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The impact of financial regulation policy uncertainty on bank profits and risk

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The impact of Financial Regulation Policy Uncertainty on Bank Profits and Risk

Abstract:

Purpose: To explore the impact of financial regulation policy uncertainty (FRPU) on bank profit and risk.

Methodology: This study employs dynamic panel techniques and uses the Baker et al. (2016) FRPU index and macroeconomic variables to assess FRPU's impact on bank profit and risk using FDIC call reports from 2000Q1 through 2016Q4 for over 4,760 commercial banks.

Findings: The effect of FRPU on profitability (ROA and ROE) and risk (standard deviation of ROA and ROE) produces complex results. FRPU negatively (positively) impacts profits for small and large banks (money center banks). There is a positive impact of FRPU on risk for small and medium banks, with no impact reported for the large and money center banks.

Practical Implications: Findings lead to several implications for financial services regulators, investors, and executives as summarized in the conclusion. It is essential to ensure that clear communication channels are open especially to small and medium-sized banks for proper strategic planning given their greater sensitivity to regulatory uncertainty.

Originality/value: This paper contributes to the literature as follows. First, it explores the impact of FRPU on bank profits and risk using a novel index introduced by Baker et al. (2016). This news-based continuous measure presents a bank profit modeling approach that differs from traditional event study methodology. Secondly, a large sample of U.S. commercial banks is used banks which represents an important departure from banking regulation studies.

Keywords: Bank profitability and risk, financial regulation policy uncertainty, dynamic panel data methods
JEL Classification Numbers: E44, G21.

1. Introduction

Over the last few decades, the financial service industry (including commercial banks) has undergone major changes in function and form. Examining the impact of external forces on bank profitability is particularly interesting given the significant transformation in financial intermediation, the gradual shift in sources of bank revenue (i.e., interest income vs. fee income), and swings in the financial regulatory environment over the last two decades. While regulation may produce valuable barriers to entry, lower rates due to deposit insurance, reduced funding costs on other bank funding instruments, and improved bank safety and soundness, increased regulatory compliance costs related to crisis-based regulatory initiatives may force economically viable banks to shut down (Cyree, 2016).

A long-standing practice in the banking literature is to evaluate the effects of key financial regulation changes employing event study methodology (e.g., Zou et al. 2011; Nippani & Green 2002; Yeager et al. 2007). Although there are advantages to using a discrete event, the identification of event periods is particularly challenging in evaluating regulatory changes[1]. Regulatory reform is a dynamic (and lengthy) process that involves interaction between various parties including politicians, experts, banking associations, and lobbying groups, that generally produces compromises and surprises and tougher or weaker regulation than initially expected. Since the regulatory reform process introduces new information to market participants over time, we opt for a continuous measure of financial regulation policy uncertainty that assists banking managers with their key objectives of risk management and maximization of shareholder value. This study explores the following research questions: 1) Does financial regulation policy uncertainty (FRPU) impact bank profits proxied by Return on Assets (ROA) and Return on Equity

[1] For a discussion of methodology concerns dealing with regulatory event studies, refer to Lamdin (2001)

(ROE)?; 2) If FRPU affects bank ROA and ROE, does the impact vary based on the state of the economy and/or bank size?; and 3) Does FRPU influence the volatility of bank profits? The banking turmoil and the subsequent 2007-2009 financial crisis motivate the importance of understanding the main elements of bank profitability. The latest regulatory trend towards re-regulation, in response to the near-collapse of the economy during the 2007-2009 great recession, further motivates our research given the potential positive and negative effects of legislative changes on banks after the crisis. Finally, revisiting the determinants of bank profitability is important since the overall functioning of the U.S. economy hinges on a stable financial system with well-capitalized profit-generating institutions operating in an economy with historically low-interest rates since the 2007-2009 financial crisis.

This paper contributes to the literature in several ways. First, to our knowledge, we are the first to explore the impact of financial regulatory policy uncertainty on bank profits and risk using a novel FPRU index introduced by Baker et al. (2016). Using this news-based continuous measure of financial regulation policy uncertainty, we present a bank profit modeling approach that differs from traditional event study methodology approaches. Brogaard and Detzel (2015) suggest that news-based indices quantify uncertainty resolution rather than assume that the passing of new legislation resolves uncertainty as implied in event study methods. Secondly, we apply dynamic panel data methods to a very large number of U.S. commercial banks following a four-size classification scheme based on asset size that yields 4,336 small banks, 389 medium banks, 26 large banks, and 12 money-center banks to examine sensitivity of bank profitability and risk to fluctuations in financial regulation policy uncertainty (FRPU). This represents an important departure from existing banking regulation studies that, with only limited exceptions, typically focus on small banks, annual data on only the largest banks, or publically traded banks (see for example, Cyree (2016), Feldman et al. (2013) and Schafer et al. (2016)). This is important because the impact of economic conditions (and in our case-regulatory burden) on bank profits and risk is not necessarily consistent across banks of different asset size (Grochulski et al., 2018 and Dolar and Dale, 2019).

The potential asymmetric impact of FRPU on profits based on bank size may be attributed to differences in economies of scale between small and large banks as suggested by Dolar and Shughart (2007). These authors report that the existence of scale economies in complying with banking regulation compliance has been fairly well-established. They suggest that economies of scale in regulatory compliance supply incentives for larger, more efficient institutions to seek competitive advantages over their smaller, less efficient competitors by lobbying for rules that increase the cost of doing business industry-wide. Given that the interests of larger, lower-cost and better-politically organized institutions tend to dominate the interests of their smaller, higher-costs and less-well-organized competitors in the regulatory process, the effects of regulation get distributed asymmetrically within the industry. Thus, we infer that changes in regulation can have the unintended consequences of weakening small community banks if their growth becomes restricted or if compliance/monitoring costs are burdensome and/or increasing over time.[2]

Implementing a dynamic panel estimation approach and controlling for bank balance composition, income sources, and macro forces, we show that the impact of FRPU on profits is negative for small and large banks, turns positive for money center banks, and has no impact on the medium bank sample. On the other hand, there is a positive impact of FRPU on risk in the

[2] A 2014 community banking survey conducted by the professional service/auditing firm of Klynveld, Peat, Marwick and Goerdeler (KPMG) shows 32% of the survey participants identifying regulatory and legislative pressures as the main barrier to significant growth for community banks. Moreover, 45% of community bankers surveyed report that compliance costs range between 5% and 10% of total operating costs while 33% of banks estimate compliance costs ranging from 11% to 20% of total operating costs (see Cyree 2016)).

small and medium bank samples with no impact reflected on the larger banks (large and money center banks). The impact of real gross domestic product (RGDP) growth on profits and risk follows a similar pattern for small, medium, and money center banks while the impact of inflation on profits (risk) is positive (negative) across all bank samples. We also find that the impact of non-interest income on profits is positive for the small, medium, and large banks while the impact on risk is positive only for small and large banks. We find no impact of non-interest on profits or risk for the money center bank sample. In sum, our findings suggest that bank size matters for the effect of financial regulatory policy uncertainty, macro forces, and diversified revenue sources on bank profits and risk. Finally, there is evidence of short-run profit and risk persistence across the bank samples with money center banks showing the highest persistence.

The remainder of the paper is structured as follows. Section 2 documents the relevant literature to the study. Section 3 describes the data, and Section 4 introduces our empirical analysis. Section 5 discusses the results. Finally, Section 6 summarizes our conclusion and provides implications.

2. Literature Review

2.1. Impact of Regulation on Banking

Previous studies on the regulatory environment within the financial services industry have suggested that there may be benefits and/or drawbacks to increased financial regulation. For instance, a group of studies examine the impact of regulatory changes on compliance and monitoring costs (and profits) of financial services firms. The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) of 2010 is viewed as the most comprehensive financial reform that has impacted the industry since the Great Depression. Feldman et al. (2013) report that the Kansas City Federal Reserve survey predicted that banks would add between 0.6 to 1.6 new employees to handle regulatory compliance for community banks after Dodd-Frank. Their empirical evidence shows an average reduction in ROA of 23 basis points for banks with less than $50 million dollars in total assets, and about a 3 basis point decline for banks with U.S. $500 million to U.S. $1 billion in total assets when hiring an additional compliance person.

Cyree (2016) finds that for small U.S. banks, major financial regulatory changes (i.e., Dodd-Frank, Patriot Act, and the Federal Deposit Insurance Corporation Improvement Act), impact the firms operating environment and profitability differently. Posing the regulatory burden hypothesis, which suggests that increased regulatory legislation tends to increase the compliance costs of banks and financial services firms, Cyree (2016) finds that measures of regulatory burden (i.e., reduced ROA, lower loans per employee, lower technology and fixed-asset expenditures, higher percent change in employees, higher salaries-to-asset ratios, and higher average pay) are mixed when examining the three major regulatory environments. Cyree (2016) finds that after the passage of the Dodd-Frank Act, five of six regime-shift indicators were consistent with an increased regulatory burden. Cyree's (2016) finding complements Schafer et al. (2016) who found that financial markets reacted to structural reforms and that the Volcker rule (a key regulation within the Dodd-Frank act) provoked strong reactions in the credit default swap (CDS) markets; more specifically, U.S. investment banks experienced a decrease in equity prices and a strong rise in CDS spreads.

Other research suggests that the passage of the Federal Deposit Insurance Corporation Improvement Act (FDICIA) in 1991 had little impact on compliance costs; moreover, banks generally show improved performance after the passage of FDICIA which may suggest that the regulatory burden was not elevated, or it was offset in some other way (see Akhigbe and Whyte (2001); Altamuro and Beatty (2010); Cyree (2016)). The PATRIOT Act of 2001 was passed to further limit the potential of money laundering and other financial crimes thus creating an additional liability on banks to comply with the new legislation. Dolar and Shughart (2007) find that compliance costs, measured by noninterest expense, increased by 44.7% on average after the PATRIOT Act was implemented. Cyree (2016) finds an increase in ROA for small banks after the passage of the PATRIOT Act which is inconsistent with an increased regulatory burden and could indicate that banks are successful in offsetting the costs in other ways.

The impact of financial regulatory changes on bank's performance and risk tends to vary based on bank size. Dolar and Shughart (2007) find that smaller institutions are at a disadvantage because average costs are larger than the average costs for bigger banks after the PATRIOT Act was enacted. Further, Cyree (2016) suggests that the burden from the Dodd-Frank on smaller banks is mostly due to the Ability-to-Repay rules and the restrictions associated with qualified mortgages. Zou et al. (2011) find that the process of deregulation on an interstate basis produces mixed results on profitability and risk. The passage of IBBEA has a positive effect on bank profitability which varies with bank size and turns negative for banks over U.S. $15 billion in assets. IBBEA leads to reduced risk for small banks and increased risk for medium and large banks.

Another interesting stream of related literature deals with the impact of regulatory changes on bank capitalization and profits. For example, major changes in Basel II regulations dealing with market-risk modeling methodology for the development (and reporting) of bank minimum capital requirements (MCR) were prompted by the erosion of bank capital, in part, due to substantial trading losses during the 2007-2009 financial crisis. Such regulation changes culminated with the creation of the 2013 version of the Basel III Accord and serve to motivate the research by Kinateder (2016). Employing Cantelli's inequality, the author computes theoretical MCR violation levels to conduct a comparative assessment of the MCR under prominent versions of the Basel regulatory framework. The author concludes that the relative effectiveness of current Basel III MCR reveals that under a normal 2.5% Expected Shorfall (ES) the resulting MCR violation level during a stress period is only marginally better than under Basel II. Using data from 1990 to 2007 for several industrial countries, Bolt et al. (2012) claim that the Basel III Accord urged banks to retain additional profits and payout fewer dividends when Tier 1 capital buffers are below required levels.

2.2 The Impact of Uncertainty on the Economy

The empirical literature on the impact of "policy uncertainty" on the economy has explored different paths focusing on monetary policy effects (e.g., Friedman (1968) and Aastveit et al. (2017)), fiscal policy decisions (e.g. Hassett & Metcalf (1999) and Fernandez-Villaverde (2015)), and regulatory policy action (e.g. Higgs (1997)). The broad findings of the reviewed literature suggest that higher levels of policy uncertainty lead to negative responses in the overall economic system. Pastor and Veronesi (2012) examine the theoretical links between economic fluctuations, policy uncertainty, and stock market volatility and suggest a negative relationship between stock prices and policy uncertainty. Other studies suggest regulatory uncertainty can have different impacts on investment expenditures (e.g., Julio and Yook (2012)) and equity returns (Santa-Clara & Valkanov (2003) and Belo et al. (2013)) based on the political party in power.

More recently, Baker et al. (2016) developed a measure of economic policy uncertainty to examine the role that economic policy uncertainty (EPU) plays in asset prices. Using firm-level data, they find that economic policy uncertainty is associated with greater stock price volatility and reduced investment and employment in policy-sensitive sectors such as defense, healthcare, finance, and infrastructure construction. Brogaard and Detzel (2015) suggest that government economic policy related to taxation, expenditures, monetary strategy and objectives, and financial regulations has large market-wide economic effects that are largely non-diversifiable. They use the Baker et al. (2016) measure of economic policy uncertainty to examine the role that EPU plays on asset prices. EPU is positively correlated with (but distinct from) general economic uncertainty as proxied by the volatility of market returns.[3] An increase of one standard deviation in EPU is associated with a contemporaneous 1.31% decrease in market returns and a 1.53% increase in future three-month log excess returns (6.12% annualized).

The banking sector is not immune from both economic and regulatory uncertainty. Desai and Stover (1985) who examine the effect of 18 bank-holding company acquisitions over the period of 1976 to 1982 find evidence of positive shareholder wealth-maximizing behavior based on bank holding company(BHCs) management decisions. Due to the nature of the uncertainty surrounding the approval of the acquisition/merger by the Federal Reserve, the study finds that removing regulatory uncertainty provides additional returns to shareholders. Baker et al. (2016) introduce a model that tests the impact of financial regulatory policy uncertainty on stock price volatility of finance-related firms. Their findings indicate that finance-related equity prices are positively linked to financial regulation uncertainty.[4] Finally, Gissler et al. (2016) focus on the financial regulatory uncertainty surrounding the Consumer Financial Protection Bureau (CFPB) that proposed and implemented laws regarding minimum requirements that mortgage lenders must consider before extending credit to consumers in and around the period of 2011-2014. The authors find a positive correlation between a reduction in bank lending and banks' management perception of prolonged uncertainty about future regulatory lending standards.

[3] Pástor and Veronesi (2013) suggest that this is the case. In their model, EPU reflects agents learning about the political costs associated with the implementation of different policies. Agents receive noisy signals (e.g., the news) that change their posterior beliefs about which political forces will get their way, and these signals are driven largely by news shocks that are orthogonal to those driving economic fundamentals.
[4] Baker (2016) create indices for policy uncertainty categories, including financial regulation using a text based methodology that screens 10 major newspapers in the United States. See Baker (2016) for further details.

3. Data

The sample draws from the population of commercial banks that are insured through the Federal Deposit Insurance Corporation (FDIC) from 2000Q1 through 2016Q4. The bank information is compiled in Consolidated Reports of Condition "call reports" that are submitted quarterly by insured banks.[5] Since this research deals with bank-level data, data is drawn from the lead bank in the case of multibank holding companies (BHC). In many instances, the lead bank commonly represents over 80% of the total insured assets reported by the BHC.[6] Banks with missing balance sheet and /or income information required for this study are excluded from the sample. We follow Loutskina (2011) and eliminate all bank-quarter data with asset growth over the preceding quarter in excess of 50%, total loan growth exceeding 100%, and total loans-to-assets ratio of less than 10%. Further, observations were winsorized at the 99% and 1% levels to eliminate cases of extreme outliers that would potentially influence the empirical results. This sample selection process left us with a total of 4,763 banks and 315,679 bank quarter observations. Following Verma and Jackson (2008), we further divide our bank sample into four groups based on average total asset size as of the beginning of period as follows: small banks (average total assets < U.S. $1 billion), medium banks (average total assets ≥ U.S. $1 billion and < U.S. $20 billion), large banks (average total assets ≥ U.S. $20 billion and < U.S. $90 billion) and money-

[5] The bank data used for this study are available through Federal Deposit Insurance Corporation (FDIC) statistics on depository institutions (SDI) database at the following website: http://www2.fdic.gov/sdi/index.asp (last accessed on 11/15/17)

[6] To investigate the presence of multibank holding companies, we extract a list of the largest 150 financial institutions as of the beginning of the sample. We match each of these institutions against the FDIC website to determine if they are BHC. The number of banks excluded that form part of a BHC represents less than 2% of the total sample. The lead banks of BHC are retained for this research while BHC data are excluded to avoid double counting. By choosing bank-level data to examine the impact of financial policy regulation policy uncertainty solely on banking performance, we avoid balance sheet and income statement activity related to affiliated non-banking business operations normally included/reported in BHCs. Other studies that examine bank-level data include: Grochulski et al. (2018), Egly et al.(2018), and Chronopoulos et al. (2013), among others.

center banks (average total assets ≥ U.S. $90 billion). The bank information extracted for this study includes: 1) return on assets (ROA) computed as net income after taxes and extraordinary items (annualized) divided by average total assets, 2) return on assets (ROE) computed as net income after taxes and extraordinary items (annualized) divided by average total equity 3) total assets, 4) total equity, 5) total loans, 6) non-interest income including income from fiduciary activities, service charges on deposit accounts, trading gains (losses), other gains (losses) and fees from trading assets and liabilities, and fees from foreign exchange transactions, 7) FDIC insured domestic deposits less than $100,000, and 8) loan loss provisions.[7] To control for the macroeconomic environment on bank profitability and risk, we include the real GDP growth rate and the inflation rate. We provide justification for the bank and macro-economic variables in subsequent paragraphs under the Empirical Analysis Section. Table 1 presents a summary of the supporting literature for our selected model variables.

Table 2 Panels A through E reports the descriptive statistics for both the bank-specific and macroeconomic variables included in the study on the banks classified as small, medium, large, and money-center banks. The mean ROA for the various bank samples ranges from 0.923 (small banks) to 1.076 (large banks). The observed increase (and magnitude) in ROA values as bank size increases is consistent with Zou et al. (2011) and Nippani and Green (2002). The mean ROE ratios are approximately 10 times the size of the ROA ratios in all samples and consistent with previous research. The mean risk-adjusted ROA (SDROA) and risk-adjusted ROE (SDROE) values range from approximately 13 to 20 and increase with bank size, suggesting that larger banks are less risk-averse compared to their smaller counterparts. Banks' exposure to loans declines as overall

[7] The deposit threshold for FDIC reporting purposes increased to $250,000 effective September 2009.Accordingly, SDI reporting of insured deposits was also revised (SDI variable code name "depsmamt" replaced with "iddepsam").

bank size rises (e.g., LtoA of 63.38% for small banks reported in Table 2 Panel A vs. 56.24% for money-center banks shown in Table 2 Panel D). This finding is consistent with the view that bank size typically drives the type of activities that the bank engages in (i.e., retail vs. wholesale banking). The mean ratio of non-interest income-to-assets increases from 0.005% for small banks to 1.301% for large banks. These results support the view that trading income is highly concentrated in the largest banks with substantial operations. The mean non-interest income-to-asset values for the large and money center bank samples (1.301% and 1.271% respectively) align reasonably well with the large bank sample value of 1.73% reported in Yeager et al. (2007). The macroeconomic variables in Table 2 Panel E are similar in magnitude and variation with those reported in the previous literature. The FRPU variable (index) ranges from a high of 506.81 (Q4 2008) to a low of 23.26 (Q4 2006) with a mean of 125.38.

Contemporaneous bivariate correlations are computed for the: 1) bank variables 2) macro variables, and 3) FRPU index for the full sample period on banks classified as small, medium, large, and money-center banks[8]. Correlation results suggest that bank behavior is not fully consistent across all subsamples. For example, the correlation between ROA and RGDP is positive and ranges between 0.064 for small banks to 0.234 for money center banks. The positive co-movement between ROA and RGDP seems in line with Albertazzi and Gambacorta (2009). They explain that improvements in economic conditions are accompanied by concurrent increases in loan demand and improved financial condition of borrowers with positive effects on the profitability of traditional financial intermediation activities. Of interest is the negative relationship between ROA and FPRU, which ranges between –0.361 for money-center banks to –0.137 for the

[8] The correlation tables for each bank size subsample are shown in Appendix A. As reported in the text, the correlation coefficients are, for the most part, low to moderate.

small banks. FPRU also tends to be negatively correlated with RGDP growth and inflation. The fairly strong negative co-movement between FRPU and RGDP growth is intuitively appealing and suggests that increases in bank performance (which usually improves balance sheet strength) are met with concurrent reductions in financial uncertainty. Banks' commonly reflect improved performance and balance sheet strength during favorable economic periods. Based on the negative correlation between FRPU and RGDP, it follows that the negative co-movement of FRPU and inflation supports the common view that during business cycle expansion periods inflation pressures rise. With the exception of the negative correlation between FRPU and RGDP of -0.518 and the strong positive correlation between ROA and ROE (dependent variables in our profit models) ranging between 0.927 and 0.940, all other correlations are either low or moderate. The low-to-moderate correlations help mitigate any potential collinearity issues that could impact our profitability models.

The main independent variable in our analysis is financial regulation policy uncertainty (FPRU) which is quantified with a news-based index developed by Baker et al. (2016). The FRPU index is computed as the monthly number of articles containing joint references to financial regulation policies, uncertainty, and the economy. The FRPU index is a sub-category of the NewsBank EPU (economic policy uncertainty) which is constructed in the same manner as the FRPU except that selected articles do not contain terms related to any specific policy area. The EPU relies on three components: news coverage of economic policy uncertainty, the number of US tax code provisions set to expire in future years, and disagreement among economic forecasters.[9] Figure 1 provides a visual of the FPRU index over our sample time frame along with the profitability (ROA) patterns for each bank size class (small, medium, large, and money center).

[9]Refer to Baker et al. (2016) for further detail on the FRPU and EPU indices.

In Figure 1, ROA across banks reflect their greatest decline during the 2007-2009 financial crisis with notable upside shown in the post-crisis period. While ROA has not fully reverted to the pre-crisis period, the small and large banks (medium and money center banks) reflect the stronger (weaker) recovery. As expected, there is an inverse relationship between ROA and our FRPU index that appears stronger for the large and money center bank samples compared to the small and medium bank samples over the entire sample period.

4. Empirical Analysis

We use dynamic panel estimation techniques to model the impact of FRPU on bank profits and risk similar to the empirical specifications presented by Lee et al. (2014) while incorporating a few important differences. First, we extend their model by controlling for the effects of macroeconomic forces on bank profits. This is important given the documented response of bank profits to macroeconomic factors (see for instance, Bolt et al. 2012, Albertazzi and Gambacorta (2009), and Aliaga-Diaz and Olivero (2011)). Second, our focus is on the U.S. banking system using individual bank-quarterly data while their work investigates individual bank-annual data for 22 Asian countries. The sample horizon in this study extends beyond the post 2007-2009 financial crisis period while their sample period ended in 2009. Third, the primary contribution of Lee et al. (2014) is to capture the impact of non-interest income on bank profitability and risk. Controlling for bank-specific and macroeconomic forces, our approach attempts to examine the impact of a continuous measure of financial regulation policy uncertainty (FRPU) on bank profits and risk. Incorporating the FRPU measure in the model may serve as a nice "news-based" complement to the low- frequency RGDP and bank-specific data alike.

4.1 Measures of Profitability and Risk

The profitability variable is represented by two alternative measures: the ratio of profits to assets (i.e., return on assets (ROA)) and the profits to equity ratio (i.e., return on equity (ROE)). ROA is mainly an indicator of managerial efficiency; it indicates how capable management has been in converting assets to earnings. This indicator, however, may be biased due to off-balance sheet activities. ROE, on the other hand, measures the rate of return that shareholders receive from investing their capital in the financial firm. The relationship between these two popular profitability measures may be expressed as: ROE $= ROA\ x\ \frac{Total\ \ Assets}{Total\ Eauity\ \ Capital}$. The second term on the right hand side of the equality (Total Assets/Total Equity Capital) is often referred to as the bank's equity multiplier, which is a measure of financial leverage. Banks with lower leverage (higher equity) will generally report higher ROA, but lower ROE. Since an analysis of ROE disregards the risks associated with high leverage and financial leverage is often determined by regulation, ROA emerges as the key ratio for the evaluation of bank profitability. For robustness purposes, we use both ROA and ROE to see if our results are sensitive to the profit measure used or if they hold. Motivated by Lee et al. (2014), we compute risk-adjusted return on assets (and return on equity) as ROA (and ROE) divided by the previous four-quarters of standard deviation of ROA and ROE, respectively. These risk-adjusted measures (i.e. (SDROA) and (SDROE)) control for an increase in earnings due to an increase in risk.

4.2 Control Variables

Size (TA): A priori, we may expect a positive or negative relationship between bank size (measured as the natural log of bank total assets) and profitability which may vary based on depending on the banks' asset size category. On one end, small banks (as opposed to their larger counterparts) charge a higher risk premium for extending credit to more risky customers as reflected by higher interest-rate margins (NIMs) that result in higher revenues and profits.[10] Barros et al. (2007) argue that the asymmetric information problems associated with lending can be reduced by smaller and specialized banks, preceding a negative impact of size on bank profitability. On the other end, Martinez-Peria and Mody (2004) argue that larger banks can charge higher loan rates and may also benefit from economies of scale and reduce costs, leading to higher profits.

Growth (ΔTA): Following Chronopoulos et al. (2015), we might expect that faster-growing banks would be able to generate greater profits. However, if the growth in assets is realized through a lower loan quality, the relationship between growth and profitability is likely to be negative. Empirically, Lee et al. (2014) and Chronopoulos et al. (2015) find a positive relationship between growth and profitability. A priori, the coefficient related to growth is expected to be ambiguous.

Liquidity (LtoA): Following Goddard et al. (2013), Lee, et al. (2014), and Tan (2016) we use the ratio of loans to total assets to measure liquidity. It reflects the possible inability of banks to accommodate decreases in liabilities or fund increases on the assets' side of the balance sheet. The higher volume of loans will lead to a decline in bank profitability if the bank does not have a strong risk management system. A larger loans to asset ratio indicates that there is a lower liquidity level and implies that there is more interest revenue generated. Therefore, a positive impact of liquidity on bank profitability is expected, but empirically the evidence is mixed on how liquidity impacts the profitability of banks (e.g., Shehzad et al. (2013), Tan (2016) and Lee et al. (2014).

[10] For example, Egly et al. (2018) find that small banks have an annualized NIM of 3.947% compared to NIM for large and money center bank of 3.387% and 3.247%, respectively for U.S. banks from 2000Q1-2016Q4. We include a continuous variable to capture the size of the bank (log of total assets) to further complement our four-size bank classification scheme (i.e. small, medium, large, and money-center banks). Following Lee et al. (2014) and Chronopoulos et al. (2015) we concurrently include TA and *(ΔTA)* in our bank profit and risk models. A review of the contemporaneous bivariate correlations between these two variables are low (e.g. correlation coefficients (in absolute value) range from 0.006 for the medium bank sample to 0.067 for the large bank sample- see Appendix A for correlation tables).

Deposits to Assets (DtoA): An inverse relationship between deposits-to-assets ratios and profitability is consistent with the view that purchases of large volumes of liquid, readily-marketable securities tend to lower the average yield from a bank's earning assets and reduce its profitability. A stable deposits to asset ratio may support a reduction in risk as it implies: 1) a bank's ability to gather short-term deposits, 2) lower funding costs, and 3) a low-risk profile if increases in deposits to assets mirror increase bank liquidity.

Capitalization (EtoA): This variable, measured as the ratio of equity capital to assets, is important in explaining the performance of financial institutions. Following Tan (2016), a positive impact of capitalization on bank profitability is expected for the following reasons. First, funding costs can be reduced for banks with higher capital levels due to the fact that a higher capital ratio indicates that the banks have higher creditworthiness. Second, banks with higher capital levels are more likely to engage in prudent lending which leads to an increase in bank profitability.

Income Diversification (NONIItoA): In order to capture the changing banking environment we incorporate a non-interest income variable (scaled by total assets) to measure the income diversification of our banking sample. Multiple income sources should stabilize operating income and generate more stable streams of profits because non-interest income activities are assumed to be uncorrelated with interest income activities (Chiorazzo et al. 2008). Thus, a positive impact of diversification on bank profitability is expected in conjunction with lower risk. Empirically, studies by Stiroh and Rumble (2006), Calmes and Liu (2009) and Lee et al. (2014) find mixed support for how non-interest income impacts profitability and overall risk of financial institutions. Thus, the impact of diversification on bank profitability may be positive or negative.

Risk (LLPtoA): We use the ratio of loan loss provision to total assets to measure risk exposure. Theory suggests that increased exposure to credit risk is normally associated with decreased firm profitability. Therefore, we expect that there will be a negative impact on credit risk on bank profitability. Empirical studies show mixed results on how risk exposure impacts the profitability of banks (e.g., Lee et al., 2014; Athanosoglou et al., 2008; Dietrich and Wanzenried, 2011; Brighi and Venturelli, 2016).

Economic Growth (RGDP): We anticipate a direct relationship between real GDP and profitability in line with the banking literature (e.g., Athanosoglou et al. (2008), Albertazzi and Gambacorta (2009), Chronopoulos et al. (2015)). Although some literature indicates a negative relationship between bank profitability and economic growth, this may be due to the varying impacts economic factors have on banks depending on their size (Grochulski et al., (2018))

Price Levels (INF): The direction of the relationship between inflation and ROA arguably depends on bank management's ability to fully anticipate (and plan for) inflation expectations suggesting that banks can adjust their pricing in order to increase revenues to offset rising costs. Empirically, inflation has been investigated and included in several models (e.g., Athanasoglou et al. (2008), Albertazzi and Gambacorte (2009) and Shehzad et al. (2013)), but no conclusive evidence has been documented. A priori, the expected relationship between inflation and bank profits is ambiguous.

4.3 Financial Policy Regulation Uncertainty (FPRU)

The regulatory burden hypothesis presented by Cyree (2016) suggests that if regulatory burden increases and is not offset in other ways, accounting performance should fall and loan production decline. Therefore, we posit that increases in FRPU will curb banks' medium-to-long-term investment and loan generation activities based on their idiosyncratic risk aversion preferences, and increase implementation and monitoring costs which dampen profitability.

4.4 Empirical Methods

A common empirical regularity in financial services firm data suggests that firm's profits are highly persistent due to imperfect competition, informational opacity, and serial correlation in regional/macroeconomic shocks (Goddard et al., 2011). The system GMM dynamic panel data estimator proposed by Blundell and Bond (1998) is designed to account for such persistence, by including the lagged dependent variable among regressors, and control for endogeneity bias. We choose system GMM (SGMM) estimation since alternative estimation techniques for evaluating dynamic panel data models, such as pooled OLS and fixed effects methods, produce biased coefficient estimates of the lagged dependent variable (Baltagi, 2008). Since capital is likely to be endogenous in our model (as in Athanasoglou et al. 2008 and Chronopoulos et al. 2015) the use of alternative estimation techniques (e.g., pooled OLS and fixed effects methods) would be inappropriate (Baltagi, 2008). It is also plausible that the FRPU regressor may be potentially endogenous. For example, increase compliance and monitoring costs associated with crisis-based financial regulation would potentially negatively impact bank profitability. Alternatively, a strong economy, including a robust (and profitable) banking system, may influence financial regulation policy uncertainty. The system GMM methodology allows instrumenting for the endogenous variables (in our case capital and FRPU) and provides consistent estimates. Finally, other estimation methods based on the OLS principle are vulnerable to the omitted variable bias if some important determinants of bank profitability are not included among explanatory variables. The system GMM method is robust to the omitted variable problem.[11]

In implementing the SGMM estimator, the instruments for the level equation are the lagged differences of the corresponding variables, whereas the instruments for the differenced equation

[11] Use of a SGMM estimator also accounts for possible correlations between any of the independent variables. For a thorough description of dynamic panel estimators, see Baltagi (2008). For a recent summary of the potential estimation of dynamic panel techniques see Lillo and Torrecillas (2018).

are the lagged levels. The purpose is to obtain more robust estimates when the autoregressive process becomes persistent. Serial correlation tests of order 1 are plausible, but we wish to rule out serial correlation tests of order 2 as advocated by Arellano and Bond (1991). Hansen's J-tests are robust for instrument validity if there are no proliferation of instruments. To deal with potential over identification problems that arise from using SGMM when the time dimension of the panel is large relative to the number of banks (e.g., in the large and money center bank samples), we employ the collapse procedure proposed by Roodman (2009).[12]

The dynamic panel data models for this study are expressed as follows:

$$\pi_{i,t} = \beta_1 \pi_{i,t-1} + \beta_2 BK_{i,t} + \beta_3 MACRO_t + \beta_4 FINREG_t + \alpha_i + \varepsilon_{i,t} \quad (1)$$

$$\Gamma_{i,t} = \beta_1 \Gamma_{i,t-1} + \beta_2 BK_{i,t} + \beta_3 MACRO_t + \beta_4 FINREG_t + \alpha_i + \varepsilon_{i,t} \quad (2)$$

where the profitability and risk variables, π and Γ ,consisting of the ROA or ROE and SDROA and SDROE respectively; BK represents a vector of bank-specific variables consisting of our size (proxied by the log of total assets), growth (measured as change in log total assets), liquidity (captured through the ratio of loans to total assets), deposits (the ratio of deposits to total assets), capital (equity capital to total assets), income diversification (the ratio of non-interest income to total assets), and credit risk (proxied by loan loss provisions scaled by total assets); $MACRO$ consists of a vector of macro-economic variables, which include: 1) real GDP growth rate and 2) inflation.[13] The *FINREG* represents our FRPU index variable. Finally, α_i represents the bank-specific fixed effects while $\varepsilon_{i,t}$ captures the remaining disturbance term.

[12] The SGMM estimation was performed on STATA software using xtabond2 program code written by Roodman (2009a). Under this program code, "gmmstyle" variable list includes endogenous variables while "ivstyle" variable list includes exogeneous variables. In our model gmmstyle variables include equity to assets and FRPU. The collapse command restricts the number of instruments in a manner that a single instrument is created for each variable and lag distance rather than an instrument for each time period, variable, and lag distance. This is useful to support our choice of the Hansen statistic to validate the instrument list.

[13] Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) unit root tests are applied to the macro variables. The null of these tests is that the series contain unit roots (i.e. non-stationary series). The RGDP growth rate and inflation

5. Results

Table 3 reports the dynamic panel regression results for equations (1) and (2) applied to the small bank sample for the period 2000Q1 through 2016Q4. The dependent variable is either our profitability measures (ROA or ROE) or our risk-adjusted profit measures (SDROA or SDROE). We initially focus on the impact of FRPU on ROA and ROE since they are the key variables of interest in our study. All other variables incorporated in our model control for the persistence of profitability or risk, bank-specific, and external factors influencing bank profit behavior as supported by our review of the literature. We include a discussion on the control variables at the end of the results section. For the small bank sample, FRPU has a negative statistically significant, net impact on bank profitability of -0.8998 (Column 1 ROA) and -6.4073 (Column 2 ROE). Therefore, the change in ROA falls by 0.8998% given a 1% increase in the FPRU index. Evaluating this coefficient at the mean of 0.0125 (translates to 1.25% in percent terms) of the FRPU index reported in Table 2 Panel E, the overall negative impact on the change in ROA is 0.0112 or 1.12%)[14] The negative effect aligns with our hypothesis that banks hold back on medium-to-long-term investment and loan generation activities (based on their idiosyncratic risk aversion preferences) in response to increases in FRPU. The direction of the impact of FRPU on ROE is similar yet much greater in magnitude (see Column 2) compared to the results shown on the ROA model (Column 1). These results imply that rising implementation and monitoring costs associated introduction of crisis-based regulation dampens profitability (ROA & ROE). Changing

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rate variable series were stationary in their original form. Unit root tests are not reported in this study but are available upon request. Variance inflation factor statistics in model variables (not shown) do not suggest multicollinearity issues.

[14] To improve visual impact of FPRU regression coefficients, we chose to scale the original financial regulation uncertainty index by 10,000. Changing the units of measurement of this independent variable does not alter the interpretation of the model or goodness-of- fit.

the focus to our risk-adjusted profit variables (SDROA & SDROE), the positive FRPU coefficients of 111.3207 and 105.3797, respectively, on our risk models are highly significant. This aligns with our hypothesis that increased financial regulatory policy uncertainty leads to greater risk for financial institutions. Our findings have an interesting connection with Baker et al. (2016) who report a statistically significant positive effect of FRPU on bank stock price volatility using quarterly U.S. bank-level data for the period 1996 to 2012. The idea is that unexpected negative movements in bank profits (triggered by FRPU) may unfavorably impact the expected stream of bank cash flows (including future stockholder dividends) and thus generate unfavorable stock price changes. Our findings nicely complement Cyree (2016) who apply panel data regressions to small U.S. banks (i.e., total assets < U.S. $5 billion) and find that the banks reflect lower pretax ROA after the passage of the Dodd-Frank Act. Specifically, these findings are consistent with the regulatory burden hypothesis introduced by Cyree (2016); their hypothesis suggests that increased regulatory legislation tends to increase compliance costs of banks and financial services firms and negatively impact profitability, all else equal.

Table 4 reports the results for the medium-sized bank sample. The positive, albeit insignificant, impact of FRPU on bank profitability (Columns 1 and 2) seems at odds with our regulatory burden hypothesis. A positive impact supports the view that strong capital buffers and favorable market based data (e.g., rising bank stock prices, decreasing interest costs on senior debt instruments, and declining cost of equity capital), usually seen in periods of strong bank profitability, signal financial strength that outweighs the influence of financial regulation policy uncertainty. The contrasting results based on bank size nicely complement Zou et al. (2011) who examine the impact of IBBEA deregulation on state-level annual bank data (divided into groups based on total asset size) for the period 1984-2004. They find that for their small bank (total assets

< U.S. $300 million) and medium bank subsamples (total assets ≥ U.S. $300 million and < U.S. $15 billion), interstate banking deregulation had a positive impact on ROA which turned negative for their large bank sample (total assets > U.S. $15 billion). The estimation of equation (2) on the medium bank sample continues to suggest that as financial regulation uncertainty rises, the risk in bank profits tend to rise given the positive and statistically significant coefficients on the FRPU regressor.

Tables 5 and 6 report the large and money center banks results, respectively, for equations (1) and (2). The impact of FPRU on our profitability and risk models on these two bank samples do not provide conclusive evidence. In the large bank sample, the estimation with ROE as our proxy measure for profitability (Column 2) indicates that FPRU has a negative impact on profitability, but is only significant at the 10% level. The estimations for our ROA model (Column 1), SDROA, and SDROE models (Columns 3 and 4) do not provide any statistically significant results. The ROA model for the money center bank sample (Table 6 Column 1) indicates that FRPU has a positive, and statistically significant, impact on profitability, although this is not confirmed in the ROE model (Table 6 Column 2). Further, as in the large bank sample, there is no statistically significant impact of FRPU on both risk measures in the money center sample. Overall, our results suggest that the bank's response to FRPU differs based on their size measured through total assets. This finding supports Grochulski et al. (2018) findings that small and large banks profitability (measured by NIM) respond in unique ways to cyclical changes in the macroeconomic environment. It is plausible that smaller banks may not have influential political interest groups that provide them with valuable lobbying power to diminish the unfavorable effects of financial regulatory changes. This conjecture supports the recent view of Papademitri et al. (2018) who investigate the impact of political influence on banking regulation and find an inverse relationship between their political influence` variable and enforcement likelihood of financial regulation. Depending on the severity of the regulatory changes, smaller banks may not be able to efficiently absorb implementation and monitoring costs, thus resulting in bank industry consolidations and shifts in deposit and loan market share towards larger banks. Conversely, large banks are more likely able to benefit from information and political influence thus resulting in minimal (or even positive) impacts of regulatory changes on bank performance. Our results also imply that the impact of financial regulation uncertainty on ROA (whether positive or negative) may depend on expectations regarding the effect of the proposed regulation on bank operations, competitors, performance and bank size.

Contrary to our expectations, RGDP growth exerts a mixed impact on our ROA and ROE profit models. The negative and statistically significant impact reported in the small bank sample is in step with Aliaga-Diaz and Olivero (2011), who report a negative (yet statistically insignificant) effect of GDP on net interest margins on their quarterly data on U.S. banks for the period 1979-2005. Bolt et al. (2012) find that real GDP has a significant negative influence on net interest income as a stand-alone regressor that turns positive when interacted with long-term interest rates. RGDP had no impact on our ROA or ROE profit models in the medium and large bank samples with the impact turning positive in the money center bank sample. RGDP tends to have a positive impact on our SDROA and SDROE risk models, in line with the expected result with no impact noted for the money-center bank sample. The results also suggest a positive effect of inflation on profitability based on statistically significant positive coefficients on the inflation variable in the small, medium, large, and money-center bank samples. The positive impact of inflation on profitability aligns with Athanasoglou et al. (2008) but contrasts with Shehzad (2013).

Finally, when analyzing the impact of the bank-specific variables in the various estimations, most of the results align with our predicted outcome. For example, the change in total assets (ΔTA) tends to increase profitability and increase risk, in line with Lee et al. (2014) and Chronopoulos et al. (2015). In the small and medium bank samples, increases in the ratio of loans to assets (LtoA) tends to increase profitability and risk, supporting the view that increased lending provides additional revenue but also increase risk. Increases in the ratio of deposits to assets (DtoA) tends to decrease both profitability and risk for small and medium banks. An increase in bank leverage (EtoA), tends to have a negative impact on profitably, and increases the risk of the profits for small banks. This finding contrasts with Athanasoglou et al. (2008) but aligns with Chronopoulos et al. (2015) who find a negative relationship between leverage and profitability. The effect of non-interest income on profitability is positive and statistically significant for small banks, medium banks, and large banks samples, but statistically insignificant for the money center sample. These positive results are in contrast to the negative results of Chronopoulos et al. (2015) and non-significant results found by Stiroh and Rumble (2006) and Lee et al. (2014) surrounding performance. When examining how income diversification impacts risk, the coefficient for NONIIA in our SDROA and SDROE risk models on the small bank sample are positive and significant supporting the view of Stiroh and Rumble (2006) and Calmes and Liu (2009) that non-interest income activities do not necessarily yield straightforward diversification benefits to bank since they contribute to bank income volatility. Finally, the credit risk variable (LLPtoA) tends to have a negative impact on both our profitability and risk models for the small, medium, and large bank samples. This effect tends to vanish in the money center sample. This positive impact contrasts with the empirical evidence by Lee et al. (2014).

Short run profit persistence is evident across all four bank samples which supports the view of imperfect competition. Generally, the coefficients on the lagged profitability variables (L.ROA or L.ROE) fall within the 0.703 to 0.863 range indicating that the persistence of profitability is fairly strong in the U.S. banking sector. These findings align well with Chronopoulos et al. (2015) who found that profit persistence for the U.S. banking sector ranges from 0.620 to 0.695 for the sample period of 1984 to 2010. The risk persistence, captured by the coefficients on the lagged SDROA and SDROE variables, tends to be in the 0.123 to 0.848 range.

We conducted several robustness exercises to check the consistency of our results. First, we run our bank profitability model using fixed effects panel data modeling with time effects (yearly time dummies) and error terms clustered on the cross-sectional effects of the individual banks. Our central findings regarding the impact of FRPU on bank profits and risk remain qualitatively unchanged. Second, under alternative specifications, we also found a direct effect of FRPU on bank ROA working through RGDP in all bank samples (except for the money center banks). This interesting result suggests that the anticipated unfavorable impact of rising financial regulation policy uncertainty on bank profits may be offset during periods of economic growth. [15] Third, we extend our work by replacing our profit and risk measures with net interest income (NIM) and a risk-adjusted NIM (SDNIM) which represent alternative measures of bank profit and risk. The coefficients on our FRPU variable for our profit model were as follows: -5.5769***. -3.2307***, -5.3643, and 1.7723 for the small, medium, large, and money center banks, respectively. The FRPU coefficients in our risk-adjusted (SDNIM) model were positive and statistically significant in our small and medium bank samples (6.4017*** and 19.2750*,

[15] Due to space constraints and for brevity, the alternative estimations (and related diagnostics) are not reported in table form in this study but are available upon request. In earlier stages of our research we had expanded our original model to include political dummy variables (e.g., Republican or Democratic controlled Congress), however such estimations are outside the specific scope of this research.

respectively) with no impact noted in the larger bank samples. These results align with our central findings as reported in Table 7. Finally, to focus on the growth in total assets rather than on the log of total assets, we also ran specifications excluding the log of total assets while retaining growth in assets. This final specification was performed to avoid potential multicollinearity issues. Here too, the results align well with our central findings. [16]

5. Conclusion

Policymakers and economists disagree about who wins and who loses from bank regulations. While some argue that the unregulated expansion of banks will increase banking fees and reduce the economic opportunities for individuals and businesses, others hold that regulations restrict competition, protect monopolistic banks, and create systemic issues within the economy. Empirically testing the impact of financial regulatory policy uncertainty is further complicated by the manner in which to capture the regulatory effect (e.g., Lamdin (2001)). The negotiation process of regulatory reform is dynamic producing compromises and surprises, tougher or weaker regulation than initially expected and therefore introducing new information to the markets.

Most of the previous work on the impact of financial regulatory changes on the banking sector implement an event study approach (e.g., Cyree (2016), Hachenberg, et al. (2017), Schafer (2016), Zou et al. (2011)). Although event study methodology provides some evidence of how regulatory changes impact the financial performance and condition of banks, the challenge when applying this approach is to identify the event periods correctly. This is particularly true for studies of regulatory changes for which there never is an easily identifiable single event date. Using a

[16] For brevity, in the narrative, we only report the FRPU coefficients related to our models that employ alternative bank profit and risk measures. The alternative estimations (and related diagnostics) are not reported in table form in this study but are available from the authors upon request. Due to space constraints and for brevity, the alternative estimations (and related diagnostics) that exclude TA but retain asset growth are also not reported in table form in this study but are available upon request. We thank the anonymous reviewer for these important modeling suggestions.

relatively new financial regulation policy uncertainty news-based index (FRPU) developed by Baker et al. (2016), this paper explores the impact of FRPU on bank profits and risk. Previous studies have used a continuous measure of financial regulation uncertainty and provide preliminary evidence that financial regulation uncertainty impacts both U.S. macroeconomic aggregates (Nodari, 2014) and the banking sector directly through reduced lending (Gissler et al. 2016). Our study focuses directly on the impact of the financial regulatory policy uncertainty index on bank profit and risk behavior. Our results validate the use of the FRPU index in an academic and practical setting[17] and show that financial regulation policy uncertainty impacts bank profits proxied through ROA and ROE and risk captured through our risk adjusted measure of ROA and ROE. The effect of FRPU on profitability and risk produces complex results that vary with bank size. FRPU negatively (positively) impacts profits for small and large banks (money center banks). On the other hand, there is a positive impact of FRPU on risk in the small and medium banks with no impact noted on the larger banks (large and money center banks).

Our findings lead to several important implications for financial services regulators, investors, and executives. First, financial services firms profit performance is sensitive to uncertainty surrounding the policies and laws that they must operate within. This implication is in alignment with Nodari (2014) who suggested that policymakers should pay considerable attention to the design of financial regulation, especially in terms of policy management and credibility. A temporary lack of transparency in economic policy design is very likely to harm the overall economy, including banks. Financial regulators and government officials must convey clear and

[17] The FPRU and other indices developed by Baker, et al (2016) have a market use validation: commercial data providers that include Bloomberg, FRED, Haver, and Reuters carry our indexes to meet demands from banks, hedge funds, corporations, and policy makers

timely communication regarding proposed changes in legislation to financial services firms in a way similar to the forward guidance delivered to Federal Reserve stakeholders surrounding monetary policy changes. As documented by Bloom (2009), a potential trade-off between policy ’’correctness’’ and ’’decisiveness’’ should be considered. It may be more desirable for governments to act decisively, albeit occasionally incorrectly, than being deliberately ambiguous on policies that many economic agents depend on for purposeful production and spending decisions.

Second, it is essential to ensure that communication channels are open especially to small and medium-sized banks for proper strategic planning given their greater sensitivity to regulatory uncertainty. The U.S. banking sector is composed of many small banks and few very large banks. In fact, about 95 percent of all Federal Deposit Insurance Corporation-insured depository institutions are small banks (community banks). Although these small banks hold only about 15 percent of total bank assets by value, many policymakers share the view that small, local banks fulfill an important role in the intermediation of credit. Using our four-size classification scheme based on asset size and controlling for bank-specific and macroeconomic factors, this research provides empirical evidence on the banks’ profit and risk behavior in response to financial regulatory shocks.

Finally, financial executives need to be aware of the views of the political leaders towards regulations and potentially adjust their balance sheets accordingly to maintain the required liquidity, capitalization, and profitability that shareholders require. A possible extension of this research may include compiling firm-specific political donations and tracking/measuring lobbying power as in Duchin and Sosyura (2012) to further understand how financial services firm’s political connections and lobbying donations influence profitability, regulation uncertainty, and overall performance. Furthermore, regulators must be cognizant (and respond to) the evolution in regulatory complexity that fosters the "too big to fail" issue, since it protects the largest banks that have access to powerful lobbyists and lawyers from competition from smaller banks. These extensions are currently beyond the scope of our study but have started to be addressed in the recent literature (e.g., Papadimitri et al. 2018).

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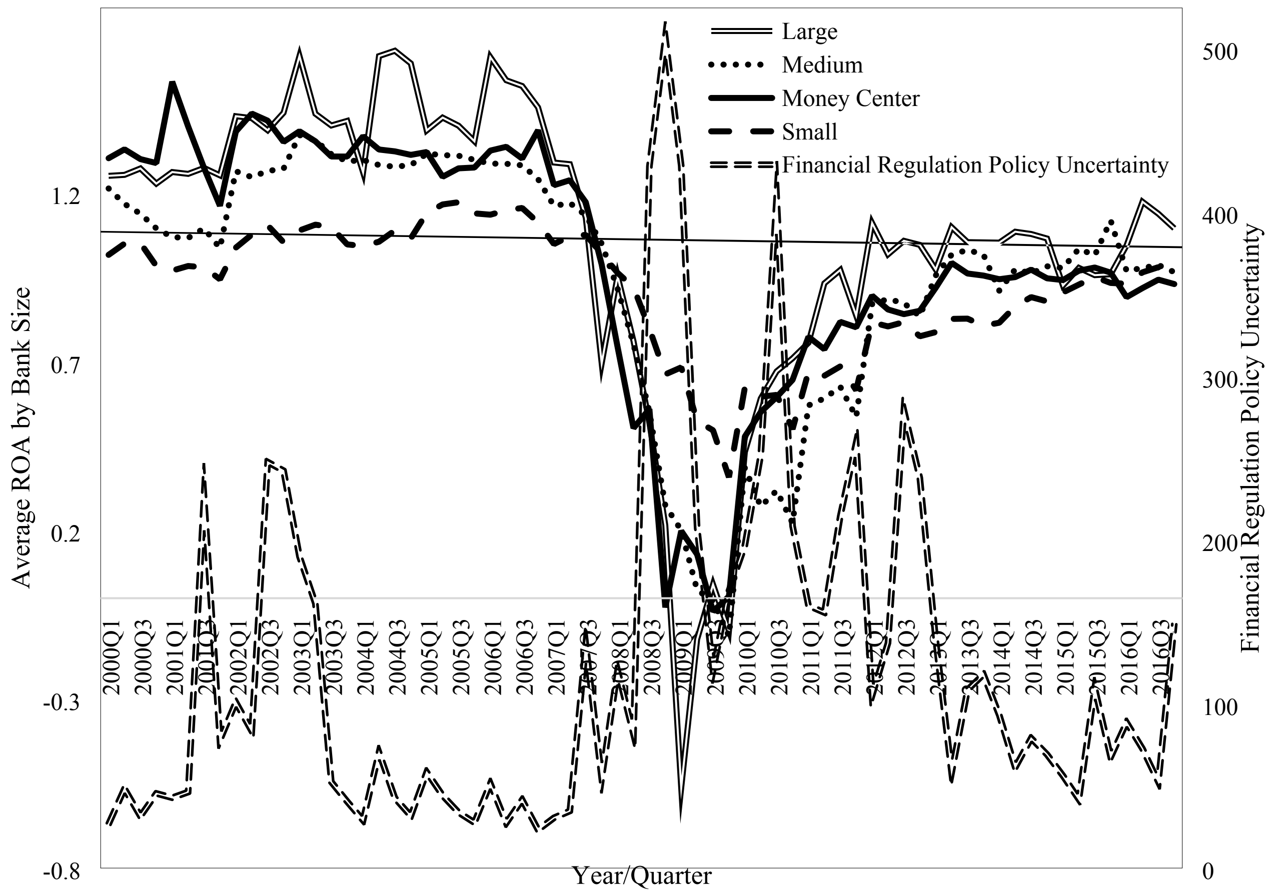
Figure 1 Return on Assets by Bank Size with Financial Regulation Policy Uncertainty



Notes: ROA is separated by bank size and averaged by quarter. Financial Regulation Policy Uncertainty data downloaded from www.PolicyUncertainty.com (data retrieved on 10/04/17)

Table 1 Summary of Variables and Supporting Literature

Variable	Description	Expected Sign (Profit)	Expected Sign (Risk)	Supporting Literature
Bank-Specific				
TA	Total assets	+/-	+/-	Chronopoulos et al. (2015), Cyree (2016), Barros et al. (2007), Lee et al. (2014)
ΔTA	Growth rate of total assets	+/-	+/-	Lee et al. (2014), Chronopoulos et al. (2015), Stiroh and Rumble (2006)
LtoA	Ratio of loans to total assets	+/-	+/-	Stiroh and Rumble (2006), Bolt et al. (2012), Lee et al. (2014)
DtoA	Ratio of deposits to total assets	+	-	Stiroh and Rumble (2006), Bolt et al. (2012), Lee et al. (2014)
EtoA	Ratio of equity to total assets	+	+	Stiroh and Rumble (2006), Athanosoglou et al. (2008), Lee et al. (2014)
NONIItoA	Non-interest income to total assets	+/-	+/-	Stiroh and Rumble (2006), Calmes and Liu (2009), Lee et al. (2014)
LLPtoA	Ratio of loan loss provisions to total assets	+/-	+	Athanosoglou et al. (2008), Dietrich and Wanzenried (2011), Brighi and Venturelli (2016)
Macroeconomic				
RGDP	Real GDP growth rate	+	+/-	Athanosoglou et al. (2008), Albertazzi and Gambacorte (2009), Chronopoulos et al. (2015)
INF	Inflation (CPI) rate	+/-	+	Athanasoglou et al. (2008), Albertazzi and Gambacorte (2009), Shehzad et al. (2013)
FPRU	Financial regulation policy uncertainty index	-	+	Feldman et al, (2013), Gissler et al. (2016), Cyree (2016)

Note: Bank-specific variables were obtained via through Federal Deposit Insurance Corporation statistics on depository institutions (SDI) database. Macroeconomic variables were obtained via the Federal Reserve of St. Louis Economic Research website (https://fred.stlouisfed.org/). Finally, the FPRU variable was obtained via http://www.policyuncertainty.com/.

Table 2 Descriptive Statistics

Panel A Small Banks

Dependent Variables	Obs	Mean	Std. Dev.	Min	Max
ROA	287330	0.923	0.799	-2.560	2.930
ROE	287330	9.079	8.106	-25.657	30.669
SDROA	280743	13.541	16.311	-3.140	96.729
SDROE	280880	13.379	16.179	-3.450	95.743
Independent Variables	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
TA	287330	11.991	0.784	5.333	16.654
ΔTA	282991	1.395	4.023	-8.148	18.217
LtoA	287330	63.382	14.179	25.107	90.048
DtoA	287330	55.034	11.183	22.627	77.647
EtoA	287330	10.666	2.998	5.732	22.275
NONIItoA	287330	0.005	0.004	0.000	0.027
LLPtoA	287330	0.001	0.002	-0.004	0.046

Panel B Medium Banks

Dependent Variables	Obs	Mean	Std. Dev.	Min	Max
ROA	25813	0.942	0.911	-3.245	4.256
ROE	25813	9.646	9.668	-37.025	37.219
SDROA	25229	19.575	25.598	-3.191	154.744
SDROE	25291	18.633	23.872	-3.194	142.379
Independent Variables	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
TA	25813	14.579	0.973	9.777	18.089
ΔTA	25423	2.253	5.649	-9.107	33.423
LtoA	25813	65.853	13.246	24.753	92.271
DtoA	25813	43.580	14.212	4.143	73.006
EtoA	25813	10.285	3.146	5.360	24.140
NONIItoA	25813	0.672	0.728	-0.003	4.789
LLPtoA	25813	0.001	0.002	-0.001	0.013

Table 2 Descriptive Statistics - continued

Panel C Large Banks

Dependent Variables	Obs	Mean	Std. Dev.	Min	Max
ROA	1720	1.076	0.898	-1.423	4.812
ROE	1720	10.732	8.577	-14.337	38.389
SDROA	1688	18.035	26.729	-1.894	177.694
SDROE	1694	2.079	1.673	-1.094	8.969
Independent Variables	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
TA	1720	17.454	0.825	13.262	19.472
ΔTA	1694	2.857	8.115	-11.825	52.130
LtoA	1720	60.164	16.980	12.511	89.648
DtoA	1720	32.699	14.817	0.276	69.000
EtoA	1720	11.359	4.190	5.268	27.935
NONIItoA	1720	1.301	1.954	-0.049	11.815
LLPtoA	1720	0.002	0.003	-0.001	0.016

Panel D Money Center Banks

Dependent Variables	Obs	Mean	Std. Dev.	Min	Max
ROA	816	1.002	0.566	-1.208	2.095
ROE	816	10.792	6.521	-14.501	22.828
SDROA	802	18.530	22.835	-2.131	130.838
SDROE	800	19.652	27.722	-1.559	197.148
Independent Variables	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
TA	816	19.333	1.078	17.297	21.474
ΔTA	804	2.127	5.571	-7.631	32.684
LtoA	816	56.240	15.562	10.971	78.091
DtoA	816	26.308	12.020	0.358	44.844
EtoA	816	9.609	1.942	5.798	13.868
NONIItoA	816	1.271	0.754	0.243	3.895
LLPtoA	816	0.001	0.002	0.000	0.008

Panel E Macroeconomic Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
RGDP	68	0.468	0.619	-2.113	1.889
INF	68	0.179	0.332	-1.320	0.819
FRPU	68	125.385	107.430	23.356	506.805

Notes: SDROA (and SDROE) are risk-adjusted profit measures defined as ROA (or ROE) scaled by its standard deviation over the past 4 quarters for each bank, TA: Log of total assets, ΔTA: Growth rate of total assets, LtoA: Ratio of loans to total assets, DtoA: Ratio of deposits to total assets, EtoA: Ratio of equity to total assets, NONIItoA: Non-interest income to total assets, LLPtoA: Ratio of loan loss provisions to total assets. Panel A Small Banks: Total Assets < U.S. $1 billion, Panel B Medium Banks: U.S. $1 billion ≤ Total Assets < U.S. $20 billion. Panel C Large Banks: U.S. $20 billion ≤ Total Assets < U.S. $90 billion, Panel D Money-center Banks: Total Assets ≥ U.S. $90 billion. RGDP: Real GDP growth rate, INF: Inflation (CPI) rate, FPRU: Financial regulation policy uncertainty. All data is quarterly from 2000Q1 through 2016Q4.

Table 3 Dynamic Panel SGMM Model - Small Banks

	ROA	ROE	SDROA	SDROE
L.ROA	0.7048***			
	(0.0073)			
L.ROE		0.7033***		
		(0.0075)		
L.SDROA			0.4075***	
			(0.0990)	
L.SDROE				0.3850***
				(0.1219)
TA	-0.0158***	-0.2295***	0.8587***	0.9676***
	(0.0036)	(0.0363)	(0.3091)	(0.3745)
ΔTA	0.0006	0.0106***	0.0115	0.0752**
	(0.0004)	(0.0037)	(0.0310)	(0.0321)
LtoA	0.0021***	0.0219***	0.0271**	0.0408***
	(0.0002)	(0.0022)	(0.0119)	(0.0154)
DtoA	-0.0003	-0.0071***	-0.0321***	-0.0261**
	(0.0002)	(0.0022)	(0.0084)	(0.0128)
EtoA	-0.0054	-0.2063***	0.5933**	0.5017*
	(0.0036)	(0.0332)	(0.2384)	(0.3025)
NONIItoA	11.2715***	119.1869***	174.7065***	197.7689***
	(0.6646)	(6.6368)	(22.0341)	(22.0898)
LLPtoA	-1.3148***	-12.9882***	-9.7511***	-9.5819***
	(0.0259)	(0.2714)	(0.4809)	(0.5297)
RGDP	-0.0088***	-0.0513**	1.8779***	1.9836***
	(0.0022)	(0.0225)	(0.1102)	(0.1146)
INF	0.0570***	0.6164***	-4.3112***	-4.5493***
	(0.0046)	(0.0465)	(0.4641)	(0.5412)
FPRU	-0.8998***	-6.4073*	111.3207***	105.3797***
	(0.3382)	(3.4479)	(21.8419)	(24.7359)
Constant	0.4489***	6.9764***	-10.6594*	-12.1524
	(0.0761)	(0.7791)	(5.6387)	(7.4905)
Observations	282,991	282,991	276,140	275,239
Number of Banks	4,336	4,336	4,336	4,336
Number of Instruments	24	24	24	24
AR(1)	-34.30 (0.00)	-31.29 (0.00)	-3.164 (0.00)	-2.936 (0.00)
AR(2)	7.008 (0.00)	5.630 (0.00)	2.058 (0.04)	-1.386 (0.16)
Hansen	729.8 (0.00)	731.0 (0.00)	300.5 (0.00)	138.4 (0.00)

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Small Bank Subsample Total Assets < U.S. $1 billion.

See Table 2 for variable descriptions and notations. The difference between the total number of observations reported on unadjusted profit (ROA and ROE) models and risk-adjusted profit models (SDROA and SDROE) as shown in Tables 3 through 6 is mainly due to the loss of quarterly observations for each respective bank when computed the rolling 4-quarters standard deviation of ROA and ROE.

Table 4 Dynamic Panel SGMM Model – Medium Sized Banks

	ROA	ROE	SDROA	SDROE
L.ROA	0.7103***			
	(0.0283)			
L.ROE		0.7389***		
		(0.0288)		
L.SDROA			0.1232***	
			(0.0448)	
L.SDROE				0.3282***
				(0.0847)
TA	0.0006	-0.0330	0.2555	1.5450**
	(0.0117)	(0.1144)	(0.8172)	(0.6477)
ΔTA	0.0029***	0.0290***	-0.1217**	-0.1065***
	(0.0009)	(0.0092)	(0.0586)	(0.0344)
LtoA	0.0028***	0.0236***	0.0313	0.0222
	(0.0006)	(0.0061)	(0.0445)	(0.0491)
DtoA	-0.0010	-0.0118	-0.0761*	-0.0751**
	(0.0007)	(0.0075)	(0.0434)	(0.0309)
EtoA	-0.0006	-0.2714***	-0.8493	-1.5413***
	(0.0099)	(0.1020)	(0.6086)	(0.4038)
NONIItoA	0.1102***	1.1174***	-0.0825	0.4133
	(0.0193)	(0.1879)	(1.0121)	(0.6203)
LLPtoA	-1.1889***	-11.4949***	-28.4721***	-17.2644***
	(0.1310)	(1.3932)	(8.7625)	(2.0790)
RGDP	-0.0095	-0.0767	4.0029***	4.5116***
	(0.0092)	(0.1013)	(0.6204)	(0.4595)
INF	0.1150***	1.1837***	-5.1994***	-7.4094***
	(0.0193)	(0.2064)	(1.1670)	(0.9499)
FPRU	1.6473	15.0737	397.2535***	337.4571***
	(1.4637)	(16.5081)	(90.3339)	(48.8237)
Constant	0.1199	4.6340**	18.8134*	2.8057
	(0.1897)	(2.0960)	(10.7974)	(9.1612)
Observations	25,423	25,423	24,812	24,765
Number of Banks	389	389	388	388
Number of Instruments	24	24	24	24
AR(1)	-10.00 (0.00)	-10.08 0.00)	-1.025	-4.127 0.00)
AR(2)	1.175 (0.24)	0.250 (0.80)	1.068 (0.29)	-0.666 (0.51)
Hansen	47.65 (0.00)	49.93 (0.00)	67.53 (0.00)	84.90 (0.00)

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1
Medium Bank Subsample U.S. $1 billion ≤ Total Assets < U.S. $20 billion
See Table 2 for variable descriptions and notations.

Table 5 Dynamic Panel SGMM Model – Large Banks

	ROA	ROE	SDROA	SDROE
L.ROA	0.7087***			
	(0.1023)			
L.ROE		0.2365**		
		(0.1072)		
L.SDROA			0.4201***	
			(0.0667)	
L.SDROE				0.4160*
				(0.2134)
TA	-0.0489*	0.8979	-0.9642	0.0326
	(0.0268)	(0.5599)	(1.1473)	(0.1058)
ΔTA	-0.0017	0.0563**	0.0400	0.0000
	(0.0024)	(0.0250)	(0.0368)	(0.0079)
LtoA	0.0024	-0.0222	0.0898	0.0027
	(0.0016)	(0.0410)	(0.0796)	(0.0059)
DtoA	0.0015	-0.0470	0.0439	-0.0082
	(0.0012)	(0.0402)	(0.0781)	(0.0081)
EtoA	-0.0009	-0.0045	-0.8046	-0.0113
	(0.0164)	(0.1955)	(0.6093)	(0.0815)
NONIItoA	0.1057***	0.1353	1.7071***	0.0148
	(0.0356)	(0.2005)	(0.6380)	(0.0753)
LLPtoA	-0.7323***	1.3757	-20.0526***	0.0348
	(0.1718)	(1.1171)	(4.6336)	(0.4742)
RGDP	-0.0173	-0.4360	2.3585**	0.0958
	(0.0283)	(0.5522)	(1.1140)	(0.2120)
INF	0.1639**	-0.8519	-6.8014***	-0.0843
	(0.0805)	(0.8479)	(1.7482)	(0.1898)
FPRU	0.3488	-150.7557*	89.7262	17.1266
	(4.3853)	(87.9680)	(90.4466)	(25.5316)
Constant	0.9168**	-3.2077	28.5346	0.5990
	(0.4114)	(10.6290)	(22.5570)	(1.4573)
Observations	1,694	1,694	1,660	1,668
Number of Banks	26	26	26	26
Number of Instruments	24	24	24	24
AR(1)	-3.439 (0.00)	-3.431 (0.00)	-2.782 (0.00)	-2.633 (0.00)
AR(2)	-0.523 (0.60)	-0.283 (0.78)	1.569 (0.12)	1.009 (0.31)
Hansen	14.46 (0.27)	13.88 (0.31)	13.01 (0.37)	22.44 (0.03)

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Large Bank Subsample U.S. $20 billion ≤ Total Assets < U.S. $90 billion.

See Table 2 for variable descriptions and notations.

Table 6 Dynamic Panel SGMM Model – Money Center Banks

	ROA	ROE	SDROA	SDROE
L.ROA	0.8631**			
	(0.4151)			
L.ROE		10.0142		
		(9.0940)		
L.SDROA			0.7286***	
			(0.1915)	
L.SDROE				0.8488***
				(0.0934)
TA	-0.9155**	189.2655	-25.2011	-368.7596
	(0.3592)	(194.6916)	(34.4994)	(376.7509)
ΔTA	0.0020	-1.8425	-0.7362*	15.8672
	(0.0044)	(1.8366)	(0.3763)	(15.0483)
LtoA	-0.0198	3.1387	-0.0223	-33.9940
	(0.0121)	(3.3172)	(0.9321)	(33.3569)
DtoA	-0.0193*	8.0468	-2.2876	-14.9904
	(0.0112)	(8.2890)	(1.6490)	(16.0370)
EtoA	0.0869	-52.3159	6.9064	396.5699
	(0.0652)	(54.5842)	(9.1494)	(388.9952)
NONIItoA	-0.0462	-14.3549	-53.5863	715.4233
	(0.0657)	(13.0070)	(37.4283)	(650.7887)
LLPtoA	-1.9701	305.0536	111.1934	807.987
	(1.2475)	(297.9566)	(185.6009)	(798.574)
RGDP	0.2374**	4.4200	51.8797	84.4389
	(0.1051)	(3.8172)	(40.1420)	(103.9858)
INF	0.2744***	-11.6912	-174.1657*	275.0261
	(0.0776)	(11.2332)	(103.5782)	(257.6019)
FPRU	0.6092**	-28.7790	3.0806	281.4452
	(0.2588)	(28.4757)	(27.8093)	(271.3610)
Constant	18.0418**	-3,630.8537	546.9192	2,802.0699
	(7.0192)	(3,732.3165)	(693.7855)	(3,162.1411)
Observations	804	804	788	787
Number of Banks	12	12	12	12
Number of Instruments	24	24	24	24
AR(1)	-2.131 (0.02)	-0.518 (0.60)	-2.026 (0.34)	-0.971 (0.73)
AR(2)	-2.460 (0.03)	1.234 (0.16)	-1.329 (0.18)	0.344 (0.33)
Hansen	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1
Money-center Bank Subsample Total Assets ≥ U.S. $90 billion.
See Table 2 for variable descriptions and notations.

Table 7 – Summary Results- Impact of FRPU

	Small Banks	Medium Banks	Large Banks	Money Center Banks
Profitability	-	no	-	+
Risk	+	+	no	no

Notes: + denotes that the financial regulation policy uncertainty variable (FPRU) is significantly and positively correlated with at least one of the two measures of profitability and of risk, and − means negatively correlated. "no" denotes that the coefficient on FPRU is insignificant on both measures of profitability and of risk.

Appendix A Correlation Tables

Panel A Small Banks

	ROA	ROE	SDROA	SDROE	TA	ΔTA	LtoA	DtoA	EtoA	NONIItoA	LLPtoA	RGDP	INF	FRPU
ROA	1.000													
ROE	0.932	1.000												
SDROA	0.010	0.009	1.000											
SDROE	0.087	0.088	0.008	1.000										
TA	-0.011	0.003	0.000	0.011	1.000									
ΔTA	0.049	0.066	0.000	0.002	0.015	1.000								
LtoA	-0.002	0.056	-0.001	0.000	0.113	0.014	1.000							
DtoA	-0.094	-0.098	0.001	-0.003	-0.220	-0.097	-0.012	1.000						
EtoA	0.118	-0.124	0.001	0.000	-0.095	-0.055	-0.186	-0.061	1.000					
NONIItoA	0.106	0.113	-0.001	-0.003	0.057	0.000	0.007	-0.040	-0.007	1.000				
LLPtoA	-0.349	-0.337	-0.004	-0.030	0.049	-0.030	0.119	0.006	-0.066	0.052	1.000			
RGDP	0.064	0.063	0.008	0.034	-0.035	-0.023	-0.046	0.153	0.003	0.033	-0.060	1.000		
INF	0.042	0.048	-0.001	-0.009	-0.039	-0.017	0.001	-0.011	-0.010	-0.186	-0.074	0.182	1.000	
FRPU	-0.137	-0.142	-0.005	-0.033	0.069	-0.011	0.010	-0.014	-0.007	0.027	0.159	-0.518	-0.340	1.000

Panel B Medium Banks

	ROA	ROE	SDROA	SDROE	TA	ΔTA	LtoA	DtoA	EtoA	NONIItoA	LLPtoA	RGDP	INF	FRPU
ROA	1.000													
ROE	0.927	1.000												
SDROA	0.108	0.112	1.000											
SDROE	0.069	0.076	0.139	1.000										
TA	-0.018	-0.059	-0.008	-0.015	1.000									
ΔTA	0.056	0.066	-0.002	-0.003	-0.006	1.000								
LtoA	0.044	0.008	-0.021	0.001	-0.052	0.001	1.000							
DtoA	-0.126	-0.141	0.009	0.021	-0.137	-0.035	0.068	1.000						
EtoA	0.087	-0.142	-0.020	-0.020	0.091	-0.013	0.040	-0.081	1.000					
NONIItoA	0.194	0.173	-0.001	-0.006	0.048	-0.004	-0.006	-0.013	-0.036	1.000				
LLPtoA	-0.311	-0.350	-0.057	-0.041	0.053	-0.001	0.129	-0.001	0.040	0.131	1.000			
RGDP	0.125	0.126	0.073	0.067	-0.052	0.003	-0.057	0.083	0.001	0.051	-0.119	1.000		
INF	0.056	0.065	-0.008	-0.008	-0.047	-0.013	-0.010	-0.023	-0.021	-0.240	-0.063	0.182	1.000	
FRPU	-0.229	-0.239	-0.078	-0.055	0.088	-0.022	-0.009	0.036	0.009	0.032	0.223	-0.518	-0.340	1.000

Notes: SDROA (and SDROE) are risk-adjusted profit measures defined as ROA (or ROE) scaled by its standard deviation over the past 4 quarters for each bank,, TA: log of total assets, ΔTA: Growth rate of total assets, LtoA: Ratio of loans to total assets, DtoA: Ratio of deposits to total assets, EtoA: Ratio of equity to total assets, NONIItoA: Non-interest income to total assets, LLPtoA: Ratio of loan loss provisions to total assets , RGDP: Real GDP growth rate, INF: Inflation (CPI) rate, FPRU: Financial regulation policy uncertainty All data is quarterly from 2000Q1 through 2016Q4. Panel A Small Banks: Total Assets < U.S. $1 billion, Panel B Medium Banks: U.S. $1 billion ≤ Total Assets < U.S. $20 billion.

Panel C Large Banks

	ROA	ROE	SDROA	SDROE	TA	ΔTA	LtoA	DtoA	EtoA	NONIItoA	LLPtoA	RGDP	INF	FRPU
ROA	1.000													
ROE	-0.018	1.000												
SDROA	0.206	-0.050	1.000											
SDROE	0.006	0.506	-0.014	1.000										
TA	-0.228	0.061	-0.112	0.024	1.000									
ΔTA	0.086	-0.001	-0.009	-0.035	-0.067	1.000								
LtoA	0.279	-0.062	0.028	0.027	-0.131	-0.028	1.000							
DtoA	-0.040	-0.137	0.083	-0.092	0.081	-0.003	0.370	1.000						
EtoA	0.007	-0.046	-0.157	-0.009	0.010	-0.002	0.038	-0.166	1.000					
NONIItoA	0.529	0.051	0.000	0.063	-0.074	0.013	0.237	-0.165	0.083	1.000				
LLPtoA	0.103	0.004	-0.130	0.067	-0.021	0.009	0.310	0.051	0.029	0.554	1.000			
RGDP	0.169	0.039	0.162	0.022	-0.083	-0.001	0.006	0.022	0.023	0.022	-0.200	1.000		
INF	0.085	-0.008	-0.047	-0.028	-0.087	-0.032	0.016	-0.049	-0.002	-0.165	-0.061	0.180	1.000	
FRPU	-0.242	-0.051	-0.196	-0.031	0.157	-0.030	-0.055	0.068	0.038	0.021	0.245	-0.518	-0.339	1.000

Panel D Money Center Banks

	ROA	ROE	SDROA	SDROE	TA	ΔTA	LtoA	DtoA	EtoA	NONIItoA	LLPtoA	RGDP	INF	FRPU
ROA	1.000													
ROE	0.940	1.000												
SDROA	0.389	0.340	1.000											
SDROE	0.152	0.163	0.186	1.000										
TA	-0.138	-0.154	-0.107	-0.089	1.000									
ΔTA	0.065	0.067	-0.007	-0.023	0.007	1.000								
LtoA	0.304	0.209	0.213	0.006	-0.425	0.021	1.000							
DtoA	0.140	0.006	0.145	-0.050	-0.356	-0.015	0.768	1.000						
EtoA	0.002	-0.289	0.037	-0.032	0.001	-0.035	0.329	0.511	1.000					
NONIItoA	0.252	0.270	0.138	0.140	-0.017	0.048	-0.099	-0.177	-0.140	1.000				
LLPtoA	-0.449	-0.419	-0.232	-0.066	0.045	0.125	0.188	0.102	0.018	0.025	1.000			
RGDP	0.234	0.229	0.158	0.051	-0.057	-0.005	0.021	0.069	0.050	0.092	-0.343	1.000		
INF	0.123	0.138	-0.052	-0.001	-0.052	-0.053	0.043	-0.004	-0.020	-0.450	-0.130	0.182	1.000	
FRPU	-0.361	-0.364	-0.234	-0.084	0.101	-0.004	-0.091	-0.002	0.034	0.034	0.465	-0.509	-0.342	1.000

Notes: SDROA (and SDROE) are risk-adjusted profit measures defined as ROA (or ROE) scaled by its standard deviation over the past 4 quarters for each bank, TA: log of total assets, ΔTA: Growth rate of total assets, LtoA: Ratio of loans to total assets, DtoA: Ratio of deposits to total assets, EtoA: Ratio of equity to total assets, NONIItoA: Non-interest income to total assets, LLPtoA: Ratio of loan loss provisions to total assets, RGDP: Real GDP growth rate, INF: Inflation (CPI) rate, FPRU: Financial regulation policy uncertainty. All data is quarterly from 2000Q1 through 2016Q4. Panel C Large Banks: U.S. $20 billion ≤ Total Assets < U.S. $90 billion, Panel D Money-center Banks: Total Assets ≥ U.S. $90 billion.