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Empirical Evidence on the Efficiency of Latin American Banks

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Abstract

The Latin American banking sector has undergone a transformation in recent years because of changes in regulation and globalization as well as developments in telecommunications and information technology. A very important example of this has been financial liberalization wherein Latin America opened its doors to foreign banks. An important issue that needs to be addressed is whether the operations of local commercial banks in this region are operationally efficient enough 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.

1 Introduction

Whether banks are efficient matters because, with international financial liberalization, these banks cannot survive competing against global, and presumably efficient, banks. The implication of these local commercial banks becoming extinct is that there would be a rise in unemployment and a worsening of the current accounts of these nations. The question of whether banks of diverse sizes are efficient is not settled. Different researchers have produced contradictory results; a few support the viewpoint that banks are relatively profitable while others disagree.

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 them in connection with prior research. In this research, we provide preliminary evidence that banks in a few South American markets have become more efficient. Although Latin American banks have shown little growth as measured by asset size over the past decade, their profitability has demonstrated a remarkable recovery. Banking efficiency has improved as a result of increased use of banking technology, which has resulted in job losses and a boost in profits. Our evidence is preliminary since

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we are constrained by the time period and the number of countries; specifically, we show our results with only 2004 data and evidence from only five countries. However, the two measures of profitability we use, return on assets and return on equity, both support our assertion that profitability rose because of liberalization. Additionally, we find that profitability relates positively with asset quality and negatively with operating expenses.

2 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 U.S. banking system, English et al. (1993) concluded that most U.S. 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).

3 Data and Methodology

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 14 banks in five Latin American countries, namely, Honduras, Mexico, Paraguay, Peru, and Venezuela, for the year 2004.

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

where π represents bank profits (either ROA or ROE) and the subscripts $i = 1,\ldots\ldots, N$ and $t = 1,\ldots\ldots, T$.

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 plan to expand our study with more countries and a greater number of years before we make any definitive conclusions. This is our initial effort to examine this issue, so 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, NLOD 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 and ROE are the profitability indicators (π). 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.

4 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 the 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 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 an even 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, operating expenses negatively influenced bank profits in all five countries and asset quality, primarily, exerted a positive influence on these profits.

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 an even 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, operating expenses negatively influenced bank profits in all the five countries and asset quality, primarily, exerted a positive influence on these profits.
Let us now turn to the reported results in Tables 3 and 4 below. There is a clear indication that the intercept term is different for each of the five countries, which means that banking is not homogeneous in these countries. When we allow for heterogeneity, we notice that the size indicator, MSA, has a slight positive impact on ROA and ROE, although it was 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. The capital adequacy indicator, EOA, has a negative impact on both ROA and ROE, while the other indicator, EOGL, has a positive and significant impact 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	
*: significant 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%.				

5 Conclusion

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

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