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Market Structure and Bank Profitability: Emerging versus Advanced Economies

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Abstract

We investigate the effects of market structure on bank profitability in 40 emerging and advanced economies. We find that bank profitability in relation to market structure is different between developed and emerging banking markets. First, in developed banking sectors, profitability is positively related to bank market share, implying evidence of market rivalry. This is not the case for emerging banking sectors however. Second, in emerging, but not advanced economies, the concentration of large banks is negatively related to profitability, indicating that large banks are inefficient (which may be caused by state intervention in large bank lending practices for political reasons). Third, more sales-generating and profit-generating bank finance is found in developed markets but not emerging markets. The differences in the findings between the two types of economies imply that the developed banking market is much more competitive than the emerging counterpart where it is still characterised by state intervention.

1.   Introduction

Bank profitability and its determinants, particularly concentration, are key aspects of financial system stability. It is evident that bank profitability has been found to be a predictor of financial crises. This paper investigates the effect of market structure on bank profitability in developed and emerging economies. Berger (1995) advocates two hypotheses which support a positive relationship between measures of market structure, such as concentration or market share, and profitability. The traditional structure-conduct-performance (SCP) hypothesis holds that in highly concentrated markets, firms set prices that are less favourable to consumers due to imperfectly competitive markets. The relative-market-power (RMP) hypothesis holds that firms with well-differentiated products can exercise their market power in pricing products, thereby earning supernormal profits. In effect, we assess to what extent relatively high bank profitability in emerging banks can be attributed to a low degree of efficiency or to non-competitive market conditions. Most research into the determinants of bank performance is based on the traditional SCP paradigm, finding a positive relationship between market concentration and bank profitability, e.g. Bourke (1989), Maudos and de Guevara (2004), Demirguc-Kunt and Huizinga (1999), and Molyneux and Thornton (1992). In contrast, some studies have failed to find this positive relationship (e.g. Smirlock (1985), Goldberg and Rai (1996)). Although empirical results from existing literature are mixed, one common feature of these studies is to mainly focus on advanced economies.

2.   Methodology and Data

2.1   Methodology

We estimate an equation of the following form for emerging and advanced economies:

$$\Pi_{i,c,t} = \alpha_0 + \alpha_1 MS_{i,c,t} + \alpha_2 CR4_{c,t} + \sum_{j=1}^{J} \beta_j X_{j\,i,c,t} + \sum_{m=1}^{M} \gamma_m X_{m\,i,c,t} + \varepsilon_{i,c,t} \qquad (1)$$

and $\varepsilon_{i,c,t} = \mu_i + \upsilon_{i,c,t}$

where i denotes bank i, c denotes country c, t denotes year t, Π measures bank profitability, and market structure refers to either using market share (MS) at a firm level, or using the 4-firm concentration ratio $(CR4)$[1] at the market level, X_j is a vector of bank-specific variables

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[1] Another ratio used to measure market concentration was the Herfindahl-Hirschman (HH) index, yielding similar results.

and X_m is a vector of country-specific and overall financial structure factors, ε_{it} is the error term with μ_i being the unobserved individual-specific effect and v_{it} being the normal stochastic disturbance, where $\mu_i \approx$ IIN $(0, \sigma^2)$ and $v_{it} \approx$ IIN $(0, \sigma^2)$.[2] Each coefficient yields the marginal effect of market structure on profitability. A coefficient combination of $\alpha_1 > 0$ and $\alpha_2 = 0$ supports the RMP theory, while $\alpha_1 = 0$ and $\alpha_2 > 0$ supports the SCP theory. See Table 1 for variables used and their sources.

2.2   Data

Our dataset comprises an unbalanced panel of 1929 banks, including 308 banks from emerging economies (122 banks in the Eastern Europe and 186 banks in the Middle East) and 1621 banks from Western Europe over the period 1999-2008, consisting of 3080 and 16210 observations, respectively.[3] The data covers 10 Eastern European, 13 Middle Eastern and 17 Western European countries.

Table 1: Variables, units, expected effects, source and sample countries

Variables	Units	Expected effect on returns	Source
Bank profitability			
Return on average assets before tax (ROAA)	Ratio	--	BankScope
Return on average equity before taxes (ROAE)	Ratio	--	BankScope
Market structure			
Market share	Ratio	Positive	BankScope
4-firm concentration ratio	Ratio	Positive	BankScope
Herfindahl-Hirschman index (HHI)	Ratio	Positive	BankScope
Bank-specific Characteristics			
Interest rate spread	Percentage	Positive	BankScope
Bank size (Log(total assets))	Logarithm	?	BankScope
Equity to total assets	Ratio	Positive	BankScope
Overheads to total assets	Ratio	Negative	BankScope
Off-balance-sheet activity to assets	Ratio	?	BankScope
Loan growth	Ratio	?	BankScope
Bank age	Years	?	BankScope
Financial structure			
Domestic credit provided by banking	Ratio	?	World Bank
Stock market turnover ratio	Ratio	Positive	World Bank
Macroeconomics			
Inflation	Percentage	?	World Bank
GDP growth	Percentage	?	World Bank
Countries Included			
Emerging economies:			
Eastern Europe: Bulgaria, Czech –Rep, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia			
Middle East: Bahrain, Egypt, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi, Syria, Turkey, UAE			
Advanced economies:			
Western Europe: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Spain, Sweden, UK			

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[2] The concentration ratio reflects the extent to which a firm's power to extract higher profits is due to oligopolistic behaviour.

[3] Banks included in the sample were eventually every bank which fell within the top 4500 banks in the world in winter 2010-2011, ranked by total assets. Furthermore, the sample covers approximately 65% of the total assets for the whole of the EU banking system and 61% of the total assets in all Middle East countries.

3.   Estimation results

Since bank profits show a tendency to persist over time and also since in each country-year, there are presumably shocks to the economy and the banking system to which profitability, market share (MS) and the 4-firm concentration ratio (CR4) are reacting together, we adopt a dynamic model specification by including a lagged dependent variable among the regressors. Specifically, we apply a GMM technique to a panel of banks on Equation (1) that covers the period 1999-2008, clustering errors at the bank level. We use the GMM estimator of Arellano and Bond (1991) by taking all variable lagged values of the dependent variable plus lagged values of the exogenous regressors as instruments.

The empirical results (Table 2) support the view that greater market share leads to higher bank profitability for advanced economies but not for emerging markets. Bank profitability seems to persist over time as the lag of the dependent variable is always positively associated with profitability. Furthermore, the integration of market share and the interest rate spread contributes to more profits in developed economies but not in emerging economies. This suggests that in developed economies, high profits are likely to be achieved with market share or size via existing bank's market power in manipulating prices, i.e. interest rate setting. Surprisingly, we find that for emerging economies, banks with a more concentrated market tend to earn lower profits. The contrast implies that developed banking markets are highly competitive as the estimated market share coefficient in relation to profitability is very low but significant. On the other hand, emerging banking sectors are characterised as markets subject to state intervention since their larger banks may be taken over by governments to serve political interests, such as financing major development projects at lower interest rates (which can lower profitability). This expectation is evident by the negative sign of the 4-large-bank concentration variable in relation to profits. This argument can be further supported by another observation that additional bank financing to an economy (as measured by the domestic banking credit variable) implies that there are more opportunities for banks to increase sales and profits, but this is not evident for emerging economies. The two differences between developed and emerging banking market indicate that in the emerging economy, bank financing is likely to be intervened by the state and this can create losses or lower profitability to banks, such as non-performing loans. Our argument explains why this short study finds that more bank financing erodes profitability in emerging banking markets because of state interference to large banks. Finally, a more liquid stock market reduces bank profitability.

Table 2: Determinants of the returns (ROAA and ROAE) over the period 2001-2010: emerging economies vs. advanced economies

	Panel A: Dependent variable: ROAA						Panel B: Dependent variable: ROAE					
	Emerging economies			Advanced economies			Emerging economies			Advanced economies		
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Lag dependent var.	0.234***	0.266***	0.211***	0.150*	0.144**	0.146*	0.282***	0.367***	0.282*	0.290***	0.141***	0.136***
	(3.99)	(3.79)	(4.38)	(1.79)	(2.31)	(1.89)	(4.11)	(2.99)	(1.77)	(2.62)	(3.69)	(3.64)
Market Structure												
Market share	0.010		0.051	0.012***		0.002*	0.128		0.323	0.005**		0.013**
	(0.22)		(0.11)	(3.11)		(1.71)	(1.46)		(0.68)	(2.06)		(2.20)
4-firms concentration		-0.022***	-0.006*		-0.001	-0.001		-0.034*	-0.127**		0.041	0.041
		(-7.86)	(-1.72)		(-0.58)	(-0.52)		(-1.88)	(-2.35)		(0.21)	(0.11)
Bank-Specific Variables												
Interest rate spread	0.085***	0.072***	0.088***	0.019***	0.017***	0.017***	0.389***	0.420***	0.426***	0.366***	0.331***	0.334***
	(4.64)	(4.61)	(4.76)	(4.94)	(3.93)	(3.68)	(3.34)	(4.23)	(3.00)	(5.10)	(5.46)	(5.06)
Log(total assets)	-0.273**	-0.226***	-0.126	0.121**	0.209***	0.206***	-0.354	-0.202***	-0.857**	0.361	0.312	0.464*
	(-2.54)	(-3.89)	(-1.60)	(2.25)	(4.32)	(4.19)	(-0.39)	(-2.76)	(-2.14)	(1.56)	(1.57)	(1.75)
Equity to total assets	0.547***	0.707***	0.724***	0.929***	0.824***	0.813***	0.665**	0.861***	0.671***	0.696***	0.663***	0.641***
	(12.82)	(19.84)	(19.39)	(12.01)	(10.66)	(10.16)	(2.18)	(4.75)	(4.30)	(7.48)	(8.30)	(7.62)
Overheads to assets	-0.174**	-0.187***	-0.362***	-0.297***	-0.283***	-0.265***	-0.720***	-0.418	-0.850**	-0.726***	-0.822***	-0.814***
	(-2.19)	(-4.21)	(-4.38)	(-5.23)	(-5.13)	(-3.96)	(-2.70)	(-0.52)	(-2.06)	(-3.27)	(-5.63)	(-3.73)
Off-balanc. to assets	0.247***	0.071***	0.085**	-0.024***	-0.053***	-0.054***	0.380	0.756***	0.892***	0.564*	0.725***	0.758**
	(4.53)	(2.62)	(2.42)	(-2.95)	(-3.46)	(-3.48)	(1.56)	(4.73)	(5.41)	(1.79)	(2.50)	(2.19)
Loan growth	0.002*	0.001	0.001	-0.001	0.002**	0.002**	0.037***	0.042***	0.032***	0.019	0.007	0.004
	(2.26)	(1.20)	(0.44)	(-0.45)	(2.03)	(2.01)	(4.42)	(6.37)	(3.43)	(0.92)	(0.42)	(0.23)
Bank age	0.148***	0.105***	0.087***	0.004	0.023**	0.023***	0.145***	0.197***	0.199***	-0.026	-0.104	-0.088
	(6.56)	(6.33)	(4.86)	(0.36)	(2.55)	(2.58)	(4.63)	(6.12)	(4.77)	(-0.17)	(-0.72)	(-0.60)
Financial Structure												
Credit provided by banking	-0.004*	-0.005*	-0.005**	0.002***	0.003***	0.003***	-0.007	-0.054*	-0.093***	0.050***	0.046***	0.046***
	(-1.68)	(-1.67)	(-2.41)	(3.27)	(3.05)	(3.08)	(-0.33)	(-2.20)	(-3.60)	(3.63)	(3.04)	(2.98)
Stock turnover ratio	-0.003***	-0.002***	-0.002**	-0.001**	-0.002***	-0.002***	-0.034***	-0.043***	-0.039***	-0.028***	-0.016	-0.016
	(-6.22)	(-3.33)	(-2.37)	(-2.27)	(-3.81)	(-3.83)	(-4.46)	(-6.56)	(-3.85)	(-2.91)	(-1.56)	(-1.55)
Macroeconomics												
Inflation	-0.043***	-0.045***	-0.050***	-0.044***	-0.048***	-0.047***	-0.452***	-0.189**	-0.232***	-0.289	-0.051	-0.085
	(-5.09)	(-4.31)	(-3.51)	(-3.39)	(-3.88)	(-3.73)	(-7.88)	(-2.40)	(-2.82)	(-1.25)	(-0.24)	(-0.40)
GDP growth	0.027***	0.022***	0.019***	0.017***	0.020***	0.020***	0.337***	0.581***	0.515***	0.370***	0.375***	0.369***
	(3.01)	(5.02)	(3.64)	(4.14)	(5.10)	(5.14)	(5.05)	(8.10)	(4.09)	(5.61)	(6.10)	(5.90)
Sargan test (p-value)	0.29	0.50	0.60	0.21	0.30	0.28	0.54	0.44	0.52	0.81	0.63	0.60
AR(1)-coefficient	-0.037	-0.097	-0.107	-0.365	-0.393	-0.392	-0.119	-0.156	-0.151	-0.227	-0.220	-0.279
p-value	0.02	0.09	0.06	0.00	0.00	0.00	0.05	0.01	0.01	0.00	0.00	0.00
AR(2)-coefficient	-0.029	-0.014	-0.029	-0.080	-0.065	-0.066	-0.073	-0.067	-0.070	0.124	-0.099	-0.058
p-value	0.16	0.78	0.59	0.11	0.17	0.01	0.27	0.19	0.00	0.00	0.14	0.29
S.E of regression	0.67	0.65	0.66	0.36	0.36	0.36	3.63	5.55	5.65	4.51	4.40	4.41
No. of countries	23	23	23	17	17	17	23	23	23	17	17	17
No. of banks	92	92	92	649	649	649	92	92	92	649	649	649
No. of observations	312	312	312	3005	3005	3005	312	312	312	3005	3005	3005

- The dependent variable in panel A is return on average assets, which is defined as profit before tax as a percentage of total assets of a bank.
- The dependent variable in panel B is return on average equity, which is defined as profit before tax as a percentage of equity a bank.
- We estimate all regressions using country and time fixed effects and clustering at bank level. t-values are in parentheses.
- *, **, *** denote significance at 10%, 5%, and 1%, respectively.
- AR(1) and AR(2): Arellano-Bond test that average auto-covariance in residuals of order 1 and 2, respectively, are 0 (H0: no autocorrelation).
- Sargan test: the test for over-identifying restrictions in GMM dynamic model estimation.

Note: The ROAE equals the ROAA multiplied by the total assets-to-equity ratio (the latter is often referred to as the bank's equity multiplier (or financial leverage)). As a result, when ROAE is the dependent variable, it would not be appropriate to include equity to assets in a profitability equation. However, we have opted to leave it in given that our results remained the same whether it was omitted or not and over-estimation was not violated.

4.   Conclusions

Our findings suggest that market share has no effect on bank profitability in emerging economies. Large banks there are inefficient, which lowers their profitability, which is evident by the concentration of large banks which is negatively related to profits. In contrast, in developed economies, banks do increase their profits with market share or size, which is likely to be related to their market power in setting prices or interest rate charges. It is also found that more equity capital stimulates banks to improve profitability. The implication of the finding for policy is to encourage banks to use more equity funds for business, especially in the case of developed economies. Moreover, since the RMP hypothesis dominates the developed economic banking system, with evidence that the relationship between market power and profitability is made via manipulating prices, there is a need for strengthening anti-trust regulation in controlling the size of a bank.

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