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How Total Asset Size Impacts Commercial Bank Financial Performance



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By

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I hereby recognize and pledge to fulfill my responsibilities as defined in the Honor Cody and to maintain the integrity of both myself and the College as a whole.

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Abstract

Commercial banks are crucial pillars of economic and financial stability in a society. This research analyzes the impact American commercial bank asset size has on financial performance. More specifically, this work investigates the variability of firm ROA as it relates to changes in asset size across commercial banks. This information could be useful to both commercial bank leadership when executing management strategy and investors seeking to predict firm profitability. Through multiple regression analysis, it was determined that total asset size within a commercial bank is not a key factor that impacts ROA. The results of the regression analysis suggest that how a firm acquires its revenues is a better indicator of future performance. Specifically, the more non-interest income that a firm generates, the better it will perform. Non-interest income is generated from consumer and account-related fees. The clear implications here are that commercial banks should focus heavily on non-interest revenue generation, and investors seeking returns should put capital into banks that focus less on lending.

Table of Contents

Chapter 1: Introduction……..1

Chapter 2: A Literature Review……3

Chapter 3: A Theoretical Framework……22

Chapter 4: Empirical Analysis……34

Chapter 5: Conclusion……42

References……46

List of Tables & Figures

Figure 3.1 Economies of Scale Graph……..24

Table 4.1 Summary Statistics……37

Table 4.2 Regression Models 1-4……..38

Chapter 1: Introduction

The banking industry is immensely influential in our daily lives as Americans. The United States financial industry is built on and operated largely through banks. Millions of Americans utilize the banking industry as an avenue to realize their larger personal and professional goals. Commercial banks play a vital role in financing many milestone achievements throughout an individual's life. Providing loan money for a college education, financing a mortgage on a home, and carrying out investment and trading activities on behalf of a client are some examples illustrating the importance of commercial banks in our society. I have taken a personal interest in the banking industry for this research because it is instrumental and directly correlated to America's economic success and sustainability. The central research question of this work revolves around commercial banks of various asset sizes and the overarching goal of this study is to determine how commercial bank size affects profitability. I aim to analyze the determinants of profitability across small, medium, and large-sized commercial banks in terms of total assets. Some of the factors that will be assessed in analyzing bank performance and operations are technology, product diversification, and relationship management, amongst others.

Similar questions have been analyzed by other banking scholars in the past. This work will build on prior research by analyzing specifically the 2016 fiscal year, intentionally following the period after the Great Recession of 2008. The profit data after the financial crisis will provide insights regarding consumer behavior and preferences towards commercial banks of varying sizes. It will also illustrate the regulatory impacts brought on by the government and how firms have responded. An ancillary goal of this research is to determine optimal

operational size in terms of total assets for a commercial bank in the United States. Products and services offered and geographical locations are considered to be a function of total assets within a firm.

The findings of this study could be useful for bank leadership, value-seeking shareholders, and general customers searching for a commercial bank to work with. Successfully determining the optimal operational size to make profits will provide a benchmark for bank leadership to strive for. It is the fiduciary responsibility of executives to maximize profits for shareholders and this research could provide a strong argument for shaping a commercial bank's form and operations. Value-seeking shareholders may also take an interest in this research. The central goal of investing is to purchase the rights to future firm profits or dividends. Ceteris paribus, these individuals would be able to use the findings of this work as a key factor when choosing to invest their wealth in firms that are poised to make the most profit. Finally, customers looking for commercial banks to start savings account with could also utilize the findings of this work. With profitability in a bank also comes stability. Highly profitable organizations are capable of withstanding economic volatility and outside influences without issue. A customer is entirely concerned with stability regarding their personal savings accounts. Profits and stability are closely linked together, and this work will be beneficial to the individuals who are solely concerned with preserving their wealth in a commercial bank.

Chapter 2: A Literature Review

The literature review chapter focuses on previous studies regarding bank performance. To briefly restate the research question, the goal of this work is to determine how bank size impacts profitability of US commercial banks throughout a period of time after the Great Recession of 2008. Each study in certain ways focuses on profitability and other various determinants of bank success both in the United States and abroad. The five papers specifically look at the long term survivability of small banks, the size-profit relationship in banking, performance of US commercial banks in the early 2000s, dynamics of bank profitability, and an empirical study of Jordanian commercial banks. Analyzing these previous works may help answer the research question addressed in this paper because the findings will shed light on how commercial banks have performed across various time periods outside of the financial crisis.

Ndu and Wetmore (2006) analyze the survivability of small commercial banks by examining bank performance between 1997-2002. Key indicators that serve as a benchmark to determine viability and success are the Profit Efficiency Test (PROFEFF), profitability ratio (ROA), and various credit risk indicators such as provision for loan loss, actual loan loss, and non-current loan. The indicators are used to evaluate and compare the success of small U.S. commercial banks with asset size less than $25 million, small banks with asset size less than $1 billion, medium size banks with assets between $1 billion and $5 billion, and large banks with assets greater than $5 billion throughout the study period.

Previous literature cited by Ndu and Wetmore (2006) state that there are many regulatory processes that potentially could threaten small banks. These threats include the

introduction of interest bearing bank accounts, the removal of regulatory ceilings on bank deposit rates, relaxing of branching laws, increased competition from non-banking firms, and the emergence of mega banks through mergers and acquisitions. Furthermore, advances in technology and banking production techniques have eliminated the main advantage small banks possess - personal interaction between bankers and customers. This has contributed the the marginalization of some small banks and a dramatic increase in the proportion of bank failures among small firms.

Shaffer (1985), Hunter and Timm (1986), Evanoff, Israilevich and Merris (1990), and Shaffer and David (1991) cited by Ndu and Wetmore (2006) also find that multibillion dollar banks experience significant economies of scale, but in contrast some researchers have found that increasing bank size does not correlate to cost savings. There is research that illustrates a positive outlook for small firms such as the fact that small banks have a comparative advantage over large firms because of “soft” information. This essentially means getting to know customers and clients on a more personal level. Similarly, small banks have been found to gain a higher ROA than large banks, and it is suggested that ceteris paribus, small banks in small areas can charge higher rates due to monopoly power.

Ndu and Wetmore (2006) lay out clear hypotheses that there may be no difference between net interest income of large and small banks, or there is a noteworthy difference between the two. The authors gathered their data on all banks ranging in size from less than $25 million to greater than $5 billion from the Federal Reserve Bank of Kansas City, the Federal Reserve Bank of Chicago, the FDIC, and the Federal Financial Institutions Examination Council Internet Reporting System, all of which is publicly available. The sample is restricted by

establishing a clear time period of the study between 1997 - 2002 and the number of observations recorded in each year decreases. They studied 2,579 banks in 1997, 2,651 in 1998, 2,655 in 1999, 2,693 in 2,000, 2,724 in 2,001, and 2,728 in 2,002.

The variables in the model are profit efficiency and return on assets. Profit efficiency in simple terms is used as a measure of determining how a firm internally allocates resources. Ndu and Wetmore (2006) contend that profit efficiency can be a determinant of operational efficiency. The authors also calculate the return on assets. The mean of the two variables is then used to compare banks of differing sizes. According to Ndu and Wetmore (2006), "The profit efficiency test and the return on asset analysis give an indication of profitability and degree of management efficiency and effectiveness in the utilization of bank assets. (P. 125)" The utilization of the profit efficiency test and return on asset analysis allow for small, medium, and large banks to be compared on a level playing field despite drastic differentiation in asset size.

Multiple regression is used as the empirical methodology in this study. Through the regression analysis, Ndu and Wetmore (2006) concluded that small banks are the least profit efficient institutions while medium sized banks are the most profit efficient. These findings are inconsistent with previous scholarly work that reports that large banks have greater profit efficiency than small banks. Similarly, the return on asset analysis indicates that small banks have the lowest ROA, or are the least profitable. Specifically, banks with less than $25 million in total assets are consistently the least profitable institutions in the study. The authors found again that medium sized banks have the highest return on assets and are the most profitable. Ndu and Wetmore (2006) found contrary information to previous scholarship that reports that

small banks have higher return on assets and profitability than large banks. This discrepancy in results across studies tells us that there are many exogenous factors that influence bank performance. Different time periods could yield different results. The current state of the economy or the economic outlook could be vastly different across studies, distorting the results and conclusions.

Ndu and Wetmore (2006) come to the conclusion that small banks are both the least profit efficient according to the profit efficiency test and are the least profitable according to the return on asset analysis. They also found that banks with $25 million or less in assets record the highest amount of non-interest income, while conversely banks with $1 billion or less in assets boast the lowest amount of non-interest income. The authors found that differences in profitability and efficiency did not test significantly across bank sizes. The statistical tests would indicate that small banks perform almost as well as their medium and large competitors, and are not in danger of being out-competed at this time.

A potential shortcoming of this paper is that it does not mention consumer preferences regarding the sizes of different banks. Consumers may potentially prefer their local savings bank, or they may value the stability of a multibillion dollar institution. Also at times the paper compares banks of the same size by discussing results that impact $25 milion banks differently than banks with less than $1 billion in assets. This appears to be somewhat counterintuitive because the goal of the study is to analyze performance differences between small, medium, and large banks rather than very tiny and small institutions.

Regehr and Sengupta (2016) further aim to find determinants of bank performance by analyzing whether or not the relationship between bank size and profitability has changed since

the 1980s. The authors also research if market competition in banking has changed as a result of new regulations instituted after the Great Recession of 2008. Regulations may increase higher fixed costs, which in turn could serve as a disadvantage towards small local banks. The authors use tax adjusted return on average assets as the general benchmark for firm comparison initially.

Regehr and Sengupta (2016) have found through previous literature and study that the banking industry has undergone immense restructuring since the 1980s. This restructuring has results in a massive decline in the number of small banks throughout the United States. Specifically, the number of small banks with less than $100 million in total assets have declined by at least 11,000. Consolidation of charters or local branches and mergers with larger institutions have steadily decreased the number of competitive small banks. Most of the growth in the banking industry since the 1980s have been attributed to the mega banks with total assets surpassing $10 billion.

Regehr and Sengupta (2016) argue that banks may have a financial incentive to become larger. Through expanding into other markets and sectors, growing banks can gain economies of scale through operations. The authors reference Mester (2010) when discussing the benefits of gaining economies of scale and growth. Through diversification large banks are able to lower general risk that the firm faces. Scale economies allow for banks to eliminate inefficiencies in their products and processes. Efficiency is correlated with lower costs, and lower costs will attract borrowers and clients. The authors also find various comparative advantages that small banks have over large institutions. Small banks are more likely to foster stronger relationships with the local community. These personal relationships with business owners and borrowers

allow the bank access to proprietary information that a large bank would be unable to obtain. The authors cite Berger (2005) when they state that this proprietary information is extremely useful in setting contract terms and making better credit underwriting decisions. Furthermore, Regehr and Sengupta believe that this soft information small banks have access to could offset any losses the firm experiences due to a lack of scale economies. Research has found through previous work that larger banks generally experienced higher returns on average assets before and after the financial crisis of 2007-2009, while smaller banks saw higher returns on average assets throughout the crisis. This phenomenon may have been a result of the fact that individual borrowers lost faith in large banks throughout the recession and chose to do business with their local community banks. More likely, however, is the fact large banks were exposed to risky investments much more than smaller firms. Small banks explicitly chose to not take on risk the same way large banks did because they would not be able to withstand the consequences of failing investments. As a result, while large banks were reeling throughout the financial crisis, small banks thrived.

Regehr and Sengupta (2016) hypothesized that bank profitability will increase with bank size at a decreasing rate. Firms should experience diminishing marginal returns as time goes on and competition becomes stiffer. The authors generally believe that greater size should be associated with higher profitability. They also theorize that bank-specific and market-specific factors can allow smaller banks to compete. The study defines bank-specific factors as business strategies and organizational structure. For example, banks that choose to focus on loans tend to have greater incomes but also take on greater risk. Business strategy could also be referred to as general management skill and expertise. Organizational structure is also vital when

assessing profitability opportunities. Multimarket banks gain the benefits of diversification and lower costs by being spread out across regions and product lines, while single-market banks are much more likely to experience the competitive advantages that small banks possess. Market-specific factors are market size and levels of competition. If a bank operates in a large market there are likely to be more opportunities to make profit but competition levels will most likely be higher. Conversely, small banks experience little competition but there are fewer profit avenues available to the firm. Similarly, if unemployment is low in a given location, bank profitability is likely to be higher. Profitability and positive economic outlooks are correlated to high bank performance.

Regehr and Sengupta (2016) use data from the Consolidated Reports of Condition and income for banks, otherwise known as the Call Reports. They also find data from the Federal Reserve Bank of Kansas City. The authors restricted their sample by studying banks with less than $100 billion in total assets during the years of 2001-2014 to encompass the financial crisis and surrounding periods. 7451 banks were studied pre-crisis during 2001-2006, 6510 throughout the crisis of 2007-2009, and 6326 post-crisis firms throughout 2010-2014. The variables Regehr and Sengupta (2016) use in their analysis are tax adjusted ROAA, bank size as a logarithm of total assets, and the Herfindahl Index (HHI) which measures market competition. The higher the HHI value is, the lower the competition in a given market.

Through multiple regression, Regehr and Sengupta (2016) found that the smallest banks experience the largest increases in conditional ROAA as they become larger. Specifically, if a bank increases in size from $200 million to $300 million, they experience growth in conditional ROAA of 6.4 basis points. They confirmed their initial hypothesis that profitability increases

with bank size at a decreasing rate. As a bank first begins to grow, conditional ROAA spikes exponentially. Over time as the firm becomes larger and larger, the growth in conditional ROAA eventually becomes marginal. This is an example of banks experiencing economies of scale with a U-shaped curve as assets grow. They also found no statistically significant difference between the size-profitability relationship before, during, or after the financial crisis of 2008. The authors confirmed their research question that size and profitability are still positively correlated together.

The authors conclude their paper by stating that they found significant scale economies present in banking across firms of all sizes. They reaffirm that growth benefits are large when a bank is small, and eventually becomes marginal when the banks become midsized. They also state that regulatory factors after the Great Recession have not affected the size-profitability relationship in the banking industry. Regehr and Sengupta (2016) completed a deeply extensive study with the only immediate shortcoming being that they did not directly analyze consumer preferences throughout the financial crisis.

Weigland and Irons (2011) looked at the financial performance of US commercial banks during the period of 2001-2010. Specifically, the authors examine the financial performance, risk, changing revenue and asset mix, executive compensation, and prospects for future shareholder value creation amongst the 15 largest US commercial banks. The study attempts to determine how banks have responded to regulatory mandates of Quantitative Easing and the Troubled Asset Relief Program (TARP) as a result of the Dodd-Frank Act after the 2008 financial crash. The authors also analyze how the banks have recovered since the recession. The authors chose to examine specifically the largest fragment of banks because these

institutions are most likely to have the resources to respond to regulatory mandates, and the earliest signs of change in the industry will most likely be evident in these 15 banks first before other smaller competitors.

Weigland and Irons (2011) find through previous literature many revelations that have been echoed throughout this chapter. The authors cite Filbeck (2011) when they find that bank size is important in predicting performance. Bank size plays a key role in the institution's ability to outperform the S&P 500, particularly during economic contractions. Similarly, the Dodd-Frank Act considers banks with $50 billion or greater in holdings to be significant to the banking industry. In this study 14 of the 15 banks meet this criteria, so the authors can assume they are industry bellwethers that are capable of responding quickly to changes in government regulation.

The Dodd-Frank Act places new capital requirements on firms because of the risk these banks pose to the US financial system as a result of their size. The authors reference Murphy (2010) by stating that the Dodd-Frank also prevents mergers and acquisitions that result in a new entity whose consolidated liabilities exceed 10% of the aggregate liabilities of all financial companies. Multiple academic studies referenced by the authors find that higher capital regulations act as a constraint for banks, resulting in lower total lending levels with accompanying substitutions of alternative assets for loans on banks' balance sheets. The regulations also result in higher capital ratios. The authors restate their intention of examining asset, revenue, and profit mix of the 15 largest banks, as well as capital holdings between the period of 2001-2010.

Weigland and Irons (2011) hypothesize a decrease in the amount of loans relative to banks' total assets as their capital ratios rise. The authors also argue that requiring banks to hold more capital is likely to limit the institution's ability to earn sufficient returns for their shareholders. They also predict that banks will invest in assets that are less stable. The banks will be required to take on assets that have a higher expected return paired with a higher level of risk in an effort to create value for shareholders. The authors expect to see an increase in total market risk of the 15 largest US commercial banks as they increase their capital holdings.

Weigland and Irons (2011) find their data for this study through the Standard & Poor's Capital IQ, EVA Dimensions, and the Federal Reserve Economic Database (FRED). Capital IQ is used to determine market capitalization of the 15 largest commercial banks. The banks, in order from largest to smallest in terms of market capitalization, are Wells Fargo, US Bancorp, PNC, BB & T, SunTrust, Fifth-Third Bank, M & T, Citi Group, Regions Financial, KeyCorp, Comerica, Huntington Bank, First Republic, Zions Bancorp, and Marshall & Illsley. The sample is restricted to only include the largest financial institutions in the country.

The authors find that the average market capitalization of these banks is $8.7 billion, median assets amount to over $91 billion, and median total loans are over $52 billion. Collectively, these banks account for 63% of all US commercial loans and employ over 500,000 people. The study finds that the average annual growth rate in revenue is 8.9% from 2001 - 2010. It was found also that growth has slowed in interest income, so banks have begun to diversify into other sectors to make profit such as trading activities, fees on credit cards, and mortgage banking activities.

Weigland and Irons (2011) also determine that aggregate net income in the sample was positive in 2009, and recovered in 2010 all the way back to 2004 profit levels, and net interest margins remained stable from 2001-2010. The authors did find, however, that aggregate dividends are lower than they have been in the previous 10 years. Regarding financial performance, executive compensation, and lending practices, the research found that bank stocks have lagged behind the S&P 500 since March of 2009. Executive compensation grew by 33% from 2008-2010, while investor dividends fell by 80% during this time. Similarly, since 2005 executives have been taking more of their compensation in the form of salary than in performance-based bonuses. The authors conclude that banks struggle to meet performance metrics that investors will find appealing while adapting to new capital-requirement regulations. The authors also find that banks who have reduced their lending by a greater amount have received more TARP funds. This essentially refutes the idea that the TARP program had a positive effect on credit creation towards consumers.

Weigland and Irons (2011) concluded and summarized their findings. The 15 banks average capital/asset ratio was equal to 12%, aggregate net income remains positive, aggregate dividends remain low, and economic value added has been negative for the last two years. Ultimately, bank financial performance has lagged while executive compensation has become more stable throughout the data period. A potential shortcoming is that the authors choose to omit the impact of the Dodd-Frank on non-megabanks. They may have been able to paint a clearer picture of the banking landscape if they expanded their study to some of the significantly smaller firms.

The implications of this study could indicate that small firms have an advantage in the market due to less strenuous requirements imposed from the Dodd-Frank Act. Small banks may be deemed to be less significant. Much of the literature to this point in the chapter has indicated that small banks face enormous disadvantages in competition. The regulations imposed on the largest banks could provide an opportunity for small banks to outperform their larger competitors.

Chronopoulos, Liu, McMillan, and Wilson (2013) analyzed the dynamics of US commercial bank profitability during the period of 1984-2010. Specifically, the authors aim to determine conditions in which short-run profits persist, and how the persistence is affected by regulatory changes as well as the financial crisis of 2008. The study examines the evolution of US bank profitability before and after the introduction of the Riegle-Neal IBBEA and the GLB Act.

Chronopoulos, Liu, McMillan, and Wilson (2013) briefly discuss how the industry has changed within the last 50 years. Many regulations instituted during the Great Depression were removed, and the Riegle-Neal and GLB Acts of 1999 were influential in ratifying deregulation that started in the 1970s and spanned multiple decades. Deregulation resulted in the total number of commercial banks being cut in half due to thousands of mergers and acquisitions with the biggest banks growing tenfold. The authors cite Barth, Brumbaugh, and Wilcox (2000) when they state that the passage of the GLB Act favors larger banks by granting market power and reducing industry competition. The study also states that consolidation of firms during the 1980s and 1990s was accompanied with an increase in the portion of industry income generated from fees rather than interest. Until mid-2007, general consensus was that

the US banking system was stable and performing well. Banks appeared to be holding unprecedented levels of capital and posted record levels of profitability. The study cites Brunnermeier (2009) and Keys (2010) by arguing that poor monetary policies, misaligned incentives for investors, bank executives and credit rating agencies, poor disclosure, accounting rules, lax lending standards, loopholes in regulation and supervision, and fraud have all been deemed as contributory factors to the financial crisis and its immediate negative impact on bank profitability.

Chronopoulos, Liu, McMillan, and Wilson (2013) find through previous literature that competition encourages efficiency by allowing the most efficient banks to survive and succeed at the expense of their inefficient competition. Specifically, in the banking industry, competition level has implications for access to finance, allocation of capital funds, competitiveness and development of manufacturing and service sectors, the level of growth, and the extent of financial stability. The authors find that larger banks gain from scale and other efficiency advantages so concentrated markets are naturally more profitable. The study cites Casu and Girardone (2009), Goddard (2007), and Dick and Hannan (2010) when conceding that the extent at which banks are able to earn high profits through the exercise of individual or collective market power, or as a consequence of superior efficiency, has never been adequately resolved. Previous research finds that local market power and informational opacity are correlated with profit persistence, and bank performance is vulnerable to macroeconomic shocks. Citing Goddard (2011), the authors determine that banks located in North America and Western Europe display a high degree of profit persistence compared to competitors in East

Asia. Similarly, profit persistence is stronger and more likely when barriers to entry are in place and competition is low.

Chronopoulos, Liu, McMillan, and Wilson (2013) hypothesize that all bank profit rates may converge towards a long-run average value. The alternative to this prediction is that incumbent banks can retard entry to the market, making differences in long-run average profit rates sustainable. The data in the multiple regression comes from Call Reports. It comprises the annual balance sheet and income statement for 17,500 US banks between 1984-2010. Banks with total assets less than $100,000 are excluded because they generally exhibit different operating behaviors than other firms. The variables in the model are ROA, log of total assets, HHI, GDP, asset growth, and other bank-specific performance indicators.

The results of the regression show that ROA plateaus at 1% during the 1990s until it becomes negative in 2009 due to the financial crisis. Predictably, there is a positive correlation between bank profitability and GDP growth, asset growth, and the log of total assets. There is a negative correlation between HHI (competition level) and profitability. The authors state that size, diversification, liquidity, credit risk, and asset growth are hugely influential in assessing bank profitability. It is also found that bank profits increase during periods of economic growth and fall during periods of stagnation or slow growth. Finally, the authors conclude that profit persistence diminishes following the Riegle-Neal IBBEA in 1994, and partially increase after the GLB Act of 1999 and the financial crisis of 2008.

Aladwan (2015) produced an empirical study on the Jordanian banking industry. The use of this paper is beneficial to the study because the author reaches a very different conclusion regarding bank profitability than the previous works discussed throughout this

chapter. He aimed to determine the impact firm size has on profitability amongst Jordanian commercial banks during the period of 2007-2012. This paper is included in this chapter to determine if banking industries differ globally outside of the United States as well as to analyze if Jordanian commercial banks operate differently than US commercial banks because they exist in an emerging market.

Aladwan (2015) states that in many places, banking plays a key role in providing economic stability and improvement to increase economic growth. He finds that the banking industry in Jordan and other emerging markets has undergone significant change in recent decades. Jordanian banks have benefitted from advances in technology and from increased investment from close Arab oil-producing nations. These improvements have had a tangible impact on bank profitability in the region. The Jordanian banking industry has also expanded quickly by total number of branches and higher assets amongst firms. As of 2000, the banking sector witnessed high growth. The consolidated balance sheet of licensed banks had growth 300% from JD 14.15 billion in total assets in 2000 to JD 37.69 billion in 2011. The author finds that with a modest population of 6.5 million, 26 banks, and 695 branches, the market may have reached its capacity. Before 2008, the industry in Jordan was experiencing a period of wealth and success driven by an overall economic boom. The governing body of Jordanian commercial banks is the Center Bank of Jordan (CBJ). The role of the CBJ is to ensure that commercial banks are complying with laws, regulations, and instructions set by the Jordan securities commission. The presence of the CBJ allows for increased trust in the overall financial system in Jordan.

Contrary to previous literature cited throughout this chapter, Aladwan (2015) states that it has been argued that the smaller the bank is, the higher the profitability of the

institution. He finds that growth costs, research and development, political costs, technological costs like computer mainframes, and difficulty in investing liquidity contribute to lower profitability rates in large banks. This paints a very different picture than what has previously been discussed. The general consensus was that the benefits gained from being a large bank such as scale economies drastically outweigh the advantages that small banks possess such as access to proprietary "soft" information about their borrowers.

Aladwan (2015) finds through previous literature that scholars generally agree there is a significant relationship between total assets and profitability ratio. The results regarding how size impacts profitability were controversial and inconclusive. The author cites the work of Redmond (2007) when stating that when using ROE as a measure of profitability, a negative significant relationship exists between profitability of banks and total volume of assets. This again echoes a very different scholarly opinion on ideal bank asset sizes. Referencing Kasimodou (2006), it was found that small banks generally perform better than large banks and that size had a significant impact on profitability outside of other factors such as liquidity and competition. The author proceeds to reference Spathes (2002) and their study of Greek banks from 1990-1999. Using ROE as the main indicator of profitability, there is evidence that indicates large banks are more efficient than small banks. Small banks experience more high capital yield (ROE) while large banks earn higher asset yields (ROA). In a study undertaken by Naceur (2003) that analyzed Tunisian banks' profitability during the period of 1980-2000, it was found that there again exists a negative relationship between asset size and profitability ratio. The same research also found a positive correlation between capital ratio and loans and stock improvements and general profitability. The author concludes by stating that previous studies

of Jordanian commercial banks have yielded vastly different results regarding the relationship between asset size and profitability.

Aladwan (2015) aims to test his hypothesis that there is a significant difference of ROE between banks of different total asset sizes. The second goal of the study is to find the effect of bank size on profitability through regression analysis. The two variables used in the methodology are ROE and asset size. ROE is defined as net income / equity. The number of banks in the study are broken into three groups: firms with less than 2 billion in assets, banks between 2.1-6 billion, and banks with greater than 6 billion in total assets. The author predicts that if there are increasing returns to scale, bank profitability will increase as bank size increases. Conversely, if the regression shows decreasing returns to scale, bank profitability will shrink as bank size increases. The sample is primarily restricted to only include 15 of the 26 domestic Jordanian banks, with no global competitors included. The author finds data for this work from the Amman stock exchange annual reports on each of the 15 banks during the period of 2007-2012. Where necessary, secondary data is collected from journals. The data is ultimately used to classify banks into the aforementioned three asset categories in the model.

Aladwan (2015) find through his regression very different results than what has been previously displayed in other literature. The study finds that there in fact is a negative correlation between ROE and increasing asset size in Jordanian commercial banks. ROE tends to decrease as the size of the bank grows. This is shown through the coefficients becoming increasingly negative as bank size increases. These results would then indicate that smaller banks are more profitable and outperform their larger competitors.

The author concludes his work by restating that profitability increases as asset size decreases. Aladwan (2015) finds through his research that size effects of profitability exists. Specifically, small and medium sized banks are more profitable than large banks. He finds that this could be very valuable information Jordanian bank officials and shareholders. A potential shortcoming of this paper is that the author does not explicitly address why his findings of small banks being more profitable than larger competition arose. There is a large amount of scholarly research that contradicts the findings of Aladwan (2015). Justification of his results would have allowed for a more comprehensive analysis against other research.

The five articles analyzed in the chapter are all beneficial to further the overarching study in this research paper. To briefly recap, Ndu and Wetmore (2016) found through their research that small banks are the least profit efficient firms but found no significant difference in overall performance across medium and large banks. This would indicate that although small banks do not experience scale economies and are somewhat inefficient, they are still able to survive in a competitive marketplace. Regehr and Sengupta (2016) concluded that banks of all sizes can experience economies of scale. They found, however, that bank growth is subject to diminishing marginal returns. The growth benefits are huge when a bank is small, but as a bank gets larger, the benefits eventually become marginalized. The authors also determine that regulatory factors stemmed from the financial crisis of 2008 have not impacted the size-profit ratio of banks. Weigland and Irons (2011) concluded that small banks actually have a competitive advantage over large banks. The study finds that large banks experience intense regulatory challenges by the Dodd-Frank Act that small banks are not subject to. This creates an opportunity for small banks to potentially out-compete larger competitors. Chronopoulos,

Liu, McMillan, and Wilson (2013) argued that there predictably is a positive correlation between profitability, GDP growth, and bank asset growth. The authors also found that there is a negative correlation between competition level in a market and profitability and that ROA was negative in many banks throughout the financial crisis. Finally, Aladwan (2015) discovered very different results about the size-profitability relationship. He found that small and medium banks are generally more profitable than large institutions. His study concluded that profitability increases as total asset size decreases. These findings strongly contradict the previous studies analyzed. This may have come from the fact that the Jordanian financial industry is fundamentally different than the United States industry, and thus, banks behave and perform differently. Ultimately, these studies agree that there is a correlation between bank size and profitability, yet optimal size for operational efficiency has yet to be determined.

Collectively, the five articles provide valuable insights about the banking industry in the United States and abroad. In some cases, the studies were contradictory regarding optimal operational size for a given commercial bank. Generally, however, the research found that larger banks outperform smaller banks. This can be attributed to a number of factors including economies of scale. The work also found that before and after the Great Recession of 2008, large banks were more profitable than smaller banks, but throughout the recession, small commercial banks thrived. Clear competitive advantages were illustrated in the banking industry. Large banks benefit from technological advancements that drive efficiency, and small banks are generally better equipped to foster relationships with the local community. The general consensus found throughout the literature review is that in most cases, large commercial banks are more profitable and outperform small competitors.

Chapter 3: A Theoretical Framework

As has been stated previously, the goal of this research is to discover and analyze some factors in determining bank profitability. Specifically, the aim is to determine the impact of bank size on profitability, amongst other performance metrics. To briefly recap, Chapter 2 outlined various determinants of profitability in banks. The goal of Chapter 3 is to present a theoretical framework of how profits change within small, medium, and large commercial banks as size changes. A key theoretical concept that will be focused on throughout Chapter 3 is the concept of economies of scale in the banking industry. Chapter 3 will present a theoretical framework surrounding economies of scale as it relates to the impact bank size has on profitability.

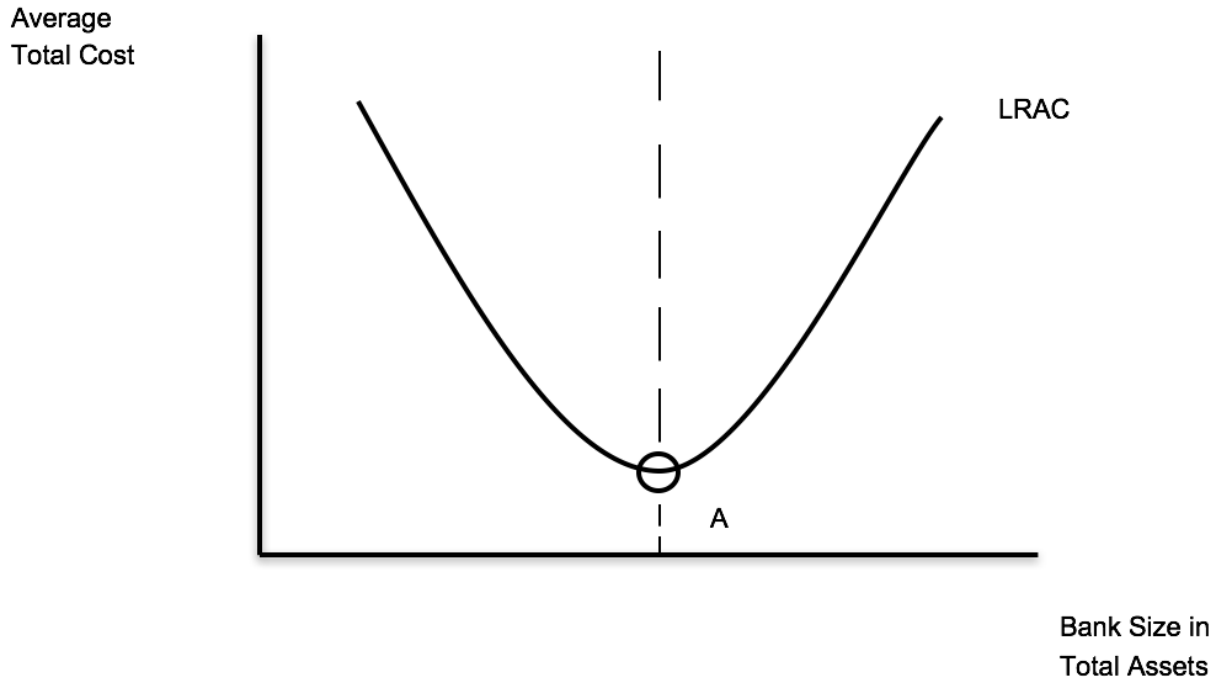
To provide a brief overview of the theory of economies of scale, as firm output increases, the average cost of production is likely to decline. This may be attributed to employee specialization as firm size increases, organization of production processes, and the lowering cost of inputs due to bulk purchasing and negotiation tactics. A firm may experience economies of scale when it can double its output for less than a doubling of cost. Conversely, diseconomies of scale occurs when a doubling of output requires more than a doubling of cost. A firm experiencing economies of scale is characterized by a U-shaped long-run average cost curve for low output levels and diseconomies of scale for high output levels. In simple terms, if costs decrease as firm size increases, the company enjoys economies of scale. In terms of banking, firms can experience economies of scale through asset growth. Growth in assets can be associated with increased technology that drives firm efficiency such as mobile banking and virtual telling. Similarly, asset growth is also associated with product and service diversification

within banks. Larger banks are better equipped to offer a larger array of trading, mortgage, and lending services, for example. Related to economies of scale are the concept of increasing returns to scale and diseconomies of scale. Increasing returns to scale occurs when output more than doubles when the quantities of all inputs are doubled. As previously discussed, firms encounter diseconomies of scale when a doubling of output requires more than a doubling of cost. As firm size increases in this case, costs also increase (Pindyck, Rubinfeld, 2005, Pgs. 237-238). From a practical standpoint, large banks may conversely experience inefficiency in operations due to size. In general, efficiency is attributed to economies of scale and inefficiency is associated with diseconomies of scale.

Below, Figure 3.1 illustrates a graphical representation of long-run average cost over time for a commercial bank. Costs for the bank initially are high with low output. The figures then illustrates how costs begin to decrease steadily as bank size starts to increase. This illustrates economies of scale that the bank is enjoying as size of total assets, employees, or another factor increases. Costs begin to fall due to technological innovation such as mobile banking and profits start to increase potentially due to product and geographical market diversification. Eventually the optimal operational size is determined at Point A, before costs begin to increase again. This is an example of diseconomies of scale occurring when the firm grows too large. Within a bank, costs may begin to increase due to bureaucracy or information silos that develop in large institutions. Decisions regarding markets to move into, or new services to offer begin to slow down due to immense size, spurring inefficiency and higher costs. Similarly, poor lending decisions and impersonal customer interaction could potentially fuel diseconomies of scale. As previously discussed in Chapter 2, large banks may be less likely

to foster personal relationships with potential clients. This relationship could provide important lending information about the consumer that allows banks to minimize firm-level risk when loaning money. Without this information, it is reasonable to expect the bank to suffer from ill-informed lending practices periodically. Incomplete information in lending can spur firm-wide diseconomies of scale.

Figure 3.1 Economies of Scale Graph



The figure in simple graphical terms lays out why it is beneficial for smaller firms to grow larger, but there is much in depth analysis still needed to adequately explain the costs and benefits of economies and diseconomies of scale.

To begin, most of the literature found that there is a quantifiable impact on profitability when bank size changes. There are a number of potential factors regarding why a commercial bank may want to grow. Growth in assets can allow for expanded product lines, entry into new markets, and larger brand recognition, amongst other motivations. A clear ancillary incentive for small to midsize banks to grow lies in the operational goal of experiencing economies of scale. For reference, the Midsize Bank Coalition of America lists its members as having average total assets of less than $20 billion (midsizebanks.com). Northwest Bank, FNB Corp, and Fulton Financial in Pennsylvania all have incentive to grow larger to enjoy economies of scale. The benefits of economies of scale in the banking industry can be realized through increased total assets, higher levels of technology, more employees, a larger number of branches spread throughout markets, and diversification amongst products offered. Ultimately through economies of scale a commercial bank sees higher levels of efficiency, lower costs, and the mitigation of operational risks.

The first key contributing factor in determining how and why a larger bank succeeds through growing larger is an increase in total assets. There are a variety of ways a commercial bank can increase total assets. The first, and clearest, method to increase assets is to boost firm and employee performance. Instituting methods to increase performance can be correlated to improving efficiency in operations, skilled management, and effective branding and marketing. Some examples of effective bank marketing come from Wells Fargo and Bank of America. Wells Fargo is attempting to rebrand itself after the recent account-creation scandal. The bank has been working relentlessly to rebuild its reputation by specifically eliminating sales goals for its Retail Bankers. This is a marketing effort to sway disgruntled

customers to give the bank a second chance, and to appear authentic to attract new customers. Bank of America boasts an Energy Efficiency Financing Program that aims to rebuild inefficient infrastructure in low income communities by working with Community Development Financial Institutions (ACEEE.com). This shows that the large bank is concerned with the environment as well as small communities, not just corporate giants and other huge financing projects. Small commercial banks may be concerned with tackling environmental issues as well, but large banks such as Bank of America are better suited to undertake large financing projects.

Effective marketing can drive performance and can further the key goal of the firm: acquiring more customers. The overarching objective of banks is to persuade and attract customers to open accounts, trade financial products, take out mortgages, and take advantage of services that the firm offers rather than doing business with a competitor.

Operational efficiency is another vital component that contributes to a bank experiencing economies of scale. In simple terms, operational efficiency within a commercial bank is characterized by providing products and services to customers in quick, timely manners that successfully minimize costs. Efficiency in lending processes can decrease overall costs. Lower costs are attributed to higher profits. As profits increase, total assets will also increase. Another way to grow total assets is to acquire and merge with other commercial banks. By joining forces with another bank, the total asset pool will increase through efficiency. Skills and technology will be exchanged between the two firms that will drive costs down. For example, a large bank may be able to provide a virtual telling service to a small bank, while a small bank may be able to foster and capitalize on community relationships more successfully than large firms. Merging with a competitor will also provide a larger geographical footprint in markets

and regions where the bank may not have operated in before the acquisition. Operating in new markets will help build the brand of the bank, and can allow for more opportunities to make profit through lending, mortgage, and trading services amongst other products in areas in which the bank did not exist before.

It was highlighted at times throughout Chapter 2 that profits and firm size are generally positively correlated. More branches around the country could provide opportunity to secure new clients. Another benefit that a larger asset pool offers a bank is stability. Assets in a volatile market can ensure the survival of a bank during times when the company struggles to make profits. Stability as a commercial bank is a key selling point for new customers. An individual may be more likely to utilize the services and products offered by the bank if it is a large, well known entity. It is favorable for banks to increase total assets because a larger pool of assets allows the firm to become more stable against future uncertainty, grow and expose the brand to new potential clients and new revenue streams, and refine processes to become as efficient as possible.

Advances in technology are also crucial in highlighting why it is preferable for banks to grow in size. As firm assets grow, the bank is now capable of accessing new technology that can revolutionize the way it operates. With greater technology, commercial banks can see gains to production by maximizing output and efficiency. There are many examples of the largest banks in the United States making strides in technology and efficiency that allow them to remain industry bellwethers. Many key innovation instances have come from PNC Bank. The bank holds roughly $360 billion in total assets 2,600 branches, 9,000 ATM machines, and online and mobile services for customers to enjoy. Two key products that PNC offers that

differentiate itself from its competitors are Virtual Wallet, and Cash Flow Optimized. Virtual Wallet is a free mobile banking service that aims to simplify a customer's finances. It is designed to organize money and help users hit personal savings goals, all from their smartphone. The product gives users a spend, reserve, and growth account. The spend account is considered to be a general checking account, the reserve account is utilized for short-term savings, and the growth account provides an avenue for long-term savings. Virtual Wallet also offers a calendar, online bill paying, mobile check depositing, and overdraw protections amongst other services.

PNC Cash Flow Optimized is a business-banking tool that streamlines access the firm has to the bank. The five services offered through the PNC CFO product are accelerated receivables, improved payment practices, tools to monitor and project cash, short and long-term financial planning, and ensured access to credit. Within this product, PNC offers investment planning, cash flow insights, and tailored solutions to financial issues by industry in which the business operates in (PNC.com). Virtual Wallet and CFO are both highly innovative tools that many smaller competitors are unable to replicate and offer. There may simply be too much cost involved in the creation of these products. PNC would potentially not have the means to build these advanced technologies if they were not as large as they are. The larger theoretical lesson here is that large banks are simply able to offer products and services that smaller banks cannot. PNC is not the only mega bank that displays technological superiority.

Wells Fargo and SunTrust are also examples of how technology can drive financial performance in the banking industry. Wells Fargo boasts total assets of roughly $1.8 trillion that allow the bank to pioneer technology in offering better, more effective services. An

example of this are the Innovation Labs. The first service that has come from the Wells Fargo Innovation Labs is pre-staging transactions. In simple terms, this allows a customer to begin banking transactions before they actually step into the branch. Pre-staging transactions decreases wait times and expedites services the customer needs completed. Taking this idea of convenience a step further, another service being created is video banking. If an individual would like to speak to a Wells Fargo employee but are unable to physically meet in person, customers may now interact with someone through a skype-like tool. Graphics, charts, and other information could be shared across connected devices as well as face-to-face conversation could occur. Wells Fargo is also beginning to offer services that synchronize together Apple Pay and customers debit cards (labs.wellsfargo.com).

Wells Fargo is a similar example to PNC. The bank is revolutionizing how customers access financial information and services. The Wells Fargo Innovation Labs are a function of the huge asset pool the bank maintains. Convenience may be a vital determining factor in which type of commercial bank a customer chooses to utilize.

The final example of a large bank leveraging its size is the SunTrust Innovation Branch in Atlanta, Georgia. The idea behind the Innovation Branch comes from the assumption that consumer preferences are changing regarding the banking industry. SunTrust EVP Brad Dinsmore stated, “Consumers want the option of self-service technology inside the branch. This new technology allows for more choices and greater convenience” (newsroom.suntrust.com). The main technological innovations are Teller Connect machines, a Tablet Bar, an interactive Microsoft Surface Tablet, and a fully automated safety deposit box system. The Teller Connect machine is very similar to the aforementioned video banking tool at

Wells Fargo. The machine functions as an ATM, allows for check cashing, and can initiate a video call to a remote teller if the user needs help or has questions. The Tablet Bar gives customers an avenue to access SunTrust mobile banking through guest wifi and the 80-inch Microsoft Surface interactive tablet serves as an educational tool for guests to learn about the various services of SunTrust (newsroom.suntrust.com). SunTrust, like Wells Fargo and PNC, is able to utilize its large asset pool of $190 billion to finance innovations that will characterize the future of the banking industry long before other competitors are able to offer similar services.

Another key factor in highlighting the benefits large banks experience through economies of scale is the fact that large firms have the capital to get involved in the largest and most lucrative investment projects around the world. To stay consistent with previous examples of firms, PNC Bank participates in financing large renewable energy projects through its Energy Capital program. The program provides funding for commercial, municipal, and federal energy projects (PNC.com). This is extremely beneficial for the firm because energy is central to the American economy and PNC is able to provide the initial capital for vital, potentially government mandated, energy projects. The Energy Capital program at PNC is able to provide a highly profitable revenue stream. A smaller bank simply does not have the assets to undertake and capitalize on similar lucrative projects.

The concept of risk mitigation that comes with asset growth has been briefly touched upon throughout the chapter. As a firm gets larger, it is equipped to offer more products and more services across different geographical locations and markets. For example, consider a scenario in which Wells Fargo is struggling to make money through its lending services, but it is making large profits through its trading services. The profits in one product line can

successfully offset the losses in another, thus mitigating risk for the firm and its shareholders. Similarly, SunTrust or another large bank may be performing well in the Southeast United States but is struggling to compete in the Midwest. If a bank is large enough to expand across products and markets, firm-level risk can be significantly lower than smaller competitors.

To briefly recap, there are a plethora of benefits large banks experience in operations. Process efficiency, risk mitigation across markets and products, access to superior technology, and other factors all contribute to banks enjoying economies of scale as total assets increase. Lower costs contribute to higher profits, which in turn create value for shareholders. Large banks are generally capable of offering a more comprehensive, superior service than smaller banks.

According to the theory of diseconomies of scale, as banks become larger and larger, they may experience rising costs that can be attributed to general inefficiency in operations. An explanation for this occurrence can be attributed to bureaucracy within the bank. Decision-making can move slowly in an enormous organization which can lead to extreme inefficiency. When the hierarchical leadership structure becomes large enough, information can both move slowly and can sit in departmental silos. Segmented information can cause processes to slow down and costs to rise. General inefficient tendencies can be displayed at large firms, and inefficiency can cause costs to rise again even as total assets and firm size continue to increase. A bureaucratic leadership structure is designed to move slowly to prevent rash decisions, but this type of decision-making method can make a bank inefficient. The silver lining regarding diseconomies of scale in the banking industry is that it is much easier for a firm to shrink than for a firm to grow. If a firm is suffering due to diseconomies of scale, it can simply downsize or

sell off assets. The benefits that come with size growth in a bank through economies of scale outweigh the shortcomings it may experience by becoming too large.

An ancillary factor that is related to bank size is the concept of moral hazard. Moral hazard is simply a situation that can occur between two or more parties. One entity is protected from risk while another is not protected from the repercussions of the agreement or exchange. In the banking industry, large firms could be protected from loss while consumers incur the costs of risky bank behavior. Moral hazard exists with large banks because they may be considered "too big to fail". Larger banks may be more likely to undertake risky activities to boost revenues because financial institutions are integral pillars of an economy. If a large bank is about to fail, they are likely to be bailed out by the government for the sake of maintaining economic stability and consumer wellbeing. The concept of moral hazard can foster a market characterized by high-risk firm behavior and unfair competition. Small to medium-sized banks will not be afforded the luxury of being backed by the federal government, and will still be expected to post admirable financial returns. Moral hazard can drastically tip the scales of competition in favor of large commercial banks.

In short, banks experience economies of scale as total assets grow. Through technological innovation, efficiency, effective branding, and risk mitigation, large banks may potentially be better equipped to outperform smaller banks. Similarly, due to asset size, large banks are better suited to undertake sizeable projects and initiatives than smaller firms. Large banks are also afforded the luxury of being "too big to fail", and may undertake unethical or risky behaviors that smaller banks simply cannot compete with. These assumptions lead to the hypothesis of this research, which is that medium-sized commercial banks will be the most

profitable entities in the study. Medium-sized banks may be able to capitalize on the technological and risk advantages that large banks enjoy through larger asset pools, while still being capable of fostering personal relationships with the surrounding community in the way that small banks can. As a result, I predict that medium-sized commercial banks will outperform large and small banks in terms of profits.

Chapter 4: Empirical Analysis

Before explicitly analyzing the findings of this work, it is important to discuss the origins of the data and the methodology behind the study. The research topic at hand here is analyzing how asset size influences commercial bank performance. The goal is to uncover trends that illustrate a potential relationship between firm financial performance and total assets. All data represented within the model is from the Reports of Condition and Income, or Call Reports, issued by the Federal Financial Institution Examination Council (FFIEC). Every national, regional, and insured nonmember financial institution is required to file Call Reports by its main regulator on an annual basis at a minimum. The report consists of a multi-page financial analysis that includes earnings, balance sheets, asset quality, liquidity, and capital (cdr.ffiec.gov). In simple terms, Call Reports filed to the FFIEC provide a concise snapshot of the general financial health and performance of participating financial institutions.

The banking data used was gathered from the 2016 Call Reports for 300 commercial banks in the United States. The groupings of banks were organized based on total assets ranging from $50M - $3B. The size parameters were set with banks between $50 - $100M, $100 - $300M, and $3B + in total assets One shortcoming that spurred from data collection was the issue of representation. The 100 banks in each sample size grouping were sorted alphabetically by state. As a result, banks from states such as Texas, Utah, Virginia, Wisconsin, and others are not in the study. A more comprehensive outlook would have potentially yielded clearer findings about the banking industry. Another shortcoming that will be discussed later in the chapter is that Call Reports offer high-level financial analysis by only expressing interest and

non-interest income. More specific financial indicators exist that could have been used to better depict commercial bank performance and behavior.

A regression analysis was utilized to determine if there was a correlation between the listed variables. Key variables analyzed were centered on bank sizes in terms of total assets. The variable representing small banks was composed of 100 insured commercial banks with $50M - $100M in total assets, the variable describing medium-sized banks consisted of 100 insured commercial banks with total assets between $100M - $300M, and the large banks variable comprised of 100 insured commercial banks with total assets exceeding $3B. The large banks variable is derived from the work cited in Chapter 2 by Weigland and Irons (2011) that argues the largest commercial banks are considered to be industry bellwethers, and will adapt to changing landscapes quicker than their smaller counterparts. Insured commercial banks with $3B or more in total assets is the largest single grouping of institutions within the Call Reports. Ancillary variables included within the model were Return on Assets (ROA), interest income, noninterest income, region, and year founded. ROA, interest income, and noninterest income were included in the model because Chronopoulos, Liu, McMillan, and Wilson (2013), Weigland and Irons (2011) analyzed similar financial performance variables in their work cited in the Literature Review. The variables region and year founded were included in the regression to determine if there were geographical implications regarding bank financial performance.

To briefly recap from Chapter 3, the hypothesis for this work is that medium-sized banks will outperform their larger and smaller competitors because they are capable of providing amenities that small banks cannot, and are more effective in fostering community relationships than larger banks. This superior performance will be shown through higher ROA.

Table 4.1 below illustrates comprehensive summary statistics within the model. Each variable is represented 300 times in the model due to the use of 300 banks. The variables "largebanks", "mediumbanks", and "smallbanks" represent the three bank sample sizes previously mentioned. The "percentintincome" variable was created by adding "interestincome" and "noninterestincome" and dividing the sum by "interestincome". The variable was created to analyze the impact of how firms obtain their money, whether that be through interest income or non-interest income, regardless of size. Interest income is generated mostly from commercial and personal loans that the firm lends out. Non-interest income is derived from fees that include deposit, transaction, insufficient fund, monthly account service charges, trading fees, and others. The "yearfounded" variable illustrates the year in which the bank was incorporated, and "region" showcased which of the 9 U.S. geographical regions determined in the census the bank was headquartered in.

Within the table, some numbers that stand out involve the interest and non-interest income of banks represented. The mean value for interest and non-interest income represents more than the total assets of all of the small banks and some of the medium sized banks in the model. This is due to the enormous amounts of annual income generated from large banks. The table also shows across the board that on average throughout the sample, banks are generating more interest income than non-interest income. Another noteworthy statistic indicates that the average bank in the model began operations in 1948. This number could indicate that there is nationwide stability in banking, regardless of firm size.

Table 4.1 Summary Statistics

Variable	*Observations*	*Mean*	*Std. Dev.*	*Min*	*Max*
largebanks	300	0.3333333	0.4721922	0	1
mediumbanks	300	0.3333333	0.4721922	0	1
smallbanks	300	0.3333333	0.4721922	0	1
percentintincome	300	0.8220466	0.1520138	0.0003917	1.638033
yearfounded	300	1948.6	45.75	1834	2011
Region	300	0.1166667	0.3215591	0	1
interestincome	300	230,000,000	789,000,000	23,000	8,570,000,000
noninterestincome	300	122,000,000	633,000,000	-1,077,000	7,540,000,000

The four regression models analyzed all looked at ROA as the dependent variable. Across the models, more independent variables were included in an attempt to highlight correlations and statistical significance. Table 4.2 below showcases the results of the four regression models.

Table 4.2 Regression Models 1-4

Variable	*Model 1*		*Model 2*		*Model 3*		*Model 4*	
	Coefficient	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**	**Coefficient**	**t-value**
Large Banks	0.644	0.24	-1.91	-0.73	-0.421	-0.16	0.086	0.03
Medium Banks	-1.11	-0.42	-0.896	-0.35	-0.234	-0.09	-0.201	-0.08
Income Allocation			-32.7	-4.63	-31.9	-4.46	-35.7	-4.72
Year Founded					-0.15	-0.6	-0.21	-0.79
Region - ENC					5.08	0.96	3.92	0.73
Region - NE					4.43	0.71	3.25	0.52
Region - WSC					2.72	0.49	1.65	0.29
Region - MTN					1.99	0.37	1.16	0.21
Region - SA					6.46	1.2	5.23	0.96
Region - WNC					2.25	0.38	1.02	0.17
Region - ESC					11.5	2.07	10.4	1.83
Interest Income							4.76	0.22
Noninterest Income							-3.43	-1.29

In Model 1 illustrated in Table 4.2, ROA was the dependent variable, while Large Banks and Medium Banks were included as independent variables. The Small Banks variable was deliberately not included in the model to serve as a control group. The assumption here was that there would be clear statistical evidence that suggests one size firm is more likely to experience higher ROA, holding all else equal. The coefficient values associated with the two variables illustrate noteworthy results. The positive sign associated with Large Banks indicates that large commercial banks experience higher ROA than smaller banks. The negative coefficient sign associated with Medium Banks denotes that medium-sized commercial banks actually underperform small commercial banks in terms of ROA.

Interestingly, the data from Model 1 indicates that these size-related variables are actually statistically insignificant. According to the P-value generated through the Model 1

regression, we cannot say definitively that there is a relationship between bank total asset size and ROA. Effectively, there is not a correlation between financial performance and firm size according to the data analyzed. The data shows that there must be other ancillary explanations that are better indicators of predicting financial performance in a commercial bank outside of total asset size. In an effort to uncover other possible determinants of firm financial performance, other independent variables were included.

In Model 2 of Table 4.2 the same variables in Model 1, with the inclusion the Income Allocation variable. This is a representation of the previously mentioned "percentintincome" variable in Table 4.1. The firm size variables remained insignificant, reaffirming the point that total asset size is not a key determinant of performance. It is noteworthy, however, to acknowledge that the positive sign previously associated with Large Banks became a negative sign with the addition of the Income Allocation variable. The Medium Banks coefficient remained consistently negative across the first two models estimated. The Income Allocation variable exhibited statistical significance in the model. The negative coefficient attached to the variable indicates that if firms gets a larger percentage of revenues from interest income than non-interest income, they do not perform as well. This finding confirms that there is a correlation between how a bank acquires its revenues and favorable profit numbers. More on this phenomenon will be covered later in the chapter.

In Model 3 of Table 4.2, the trend was continued to expand the number of independent variables in the regression. In the third model, the variables Year Founded and Region were included. The P-value that was associated with Year Founded illustrated statistical insignificance. This means that it cannot be stated with certainty that bank age impacts

performance. A new bank may perform just as well as a bank with 100 years of experience. The region variables were included to analyze geographic impacts of bank headquarters. Every region in the United States was found to be insignificant in determining performance outside of the East South Central region. This consists of Alabama, Kentucky, Mississippi, and Tennessee. The positive coefficient associated with this grouping of states indicates that banks experience a higher Return on Assets than its counterparts. This relationship could exist in these states due to governmental incentives, innovation, economies of scale, or another innovation that was discussed within Chapter 3.

It is also noteworthy that due to the previously mentioned shortcomings regarding state representation in the model, there are only eight regions expressed in the model. States such as Texas, Pennsylvania, and Wyoming amongst others, are not present. The Income Allocation variable remained statistically significant in Model 3, affirming the relationship between profit streams and ROA, regardless of bank age and location. The size-related variables remained insignificant in Model 3, and both of the coefficients remained negative as well.

In Model 4, the final model analyzed included all the previous variables from Models 1, 2, and 3, plus Interest Income and Non-Interest Income. These two variables represent bank financial revenues from interest and non-interest income. As previously stated, the new variables were individually included in Model 4 because they were analyzed in some of the studies mentioned in the Literature Review chapter. The results from estimating Model 4 illustrate many of the same findings that have been detailed throughout this chapter. There were no new variables that either gained or lost statistical significance with the inclusion of revenue-related variables. The Large Banks and Medium Banks variables remained statistically

insignificant with the addition of new independent variables. The coefficients associated with size-related variables remained consistent with previous findings outside of the fact that the Large Banks coefficient became positive again. The same characteristic occurred when Model 1 was estimated. All but one region-related variable, Year Founded, Interest Income, and Non-Interest Income also did not exhibit a significant relationship with ROA. The Income Allocation variable and the region variable that represents the East South Central area of the United States were again statistically significant.

The key discovery of this work is that it does not matter the size, location, or age of the commercial bank in order to predict financial performance metrics such as Return on Assets. How a bank acquires its revenues is crucial in analyzing performance. Through regression analysis, the data indicated that the more interest income a bank obtains as a fraction of total income, the less profitable the firm is.

The conclusion reached from the Model 1 regression is unexpected, but could serve as welcome news to small and medium-sized insured commercial banks around the country. The hypothesis stated earlier in this work that medium-sized firms would outperform both smaller and larger commercial banks was proven to be incorrect. Through Models 2-4, it was found that profit-focused commercial banks should focus on obtaining revenues from non-interest income to boost ROA and other metrics of profitability. Examples of non-interest income include trading, account, management, deposit, transaction, and other consumer account related fees.

Chapter 5: Conclusion

The objective of this research was to analyze the determinants of bank financial performance. The study was grounded on the assumption that there would be significant variation across bank profit data as the size in terms of total assets varied. Ultimately, through regression analysis, this work reached the conclusion that asset size is not necessarily a key determinant of bank profitability and sustained financial success. The study suggests that there is a correlation between positive financial performance in the form of Return on Assets and non-interest income revenue streams in banking. Conversely, the data also indicates that banks that obtain most of their revenue from interest income are likely to exhibit poor profit numbers and lower ROA than their competitors. These findings conflict with the research discussed throughout Chapter 2. Scholars before have undertaken similar research projects and have concluded that there is a relationship between asset size and performance. It was also determined that the age of the bank, and main regions in which financial firms operate are mostly uncorrelated to performance. This was somewhat unexpected because there are clear differences in household and consumer income levels across the United States, which could potentially impact bank financial numbers. The information discovered through this work could be highly useful for both prospective investors and bank leadership teams to boost performance.

The data illustrated clear trends that suggest that the more interest income a bank generates; the lower ROA it experiences. Although it is unexpected in the data to find that size is irrelevant to financial performance, it is reasonable to assume that large banks are more equipped to undertake non-interest income activities. As was discussed throughout Chapter 3,

medium to large-sized commercial banks are more likely to be capable of offering expanded product lines outside of simple mortgage and corporate financing projects. Firms that have access to more assets are likely to be able to offer a wide variety of services that will provide multiple revenue streams to the bank such as credit card services, trading services, and activity-related fees. Firm strategy could absolutely be impacted due to the revelations uncovered through regression analysis in Models 1-4 listed previously. The data has made clear that it is beneficial for firms to focus heavily on generating non-interest revenue streams.

The work in this study ultimately did not discredit or affirm the work cited in Chapter 2. Previous literature discussed earlier in the work did not specifically come to conclusions regarding revenue streams across banks of all sizes. The study here provided further insights that aid in predicting bank performance outside of simply total asset size. Like any study, however, this work has several shortcomings. The first and most immediate limitation stems from the sample sizes of the groups of banks studied. A total of 300 FDIC insured commercial banks with total assets that range from $50 M - $3B + are present in the study. More banks of all sizes could be incorporated to better encapsulate the banking industry in the United States. Similarly, more clear trends could be discovered as the sample size increases. Another clear shortcoming revolves around the ability to directly compare data between extremely small banking institutions and their larger counterparts. Within the Call Reports, the smallest possible data set offered that shares comparable characteristics with large bank data sets is capped at $50M in total assets at its lowest. For example, there are reports that reveal data on banks with less than $50M in total assets, but they are only present in rural areas, or only have

2 offices, for example. It would risk discrediting or delegitimizing the findings of this work to compare groups of banks that do not exhibit the same operational characteristics.

A final noteworthy limitation of the study revolves around income streams within the bank. The Call Reports simply break down bank revenues into interest and non-interest income. A deeper analysis of financial performance in banking could dive into the specific avenues that encompass interest and non-interest income. For example, it could be beneficial to determine what percentage of non-interest income in a bank is generated through credit card services or trading account management fees. Similarly, it would be beneficial to analyze the tendencies in which commercial banks lend, whether that be through personal mortgages or commercial projects. Ultimately, building better indicators that reflect more accurately the revenue streams of commercial banks could allow for a more complete and comprehensive examination.

Although it was not illustrated within the regression analysis carried out in Chapter 4, there are tangible benefits that banks with large asset pools experience that smaller banks may not be able to enjoy. It is reasonable to assume that a bank with more assets is more capable of providing expanded product lines and services than firms with less assets. These larger firms would then have more opportunities to generate revenue through vital non-interest fees. Small to medium-sized commercial banks may be forced to rely more heavily on less lucrative lending practices. Couple the expanded product lines large banks have the assets to offer and the previously discussed concept of moral hazard in Chapter 3, it is reasonable to infer that large banks are generally going to maintain powerful competitive advantages. Future studies

could build on this work by expanding the number of banks in the sample and analyzing more specifically the revenue streams of these firms beyond interest and non-interest income.

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