



Advances in Management Accounting

The Profitability and Performance Measurement of U.S. Regional Banks Using the Predictive Focus of the "Fundamental Analysis Research"

Glenn Growe Marinus DeBruine John Y. Lee José F. Tudón Maldonado

Article information:

To cite this document: Glenn Growe Marinus DeBruine John Y. Lee José F. Tudón Maldonado . "The Profitability and Performance Measurement of U.S. Regional Banks Using the Predictive Focus of the "Fundamental Analysis Research"" *In Advances in Management Accounting*. Published online: 02 Dec 2014; 189-237.

Permanent link to this document:

<http://dx.doi.org/10.1108/S1474-787120140000024006>

Downloaded on: 29 June 2015, At: 16:59 (PT)

References: this document contains references to 0 other documents.

To copy this document: permissions@emeraldinsight.com

The fulltext of this document has been downloaded 57 times since NaN*

Users who downloaded this article also downloaded:

Yong Tan, Christos Floros, (2012), "Bank profitability and inflation: the case of China", *Journal of Economic Studies*, Vol. 39 Iss 6 pp. 675-696 <http://dx.doi.org/10.1108/01443581211274610>

Kyriaki Kosmidou, (2008), "The determinants of banks' profits in Greece during the period of EU financial integration", *Managerial Finance*, Vol. 34 Iss 3 pp. 146-159 <http://dx.doi.org/10.1108/03074350810848036>

Chong M. Lau, Vimala Amirthalingam, (2014), "The Relative Importance of Comprehensive Performance Measurement Systems and Financial Performance Measures on Employees' Perceptions of Informational Fairness", *Advances in Management Accounting*, Vol. 24 pp. 77-115 <http://dx.doi.org/10.1108/S1474-787120140000024003>

Access to this document was granted through an Emerald subscription provided by All users group

For Authors

If you would like to write for this, or any other Emerald publication, then please use our Emerald for Authors service information about how to choose which publication to write for and submission guidelines are available for all. Please visit www.emeraldinsight.com/authors for more information.

About Emerald www.emeraldinsight.com

Emerald is a global publisher linking research and practice to the benefit of society. The company manages a portfolio of more than 290 journals and over 2,350 books and book series volumes, as well as providing an extensive range of online products and additional customer resources and services.

Emerald is both COUNTER 4 and TRANSFER compliant. The organization is a partner of the Committee on Publication Ethics (COPE) and also works with Portico and the LOCKSS initiative for digital archive preservation.

*Related content and download information correct at time of download.

THE PROFITABILITY AND PERFORMANCE MEASUREMENT OF U.S. REGIONAL BANKS USING THE PREDICTIVE FOCUS OF THE “FUNDAMENTAL ANALYSIS RESEARCH”

Glenn Growe, Marinus DeBruine, John Y. Lee and José F. Tudón Maldonado

ABSTRACT

Purpose – This paper examines the profitability and performance measurement of U.S. regional banks during the period 1994–2011, using the GMM estimator technique. Our study extends prior research by including several factors not previously considered using U.S. data.

Approach – We use bank-specific, industry-specific, and macroeconomic determinants of profitability contemporaneous with our performance indicators. We follow the accounting fundamental analysis path in explaining the bank performance.

Findings – Among the performance measures, the efficiency ratio and provisions for credit losses are negatively and equity scaled by assets is positively related to profitability. However, these relationships either reverse (efficiency ratio and provisions for credit losses) or become insignificant (equity scaled by assets) when the target becomes change in profitability. The level of nonperforming assets is negatively related to profitability across all measures of profitability used. Macroeconomic variables are largely unrelated to profitability during the year they are measured. However, they have a significant relationship with earnings change measures, suggesting they have a lagged effect on profitability. The slope of the yield curve is especially strong in this regard.

Originality – We use our determinants to model changes in bank profitability one year ahead, in addition to including several factors not previously considered, using the predictive focus of the fundamental analysis research.

Keywords: Banking profitability; return on assets (ROA); return on equity (ROE); efficiency ratio; macroeconomic factors; fundamental analysis research

INTRODUCTION

In this paper, we examine the profitability and performance measurement of U.S. regional banks during the period 1994–2011. Our study extends prior research (1) by including several factors not previously considered using U.S. data and (2) by using our determinants to model changes in bank profitability one year ahead. Research over the last two decades indicates that the development of a nation's financial system, including its stock markets and banks, is an important force furthering its economic well-being. Banks further economic growth by providing instruments for diversifying risk and enhancing liquidity (Levine, 2005). Wurgler (2000) shows that countries, in which financial institutions are more developed, capital is allocated to industries based upon their growth potential. When they experience financial distress, economic growth is impeded (Kroszner, Laeven, & Klingebiel, 2007). Declines in bank profitability have also been linked to financial instability (Borio, 2003; Tsomocos, 2003).

In the economic environment where the ability to bounce back from economic shocks is highly important, profitability is a critical attribute

(Golin & Delhaise, 2013). Retained profits are a significant source of bank equity (Rime, 2001). Equity is a buffer between losses and insolvency when a bank loses money. During the recent financial crisis, failed banks had roughly half the equity cushion of surviving banks (Kerstein & Kozberg, 2013). Bank profitability has been operationalized as the financial statement ratios return on assets (ROA) and return on equity (ROE). Other profitability measures include net interest income divided by average earning assets (net interest margin) and certain economic measures, such as economic value added.

Bank-specific, industry-specific, and macroeconomic factors have been related to the measures of bank profitability. Bank-specific variables primarily include ratios developed from financial statement accounts, such as the amount of equity to total assets and the amount of noninterest income to total revenue. Industry-specific factors characterize industry conditions: For example, the level of concentration in the bank's market area and the ratio of all bank assets to a nation's gross domestic product (GDP). Macroeconomic factors characterize aspects of overall economic conditions affecting all of a nation's banks during a given period, such as the changes in the GDP or the inflation rate.

A large, international, and rapidly growing literature on the determinants of bank profitability regresses bank performance measures on determinants contemporaneous with the performance measures (Athanasoglou, Brissimis, & Delis, 2005; Dietrich & Wanzenried, 2011; Trujillo-Ponce, 2013). The discovered relationships are proffered as providing perspectives on enhancing bank performance and avoiding bank failures. In addition to determinants employed in other studies, we test the usefulness of several ratios from the practitioner literature (Compustat, n.d., and Golin & Delhaise, 2013), as well as certain relatively novel industry-specific and macroeconomic variables.

The focus on contemporaneous determinants of bank earnings differentiates banking profitability studies from a stream of accounting research involving nonfinancial companies which predicts *future* earnings. This work is categorized as "fundamental analysis" research. It utilizes financial statement, industry, and economic data to predict accounting earnings and equity returns (Abarbanell & Bushee, 1997; Lev, Li, & Sougiannis, 2010; Seng & Hancock, 2012; Wahlen & Wieland, 2011). Prediction of future earnings has been identified as the central task of "fundamental analysis" research (Abarbanell & Bushee, 1997; Penman, 1992). The approach of predicting future performance has been applied to the banking industry only by Chronopoulos, Liu, McMillan, and Wilson (2012). In the present paper,

we follow the predictive focus of fundamental analysis research. We build upon the work of Chronopoulos et al. (2012) by applying our expanded array of profitability measures to the prediction of bank profitability.

Our results confirm and extend previous research on the bank-specific, industry-specific, and macroeconomic factors determining profitability contemporaneous with those factors. Noninterest expense scaled by income and provisions for credit losses are negatively related to profitability. Equity scaled by assets is positively related to profitability. However, these relationships either reverse (efficiency ratio and provisions for credit losses) or become insignificant (equity scaled by assets) when the dependent variable becomes change in profitability. Noninterest income measures are unrelated to profitability. Profitability is positively related to spending on noninterest expenses when scaled by total assets. Macroeconomic factors, while unrelated to profitability during the year they are measured tend to significantly relate to the change in profitability, suggesting they have a delayed effect.

The paper is organized as follows. The next section reviews the literature on determinants of bank profitability. The section that follows this describes the measures of bank profitability and the determinant variables we use. The next section describes our data and methodology. The next section details our empirical results and the final section presents the discussion of our findings.

LITERATURE REVIEW

We review the literature on the determinants of bank profitability. Because of its widespread acceptance, for the sake of conciseness, and to facilitate comparisons across studies, we cite ROA results unless otherwise specified. We will also describe the approach of fundamental analysis to earnings prediction.

Geographic Scope of Banking Profitability Studies

Several studies have focused on bank profitability in individual countries. Single country studies are of Bangladesh (Sufian & Habibullah, 2009), China (Garcia-Herrero, Gavi la, & Santab rbara, 2009; Heffernan & Fu, 2008;

Lee & Hsieh, 2013; Tan & Floros, 2012) Greece (Alexiou & Sofoklis, 2009; Athanasoglou et al., 2005, Mamatzakis & Remoundos, 2003), India (Bhatia, Mahajan, & Chander, 2012; Karimzadeh, Akhtar, & Karimzadeh, 2013; Sufian & Noor, 2012), Indonesia (Agustini, 2011; Sastrosuwito & Suzuki, 2012), Japan (Liu & Wilson, 2010), Jordan (Almumani, 2013; Khrawish, 2011; Ramadan, Kilani, & Kaddumi, 2011), Kenya (Kiganda, 2014; Ongore & Kusa, 2013), Korea (Lee, 2013; Lee & Kim, 2013; Sufian, 2011), Macao, (Vong & Chan, 2009), Macedonia (Poposka & Trpkoski, 2013), Malaysia (Guru, Staunton, & Shanmugam, 2002; Vejzagic & Zarafat, 2014), Nigeria (Aburime, 2008), Pakistan (Ali, Akhtar, & Ahmed, 2011; Jabbar, 2014; Javaid, Anwar, Zaman, & Gafoor, 2011; Naseem, Saleem, Shah, & Shah, 2012; Raza, Jawaid, & Shafqat, 2013; Riaz, 2013; Sohail, Iqbal, Tariq, & Mumtaz, 2013), Phillipines (Sufian & Chong, 2008), Spain (Trujillo-Ponce, 2013), Switzerland (Dietrich & Wanzenried, 2011), Syria (Al-Jafari & Alchami, 2014), Thailand (Chantapong, 2005), Tunisia (Ameur & Mhiri, 2013; Ayadi & Boujelbene, 2012; Ben Naceur & Goaid, 2008; Rachdi, 2013), Turkey (Alp, Ban, Demirgunes, & Kilic, 2010; Alper & Anbar, 2011; Ayaydin & Karakaya, 2014; Cerci, Kandir, & Onal, 2012; Gul, Irshad, & Zaman, 2011; Macit, 2012; Turgutlu, 2014), United Kingdom (Kosmidou, Tanna, & Pasiouras, 2005; Saeed, 2014), United States (Bourke, 1989; Chaudhry, Chatrath, & Kamath, 1995; Chronopoulos et al., 2012; Kanas, Vasiliou, & Eriotis, 2012; Tregenna, 2009; Wall, 1985; Zimmerman, 1996).

Other studies have examined profitability across multiple countries. These cover South Eastern European countries (Athanasoglou, Delis, & Staikouras, 2006), 12 countries or territories in Europe, North America, and Australia (Bourke, 1989), 80 industrial and developing countries (Demirguc-Kunt & Huizinga, 1999), 5 major European Union countries (Goddard, Molyneux, & Wilson, 2004), countries from the Middle East and North Africa region (Olson & Zoubi, 2011), 15 European Union countries (Pasiouras & Kosmidou, 2007), 4 South Asian countries (Perera, Skully, & Chaudhry, 2013), 13 European Union countries (Staikouras & Wood, 2004), 12 advanced economies (Shen, Chen, Kao, & Yeh, 2009), twelve West-European countries (van Ommeren, 2011), 41 countries from Sub-Saharan Africa (Flamini, McDonald, & Schumacher, 2009; 18 European countries (Molyneux & Thornton, 1992), twelve Middle Eastern countries (Mirzaei & Mirzaei, 2011), 12 countries including Canada, Japan, and several in Europe (Short, 1979), 42 countries in Sub-Saharan Africa (Francis, 2013), and 3 ASEAN countries (Wahidudin, Subramanian, & Kamaluddin, 2013).

Considering the Results

Generalizing from studies of bank profitability is challenging. Given the differences in regulatory standards, accounting rules, and economic environments across countries and time periods covered it is to be expected that the results will vary. Diverse statistical regression analyses across studies (i.e., pooled OLS, random effects and fixed effects models, generalized method of moments) may also contribute to the nonuniformity of results. Finally, sample sizes vary widely.

Italicized in parentheses following the initial description of each determinant variable will appear the number of studies respectively showing a significant positive, negative, and insignificant relationship with profitability. The format will be (<# of studies with + relationship>, <# of studies with – relationship>, <# of studies with N.S. relationship>). Thus, if a variable has a relationship with profitability that is positive in 17 studies, negative in 8 studies, and not significant in 7 studies this will be shown as (17, 8, 7).

Bank-Specific Determinants

Almost all bank-specific determinants of profitability are ratios of the values of various financial statement accounts. A unique feature of financial statement ratio analysis with banks is that ratio levels represent the business model of the organization. With nonfinancial companies, ratio values tend more to represent the outcome of operating activities resulting from the firm's business model. Management's effect on the values of such ratios is indirect. Examples include accounts receivable or inventory turnover. Among banks, where money is the "raw material" of the business, ratio values embody aspects of the banks business model. Financial statement ratios tend to represent factors over which the bank's management exercises control. For example, significant bank ratios include the ratio of liquid to total assets, the level of equity to total assets, and the degree to which income is derived from earning interest or from charging fees for nonloan related activities. Thus, how bank financial ratios relate to profitability is taken as indicative of how a successful bank should be managed.

Bank-specific determinants include financial statement ratios in four areas: (1) capital; (2) earnings, profitability, and efficiency; (3) liquidity; and (4) asset quality (Golin, 2001). We will describe several key ratios from these areas and show how research has found them related to profitability.

Capital indicators measure the strength of the bank's capital position, including its ability to withstand and recover from economic shocks. Such ratios include equity to assets, leverage (assets to shareholder's equity), debt to equity, and equity growth.

Theoretical expectations, as well as empirical results, for the *equity to assets ratio* (Total equity/Total assets) suggest that the ratio will be positively related to bank profitability (41, 4, 8). More capital means less need for external funding and a lower cost of capital when it is sought. Bankruptcy risk costs will be less due to the larger safety net in case of negative developments. On the other hand, when capital levels are high, low levels of leverage and risk are implied. Some have contended that shareholders' profits should be higher when equity level decreases and risk increases. However, recent theoretical work indicates that, when earnings are mean-reverting, the relationship between leverage and current earnings should be negative (Sarkar & Zapatero, 2003). There is substantial evidence that earnings in banking mean-revert (Knapp, Gart, & Chaudhry, 2006). In addition, studies across industries have found that the actual relationship between leverage and profitability was negative (Fama & French, 2000; Rajan & Zingales, 1995). The implication is that the level of equity in a bank's capital structure should be positively related to profitability.

Studies showing a positive relationship between capital levels and profitability include: Alp et al. (2010), Ameer and Mhiri (2013), Athanasoglou et al. (2005, 2006), Ayadi and Boujelbene (2012), Ayaydin and Karakaya (2014), Ben Naceur and Goaied (2008); Bourke (1989), Demircug-Kunt and Huizinga (1999), Dietrich and Wanzenried (2011), Flamini et al. (2009), Francis (2013), Garcia-Herrero et al. (2009), Jabbar (2014), Javaid et al. (2011), Kanas et al. (2012), Khrawish (2011), Kosmidou et al. (2005), Lee (2012), Lee and Hsieh (2013), Liu and Wilson (2010), Macit (2012), Mamatzakis and Remoundos (2003), Mirzaei and Mirzaei (2011), Molyneux and Thornton (1992), Olson and Zoubi (2011), Ongore and Kusa (2013), Pasiouras and Kosmidou (2007), Perera et al. (2013), Poposka and Trpkoski (2013), Ramadan et al. (2011), Saeed (2014), Sastroswito and Suzuki (2012), Shen et al. (2009), Sufian and Chong (2008), Trujillo-Ponce (2013), van Ommeren (2011), Vong and Chan (2009), Wahidudin et al. (2013), Wall (1985), and Zimmerman (1996). Studies finding a negative relationship include: Ali et al. (2011), Chronopoulos et al. (2012), Goddard et al. (2004), Guru et al. (2002). In other studies, this relationship was not significant (Al-Jafari & Alchami, 2014; Almumani, 2013; Alper & Anbar, 2011; Heffernan & Fu, 2008; Sufian & Noor, 2012; Tan & Floros, 2012; Tregenna, 2009; Turgutlu, 2014).

In the earnings, profitability, and efficiency area, a key ratio is the *efficiency* or *cost to income ratio* (Noninterest expense/Total income) (0, 18, 3). Included in noninterest expenses are administrative, compensation, marketing, and property costs. Higher numbers indicate a bank is operating less efficiently. Its relationship with profitability is almost uniformly negative (Alexiou & Sofoklis, 2009; Almumani, 2013; Ameer & Mhiri, 2013; Bhatia et al., 2012; Bourke, 1989; Cerci et al., 2012; Dietrich & Wanzenried, 2011; Francis, 2013; Heffernan & Fu, 2008; Kosmidou et al., 2005; Liu & Wilson, 2010; Olson & Zoubi, 2011; Pasiouras & Kosmidou, 2007; Rachdi, 2013; Sastrosuwito & Suzuki, 2012; Trujillo-Ponce, 2013; Turgutlu, 2014; van Ommeren, 2011). Failure of this variable to significantly relate to profitability was found in the work by Ali et al. (2011), Flamini et al. (2009), and Vong and Chan (2009). Mixed results have also been reported (Tregenna, 2009).

Another earnings, profitability, and efficiency ratio is the *cost to assets* ratio (Noninterest expense/Total assets) (5, 10, 1). This ratio is less variable than the efficiency ratio which fluctuates with yearly income. Several studies have found that high values on it lower profitability (Alp et al., 2010; Athanasoglou et al., 2005, 2006; Demircuc-Kunt & Huizinga, 1999; Sohail et al., 2013; Staikouras & Wood, 2004; Sufian, 2011; Sufian & Chong, 2008; Tan & Floros, 2012; Wahidudin et al., 2013). Other studies (Al-Jafari & Alchami, 2014; Ben Naceur & Goaid, 2008; Mirzaei & Mirzaei, 2011; Sufian & Habibullah, 2009; Sufian & Noor, 2012) found a positive and significant relationship with bank performance. One explanation offered was that more qualified staff whose presence boosts performance may, in some contexts, require higher compensation. Another possibility is that the direction of causality is from more profitable banks being willing to spend more money on noninterest expenses. One study found this ratio did not significantly relate to profitability (Chantapong, 2005).

While banks' main income source is interest income, noninterest revenue has become increasingly significant in recent years. Noninterest income includes bank fees, service charges, dividend income, securitization, and trading profit/loss. Legal changes in the United States, such as the 1994 Riegle-Neal Interstate Banking and Branching Efficiency Act, the 1999 Gramm-Leach-Bliley Act, as well as technological and competitive changes have encouraged banks to expand into nonbanking activities. While this type of income offers banks a degree of diversification, it is seen as less sustainable and of lower quality than interest income (Golin & Delhaise, 2013).

One measure of revenues from such activities is the *noninterest contribution to revenues* (Noninterest income/Operating income or revenues) ratio (2, 4, 1). In a minority of studies, noninterest income has been found to significantly and positively affect profitability (Alper & Anbar, 2011; van Ommeren, 2011). It failed to reach significance in another study (Kanas et al., 2012). Other studies report that the proportion of non-interest income was negatively related to profitability (Agustini, 2011; Chronopoulos et al., 2012; Raza et al., 2013; Tan & Flores, 2012). Some have suggested that this may be due to lower margins in these highly competitive business activities. The apparently mixed relationship of these newer activities to profitability adds to concerns that such activities tend to be difficult to monitor and control, while increasing risk (DeYoung & Rice, 2004; Morris, 2011; Stiroh & Rumble, 2006). A variant ratio also reflecting the degree of the mix of interest and noninterest revenue (Net interest revenues/Other operating income) showed that bank activity diversification positively influenced profitability (Flamini et al., 2009).

Another indicator of the contribution of noninterest income is the *noninterest income to total assets* ratio (Noninterest income/Assets) (4, 1, 2). Positive and significant relationships with profitability have been reported (Bhatia et al., 2012; Sufian, 2011; Sufian & Chong, 2008; Sufian & Noor, 2012). A significantly negative relationship was also reported (Sufian & Habibullah, 2009). A nonsignificant relationship has been reported (Chantapong, 2005; Heffernan & Fu, 2008).

A measure of diversification of assets is *noninterest-bearing assets in relation to total assets* (Nonloan assets/Total assets) (0, 1, 1). A multinational study using this ratio (Demirguc-Kunt & Huizinga, 1999) found no significant relationship to profitability for the entire sample. They went on to explore the interaction of noninterest earning assets and per capita GDP and found that the presence of noninterest earning assets depressed earnings in high-income countries more than in low-income nations. Apparently, at higher income levels lending activities are more profitable than noninterest activities. A negative relationship of this variable with profitability has also been reported (Wahidudin et al., 2013).

The *economic contribution to the bank on a per employee basis* has been studied with an expected effect that labor productivity ($\text{Profit measure} / \text{Number of employees}$) has a positive effect upon bank profits (3, 1, 1). Most studies support this view (e.g., Athanasoglu et al., 2005; Bhatia et al., 2012; Tan & Floros, 2012). A study from Greece found a negative and significant effect on profitability (Alexiou & Sofoklis, 2009). The explanation offered was that Greek banks had a suboptimal number of employees for

the assets under management. One study shows no significant relationship (Aburime, 2008).

A key liquidity ratio is the *liquid assets ratio* (Liquid assets/Total assets) (4, 4, 1). Components of liquid assets may vary across countries, but generally include cash, government securities, interbank deposits, and short-term marketable securities (Golin & Delhaise, 2013). Lower liquidity means higher risk. The portfolio theory suggests higher risk leads to higher profitability. In accordance with this perspective, some studies have found that the liquidity ratio was negatively related to profitability (Alp et al., 2010; Goddard et al., 2004; Lee & Hsieh, 2013; Molyneux & Thornton, 1992). Liquid assets typically earn a lower rate of return than the longer term loans banks make. However, in some studies, liquidity was found to be positively related to profitability, despite the conventional wisdom that liquidity holdings represented assets earning a smaller profit (Bourke, 1989; Kosmidou et al., 2005; Poposka & Trpkoski, 2013; Shen et al., 2009). The rationale offered was that more liquid banks had less need to resort to costly external funding. Less expensive funding meant increased income. Bordeleau and Graham (2010) posited that liquidity levels affected profitability in two ways. First, liquidity lowers a bank's insolvency risk reducing financing costs and improving profitability. Second, liquid assets have a lower return than nonliquid assets, reducing profitability. At low levels of liquidity, the first effect is more pronounced. As liquidity increases, the opportunity cost of foregone income comes to predominate and increasing liquidity lowers profitability. Thus, the overall relationship between liquidity and profitability is nonlinear. In a sample of United States and Canadian banks, Bordeleau and Graham (2010) found evidence of a downward-concave parabolic relationship between liquidity and profitability. Thus, holding some liquid assets increases profitability, but a point is reached where holding further liquid assets lessens profitability. During economically stressful and risky times, the profit-maximizing liquidity level increases. One study found that this ratio did not relate significantly to profitability (Alper & Anbar, 2011).

Liquidity has also been measured by *liquid assets to total deposits* (Liquid assets/deposits) (0, 1, 2). It has been negatively related to profitability in one study (Al-Jafari & Alchami, 2014) and found to be not significantly related in others (Almumani, 2013; Ayaydin & Karakaya, 2014).

A widely used liquidity measure is the *loans-to-total assets ratio* (Total loans/Assets) (12, 12, 13). Loans are less liquid than the other main component of a bank's asset portfolio – investment securities. Hence, higher values of this ratio denote less liquidity. Because loans earn higher raw

rates of return than more secure assets, this ratio may be positively related to profitability. This advantage may be eroded by the higher administrative and transaction costs of loans. If there are substantial loan defaults, because a bank's credits are substandard or economic conditions are adverse, a large loan portfolio can lead to reduced profitability. If a bank is paying a high cost to fund the loans their impact on profitability will be negative. Higher liquidity may act to increase profitability by reducing insolvency risk costs. Studies, finding that the larger the share of loans on the balance sheet the greater will be the bank's profitability, include Francis (2013), Gul et al. (2011), Karimzadeh et al. (2013), Lee (2012), Mamatzakis and Remoundos (2003), Olson and Zoubi (2011), Ramadan et al. (2011), Sastrosuwito and Suzuki (2012), Sufian (2011), Sufian and Habibullah (2009), Trujillo-Ponce (2013), and Zimmerman (1996). In other studies, this relationship failed to reach significance (Almumani, 2013; Alp et al., 2010; Athanoglou et al., 2006; Ayadi & Boujelbene, 2012; Ayaydin & Karakaya, 2014; Ben Naceur & Goaid, 2008; Chantapong, 2005; Javaid et al., 2011; Lee, 2012; Liu & Wilson, 2010; Rachdi, 2013; Saeed, 2014; Tan & Floros, 2012). In other studies, the relationship of the size of the credit portfolio and profitability was negative (Aburime, 2008; Chronopoulos et al., 2012; Demircuc-Kunt & Huizinga, 1999; Heffernan & Fu, 2008; Lee & Hsieh, 2013; Mirzaei & Mirzaei, 2011; Naseem et al, 2012; Raza et al., 2013; Staikouras & Wood, 2004; Sufian & Noor, 2012; Vong & Chan, 2009; Wall, 1985). The widespread nonperformance of bank loans, typical in the country in which the study was performed, was cited in one study. Another suggested that, in certain contexts, nonloan assets may be more profitable. Intense competition in the credit market may drive loans rates down, reducing lenders' profits.

Another liquidity ratio is *net loans-to-deposits* (Net loans/deposits) (2, 3, 3). A figure in the 70–90% range is seen as optimal (Golin & Delhaise, 2013), with higher numbers being on the risky side and below this range is conservative. Alexiou and Sofoklis (2009) found a significantly negative relationship for Greek banks although the average level of this ratio in their sample was 79%. Perera et al. (2013) also found that higher values on this ratio lessened profitability. Higher amounts of nonperforming assets and increased liquidity costs were cited. In a Chinese sample, the ratio averaged 198.34% and the relationship with profitability was negative (Lee & Hsieh, 2013). Positive and significant relationships with profitability have also been reported (Flamini et al., 2009; Sohail et al., 2013). Both of these studies reported averages on this ratio below 70%. This may suggest that when most banks in a sample are conservative in their credit risk

levels, those with higher exposures can be more profitable. Other studies found this ratio not significantly related to profitability (Bhatia et al., 2012; Lee & Kim, 2013; Ongore & Kusa, 2013).

Asset quality indicators provide indications of difficulties with a bank's loan portfolio. Problems with a bank's asset quality are usually assumed to lower profitability. One asset quality indicator is the *NPL (nonperforming loans) ratio* (Nonperforming loans/Total loans) (0, 5, 0). This measure has been found to be significantly and negatively related to profitability (Lee, 2012; Macit, 2012; Ongore & Kusa, 2013; Poposka & Trpkoski, 2013; Trujillo-Ponce, 2013).

Another widely used asset quality measure is the *reserves to loans ratio* (Loan loss reserves/Total loans) (4, 16, 2). Banks with a higher proportion of reserves may be those with more aggressive lending strategies. High risk loans can be expected to lead to nonperforming loans and reductions in interest revenue. However, this effect may be offset by higher interest rates charged by lenders to riskier borrowers. The usefulness of this ratio has been questioned, because the level of reserves may not indicate the level of problem loans they are meant to provide against (Golin & Delhaise, 2013). Several studies have found this ratio to be negatively and significantly related to profitability (Alexiou & Sofoklis, 2009; Ali et al., 2011; Al-Jafari & Alchami, 2014; Athanoglou et al., 2005, 2006; Ayaydin & Karakaya, 2014; Kanas et al., 2012; Liu & Wilson, 2010; Ramadan et al., 2011; Raza et al., 2013; Shen et al., 2009; Staikouras & Wood, 2004; Sufian & Chong, 2008; Tan & Floros, 2012; Trujillo-Ponce, 2013; Vong & Chan, 2009). In Switzerland, a country with historically low loan loss provisions, such loss provisions prior to the financial crisis years did not have a statistically significant effect on profitability. During the crisis years of 2007–2009, they increased and did have a significantly negative relationship with profitability (Dietrich & Wanzenried, 2011). Some studies reported a positive relationship between this ratio and profitability (Heffernan & Fu, 2008; Olson & Zoubi, 2011; Riaz, 2013; Sufian & Habibullah, 2009). One explanation, referred to as the “skipping hypothesis,” is that a bank may rationally reduce loan underwriting and monitoring costs as doing so may offset higher nonperformance costs (Berger & DeYoung, 1997). The generally negative effect of this measure on profitability has been taken to indicate that banks should focus on credit risk management. Two studies found an insignificant relationship between this variable and profitability (Kosmidou et al., 2005; Mamatzakis & Remoundos, 2003).

Loan loss reserves to total assets (Loan loss reserves/Total assets) (0, 1, 0) have been found to relate negatively to profitability (Chantapong, 2005).

Loan loss provisioning to average assets (Loan loss provisioning/Average assets) is also reflective of asset quality (0, 4, 0). It has exclusively been found to be significantly and negatively related to profitability (Bhatia et al., 2012; Chaudhry et al., 1995; Jabbar, 2014; Sohail et al., 2013).

Loan loss provisioning to loans (Loan loss provisions/Total loans) was significantly and negatively related to profitability (Mirzaei & Mirzaei, 2011) in one study and not significantly related in another (Almumani, 2013) (0, 1, 1).

Another asset quality indicator is *net charge-offs to total loans* (Net charge-offs/Loans) (1, 0, 0). Charge-offs reflect a recognition of bad loans and the consequent cleaning up of the bank's loan book. The usefulness of this ratio may be limited, since write-offs can arise from either forward-looking adjustments or remedial action for situations long determined to be unfavorable. A study which examined determinants of profitability one year ahead found a positive relationship with profitability. The interpretation was that actions improving the quality of the bank's assets in one year favorably affect profits the following year (Chronopoulos et al., 2012).

Loan growth measures growth in the bank's primary business activity which presumably would not be undertaken unless profitable investment opportunities were present (Percentage change in total loans) (0, 0, 1). Thus, a positive relationship to profitability is expected. However, such growth can reflect negatively on asset quality if it is too robust. The concern is that the bank may not have adequately evaluated prospective borrowers (Golin & Delhaise, 2013). However, the prevailing methodology of looking at profitability, contemporaneous with the determinant independent variables may hide the significance of high values on this ratio, since there will be a lag of months to years between the creation of a pool of loans and their falling to a nonperforming status. Only one study thus far has included this measure, and found it to be insignificantly related to profitability (van Ommeren, 2011).

The *size* of the bank, as measured by the logarithm of total assets is another bank-specific variable (16, 9, 15). Increased size is presumed to confer benefits which can enhance profitability. Included are greater market power, improved technological efficiency, and the ability to secure funding at a lower cost. However, increasing size beyond a certain point may lead to scale inefficiencies as the organization's bureaucracy impedes communication. Larger size may allow banks to diversify, affecting both risk and profitability and decision making. Thus, the relationship between size and profitability may be nonlinear or ambiguous. Studies have found a positive relationship between size and profitability (Agustini, 2011;

Alexiou & Sofoklis, 2009; Al-Jafari & Alchami, 2014; Alper & Anbar, 2011; Alp et al., 2010; Athanasoglou et al., 2006; Ayadi & Boujelbene, 2012; Gul et al., 2011; Jabbar, 2014; Karimzadeh et al., 2013; Khrawish, 2011; Lee, 2012; Mirzaei & Mirzaei, 2011; Naseem et al., 2012; Sufian & Noor, 2012; Zimmerman, 1996). Others report a negative relationship (e.g., Ameer & Mhiri, 2013; Kosmidou et al., 2005; Lee & Hsieh, 2013; Macit, 2012; Pasiouras & Kosmidou, 2007; Perera et al., 2013; Rachdi, 2013; Sohail et al., 2013; Sufian & Chong, 2008). Some studies have found size unrelated to profitability (Aburime, 2008; Almumani, 2013; Athanasoglou et al., 2005; Goddard et al., 2004; Guru et al., 2002; Heffernan & Fu, 2008; Olson & Zoubi, 2011; Ramadan et al., 2011; Saeed, 2014; Sastrosuwito & Suzuki, 2012; Sufian, 2011; Tan & Floros, 2012; Trujillo-Ponce, 2013; Turgutlu, 2014; van Ommeren, 2011).

To assess the possible presence of a nonlinear relationship between size and profitability as discussed above, the square of the logarithm of total assets is related to profitability. A nonlinear relationship is indicated when the size is positively related and the square of the size variable is negatively related to profitability. Several recent studies have found just such a relationship (Chronopoulos et al., 2012; Flamini et al., 2009; Lee & Kim, 2013; Mamatzakis & Remoundos, 2003; Mirzaei & Mirzaei, 2011; Shen et al., 2009; Tregenna, 2009). This was taken as confirmation of the theory that economies of scale enhance profitability up to a certain size beyond which the effect diminishes and scale inefficiencies predominate. A similar result was obtained by Staikouras and Wood (2004) who split their sample into large and small banks. Among small banks, size was positively related to profitability. Among large banks, the relationship was negative. This was taken as evidence for diseconomies of scale from a certain size upwards.

There is substantial evidence that bank profitability levels persist from one year to the next. Thus, the *lagged profitability* is used as a determinant of profitability in the base year (13, 1, 0). Studies of bank profitability have found lagged profitability to be significantly predictive of current profitability (Ameer & Mhiri, 2013; Athanasoglou et al., 2005; Ayaydin & Karakaya, 2014; Chronopoulos et al., 2012; Dietrich & Wanzenried, 2011; Garcia-Herrero et al., 2009; Lee & Hsieh, 2013; Mirzaei & Mirzaei, 2011; Perera et al., 2013; Rachdi, 2013; Tan & Floros, 2012; Trujillo-Ponce, 2013; van Ommeren, 2011). One study has found a negative relationship between previous and current year's profitability (Al-Jafari & Alchami, 2014). Other studies have explored the determinants of this persistence (Berger, Bonime, Covitz, & Hancock, 2000; Goddard, Liu, Molyneux, & Wilson, 2011).

Industry-Specific Determinants

Bank industry determinants are external factors that may relate to bank profitability, such as the extent of industry concentration and the size of the banking system in relation to the size of the economy as a whole.

Industry concentration is the degree to which the industry in a market is served by just a few or by many banks (19, 6, 10). When a banking market is more concentrated, customers have fewer choices, competition is less, and the market power of individual banks is greater. With greater industry concentration, the profitability of individual banks may be enhanced by the earning of monopolistic profits. That the overall profitability of banks may not be enhanced by market concentration is suggested by the “noisiness” of bank profits. That is, bank profits are multi-determined and concentration alone may not have a discernible effect. Another possibility is that concentration may offer competitive advantages but profitability is not increased, because the benefits are expended by management pursuing a “quiet life” in the form of a more relaxed environment in which costs are allowed to rise and revenue-enhancing opportunities are foregone (Berger & Humphrey, 1994). Thus, concentration may lead to greater revenues, but these will be offset by greater expenses incurred by banks in more concentrated markets, such that the effect of concentration on profitability is negligible. There is some evidence that this is indeed what happens (Wall, 1985). In addition, any correlation between concentration and profitability may be spurious because increased managerial efficiency can lead to both increased market share and greater profits (Berger, 1995).

Concentration can be assessed as the assets of the top X number of banks to the total assets held by banks. Another common method is the Herfindahl–Hirschman Index. However, for banks greater in size than community banks (i.e., regional and diversified banks), the measurement of market concentration is problematic. Larger banks operate in several markets, and using the location of the home office most likely will not necessarily reflect the market concentration faced by the bank. More complex schemes, such as weighting the concentration indices for the multiple markets the bank operates in by the proportion of the deposits derived from the market also have difficulties (Wall, 1985). A new concentration index, using the weighted share of the largest 2% and 5% of institutions, has also been developed (Tregenna, 2009).

Studies finding a positive relationship between the degree of industry concentration and profitability include Athanoglou et al. (2006), Ayaydin and Karakaya (2014), Bourke (1989), Demircuc-Kunt and Huizinga (1999),

Dietrich and Wanzenried (2011), Goddard et al. (2004), Karimzadeh et al. (2013), Kosmidou et al. (2005), Lee and Hsieh (2013), Molyneux and Thornton (1992), Pasiouras and Kosmidou (2007), Perera et al. (2013), Rachdi (2013), Sastrosuwito and Suzuki (2012), Shen et al. (2009), Short (1979), Sufian (2011), Tregenna (2009), Trujillo-Ponce (2013). Bourke (1989) reports findings in conjunction with the concentration measure suggesting that profits rise with increased concentration because overhead expenses are squeezed along with concentration. Studies have found a significant negative relationship between concentration and profitability (e.g., Ameer & Mhiri, 2013; Chronopoulos et al., 2012; Kanas et al., 2012; Liu & Wilson, 2010; Ramadan et al., 2011; Tan & Floros, 2012). Others have found no significant relationship (e.g., Al-Jafari & Alchami, 2014; Athanasoglou et al., 2005; Ayadi & Boujelbene, 2012; Ben Naceur & Goaid, 2008; Mamatzakis & Remoundos, 2003; Olson & Zoubi, 2011; Staikouras & Wood, 2004; Turgutlu, 2014; van Ommeren, 2011; Vong & Chan, 2009). Findings on the relationship between concentration and profitability have policy implications. Results suggesting that concentration increases bank profitability at the expense of nonbanking entities have been taken to justify intensifying the regulation of banks (Tregenna, 2009).

The *relative size of the banking system to the entire economy* (Total bank assets/GDP) has also been related to overall profitability (2, 3, 2). A negative relationship is expected, because when the banking sector is larger, it can be expected to be more competitive, which lowers the profitability of individual banks. Negative relationships between this ratio and bank profitability were found by Ameer and Mhiri (2013), Ayadi and Beoujelbene (2012), and Demirguc-Kunt (1999). A positive and significant effect of banking sector development and profitability has been found in certain studies (Raza et al., 2013; Tan & Floros, 2012). These latter results were found in China and Pakistan. The authors speculated that, in less developed countries, greater financial system development can enhance efficiency and profitability. A finding of no significant relationship has also been reported (Agustini, 2011; Ramadan et al., 2011).

Another industry-based indicator is the *ratio of stock market capitalization to the total assets of the banking system* (Stock market capitalization/Total bank assets) (2, 1, 0). The size of the stock market may signal a competitive challenge to banks, or be complementary to banking operations. Companies can meet their financing needs from issuing stock, as well as borrowing from banks. The better developed the stock market and the higher the values in it, the more easily the stock market can substitute for bank finance. Stock market size may be complementary to bank

profitability, if this increases the information flow about companies, enabling banks to make wiser lending decisions and better monitor loan customers. Two studies have supported the complementarity relationship, as larger stock market size increased bank profits (Ben Naceur & Goaid, 2008; Kosmidou et al., 2005). A negative relationship between stock market development and bank profitability has also been reported (Agustini, 2011).

Macroeconomic Determinants

Economic growth is thought to impact bank profitability favorably, by increasing loan demand, decreasing loan default rates, and allowing banks to charge more for their services. This may be offset by increasing the supply of banking services, as expansions and new entrants are encouraged by perceived favorable conditions. This variable is assessed by the year's *real change in gross domestic product (GDP)* for the nation the bank is located in, sometimes on a per capita basis (14, 5, 21). GDP growth was positively related to profitability in a number of studies (Ali et al., 2011; Chronopoulos et al., 2012; Dietrich & Wanzenried, 2011; Goddard, et al., 2004; Gul et al., 2011; Karimzadeh et al., 2013; Kosmidou et al., 2005; Lee & Hsieh, 2013; Lee & Kim, 2013; Shen et al., 2009; Trujillo-Ponce, 2013; Turgutlu, 2014; van Ommeren, 2011; Vejzagic & Zarafat, 2014). This variable was not significantly related in several studies (Alexiou & Sofoklis, 2009; Alper & Anbar, 2011; Ameer & Mhiri, 2013; Ayadi & Boujelbene, 2012; Ben Naceur & Goaid, 2008; Demircuc-Kunt & Huizinga, 1999; Francis, 2013; Kiganda, 2014; Macit, 2012; Mirzaei & Mirzaei, 2011; Ongore & Kusa, 2013; Poposka & Trpkoski, 2013; Ramadan et al., 2011; Riaz, 2013; Saeed, 2014; Naseem et al., 2012; Sufian, 2011; Sufian & Chong, 2008; Sufian & Habibullah, 2009; Sufian & Noor, 2012; Vong & Chan, 2009). There are also reports of a negative association between this variable and profitability (Al-Jafari & Alchami, 2014; Ayaydin & Karakaya, 2014; Khrawish, 2011; Liu & Wilson, 2010; Staikouras & Wood, 2004). The negative association was interpreted as reflecting increased ease of entry and consequent competition and reduced profitability with GDP growth.

The GDP growth variable has been lagged by one year under the assumption that, it will take time for the effect of a change to filter through to banks and their customers (Heffernan & Fu, 2008). When used in this way, it had a positive relationship with profitability.

The *inflation rate* is assessed by entering in the CPI change rate for the nation and the year (14, 7, 15). It can have both direct and indirect effects upon bank profits (Staikouras and Wood (2004). Direct effects include an increase in prices banks pay for inputs, such as labor, equipment, and facilities. Indirect effects on profitability may come through changes in interest rates and asset values. The extent to which inflation is successfully foreseen by bank management may determine its effect upon bank profitability (Perry, 1992). When anticipated, banks can adjust their rates to offset it. If it is not anticipated, costs may increase faster than revenues and profits will decline. It has been suggested that, because banks, in their maturity transformation role, lend money for longer periods than they borrow it for, inflation tends to decrease their margins and profits (Bordeleau & Graham, 2010). CPI was negatively related to profitability across a number of studies: (Ali et al., 2011; Ayaydin & Karakaya, 2014; Francis, 2013; Khrawish, 2011; Ongore & Kusa, 2013; Rachdi, 2013; Sufian & Chong, 2008). Inflation rate was found to be unrelated to profitability in many studies: (Alexiou & Sofoklis, 2009; Al-Jafari & Alchami, 2014; Alper & Anbar, 2011; Ameer & Mhiri, 2013; Ayadi & Boujelbene, 2012; Ben Naceur & Goaid, 2008; Karimzadeh et al., 2013; Kiganda, 2014; Macit, 2012; Mamatzakis & Remoundos, 2003; Mirzaei & Mirzaei, 2011; Ramadan et al., 2011; Saeed, 2014; Sastrosuwito & Suzuki, 2012; Vejzagic & Zarafat, 2014). In other studies, the relationship was positive (Athanasoglou et al., 2005, 2006; Guru et al., 2002; Demirguc-Kunt & Huizinga, 1999; Flamini et al., 2009; Garcia-Herrero et al., 2009; Gul et al., 2011; Raza et al., 2013; Riaz, 2013; Shen et al., 2009; Sufian, 2011; Tan & Floros, 2012; Trujillo-Ponce, 2013; Vong & Chan, 2009).

Inflation was positively related to profitability among a nation's domestically-owned banks, and negatively related among foreign-owned banks (Pasiouras & Kosmidou, 2007). This could have been due to differences in the ability to anticipate nation-specific economic news depending upon their understanding of the country's economic condition.

Another macroeconomic variable studied is the *ratio of the nation's stock market capitalization to GDP* (Stock market capitalization/GDP) (3, 1, 3). A complementary effect between the development of a nation's banking system and stock markets has been suggested by Levine (1997). A more developed equity market makes it easier for banks to raise capital. As noted above, higher capitalization is associated with increased profitability. Also, a more developed stock market means company information is more available. This enables banks to better judge credit risk. A positive value for this variable was found in Ben Naceur and Goaid (2008), Sufian (2011),

Tan and Floros (2012). A negative relationship arose in Liu and Wilson's (2010) work. This was interpreted as due to a high value of this ratio as reflecting a buoyant stock market associated with firm decisions to finance through equity issues rather than bank loans, thereby reducing bank's business opportunities. A lack of a significant relationship was noted in other studies (Raza et al., 2013; Sufian & Chong, 2008; Sufian & Noor, 2012).

The *term structure of interest rates* has been related to bank profitability (1, 0, 1). It has been defined as the difference between the yield on the 10-year Treasury note (United States) or interest rate swap (Europe) and the 3-month Treasury bill (United States) or EURIBOR (Europe) (Estrella & Mishkin, 1996; Golin & Delhaise, 2013; van Ommeren, 2011). Because banks tend to utilize short-term customer deposits to finance longer term loans, a steeper yield curve leads to a greater difference between their revenues and costs. Thus, a positive relationship between the yield curve and bank profitability is expected. This expected positive relationship was found by Dietrich and Wanzenried (2011). However, this study assessed the yield curve using the difference between the five-year and two-year Swiss Treasury bills. In a study of European banks, no relationship with profitability was found between the yield curve as measured by the difference between the 10-year EUR interest rate swap and the three-month EURIBOR (van Ommeren, 2011).

It has been suggested that the absolute *level of interest rates* (as measured by the real interest rate on government bonds or the average interest rate charged by banks) may be a determinant of bank profitability (van Ommeren, 2011) (4, 1, 3). This is because, it is expected to correlate to the difference between what a bank can earn on interest-bearing loans and those sources of funds on which it pays zero interest – equity and customer deposit accounts. The higher the interest rate level, the greater the profitability. A positive effect on profitability of real interest rates has been found (Demirguc-Kunt & Huizinga, 1999; Garcia-Herrero et al., 2009; Macit, 2012; Molyneux & Thornton, 1992). One study found a negative relationship (Riaz, 2013). Insignificant relationships have also been found (Karimzadeh et al., 2013; Turgutlu, 2014; Vejzagic & Zarafat, 2014).

Earnings Prediction by Fundamental Analysis Research

Fundamental analysis uses financial ratios and other information about the company, or its industry, to predict future earnings and/or equity values (Richardson, Tuna, & Wysocki, 2010). This task involves practitioners,

such as equity analysts, as well as academics (Stickney, 1997). Future earnings performance in the academic literature in this area has been operationalized as changes in earnings per share (Abarbanell & Bushee, 1997; Seng & Hancock, 2012) or changes in a core earnings measure (Li, 2003) between a base year and one or more years into the future. The predictive ratios used have been applicable across a wide range of industries. Financial services companies have been excluded due to the unique nature of their financial statement accounts. There have been calls for the development of industry-specific or “contextual” fundamental analysis models (Sloan, 2001).

MEASURES OF BANK PROFITABILITY AND DETERMINANT VARIABLES

Next, we will describe the measures of bank profitability, followed by a description of the independent variables.

Dependent Variables: Measures of Profitability

We use return on assets (ROA) and the change in ROA from year t to $t + 1$ as our primary measures of bank profitability. Return on equity (ROE) and the change in return on equity from year t to year $t + 1$ are our secondary measures of profitability. We designate the dependent variable of ROA contemporaneous with the primary determinant variables as ROA_t . The dependent variable of the change in ROA between the base year and the following year is designated ΔROA . The corresponding ROE dependent variables are designated ROE_t and ΔROE .

In calculating ROA, we use the averaged assets in the denominator. We retain the designation ROA. ROE uses the most current year's equity in the denominator.

ROA has been the most widely used in the literature, and is invariably present among whichever the subset of measures used. There are several reasons why the ROA measure is preferred. First, assets directly reflect both income and expense levels (Olson & Zoubi, 2011). Second, ROA does not vary according to the amount of leverage employed, as does ROE (Golin & Delhaise, 2013). Thus, high ROE may reflect good profitability or restricted equity capital (European Central Bank, 2010). By measuring

profitability solely in relation to a bank's asset base, ROA has attributes characteristic of a core profitability indicator. A downside is that it does not include off-balance sheet items.

Independent Variables: Determinants of Profitability

Factors explaining bank profitability have been divided among those within the bank and reflecting managerial actions (bank-specific determinants) and those external to the bank mirroring banking industry and macroeconomic conditions. Bank-specific determinants are largely derived from ratios of financial statement accounts, and assume unique values for each bank-year. Macroeconomic and industry variables take a value determined for the entire economy or banking industry for a given year.

Bank-Specific (Internal) Determinants

The ratio measures employed, while reflective of the literature on bank profitability, are specifically derived from those detailed in the comprehensive reference on bank credit analysis by Golin and Delhaise (2013) and in the Compustat white paper on bank and thrift industry-specific data (Compustat, n.d.). Most bank-specific determinants are classifiable as capital, earnings, profitability, and efficiency (EP&E), liquidity, and asset quality ratios.

A capital ratio we employ is *equity to assets* (EA). This measure of equity, relative to total assets, reflects the bank's capital strength or solvency (Golin & Delhaise, 2013). Higher values mean the bank will have lower interest expenses and expenses related to insolvency risk. While the relationship of this variable to profitability may vary across the stages of the business cycle (Berger, 1995), we expect it will have an overall positive relationship to profitability.

Three capital ratios from the practitioner literature (Golin, 2001) are added. *Equity growth*, (EG) measures the yearly change in shareholder's equity (Golin, 2001). Such growth may come from various sources (i.e., retained earnings, sale of new shares, merger, etc.). The growth rate in equity is compared to the growth in total assets in the *equity to asset growth* (EAG) measure. The growth in equity is compared to the growth in loans in the *equity to loan growth* (ELG) measure. Because of the newness of the use of these measures in the empirical literature, there are no predictions on how they relate to profitability.

Several ratios fall into the category of *earnings, profitability, and efficiency (EP&E)* ratios (Golin, 2001). The *efficiency ratio (ERATIO)* is the ratio of noninterest expenses to total income. It reflects the extent to which overhead expenses are impacting on profitability (Compustat, n.d.; Golin & Delhaise, 2013). Better control of personnel, occupancy and equipment costs improve (lower) this ratio. Our expectation is that it will be negatively related to profitability.

The *cost to assets (CA)* ratio is a variation on the efficiency ratio. It places the noninterest (overhead) expenses in relation to average assets instead of income (Golin, 2001). The volatility of this measure is lower than that of the efficiency ratio.

In recent years, noninterest income has become increasingly important. Noninterest income may be less stable than interest income, but does provide the bank with diversification of income streams. It is measured by the ratio *noninterest income to revenue (NIIR)*. Given the mixed results with this variable, we have no expectation of its relationship with profitability.

The ratio of *loans to assets (LA)* has been regarded as a measure of *liquidity* (Golin, 2001). Higher values result in lower liquidity. Given the mixed results of previous studies, we have no prediction regarding its relationship with profitability.

Several of our measures reflect the bank's *asset quality*. The *provision for credit losses (PCL)* is the amount charged against income for provisions against loan losses, in relationship to total loans. It reflects the riskiness of the bank's loan portfolio. Our expectation is for a negative relationship with profitability.

There are two asset quality indicators reflecting *reserve for credit losses (RCL)*. This reserve is the cumulative stock for loan losses, after new provisions have been added, and write-offs have been deducted. These ratios place the reserves for credit losses in relation to either the annualized net charge-offs or to the level of nonperforming assets. They show the reserves set aside for net charge-offs or nonperforming assets, and are expected to relate negatively to profitability.

The *nonperforming assets (NPA)* ratio is also another asset quality indicator. Loan delinquencies, real-estate foreclosures, and restructured and renegotiated debt comprise this asset category. The ratio divides this quantity by the bank's total assets. In that nonperforming assets provide diminished interest revenue and are at risk for failure to return loan principal, it is expected this ratio will be negatively related to profitability.

Net charge-offs are seen as the bottom line for asset quality analysis (Compustat, n.d.). They are put in ratio to total loans as *net charge-offs*

(NCO). As another indicator of loans not producing profit, it is expected the relationship to profitability will be negative.

Loan growth (LG) indicates that funds raised are being converted into loans. This means growth in the bank's primary business activity. However, such growth can reflect negatively on asset quality if it is too robust. The concern is that the bank may not have adequately evaluated prospective borrowers (Golin, 2001). Hence, there is no prediction as to the direction of the relationship with profitability.

A measure reflecting the size of the bank is the *logarithm of total assets* (L_AT). This data was adjusted for inflation using the GDP price deflator. To test for a nonlinear, convex relationship the *square of the logarithm of total assets* (L_AT2) is also related to profitability. In line with recent results using these measures, we expect the logarithm of total assets will be positively related to profitability, but that the relationship of the square of the logarithm of total assets will be negative. Such a finding will indicate that, there are economies of scale across lower parts of the size range, but diseconomies of scale predominate after a certain point on this range is reached. To assess whether a change in the size of the bank affects profitability, we employ the *difference between the logarithm of total assets_t and the logarithm of total assets_{t-1}* (Δ_L_AT).

The profitability value of the year prior to that of the dependent variable may have an effect. Both profitability persistence and regression to the mean have been reported in banking. Thus, we use *lagged profitability* as a determinant variable.

Macroeconomic Determinants

Annual values of several macroeconomic variables were also related to bank profitability. *GDP growth* (GDP) is a measure of overall economic growth. In general, this variable has been positively related to bank profitability. The rationale has been that, favorable economic times increase bank profit opportunities.

Inflation rate (CPI) is assessed by change in the CPI. Most studies have shown that, inflation favorably affects bank profitability. This is presumably because banks are able to anticipate inflation and favorably adjust their rate structure upwards to compensate for it. However, in the United States during the years of this study, inflation rates were subdued hence no prediction is made that it will significantly influence bank profitability during the study period.

The *yield curve* (YIELD) measures the difference between the yield on the U.S. government 10-Year notes and that on the 3-Month Treasury bill.

Table 1. Definition of Variables.

Dependent Variables	Description
ROA _{<i>t</i>}	$\frac{\text{Net income}_t}{(\text{Total assets}_t + \text{Total assets}_{t-1})/2}$
ΔROA	$\frac{\text{Net income}_{t+1}}{(\text{Total assets}_{t+1} + \text{Total assets}_t)/2} - \frac{\text{Net income}_t}{(\text{Total assets}_t + \text{Total assets}_{t-1})/2}$
ROE _{<i>t</i>}	$\frac{\text{Net income}_t - \text{Preferred dividends}_t}{\text{Common equity}_t}$
ΔROE	$\frac{\text{Net income}_{t+1} - \text{Preferred dividends}_{t+1}}{\text{Common equity}_{t+1}} - \frac{\text{Net income}_t - \text{Preferred dividends}_t}{\text{Common equity}_t}$
Independent Variables	
<i>Macroeconomic characteristics</i>	
CPI	Annual change in Consumer Price Index (%)
GDP	Annual real GDP growth (%)
Yield curve (YIELDC)	The difference between the interest rate of a U.S. Ten-Year Note and a 6-month T-Bill
<i>Industry-specific characteristics</i>	
Bank assets to GDP (BK_GDP)	$\frac{\text{U.S. bank assets}_t}{\text{GDP}_t}$
Stock market capitalization to bank assets (MC_BA)	$\frac{\text{U.S. stock market capitalization}}{\text{U.S. bank assets}}$
<i>Bank-specific characteristics</i>	
Efficiency ratio (ERATIO)	$\frac{\text{Noninterest expense}_t}{\text{Total income}_t}$
Equity to assets (EA)	$\frac{\text{Total equity}_t}{\text{Total assets}_t}$
Provision for credit losses (PCL)	$\frac{\text{Provision for credit losses}_t}{\text{Total loans}_t}$
Reserve for credit losses one (RCL)	$\frac{\text{Reserve for credit losses}_t}{\text{Annualized net charge offs}_t}$

Reserve for credit losses two (RCL2)	$\frac{\text{Reserve for credit losses}_t}{\text{Nonperforming assets}_t}$
Nonperforming assets (NPA)	$\frac{\text{Nonperforming assets}_t}{\text{Total assets}_t}$
Net charge offs (NCO)	$\frac{\text{Annualized net charge offs}_t}{\text{Total loans}_t}$
Noninterest income to revenue (NIIR)	$\frac{\text{Noninterest income}_t}{\text{Net interest income}_t + \text{Noninterest income}_t}$
Natural logarithm of total assets (L_AT)	LN (Total assets)
Square of the natural logarithm of total assets (L_AT^2)	(LN (Total assets))^2
Δ Natural logarithm of total assets (Δ _L_AT)	LN (Total assets) _t - LN (Total assets) _{t-1}
Loans to assets (LA)	$\frac{\text{Total loans}_t}{\text{Total assets}_t}$
Equity growth (EG)	$\frac{\text{Shareholder's equity}_t - \text{Shareholder's equity}_{t-1}}{\text{Shareholder's equity}_{t-1}}$
Equity to Asset Growth (EAG)	$\frac{\text{Shareholder's equity}_t - \text{Shareholder's equity}_{t-1}}{\text{Shareholder's equity}_{t-1}} - \frac{\text{Total assets}_t - \text{Total assets}_{t-1}}{\text{Total assets}_{t-1}}$
Loan Growth (LG)	$\frac{\text{Total loans}_t - \text{Total loans}_{t-1}}{\text{Total loans}_{t-1}}$
Equity to Loan Growth (ELG)	$\frac{\text{Shareholder's equity}_t - \text{Shareholder's equity}_{t-1}}{\text{Shareholder's equity}_{t-1}} - \frac{\text{Total loans}_t - \text{Total loans}_{t-1}}{\text{Total loans}_{t-1}}$
Cost to Assets (CA)	$\frac{\text{Noninterest expense}_t}{\text{Average assets}}$

Empirical work has determined that, the size of the difference has prognostic significance for the growth rate of the economy approximately one-year out (Estrella & Mishkin, 1996). Because its effects may be felt several months in the future, the one-year lagged values of this variable, as well as the end of year values, are entered into the models. Higher values indicate both that future economic conditions are likely to be favorable and that the spread between what banks receive from interest on long-term loans and what they are paying short-term depositors is favorable. Thus, a positive relationship between this variable and bank profitability is anticipated.

Industry-Specific Determinant

These are determinants characteristic of the industry itself for a particular year. Here, we include the *relative size of bank industry assets to GDP* (BK_GDP). This ratio has been negatively related to profitability when examined in developed economies. It has been taken as a proxy for increased competition in the industry.

We also use the ratio of the *capitalization of the nation's stock market to the total assets of the banking system* (MC_BA). A preponderance of the small number of studies using this variable found it positively related to profitability. Also, buoyant share prices suggest a favorable economic climate which may auger well for bank profits. Hence, a positive relationship with profitability is expected.

A summary of our dependent and explanatory variables is in [Table 1](#).

DATA AND METHODOLOGY

Data

The data used to develop the banking industry ratios was annual data from Standard and Poor's Compustat's Industry-Specific dataset for the Banking and Thrift industry (Compustat, n.d.). The banks studied belong to the regional banking sector (GICS sub-industry 40101015), as defined by the Global Industry Classification Standard (GICS Structure, n.d.). Regional banks operate chains of banks in regional geographic regions. They derive revenue from lending to small and medium size corporations. We do not include institutions from the GICS classification diversified banks (40101010), because they derive significant revenues from nonbanking operations. GICS classifications have been shown to be consistently

superior to other classification schemes on several important criteria (Bhojraj, Lee, & Oler, 2003). Our dataset is comprised of regional banks with complete Compustat data on the variables necessary for measuring profitability and the bank-specific determinants for the period 1994 through 2011. This gave us a sample of 4,546 bank-years from 452 separate banks.

Data to construct the industry-specific and macroeconomic variables, including the consumer price index, GDP growth, interest rates for the 10-year Note and the 6-month T-Bill, Total bank assets, and stock market capitalization were downloaded from U.S. Government Web sites, such as the U.S. Department of Commerce: Bureau of Economic Analysis (GDP change and GDP Price Deflator) and Federal Reserve Economic Data (Commercial Bank Assets).

Our data consists of varying number of years of bank data, which characterizes our sample as unbalanced panel data.

Descriptive statistics for the variables used are presented in Table 2. Values on some of the most commonly used variables are reasonably close to those reported in other recent studies. For example, the mean efficiency ratio in our data was .6408 while in Dietrich and Wanzenried's (2011) sample of Swiss banks, it was 0.6497, and in Trujillo-Ponce's (2013) Spanish bank sample, it was 0.5734. The mean equity to assets ratio in our sample was 0.0909, while in the Swiss and Spanish samples, the corresponding values were 0.0855 and 0.0699, respectively. The mean ROA values across the American, Swiss and Spanish samples were 0.0088, 0.0063, and 0.0099. The mean provision for credit losses to total loans was 0.0035 in the conservative Swiss banking culture and 0.0060 in our American sample.

The data was "winsorized" at the top and bottom 1% of the outliers by the top and bottom 1% of values of the distribution.

The correlation matrix of independent variables is found in Table 3.

Methodology

To investigate the effects of our bank-specific, industry-specific, and macroeconomic determinants on bank profitability, we closely follow Garcia-Herrero et al. (2009) and Dietrich and Wanzenried (2011). The main regression will be:

$$y_{it} = \alpha_i + \delta y_{i,t-1} + \chi_{it}\beta + \chi_{it}^e\beta^e + \epsilon_{it} \quad (1)$$

Table 2. Descriptive Statistics.

	Mean	Median	Std. Dev.
<i>Dependent variables</i>			
ROA _{<i>t</i>}	0.0088	0.0105	0.0092
ROE _{<i>t</i>}	0.1073	0.1121	2.7408
<i>Independent variables</i>			
CPI	2.5067	2.8	0.9555
GDP	2.3964	2.5	1.9057
YIELDC	1.6905	1.54	1.1601
BK_GDP	0.6651	0.6427	0.0951
MC_BA	1.8646	1.9281	0.4909
ERATIO	0.6408	0.6224	0.1949
EA	0.0909	0.0886	0.0238
PCL	0.006	0.0032	0.0096
RCL	9.4593	5.1654	130.0288
RCL2	7.2053	1.5721	176.3549
NPA	0.0108	0.0055	0.0171
NCO	0.0048	0.0023	0.0086
NIIR	0.2271	0.2207	0.2084
L_AT	7.4057	7.1485	1.425
L_AT^2	56.8753	51.101	22.8291
Δ_L_AT	0.1042	0.0797	0.1415
LA	0.6569	0.6669	0.1053
EG	0.1415	0.0845	0.3629
EAG	0.0193	0.0031	0.3104
LG	0.1276	0.09	0.2137
ELG	0.0139	-0.0013	0.3301
CA	0.0317	0.0305	0.0088

where y_{it} is ROA or ROE for bank i at period t ; α_i is a bank-specific effect; χ_{it} is a vector of exogenous characteristics; χ_{it}^e is a vector of endogenous characteristics; and ϵ_{it} is an idiosyncratic shock.

As noted earlier, bank profits tend to be serially correlated, showing tendencies to both persist and regress towards a mean (Goddard et al., 2011 and Knapp et al., 2006). Because of this, we employ a dynamic model with a one-period lagged dependent variable among the determinants. With this autocorrelation of the dependent variable, it is unlikely that our dynamic model's characteristics meet the underlying assumptions of the ordinary least squares (OLS) model.

Another issue is that the bank-specific regressors do not meet the OLS assumption that explanatory variables are exogenous. For example, banks with high equity to assets ratios may have higher profitability due to their

Table 3. Correlation Matrix of Independent Variables.

	CPI	GDP	YIELD	BK_GDP	MC_BA	ERATIO	EA	PCL	RCL	RCL2	NPA	NCO	NIIR	L_AT	L_AT^2	D_L_AT	LA	EG	EAG	LG	ELG	CA	
CPI	1																						
GDP	0.42	1																					
YIELD	-0.44	-0.44	1																				
BK_GDP	-0.08	-0.7	0.3	1																			
MC_BA	0.07	0.68	-0.59	-0.64	1																		
ERATIO	-0.04	-0.15	0.07	0.16	-0.13	1																	
EA	0.01	-0.07	0.03	0.12	-0.09	-0.15	1																
PCL	-0.32	-0.39	0.27	0.34	-0.29	0.18	-0.06	1															
RCL	0.01	0.01	-0.02	-0.02	0.02	-0.01	-0.02	-0.02	1														
RCL2	0.01	0.02	0.01	-0.01	0.01	-0.02	-0.01	-0.02	-0.01	1													
NPA	-0.23	-0.33	0.28	0.36	-0.35	0.24	-0.08	0.56	-0.02	-0.02	1												
NCO	0.28	0.32	-0.27	-0.32	0.27	-0.21	0.05	-0.91	0.03	0.02	-0.57	1											
NIIR	-0.02	0.03	0.02	-0.01	0.03	-0.6	0.01	0	0	0	-0.03	-0.01	1										
L_AT	-0.02	-0.07	0.03	0.14	-0.06	-0.15	-0.04	0.12	-0.01	0	-0.03	-0.13	0.23	1									
L_AT^2	-0.02	-0.06	0.02	0.12	-0.05	-0.14	-0.02	0.12	-0.01	0	-0.03	-0.13	0.24	0.99	1								
D_L_AT	0.04	0.18	-0.12	-0.22	0.18	-0.11	-0.01	-0.22	-0.01	0.01	-0.25	0.28	-0.03	0.01	0.00	1							
LA	0.07	-0.1	-0.07	0.15	-0.05	0	-0.03	0.05	-0.02	-0.03	0.12	0	-0.03	-0.05	-0.05	0.00	1						
EG	0.04	0.07	-0.03	-0.06	0.03	-0.01	0.17	-0.1	-0.02	0	-0.1	0.06	0	0.03	0.03	0.48	-0.01	1					
EAG	0.03	-0.02	0.03	0.05	-0.06	0.03	0.2	-0.01	-0.02	-0.01	0.01	-0.07	0.02	0.03	0.03	-0.04	-0.01	0.85	1				
LG	0.11	0.23	-0.16	-0.23	0.21	-0.06	0	-0.24	0.01	0.01	-0.23	0.29	-0.04	0	0	0.84	0.07	0.44	-0.03	1			
ELG	-0.03	-0.08	0.07	0.09	-0.1	0.03	0.19	0.05	-0.03	-0.01	0.04	-0.12	0.03	0.04	0.04	-0.02	-0.06	0.81	0.95	-0.16	1		
CA	-0.04	0.07	-0.01	-0.12	0.04	0.33	0.02	0.09	-0.02	-0.02	0.05	-0.13	0.26	-0.08	-0.06	0.04	0.04	0.04	0.02	0.06	0.01	1	

lower financing and bankruptcy risk costs. However, causality may also flow from profitability to a high equity to assets ratio. More profitable banks may choose to retain more earnings, raising the equity to assets ratio. Such variables are endogenous.

A further problem for any model of bank profitability is unobservable heterogeneity among banks (Dietrich & Wanzenried, 2011). For example, it has been shown that individual managers affect corporate behavior and performance (Bertrand and Schoar, 2003), yet we are unable to measure this influence.

We follow Dietrich and Wanzenried (2011), Garcia-Herrero et al. (2009), Trujillo-Ponce (2013), and van Ommeren (2011) in using the generalized method of moments (GMM) approach developed by Arellano and Bond (1991) to address these problems. This method, explicitly shown in Eq. (1), uses lagged values of dependent variables as instrumental variables to solve the problem of endogeneity. GMM is also flexible enough to include serial correlation and unobserved heterogeneity into the model. Due to a specific interest in our set of explanatory variables, we consider as endogenous all bank-specific variables, which concurs with the related literature. We also include a one-period lagged value for the yield curve determinant, as it has been shown to have a delayed effect upon economic performance (Estrella & Mishkin, 1996).

We instrument the endogenous variables with lags 1 through 4 (Roodman, 2009). We used the one-step GMM estimator which is known to outperform the two-step estimator with short samples (Inkmann, 2000). Due to this very nature of the sample, we conduct a robustness check where macroeconomic regressors are substituted by time dummies. Results are very similar.

The use of several ratios based upon bank financial accounts raises the issue of multicollinearity. We employ tests to remove variables with this issue from our models.

EMPIRICAL RESULTS

The L. variable notation in the tables means that it is the 1 lagged value of the variable, or in other words, $variable_{t-1}$.

$$ROA_t$$

Tables 4 and 5 show the regression results for our primary profitability measures, ROA_t and ΔROA , respectively. Table 4 presents the empirical

Table 4. Regression Results for Return on Assets (ROA_{*t*}) as Dependent Variable.

	+	Robust		<i>z</i>	<i>P</i> > $ z $
		Coeff.	Std. Err.		
Roat					
L1		−0.0795784	.051488	−1.55	0.122
Eratio					
−		−0.0420327	0.0026854	−15.65	0.000
L1		−0.0043243	0.0028882	−1.50	0.134
Ea					
−		0.0743801	0.034417	2.16	0.031
L1		−0.0562869	0.0336434	−1.67	0.094
Pcl					
−		−0.6179929	0.0502062	−12.31	0.000
L1		−0.0261818	0.0599006	−0.44	0.662
Rcl					
−		2.22e-06	2.90e-06	0.77	0.444
L1		−8.78e-07	3.48e-06	−0.25	0.801
Rcl2					
−		−0.000036	0.0000257	−1.40	0.161
L1		−0.0000248	0.0000254	−0.97	0.330
Npa					
−		−0.0439919	0.0241565	−1.82	0.069
L1		0.0028657	0.0277458	0.10	0.918
Nco					
−		−0.1399112	0.0625961	−2.24	0.025
L1		−0.0045657	0.0582718	−0.08	0.938
Niir					
−		−0.0033748	0.0028381	−1.19	0.234
L1		0.0047078	0.003269	1.44	0.150
L_at					
−		0.0114252	0.0079673	1.43	0.152
L1		−0.0104927	0.0076616	−1.37	0.171
L_at2					
−		−0.0006283	0.0003837	−1.64	0.102
L1		0.000521	0.0003454	1.51	0.131
Δ_l_at					
−		0.0173521	0.0072504	2.39	0.017
L1		0.0069451	0.0059791	1.16	0.245

Table 4. (Continued)

	+	Robust		z	P > z
		Coeff.	Std. Err.		
La					
-		0.0027041	0.0059902	0.45	0.652
L1		-0.0048244	0.0061658	-0.78	0.434
Eg					
-		-0.007801	0.0034542	-2.26	0.024
L1		-0.0051892	0.0044906	-1.16	0.248
Eag					
-		0.0100142	0.0072557	1.38	0.168
L1		0.0062223	0.0049024	1.27	0.204
Lg					
-		-0.0092409	0.0054382	-1.70	0.089
L1		-0.0018305	0.0028075	-0.65	0.514
Elg					
-		-0.0028152	0.0055963	-0.50	0.615
L1.		0.0005767	0.003151	0.18	0.855
Ca					
-		0.1444798	0.0481452	3.00	0.003
L1.		0.0917886	0.044854	2.05	0.041
Cpi		-0.0001424	0.000096	-1.48	0.138
Gdp		0.0000541	0.0000708	0.76	0.444
Yieldc					
-		1.67e-06	0.0000886	0.02	0.985
L1.		0.0000648	0.0000676	0.96	0.338
Bk_gdp		0.0001047	0.003223	0.03	0.974
Mc_ba		0.000228	0.0002806	0.81	0.416
_Cons		0.0336019	0.0084086	4.00	0.000

Number of observations: 3,512.

Number of banks 413.

Wald-test $\chi^2(41) = 2862.57$.

Number of instruments $1.1e + 03$.

The table reports results from the GMM estimation of the effects of bank-specific, industry-specific, and macroeconomic variables on ROA. For notation of variables, see Table 1.

The significance parameters are indicated with *, **, or *** for coefficients differing significantly from zero at the 10%, 5%, and 1% levels, respectively.

Table 5. Regression Results for Change in Return on Assets (Δ ROA) as Dependent Variable.

	+	Robust		z	P > z
		Coeff.	Std. Err.		
Δ _Roa					
L1.		-0.3420084	0.0510499	-6.70	0.000
Eratio					
-.		0.0136713	0.0049694	2.75	0.006
L1.		0.016493	0.0052145	3.16	0.002
Ea					
-.		-0.0331816	0.0545462	-0.61	0.543
L1.		0.0185999	0.0572498	0.32	0.745
Pcl					
-.		0.2986573	0.1130213	2.64	0.008
L1.		0.2663602	0.0742461	3.59	0.000
Rcl					
-.		-0.0000126	6.20e-06	-2.04	0.042
L1.		-5.40e-07	5.53e-06	-0.10	0.922
Rcl2					
-.		2.04e-06	0.0000545	0.04	0.970
L1.		0.0001401	0.0000595	2.36	0.018
Npa					
-.		-0.2547106	0.0500257	-5.09	0.000
L1.		0.1458484	0.0467918	3.12	0.002
Nco					
-.		0.0758482	0.1334387	0.57	0.570
L1.		-0.1134162	0.0785277	-1.44	0.149
Niir					
-.		0.0002762	0.0057274	0.05	0.962
L1.		-0.0082505	0.0061525	-1.34	0.180
L_at					
-.		-0.0095912	0.0120902	-0.79	0.428
L1.		0.013867	0.0113414	1.22	0.221
L_at2					
-.		0.0000372	0.0005735	0.06	0.948
L1.		-0.0001131	0.0005017	-0.23	0.822
Δ _L_at					
-.		0.0271883	0.0103775	2.62	0.009
L1.		-0.0118881	0.0097785	-1.22	0.224

Table 5. (Continued)

	+	Robust		z	P > z
		Coeff.	Std. Err.		
La					
-.		0.0011723	0.0113349	0.10	0.918
L1.		0.0127638	0.0111227	1.15	0.251
Eg					
-.		-0.0038259	0.006088	-0.63	0.530
L1.		0.0037648	0.0051096	0.74	0.461
Eag					
-.		0.0147218	0.0093895	1.57	0.117
L1.		-0.0086429	0.0077495	-1.12	0.265
Lg					
-.		-0.00778	0.0073441	-1.06	0.289
L1.		0.0049617	0.0074096	0.67	0.503
Elg					
-.		-0.0125505	0.0100245	-1.25	0.211
L1.		0.0027668	0.0076662	0.36	0.718
Ca					
-.		0.2531935	0.0779876	3.25	0.001
L1.		-0.1701098	0.0914445	-1.86	0.063
Cpi		0.0002672	0.0001784	1.50	0.134
Gdp		-0.0005862	0.0001341	-4.37	0.000
Yieldc					
-.		0.0003687	0.000172	2.14	0.032
L1.		0.0008101	0.0001306	6.20	0.000
Bk_gdp		-0.0484918	0.0064856	-7.48	0.000
Mc_ba		0.0014438	0.0005723	2.52	0.012
_Cons		-0.0296535	0.015791	-1.88	0.060

Number of observations: 3,506.

Number of banks 413.

Wald-test $\chi^2(41) = 657.45$.

Number of instruments $1.1e + 03$.

The table reports results from the GMM estimation of the effects of bank-specific, industry-specific, and macroeconomic variables on Δ ROA. For notation of variables, see Table 1.

The significance parameters are indicated with *, **, or *** for coefficients differing significantly from zero at the 10%, 5%, and 1% levels, respectively.

estimation of Eq. (1) for ROA_t with regressors contemporaneous with the dependent variable. This is the standard approach taken by studies of bank profitability.

As with almost all previous studies where it was evaluated, we find that the efficiency ratio is significantly and negatively related to profitability. Banks that spend more on expenses in relation to current income depress profitability.

The level of bank capitalization in the year contemporaneous with this profitability measure is significantly and positively related to profitability. This is in line with the large majority of other research, both in the banking industry and elsewhere showing that more equity in relation to debt financing improves profitability. However, there is a weaker, but significant, negative relationship with one-year lagged equity levels and profitability.

Provisions for credit losses are direct deductions from the current year's income. Thus, it is not surprising that they have a strongly negative and significant relationship with a measure of contemporaneous profitability, such as ROA_t .

The base year's values of two asset quality indicators (nonperforming assets and net charge-offs) have significant negative relationships with ROA_t . In line with expectations, high levels of problem assets are negative for profitability.

A measure of the difference in bank size from the previous year was significantly and positively related to ROA_t . Measures of current bank size were unrelated to profitability.

Growth in bank equity from the previous year was significantly negatively related to profitability. While this result was not large, it is surprising, given the big positive relationship between current year equity level and profitability. This may be because an increase in equity can be due to reasons that depress profitability. For example, equity may increase through a sale of new stock. New issues of stock have been found to relate to strong earnings in previous years but weaker performance going forwards (Firth, 1997; Loughran & Ritter, 1997). If equity increases due to strong previous year's earnings with a significant amount of new retained earnings, the current year's results may suffer due to mean reversion.

Loan growth was negatively related to ROA_t . Possible explanations include a tendency for banks with rapidly growing loan portfolios to fund it from more expensive capital sources.

Both the current and lagged values of the cost to assets ratio are significantly related to profitability. This contrasts with the strong negative

relationship between the cost to income ratio and profitability. The implication is that banks can benefit from spending on noninterest expenses, as long as they do not cut into profitability.

None of the macroeconomic regressors related significantly to ROA_t . Other studies exploring the determinants of contemporaneous profitability measures also have noted absent or weak relationships between macroeconomic variables and bank profitability (Al Jafari & Alchami, 2014; Kanwal & Nadeem, 2013). In our literature review, the largest frequency of the type of relationship with profitability for three of four macroeconomic determinants was “insignificant.”

ΔROA

Table 5 presents the empirical estimation of Eq. 1 for ΔROA with the dependent variable being the change in ROA between year t and $t+1$. Building a model to predict the change in a core earnings variable is the approach followed in the fundamental analysis literature.

The lagged change in ROA is significantly negatively related to the ROA change from the current (base) year to the next year. This indicates a strong tendency for earnings to mean-revert in the competitive U.S. banking industry. Profit bulges are quickly eroded away. Banks performing poorly take corrective actions that improve their situations.

The current year and lagged efficiency ratio values are significantly and positively related to ΔROA . This is diametrically opposite their relationship with ROA_t . It may be that higher spending on noninterest items may depress current but improve future profitability.

Provisions for credit losses for the current and lagged years are also positively related to ΔROA . This suggests that banks frequently elect to take a stiff charge against current income which “clears the books” and allows for greater future profitability.

Nonperforming assets in the current year are negatively related to ΔROA , while lagged values of this variable are positively related. Thus, the extent to which borrowers are not paying back money lent to them has predictive value for bank profitability.

The change in bank size is also positively related to ΔROA . Our findings suggest a robust link between asset growth and profitability change. This accords with the findings of another study which related this variable to the following year’s profitability (Chronopoulos et al., 2012).

The extent of spending on noninterest expense scaled by total assets is positively related to ΔROA . Spending in this area appears to be productive for many banks.

While macroeconomic variables were unrelated to ROA_t , they significantly determine ΔROA . GDP growth was significantly negatively related to ΔROA . This may be because favorable economic times reduce bank profits by encouraging bank expansion and increase competition.

The size of the yield curve is predictive of positive ΔROA values. When the yield curve is high, the rate of return from banks' lending activities, which tend to be longer term, will contrast favorably with the low rate they pay for the short-term borrowing which funds their lending. This state will favorably affect future profitability, as more loans reflecting this disparity are booked.

Bank assets scaled by GDP are negatively related to ΔROA . This relationship was expected, as the larger the banking sector in relation to the entire economy, the greater the competition among banks.

Stock market capitalization in relationship to the assets of the banking system positively and significantly predicts ΔROA . In the U.S. context, buoyant stock values are a leading indicator of economic prosperity which improves banks profitability.

The multiple significant relationships found between macroeconomic variables and ΔROA contrast with the absence of such relationships with contemporaneously assessed profitability (ROA_t). It appears that these economic fundamentals take time to manifest their effects on bank profits. A research approach examining changes in profitability allows such effects to become apparent.

ROE

Table 6 presents the empirical estimation of Eq. 1 for ROE_t . This is a secondary measure of profitability in the banking industry. Findings largely parallel those for ROA_t .

Values on the efficiency ratio are significantly negatively related to this measure of profitability. Asset quality measures, such as the provision for credit losses, the reserve for credit losses, and nonperforming assets, have significant negative relationships.

There was a positive relationship between the natural logarithm of total assets and a negative one with the square of the logarithm of total assets

Table 6. Regression Results for Return on Equity (ROE_t) as Dependent Variable.

	+	Robust		z	P > z
		Coeff.	Std. Err.		
Roet					
L1.		-0.0723296	0.0533628	-1.36	0.175
Eratio					
-.		-0.5069181	0.0691667	-7.33	0.000
L1.		0.0457898	0.0582261	0.79	0.432
Ea					
-.		0.0449836	0.7629382	0.06	0.953
L1.		-0.3282236	0.8728977	-0.38	0.707
Pcl					
-.		-6.884404	1.18109	-5.83	0.000
L1.		-0.4383844	0.9458337	-0.46	0.643
Rcl					
-.		0.0000598	0.000053	1.13	0.259
L1.		-0.0000707	0.0000689	-1.03	0.305
Rcl2					
-.		-0.0018762	0.0005831	-3.22	0.001
L1		-0.0010063	0.0005551	-1.81	0.070
Npa					
-.		-2.079217	0.5762687	-3.61	0.000
L1.		-0.2236372	0.6864288	-0.33	0.745
Nco					
-.		-0.1686589	1.314991	-0.13	0.898
L1.		-0.6164112	1.001218	-0.62	0.538
Niir					
-.		-0.0740949	0.0702636	-1.05	0.292
L1.		0.0967756	0.0657434	1.47	0.141
Lat					
-.		0.479647	0.2126915	2.26	0.024
L1.		-0.4357771	0.2038124	-2.14	0.033
Lat2					
-.		-0.0193091	0.0089028	-2.17	0.030
L1.		0.0150409	0.0077862	1.93	0.053
Δ_Lat					
-.		0.2219241	0.1569593	1.41	0.157
L1.		0.2952402	0.1137181	2.60	0.009

Table 6. (Continued)

	+	Robust		z	P > z
		Coeff.	Std. Err.		
La					
-		0.024311	0.1518792	0.16	0.873
L1.		-0.1529212	0.1500289	-1.02	0.308
Eg					
-		0.0145471	0.0949682	0.15	0.878
L1.		-0.0389018	0.0884305	-0.44	0.660
Eag					
-		0.3123679	0.130858	2.39	0.017
L1.		0.2646025	0.0953866	2.77	0.006
Lg					
-		-0.3781102	0.1170118	-3.23	0.001
L1.		-0.2031707	0.0698194	-2.91	0.004
Elg					
-		-0.244354	0.1450173	-1.68	0.092
L1.		-0.1794317	0.0710202	-2.53	0.012
Ca					
-		0.1156672	1.341999	0.09	0.931
L1.		0.7337927	0.93592	0.78	0.433
Cpi		0.0026521	0.0019425	1.37	0.172
Gdp		0.0007413	0.0015716	0.47	0.637
Yieldc					
-		0.0038284	0.0018268	2.10	0.036
L1.		-0.001319	0.0013738	-0.96	0.337
Bk_gdp		0.1509169	0.0837456	1.80	0.072
Mc_ba		0.0147312	0.0076323	1.93	0.054
_Cons		0.30857	0.1767721	1.75	0.081

Number of observations: 3,512.

Number of banks 413.

Wald-test $\chi^2(41) = 1102.09$.

Number of instruments $1.1e + 03$.

The table reports results from the GMM estimation of the effects of bank-specific, industry-specific, and macroeconomic variables on ROE. For notation of variables, see Table 1.

The significance parameters are indicated with *, **, or *** for coefficients differing significantly from zero at the 10%, 5%, and 1% levels, respectively.

Table 7. Regression Results for Change in Return on Equity (Δ ROE) as Dependent Variable.

	+	Coeff.	Std. Err.	<i>z</i>	<i>P</i> > $ z $
Δ _Roe					
L1.		-0.3567961	0.0576094	-6.19	0.000
Eratio					
-.		0.0696453	0.1236538	0.56	0.573
L1.		0.2137609	0.1034151	2.07	0.039
Ea					
-.		-0.3100916	0.9829488	-0.32	0.752
L1.		-0.0653919	1.084534	-0.06	0.952
Pcl					
-.		2.612171	1.809985	1.44	0.149
L1.		2.730283	1.467948	1.86	0.063
Rcl					
-.		-0.0002219	0.0001133	-1.96	0.050
L1.		-0.0000724	0.0000889	-0.81	0.416
Rcl2					
-.		0.0001279	0.0008428	0.15	0.879
L1.		0.0023004	0.0010439	2.20	0.028
Npa					
-.		-3.107688	1.05642	-2.94	0.003
L1.		2.1261	0.9652558	2.20	0.028
Nco					
-.		0.8155946	2.177983	0.37	0.708
L1.		-2.07413	1.688759	-1.23	0.219
Niir					
-.		0.0220051	0.0964282	0.23	0.819
L1.		0.0344931	0.1262238	0.27	0.785
Lat					
-.		-0.5613051	0.2124176	-2.64	0.008
L1.		0.572765	0.2058806	2.78	0.005
Lat2					
-.		0.0124998	0.0094571	1.32	0.186
L1.		-0.010205	0.0084694	-1.20	0.228

Table 7. (Continued)

	+	Coeff.	Std. Err.	z	P > z
Δ_Lat					
-		0.3638026	0.2045412	1.78	0.075
L1.		-0.2696268	0.1900726	-1.42	0.156
La					
-		-0.1275913	0.1878457	-0.68	0.497
L1.		0.2952105	0.1927465	1.53	0.126
Eg					
-		-0.0526832	0.1128729	-0.47	0.641
L1.		0.0323868	0.0958768	0.34	0.736
Eag					
-		-0.0038534	0.1318954	-0.03	0.977
L1.		-0.1731478	0.1627729	-1.06	0.287
Lg					
-		0.1104266	0.122503	0.90	0.367
L1.		0.1544589	0.1404749	1.10	0.272
Elg					
-		0.0112661	0.1630506	0.07	0.945
L1.		0.0969619	0.1442406	0.67	0.501
Ca					
-		3.939799	1.544977	2.55	0.011
L1.		-2.468265	1.819392	-1.36	0.175
Cpi		-0.005641	0.0032124	-1.76	0.079
Gdp		-0.0036908	0.0028069	-1.31	0.189
Yieldc					
-		-0.0046399	0.0030762	-1.51	0.131
L1.		0.0127877	0.0022948	5.57	0.000
Bk_gdp		-0.6152791	0.114245	-5.39	0.000
Mc_ba		0.0087191	0.0099694	0.87	0.382
_Cons		-0.1598763	0.2693447	-0.59	0.553

Number of observations: 3,414.

Number of banks 406.

Wald-test $\chi^2(41) = 344.16$.

Number of instruments 1.1e + 03.

The table reports results from the GMM estimation of the effects of bank-specific, industry-specific, and macroeconomic variables on ΔROE . For notation of variables, see Table 1.

The significance parameters are indicated with *, **, or *** for coefficients differing significantly from zero at the 10%, 5%, and 1% levels, respectively.

with ROE_t . This is in line with previous research indicating a curvilinear relationship between bank size and profitability.

Growth in equity, in relationship to growth in assets, is positively related to ROE_t . This accords with the reported finding that earnings for the year in which firms issue new equity tend to be favorable although they trail off thereafter (Loughran & Ritter, 1997). However, the growth in equity may also be coming from retained earnings.

Growth in total loans was negatively related to ROE_t . A high rate of growth in loans can hurt profitability if banks are funding this growth from costly sources of capital.

When growth in loans is faster than growth in equity ROE_t falters. This is another indication that bank profitability is best served by a balance between equity and loan levels.

The macroeconomic variables yield curve, bank assets to GDP, and market capitalization to bank assets were positively related to ROE_t .

ΔROE

Table 7 presents the empirical estimation of Equation 1 for ΔROE . The findings largely parallel those of ΔROA .

Lagged ΔROE is negatively related to current ΔROE , suggesting mean reversion in this change in profitability measure as well. Findings with several asset quality measures, and asset size variables mirrored those for ΔROA .

Spending on noninterest expenses scaled by total assets is significantly related to favorable ROE growth. The lagged yield curve is positively and significantly related to ΔROA . Bank assets in relation to GDP are negatively related to ΔROE . These findings are all in accord with but less extensive than those with ΔROA .

CONCLUSIONS

This paper studies the profitability of a sample of U.S. regional banks using bank-specific, industry-specific, and macroeconomic determinants over the period 1994 through 2011. Due to autocorrelation and endogeneity issues, we employed the GMM regression analysis. Our study extends previous research, by modeling not only bank profitability contemporaneous with

the determinant variables, but also modeling changes in bank profitability levels between a base year and the next year. Our focus upon predicting changes in profitability follows fundamental analysis research. Another contribution was the use of a more extensive series of determinant factors.

Our results show that profitability contemporaneous with the determinants is negatively related to a measure of noninterest expenses, provisions for credit losses and measures of asset quality. Noninterest income did not relate significantly to profitability.

Noninterest spending scaled by assets was positively related to profitability. Thus, spending on noninterest items can enhance profitability so long as it does not become too large related to income.

Changes in profitability were positively related to spending on noninterest items and to the current and lagged provisions for credit losses. Taking substantial credit loss provisions in one year may pave the way for subsequent gains in profitability.

A high proportion of nonperforming assets presages a negative change in subsequent year profitability. The rate of nonperforming assets thus appears to be a critical asset quality indicator. It appears to be a more reliable indicator of negative future bank performance than traditional asset quality indicators, such as the levels of provisions, reserves for credit losses, or net charge-offs.

Growth in asset size was positively related to profitability across profitability measures.

Macroeconomic factors, although not related to profitability in the year during which they are measured, have significant relationships with changes in profitability levels for the subsequent year. In particular, a steep yield curve presages positive future changes in bank profitability. A smaller size of bank assets, in relation to the overall economy, is favorable for the direction of the future change in bank profits. It appears that the effects of macroeconomic variables take time to filter through to banks and their customers (Heffernan & Fu, 2008).

REFERENCES

- Abarbanell, J. S., & Bushee, B. J. (1997). Fundamental analysis, future earnings, and stock prices. *Journal of Accounting Research*, 35(1), 1–24.
- Aburime, U. T. (2008). Determinants of bank profitability: Company-level evidence from Nigeria. *International Journal of Nigerian Studies and Development*, 14, 21–34.

- Agustini, M. (2011). Factors influencing the profitability of listed Indonesian commercial banks before and during financial global crisis. *Indonesian Capital Market Review*, 4(1), 29–40.
- Alexiou, C., & Sofoklis, V. (2009). Determinants of bank profitability: Evidence from the Greek banking sector. *Economic Annals*, 54, 93–118.
- Ali, K., Akhtar, M. F., & Ahmed, H. Z. (2011). Bank-specific and macroeconomic indicators of profitability – Empirical evidence from the commercial banks of Pakistan. *International Journal of Business and Social Science*, 2, 235–242.
- Al-Jafari, M. K., & Alchami, M. (2014). Determinants of bank profitability: Evidence from Syria. *Journal of Applied Finance & Banking*, 4(1), 17–45.
- Almumani, M. A. (2013). Impact of managerial factors on commercial bank profitability: Empirical evidence from Jordan. *International Journal of Academic Research in Accounting, Finance & Management Sciences*, 3(3), 298–310.
- Alp, A., Ban, U., Demirgunes, K., & Kilic, S. (2010). Internal determinants of profitability in Turkish banking sector. *ISE Review*, 12(46), 1–14.
- Alper, D., & Anbar, A. (2011). Bank specific and macroeconomic determinants of commercial bank profitability: Empirical evidence from Turkey. *Business and Economics Research Journal*, 2, 139–152.
- Ameur, I. G. B., & Mhiri, S. M. (2013). Explanatory factors of bank performance evidence from Tunisia. *International Journal*, 2(1), 1–11.
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58, 277–297.
- Athanasoglou, P., Brissimis, S., & Delis, M.. (2005). *Bank-specific, industry-specific and macroeconomic determinants of bank profitability*. Bank of Greece Working Paper No. 25. pp. 1–32.
- Athanasoglou, P., Delis, M., & Staikouras, C. (2006). Determinants of bank profitability in the South Eastern European region. *Munich Personal RePEc Archive*.
- Ayadi, N., & Boujelbene, Y. (2012). The determinants of the profitability of the Tunisian deposit banks. *IBIMA Business Review*, 1–21.
- Ayaydin, H., & Karakaya, A. (2014). The effect of bank capital on profitability and risk in Turkish banking. *International Journal of Social Science*, 5(1), 252–271.
- Ben Naceur, S., & Goaid, M. (2008). The determinants of commercial bank interest margin and profitability: Evidence from Tunisia. *Frontiers in Finance and Economics*, 5(1), 106–130.
- Berger, A. N. (1995). The relationship between capital and earnings in banking. *Journal of Money, Credit and Banking*, 27(2), 432–456.
- Berger, A. N., Bonime, S. D., Covitz, D. M., & Hancock, D. (2000). Why are bank profits so persistent? The roles of product market competition, informational opacity, and regional/macro-economic shocks. *Journal of Banking & Finance*, 24(7), 1203–1235.
- Berger, A. N., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking and Finance*, 21(6), 849–870.
- Berger, A. N., & Humphrey, D. B. (1994). *Bank scale economies, mergers, concentration, and efficiency: The US experience*.
- Bertrand, M., & Schoar, A. (2003). Managing with style: The effect of managers on firm policies. *The Quarterly Journal of Economics*, 118(4), 1169–1208.
- Bhatia, A., Mahajan, P., & Chander, S. (2012). Determinants of profitability of private sector banks in India. *Indian Journal of Accounting*, 42(2), 39–51.

- Bhojraj, S., Lee, C., & Oler, D. K. (2003). What's my line? A comparison of industry classification schemes for capital market research. *Journal of Accounting Research*, 41(5), 745–774.
- Bordeleau, É., & Graham, C. (2010). *The impact of liquidity on bank profitability*. Bank of Canada Working Paper No. 2010, 38.
- Borio, C. (2003). Towards a macroprudential framework for financial supervision and regulation? *CESifo Economic Studies*, 49(2), 181–215.
- Bourke, P. (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking and Finance*, 13, 65–79.
- Cerci, G., Kandir, S. Y., & Onal, Y. (2012). Profitability analysis of banks: An Application on the Turkish banking industry. *ISE Review*, 13, 29–44.
- Chantapong, S. (2005). Comparative study of domestic and foreign bank performance in Thailand: The regression analysis. *Economic Change and Restructuring*, 38(1), 63–83.
- Chaudhry, M., Chatrath, A., & Kamath, R. (1995). Determinants of bank profitability. *American Journal of Business*, 10, 41–46.
- Chronopoulos, D., Liu, H., McMillan, F., & Wilson, J. (2012). *The dynamics of US Bank profitability*. Available at <http://ssrn.com/abstract=1972835>
- Compustat. (n.d.). *Data navigator white paper: Bank and thrift industry-specific data*. Standard and Poors.
- Demirguc-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: Some international evidence. *The World Bank Economic Review*, 13, 379–408.
- DeYoung, R., & Rice, T. (2004). Noninterest income and financial performance at US commercial banks. *Financial Review*, 39(1), 101–127.
- Dietrich, A., & Wanzenried, G. (2011). Determinants of bank profitability before and during the Crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions and Money*, 21, 307–327.
- Estrella, A., & Mishkin, F. (1996). The yield curve as a predictor of US recessions. *Current Issues in Economics and Finance*, 2(7), 1–6.
- European Central Bank. (2010). Beyond ROE – How to measure bank performance. *Appendix to the Report on EU Banking Structures*.
- Fama, E. F., & French, K. R. (2000). Forecasting profitability and earnings. *The Journal of Business*, 73(2), 161–175.
- Firth, M. (1997). An analysis of the stock market performance of new issues in New Zealand. *Pacific-Basin Finance Journal*, 5(1), 63–85.
- Flamini, V., McDonald, C. A., & Schumacher, L. (2009). *The determinants of commercial bank profitability in Sub-Saharan Africa* (EPub) (Vol. 9). International Monetary Fund.
- Francis, M. E. (2013). Determinants of commercial bank profitability in Sub-Saharan Africa. *International Journal of Economics & Finance*, 5(9), 134–147.
- Garcia-Herrero, A., Gavilá, S., & Santabábara, D. (2009). What explains the low profitability of Chinese banks? *Journal of Banking & Finance*, 33(11), 2080–2092.
- GICS Structure. (n.d.). *GICS structure and sub-industry definitions: Effective after close of business*. Retrieved from http://www.msci.com/products/indices/sector/gics/gics_structure.html. Accessed on June 30, 2010.
- Goddard, J., Liu, H., Molyneux, P., & Wilson, J. O. (2011). The persistence of bank profit. *Journal of Banking & Finance*, 35(11), 2881–2890.

- Goddard, J., Molyneux, P., & Wilson, H. O. S. (2004). Dynamics of growth and profitability in banking. *Journal of Money, Credit, and Banking*, 36, 1069–1090.
- Golin, J. (2001). *The bank credit analysis handbook: A guide for analysts, bankers and investors* (1st ed.). New York, NY: Wiley.
- Golin, J., & Delhaise, P. (2013). *The bank credit analysis handbook: A guide for analysts, bankers and investors* (2nd ed.). New York, NY: Wiley.
- Gul, S., Irshad, F., & Zaman, K. (2011). Factors affecting bank profitability in Pakistan. *The Romanian Economic Journal*, 14, 61–87.
- Guru, B. K., Staunton, J., & Shanmugam, B. (2002). Determinants of commercial bank profitability in Malaysia. *Journal of Money, Credit, and Banking*, 17, 69–82.
- Heffernan, S., & Fu, X. (2008). *The determinants of bank performance in China* (pp. 1–28). Available at <http://ssrn.com/abstract=1247713>
- Inkmann, J. (2000). *Finite sample properties of one-step, two-step and bootstrap empirical likelihood approaches to efficient GMM estimation* (No. 00/03). CoFE Discussion Paper.
- Jabbar, H. (2014). Determinants of banks profitability. *IOSR Journal of Business and Management*, 16(1), 109–113.
- Javaid, S., Anwar, J., Zaman, K., & Gafoor, A. (2011). Determinants of bank profitability in Pakistan: Internal factor analysis. *Mediterranean Journal of Social Sciences*, 2, 59–78.
- Kanas, A., Vasiliou, D., & Eriotis, N. (2012). Revisiting bank profitability: A semi-parametric approach. *International Financial Markets, Institutions, and Money*, 22, 990–1005.
- Kanwal, S., & Nadeem, M. (2013). The impact of macroeconomic variables on the profitability of listed commercial banks in Pakistan. *European Journal of Business and Social Sciences*, 9(2), 186–201.
- Karimzadeh, M., Akhtar, S. J., & Karimzadeh, B. (2013). Determinants of profitability of banking sector in India. *Transition Studies Review*, 20(2), 211–219.
- Kerstein, J., & Kozberg, A. (2013). Using accounting proxies of proprietary FDIC ratings to predict bank failures and enforcement actions during the recent financial Crisis. *Journal of Accounting, Auditing & Finance*, 28(2), 128–151.
- Khrawish, H. A. (2011). Determinants of commercial banks performance: Evidence from Jordan. *International Research Journal of Finance and Economics*, 81, 147–159.
- Kiganda, E. O. (2014). Effect of macroeconomic factors on commercial banks profitability in Kenya: Case of equity bank limited. *Journal of Economics and Sustainable Development*, 5(2), 46–56.
- Knapp, M., Gart, A., & Chaudhry, M. (2006). The impact of mean reversion of bank profitability on post-merger performance in the banking industry. *Journal of Banking & Finance*, 30(12), 3503–3517.
- Kosmidou, K., Tanna, S., & Pasiouras, F. (2005). Determinants of profitability of domestic UK commercial banks: Panel evidence from the period 1995–2002. In *Money Macro and Finance (MMF) Research Group Conference* (Vol. 45).
- Kroszner, R. S., Laeven, L., & Klingebiel, D. (2007). Banking crises, financial dependence, and growth. *Journal of Financial Economics*, 84(1), 187–228.
- Lee, C. C., & Hsieh, M. F. (2013). Beyond bank competition and profitability: Can moral hazard tell us more? *Journal of Financial Services Research*, 44(1), 87–109.
- Lee, J. Y., & Kim, D. (2013). Bank performance and its determinants in Korea. *Japan and the World Economy*, 27, 83–94.
- Lee, S. W. (2012). Profitability determinants of Korean banks. *Economics and Finance Review*, 2(9), 6–18.

- Lee, S. W. (2013). Financial Crisis, regulatory changes and bank profit. *Review of European Studies*, 5(5), 151–158.
- Lev, B., Li, S., & Sougiannis, T. (2010). The usefulness of accounting estimates for predicting cash flows and earnings. *Review of Accounting Studies*, 15(4), 779–807.
- Levine, R. (1997). Financial development and economic growth: Views and agenda. *Journal of Economic Literature*, 35(2), 688–726.
- Levine, R. (2005). Finance and growth: Theory and evidence. *Handbook of economic growth*, 1, 865–934.
- Li, S. (2003). *Financial statement analysis, growth expectations, and equity valuation*. Doctoral dissertation, Columbia University.
- Liu, H., & Wilson, J. O. S. (2010). The profitability of banks in Japan. *Applied Financial Economics*, 20, 1851–1866.
- Loughran, T., & Ritter, J. R. (1997). The operating performance of firms conducting seasoned equity offerings. *The Journal of Finance*, 52(5), 1823–1850.
- Macit, F. (2012). Bank specific and macroeconomic determinants of profitability: Evidence from participation banks in Turkey. *Economics Bulletin*, 32(1), 586–595.
- Mamatzakis, E. C., & Remoundos, P. C. (2003). Determinants of Greek commercial banks profitability, 1989–2000. *Spoudai*, 53(1), 84–94.
- Mirzaei, A., & Mirzaei, Z. (2011). Bank-specific and macroeconomic determinants of profitability in middle eastern banking. *Iranian Economic Review*, 15(29), 101–128.
- Molyneux, P., & Thornton, J. (1992). Determinants of European bank profitability: A note. *Journal of Banking & Finance*, 16(6), 1173–1178.
- Morris, C. S. (2011). What should banks be allowed to do? *Federal Reserve Bank of Kansas City Economic Review*, 4, 55–80.
- Naseem, I., Saleem, A., Shah, S., & Shah, A. (2012). The profitability of banking sector in Pakistan: An empirical analysis from 2006–2010. *Science Series Data Report*, 4(2), 42–53.
- Olson, D., & Zoubi, T. A. (2011). Efficiency and bank profitability in MENA countries. *Emerging Markets Review*, 12(2), 94–110.
- Ongore, V. O., & Kusa, G. B. (2013). Determinants of financial performance of commercial banks in Kenya. *International Journal of Economics and Financial Issues*, 3(1), 237–252.
- Pasiouras, F., & Kosmidou, K. (2007). Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance*, 21(2), 222–237.
- Penman, S. H. (1992). Return to fundamentals. *Journal of Accounting, Auditing & Finance*, 7(4), 465–483.
- Perera, S., Skully, M., & Chaudhry, Z. (2013). Determinants of commercial bank profitability: South Asian evidence. *Asian Journal of Finance & Accounting*, 5(1), 365–380.
- Perry, P. (1992). Do banks gain or lose from inflation. *Journal of Retail Banking*, 14(2), 25–30.
- Poposka, K., & Trpkoski, M. (2013). Secondary model for bank profitability management—test on the case of Macedonian banking sector. *Research Journal of Finance and Accounting*, 4(6), 216–225.
- Rachdi, H. (2013). What determines the profitability of banks during and before the international financial crisis? Evidence from Tunisia. *International Journal of Economics, Finance and Management*, 2(4), 330–337.

- Rajan, R. G., & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *The Journal of Finance*, 50(5), 1421–1460.
- Ramadan, I. Z., Kilani, Q. A., & Kaddumi, T. A. (2011). Determinants of bank profitability: Evidence from Jordan. *International Journal of Academic Research*, 3(4), 180–191.
- Raza, S. A., Jawaid, S. T., & Shafqat, J. (2013). Profitability of the Banking Sector of Pakistan: Panel Evidence from Bank-Specific, Industry-Specific and Macroeconomic Determinants.
- Riaz, S. (2013). Profitability Determinants of Commercial banks in Pakistan. In *Proceedings of 6th international Business and Social Sciences research conference*, Dubai, UAE.
- Richardson, S., Tuna, Í., & Wysocki, P. (2010). Accounting anomalies and fundamental analysis: A review of recent research advances. *Journal of Accounting and Economics*, 50(2), 410–454.
- Rime, B. (2001). Capital requirements and bank behaviour: Empirical evidence for Switzerland. *Journal of Banking & Finance*, 25(4), 789–805.
- Roodman, D. (2009). A note on the theme of too many instruments. *Oxford Bulletin of Economics and Statistics*, 71(1), 135–158.
- Saeed, M. S. (2014). Bank-related, industry-related and macroeconomic factors affecting bank profitability: A case of the United Kingdom. *Research Journal of Finance and Accounting*, 5(2), 42–50.
- Sarkar, S., & Zapatero, F. (2003). The trade off model with mean reverting earnings: Theory and empirical tests. *The Economic Journal*, 113(490), 834–860.
- Sastroswito, S., & Suzuki, Y. (2012). The determinants of post-crisis Indonesian banking system profitability. *Economics & Finance Review*, 1(11), 48–57.
- Seng, D., & Hancock, J. R. (2012). Fundamental analysis and the prediction of earnings. *International Journal of Business and Management*, 7(3), 32–46.
- Shen, C. H., Chen, Y. K., Kao, L. F., & Yeh, C. Y. (2009). *Bank liquidity risk and performance*. (pp. 1–37). Working Paper. Department of Finance, National University of Kaohsiung.
- Short, B. K. (1979). The relation between commercial bank profit rates and banking concentration in Canada, Western Europe, and Japan. *Journal of Banking & Finance*, 3(3), 209–219.
- Sloan, R. G. (2001). Discussion of: “Contextual fundamental analysis through the prediction of extreme returns”. *Review of Accounting Studies*, 6(2–3), 191–195.
- Sohail, N., Iqbal, J., Tariq, H., & Mumtaz, R. (2013). Determinants of commercial banks profitability: Panel data evidence from Pakistan. *Research Journal of Finance and Accounting*, 4(10), 67–76.
- Staikouras, C. K., & Wood, G. E. (2004). The determinants of European bank profitability. *International Business and Economics Research Journal*, 3, 57–68.
- Stickney, C. P. (1997). The academic’s approach to securities research: Is it relevant to the analyst. *Journal of Financial Statement Analysis*, 2(4), 52–60.
- Stiroh, K. J., & Rumble, A. (2006). The dark side of diversification: The case of US financial holding companies. *Journal of Banking & Finance*, 30(8), 2131–2161.
- Sufian, F. (2011). Profitability of the Korean banking sector: Panel evidence on bank-specific and macroeconomic determinants. *Journal of Economics and Management*, 7(1), 43–72.
- Sufian, F., & Chong, R. R. (2008). Determinants of bank profitability in a developing economy: Empirical evidence from the Philippines. *Asian Academy of Management Journal of Accounting and Finance*, 4(2), 91–112.

- Sufian, F., & Habibullah, M. S. (2009). Determinants of bank profitability in a developing economy: Empirical evidence from Bangladesh. *Journal of Business Economics and Management*, 10(3), 207–217.
- Sufian, F., & Noor, M. A. N. M. (2012). Determinants of bank performance in a developing economy does bank origins matters? *Global Business Review*, 13(1), 1–23.
- Tan, A. Y., & Floros, C. (2012). Bank profitability and inflation: The case of China. *Journal of Economic Studies*, 39(6), 675–696.
- Tregenna, F. (2009). The fat years: The structure and profitability of the US banking sector in the pre-crisis period. *Cambridge Journal of Economics*, 33(4), 609–632.
- Trujillo-Ponce, A. (2013). What determines the profitability of banks? Evidence from Spain. *Accounting & Finance*, 53, 561–586.
- Tsomocos, D. P. (2003). Equilibrium analysis, banking and financial instability. *Journal of Mathematical Economics*, 39(5), 619–655.
- Turgutlu, E. (2014). Dynamics of profitability in the Turkish banking industry. *Ege Academic Review*, 14(1), 43–52.
- van Ommeren, S. (2011). *An examination of the determinants of banks' profitability in the European banking sector*. Unpublished master's thesis, Erasmus University Rotterdam.
- Vejzagic, M., & Zarafat, H. (2014). An Analysis of Macroeconomic Determinants of Commercial Banks Profitability in Malaysia for the Period 1995–2011. *Asian Economic and Financial Review*, 4(1), 41–57.
- Vong, P. I. A., & Chan, H. S. (2009). Determinants of bank profitability in Macao. *Macau Monetary Research Bulletin*, 93–113.
- Wahidudin, A., Subramanian, U., & Kamaluddin, P. (2013, April 16). *Determinants of profitability – A comparative analysis of Islamic banks and conventional banks in ASEAN countries*. (pp. 1–2). Available at <http://ssrn.com/abstract=2251602>
- Wahlen, J. M., & Wieland, M. M. (2011). Can financial statement analysis beat consensus analysts' recommendations? *Review of Accounting Studies*, 16(1), 89–115.
- Wall, L. (1985). Why are some banks more profitable than others? *Journal of Bank Research*, (Winter), 240–256.
- Wurgler, J. (2000). Financial markets and the allocation of capital. *Journal of Financial Economics*, 58(1), 187–214.
- Zimmerman, G. C. (1996). Factors influencing community bank performance in California. *Economic Review-Federal Reserve Bank of San Francisco*, 26–40.