Market Share Growth and Performance Measures: The Case of Large Versus Community Banks

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In this study we consider the relationship between profitability and market share for 2,438 U.S. bank observations between 2001 and 2008. We examine the relationship between both aggregate market share and the change in market share on measures of bank profitability for large and for community banks. We find that traditional relationships between market share and profitability generally do not hold for either large or community banks during our sample period. There appears to be fewer advantages to large banks making market share gains in terms of subsequent performance. Higher funding costs are negatively related to profitability for community banks but not large banks. Also, a higher proportion of interest income relative to total income is negatively related to profitability for both large and community banks.

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1. Introduction

The relationship between concentration and profitability has been of significant interest since the 1980s when consolidation in the banking industry became widespread. Much of the work in this area has focused on the relationship between concentration and monopoly rents earned by banks. The topic is again relevant as banks have and will continue to merge as a result of the financial crisis of 2007-2008.

Rhoades (1977) observes that the effect of concentration on performance was largely documented for industrial firms. However, in a survey of the literature, he finds little evidence of this relationship in financial firms. In a subsequent paper, Kurtz and Rhoades (1992) find that, in general, market share is directly related to profitability for financial institutions.

Smirlock (1985), following the work of Demestz (1973), Peltzman (1977) and Brozen (1982, argues that banks gain concentration as a result of superiority in gaining market share. He finds a distinct link between bank profitability and market share. In this paper, we provide further evidence that there is a link between bank profitability and market share, although we hypothesize that the relationship is different for large versus community banks.

In this paper, we investigate the relationship between the profitability of a bank to the bank's market share as well as to the change in market share. During the late 1970's and early 1980's, when the link between bank profitability and market share was last studied in depth, the banking industry experienced significant regulatory changes and consolidation. A new wave of mergers and acquisitions has emerged in the wake of the financial crisis of 2007-2008. Approximately 400 banks have failed since 2007 and even more have merged. Banks have been less willing to lend in the wake of the sub-prime mortgage crisis; and, with depressed market values, unused lending capacity and idle cash, mergers are attractive.

As in previous research in this area, the term "market" is defined as a metropolitan statistical area (MSA). We combine market share data from the FDIC Market Share Report with bank financial data from the FDIC Uniform Bank Performance Report. The FDIC market share data is hand collected for all banks in the 25 MSAs.

We explore three questions in this study. First, we seek to determine whether our data support previous conclusions that market share is positively related to bank profitability. Second, we test

whether the change in market share is positively related to bank profitability. Third, we examine whether the relationships between bank profitability and market share and bank profitability and the changes in market share are different for large banks versus community banks. We also explore other relationships, such as how funding costs and interest income as a percent of total income relate to ROA and ROE for large and for community banks. We add to the body of literature on bank profitability by reexamining the question of market share and profitability in a time of increased mergers and acquisitions activity following the sub-prime mortgage crisis. We also contribute to the sparse literature on how large banks versus community banks differ in terms of drivers of profitability.

The paper is organized as follows. In Section 2 we discuss background information regarding the subject of our research, and in Section 3 we highlight the relevant literature. Section 4 includes discussions of the data and methodology. Finally, we discuss the results and conclusions of the paper in Sections 5 and 6, respectively.

2. Background

There are many theories and much academic work devoted to the question of why banks exist. Banks are financial intermediaries. They improve the flow of information as a result of credit evaluation and monitoring of loan customers. Banks assist in the movement of capital from lenders (depositors) to borrowers. Banks pool funds from households and businesses and reduce risk by holding diversified portfolios of loans. However, banks continue to change. Both funding sources and sources of revenue are evolving. Deregulation has contributed to the ever changing role of banks. In addition, large banks are evolving in different ways than their smaller counterpart, community banks. Financial performance and the determinants of financial performance may differ based on the size of the institution.

Bank market share is typically defined by the bank's share of the deposit market. Deposits are a low-cost source of funds for banks and deposit market share is critical to a bank's viability in a highly competitive environment, although more so for community banks than larger banks. Over the last several decades, large banks have relied increasingly on wholesale funding, while community banks continue to use core (deposit) funding. Banks gain deposit market share via mergers and acquisitions as well as through organic growth. Superior service is often cited as a key to deposit market share growth. Community banks often distinguish themselves based on relationships with customers and on the service they provide.

Community banks are locally-owned and operated banking institutions that offer traditional banking services. A community bank is defined as a bank with total assets of $1 billion or less by the Federal Deposit Insurance Corporation (FDIC). This is the definition we use in this study to define a community bank although these banks are defined by more than asset size alone. Community bank managers often form one-on-one relationships with customers. Individuals who have checking accounts, savings accounts, money market deposit accounts and certificates of deposits at banks are the primary liability-side customers of community banks. The loan clientele typically consists of small, independent businesses. Smaller firms often prefer the local decision-making that they get from a locally-owned, community bank. Creating relationships with customers and cross-selling deposit and loan products has become more important in recent years. Some would argue that $1 billion in assets is too low a threshold to define a community bank. While we might agree, choosing the "correct" size is arbitrary, so we rely on the guidance of the FDIC.

Deposit growth has been declining in recent years, despite efforts to link liability-side and asset-side bank customers through relationship banking. Deposits as a percent of total bank funding have fallen from a peak of approximately 93 percent in the mid-1940s to around 65 percent today (FDIC Statistics on Banking, www2.fdic.gov/hsob/index.asp). By the end of 2007, approximately 44 percent of total U.S. bank assets were funded with core deposits, which include checking accounts, savings accounts, and small time accounts. However, bank funding differs depending on the size of the institution. The shift away from core deposits is most dramatic for large banks. For instance, core

deposits accounted for approximately 60 percent of funding for the smallest institutions but a mere 39 percent for the five largest banking institutions in 2009 (Lee and Rose, 2010). However, Lee and Rose also report that in a slight reversal of the long-term trend, core deposits actually grew by eight percent in 2009. Because market interest rates were so low, the opportunity cost of holding deposits was small. The idea of deposit "market share" and its relationship to profitability may differ based on the size of the institution.

In addition, wholesale sources of funding have become more important, especially for larger banks, leaving banks more exposed to liquidity and interest rate risks. For example, managed liabilities (e.g., large time deposits, Fed funds purchased, and repurchase agreements) accounted for approximately 23 percent of the smallest banks' funding but nearly 47 percent of the 10 largest banks' funding sources (Bassett and King, 2008). However, Lee and Rose (2010) point out that managed liabilities contracted 16.5 percent during 2009 alone. Bank balance sheets were shrinking and core deposit funding was increasing at the same time, reducing the reliance on managed funds, at least temporarily. Ironically, large banks were able to improve profitability more rapidly than smaller banks in 2009, because large banks shifted from managed deposits to core deposits, a shift that community banks could not make given their already significant reliance on core funding. Overall, the recent financial crisis has proved that banks are more vulnerable to all types of risk than perhaps thought.

3. Literature

Two strands of literature exist that are relevant to this study. First, we consider the related literature on market share and bank profitability. Second, we consider the literature on the differences between large banks and community banks with respect to profitability.

3.1 Market Share and Profitability

As noted by Rhoades (1977), the issue of market share and profitability has been widely examined in studies of industrial firms. In an early study, Buzzell, Gale and Sultan (1975) argue that the market shares of industrial firms and their respective returns on investments (ROI) are positively correlated. The authors note several possible reasons for the positive correlation. They indicate that economies of scale, market power, and the quality of the firm's management are likely reasons that high market share firms exhibit higher returns. They indicate that as industrial firms gain market share, they are likely to see higher profit margins, declining marketing costs as a percent of sales and higher-priced and higher-quality products. Interestingly, they find that businesses that sell infrequently purchased products to fragmented markets benefit most from larger shares of the market.

Gilbert (1984) performs an exhaustive survey of studies that link bank performance to market concentration. This relationship was an especially important one during the 1970s and early 1980s as the banking industry was undergoing significant regulatory reforms. Branch banking laws and interest rate deregulation were in the works during the period covered by the Gilbert study. Gilbert notes that most studies specify market areas as MSAs for urban banks, as we do in this study, and counties for more rural banks. He indicates that concentration is the relevant measure of market structure in most studies. In addition, he concludes that bank performance should be measured based on profit rates and not based on average interest rates and/or average service charge rates. In the survey of the literature, Gilbert surprisingly finds that concentration affects performance in the predicted direction in a mere 27 of the 56 studies examined. There are inconsistencies across the findings that make it difficult to draw definitive conclusions regarding market share and profitability.

Expenses impact profitability and there is mixed evidence regarding whether banks in more concentrated markets have higher expenses. One expects firms to engage in profit maximizing behavior. However, some managers act to maximize personal utility rather than shareholder wealth. Higher salaries, larger staffs, and significant perks are examples of "expense preference behavior."

Some evidence of expense preference behavior exists in U.S. banks and savings and loans. For example, Edwards (1977), Hannan (1979), and Hannan and Mavinga (1980) find that banks in concentrated areas have more employees than banks in less concentrated markets. Other studies such as those of Kalish and Gilbert (1973), Smirlock and Marshall (1983), Rhoades (1980) as well as Rhoades (1982) reject this hypothesis. For example, Smirlock and Marshall find that larger banks, rather than banks in highly concentrated markets, are more likely to engage in expense preference behavior.

Purroy and Salas (2000) focus on the strategic interaction between profit-maximizing banks and banks that exhibit expense preference behavior. The authors focus on the peculiar ownership structure of Spanish savings banks, which allows them to be non-profit maximizing and to exhibit expense-preference behavior. Spanish savings banks do not have shareholders per se. Workers and managers have control of the bank, and profits are either retained or allocated to social welfare programs. In Spain, they are viewed much like worker cooperatives. However, these savings banks compete in the Spanish retail banking market against profit-maximizing, commercial banks. The authors note that savings banks have increased their share of bank deposits from 30 percent to 50 percent over the last 35 years. However, while deposit market share was declining, commercial banks generally outperformed savings banks on measures of profitability and solvency. Purroy and Salas find that in an oligopolistic market, firms with expense preference behavior can outperform profit maximizing firms both in terms of market share and profitability. Choosing the right manager incentives to illicit the proper market-place aggressiveness for commercial banks is important. They also find that competition is more intense, both in homogeneous and differentiated product markets, if non-profit maximizing banks are present. They conclude that this may lead to solvency issues in the industry.

Several studies have shown that higher concentration in banking markets generally leads to higher loan rates and lower deposit rates. However, surprisingly, given this result, many studies find that profitability is not substantially increased (see Hannan, 1991; Berger 1995; and Berger and Hannan, 1997). One explanation is that while market power allows firms the benefits of higher pricing, it also may lead to higher non-interest costs.

To investigate this idea further, Berger and Hannan (1998) examine whether banking firms in highly concentrated markets are less cost efficient than those in more fragmented markets. The authors argue that several factors such as shirking managers, incompetence, and efforts spent on maintaining or gaining market share or the pursuit of other, non-profit maximizing goals may lead to lower cost efficiency in banks in more concentrated markets. They find strong evidence to support their hypothesis and suggest that the typical cost saving arguments made for horizontal mergers in banking may not be sound. But, as noted, both Edwards and Heggestad (1973) and Heggestad and Mingo (1976) indicate that an inverse relationship may exist between market power and higher profitability as banks focus more on risk mitigation than on expense preference behavior.

Edwards and Heggestad (1973) and Heggestad and Mingo (1976) theorize that higher concentration allows banks to hold less risky assets and does not necessarily result in higher profits as a result. In general however, the Gilbert (1984) survey finds little evidence from previous studies that banks in more concentrated markets pursue aims other than profit maximization.

Bourke (1989) identifies several internal factors that influence bank profitability including capital and liquidity ratios, the loan/deposit ratio (the inverse of the liquidity ratio), loan loss expenses, and overhead expenditures (see also Short, 1979; Bell and Murphy, 1969; and Kwast and Rose, 1982). Benston, Hanweck, and Humphrey (1982) and Short (1979) suggest that bank size and economies of scale serve as external factors impacting bank profitability. Other factors that explain better performing banks include higher levels of equity relative to assets (Demirguc and Huizinga, 1999; Goddard, Molyneux, and Wilson, 2004; and Pasiouras and Kosmidou, 2007) and lower overhead costs (Athanasoglou, Brissimis, and Delis, 2008).

A discussion of bank profitability would be incomplete without acknowledging the impact of the economic cycle on profitability. When economic conditions worsen, the quality of the loan

portfolio deteriorates, creating credit losses and a reduction in bank profitability. Issuing new equity for banks is costly due to agency costs and tax disadvantages relative to debt funding and thus banks reduce lending activity. This condition is known as the "bank capital channel". Van den Heuvel, (2003); Albertazzi and Gambacorta, (2009) acknowledge that bank profitability is pro-cyclical and note that cyclicality affects both net interest income (because, as noted, lending falls) and increased loan loss provisions due to weakening credit quality. The authors point out that while U.S. banks tend to have a higher ratio of non-interest income to gross income than banks in other countries, the observed high levels of pro-cyclicality is tied more closely to counter-cyclical provisioning policies.

DeYoung and Rice (2004) observe that non-interest income accounts for over 40 percent of operating income of U.S.-based banks, but that better-managed banks are less likely to pursue non-interest activities due to their inferior risk-return characteristics. The authors suggest that "large banks generate relatively more non-interest income; that well-managed banks rely less heavily on non-interest income; that relationship banking tends to generate non-interest income; and that some technological advances (e.g., cashless transactions, mutual funds) are associated with increased non-interest income while other technological advances (e.g., loan securitization) are associated with reduced non-interest income at banks" (p. 126). The authors find that overall, marginal increases in non-interest income result in higher bank profits. However, the profits are more variable. DeYoung and Rice conclude that during their sample period there is a worsening of the risk-return tradeoff for the average bank as a bank increases non-interest income relative to total income.

Smirlock (1985) argues that it is not concentration that drives performance as much as it is market share. He distinguishes between concentration and market share in an attempt to determine whether high levels of concentration in banking markets leads to monopoly profits. He contends that evidence to support the conclusion in previous studies is spurious and argues that most studies omit market share, the relevant variable in Smirlock's findings. He finds, in a study of 2,700 state banks, that once market share is accounted for correctly, bank profitability is not explained by concentration. Profitability is, however, positively related to the market shares of banks. Smirlock finds support for an "efficient structure hypothesis" instead and argues that high market share banks exhibit superior efficiency and that regulatory actions that penalize efficiency may actually harm economic welfare.

Exploring the impact of the financial crisis of 2007-2008 on Swiss banks, Dietrich and Wanzenried (2011) show that differences in bank profitability, measured by return on average assets (ROAA), can be explained by several factors. They find that better-capitalized banks are more profitable. Also, the cost-income ratio (non-interest expenses such as salaries and administrative costs over total revenues) explains differences in profitability prior to the crisis. The negative impact of loan-loss provisions relative to total loans is much stronger during the crisis, according to their analysis. In addition, they find a positive relationship, prior to the crisis, between the bank's loan volume and bank profitability. In addition, prior to the crisis, they find that banks with higher interest income relative to total income are less profitable.

In another recent paper, Kanas, Visiliou and Eriotis (2011) use a semi-parametric approach to analyze bank profitability. The authors use both ROA and ROE as measures of profitability in the study. They argue a semi-parametric approach is superior and compare linear and semi-parametric model results in an attempt to prove this. They find no relationship between bank profitability and the business cycle or short-term interest rates and inflation expectations using a linear regression model but find the variables do in fact have an impact on profitability when the model is re-specified. They believe that this has policy implications in the wake of the recent financial crisis and argue that policy makers, relying on linear regression models, may not truly understand the determinants of bank profitability.

The appropriate measure for evaluating bank performance has evolved over time. Cates (1996) points out that ROA was adopted by financial institutions to measure performance in the 1960s. ROA was an appropriate measure of performance in the 1960s because bank revenues and expenses originated on the balance sheet. Recently however, much of a bank's profitability, and risk for that

matter, is increasingly associated with off-balance sheet activities. Cates argues that ROE is a better measure because shareholders underwrite both the on and off-balance sheet risks of the bank. We consider both ROA and ROE in our study of performance variables and market share.

DeYoung (1997) argues that while accounting-based ratios are popular because they are simple to calculate and easy to use, they are misleading unless banks are of similar size, product mix and so on. He suggests there are ways to adjust accounting measures to make them more useful for analysis.

3.2 Community Banks versus Large Banks

Boyle (2007) points out that "despite the oft-heard arguments for economies of scale, mom-and-pop banks usually outperform the big boys in key metrics like return on assets and net interest margin (the banking equivalent of gross margin)" (p. 31). However, the superior performance on these two metrics may be dismissed given that community banks have fewer physical assets. Also, because community banks have close relationships with customers, they may be able to charge a premium for service, increasing overall performance.

Previous studies suggest that large banks may be able to influence markets to an extent that exceeds that associated with their market shares. This finding implies that, in markets where big banks already have market power stemming from a dominant position, additional market power may be exerted (Pilloff, 1999).

Emmons, Gilbert, and Yeager (2004) conclude that the maximum efficient asset size for banks is between $300 and $500 million. The authors argue that banks that are smaller than $300 million face increasing returns to scale while larger banks face constant or decreasing returns to scale. Operational economies of scale work against many community banks, which have asset sizes below the $300 million threshold. Because of the operational scale disadvantages faced by very small community banks, they conclude that these banks may have a more difficult time generating profits.

DeYoung, Hunter, and Udell (2004) examine the effects of a changing environment on community banks. They analyze the effects of deregulation, the creation of new financial products, advances in information technology, and increased competition on community banks. They note that the number and market shares of community banks have declined significantly since 1980. The authors conclude that the smallest community banks have size disadvantages and argue that these banks must be extremely well run in order to overcome these disadvantages and earn returns comparable to larger banks. However, DeYoung et al. suggest that for well-managed community banks, there are significant opportunities to compete and establish strategic positions.

In a 1973 article, Demsetz argues that differential efficiencies between large and community banks in various markets may explain the positive relationship between profit rates and concentration in MSAs, rather than more effective collusion among banks in concentrated regions. Gilbert (1984) points out that previous research finds support for this hypothesis, noting a statistically significant relationship between concentration and the performance of large versus smaller banks in the same market areas. He does note that previous research finds that there is no relationship between the profitability of small banks and market concentration but a statistically significant positive relationship between profit rates and market concentrations of large banks. Flannery (1981) does find that larger banks tend to be more resilient to market rate fluctuations than smaller banks.

In this paper, we examine whether market share is related to bank profitability. However, we take an alternative approach to previous studies and investigate not only the relationship between market share and profitability, but also the relationship between the change in market share and profitability. We are interested in whether gains in market share actually cost the firm, or are beneficial in terms of increasing profitability. In addition, we consider whether the relationships are similar for large and for community banks. To examine this question we divide the full sample into large banks and community banks. Our first hypothesis is that market share is positively related to bank profitability. Second, we hypothesize that the change in market share is positively related to

bank profitability. We also examine whether the relationships between bank profitability and market share and bank profitability and the changes in market share are different for large banks versus community banks. We also explore other relationships, such as funding costs and interest income as a percent of total income as they relate to ROA and ROE for large and for community banks.

4. Sample and Methodology

All financial data used in this study is obtained from the Federal Deposit Insurance Corporation (FDIC)'s "Uniform Bank Performance Report" (UBPR) for the years ended 2001 – 2008. The market share data is collected from the FDIC's Deposit Market Share Report. Data in the UBPR are collected from the Report of Condition and Income, commonly called the Call Report, which banks file quarterly. According to the FDIC website, the UBPR shows the impact of management decisions and economic conditions on banks' performance and balance sheet composition. The purpose of the report is to help users understand the financial condition (e.g., liquidity, capital, growth and asset/liability management) of participating banks. All commercial banks under the jurisdiction of the Board of Governors of the Federal Reserve System, the FDIC, or the Office of the Comptroller of the Currency are included. In addition, savings banks insured by the FDIC also appear in the database.

The total number of observations across the eight years of data (i.e., up to eight years of data for each bank) from the UBPR is 65,017. This total represents all bank filings over the eight year span of this study. To supplement the accounting data available in the UBPR, we next hand collect market share data from the "FDIC's Market Share Report." We randomly select 25 MSAs[1] from the five geographic U.S. regions (five per region) and collect data across the MSAs. (http://www2.fdic.gov/sod/sodMarketBank.asp?barItem=2). A complete list of the selected MSAs appears in Table 1, including their location, region, the number of banks included with the MSA. Market share data for banks are based on deposits within the MSA.[2] A total of 499 banks exist across the 25 MSAs surveyed. Robustness tests are conducted to ensure that the representative sample mirrors population characteristics using auxiliary data and ratio estimates with respect to average population served per bank within an MSA. The market share report provides deposit market share by geographic area. Deposits are based on the branch/office deposits for all FDIC-insured institutions as of June 30th of each year. The bank certification number is used to match data between the UBPR and the FDIC Deposit Market Share Report. Firms that acquired other banks within the eight-year window of our study were retained in the database. Duplicate records caused by acquired firms being assigned to the acquirer's certification number in the UBPR data were matched and adjusted for market share.

A total of 3,236 observations across the seven years (as one of our variables requires a calculated change in market share) remain based on available market share data. Next, we calculate the percentage change in market share, which creates seven years of year-over-year data between 2001 and 2008. In order to remove the effects of skewed data, we eliminate any change in market share which is higher than 100 percent or less than -100 percent.[3] After screening data for missing observations of the independent variables used in the regression models, a total of 2,438 observations remain.

There are 44 banks operating in more than one MSA in our sample. The market shares of these banks are different across different MSAs (because the FDIC separately lists deposits inside and outside the MSA for each bank). For example, Bank of America has unique values of market share for

[1] We sample 25 of the approximately 350 MSAs due to the efforts of hand collecting data. The MSA selections are balanced across the 350 regions. After separating MSAs by region, a random number table was used to select the five MSAs within each region. Since these MSAs are randomly selected, our choice of MSAs does not influence the results. We have tried the subsamples using 10, 15 and 20 MSAs and our results remain qualitatively similar.

[2] The FDIC separates deposits for each bank within a MSA by deposits inside and outside the MSA, which avoids complications arising for banks operating across several MSAs.

[3] Alternatively, we use a 500 percent market share screening criteria and observe similar results.

16 MSAs in our sample. On average, there are approximately 102 observations (21 distinct banks) in each MSA and the number of observations ranges from 57 to 169 (9 to 35 distinct banks). The average bank size (using total asset as a proxy) for each MSA is around $107 billion, with considerable variations in terms of total assets across different MSAs (with a standard deviation of $40 billion). This has raised a question that the economic activities for different MSAs may influence our interpretation of results. In our robustness tests section, we will control for MSA differences.

Table 1
MSAs in sample by state and region

MSA	State	Region	Banks
Buffalo-Niagara Falls, NY	NY	Northeast	19
Albuquerque, NM	NM	Mountain	23
Bakersfield, CA	CA	Pacific	22
Grand Rapids-Wyoming, MI	MI	Midwest	29
Columbia, SC	SC	South	31
Stockton, CA	CA	Pacific	25
Scranton-Wilkes-Barre, PA	PA	Northeast	26
Ogden-Clearfield, UT	UT	Mountain	19
Santa Rosa-Petaluma, CA	CA	Pacific	23
Reno-Sparks, NV	NV	Mountain	17
Salinas, CA	CA	Pacific	16
Trenton-Ewing, NJ MSA	NJ	Northeast	28
Ocala, FL MSA	FL	South	23
Atlantic City-Hammonton, NJ	NJ	Northeast	16
Appleton, WI	WI	Midwest	32
Anderson, SC	SC	South	21
Oshkosh-Neenah, WI	WI	Midwest	17
Alexandria, LA	LA	South	14
Billings, MT	MT	Mountain	13
Santa Fe, NM	NM	Mountain	11
Lewiston-Auburn, ME	ME	Northeast	10
Brunswick, GA	GA	South	16
Longview, WA	WA	Pacific	10
Grand Forks, ND-MN	ND-MN	Midwest	21
Fond du Lac, WI	WI	Midwest	17

An average of 348 observations (260 distinct banks) exists each year during our sample period, which ranges from 331 to 373 observations (252 to 269 distinct banks) each year. Across time, the average profitability of the banks in our sample changed considerably. For example, the average ROA ranges from 0.14 percent (in 2008) to 1.20 percent (in 2005). This suggests that different sample years may influence our interpretation of results as well. In our robustness tests section, we control for time differences.

To test whether the relationship between market share and profitability is the same for large and community banks, we divide the sample into large banks versus community banks based on a total asset cutoff of $1 billion[4]. There are 1,153 observations in the large bank sample and 1,285 observations in the community bank sample.

To test whether the relationship between market share and profitability changes over time, we divide the sample period into two sub-periods: 2001 – 2004 and 2005 – 2008. There are 1,015 observations in the former sub-period and 1,423 observations in the latter sub-period.

Sample characteristics of the whole sample and sub-samples are listed in Table 2. Note that the mean asset size for the total banks sample is approximately $100 billion. The total assets of the large

[4] We have also used $5 billion as our cutoff point to divide into large banks versus community banks. Our results remain qualitatively similar and therefore omitted for brevity.

banks in the sample average approximately $211 billion. The community bank average asset size is approximately $299 million. The smallest, large bank is approximately $1 billion while the largest bank in the sample is $1.7 trillion in asset size. The smallest community bank is a mere $2.95 million in total assets. ROA and ROE are quite close across samples, averaging approximately one percent and 10 percent respectively.

Table 2
Descriptive Statistics

Variable	Number of Firm Years	Mean	Standard Deviation	Min	Max
Whole sample	2,438				
Total asset (millions $s)		99,779.27	278,024.98	2.95	1,746,242.00
Market share (%)		5.54	7.37	0.00	73.13
Market share change (%)		1.90	22.44	-100.00	100.00
ROA (%)		1.01	1.05	-14.38	22.84
ROE (%)		10.46	12.33	-195.97	314.75
Community banks sample	1,285				
Total asset (millions $s)		299.29	230.85	2.95	995.98
Market share (%)		3.03	4.66	0.00	41.34
Market share change (%)		5.06	23.38	-100.00	100.00
ROA (%)		1.01	1.12	-14.38	22.84
ROE (%)		10.15	12.11	-87.30	314.75
Large banks sample	1,153				
Total asset (millions $s)		210,648.12	374,404.19	1,003.72	1,746,242.00
Market share (%)		8.34	8.71	0.00	73.13
Market share change (%)		-1.61	20.79	-100.00	100.00
ROA (%)		1.01	0.97	-11.48	4.82
ROE (%)		10.80	12.56	-195.97	54.73
Year 2001 – 2004	1,015				
Total asset (millions $s)		56,464.29	157,606.67	2.95	967,365.00
Market share (%)		5.69	6.98	0.01	37.39
Market share change (%)		2.76	22.58	-99.53	100.00
ROA (%)		1.18	0.94	-1.68	22.84
ROE (%)		12.30	7.00	-30.96	50.53
Year 2005 – 2008	1,423				
Total asset (millions $s)		130,675.06	335,357.45	3.08	1,746,242.00
Market share (%)		5.44	7.64	0.00	73.13
Market share change (%)		1.29	22.33	-100.00	100.00
ROA (%)		0.89	1.11	-14.38	6.39
ROE (%)		9.15	14.88	-195.97	314.75

Over the 2001 – 2008 sample period, there is a dramatic increase in total asset size. For example, the average asset size during the sub-period 2001 – 2004 is $56 billion, while the corresponding figure for the sub-period 2005 – 2008 is $131 billion. Merger and acquisition activities in the banking industry account for much of the change during the sample period. On average, banks experienced less market share change during the second sub-period compared with the first sub-period (1.29% vs. 2.76%). Also evident from Table 2 is that banks on average have lower profitability during the 2005 - 2008 sub-period compared with the 2001 – 2004 sub-period. These differences indicate that time period under investigation may have some effect on our results as well.

To test the relationships between return and market share, we employ the two models:

$$ROA_t = a + \beta_1 MKTSH_t + \beta_2 EA/TA_t + \beta_3 CAP\_EQ/TA_t + \beta_4 COST/INC_t + \beta_5 SIZE_t + \beta_6 INT/INC_t + \beta_7 FUND\ COST_t + \varepsilon_t \quad (1)$$

$$ROE_t = a + \beta_1 MKTSH_t + \beta_2 EA/TA_t + \beta_3 COST/INC_t + \beta_4 SIZE_t + \beta_5 INT/INC_t + \beta_6 FUND\ COST_t + \varepsilon_t \quad (2)$$

where:

MKTSH = log of market share (%)
ROA = return on assets
ROE = return on equity
EA/TA = earning assets as a percent of total assets
CAP_EQ/TA = equity capital divided by total assets
COST/INC = cost divided by total income (interest income plus non-interest income)
SIZE = log of total asset size
INT INC/INC= interest income divided by total income
FUND COST = interest expense divided by average total deposits

These remaining variables are common control variables used in bank profitability studies. Since equity capital to total assets is negatively correlated with ROE, we did not include the control variable CAP_EQ/TA in our equation (2) where ROE is the dependent variable. We take the log of the control variables MKTSH and SIZE as these two variables are highly skewed. The skewness is evident in the summary statistics reported in Table 1.

Alternatively, we run the models using percentage change in market share (MKT_CH) rather than the actual market share as follows:

$$ROA_t = a + \beta_1 MKT\_CH_t + \beta_2 EA/TA_t + \beta_3 CAP\_EQ/TA_t + \beta_4 COST/INC_t + \beta_5 SIZE_t + \beta_6 INT/INC_t + \beta_7 FUND\ COST_t + \varepsilon_t \quad (3)$$

$$ROE_t = a + \beta_1 MKT\_CH_t + \beta_2 EA/TA_t + \beta_3 COST/INC_t + \beta_4 SIZE_t + \beta_5 INT/INC_t + \beta_6 FUND\ COST_t + \varepsilon_t \quad (4)$$

5. Results

The regression results are reported in Tables 3 and 4. Table 3 reports the relationship between the total market share of a bank and the profitability of the bank for the whole sample and sub-samples. As described in the above equations, the dependent variable is profitability (ROA in Panel A and ROE in Panel B) and the independent variable of interest is aggregate bank market share.

Panel A in Table 3 indicates that market share is negatively related to ROA in the whole sample. However, the relationship is insignificant. When we examine the sub-samples, we observe a statistically significant (at the 5 percent level) negative coefficient for the community banks sample, but an insignificant coefficient for the large bank sample. Market share is negatively related to ROA in both the sub-period 2001 – 2004 (significant at the 5 percent level) and the 2005 – 2008 sub-period (significant at the 10 percent level). We do find significant relationships between profitability and bank capital. Banks with higher capital to asset ratios enjoy higher ROA. This result is similar across the entire sample as well as all subsamples with the exception of the 2005 – 2008 sub-period. A significant, negative relationship between ROA and the size of the bank also exists, evident in the whole sample as well as each sub-sample. However, when ROE is the relevant measure of return, size has a positive sign (significant at the 5 percent level) for community banks and a negative (significant at the one percent level) sign for large banks. This finding suggests that being a larger community bank has its advantages, perhaps in economies of scale, but being a smaller large bank is more advantageous. This is consistent with the work of Emmons, Gilbert, and Yeager (2004) who conclude that the maximum efficient asset size for banks is between $300 and $500 million. They suggest that banks that are smaller than $300 million face increasing returns to scale while larger banks face constant or decreasing returns to scale.

Table 3
Regression Results – Aggregate Market Share

Panel A. Regression results using ROA (%) as dependent variable

Sample	Intercept	Log (MKTSH)	EA/ TA	CAP_EQ/ TA	COST/ INC	Log (SIZE)	INT/ INC	FUND COST
Whole sample	9.226***	-0.017	0.047	0.989***	-5.282***	-0.122***	-5.228***	-0.190
Community banks	10.029***	-0.045**	-1.453**	1.554***	-5.741***	-0.100***	-4.459***	-13.375***
Large banks	7.395***	-0.008	3.492***	3.675***	-5.506***	-0.142***	-6.510***	-0.062
Year 2001 - 2004	11.466***	-0.039**	-4.382***	1.736***	-5.614***	-0.085***	-3.480***	0.041
Year 2005 - 2008	7.898***	-0.026*	2.459***	0.374	-5.398***	-0.130***	-6.155***	-0.317**

Panel B. Regression results using ROE (%) as dependent variable

Sample	Intercept	Log (MKTSH)	EA/ TA	CAP_EQ/ TA	COST/ INC	Log (SIZE)	INT/ INC	FUND COST
Whole sample	42.517***	0.267	30.561***		-36.783***	-0.629***	-40.072***	-1.801
Community banks	16.552	0.214	15.841*		-20.133***	0.905**	-22.622***	-82.577***
Large banks	79.543***	0.086	46.481***		-61.226***	-1.471***	-74.634***	-1.289
Year 2001 - 2004	32.724***	-0.075	22.944***		-35.564***	-0.053	-29.658***	0.680
Year 2005 - 2008	50.742***	0.172	27.381**		-42.383***	-0.824***	-42.327***	-2.516*

Note: Table 3 reports the regression results using aggregate market share as independent variable. Variables are defined as follows: MKTSH = log of market share (%), ROA= return on Assets, ROE= return on Equity, EA/TA= earning assets as a percent of total assets, CAP_EQ/TA= equity capital divided by total assets, COST/INC= cost divided by total income (interest income plus non-interest income), SIZE =log of total asset size, INT/INC= interest income divided by total income, FUND COST= interest expense divided by average total deposits. We take the log for control variables MKTSH and SIZE in our regressions as these two variables are skewed. Since equity capital to total assets is negatively correlated with ROE, we did not include the control variable CAP_EQ/TA when we use ROE as dependent variable. ***indicates significant at the 1 percent level; **indicates significant at the 5 percent level; *indicates significant at the 10 percent level.

The results also suggest that the higher the proportion of interest income to total income, the lower ROA. Again, this is true across samples. Although analyzed in a different way, this result is consistent with DeYoung and Rice (2004) who find that the more non-interest income to total income a bank has, the higher the bank's profitability.

Finally, in contrast to large banks, the higher a smaller bank's funding costs relative to total deposits, the lower the bank's ROA. This finding is significant at the one percent level and interestingly does not hold true for large banks. This result may be the case because of the different ways large banks generate profits relative to small banks. Community banks still largely rely on the traditional banking model of taking in deposits for the purpose of making loans. The spread (i.e. the difference between the two rates), is a key driver of performance. Conversely, large banks engage in a wider variety of profit-generating activities along several lines of business. They are more likely to engage in off-balance sheet activities as well as non-traditional banking activities. As a result, the cost of funding may be more relevant to a smaller bank's bottom line than to a larger bank's profitability.

Panel B indicates the relationship between aggregate market share and ROE. Generally we do not find a significant relationship between market share and ROE except for the whole sample (positive and significant at the 10 percent level). It is interesting to note that the size variable is related to ROE differently for large and community banks. The size coefficient is positive and

significant at the five percent level for community banks but negative and significant at the one percent level for large banks. This implies that while deposit market share may not be related to a community bank's profitability, being relatively larger than other small banks improves ROE. However, within the larger bank category, being larger is not beneficial. Finally, consistent with the ROA results, a higher proportion of interest income to total income is negatively related to ROE for both large and community banks (significant at the one percent level). Also, higher funding costs are again significantly negatively related to ROE for community banks, but unrelated to ROE for large banks.

Table 4
Regression Results – Percentage Change in Market Share

Panel A. Regression results using ROA (%) as dependent variable

Sample	Intercept	MKT_CH (%)	EA/ TA	CAP_EQ/ TA	COST/ INC	Log (SIZE)	INT/ INC	FUND COST
Whole ample	9.394***	-0.315***	0.135	0.899**	-5.281***	-0.130***	-5.287***	-0.197
Community banks	10.179***	-0.253**	-1.223*	1.584***	-5.647***	-0.107***	-4.589***	-13.062***
Large banks	7.603***	-0.279***	3.389***	3.499***	-5.495***	-0.147***	-6.511***	-0.074
Year 2001 - 2004	11.811***	-0.307***	-4.316***	1.717***	-5.583***	-0.100***	-3.545***	0.002
Year 2005 - 2008	8.079***	-0.314***	2.593***	0.340	-5.376***	-0.139***	-6.241***	-0.302*

Panel B. Regression results using ROE (%) as dependent variable

Sample	Intercept	MKT_CH (%)	EA/ TA	CAP_EQ/ TA	COST/ INC	Log (SIZE)	INT/ INC	FUND COST
Whole sample	39.723***	-2.840***	32.068***		-37.241***	-0.592***	-39.910***	-2.141
Community banks	14.149	-1.241	16.282*		-20.652***	0.984**	-22.139***	-83.426***
Large banks	79.767***	-4.597***	47.175***		-61.066***	-1.511***	-75.364***	-1.593
Year 2001 - 2004	33.328***	-0.777	23.180***		-35.508***	-0.083	-29.793***	0.573
Year 2005 - 2008	48.753***	-4.355***	28.864***		-43.042***	-0.815***	-42.097***	-2.691

Note: Table 4 reports the regression results using percentage change of market share as independent variable. Variables are defined as follows: MKT_CH= percent change in year-over-year market share, ROA= return on Assets, ROE= return on Equity, EA/TA= earning assets as a percent of total assets, CAP_EQ/TA= equity capital divided by total assets, COST/INC= cost divided by total income (interest income plus non-interest income), SIZE= log of total asset size, INT/INC= interest income divided by total income, FUND COST= interest expense divided by average total deposits. We take the log for control variable SIZE as it is skewed. Since equity capital to total assets is negatively correlated with ROE, we did not include the control variable CAP_EQ/TA when we use ROE as dependent variable. ***indicates significant at 1 percent level; **indicates significant at 5 percent level; *indicates significant at 10 percent level.

Thus, for the smallest banks, our evidence suggests that market share is negatively related to profitability. Also, market share is generally negatively related to large bank profitability as well. This result does not support the widely held view that the greater the market share, the greater a company's profitability. However, this community bank finding may support the conclusions of DeYoung, Hunter and Udell (2004). They argue that it is more important for smaller institutions than larger institutions to be well managed. For some smaller institutions this may mean forgoing market share in exchange for other, profit maximizing goals. Thus, the direct relationship between market share and profitability, as documented in several studies (see e.g., Smirlock, 1985), does not hold true for larger or for community banks in this study. In fact, while aggregate market share does not seem

to matter at all to the profitability of large banks (insignificant for both ROA and ROE), it is negatively related to the ROA of community banks and unrelated to the ROE of community banks.

In Table 4 the year-to-year change in market share is included rather than the aggregate market share of the bank. The results in Table 4 are interesting for a number of reasons. First, Panel A indicates that the percentage change in market share is negatively related to ROA in each model. This seems counterintuitive. One would expect that increasing market share would be positively related to ROA, else why would banks do it? However, it could be that garnering the added share is costly and requires non-profit maximizing behaviors. Also, mergers are not always beneficial at the start so in-so-far as the market share gains are the result of mergers and acquisitions, they may, at least initially, not increase a bank's profitability.

Panel B is interesting as well. While there is a negative relationship between the change in market share and the ROE of large banks (significant at the one percent level), the relationship is insignificantly different from zero in the community banks sample. This implies that garnering additional market share erodes the wealth of shareholders who own large bank stocks, but is irrelevant to the shareholders of community banks.

In addition, the signs and significances of other variables such as interest income to total income and interest expense to total deposits are similar to the results in Table 3.

6. Robustness Tests

6.1 Control for Fixed Effects

The results to this point use a pooled OLS regression model. When we divide the whole sample into sub-samples, we find that the effects of market share on profitability are different between large and community banks as well as across different sub-periods. Also, from Table 1, we find that banks are typically smaller during the sub-period 2001 – 2004 compared with the sub-period 2005 – 2008. This finding casts doubt on whether our results are driven by the bank size or by the time periods.

In addition, as noted previously, well-known effects of the business cycle on the profitability of banks exist (see for example, Flannery, 1981; and Albertazzi and Gambacorta, 2009). Also, our sample spans eight years. There may be large macroeconomic fluctuations and policy changes during this period. Moreover, different MSAs may have different levels of economic activity, and this difference may also influence our results.

To control for the differences across time and MSAs, we include "year" and "MSA" dummy variables and use a general linear model (GLM) to re-estimate the effect of market share and the percentage change in market share, on profitability

Table 5
Regression Results – Controlling for Fixed Effects

Panel A. Regression results after controlling for fixed effects - aggregate market share as independent variable

Dep. Variable	Log (MKTSH)	EA/ TA	CAP_EQ/ TA	COST/ INC	Log (SIZE)	INT/ INC	FUND COST
ROA (%)	-0.048***	0.074	1.235***	-5.500***	-0.093***	-4.553***	-0.070
ROE (%)	-0.080	29.049***		-38.787***	-0.346***	-33.223***	-0.784

Panel B. Regression results after controlling for fixed effects - change in market share as independent variable

Dep. Variable	MKT_CH (%)	EA/ TA	CAP_EQ/ TA	COST/ INC	Log (SIZE)	INT/ INC	FUND COST
ROA (%)	-0.219***	0.183	1.302***	-5.437***	-0.108***	-4.669***	-0.051
ROE (%)	-2.554**	30.019***		-38.773***	-0.395***	-33.592***	-0.862

Note: Table 5 reports the regression results of after controlling fixed effects of time differences and MSA differences. We include "year" dummies and "MSA" dummies and use general linear model (GLM) to re-estimate the effect of market share (market share percentage change) on profitability. We omit the regression coefficients for year dummies and MSA dummies for brevity. ***indicates significant at the 1 percent level; **indicates significant at the 5 percent level; *indicates significant at the 10 percent level.

. Our results are reported in Table 5. We omit the regression coefficients for both categories of dummy variables for brevity. The results indicate that the negative relationship between market share (or the percentage change in market share) and ROA remain robust after controlling for fixed effects. Similar to the results in Table 3, we find somewhat weaker effects when ROE is used as the dependent variable. The change in the market share variable is statistically significant but the aggregate market share variable is insignificant.

6.2 Control for Endogeneity

Although the results in the previous sections indicate that banks with larger changes in market shares have lower profitability, the results may be driven by endogeneity issues. For example, banks may simultaneously decide the interest rate paid on deposits (which will affect the amount issued and thus market share) and asset risk, which ultimately affects bank profitability. We employ the following structural model to further examine the effect of market share on profitability after controlling for a possible endogeneity problem:

$$EA/TA_t = a_0 + a_1 MKTSH \text{ (or } MKT\_CH_t) + a_2 ROA_t(\text{or } ROE_t) + \eta_t \quad (5)$$

$$ROA_t(\text{or } ROE_t) = \beta_0 + \beta_1 MKTSH \text{ (or } MKT\_CH_t) + \beta_2 CAP\_EQ/TA_t + \beta_3 COST/INC_t + \beta_4 SIZE_t + \beta_5 INT/INC_t + \beta_6 FUND\ COST_t + YEAR\ DUMMIES + MSA\ DUMMIES + \varepsilon_t \quad (6)$$

Table 6
Regression Results – 2SLS Regression

Panel A. 2SLS regression results after controlling for fixed effects - aggregate market share as independent variable

Dep. Variable	Intercept	Log (MKTSH)	CAP_EQ/ TA	COST/ INC	Log (SIZE)	INT/ INC	FUND COST
ROA (%)	7.563***	-0.048***	1.221***	-5.506***	-0.094***	-4.549***	-0.069
ROE (%)	53.554***	-0.080		-41.122***	-0.499***	-30.690***	-0.499

Panel B. 2SLS regression results after controlling for fixed effects - change in market share as independent variable

Dep. Variable	Intercept	MKT_CH (%)	CAP_EQ/ TA	COST/ INC	Log (SIZE)	INT/ INC	FUND COST
ROA (%)	8.007***	-0.218***	1.268***	-5.453***	-0.109***	-4.659***	-0.049
ROE (%)	54.843***	-2.279**		-41.166***	-0.549***	-30.964***	-0.555

Note: Table 6 reports the 2SLS regression results. We employ the following structural model to further examine the effect of market share on profitability after controlling for possible endogeneity problem: $EA/TA_t = a_0 + a_1 MKTSH \text{ (or } MKT\_CH_t) + a_2 ROA_t(\text{or } ROE_t) + \eta_t$; $ROA_t(\text{or } ROE_t) = \beta_0 + \beta_1 MKTSH \text{ (or } MKT\_CH_t) + \beta_2 CAP\_EQ/TA_t + \beta_3 COST/INC_t + \beta_4 SIZE_t + \beta_5 INT/INC_t + \beta_6 FUND\ COST_t + YEAR\ DUMMIES + MSA\ DUMMIES + \varepsilon_t$. We estimate the above model using the two-stage least squares (2SLS). We omit the control variable CAP_EQ/TA in equation (6) when we use ROE as dependent variable. We also include "year" dummies and "MSA" dummies to control for fixed effects in equation (6). Because the primary purpose of the above regression model is to measure the effect of market share on bank profitability, we report only the results of regression model (6). We also omit the regression coefficients for year dummies and MSA dummies for brevity. ***indicates significant at the 1 percent level; **indicates significant at the 5 percent level; *indicates significant at the 10 percent level.

We estimate the above models using the two-stage least squares (2SLS) approach[5]. We omit the control variable CAP_EQ/TA in equation (6) when we use ROE as the dependent variable. We also include "year" dummies and "MSA" dummies to control for fixed effects in equation (6). Results are reported in Table 6. Because the primary purpose of the above regression model is to measure the effect of market share on bank profitability, we report only the results of regression model (6) in Table 6. We also omit the regression coefficients for year dummies and MSA dummies for brevity.

[5] We have also used lagged independent variables to further control for the endogeneity issues. Our results are qualitatively similar and therefore omitted for brevity.

The results are consistent with our previous findings: the change in market share is negatively related to profitability, and the results are robust after we control for fixed effects of time and MSA differences, and possible endogeneity issues.

7. Conclusions

In this study, we examine the relationship between market share and bank profitability in a sample of 2,438 bank observations across 25 MSAs in the U.S. We define a community bank as one with total assets of $1 billion or less. We specifically consider whether our results are consistent with previous research which generally finds a positive relationship between bank market share and profitability. We generally do not find support for the positive relationship between market share and bank profitability, as reported in many earlier studies. While we do find some differences between profit drivers for community banks versus large banks, we find it largely relating to size issues and funding costs.

With respect to aggregate market share, we do find some differences between large versus community banks when we use ROE as a profitability measure. While the whole sample does exhibit a marginally-significant positive relationship between aggregate market share and bank profitability, neither subsample shows a statistical relationship. However when profitability is defined as ROA, we find a negative relationship between profitability and market share for the community bank sample.

In addition we find that there is a statistically significant negative relationship between ROA and changes in market share for the whole bank sample and for both large banks and community banks. The result is insignificant for the community banks sample when ROE is used as a measure of profitability, but is negative and significant at the one percent level when large banks are considered. Concentrating the ROE measures, which are more of an industry standard, these findings suggest that attaining higher market shares may not be in the best interests of large bank managers. While there is no negative consequence to gaining market share in terms of return generated for shareholders, as there appears to be for larger banks, no payoff to attaining higher market share either. Market share appears to be less relevant overall to community banks than to large banks.

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