Evaluating the efficiency of Latin American banks

Malindretos, John; Kasibhatla, Krishna and Rivera-Solis, Luis Eduardo

11. May 2008

Evaluating the efficiency of Latin American banks

Krishna M. Kasibhatla, Agricultural and Technical State University
John Malindretos, William Paterson University
Luis Eduardo Rivera- Solis , Dowling College

Abstract

Latin American banking sector has undergone tremendous changes over the years as a result of changes in regulation, globalization and developments in Telecommunications and Information Technology. A very important development has been financial liberalization where Latin America opened its doors to foreign banks. An important issue that needs to be addressed is whether the local commercial banks are efficient enough in their operations to be economically viable in a highly competitive environment**.** The objective of this study is to examine the factors behind bank profitability, following financial liberalization in five countries, Honduras, Mexico, Paraguay, Peru, and Venezuela, using 2004 financial data.

Introduction

Over the decade Latin American banks have shown little growth as measured by asset size. Profitability has demonstrated a remarkable recovery. Banking efficiency has improved as a result of an increased use of banking technology, which has resulted in job losses and a boost in profits. The purpose of this paper is to utilize balance sheet and income statement data and to analyze the trends and factors that have influenced bank performance in Latin America and to evaluate it in connection to prior research.

Literature Review

There has been a great deal of research in the area of banking efficiency and performance, Some of the research has focused on technical, scale, and scope economies. (Mester, 1987;Berger and Humphrey. (1997) and Green et al. (2004). In a study of the US banking system, English (1993) concluded that most US banks were technically inefficient, with larger banks being less technically inefficient that smaller banks Miller and Noulas (1996), on the other hand, found that there existed higher levels of technical efficiency for larger banks Kwast and Rose (1982) found that those banks experiencing high profitability also experienced lower operating costs. Rivera-Solis (2006) found that the Mexican banking sector was technically efficient but the results were not statistically significant

The objective of this study is to examine the factors behind bank profitability, following financial liberalization in five countries, Honduras, Mexico, Paraguay, Peru, and Venezuela, using 2004 financial data. *(Latin Finance,2005)*

Empirical Model

The empirical model used is the pooled cross-section with ordinary least squares (OLS) as well as pooled OLS with 'fixed effects' to examine the factors behind the profitability of fourteen banks in five Latin American countries, namely, Honduras, Mexico, Paraguay, Peru, and Venezuela, for the year 2004.

$$pit = a + b1\ X1it + b2\ X2it + b3\ X3it + b4\ X4it + b5\ X5it + b6\ X6it + b7\ X7it + eit, \quad (1)$$

where, p represents bank profits (either ROA or ROE), the subscripts (i = 1,……, N and t = 1,……, T)

Description of the variables in the above empirical model:
X1 : MSA: Market share of Assets
X2 : MSD: Market share of Deposits
X3 : EOA: (Equity/Assets)
X4 : EOGL: (Equity/Loans)
X5 : NLOD: (Gross Loans)
X6 : OLGL: (Overdue Loans/Gross Loans)
X7 : LPOOL: (Loan Loss Reserves/ Overdue Loans)
X8 : OEONI: (Operating Expenses/ Net Income including non-interest income)
X9 : ROA: (Net Income/Assets)
X10: ROE: (Net Income/Equity)

The Xi s are the explanatory variables, and eit is the error term with the usual assumptions associated with pooled cross-section models. Due to data constraints we had to select those five countries. We do plan to expand our study with more countries and also for more number of years before we make any definitive conclusions. This is our initial effort to examine this issue. The caveat is that the conclusions of this study are only tentative.

Market share of assets and deposits (MSA and MSD) are indicators of the bank size, EOA and EOGL are the bank capital adequacy indicators, NILOD is the proxy for liquidity management, OLGL and LPOOL are the two asset quality indicators, OEONI is a proxy for efficiency in terms of management of bank operating expenses, and ROA, ROE are the profitability indicators (p). All the above variables, except NLOD, are in percentages. Bank profitability is stipulated as a function of bank size, capital adequacy,and other indicators of financial management, including bank operating expenses

Empirical Results

According to the Results in Table 1, bank operating expenses(OEONI) and one capital adequacy measure, EOA, have a significant negative impact on ROA while the other capital adequacy indicator, EOGL, -and asset quality measure, OLGL, have a statistically significant positive influence on ROA.

TABLE 1
Pooled Least Squares: Dependent Variable ROA

Dependent Variable: ROA				
Method: Pooled Least Squares				
Cross-sections included: 5				
Total pool (balanced) observations: 65				
Convergence achieved after 9 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.9204	1.0267	5.766	0
MSA	0.1311	0.2324	1.5642	0.1854
MSD	-0.2049	0.2323	-0.882	0.3824
EOA	-0.0858	0.0342	-2.5092**	0.0158
NLOD	0.0041	0.0045	0.0908	0.928
EOGL	0.0211	0.0103	2.0475**	0.0465
OLGL	0.1046	0.0308	3.3916**	0.0015
LPOOL	-0.0023	0.0029	-0.7711	0.4447
OEONI	-0.0497	0.0092	-5.3844**	0
R-squared	0.501	F-statistic	5.0211	
Adj.R-squared	0.4312	Prob(F-stat.)	0.0001	
Durbin-Wat. stat.	2.0494	Akaike info crit.	3.4808	
		Schwarz crit.	3.8457	
** : significant at 5%				

We estimated two different types of pooled cross-section equations with ROA/ROE as the proxy for bank profits. The first set of equations estimated is the ‘pooled OLS’, and the second set is the ‘pooled OLS’ with ‘fixed effects’. The main difference between the two procedures is that for the pooled OLS, the implicit assumption is that all the five countries in the cross-section will have the same intercept, while the OLS ‘fixed effects’ assumes that these countries are not homogeneous and hence will have different intercepts. Estimated results are presented in the Tables 1 through 4.

Likewise, in Table 2, operating expenses, OEONI, exert even a greater negative influence on ROE .Reported results in Tables 1 and 2, show that both ROA and ROE are influenced by the same factors but in different magnitudes .In sum, according to the pooled OLS estimates, bank profits, in all the five countries, are negatively influenced by operating expenses, and asset quality, primarily, exerted a positive influence.

TABLE 2
Pooled Least Squares: Dependent Variable ROE

Dependent Variable: ROE				
Method: Pooled Least Squares				
Cross-sections included: 5				
Total pool (balanced) observations: 65				
Convergence achieved after 9 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.974	1.316	10.341	0
MSA	0.3803	0.0887	0.3493	0.7281
MSD	-0.5486	0.0515	-0.5217	0.6039
EOA	-0.5843	0.1957	-2.9849**	0.0042
NLOD	-0.0122	0.0247	-0.4969	0.6212
EOGL	0.0284	0.0572	0.4973	0.6209
OLGL	0.3769	0.1785	2.1112**	0.0393
LPOOL	-0.0161	0.016	-1.0078	0.318
OEONI	-0.4642	0.0511	-9.0686**	0
R-squared	0.6468	F-statistic	11.193	
Adj.R-squared	0.589	Prob(F-stat.)	0	
Durbin-Wat. stat.	1.9772	Akaike info crit.	6.8134	
		Schwarz crit.	7.1479	
**: significant at 5%				

Likewise, in Table 2, operating expenses, OEONI, exert even a greater negative influence on ROE .Reported results in Tables 1 and 2, show that both ROA and ROE are influenced by the same factors but in different magnitudes .In sum, according to the pooled OLS estimates, bank profits, in all the five countries, are negatively influenced by operating expenses, and asset quality, primarily, exerted a positive influence.

Let us now turn to the reported results in Tables 3 and 4 above. There is clear indication that the intercept term is different for each of the five countries. That means, banking is not homogeneous in these countries. . When we allow for heterogeneity, we notice that size indicator, MSA, has a slight positive impact on ROA and ROE, although not significant at conventional levels. But MSD, market share of deposits, as an indicator of market concentration, has a significant positive impact on both ROA and ROE. Capital adequacy indicator, EOA, has a negative impact on both ROA and ROE, while the other indicator, EOGL, has a positive and significant on the dependent variable.

TABLE 3

Pooled Least Squares: Cross-Section Fixed Effects
Dependent Variable ROA

Dependent Variable: ROA				
Method: Pooled Least Squares: Cross-section Fixed Effects				
Cross-sections included: 5				
Total pool (balanced) observations: 65				
White cross-section standard errors & covariance				
Convergence achieved after 10 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.9843	0.5029	9.9095	0
MSA	-0.1824	0.1165	-1.5648	0.1253
MSD	0.1252	0.1069	1.8713*	0.0428
EOA	-0.0426	0.0399	-1.7667*	0.0512
NLOD	0.0061	0.0183	0.3361	0.7385
EOGL	0.0048	0.0083	1.7834*	0.0728
OLGL	0.066	0.0438	1.6843*	0.0952
LPOOL	0.004	0.0023	1.7264*	0.0918
OEONI	-0.0481	0.0038	-2.6370*	0
Fixed Effects (Cross-section)				
_HOND--C	-0.3777			
_MEXI--C	-1.5554			
_PARA--C	0.3367			
_PERU--C	0.2245			
_VENZ--C	1.3719			
R-squared	0.627	F-statistic	5.3026	
Adj.R-squared	0.5087	Prob(F-stat.)	0	
Durbin-Wat. stat.	2.209	Akaike info crit.	3.3352	
		Schwarz crit.	3.8461	
*: signigicant at 10%				

TABLE 4
Pooled Least Squares: Cross Section Fixed Effects
Dependent Variable ROE

Dependent Variable: ROE				
Method: Pooled Least Squares: Cross-section Fixed Effects				
Cross-sections included: 5				
Total pool (balanced) observations: 65				
White cross-section standard errors & covariance				
Convergence achieved after 12 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.411	3.9927	14.128	0
MSA	-0.4455	0.4037	-1.6033	0.1251
MSD	0.2468	0.3418	1.7222*	0.0909
EOA	-0.5619	0.3254	-1.7267*	0.0903
NLOD	0.0293	0.095	1.7183*	0.0959
EOGL	-0.0322	0.0402	-0.8001	0.4273
OLGL	0.3752	0.1042	3.6003*	0.0007
LPOOL	-0.007	0.0167	-0.4212	0.6753
OEONI	-0.4868	0.0312	-5.5982*	0
Fixed Effects (Cross-section)				
_HOND--C	4.3876			
_MEXI--C	-3.3939			
_PARA--C	-0.972			
_PERU--C	-0.0118			
_VENZ--C	-0.0097			
R-squared	0.7355	F-statistic	10.909	
Adj.R-squared	0.668	Prob(F-stat.)	0	
Durbin-Wat. stat.	2.0482	Akaike info crit.	6.6474	
		Schwarz crit.	7.1157	
*: significant at 10%.				

Conclusion

We think that our results, based on our multivariate regression models, are just preliminary, and the inferences drawn from those results are just tentative. We do plan to expand our study to include more countries and also expand the time series data for more number of years in order to estimate a panel data econometric model using not only the 'fixed effects', but also other methods, such as, 'random effects', 'generalized method of moments' (GMM), and 'system GMM'. We might also add that the period examined was prior to the Sub Prime Financial Crisis that subsequently followed the years in question. An area of further research would be to examine the implications of this important economic event.

References

Berger, A.N., and Humphrey, D. B., "Efficiency of Financial Institutions: International Survey and Direction for Future Research," *European Journal of Operational Research*, Vol.98 (1997): 175-212.

English, M., Grosskopf, S., Hayes, K., and Yaisawarng, S., "Output Allocative and Technical Efficiency of Banks," *Journal of Banking and Finance*, Vol. 17 (1993): 349-366.

Green C. J., Murinde V., and Nikolov, I.(2004), "The Efficiency of foreign and Domestic Banks in Central and Eastern Europe: Evidence on Economies of Scale and Scope," *Journal of Emerging Market Finance*, Vol.3 (2):17-205

Latin Finance, *Latin Banking Guide & Directory 2004*, August 2005.

Mester, L. J., "Efficiency Production of Financial Services: Scale and Scope Economies," *Federal Reserve Bank of Philadelphia Business Review*, Vol. 104, Issue 1 (1987): 15-25.

.Rivera-Solis, L.E, (2006), "Evaluating the Efficiency and Productivity of Mexican Banks, *Proceedings of the Northeast Decision Sciences Institute 2006 Annual Meeting*