2.04	2.12	2.00
Peru	6.48	5.94	5.79	2.45	3.30	3.94	2.49	3.98
CPI								
Argentina	9.78	10.05	10.62	21.40	16.36	37.52	26.49	34.28
Brazil	6.64	5.40	6.20	6.33	9.03	8.74	3.45	3.67
Chile	3.33	2.99	1.92	4.40	4.35	3.79	2.18	2.32
Colombia	3.42	3.17	2.02	2.90	4.99	7.51	4.32	3.24
Mexico	3.40	4.11	3.81	4.02	2.72	2.82	6.04	4.90
Peru	3.37	3.66	2.81	3.25	3.55	3.59	2.80	1.32

8. Nine major variables summary statistics sheet on four Asian markets

Country	2011	2012	2013	2014	2015	2016	2017	2018
ROA(%)								
Korea	0.86	0.56	0.35	0.44	0.73	0.66	0.77	0.76
Indonesia	1.72	1.77	1.80	1.45	1.08	1.48	1.44	1.29
Malaysia	1.21	1.23	1.20	1.05	0.94	0.85	0.93	0.94
Thailand	1.08	1.43	1.64	1.29	1.43	1.64	1.44	1.48
NIM(%)								
Korea	2.46	2.47	2.19	1.92	1.86	1.74	1.75	1.89
Indonesia	5.36	5.76	5.20	5.07	5.47	5.77	5.62	5.19
Malaysia	0.78	0.58	1.66	1.75	1.69	1.70	1.62	1.41
Thailand	3.04	2.96	3.06	3.19	3.29	3.19	3.20	3.47

Country	2011	2012	2013	2014	2015	2016	2017	2018
CAP(%)								
Korea	13.98	14.62	14.63	14.02	13.66	14.93	15.10	14.91
Indonesia	16.38	16.87	18.12	17.89	19.33	21.38	21.73	21.35
Malaysia	18.30	18.81	17.74	18.41	19.87	18.74	20.78	19.67
Thailand	15.22	16.04	15.12	16.80	17.86	18.31	17.96	17.96
AST								
Korea	1.64	1.63	1.99	2.20	1.88	1.41	1.16	1.25
Indonesia	1.81	1.44	1.39	1.91	2.68	3.04	2.97	2.75
Malaysia	2.84	2.21	1.92	1.70	1.83	1.90	1.70	1.94
Thailand	3.97	2.59	2.88	2.94	2.99	3.25	3.03	3.22
MAN								
Korea	58.51	62.34	70.87	70.84	70.34	70.55	67.89	62.75
Indonesia	58.15	59.27	57.36	59.36	60.51	57.42	56.90	57.94
Malaysia	48.97	48.29	49.48	48.94	53.44	52.47	51.83	49.72
Thailand	50.74	60.37	49.32	49.62	49.21	48.07	49.12	48.31
EAR								
Korea	1.22	0.77	0.55	0.68	1.04	0.91	1.01	1.08
Indonesia	2.06	2.42	2.46	1.99	1.52	2.10	2.06	1.86
Malaysia	1.64	1.66	1.62	1.40	1.26	1.28	1.34	1.37
Thailand	1.89	1.65	1.78	1.53	1.58	1.58	1.57	1.72
LIQ								
Korea	103.62	104.90	104.01	93.11	92.01	99.46	101.41	95.85
Indonesia	81.12	84.98	88.09	86.26	87.09	86.20	84.98	87.20
Malaysia	64.47	66.34	70.62	74.05	77.67	79.94	82.55	82.31
Thailand	91.66	99.27	98.07	97.49	94.89	95.77	95.49	101.27
GDP								
Korea	3.69	2.40	3.17	3.20	2.81	2.95	3.16	2.67
Indonesia	6.18	6.03	5.56	5.01	4.88	5.02	5.07	5.17
Malaysia	5.29	5.47	4.69	6.01	5.03	4.22	5.74	4.74
Thailand	0.84	7.24	2.73	0.91	2.94	3.24	4.04	4.12
CPI								
Korea	4.03	2.18	1.30	1.28	0.71	0.97	1.94	1.48
Indonesia	5.36	4.28	6.41	6.40	6.36	3.52	3.81	3.20
Malaysia	3.17	1.66	2.11	3.14	2.10	2.09	3.80	0.97
Thailand	3.81	3.01	2.18	1.90	-0.90	0.19	0.67	1.07

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