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CONCENTRATION RATIOS, FINANCIAL LEVERAGE AND PROFITABILITY: THE CASE OF SELECTED PHILIPPINE CORPORATIONS, 1997-2006

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Studies on the empirical relationship between market share and profitability have focused largely on operating profitability, with little attention to the contribution of financial leverage or financing-related profitability. This paper aims to contribute to the literature on what traditionally has been the purview of the field of industrial organization but which needs to recognize the significance of corporate financial decisions in strategic policy formulation.

There is no evidence to support the hypothesis that profitability as measured by return on equity is positively and linearly related to concentration indices as measured by relative market share. There seems to be a modicum of evidence, however, that points to the relationship between financial leverage and market share albeit only at the high-end of concentration ratios. At this end of the spectrum, corporations conceivably take advantage of corporate size in leveraging their resources for greater profitability.

The use of multi-year averages of profitability and of market share to reduce the "noise" of year-to-year variations did little to address the chaotic behavior of single-year estimates. The procedure failed to smoothen out the variability that was hoped would allow the extraction of empirical evidence to support long-standing theories.

Keywords: concentration ratios, market share, financial leverage, profitability, Philippine corporations

I. INTRODUCTION

The foundation of this paper is a test of the market share – profitability relationship across top-performing corporations in select Philippine sectors over the ten-year period from 1997 through 2006.

Market share has historically been and continues to be a variable of prime interest to business policymakers. Substantial empirical research points to the positive relationship between market share and profitability. If this relationship could be shown by empirical evidence to be true for Philippine corporations, then the pursuit of greater market share will be validated as a key profit-maximizing goal in the local context. Of parallel interest is to determine the extent by which firms' profit maximization goals is enhanced by their capital structure.

Profitability may be measured in a variety of ways depending on one's specific purpose. It may be divided into its components – operating profitability, taken here to mean return on assets (ROA), and financing-related profitability. Operating profitability, in turn, may be further simplified into its sub-components, namely net profit margin (or, net income / net sales) and total asset turnover (or, net sales / total

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assets). Of these two, net profit margin (NPM) is the more significant component in that it correlates to ROA more strongly than does total asset turnover (TAT), an observation supported by our empirical data; hence, NPM, or more precisely its logarithmic form log(NPM), was chosen to serve as an independent variable in our model whose impact on return on equity (ROE) is of interest.

Financing-related profitability has to do with the firm's capital structure. Our interest is on the significance of debt-equity (D-E) ratio or of its proxy the financial leverage multiplier (FLM) in enhancing the firm's overall profitability; hence, FLM, or more precisely its logarithmic form log(FLM) will likewise serve as an independent variable in our model, again, whose impact on ROE is of interest especially in relation to the corresponding impact of NPM on ROE. Yu and Aquino (2009), in testing the Pecking Order and Trade Off models did just the reverse, using financial leverage as the dependent variable and profitability as one of the independent variables.

II. AN INDUSTRIAL ORGANIZATION (IO) PERSPECTIVE ON THE PROBLEM

Mann (1966) demonstrated a positive relationship between market power, as measured by both market concentration and entry barriers, and firm profitability, as measured by the ratio of net income to the book value of stockholders' equity (or, return on equity). Sullivan (1974) noted that as industry concentration ratios increase, equity returns increase as theory predicts, while long-term debt to total invested capital ratios decrease contrary to theoretical expectations. Gupta (1969) described corporate size as a determinant of debt ratios and a possible proxy for perceived business risk. He argued that since large, multi-product firms are generally less risky than small, one-product firms, it may follow that large firms can carry higher debt ratios. Remmers, Stonehill, Wright and Beekhuisen (1974) similarly tested firm size as a direct determinant of corporate debt ratios and concluded likewise.

Against a backdrop of a preponderance of empirical evidence supporting the positive relationship between market share and profitability on one hand, there had been some empirical research that questioned the validity and generalizability of the said relationship on the other hand (Cook, 1985; Jacobson, 1988; Jacobson and Aaker, 1985). Schmalensee (1987), for instance, observed that businesses with relatively small market shares could be operating at levels greater than minimum efficient scale. Moreover, it had been found that small-share businesses could be as profitable as large-share businesses (Woo & Cooper, 1981). These point to the possibility of a non-linear relationship between the two variables.

Notwithstanding the above empirical evidence, there are numerous other empirical research that, in general, model market share as an antecedent of profitability (Szymanski, Mharadwaj & Varadarajan, 1993; Domowitz, Hubbard & Petersen, 1986). Two main theories and a supplemental one support this direct relationship between market share and profitability.

First, among others, Demsetz (1973) cited this relationship as being grounded in efficiency theory, that is, the cost efficiencies for firms with high market shares leads to greater profitability, a key argument in this study's model. The emphasis is on the cost side of the profit equation and scale economies.

Second, Schroeter (1988) placed emphasis on market power theory, that is, firms with high market shares are able to exercise market power to: a) set prices as opposed to being a price taker; b) obtain inputs at lower costs; and, c) extract concessions from channel members, another

key argument in support of this study's model. An often-cited example to illustrate market power is the U.S. retail giant Wal-Mart. Its local counterpart ShoeMart (SM) is not far from making its mark as a behemoth that practically holds Philippine competition by their necks.

Additionally, Smallwood and Conlisk (1979) point to product quality assessment theory, that is, buyers use market share as a signal for brand quality and a brand's widespread acceptance as an indicator of superior quality. The impact of this third theory may not be as significant as the first two but nonetheless merits mentioning especially so in a brand-conscious market like the Philippines.

In any event, little locally-published research has been unearthed in the direction of estimating the relative importance of the financing decisions of firms to overall profitability; hence the auxiliary focus of this paper.

III. DEVELOPING THE MODEL

Measure of Market Share

Tirole (1988) identified three examples of concentration indices namely, the m-firm concentration ratio, the Herfindahl index and the entropy index. These measures are all based on market shares and the calculations thereof require that market shares of all industry players (hence, the industry) be known or estimable with a reasonable level of accuracy.

There are several other alternative measures of concentration ratios. However, market share based on revenues seems to be the default measure particularly in the Philippines where other, perhaps more indicative, data such as production volumes (which are neutral with respect to price) or number of employees, are not as readily available, if at all.

Which measure of market share is then appropriate for use? Other market share variants (such as the range or midpoint of the range of concentration ratios) may be also be used but two are of particular interest. Absolute market share (or the ratio of a business' sales to total sales in the served market; henceforth referred to as AMS) is most common and is preferred when specific industries are studied. Schwalbach (1991) used this measure in studying 2,744 business units subdivided into eight business markets.

As an alternative measure, relative market share (or the ratio of a business' market share to the combined market share of its three largest competitors; henceforth RMS3) is preferred when cross-sectional data is pooled across industries. The business' scale and bargaining effects in its served market are thought to be captured better with relative market share measures (Szymanski et al., 1993).

Yet another common way of computing relative market share is to use the largest competitor's share in the denominator (henceforth RMS1). The sticking point with this method of computing relative market share is that the value computed for market leaders all equal 1. This results in a clustering of ROE values (exactly 25% of all corporations' ROE in this study) at that RMS1 value rendering a significant number of data points worthless.

Additionally, while absolute market share is measured in percentages, relative market share (RMS) being a ratio of market shares, the percentages in the numerator and denominator of the measure cancel out. These differences in scale properties could yield different estimates of the market share elasticity (Szymanski et al., 1993).

Therefore, it seems convincing enough to pick relative market share relative to its three largest competitors (RMS3) as the better

choice over absolute market share (AMS). This is so not only because of the aforementioned advantages of RMS use but also because, unfortunately, obtaining reliable estimates of industry size in the Philippines could present a reliability issue. For example, a number of inconsistencies were noted in a cursory review of the two secondary sources of information initially being considered for this study. Only one source or the other may be used, that is, the two cannot complement each other without risking gross errors in estimating market shares. This is so because the categorization of corporations into the Philippine Standard Industry Classification (PSIC) codes is not consistent between the sources. Therefore, potential errors in estimating industry size preclude the use of AMS.

Measure of Profitability

Which measure of profitability is most appropriate for use? It had been suggested in the literature that measuring profit as return on sales (ROS), rather than return on investment (ROI), understates profits and the magnitude of the market share - profitability relationship. Szymanski et al. (1993) found that market share – profitability findings differ when the measure of profitability used is return on investment (ROI), return on assets (ROA) or return on equity (ROE).

In any event, in order for the measure to be more encompassing and subsequently lend itself to isolating the financial leverage component, the so-called DuPont system (White, Sondhi and Fried, 1994) will be used. This system conveniently decomposes ROE into ROA and into the financial leverage multiplier (FLM).

Of related albeit minor interest would be to examine whether total asset turnover (TAT) would decline as the size of the corporation increases as Gupta (1969) had observed. So as not to deviate from our focus, this peripheral investigation is better reserved for future research.

Measurement Time Frame

Decisions at the corporate level and strategic business unit (SBU) level tend to be characterized by a relatively longer time horizon compared to decisions at the functional level. Because of this, measuring market share and profitability as a multi-year (for example, 4-year) average versus a 1-year estimate may be a preferred indicator of the effectiveness of strategic decisions.

Multi-year averages may also provide a better picture of the central tendency of business performance when performance fluctuates as a result of ups and downs in the economy. The effects of these external factors can be smoothed out through the use of a multi-year-averaged measure. Note that collapsing the values of the variables of interest over the years into a multi-year average has the effect of reducing the panel data set into one that is essentially cross-sectional.

In addition, when performance fluctuates because of additional factors, the probability that a multi-year average and a single-year estimate of performance are equal diminishes. Hence, on average, different estimates of the market share elasticity would be expected when 1-year versus 4-year averaged data are used (Szymanski et al., 1993). Melicher, Rush and Winn (1976) used 10-year averages.

This paper explores the impact of using multi-year estimates of the primary variables of interest as a natural extension of the paper given its data limitations.

For thoroughness, potentially relevant strategic- and market-specific factors (such as barriers to entry and exit, environmental stability, task variability, organization centralization and formalization, information quality and accessibility, managers' cognitive skills) should be identified and modeled. Capon, Farley, and Hoenig (1990), for instance, focused on variables like advertising to sales ratio, R&D to sales ratio, growth rate, and capital investment to size ratio. However, this would unduly enlarge

the scope of the paper and, hence, was intentionally not covered this time around but is a potentially fertile ground to explore in the future.

Perhaps a critical assumption implicitly made in the absence of immediately available secondary data is that it is highly unlikely that a new corporation will have made it to the Top 1000 list within two years of its inception. It is reasonable to assume that corporations established after 2004 (or after 1995) are not in the data set because they would not have had enough time (arbitrarily 2 years) to establish a stable market position by 2006 (or by 1997, the first year of the covered ten-year period) [Woodcock, Beamish & Makino, 1994].

The Model

Putting it all together, the model takes on the form of the classical multiple linear regression model.

[1] $\log(ROE_i) = \alpha_i + \beta_1 \log(NPM_i) + \beta_2 \log(FLM_i) + \beta_3 \log(RMS3_i) + \varepsilon_i$

with ***i*** number of observations.

The beta coefficients β_1 and β_2 are herein interpreted respectively as partial elasticities of ROE with respect to operating profitability as measured by NPM, and with respect to financing-related profitability as measured by FLM. β_3 is similarly the partial elasticity of return on equity with respect to market share as measured by RMS3 (Wooldridge, 2009). The corresponding hypotheses are:

H_{01} : Return on equity is positively and linearly related to market share.

H_{02a} : Return on equity is positively and linearly related to net profit margin.

H_{02b} : Return on equity is positively and linearly related to financial leverage.

H_{02c} : $\beta_1 = \beta_2$ or that the partial elasticities of ROE with respect to NPM and to FLM, respectively, are equal.

Form of the Relationship

Another kink in this debate is the nature of the relationships that were examined. Ravenscraft (1983) found support for the positive linear relationship between market shares and profitability as indicated by return on sales. He found that business units with market shares higher than 50 percent exhibit three times higher rates of return on investment (ROI) than business units which serve less than 10 percent of the market. Melicher et al. (1976) obtained a sort of "threshold" at 85% beyond which rates of return from operations are substantially higher. Whether leveraging will exhibit a "threshold" effect is also of interest.

Porter (1980), however, asserts that "There is no single relationship between profitability and market share . . ." Instead, Porter argues, "a U-shaped relationship between market share and profitability can be expected for that market." To examine potential non-linear relationships across markets one can impose various types of functional relationships and study the statistical significance of each type. This approach has been applied in several studies including this one.

For example, Gale (1972) and Shepherd (1972) imposed a curvilinear relationship next to a linear one and found opposite results for different data sets. While Gale's results favor a convex or U-shaped relationship, Shepherd's results indicate a weak concave relationship between profitability and market share.

While the two aforementioned empirical studies tested for a non-linear relationship, they assumed implicitly that a single relationship prevails across all markets.

Schwalbach (1991) imposed a polynomial function. He found that, for seven out of eight markets, the linear function approximated the true ROI - market share relationship as well as the quadratic and cubic functions. Only for the service market did a convex function provide a better fit.

Melicher et al. (1976), imposed linear relationships but divided their sample into nine concentration ratio groups each with an equal number of firms (55). A similar partitioning of data into nine concentration ratio groups was employed in this study and OLS regression equations estimated for each. This partitioning process transforms equation 1 into:

$$[2]\ \log(ROE_i) = \alpha_{ij} + \beta_{1j}\log(NPM_i) + \beta_{2j}\log(FLM_i) + \beta_{3j}\log(RMS3_i) + \varepsilon_i$$

where $j = 1, \ldots, 9$ is the j^{th} concentration ratio group.

IV. DATA

Business World publishes a yearly compilation of select and rather limited basic financial information on the top 1000 corporations (based on gross revenues) in the Philippines. The corporations are organized by decreasing annual gross revenue within each Philippine Standard Industry Classification (PSIC) Code. Groups of classes are, in turn, aggregated upwards into sectors as large as manufacturing, wholesale and retail trade, and financial intermediation and as small as health and social work, fishing, and mining and quarrying.

For purposes of this research, corporations "qualify" to be in the data set whenever there are at least four corporations listed under each of the PSIC Codes. It is worth noting the entire financial intermediation sector was excluded given that the composition of its liability accounts are inherently different in the manner by which their assets are funded from those of non-financial corporations. Moreover, the sector is very heavily regulated and the capital structure thereof potentially reflects monetary policy more than it does the impact of leveraging.

Some corporations were consistently in each of the ten years from 1997 through 2006. However, because most others pop in and out of the annual top 1000 list, we have an unbalanced panel that is at the same time not fixed (Green, 2008). A general profile of the initial panel is shown in Tables 1a and 1b.

Table 1a
Profile of the *Initial* Panel

Sector	Abbreviation	# of data points		
		'97-'06	'97-'01	'02-'06
Manufacturing	**MFG**	**1,013**	**480**	**533**
Wholesale and retail trade	**TRADE**	**548**	**248**	**300**
Transport, storage and communications	TRANS	107	43	64
Real estate, renting and business activities	REAL	99	43	56
Hotels and restaurants	HOTEL	63	31	32
Agriculture, hunting and forestry	AGRI	34	11	23
Construction	CONST	28	13	15
Electricity, gas and water supply	UTIL	26	16	10
Mining and quarrying	MINE	14	3	11
Fishing	FISH	7	0	7
Health and social work	HEALTH	7	3	4
		1,946	**891**	**1,055**

Table 1b
Secondary Classifications of the *Initial* Panel

Secondary Classifications	Abbreviation	# of firms		
		'97-'06	'97-'01	'02-'06
Exporter	EXP	786	341	445
Multinational corporation	MNC	723	297	426
Listed corporation	LIST	184	91	93

It is important to note at this point the conscious effort to present the ten-year data alongside its dissection into two 5-year sub-periods (1997–2001 and 2002–2006). Arguably, the Asian financial crisis of 1997 and the emergence of corporations therefrom through 2000 might have an impact on the conclusions derived from an analysis that entirely disregards any possible regime changes that might have characterized sub-segments of the study's ten-year period.

Several data points were also excluded because of extraordinary circumstances. For example, corporations reporting negative values of total assets or of stockholders equity and, likewise, those reporting gross profit margins of 100% or very close to 100% were dropped. Also, while it is perfectly possible for corporations to report losses in certain years, the (logarithmic) form of the profitability variable restricts net income to positive values only. Furthermore, holding companies (as opposed to operating companies) do not reflect valid and reliable industry-specific profitability numbers.

Moreover, because the data points will be subsequently partitioned into nine subsets based on increasing ranges of the primary independent variable RMS3, any analysis at the sectoral level will have to be limited to sectors that have sufficiently large numbers of data points. These sectors are MFG and TRADE.

In order to use ordinary least squares (OLS) regression, it is necessary to assume the independence of each observation of the relevant variables on the same corporation over the covered period. On one hand, treating same-company observations over different years as independent of each other

risks losing potentially substantial information. The alternative to assuming away independence is to calculate multi-year averages as described earlier.

More sophisticated modeling and data analyses are severely constrained by available data. There may have been difficulties on the part of the secondary information sources in disentangling the leaders' sales in the desired industry from their sales in other fields, for diverse activities may be housed under one roof. This is likely the explanation for the same corporation being classified differently by the only other secondary source. The literature cites these problems as seldom serious, however. "A much more vexing problem it seems arises in defining the industry meaningfully – that is, so that all firms which are competitors, and only those firms, are included" (Scherer, 1980, p. 59).

Noninclusion of strategic and market-specific variables in the model and the exclusion of additional secondary sources of data is a potential cause for model specification errors, e.g., not allowing for the inclusion of firm-specific intangibles, such as management skill and luck, in the profit model (Jacobson, 1988; 1990). A more complex theoretical model showing causal and spurious relationships between market share and ROI such as that modeled by Prescott, Kohli and Venkatraman (1986) could also be developed.

Furthermore, the ten years covered by this study may be of insufficient span to come up with reasonably well smoothed-out multi-year averages. Had the coverage been extended to, say, twenty years, there would be enough data points that might even allow for multi-year average analysis for same-number-of-year-averages. Indeed, if the data could be extended ten years back, the regime change analysis pre- and post- the 1997 Philippine financial turmoil could be assessed. Similarly, the data could be extended ten years forward to assess the impact of the global financial crisis that began to be really felt in the Philippines in 2008.

Data Analysis

A quick correlation assessment of the model's variables (see Table 2) confirms the earlier statement (and validates the regression model's specifications) that, of the return on assets (ROA) components, net profit margin (NPM) is more significantly correlated with ROE than is total asset turnover (TAT).

Table 2
Correlation of the Model's Variables with log(ROE)

	Correlation with log(ROE)			
Sector	**log(NPM)**	**log(TAT)**	**log(FLM)**	**log(RMS3)**
All Firms	0.4790	0.3127	0.2167	0.0112
MFG	0.6758	0.3073	0.1069	0.0263
TRADE	0.3944	0.2054	0.3261	0.0788

The process of partitioning the data into smaller groups in order of increasing concentration ratios is akin to a concept underlying differential calculus – that of approximating a curvilinear function as being linear within each partition. (Please contact the author for detailed correlation results.) Some general observations may be made.

Firstly, we can glean there isn't any apparent relationship between market share and return on equity as evidenced by the low values of the correlation coefficients between

log(RMS3) and log(ROE).

Next, overall, log(NPM) correlates better with log(ROE) than does log(FLM). This is more pronounced in MFG than in TRADE. Indeed, we find some exceptions to this general observation in the TRADE sector where, perhaps because of the nature of the industry, the extensive use of trade credit increases financial leverage; hence, conceivably playing a greater role in overall firm profitability relative to firms in other sectors.

Finally, there seems to be a threshold beyond which the correlation of log(FLM) with log(ROE) is significantly higher and this happens at the eighth or ninth concentration ratio group. This is consistent with the findings of Melicher et al. (1976).

If nothing else, the foregoing observations direct our attention to what might be expected when we subsequently estimate the regression coefficients. Table 3 summarizes data measures for the key model variables. The data sets arranged in increasing RMS3 are partitioned into groups that contain an equal (more or less) number of data points within. This partitioning process yields Table 4.

Table 3
Summary Measures of Data

	Summary Measures	1997 - 2006			1997 - 2001			2002 - 2006		
		All Firms	**MFG**	**TRADE**	**All Firms**	**MFG**	**TRADE**	**All Firms**	**MFG**	**TRADE**
		(n = 1,946)	*(n = 1,013)*	*(n = 548)*	*(n = 891)*	*(n = 480)*	*(n = 248)*	*(n = 1,055)*	*(n = 533)*	*(n = 300)*
ROE	Mean	0.2551	0.2394	0.2501	0.2658	0.2343	0.2589	0.2461	0.2440	0.2428
	Standard Deviation	0.5457	0.5064	0.2967	0.5884	0.4073	0.3203	0.5069	0.5817	0.2760
	Skewness	11.4	10.1	4.5	11.7	6.5	4.5	10.9	10.7	4.3
	Kurtosis	191.7	144.0	32.3	205.8	64.3	32.4	159.1	143.3	30.3
	Jarque-Bera Statistic	2,928,177	856,931	21,428	1,547,610	78,569	9,747	1,091,669	447,375	10,230
	J-B p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NPM	Mean	0.3004	0.0814	0.0895	0.5716	0.0979	0.1737	0.0713	0.0666	0.0199
	Standard Deviation	8.8986	0.5410	1.3291	13.1490	0.7774	1.9743	0.1254	0.1101	0.0296
	Skewness	43.6	30.3	22.9	29.4	21.5	15.4	4.3	6.0	4.3
	Kurtosis	1,911.7	946.0	533.0	874.4	467.4	240.3	29.7	58.2	30.3
	Jarque-Bera Statistic	296,000,000	37,684,759	6,461,197	28,320,027	4,349,535	591,667	34,541	70,974	10,242
	J-B p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FLM	Mean	6.9810	6.8819	8.3989	8.9841	9.8882	8.3717	5.2893	4.1746	8.4215
	Standard Deviation	65.2130	89.2186	15.3190	95.7025	129.3700	15.2283	10.3771	7.5587	15.4189
	Skewness	42.0	31.5	5.7	29.0	21.8	5.9	7.2	7.2	5.6
	Kurtosis	1,818.3	998.1	43.9	854.8	475.5	46.1	75.3	74.5	42.2
	Jarque-Bera Statistic	268,000,000	41,960,767	41,198	27,061,247	4,502,394	20,648	239,147	118,107	20,725
	J-B p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RMS3	Mean	0.4524	0.4055	0.5071	0.4665	0.4169	0.5319	0.4405	0.3953	0.4867
	Standard Deviation	0.7444	0.4912	1.0343	0.8494	0.6256	1.1487	0.6427	0.3261	0.9306
	Skewness	8.5	11.1	7.3	8.6	10.9	7.1	7.8	2.3	7.1
	Kurtosis	101.0	216.3	64.4	95.5	172.3	60.9	88.9	9.2	62.6
	Jarque-Bera Statistic	802,668	1,941,472	90,831	328,261	583,078	36,794	334,736	1,328	46,969
	J-B p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00

Table 4
Ranges of RMS3 by Concentration Ratio Group

Concentration Ratio Group	1997 – 2006								
	All Firms (*n=1,946*)			MFG Sector (*n=1,013*)			TRADE Sector (*n=548*)		
	Low	Mid-point	High	Low	Mid-point	High	Low	Mid-point	High
1	0.014	0.063	0.111	0.014	0.070	0.126	0.020	0.063	0.106
2	0.111	0.137	0.163	0.127	0.150	0.173	0.107	0.131	0.155
3	0.163	0.187	0.210	0.173	0.199	0.224	0.155	0.176	0.196
4	0.210	0.235	0.260	0.224	0.248	0.271	0.196	0.215	0.233
5	0.260	0.287	0.313	0.271	0.296	0.320	0.234	0.259	0.284
6	0.314	0.354	0.394	0.320	0.357	0.394	0.285	0.334	0.382
7	0.395	0.453	0.511	0.395	0.441	0.487	0.386	0.453	0.520
8	0.511	0.633	0.755	0.489	0.599	0.709	0.520	0.687	0.853
9	0.764	6.325	11.886	0.712	5.830	10.948	0.856	6.371	11.886

Concentration Ratio Group	1997 – 2001								
	All Firms (*n=891*)			MFG Sector (*n=480*)			TRADE Sector (*n=248*)		
	Low	Mid-point	High	Low	Mid-point	High	Low	Mid-point	High
1	0.016	0.060	0.104	0.016	0.060	0.103	0.020	0.066	0.111
2	0.104	0.132	0.159	0.108	0.134	0.160	0.113	0.134	0.155
3	0.159	0.181	0.202	0.160	0.184	0.208	0.162	0.180	0.198
4	0.202	0.230	0.258	0.209	0.238	0.267	0.199	0.219	0.238
5	0.259	0.287	0.315	0.267	0.293	0.318	0.242	0.270	0.297
6	0.315	0.359	0.402	0.318	0.361	0.403	0.297	0.345	0.393
7	0.403	0.452	0.501	0.404	0.443	0.481	0.394	0.442	0.490
8	0.505	0.637	0.768	0.481	0.606	0.730	0.493	0.658	0.823
9	0.775	6.331	11.886	0.732	5.840	10.948	0.832	6.359	11.886

Concentration Ratio Group	2002 – 2006								
	All Firms (*n=1,055*)			MFG Sector (*n=533*)			TRADE Sector (*n=300*)		
	Low	Mid-point	High	Low	Mid-point	High	Low	Mid-point	High
1	0.014	0.066	0.117	0.014	0.080	0.145	0.021	0.061	0.101
2	0.118	0.142	0.165	0.146	0.168	0.189	0.106	0.130	0.153
3	0.165	0.190	0.214	0.190	0.212	0.233	0.153	0.173	0.193
4	0.214	0.238	0.261	0.235	0.254	0.272	0.194	0.213	0.231
5	0.261	0.287	0.313	0.272	0.297	0.322	0.232	0.253	0.274
6	0.313	0.351	0.389	0.329	0.359	0.389	0.275	0.318	0.361
7	0.390	0.452	0.514	0.391	0.440	0.489	0.362	0.450	0.537
8	0.514	0.629	0.743	0.493	0.590	0.686	0.560	0.707	0.853
9	0.745	5.223	9.701	0.695	1.368	2.041	0.856	5.279	9.701

V. REGRESSION RESULTS

We now estimate the coefficients of regression using equation 2 for each of the concentration ratio groups within each sector and using equation 1 for all firms and entire sectors.[1] The following observations are made.

First, there is no evidence of a relationship between market share and return on equity. We had predicted this from the quick correlation analysis performed earlier. The t-statistics of the β_3 coefficients are not sufficiently high (or corollarily, p-values are significantly higher than 0.05). Sectoral regression results when the data sets are not partitioned are even better at the 5% level of significance. Further, the β_3 coefficients are either positive or negative about half the time.

We therefore reject our hypothesis H_{01} that return on equity is positively and linearly related to market share. Splitting the data into two 5-year periods does not change this conclusion.

Second, the β_1 and β_2 coefficients (of log(NPM) and of log(FLM), respectively) are consistently positive. The coefficients are significant at a level α = 1%.

We therefore accept our hypothesis H_{02a} that return on equity is positively and linearly related to net profit margin; and hypothesis H_{02b} that return on equity is positively and linearly related to financial leverage. Splitting the data into two 5-year periods does not change this conclusion either.

A Chow test for structural change was conducted to test if the β_1 coefficients, as well as the β_2 coefficients, are the same across the nine concentration groups. Table 5 shows that the F-statistics have p-values that are less than 1% signifying that we can reject the null hypotheses that there are no structural changes across the nine concentration ratio groups. (Splitting the data into two 5-year periods does not change this conclusion. The exceptionally high p-value of 0.125813 for TRADE in the first 5-year period may reflect the small sample size of 248.) This conclusion lends credence to the partitioning procedure. It may be conjectured that a greater number of observations would allow partitioning into an even greater number of concentration ratio groups for an even closer linear approximation of what might actually be a curvilinear relationship.

Table 5
Chow Test for Structural Change, Single-Year Estimates

	1997 - 2006		1997 - 2001		2002 - 2006	
Sector	**F-statistic**	**p-value**	**F-statistic**	**p-value**	**F-statistic**	**p-value**
All	2.363206	0.000028	2.439292	0.000019	1.729281	0.007515
MFG	2.837900	0.000000	2.774592	0.000002	2.734031	0.000002
TRADE	2.355857	0.000059	1.324267	0.125813	1.854374	0.004806

Third, following through with the "suggestion" early on of a threshold market share beyond which financial leverage may indeed play a significant role in enhancing profitability, we look at the β_2 coefficients by concentration ratio group. We find that the β_2 coefficients for the eighth and ninth concentration ratio groups are significantly higher than those for the other groups. Overall, the β_2 coefficient increases by 26%

going from the seventh to the eighth concentration ratio group signifying a threshold concentration ratio of about 76%. In MFG, the β_2 coefficient jumps up almost 88% going from the seventh to the eighth concentration ratio group signifying a threshold concentration ratio of about 71%. In TRADE, the β_2 coefficient jumps about 31% going from the seventh to the eighth concentration ratio group signifying a threshold concentration ratio of about 85%. These findings are similar to the 85% threshold value obtained by Melicher et al. (1976) although their threshold seems to be between the eighth and the ninth concentration ratio groups.

Moreover, we could superimpose a U-shaped curve, albeit of differing degrees of curvature, connecting the readings for each of the nine concentration ratio groups. This observation is consistent with the model Porter (1980) espoused as well as with the results obtained by Gale (1972). Melicher et al. (1976) did not observe a "threshold" at the lower concentration ratio groups. In this paper, such threshold with a value of 21% seems to exist between the 3rd and the fourth concentration ratio groups in all firms. Similar thresholds at the sectoral level are not as well defined and seem to occur between different sets of concentration ratio groups.

Lastly, the overall regression fit is quite good as evidenced by moderately high values of R^2, more so at the sectoral level than at the aggregate, i.e., all firms, level. Empirical evidence seems to validate the supposition that inter-industry differences get reflected as greater variability in aggregated data.

Multi-year Averaging

In this section we explore the impact of multi-year averaging. As mentioned earlier, multi-year averaging has the effect of collapsing the longitudinal dimension of the panel data into a cross-section of multi-year averages of the variables being studied. It is surmised that this simple approach will sufficiently address the limitations of the data that prevents its analysis as panel data. Its impact on the data profile is shown in Tables 6a and 6b.

Table 6a
Profile of the *Initial* Panel v *Multi-Year Averaged* Panels

Sector	Abbreviation	# of data points			
		Single-Year Estimates			Multi-Year Averages
		'97-'06	'97-'01	'02-'06	'97-'06
Manufacturing	**MFG**	**1,013**	**480**	**533**	**320**
Wholesale and retail trade	**TRADE**	**548**	**248**	**300**	**208**
Transport, storage and communications	TRANS	107	43	64	40
Real estate, renting and business activities	REAL	99	43	56	38
Hotels and restaurants	HOTEL	63	31	32	15
Electricity, gas and water supply	UTIL	26	16	10	12
Agriculture, hunting and forestry	AGRI	34	11	23	11
Construction	CONST	28	13	15	10
Mining and quarrying	MINE	14	3	11	7
Fishing	FISH	7	0	7	5
Health and social work	HEALTH	7	3	4	4
		1,946	**891**	**1,055**	**670**

Table 6b
Secondary Classifications of the *Initial* Panel v *Multi-Year Averaged* Panels

Secondary Classifications	Abbreviation	# of firms			
		Single-Year Estimates			Multi-Year Averages
		'97-'06	'97-'01	'02-'06	'97-'06
Exporter	EXP	786	341	445	252
Multinational corporation	MNC	723	297	426	227
Listed corporation	LIST	184	91	93	53

Obviously, the number of data points we are left with is substantially less than ideal. Sectoral analysis is no longer feasible for the TRADE sector because we will have concentration ratio groups with way less than 30 data points.

Results obtained from multi-year averaging are not as encouraging as from single-year estimates. The R^2 coefficients dropped somewhat. The p-values for the β_1 coefficient remain within the 1% significance level except for one instance at the 4th concentration ratio group in MFG. However, the statistical significance as indicated by the p-values of the β_2 coefficients has dropped. This is perhaps the result of the not-so-obvious redistribution of the corporations into the concentration ratio groups. This may have caused shifts in the data that obfuscates the clear patterns originally observed with single-year estimates.

This finding is seemingly in contrast with the results obtained by Melicher et al., in 1976. The difference lies perhaps in their use of ten-year averages for all corporations; whereas the multi-year averages in this study are a combination of single-year estimates and 2- and 3- . . . and 10-year averages. A certain degree of distortion is introduced by the use of differing number of observations used for averaging.

With the exception of the fourth concentration ratio group, the β_2 coefficients are generally higher than the β_1 coefficients but this relationship is not necessarily isolated at the extreme low or high ends. The same overall pattern seems to exist in comparison to single-year estimates.

The results of the Chow test for structural change in Table 7 shows that the significance has remained at the 1% level even with the averaging procedure.

Table 7
Chow Test for Structural Change, Multi-Year Averaged Data

Sector	F-statistic	p-value
All	1.714872	0.009144
MFG	3.489281	0.000000

Similar to our findings using single-year estimates, we find that the β_2 coefficients for the ninth concentration ratio group are significantly higher than those for the other groups. In the MFG sector, the β_2 coefficient almost doubles going from the eighth to the ninth concentration ratio group signifying a threshold concentration ratio of about 63%. In All Firms, the β_2 coefficient goes up 49% more going from the eighth to the ninth concentration ratio group signifying a threshold concentration ratio of about 67%. Please see Table 8 for ranges of AveRMS3.

We are no longer able, however, to superimpose a U-shaped curve because the lower-end thresholds no longer exist like they did with single-year estimates.

Table 8
Ranges of AveRMS3 by Concentration Ratio Group

Concentration Ratio Group	All Firms (*n = 670*)			MFG Sector (*n = 320*)			TRADE Sector (*n = 208*)		
	Low	Mid-point	High	Low	Mid-point	High	Low	Mid-point	High
1	0.017000	0.059000	0.101000	0.017000	0.071500	0.126000	0.020000	0.056500	0.093000
2	0.102000	0.131000	0.160000	0.128000	0.152000	0.176000	0.094000	0.121500	0.149000
3	0.161000	0.178500	0.196000	0.177000	0.197000	0.217000	0.151000	0.165500	0.180000
4	0.197000	0.220000	0.243000	0.217000	0.235500	0.254000	0.181000	0.195500	0.210000
5	0.244000	0.263000	0.282000	0.255000	0.275000	0.295000	0.212000	0.233500	0.255000
6	0.284000	0.309500	0.335000	0.296000	0.323000	0.350000	0.257000	0.280500	0.304000
7	0.335000	0.385500	0.436000	0.351000	0.401500	0.452000	0.305000	0.355500	0.406000
8	0.437000	0.554000	0.671000	0.454000	0.527500	0.601000	0.419000	0.545000	0.671000
9	0.673000	5.810500	10.948000	0.627000	5.787500	10.948000	0.684000	4.943500	9.203000

VI. CONCLUSION

It is indeed surprising to not find empirical evidence to support the fundamental market share – profitability relationship in Philippine corporations. The pursuit of greater market share as a strategy for obtaining higher profitability, while conceptually plausible, does not seem valid in the Philippine context over the ten-year period covered by this study.

Without unnecessarily implying causality, the role of financial leverage in enhancing overall profitability is strongly supported. This seems especially true among the largest corporations. The notion of an upper threshold market share is supported quite strongly. However, it is inconclusive to assume the existence of a similar threshold at the lower end of the spectrum.

VII. DIRECTIONS FOR FUTURE RESEARCH

On a broader and grander scale, following are directions for future research. First, there might be a need to assess the reliability of the publication Business World's Top 1000 Corporations in the Philippines as a research database and the validity of research findings based on it for bias in ways that could affect the magnitude of derived relationships. This would take the form of a meta-analysis the likes of which have been performed on research based on the PIMS (Profit Impact of Marketing Strategy) database.

Second, Schwartz and Aronson (1967), Scott (1972), and Scott and Martin (1975) have suggested that financial structures differ by type of industry. However, Remmers et al., (1974) conclude differently. A subsequent sectoral-level (rather than firm-level) analysis from this perspective would be a logical follow through investigation. Needless to say, this is contingent on being able to accurately estimate absolute market shares that were earlier mentioned as potentially containing gross errors.

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NOTES

[1] Detailed regression results may be obtained from the author.

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