# The Direct Costs of Bank Compliance around Crisis-Based Regulation for Small and Community Banks

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**Abstract**

Community Bankers report increased regulatory burden, especially after crisis-based legislation such as the Dodd-Frank Act (DFA). This study investigates direct measures of cost and productivity for small and community banks around major crisis-based regulatory programs from 1991 to 2014. The PATRIOT Act had positive pre-tax ROA effects compared to negative effects for the rulemaking period of the DFA for community banks. Loans per employee fell significantly for the PATRIOT Act and the DFA. The change in small bank employees is positive for the PATRIOT Act, but mixed for FDICIA and the DFA. The DFA shows lower average pay just after passage, but FDICIA and the rulemaking period of the DFA have higher pay. The DFA is the only crisis regulation that shows consistently lower technology and fixed-asset expenditures. Collectively, these results are consistent with increased regulatory burden for small and community banks after the DFA.

Keywords: bank regulatory burden, compliance costs

JEL codes: G21, G28

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## Abstract

Community Bankers report increased regulatory burden, especially after crisis-based legislation such as the Dodd-Frank Act (DFA). This study investigates direct measures of cost and productivity for small and community banks around major crisis-based regulatory programs from 1991 to 2014. The PATRIOT Act had positive pre-tax ROA effects compared to negative effects for the rulemaking period of the DFA for community banks. Loans per employee fell significantly for the PATRIOT Act and the DFA. The change in small bank employees is positive for the PATRIOT Act, but mixed for FDICIA and the DFA. The DFA shows lower average pay just after passage, but FDICIA and the rulemaking period of the DFA have higher pay. The DFA is the only crisis regulation that shows consistently lower technology and fixed-asset expenditures. Collectively, these results are consistent with increased regulatory burden for small and community banks after the DFA.



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## I. Introduction

Anecdotal evidence from bankers indicates increased costs of complying with new regulations and rules when large regulatory changes are made. Bankers argue that the burden is significantly increased when regulation and legislation is passed after a crisis. The 2014 KPMG Community Banking Survey shows that the largest barrier to significant growth for community banks is regulatory and legislative pressures with 32% choosing this as their largest constraint. Further, 45% of community banks indicate compliance costs are 5%-10% of total operating costs and 33% of banks estimate compliance costs are between 11-20% of total operating costs. The largest drivers of compliance costs are Anti-Money Laundering (23%), consumer protection (17%), and lending practices (17%). Clearly bankers believe regulatory costs are burdensome, yet there is relatively little study of direct compliance costs for banks and the effect on loan production around new regulation. This study estimates the direct costs to banks around large regulatory changes from 1991 to 2014. A particular focus is on whether or not costs and loan production differ for prior major regulatory events during crises compared to the most recent effects of the Dodd-Frank Act (DFA) for community and small banks.

In large part, the reason this important area has not been studied is that precise data do not exist from standard data sources. For example, there is no field in the Call reports or FR-Y9 that indicates the precise dollar amount or time spent on complying with regulations or rules.[1] However, there are data on salaries, the number of employees, and the dollar amount of bank loans such that at least a crude measure of compliance costs can be estimated, and it is these measures that are used in this investigation. If regulatory burden increases around these events, accounting performance should fall and loan production decline, all else equal. Possible

[1] The RI-E section of the call report includes expenses on data processing and legal/audit fees, but quite often these fields are missing for small banks, and even if they are reported they are not a direct measure of the full costs of the regulatory burden.

offsetting influences of regulatory burden include an increase in the number employees, an increase in average pay, and a fall in technology expenditures as banks hire more highly skilled compliance personnel or shift expenditures away from technology.

The cost of compliance for banks is important to estimate so policymakers and other constituents can evaluate whether or not the benefits from regulatory change are worth the costs as discussed in LaFond and You (2010). In addition, banks would be at a competitive disadvantage to non-banks who are not subject to the same regulation if these costs are burdensome, or increase over time. While it is difficult, if not impossible, to measure all the indirect costs and benefits, it is prudent to see if there is merit to the claims that bankers make that the regulatory burden increases after rules change due to crises.

The vast majority of bank regulatory research focuses on the benefits of regulation, or the unintended and indirect costs of policies such as deposit insurance or capital rules. There are literally thousands of studies that look at the indirect costs, such as moral hazard due to deposit insurance, increased capital costs, or the macro costs of bank crises. However, few studies look at the direct costs of compliance or the costs of different regulations for banks over time for the banks themselves. If banks are reallocating time and resources away from managing the banking organization and implementing strategies to maximize shareholder wealth, these effects should be apparent in bank costs and profits, and in reduced loan production, all else equal. In other words, if new regulation is burdensome, then either banks will need to hire additional employees to produce the same output, or output will fall with the same number of employees, or some combination of the two. Thus, it is the goal of this study to compare costs and productivity on as direct a basis as possible given the data, to investigate if these factors have changed since 1991, and, in particular, whether or not the Dodd-Frank Act (DFA) has created different effects

compared to other large crisis-borne legislative actions over the past two decades for community and small banks. Since this study uses individual bank holding company data, the methodology is more useful in discovering the impact of regulatory change on smaller and community banks without the complicated operating structures common in regional and money center banks.

## II. Literature Review

Prior studies on the effects of bank regulation have focused on bank capital, deposit insurance, bank safety, and preventing bank runs or failure. For example, Diamond and Rajan (2000) develop a theory that optimal bank capital depends, at least in part, on diversification and risk management, which act as substitutes for bank capital. Also, deposit insurance pricing and risk incentives (e.g., moral hazard) are widely studied. For example, Demirguc-Kunt and Kane (2002) study where deposit insurance works globally.

The literature germane to this study is those that review regulatory reform and legislative responses to crises, and the effects of these changes on the industry. Each of these is discussed below, with the regulatory events that fall into each category in the appropriate section.

*Regulation reform in response to industry problems or crises*

In general, bank regulation that deals with a specific problem is a reaction by regulators and Congress to some major event or crisis, and is typically believed to have the side-effects of increasing regulatory burden. Key legislation that fits this description in the sample period from 1991 to 2014 includes FDICIA, the PATRIOT Act, and the Dodd-Frank Act (DFA).

The Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 was in response to the Savings and Loan crisis of the late 1980s. FDICIA was most noteworthy for

introducing Prompt Corrective Action, but the effect most likely to increase regulatory burden was in moving the examination periods to either every 12 or 18 months and increasing internal controls. As Hirtle and Lopez (1999) note, "examinations are resource intensive for both banks and supervisors…" Shorter exam cycles and increased internal controls should increase regulatory burden and costs, all else equal.

Akhigbe and Whyte (1999) find that FDICIA significantly increases bank returns and reduces bank risk, both of which are inconsistent with increased regulatory burden. Altamuro and Beatty (2010) find that post-FDICIA, the internal controls requirements seems to work since loan loss provisions are more accurate and there is earnings persistence compared to banks under the FDICIA size threshold. Dahl, O'Keefe, and Hanweck (1998) find that bank examinations impact the timing of loan-loss recognition after FDICIA indicating a possibility that bank earnings would be negatively affected. LaFond and You (2010) discuss that internal controls and audits after FDICIA cannot prevent bad decisions or fraud, but can help reveal them better, and that the costs of the internal control should be considered. Collectively, the extant literature suggests that the effects of FDICIA were mixed, but banks generally experienced lower risk, higher profits, and higher quality information. Thus, prior research tends to show higher ROA and performance variables after the passage of FDICIA, which indicates either regulatory burden did not increase or was offset in some other way, although none of these studies investigate this hypothesis directly.

The International Money Laundering Abatement and Financial Anti-Terrorism Act of 2001 was a part of the PATRIOT Act of 2001, which was a reaction to the terrorist attacks of 9/11. This act required new rules and regulations for identifying possible money laundering and other financial crimes, creating an additional burden on banks to comply with the new requirements.

As discussed by Mojuye (2007), Section 352 of the PATRIOT Act requires banks to develop internal procedures and controls, designate a Compliance Officer, and provide ongoing employee training. Dolar and Shughart (2007) use total non-interest expenditures as a proxy for compliance costs and find smaller institutions are at a disadvantage since costs are proportionally larger than for bigger banks after the PATRIOT Act was enacted. In addition, Dolar and Shughart find that post-Act, non-interest expenses rose by 44.7% on average for their sample, which included thrifts. Thus, it is plausible that the effects of the PATRIOT Act were to increase costs without increasing revenue, and thus costs should rise and profits fall, consistent with increased regulatory burden. Following Dolar and Shughart (2007), I use several non-interest expenses, such as salaries-to-assets, average pay, and technology and fixed-asset expenses to evaluate cost around regulatory events. Given the Dolar and Shughart results, it is expected that costs will rise and productivity will fall across all the measures after the PATRIOT Act.

The Dodd-Frank Act is viewed by many as the most comprehensive financial reform since the Great Depression. As far as potential regulatory burden, Dodd-Frank could increase the regulatory burden in many ways. The Act created a new regulator, the Consumer Financial Protection Bureau, and more than 400 new rules and mandates. One example of the regulatory burden due to Dodd-Frank is captured in this quote from Mr. Dale Wilson, CEO of First State Bank in San Diego, TX, in his testimony to the Financial Services Committee on Dodd-Frank:

> During the last decade the regulatory burden for community banks has multiplied ten-fold. Dodd-Frank alone has added nearly 14,000 pages of proposed and final regulations… Since the passage of Dodd-Frank there are 80 fewer Texas banks. These banks didn't fail…. These are community bankers, and I have talked to some of them personally that could not maintain profitability with regulatory cost increasing between 50-200 percent. These were good banks that for decades have been contributing to the growth and vitality of their towns but ability to serve the community is being undermined by excessive regulation and government micromanagement.

The burden from Dodd-Frank on smaller community banks is mostly due to Ability-to-Repay rules and the definition of a Qualified Mortgage. New capital requirement rules impact

community and small banks, but more so for the largest banks declared Systemically Important Financial Institutions (SIFI).[2] In many cases, the definition of capital has been narrowed, such as disallowing Trust Preferred securities to count as capital.

Chortareas, Girardone, and Ventouri (2011) study the effects of recent regulation in a Basel III framework, and largely focus on the capital requirements. They find that operating costs for banks are positively related to the power of the regulator to make changes and corrections. Their measure of supervisory power is calculated through using survey responses about the power to use prompt corrective action and declare institutions insolvent. Their sample is from 11 EU countries and does not include US banks. This increase in operating cost is consistent with increased regulatory burden as regulators are more powerful. In addition, they use inefficiency measures from a Data Envelopment Analysis (DEA) model, but find no relation between inefficiency and supervisory power. Although they do not use a direct measure of costs of regulatory burden for banks, their investigation is close to the spirit of this study.

Similar to Chortareas et al., Pasiouras, Tanna, and Zopounidis (2009) find more supervisory power is related to increases in cost efficiency and profit efficiency for banks in 74 countries. Barth, Lin, Ma, Seade, and Song (2013) study several aspects of bank regulation on bank efficiency from a DEA model. Barth et al. find that the power of the regulatory supervisor does not affect bank efficiency, at least in their sample from 1999 through 2007 across 72 countries. They do find that tighter restrictions on bank activity are negatively related to bank efficiency when a country changes regulations to prevent banks from doing activities such as underwriting or dealing in securities. This latter finding is consistent with increased regulatory

[2] SIFI banks were named by the Financial Stability Board in November, 2011. These institutions are subject to additional capital requirements proposed under Basel III, including surcharges for additional equity based on risk assessments up to 2% in extra capital. In the US, SIFI banks are the Bank of America, Bank of New York/Mellon, Citigroup, Goldman Sachs, JP Morgan Chase, Morgan Stanley, State Street, and Wells Fargo as of 2015.

burden, but in this case the particular regulatory changes prevent banks from doing activities found "too risky" or otherwise inappropriate for banks.

*Studies related to regulatory cost*

Franks, Schaefer, and Staunton (1998) study direct regulatory agency costs for financial firms in the UK compared to those in France and the US, but explicitly exclude commercial banking. They estimate compliance costs average 1.9% of operating expenses on average for securities firms and 5.8% for securities management firms. They do not study changes in burden around regulatory events.

Kahn and Santos (2005) review the optimal form of bank regulation and conclude the multi-regulator model is sub-optimal, but in such a framework, the deposit insurer is the best choice to provide supervision. However, Kahn and Santos do not use empirical data or estimate the costs of such regulation on banks.

Boot, Dezelan, and Milbourn (2000) show that a level playing field is important for regulation, and that high quality institutions suffer when that is not the case, such as when other non-regulated firms offer their products and services. Again as in other studies, they do not measure the direct costs to banks or whether or not certain regulations impact those costs.

Klomp and de Haan (2012) find that bank supervisory control decreased both bank "liquidity and market risk" and "capital and asset risk." Klomp and de Haan do not study bank costs or performance with respect to different regulatory supervision or changes. But, it is plausible that bank regulators have strong incentives to supervise and examine more closely when risk is prevalent since safety and soundness is related to reducing bank risk. This implies

that supervision and regulatory burden would increase after a banking crisis, which is the central research question for this study.

*Studies of Single Event Regulatory Effects*

Many researchers study the wealth effects or accounting performance of banks after specific legislation. For example, Zou, Miller and Malamud (2011) use state-level data and find both net interest margins and return on assets increased during and after passage of the Interstate Banking and Branching Efficiency Act (IBBEA). Their results are an extension of Nippani and Green (2002) who find that univariate ROA is higher after the passage of the IBBEA, but in multivariate regressions ROA is generally not significant. Higher accounting performance by banks is consistent with the IBBEA reducing regulatory costs, although they do not do a direct test of this hypothesis. Since the IBBEA is aimed towards increasing efficiency and was not created after a crisis, it is not investigated in this study.

Filson and Olfati (2014) find significantly positive Cumulative Abnormal Residuals for diversifying mergers, long after the passage of the Gramm-Leach-Bliley Act (GLBA). Yeager, Yeager, and Harshman (2007) find that accounting profit is statistically unchanged for those holding companies that converted to Financial Holding Company status, bringing into question the diversification benefits due to the GLBA. Again, these findings are not supportive of increased regulatory burden, but the GLBA was aimed towards diversifying bank products and allowed entry into higher performing areas such as investment banking; thus, the GLBA is not used in this study.

There are many other studies that look at singular legislative events and the performance effects of regulation, but not the direct burden of these regulatory changes, and especially not around crisis-based legislation.

## III. Data and Empirical Method

The data used in this study are from the Federal Reserve FR-Y9C reports for bank holding companies in the US. Using US data avoids having different regulatory regimes and relying on indices to measure regulatory effectiveness and other structural differences across countries. It is prudent to use holding company data since costs are reflected across all bank subsidiaries in this structure.[3] The data are quarterly from 1991 through 2014Q1. There are more than 125,000 bank-quarter observations that have sufficient data in the sample. Observations were trimmed at the 99% and 1% level since there were several cases of extreme outliers that would influence the results, and were likely data errors.

The goal of the investigation is to estimate bank compliance costs in terms of direct expenses in personnel and other costs, and in reduced loan output for community and smaller banks. The sample is split into banks with total asset size between $5 and $1 billion (termed "small banks"), and less than $1 billion ("community banks"). The traditional academic definition of a community bank is one with assets less than $1 billion (see DeYoung, Hunter, and

[3] This could bias the results against the smallest banks that are not formed as holding companies and therefore are not in the sample, but these holding companies in the sample represent the vast majority of assets in US domestic banks. Additionally, it is likely that compliance costs will be centered in the holding company rather than at the bank level, and the aggregation at the holding company level even if that is not the case does not pose any problems evaluating regulatory burden.

Udell (2004)), but I include slightly larger banks since it is plausible that they have similar effects of compliance compared to community banks.[4]

In order to test whether or not there are changes in costs around regulatory events due to a crisis, it is important to first identify large crisis-based regulatory changes. While banking rules and regulations change annually, if not continuously, the focus here is on several large changes that should have the most impact on direct banking compliance and regulatory costs. These events are identified in Table 1 as:

**Table 1**
**Major crisis-based regulatory act time period definitions**

| **Act Name** | **Time Period** |
|---|---|
| Federal Deposit Insurance Improvement Act (FDICIA) | 1991Q4 through 1992Q2 |
| PATRIOT Act | 2001 Q4 through 2002Q2 |
| Dodd-Frank Act | 2010Q3 through 2011 Q1 |
| Dodd-Frank Act Ability to Repay and Qualified Mortgage | 2013Q1 through 2013 Q4 |

The time period for evaluation is chosen as three quarters (quarters 0, +1, and +2) since it is plausible that this is a sufficient adjustment period. However, this time period is ad hoc since some changes will be easier to adjust to than others. Thus, other plausible time periods are also used and presented in the robustness section to provide confidence that the results are not due to the selection of the amount of quarters used in the evaluation of bank costs and productivity.

Although mergers are not the focus of this study, some regulatory changes affected the numbers and types of mergers and acquisitions. As shown in Figure 1, unassisted mergers rose after FDICIA and remained high through 2000. At issue for this study is whether or not effects appear to be different after Dodd-Frank. Mr. Wilson's testimony to the Financial Services

[4] The goal of this paper is to see if the compliance burden is different around Dodd-Frank compared to other regulatory events for the banks most likely to suffer the burden of additional regulation—small banks. Thus, the better defined grouping for community banks such as operating area, product types, or ownership structure is not necessary and a size-only based dichotomy is sufficient. In a prior version, I also used larger banks including SIFI institutions. These results are available upon request.

Committee suggests that mergers would increase as smaller banks were acquired to overcome the increased regulatory burden via economies of scale in a larger bank. As the chart shows, unassisted mergers were lower from 2009 through 2013, but failure mergers increased as more banks failed and were merged or acquired with FDIC assistance.[5] If Mr. Wilson was referring to assisted mergers in his testimony, then this evidence supports his case that Dodd-Frank increased this activity, but an increase in unassisted mergers does not appear to generalize to all US banks. Noteworthy is the decline of new charters to essentially zero after the DFA as shown by the solid line in Figure 1. These results indicate that either the economic climate was not conducive to unassisted merger activity or new charters, or the effects of the DFA played a part in the reduction, or perhaps both. Investigating the effects of the DFA on merger and chartering activity is beyond the scope of this study, but this chart indicates it warrants more detailed analysis. It is germane to this study since whatever industry-wide cost or productivity differences due to regulatory burden exist due to the DFA, they are not driven by increased merger and acquisition or charter activity.

*Regression Model Dependent Variables*

To investigate the costs and effects of regulatory change, several dependent variables are used. First, a measure of overall bank accounting performance is defined as Pre-tax return on assets (PREROA). While ROA has some issues since it is an accounting measure of performance, it is still widely used by researchers for at least a comparison to more complicated measures, such as X-efficiency. For example, Hasan, Schmiedel, and Song (2012) use ROA and ROE in addition to two efficiency measures to investigate the effects of the retail payment

[5] The data for the graph is merger and acquisition applications, which differ very slightly from other studies that use completed mergers or announcement dates since the timing of the completed merger or acquisition or the announcement might fall into a different calendar year.

market on performance. The reason to use pre-tax ROA is because some banks are S Corporations and do not pay federal income taxes, thus using pre-tax numbers mitigates the effects of taxes.

Other studies use measures such as cost efficiency or profit efficiency to study bank performance around many different events, including regulatory changes. However, these efficiency measures are comparative to the "best practice" bank and would create noise in measuring direct changes in costs for banks around regulatory events.[6] Bauer, Berger, Ferrier, and Humphrey (1998) show that the four X-efficiency methods they use to establish consistency across methods and over time yields mixed results. Berger and Mester (1997) show a correlation of 0.122 and 0.177 between ROA and standard profit efficiency and alternative profit efficiency respectively. Rather than cloud the issue with specification errors, or consistency issues, this study uses accounting data that has the best potential to measure costs directly. If regulatory burden increased without an offsetting reduction in costs or increase in revenue, then pre-tax ROA would decline.

Next, loans-per-employee is used as a measure of output. Often the amount of loans is used as an input for a model, however some researchers such as Coelho, de Mello, and Rezende (2013) directly use loans per employee to measure output. Since loans are most often the largest asset category for banks, at least on average, it is a natural measure of production. Another option for an output could be to use deposits. However, in many cases as shown in Hughes, Mester, and Moon (2001), deposits behave as inputs and are not a good measure of output even though some of the characteristics of deposits are consistent with an output. If employee efforts

[6] In order to compare the changes in X-efficiency, estimates of efficiency in the pre-regulatory period would be used to estimate after the regulation compare to the "best practice banks" in the prior time period given this period's inputs and outputs. Using this method creates a percentage of inefficiency that can be compared, but the relation of the inefficiency to regulatory burden is not readily apparent.

are diverted to handle additional regulatory burden, then loans per employee would decline unless there were more employees added to increase production; thus, a negative sign for the regulatory change indicator variables is consistent with increased regulatory burden.

The change in the number of employees is used to measure whether or not crisis-based regulatory actions increase headcount, all else equal. Increasing employees after regulatory events is consistent with increased burden, all else equal. Another possible effect of major regulatory actions is that banks adjust by hiring additional compliance personnel, using technology to manage the changes, or both. Similarly, banks could replace employees through normal attrition with higher-priced compliance specialists. It is likely that these activities would increase salaries and personnel costs as regulatory burden increases. To investigate the effects of regulation on employee salaries, two measures are used: salaries-to-assets and average pay, defined as total salaries divided by the number of employees.

Beccalli (2007) finds that information technology expenses by banks is negatively correlated with ROA at the country level indicating that technology expenses are not offset by saving labor costs or increasing revenue. Technology expenditures are not a separate line-item in the FR Y9 reports, so expenses on technology and fixed assets are used to proxy for technology expenditures. If technology expenses are reduced around these regulatory events, it is consistent with offsetting increased regulatory burden costs and therefore the coefficient would be negative.

Using these dependent variable definitions, the pooled model of the costs of regulatory effects on bank costs and output is estimated as:

$$Y_{i,t} = \alpha + \beta_1 Q1 + \beta_2 Q2 + \beta_3 Q3 + \beta_4 TIMETREND + \beta_5 LNASSETS + \beta_6 CAPRATIO$$
$$+ \beta_7 NETINTINC + \beta_8 FIDUINC + \beta_9 EXTRAORD + \beta_{10} NONACCRU$$
$$+ \beta_{11} AGLOANS + \beta_{12} USCNILOAN + \beta_{13} FORCNILOAN + \beta_{14} BIGCDS$$
$$+ \beta_{15} ALLL + \beta_{16} PLLL + \beta_{17} GDPGROWTH + \beta_{18} INTLEVEL + \beta_{19} INTSLOPE$$
$$+ \beta_{20} TECHNFA + \beta_{21} DEMDEPS + \beta_{22} NOW + \beta_{23} MMDA + \beta_{24} SMALLCD$$
$$+ \beta_{25} FDICIA + \beta_{26} PATRIOT + \beta_{27} DODDFRANK + \beta_{28} DODDFRANK2$$
$$+ \sum_{i=1}^{4} \lambda_i Y_{t-i} + \varepsilon_{i,t}$$

where Q1, Q2, and Q3 are indicator variables that equal one if Quarter 1, 2, or 3 respectively, with Q4 omitted to avoid perfect multicollinearity; TIMETREND is a time-trend variable to account for technological change over time; LNASSETS is the log of total assets to control for size differences, even within the two size groups. CAPRATIO is the equity-to-assets ratio as a measure of bankruptcy risk since higher capital ratios reduce the risk of failure, and especially after crises. The type of business model the bank uses will be captured in part by these control variables: NETINTINC is net interest income (interest income less interest expense) to capture the effect of traditional loan and deposit business, FIDUINC is fiduciary income and is used as a proxy for non-interest earnings, and EXTRAORD is extraordinary income to capture any merger activity, branch sales, or other non-reoccurring events.

NONACCRU is loans not accruing interest scaled by assets, a measure of future credit risk for the lending portfolio; AGLOANS is agricultural loans scaled by assets, a business-mix variable; USCNILOAN and FORCNILOAN are US and Foreign Commercial and Industrial loans, both scaled by total assets to gauge business lending in the US and abroad. BIGCDS is large CDs scaled by assets to account for funding deposits with more volatile and rate-sensitive

liabilities. ALLL is the allowance for loan and lease losses, divided by assets, a measure of credit risk as a reserve for bad debts; and, PLLL is the provision for loan and lease losses and is a measure of future credit risk as the estimate of loan losses that will be charged off in the future. GDPGROWTH is the annualized quarterly growth rate in Gross Domestic Product as a measure of economic activity; INTLEVEL is the 10-year Treasury rate to account for different interest rate environments; INTSLOPE is the slope of the yield curve as measured by the difference in the 10-year and 3-month Treasury rates and is a measure of expected economic activity; DEMDEPS is demand deposits-to-assets to capture a bank's reliance on cheap and stable financing through interest-free checking accounts; TECHNFA is the expense on premises, fixed assets, and technology, scaled by assets; NOW is Negotiable Order of Withdrawal deposit accounts scaled by assets; MMDA is money market and savings accounts scaled by assets; and, SMALLCD are Certificates of Deposit less than $100,000, scaled by assets.

The regulatory variables start with FDICIA as an indicator variable for the FDIC Improvement Act and equals one if 1991Q4 through 1992Q2; PATRIOT is an indicator equal to one if 2001 Q4 through 2002Q2 after the passage of the PATRIOT Act; DODDFRANK is an indicator equal to one if 2010Q3 through 2011 Q1 after the passage of the Dodd-Frank Act; and, DODDFRANK2 is an indicator equal to one if 2013Q1 through 2013Q4 during the rule-making debate on Ability to Repay and Qualified Mortgages due to the passage of the Dodd-Frank Act.[7]

The summation term in the model is four lags of the dependent variable to help solve whatever serial correlation problems could exist. The dependent variables are stationary as indicated by the KPSS Stationarity Test (results not shown); however, before using lagged variables some exhibited significant Dickey-Fuller statistics that indicate serial correlation.

[7] Note that interaction terms between the regulatory period indicators and certain independent variables based on prior research are added to the specification to see if there is a change in slope for these variables. These results are presented in the robustness section. I thank Scott Hein for this suggestion.

Thus, the lagged auto-regressive terms are used to account for trends and serial correlation, and along with the quarterly dummy variables and a time-trend, statistical tests indicate they are effective in handling any serial correlation problems. Four lags are used since it spans a year, as well as the AIC statistics showing that additional terms beyond four lags add little, if any, explanatory power. Also, variance inflation factors indicate no significant problems with multicollinearity in any of the models.

## IV. Empirical Results

This section is a discussion of the descriptive statistics and regression results to investigate the effects on profitability, costs, and lending production of the major crisis-based regulatory acts since 1991. For regression result discussions, the main focus will be on the indicator variables and then the control variables will be summarized at the end of the section.

Table 2 contains the descriptive statistics for the sample. The means for the variables are listed by size groups. Since sample sizes are large, almost all differences are significantly different across the two groups, which is also the reason for splitting the sample by size. Salaries per assets are higher for banks less than $1 billion compared to those between $5 and $1 billion in assets. Figure 2 shows median salaries-to-assets over the sample period, and indicates a relatively level trend over most of the period, with the exception of a large decline during the 2007-2008 crisis and then an increase after the crisis. Pre-tax ROA is much larger for the smaller community banks—almost 100 basis points on average. Assets per employee fall as banks get smaller, as does loans per employee. Expenditures on fixed assets and technology are almost equal across the two size groups. The change in employees is small and relatively similar, on average. Figure 3 shows the number of employees over time, and there is an evident negative trend with the exception of a large jump in 2005 for community banks; so, changes are

likely to be negative and will need to be controlled for by using lagged variables in the regression model. Similarly, average pay exhibits a positive trend over the sample period as shown in Figure 4, and this trend will need controls in the regression.

*Auto-regression results*

Table 3 presents the results for the auto-regression model for both size groups (small and community banks) with Pre-tax ROA as the dependent variable. The variables of interest are the indicators for the time periods around large changes in regulations and rules after crises. In general, the indicators agree in signs although not necessarily in statistical significance. Pre-tax ROA increased after the passage of the PATRIOT Act as shown by both size groups having positive and significant estimates for PATRIOT. The indicator variables show an economically significant 34 and 23 basis point increase in pre-tax ROA for small and community bank groups respectively. Positive increases in ROA are inconsistent with increased regulatory burden, or could indicate that the banks were successful in offsetting the costs in other ways, such as becoming more efficient or by substituting technology (which will be investigated through other dependent variables below). This is not to suggest that the PATRIOT Act solely caused the increase in bank accounting performance since there are other factors, although the model does account for a time trend, interest rate levels, and the economic environment to help mitigate the impact of external factors. Plausible explanations include that depositors viewed the banking system safer after 9/11/2001 and diverted business to small banks due to increased confidence, but testing customer opinions is beyond the scope of this study.

After the passage of the DFA, pre-tax ROA is higher, but only significant for banks between $1 and $5 billion in assets where the coefficient indicates a 16 basis point increase in

pre-tax ROA, all else equal. For the rule-making period of Dodd-Frank (DODDFRANK2), both size groups have negative coefficients for Pre-ROA but only the community bank group has a significant coefficient, which is consistent with increased regulatory burden for community banks during this period and the coefficient indicates a 9 basis point decline, ceteris paribus. The key point in these regressions is that banks are generally able to avoid a significant decline in accounting profits after large regulatory changes due to crises with the exception of community banks during the rulemaking period of the DFA.

Table 4 shows the loans-per-employee regression results as a measure of production effects of these large crisis-induced regulatory events. The estimates are negative and significant for both size groups after the PATRIOT Act. The provisions of the PATRIOT Act could have diverted resources away from lending and towards security-based activities, all else equal, and these results are consistent with increasing regulatory burden. The coefficients indicate a $0.166 million and $0.064 million fall in lending per employee, which is economically significant. The coefficients on DODDFRANK and DODDFRANK2 have negative estimates, although the estimate for $1 to $5 billion banks is only significant at the ten-percent level, indicating decreased loans per employee after the passage and during the rulemaking period of the DFA. For the DFA passage, loans fell by $0.138 million and $0.109 million per employee for each size group. During the rulemaking period of the DFA, loans per employee fell by $0.115 million for community banks, all else equal. The results for the DFA are consistent with higher regulatory burden reducing lending, all else constant. While loan demand is likely lower in periods after a crisis, the economic, time-trend, and auto-regressive terms captures at least some of the decline

due to economic factors, thus the evidence indicates support for decreased lending around these regulatory changes.[8]

Table 5 contains the results for the percentage change in bank employees. This regression is aimed towards investigating whether or not banks increased headcount after crises, which is consistent with increased regulatory burden. After the PATRIOT Act was passed, the change in employment was significant and positive, consistent with hiring more personnel to handle the new anti-money laundering and other rules in the Act. Since there are four lagged dependent variables in the auto-regressions (not shown in the table) and a time-trend variable, the trend in employment falling as shown in Figure 2 is accounted for, so the result is not due to a secular trend. The economic significance of this variable for the PATRIOT Act is large since the average change in employees per quarter across both size groups for the entire sample is about 1.0, and the coefficient indicates increases of about 0.63 employees per quarter. The rest of the regulatory results are inconsistent, although after the passage of the DFA, $1 to $5 billion banks have a significant and positive coefficient. This finding for small banks is consistent with hiring net new personnel to deal with the new rules due to the DFA, or perhaps replacing employees who left or were reduced through layoffs with compliance and regulatory personnel.

If the DFA and other acts during the sample period required replacing exiting employees with either more productive personnel or more highly skilled workers with compliance and regulatory expertise, there is likely to be an increase in salaries.[9] Some of the increase in salaries

[8] The coefficient on FDICIA for loans per employee is positive even though there was a recession. NBER shows the recession of 1990-1991 during FDICIA passage lasted eight months and the recession around the PATRIOT Act also lasted eight months, thus they were of similar duration and the length of the downturn is not the cause of the difference in loan production variables in the regressions. The great recession of 2007-2009 lasted 18 months, but the drop in GDP was more severe than the other two crisis periods used in this study. The economic variables are used to account for differences in the severity of the recessions.

[9] Although there is no direct data to test the hypothesis, it is intuitive that more productive new hires will demand higher salaries, and especially compared to those being replaced.

could accrue to the CEO, so higher salaries are not definitive, but an increase in average salaries above the trend would be consistent with more skilled employees. Table 6 contains the first measure of salaries, salaries-to-assets, which is a measure of productivity and the cost of wages. The period after the DFA passage indicates salaries-to-assets declined as shown by the negative coefficients in both size groups. This indicates that either efficiency improved due to higher assets or salaries declined during the period. Since loans-to-assets declined around the DFA passage as shown in Table 4, these salaries-to-assets results are consistent with replacing exiting employees with lower paid employees who were not more productive. These findings are not consistent with increased regulatory burden driving up salaries.

Table 7 presents the auto-regression results for average pay—a more direct test of the changes in pay around crisis-based regulatory changes. Average pay increased relative to the trend during FDICIA for both size groups as shown by the significantly positive coefficients. The estimates are large and economically significant as the coefficients show an increase of $1,677 and $1,352 per quarter after FDICIA for each size group respectively. The coefficients are negative and significant for the DFA passage, but only for banks with assets between $1 and $5 billion. Average pay significantly increased during the rulemaking period of the DFA for both size groups. The coefficients for DODDFRANK2 indicate increases of $969 and $1,365 per quarter, all else equal. This finding indicates more expense on salaries above the trend during the rulemaking period of the DFA, similar to the increase after the passage of FDICIA. Since production of loans fell during this period, it is likely banks responded to the new regulatory burden by hiring more skilled workers, or perhaps existing workers were more productive and banks simply hired higher paid compliance personnel. The increase in pay is consistent with increased regulatory burden.

The last hypothesis to explore is whether or not technology is used to offset these regulatory changes. Although the measure of technology and fixed asset expenditure is crude at best, it should give an indication of spending in the area, assuming that on average the costs of additional fixed assets is not clustered around these regulatory events. Table 8 contains the results for technology and fixed asset expenditures. For Dodd-Frank, technology expenditures are significantly below trend across both size groups for the rulemaking period (DODDFRANK2) indicating that banks reduced technology and fixed asset expenditures after the DFA. The coefficients for DODDFRANK2 are the only ones negative and statistically significant, although they are both negative after the passage of the DFA (DODDFRANK). Reduced technology and fixed asset expenditures coupled with increased salaries in Table 7 indicates that banks substituted higher skilled labor for technology during the rulemaking period of the DFA. As shown in Table 5, there was no significant net addition of employees, so these changes came through either reassigning people to higher paying jobs, or replacing employees who left with higher paid replacements such as compliance personnel, consistent with increased regulatory burden. Since the average technology and fixed asset expenditures-to-assets is 2.85 for both size groups across the sample period as shown in Table 2, the coefficients in Table 8 are very economically impactful since they indicate declines of about 4.6% for small banks' expenditures (-0.1299/2.85) and about 6.2% per quarter for community banks' expenditures on technology and fixed assets (-0.1741/2.85).

*Control variable discussion*

The majority of the control variables that are significant make intuitive sense. The quarterly dummy variables are perhaps the most commonly significant control variables and

show the cyclicality of the data, and therefore the importance of having these in the model. Banks with higher capital and larger size have higher pre-tax ROA, but have mixed results in many cases for other dependent variables and size groups. Typically, any expense such as non-accruing loans reduces pre-tax ROA or lending, but the results are inconsistent across size groups. It is clear that the small banks are different than the community banks, hence the importance of separating them in the estimations. Controls for the deposit and funding mix are inconsistent in most cases. Some exceptions are that banks with higher proportions of large CD funding (BIGCDS) have higher pre-tax ROA, loans-per-employee, and change in employees. GDP growth is typically significant across the dependent variable regressions with higher GDP growth related to higher pre-tax ROA and a larger change in employees. GDP growth is negatively related to loans per employee, average pay, and technology expenditures, which is consistent with banks laying off employees, paying more for productive employees, and reducing technology expenditures when the economy slows. The two other economic variables related to interest rates show similar results with ROA declining with increases in interest rate levels and the slope of the yield curve, but loans per employee increasing. As interest rates rise, expenditures on technology and fixed assets increase, all else constant. Similar to the deposit mix variables, the lending mix variables such as US and Foreign Commercial loans show inconsistent results across size groups, indicating the diverse business models depending on bank size. Higher proportions of agricultural loans are related to higher ROA, lower loans per employee, lower average pay, and lower expenditures on technology and fixed assets.

*Robustness*

There are several robustness methods to help provide confidence in the results. First, the bank size groups could be considered ad hoc and could be influencing the results. To help mitigate this concern, regressions for both groups together are estimated with only the log of assets to control for size. For the entire sample, results are largely the same for the main findings for the effects of the individual Acts. For example, the coefficient for salaries-to-assets is negative for the passage of the DFA, consistent with both size groups being negative and significant. One difference is that pre-tax ROA is negative and significant at the one-percent level for the DFA rulemaking period and the passage of the DFA, in contrast to the results for the two groups separately where only the coefficients for the passage of the DFA are positive. The coefficients on loans per employee are significantly lower for PATRIOT, DODDFRANK, and DODDFRANK2, which is largely consistent with the results when banks are split into size groups. The results for technology and fixed assets expenditures were largely the same as the grouped size-based regressions, with the exception that the DODDFRANK variable is now significantly negative whereas with the size groups estimated separately it was insignificant.

As another robustness test, interaction terms are added with the regulatory indicator multiplied by certain independent variables based on prior research to see if there is a change in slope. In particular, FDICIA was shown by Akhigbe and Whyte (1999) to reduce bank risk, so FDICIA is interacted with NONACCRU to see if there is a change in the risk of loans. The Dodd-Frank indicator is also interacted with the commercial loan variables and the capital ratio since the effects of DFA are most likely to influence the reaction to a potential increase in regulatory burden if banks reallocate loan production resources and build capital under new regulations.

The interaction terms have very little consistency across size groups for any of the dependent variables, thus the table is not shown. Interactions show that Pre-tax ROA is even lower during the DFA period when the bank has higher proportions of US commercial loans for both size groups. This is not to imply causation, but rather indicates that at least some of the poor performance is due to banks with more commercial loans not performing as well, perhaps due to these loans defaulting at a higher rate than other loan types. Loans-per-employee shows no consistent pattern with the interaction terms with the exception of being positively related to commercial lending during the passage of the DFA (the coefficient for DODDFRANK * USCnILOAN is positive) for both size groups. For community banks, defined as those with assets less than $1 billion, expenditures on technology and premises is higher during Dodd-Frank passage when bank capital is higher. The rest of the interaction coefficients are mixed in significance and sign and do not provide much insight into the effects of these regulatory events.

As another robustness check, different specifications of the interest rate level and slope variables were used with minimal impact. In a few cases, significance levels in the base case presented went from not quite significant to significant (e.g., pre-tax ROA for community banks had DODDFRANK become significant at the five-percent level). In general, the main results hold with a few minor changes.[10]

The choice of the period to evaluate the effects of crisis-based regulation is ad hoc as discussed earlier and could be influencing the results. There is no theory to guide how long it would take to incorporate the effects, thus the initial base case was chosen as three quarters. Table 9 contains other plausible windows for evaluation for community banks (those with less

[10] There are several different choices for interest rate levels and the slope of the yield curve. Some researchers use the 30-year rate as the long rate, however from 2002 to 2006, the 30-year security was not available so it was not plausible to use it as the long rate. The base case used in this study is similar to many researchers, such as Estrella and Hardouvelis (1991), who use the 10-year rate minus the 3-month T-bill rate.

than $1 billion in assets). In particular, the window was changed to quarters 0 to +3, 0 to +4, -1 to +2, and -1 to +3 to see if these different event period windows make a difference. For pre-tax ROA, where the base case was significant for PATRIOT and DODDFRANK2, all windows are of the same sign and significance. The same is true for loans-per-employee, the change in employees, salaries-to-assets, average pay, and technology expenditures—namely, that all windows have the same sign and significance as the base case when these variables are significant. This is strong evidence that the results are not due to the selection of the event window. There are some differences in some variables that were not significant in the base case that are significant when the event window is changed. For example, pre-tax ROA is significantly lower for DODDFRANK for longer windows, as is the change in number of employees, average pay, and technology expenditures. Thus, the main results of the paper are confirmed, with additional evidence of regulatory burden depending on the event window in some cases.

## V. Conclusions and Summary

The goal of this study is to investigate the effects of major regulatory and rule changes surrounding crises after FDICIA, the PATRIOT Act, and the Dodd-Frank Act (DFA) on the direct costs of banks for personnel and technology, and profitability. The hypothesis that banks had no changes in performance, costs, and production around major crisis-induced regulatory events is rejected, but the relationship is more complex than simply hiring more people to do additional regulatory and compliance tasks.

Results show that the effects of the Dodd Frank Act (DFA) are different from prior large regulatory changes after crises. During the rulemaking period of the DFA, defined as during

2013 when regulators were making changes to Ability-to-Repay and Qualified Mortgage rules, pre-tax ROA was significantly lower for "community banks" (those with less than $1 billion in assets). For the other large regulatory acts after crises, pre-tax ROA coefficients were positive and significant (e.g., the PATRIOT Act) or insignificant (FDICIA). Loans per employee were generally smaller for all Acts except FDICIA, although only significant at the ten-percent level for banks with assets between $1 and $5 billion during the rulemaking period of the DFA. These results are consistent with the reaction to increased rules due to crisis-based regulation not simply hiring additional employees and continuing loan production levels to the detriment of profitability. However, it is noteworthy that the change in the number of employees was positive and significant compared to the trend after the PATRIOT Act, which is the only non-financial crisis studied. Additionally, average pay rose compared to trend after FDICIA and during the rulemaking period of the DFA, but also fell for banks with assets between $1 and $5 billion after the DFA passed. Higher pay is consistent with hiring more specialized and higher-priced compliance personnel, and especially when coupled with lower loan production that suggests banks were not buying more productive workers with higher wages. Also, technology and fixed-asset expenses were significantly lower for the DFA rulemaking period in contrast to the other major regulatory changes, suggesting some substitution of labor for technology after these crisis-based regulatory changes.

These results are not all-inclusive direct measures of the costs of regulation since the data do not exist that explicitly allocate costs to compliance and regulatory tasks. Instead, the data are collected as a whole, such as total salaries or the total number of employees. However, the data used show evidence of increased costs and more labor since they contain the effects of both indirect and direct expenses on costs and productivity.

Collectively, it appears that bankers are adept at adjusting to new rules and making acceptable accounting profits in the face of major regulatory changes even though the burden appears to be a challenge for the smallest so-called community banks. More thorough analysis would be possible if regulators collected data on how many people, total hours, and expenses went directly to compliance, and this would be useful for future research. Additionally, as is the case with all event studies, other factors could be influencing the results so causality is less than certain even though there is consistent evidence of increasing regulatory burden for small and community banks.

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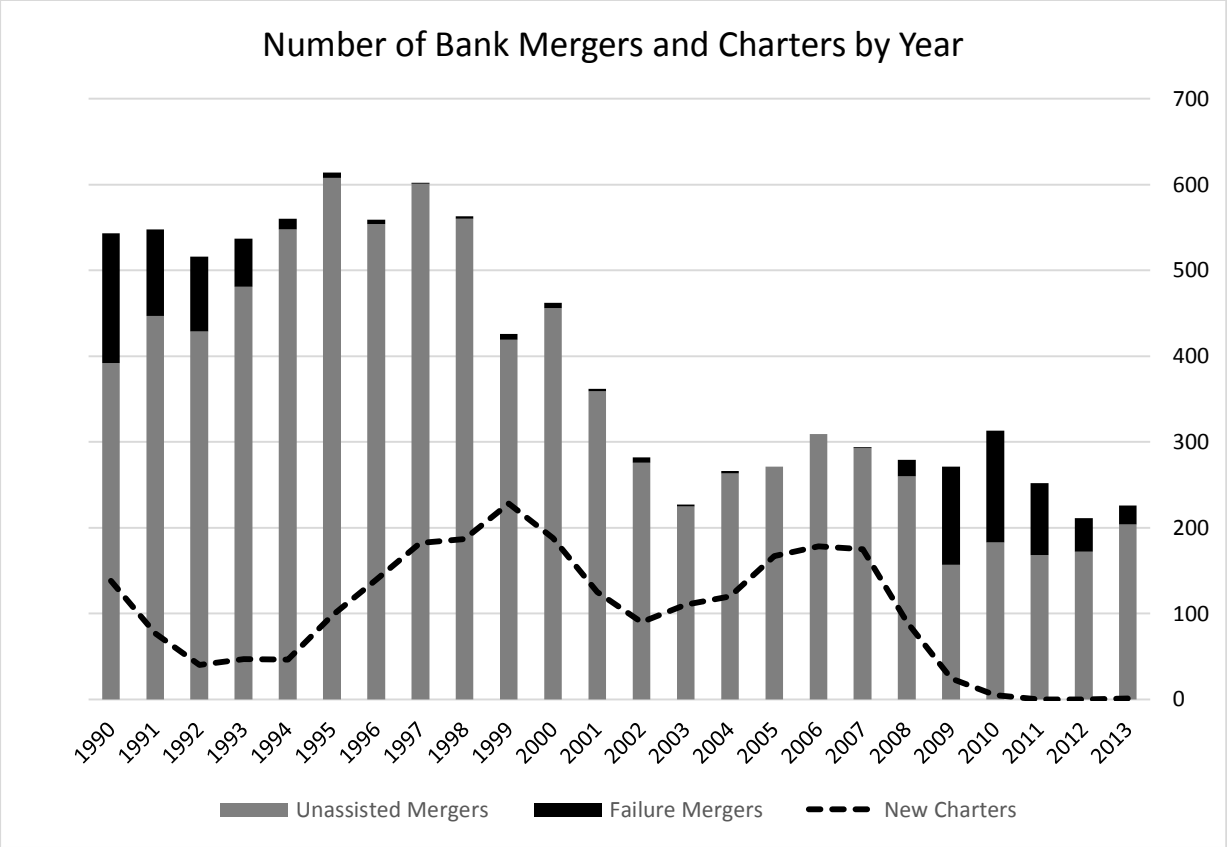


Source: FDIC website.

Figure 1

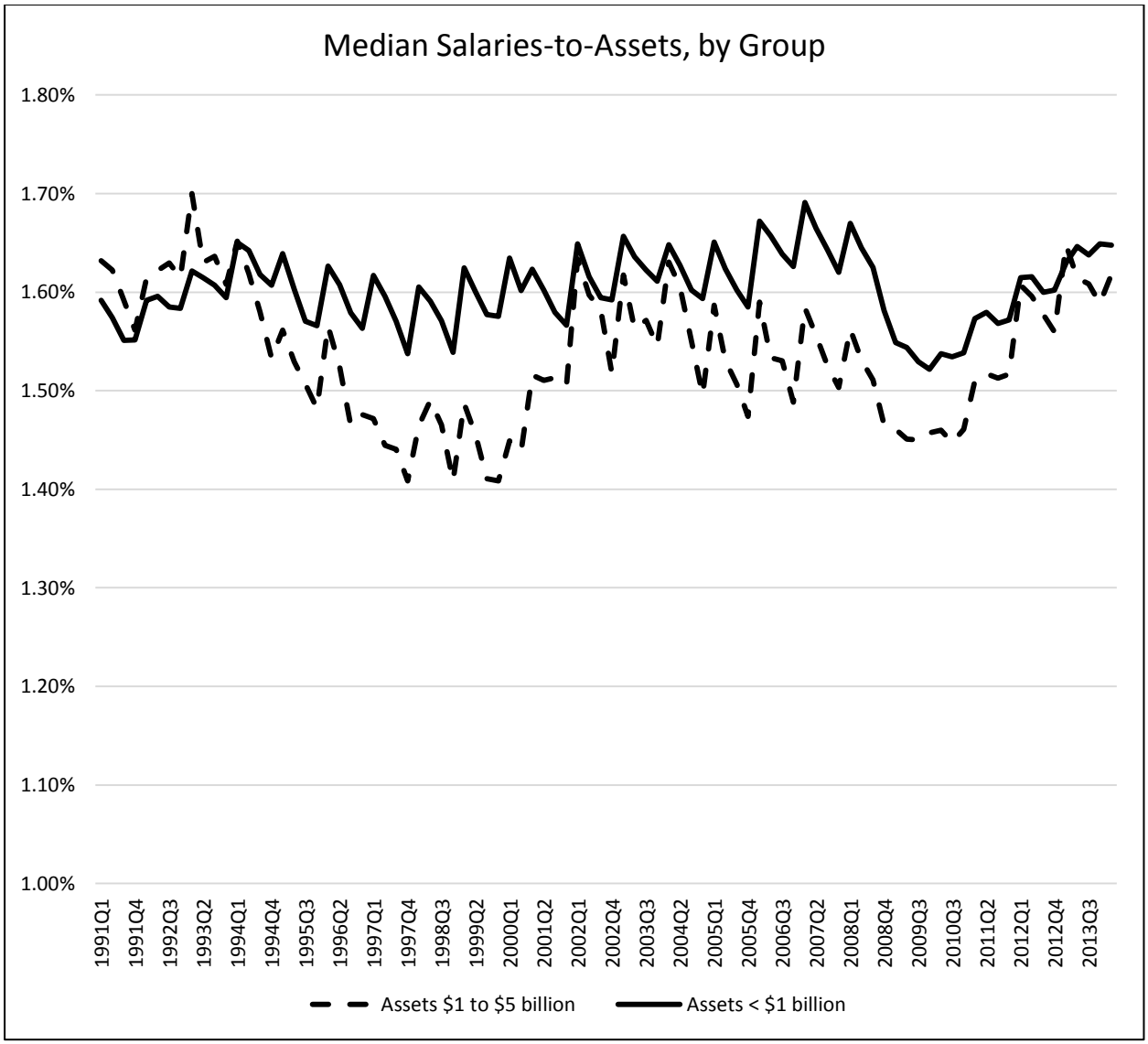
Median Salaries-to-Assets, by Group
1.80%
1.70%
1.60%
1.50%
1.40%
1.30%
1.20%
1.10%
1.00%
1991Q1
1991Q4
1992Q3
1993Q2
1994Q1
1994Q4
1995Q3
1996Q2
1997Q1
1997Q4
1998Q3
1999Q2
2000Q1
2001Q2
2002Q1
2002Q4
2003Q3
2004Q2
2005Q1
2005Q4
2006Q3
2007Q2
2008Q1
2008Q4
2009Q3
2010Q3
2011Q2
2012Q1
2012Q4
2013Q3
Assets $1 to $5 billion
Assets < $1 billion

Figure 2

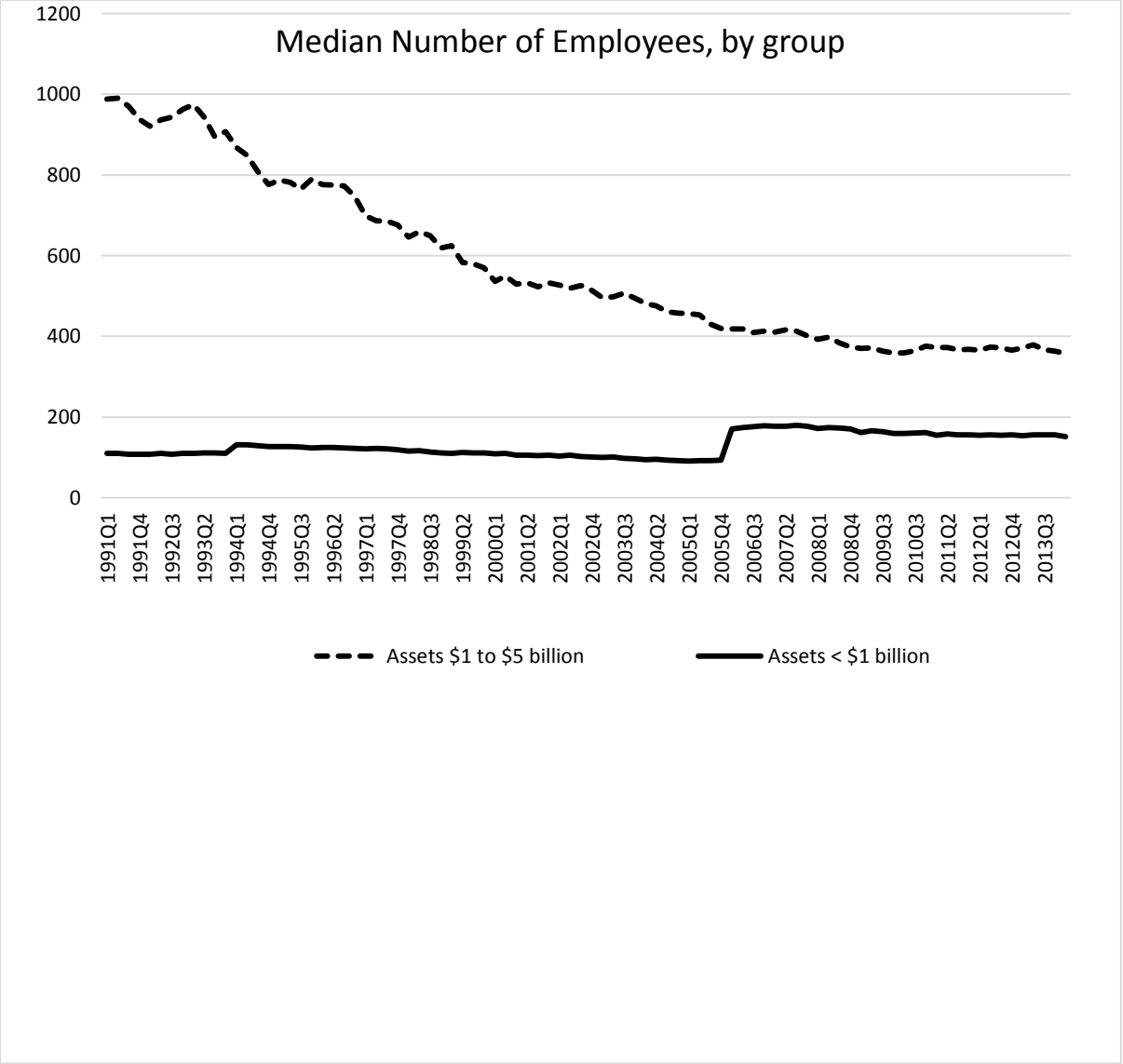
Median Number of Employees, by group
1200
1000
800
600
400
200
0
1991Q1
1991Q4
1992Q3
1993Q2
1994Q1
1994Q4
1995Q3
1996Q2
1997Q1
1997Q4
1998Q3
1999Q2
2000Q1
2001Q2
2002Q1
2002Q4
2003Q3
2004Q2
2005Q1
2005Q4
2006Q3
2007Q2
2008Q1
2008Q4
2009Q3
2010Q3
2011Q2
2012Q1
2012Q4
2013Q3
Assets $1 to $5 billion
Assets < $1 billion

Figure 3

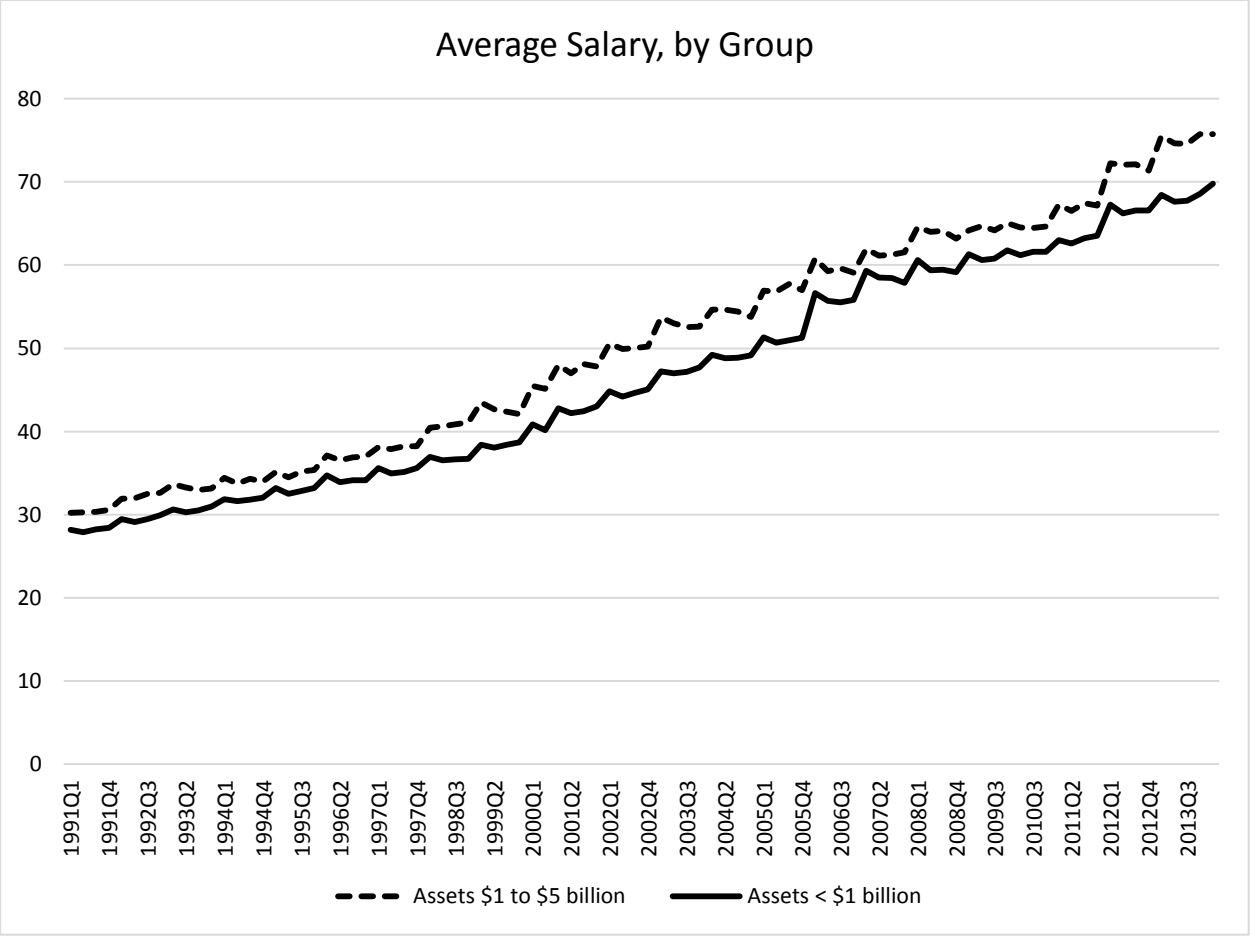
Average Salary, by Group
80
70
60
50
40
30
20
10
0
1991Q1
1991Q4
1992Q3
1993Q2
1994Q1
1994Q4
1995Q3
1996Q2
1997Q1
1997Q4
1998Q3
1999Q2
2000Q1
2001Q2
2002Q1
2002Q4
2003Q3
2004Q2
2005Q1
2005Q4
2006Q3
2007Q2
2008Q1
2008Q4
2009Q3
2010Q3
2011Q2
2012Q1
2012Q4
2013Q3
Assets $1 to $5 billion
Assets < $1 billion

Figure 4

Table 2
Means of selected variables

| Variable | Small Banks with Assets between $1 and $5 billion (N = 24,857) | Community Banks with Assets less than $1 billion (N = 101,709) |
|---|---|---|
| SAL2ASST | 0.0168 | 0.0171 |
| PREROA | 0.0127 | 0.0223 |
| ASSTPEREMPL | 4.2113 | 2.9583 |
| LOANPEREMPL | 2.6606 | 1.8955 |
| TECHNFA | 2.8543 | 2.8538 |
| NUMEMPL | 681.61 | 150.29 |
| TOTASSET | 2,046,436 | 382,705 |
| EMPLCHG% | 1.2027 | 1.1952 |
| AVGPAY | 58.4475 | 46.3253 |

SAL2ASST is salaries divided by assets, PREROA is pre-tax net income divided by total assets, ASSTPEREMPL is assets in Millions divided by the number of employees, LOANPEREMPL is loans in Millions divided by the number of employees, TECHNFA are fixed asset and technological expenses divided by assets, NUMEMPL is the number of employees, TOTASSET is total assets in $1,000s, EMPLCHG% is the percentage change in number of employees, AVGPAY is the total salaries paid divided by the number of employees, in $1,000s.

Table 3
Pre-tax return on assets dependent variable auto-regression results with four lags, by asset size groups.

| | Small Banks (Assets $1 to $5 billion) | | Community Banks (Assets < $1 billion) | |
|---|---|---|---|---|
| Variable | Estimate | p-value | Estimate | p-value |
| INTERCEPT | **-0.0129** | <.0001 | **-0.0231** | <.0001 |
| Q1 | **0.0146** | <.0001 | **0.0160** | <.0001 |
| Q2 | **0.0098** | <.0001 | **0.0107** | <.0001 |
| Q3 | **0.0051** | <.0001 | **0.0056** | <.0001 |
| TIMETREND | **-0.0001** | <.0001 | **-0.0001** | <.0001 |
| LNASSETS | **0.0008** | <.0001 | **0.0011** | <.0001 |
| CAPRATIO | **0.0489** | <.0001 | **0.0562** | <.0001 |
| NETINTINC | **0.9054** | <.0001 | **0.8833** | <.0001 |
| FIDUINC | **0.4918** | <.0001 | **0.3156** | <.0001 |
| EXTRAORD | **-0.2349** | 0.0221 | **0.0671** | 0.0469 |
| NONACCRU | **-0.1630** | <.0001 | **-0.1532** | <.0001 |
| AGLOANS | **0.0243** | <.0001 | **0.0047** | <.0001 |
| USCNILOAN | **-0.0057** | <.0001 | 0.0002 | 0.4573 |
| FORCNILOAN | **0.0206** | <.0001 | **0.0102** | <.0001 |
| BIGCDS | **0.0037** | 0.0001 | **0.0049** | <.0001 |
| ALLL | **-0.1482** | <.0001 | -0.0114 | 0.0553 |
| PLLL | **-1.2628** | <.0001 | **-1.2438** | <.0001 |
| GDPGROWTH | **0.0589** | <.0001 | **0.0433** | <.0001 |
| INTLEVEL | **-0.0007** | <.0001 | **-0.0006** | <.0001 |
| INTSLOPE | **-0.0003** | 0.0013 | **-0.0002** | <.0001 |
| DEMDEPS | 0.0013 | 0.2817 | **0.0010** | 0.0157 |
| TECHNFA | **-0.0022** | <.0001 | **-0.0022** | <.0001 |
| NOW | **-0.0086** | <.0001 | **0.0011** | 0.0140 |
| MMDA | **-0.0045** | <.0001 | **0.0017** | <.0001 |
| SMALLCD | **-0.0051** | <.0001 | 0.0004 | 0.1085 |
| FDICIA | 0.0004 | 0.4127 | 0.0002 | 0.2691 |
| PATRIOT | **0.0034** | <.0001 | **0.0023** | <.0001 |
| DODDFRANK | **0.0016** | <.0001 | 0.0004 | 0.0759 |
| DODDFRANK2 | -0.0005 | 0.1408 | **-0.0009** | <.0001 |

The data are from the FR-Y9C reports for bank holding company quarterly data from 1991Q1 through 2014Q1. Q1, Q2, and Q3 are indicator variables equal to one if in quarter 1, 2, or 3 respectively. TIMETREND is a time-trend variable. LNASSETS is the log of total assets. CAPRATIO is the equity-to-assets ratio. NETINTINC is net-interest income, scaled by assets. FIDUINC is fiduciary income divided by assets. EXTRAORD is extraordinary income divided by assets. NONACCRU is non-accruing loans, divided by assets. AGLOANS is agricultural loans divided by assets. USCNILOAN and FORCNILOAN are US and Foreign commercial and industrial loans, divided by assets. BIGCDS are large CDs divided by assets. ALLL and PLLL are the allowance for loan and lease losses and provision for loan and lease losses respectively, with both scaled by assets. GDPGROWTH is the annualized quarterly growth rate in US Gross Domestic Product. INTLEVEL and INTSLOPE are the 5-year Treasury rate level and the difference between the 10-year and 3-month treasury rates respectively. DEMDEPS is demand deposits, scaled by assets. TECHNFA is technological and fixed-asset expenditures, scaled by assets. NOW, MMDA, and SMALLCD are NOW accounts, money market accounts, and small CDs, with each scaled by assets. FDICIA is an indicator variable equal to one from 1991Q4 through 1992Q2 after the passage of the FDICIA Act. PATRIOT is an indicator variable equal to one from 2001Q4 through 2002Q2 after the passage of the PATRIOT Act. DODDFRANK and DODDFRANK2 are indicator variables equal to one from 2010Q3 through 2011Q1 after the passage of the Dodd-Frank Act and from 2013Q1 to 2013Q3 for the rulemaking period of the Dodd-Frank Act, respectively. Bold coefficients indicate significance at least at the five-percent level.

Table 4
Loans-per-employee (in $ millions) dependent auto-regression results with four lags, by asset size groups.

| | Small Banks (Assets $1 to $5 billion) | | Community Banks (Assets < $1 billion) | |
|---|---|---|---|---|
| Variable | Estimate | p-value | Estimate | p-value |
| INTERCEPT | **0.9771** | <.0001 | **1.6829** | <.0001 |
| Q1 | **-0.9765** | <.0001 | **-0.8619** | <.0001 |
| Q2 | **-0.6617** | <.0001 | **-0.5626** | <.0001 |
| Q3 | **-0.3109** | <.0001 | **-0.2655** | <.0001 |
| TIMETREND | **0.0260** | <.0001 | **0.0199** | <.0001 |
| LNASSETS | **0.1014** | <.0001 | **0.0608** | <.0001 |
| CAPRATIO | **-2.2036** | <.0001 | **-2.7423** | <.0001 |
| NETINTINC | **10.8016** | <.0001 | -0.7364 | 0.1357 |
| FIDUINC | **-12.0575** | 0.0007 | **-37.4671** | <.0001 |
| EXTRAORD | -4.4615 | 0.6259 | -4.1156 | 0.2168 |
| NONACCRU | **-1.2266** | 0.0286 | **-1.3507** | <.0001 |
| AGLOANS | **-3.0894** | <.0001 | **-0.7815** | <.0001 |
| USCNILOAN | **1.8764** | <.0001 | **1.7721** | <.0001 |
| FORCNILOAN | **1.0932** | 0.0031 | 0.1149 | 0.5388 |
| BIGCDS | **0.7301** | <.0001 | **1.0659** | <.0001 |
| ALLL | **14.8194** | <.0001 | **21.6143** | <.0001 |
| PLLL | **9.4229** | <.0001 | **-2.8138** | <.0001 |
| GDPGROWTH | **-2.8429** | <.0001 | **-0.4584** | 0.0208 |
| INTLEVEL | **0.0851** | <.0001 | **0.0254** | <.0001 |
| INTSLOPE | 0.0096 | 0.2826 | **0.0119** | 0.0003 |
| DEMDEPS | **-2.2409** | <.0001 | **-1.7031** | <.0001 |
| TECHNFA | **-0.3914** | <.0001 | **-0.2406** | <.0001 |
| NOW | **-2.6359** | <.0001 | **-2.5569** | <.0001 |
| MMDA | **-0.6363** | <.0001 | **-0.6280** | <.0001 |
| SMALLCD | **-0.3667** | <.0001 | **-0.5509** | <.0001 |
| FDICIA | 0.0730 | 0.1505 | 0.0199 | 0.2411 |
| PATRIOT | **-0.1656** | 0.0005 | **-0.0640** | <.0001 |
| DODDFRANK | **-0.1379** | 0.0007 | **-0.1085** | <.0001 |
| DODDFRANK2 | -0.0582 | 0.0866 | **-0.1145** | <.0001 |

The data are from the FR-Y9C reports for bank holding company quarterly data from 1991Q1 through 2014Q1. Q1, Q2, and Q3 are indicator variables equal to one if in quarter 1, 2, or 3 respectively. TIMETREND is a time-trend variable. LNASSETS is the log of total assets. CAPRATIO is the equity-to-assets ratio. NETINTINC is net-interest income, scaled by assets. FIDUINC is fiduciary income divided by assets. EXTRAORD is extraordinary income divided by assets. NONACCRU is non-accruing loans, divided by assets. AGLOANS is agricultural loans divided by assets. USCNILOAN and FORCNILOAN are US and Foreign commercial and industrial loans, divided by assets. BIGCDS are large CDs divided by assets. ALLL and PLLL are the allowance for loan and lease losses and provision for loan and lease losses respectively, with both scaled by assets. GDPGROWTH is the annualized quarterly growth rate in US Gross Domestic Product. INTLEVEL and INTSLOPE are the 5-year Treasury rate level and the difference between the 10-year and 3-month treasury rates respectively. DEMDEPS is demand deposits, scaled by assets. TECHNFA is technological and fixed-asset expenditures, scaled by assets. NOW, MMDA, and SMALLCD are NOW accounts, money market accounts, and small CDs, with each scaled by assets. FDICIA is an indicator variable equal to one from 1991Q4 through 1992Q2 after the passage of the FDICIA Act. PATRIOT is an indicator variable equal to one from 2001Q4 through 2002Q2 after the passage of the PATRIOT Act. DODDFRANK and DODDFRANK2 are indicator variables equal to one from 2010Q3 through 2011Q1 after the passage of the Dodd-Frank Act and from 2013Q1 to 2013Q3 for the rulemaking period of the Dodd-Frank Act, respectively. Bold coefficients indicate significance at least at the five-percent level.

Table 5
Change in the number of employees auto-regression results with four lags, by asset size groups.

| | Small Banks (Assets $1 to $5 billion) | | Community Banks (Assets < $1 billion) | |
|---|---|---|---|---|
| Variable | Estimate | p-value | Estimate | p-value |
| INTERCEPT | **3.7455** | 0.0010 | 0.1849 | 0.6867 |
| Q1 | **-1.3252** | <.0001 | **-0.7307** | <.0001 |
| Q2 | -0.0427 | 0.7877 | **0.4285** | <.0001 |
| Q3 | **-1.1146** | <.0001 | **-0.8679** | <.0001 |
| TIMETREND | **-0.0200** | <.0001 | **-0.0187** | <.0001 |
| LNASSETS | 0.1089 | 0.1162 | **0.2974** | <.0001 |
| CAPRATIO | **-6.2254** | <.0001 | **-6.3950** | <.0001 |
| NETINTINC | -11.1541 | 0.1433 | -4.6782 | 0.1739 |
| FIDUINC | **-99.2070** | <.0001 | **-62.3375** | <.0001 |
| EXTRAORD | 39.6719 | 0.4369 | 17.3957 | 0.4599 |
| NONACCRU | **-16.5680** | <.0001 | **-31.2722** | <.0001 |
| AGLOANS | 1.0888 | 0.3296 | 0.1362 | 0.6493 |
| USCNILOAN | 0.5114 | 0.2721 | **2.4524** | <.0001 |
| FORCNILOAN | -2.9193 | 0.1578 | **-4.4630** | 0.0006 |
| BIGCDS | **3.3243** | <.0001 | **3.1793** | <.0001 |
| ALLL | **-64.3236** | <.0001 | **-24.8505** | <.0001 |
| PLLL | -2.0977 | 0.8079 | **13.0543** | 0.0064 |
| GDPGROWTH | **11.4018** | <.0001 | **10.6509** | <.0001 |
| INTLEVEL | **-0.2494** | <.0001 | **-0.1730** | <.0001 |
| INTSLOPE | **-0.1779** | <.0001 | **-0.1066** | <.0001 |
| DEMDEPS | 0.9422 | 0.1004 | **0.7567** | 0.0070 |
| TECHNFA | **-0.2597** | <.0001 | **-0.1718** | <.0001 |
| NOW | **2.5582** | 0.0002 | **-1.9623** | <.0001 |
| MMDA | 0.0555 | 0.8605 | **-0.7069** | <.0001 |
| SMALLCD | -0.5979 | 0.1269 | -0.2154 | 0.2527 |
| FDICIA | **-0.5657** | 0.0058 | -0.1307 | 0.1306 |
| PATRIOT | **0.6239** | 0.0011 | **0.6300** | <.0001 |
| DODDFRANK | **0.3292** | 0.0459 | -0.2243 | 0.0715 |
| DODDFRANK2 | -0.1316 | 0.3398 | -0.1670 | 0.1164 |

The data are from the FR-Y9C reports for bank holding company quarterly data from 1991Q1 through 2014Q1. Q1, Q2, and Q3 are indicator variables equal to one if in quarter 1, 2, or 3 respectively. TIMETREND is a time-trend variable. LNASSETS is the log of total assets. CAPRATIO is the equity-to-assets ratio. NETINTINC is net-interest income, scaled by assets. FIDUINC is fiduciary income divided by assets. EXTRAORD is extraordinary income divided by assets. NONACCRU is non-accruing loans, divided by assets. AGLOANS is agricultural loans divided by assets. USCNILOAN and FORCNILOAN are US and Foreign commercial and industrial loans, divided by assets. BIGCDS are large CDs divided by assets. ALLL and PLLL are the allowance for loan and lease losses and provision for loan and lease losses respectively, with both scaled by assets. GDPGROWTH is the annualized quarterly growth rate in US Gross Domestic Product. INTLEVEL and INTSLOPE are the 5-year Treasury rate level and the difference between the 10-year and 3-month treasury rates respectively. DEMDEPS is demand deposits, scaled by assets. TECHNFA is technological and fixed-asset expenditures, scaled by assets. NOW, MMDA, and SMALLCD are NOW accounts, money market accounts, and small CDs, with each scaled by assets. FDICIA is an indicator variable equal to one from 1991Q4 through 1992Q2 after the passage of the FDICIA Act. PATRIOT is an indicator variable equal to one from 2001Q4 through 2002Q2 after the passage of the PATRIOT Act. DODDFRANK and DODDFRANK2 are indicator variables equal to one from 2010Q3 through 2011Q1 after the passage of the Dodd-Frank Act and from 2013Q1 to 2013Q3 for the rulemaking period of the Dodd-Frank Act, respectively. Bold coefficients indicate significance at least at the five-percent level.

Table 6
Salaries-to-asset dependent variable auto-regression results with four lags, by asset size groups.

| | Small Banks (Assets $1 to $5 billion) | | Community Banks (Assets < $1 billion) | |
|---|---|---|---|---|
| Variable | Estimate | p-value | Estimate | p-value |
| INTERCEPT | **0.0061** | <.0001 | **0.0013** | 0.0002 |
| Q1 | **0.0114** | <.0001 | **0.0132** | <.0001 |
| Q2 | **0.0075** | <.0001 | **0.0086** | <.0001 |
| Q3 | **0.0037** | <.0001 | **0.0042** | <.0001 |
| TIMETREND | **0.0000** | <.0001 | **0.0000** | <.0001 |
| LNASSETS | **-0.0007** | <.0001 | **-0.0003** | <.0001 |
| CAPRATIO | **0.0033** | <.0001 | **-0.0119** | <.0001 |
| NETINTINC | **0.1210** | <.0001 | **0.2283** | <.0001 |
| FIDUINC | **0.5022** | <.0001 | **0.5752** | <.0001 |
| EXTRAORD | **0.1407** | 0.0004 | -0.0187 | 0.2985 |
| NONACCRU | 0.0028 | 0.2471 | 0.0011 | 0.3657 |
| AGLOANS | **0.0102** | <.0001 | **0.0028** | <.0001 |
| USCNILOAN | **0.0061** | <.0001 | **0.0016** | <.0001 |
| FORCNILOAN | -0.0012 | 0.4577 | **0.0100** | <.0001 |
| BIGCDS | **-0.0040** | <.0001 | **-0.0031** | <.0001 |
| ALLL | 0.0002 | 0.9748 | **0.0221** | <.0001 |
| PLLL | **-0.0339** | <.0001 | **-0.0431** | <.0001 |
| GDPGROWTH | **0.0067** | <.0001 | **-0.0031** | 0.0003 |
| INTLEVEL | 0.0000 | 0.7752 | **0.0001** | 0.0018 |
| INTSLOPE | **0.0001** | 0.0342 | **0.0001** | <.0001 |
| DEMDEPS | **0.0055** | <.0001 | **0.0069** | <.0001 |
| TECHNFA | **0.0023** | <.0001 | **0.0019** | <.0001 |
| NOW | **0.0035** | <.0001 | **0.0006** | 0.0048 |
| MMDA | 0.0000 | 0.8440 | **0.0004** | 0.0008 |
| SMALLCD | 0.0004 | 0.2287 | **-0.0024** | <.0001 |
| FDICIA | 0.0002 | 0.1630 | **0.0002** | 0.0249 |
| PATRIOT | **0.0005** | 0.0026 | 0.0000 | 0.4520 |
| DODDFRANK | **-0.0006** | <.0001 | **-0.0005** | <.0001 |
| DODDFRANK2 | 0.0001 | 0.4009 | -0.0001 | 0.1247 |

The data are from the FR-Y9C reports for bank holding company quarterly data from 1991Q1 through 2014Q1. Q1, Q2, and Q3 are indicator variables equal to one if in quarter 1, 2, or 3 respectively. TIMETREND is a time-trend variable. LNASSETS is the log of total assets. CAPRATIO is the equity-to-assets ratio. NETINTINC is net-interest income, scaled by assets. FIDUINC is fiduciary income divided by assets. EXTRAORD is extraordinary income divided by assets. NONACCRU is non-accruing loans, divided by assets. AGLOANS is agricultural loans divided by assets. USCNILOAN and FORCNILOAN are US and Foreign commercial and industrial loans, divided by assets. BIGCDS are large CDs divided by assets. ALLL and PLLL are the allowance for loan and lease losses and provision for loan and lease losses respectively, with both scaled by assets. GDPGROWTH is the annualized quarterly growth rate in US Gross Domestic Product. INTLEVEL and INTSLOPE are the 5-year Treasury rate level and the difference between the 10-year and 3-month treasury rates respectively. DEMDEPS is demand deposits, scaled by assets. TECHNFA is technological and fixed-asset expenditures, scaled by assets. NOW, MMDA, and SMALLCD are NOW accounts, money market accounts, and small CDs, with each scaled by assets. FDICIA is an indicator variable equal to one from 1991Q4 through 1992Q2 after the passage of the FDICIA Act. PATRIOT is an indicator variable equal to one from 2001Q4 through 2002Q2 after the passage of the PATRIOT Act. DODDFRANK and DODDFRANK2 are indicator variables equal to one from 2010Q3 through 2011Q1 after the passage of the Dodd-Frank Act and from 2013Q1 to 2013Q3 for the rulemaking period of the Dodd-Frank Act, respectively. Bold coefficients indicate significance at least at the five-percent level.

Table 7
Average pay dependent variable auto-regression results with four lags, by asset size groups.

| | Small Banks (Assets $1 to $5 billion) | | Community Banks (Assets < $1 billion) | |
|---|---|---|---|---|
| Variable | Estimate | p-value | Estimate | p-value |
| INTERCEPT | **40.2388** | <.0001 | **32.7140** | <.0001 |
| Q1 | -0.8141 | 0.1996 | **1.9149** | <.0001 |
| Q2 | **-0.9482** | 0.0449 | **0.7943** | <.0001 |
| Q3 | -0.3416 | 0.3135 | **0.2776** | 0.0478 |
| TIMETREND | **0.4784** | <.0001 | **0.4172** | <.0001 |
| LNASSETS | **-0.3831** | 0.0463 | **0.1582** | 0.0135 |
| CAPRATIO | **5.7923** | 0.0479 | **-31.3006** | <.0001 |
| NETINTINC | -26.7549 | 0.2099 | **90.9821** | <.0001 |
| FIDUINC | **851.9960** | <.0001 | **917.1531** | <.0001 |
| EXTRAORD | 168.8794 | 0.2327 | 54.1396 | 0.2857 |
| NONACCRU | -1.4584 | 0.8658 | 6.4539 | 0.0653 |
| AGLOANS | **-33.0980** | <.0001 | **-3.8672** | <.0001 |
| USCNILOAN | **36.1207** | <.0001 | **11.2928** | <.0001 |
| FORCNILOAN | **44.0275** | <.0001 | **54.8829** | <.0001 |
| BIGCDS | **-5.9034** | <.0001 | **6.2816** | <.0001 |
| ALLL | **50.5130** | 0.0125 | **107.8697** | <.0001 |
| PLLL | **78.6673** | 0.0012 | **-55.9644** | <.0001 |
| GDPGROWTH | **-15.1395** | 0.0126 | **-22.9260** | <.0001 |
| INTLEVEL | 0.1007 | 0.4845 | **0.1580** | 0.0159 |
| INTSLOPE | 0.1337 | 0.2640 | **0.3223** | <.0001 |
| DEMDEPS | 0.5867 | 0.7156 | **6.5728** | <.0001 |
| TECHNFA | **-0.9847** | <.0001 | **-0.7191** | <.0001 |
| NOW | **-30.6472** | <.0001 | **-37.9528** | <.0001 |
| MMDA | **2.0057** | 0.0229 | **-1.3478** | 0.0004 |
| SMALLCD | **-34.2653** | <.0001 | **-27.4437** | <.0001 |
| FDICIA | **1.6772** | 0.0141 | **1.3518** | <.0001 |
| PATRIOT | -0.9311 | 0.1454 | **-2.0452** | <.0001 |
| DODDFRANK | **-1.9258** | 0.0005 | -0.4345 | 0.2353 |
| DODDFRANK2 | **0.9692** | 0.0342 | **1.3649** | <.0001 |

The data are from the FR-Y9C reports for bank holding company quarterly data from 1991Q1 through 2014Q1. Q1, Q2, and Q3 are indicator variables equal to one if in quarter 1, 2, or 3 respectively. TIMETREND is a time-trend variable. LNASSETS is the log of total assets. CAPRATIO is the equity-to-assets ratio. NETINTINC is net-interest income, scaled by assets. FIDUINC is fiduciary income divided by assets. EXTRAORD is extraordinary income divided by assets. NONACCRU is non-accruing loans, divided by assets. AGLOANS is agricultural loans divided by assets. USCNILOAN and FORCNILOAN are US and Foreign commercial and industrial loans, divided by assets. BIGCDS are large CDs divided by assets. ALLL and PLLL are the allowance for loan and lease losses and provision for loan and lease losses respectively, with both scaled by assets. GDPGROWTH is the annualized quarterly growth rate in US Gross Domestic Product. INTLEVEL and INTSLOPE are the 5-year Treasury rate level and the difference between the 10-year and 3-month treasury rates respectively. DEMDEPS is demand deposits, scaled by assets. TECHNFA is technological and fixed-asset expenditures, scaled by assets. NOW, MMDA, and SMALLCD are NOW accounts, money market accounts, and small CDs, with each scaled by assets. FDICIA is an indicator variable equal to one from 1991Q4 through 1992Q2 after the passage of the FDICIA Act. PATRIOT is an indicator variable equal to one from 2001Q4 through 2002Q2 after the passage of the PATRIOT Act. DODDFRANK and DODDFRANK2 are indicator variables equal to one from 2010Q3 through 2011Q1 after the passage of the Dodd-Frank Act and from 2013Q1 to 2013Q3 for the rulemaking period of the Dodd-Frank Act, respectively. Bold coefficients indicate significance at least at the five-percent level.

Table 8
Technology and fixed asset expenditures-to-assets dependent variable auto-regression results with four lags, by asset size groups.

| | Small Banks (Assets $1 to $5 billion) | | Community Banks (Assets < $1 billion) | |
|---|---|---|---|---|
| Variable | Estimate | p-value | Estimate | p-value |
| INTERCEPT | **2.9448** | <.0001 | **2.4520** | <.0001 |
| Q1 | **-1.6525** | <.0001 | **-1.2481** | <.0001 |
| Q2 | **-1.0810** | <.0001 | **-0.7949** | <.0001 |
| Q3 | **-0.5022** | <.0001 | **-0.3473** | <.0001 |
| TIMETREND | -0.0012 | 0.0652 | **0.0015** | <.0001 |
| LNASSETS | **-0.0610** | <.0001 | **-0.0277** | <.0001 |
| CAPRATIO | **-3.1083** | <.0001 | **-6.9584** | <.0001 |
| NETINTINC | **51.9965** | <.0001 | **66.4447** | <.0001 |
| FIDUINC | **72.7456** | <.0001 | **87.8762** | <.0001 |
| EXTRAORD | **-24.7508** | 0.0085 | 0.2520 | 0.9598 |
| NONACCRU | **7.9814** | <.0001 | **10.1973** | <.0001 |
| AGLOANS | **-1.8784** | <.0001 | **-1.8712** | <.0001 |
| USCNILOAN | **-0.3696** | <.0001 | **0.2672** | <.0001 |
| FORCNILOAN | **-1.4042** | 0.0002 | **2.9168** | <.0001 |
| BIGCDS | **-0.3826** | <.0001 | **-0.7216** | <.0001 |
| ALLL | -2.2842 | 0.0880 | **-6.8373** | <.0001 |
| PLLL | 0.2129 | 0.8938 | -0.2356 | 0.8171 |
| GDPGROWTH | **-2.6688** | <.0001 | **-3.0959** | <.0001 |
| INTLEVEL | **0.0345** | <.0001 | **0.0349** | <.0001 |
| INTSLOPE | -0.0088 | 0.2008 | **-0.0294** | <.0001 |
| DEMDEPS | **2.3137** | <.0001 | **2.7412** | <.0001 |
| NOW | **1.7538** | <.0001 | **0.8249** | <.0001 |
| MMDA | **0.8842** | <.0001 | **0.5471** | <.0001 |
| SMALLCD | -0.0345 | 0.6336 | **-0.7586** | <.0001 |
| FDICIA | **0.0793** | 0.0442 | -0.0051 | 0.7889 |
| PATRIOT | 0.0248 | 0.5024 | **0.0468** | 0.0067 |
| DODDFRANK | -0.0359 | 0.2583 | -0.0353 | 0.2013 |
| DODDFRANK2 | **-0.1299** | <.0001 | **-0.1741** | <.0001 |

The data are from the FR-Y9C reports for bank holding company quarterly data from 1991Q1 through 2014Q1. Q1, Q2, and Q3 are indicator variables equal to one if in quarter 1, 2, or 3 respectively. TIMETREND is a time-trend variable. LNASSETS is the log of total assets. CAPRATIO is the equity-to-assets ratio. NETINTINC is net-interest income, scaled by assets. FIDUINC is fiduciary income divided by assets. EXTRAORD is extraordinary income divided by assets. NONACCRU is non-accruing loans, divided by assets. AGLOANS is agricultural loans divided by assets. USCNILOAN and FORCNILOAN are US and Foreign commercial and industrial loans, divided by assets. BIGCDS are large CDs divided by assets. ALLL and PLLL are the allowance for loan and lease losses and provision for loan and lease losses respectively, with both scaled by assets. GDPGROWTH is the annualized quarterly growth rate in US Gross Domestic Product. INTLEVEL and INTSLOPE are the 5-year Treasury rate level and the difference between the 10-year and 3-month treasury rates respectively. DEMDEPS is demand deposits, scaled by assets. TECHNFA is technological and fixed-asset expenditures, scaled by assets. NOW, MMDA, and SMALLCD are NOW accounts, money market accounts, and small CDs, with each scaled by assets. FDICIA is an indicator variable equal to one from 1991Q4 through 1992Q2 after the passage of the FDICIA Act. PATRIOT is an indicator variable equal to one from 2001Q4 through 2002Q2 after the passage of the PATRIOT Act. DODDFRANK and DODDFRANK2 are indicator variables equal to one from 2010Q3 through 2011Q1 after the passage of the Dodd-Frank Act and from 2013Q1 to 2013Q3 for the rulemaking period of the Dodd-Frank Act, respectively. Bold coefficients indicate significance at least at the five-percent level.

Table 9
Robustness for event-period selection for Community Banks with assets less than $1 billion.

| Panel A: Pre-tax ROA Dependent Variable | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Event Window Quarter 0 to +3 | | Event Window Quarter 0 to +4 | | Event Window Quarter -1 to +2 | | Event Window Quarter -1 to +3 | |
| | Estimate | p-value | Estimate | p-value | Estimate | p-value | Estimate | p-value |
| FDICIA | -0.0002 | 0.1642 | -0.0001 | 0.3379 | 0.0000 | 0.9840 | -0.0002 | 0.2065 |
| PATRIOT | **0.0019** | <.0001 | **0.0019** | <.0001 | **0.0021** | <.0001 | **0.0019** | <.0001 |
| DODDFRANK | -0.0002 | 0.2227 | -0.0002 | 0.3147 | -0.0004 | 0.0338 | **-0.0007** | <.0001 |
| DODDFRANK2 | **-0.0010** | <.0001 | **-0.0009** | <.0001 | **-0.0006** | 0.0003 | **-0.0005** | 0.0009 |
| Panel B: Loans-per-employee Dependent Variable | | | | | | | | |
| | Event Window Quarter 0 to +3 | | Event Window Quarter 0 to +4 | | Event Window Quarter -1 to +2 | | Event Window Quarter -1 to +3 | |
| | Estimate | p-value | Estimate | p-value | Estimate | p-value | Estimate | p-value |
| FDICIA | 0.0294 | 0.0544 | 0.0270 | 0.0768 | 0.0205 | 0.1753 | 0.0284 | 0.0462 |
| PATRIOT | **-0.0536** | <.0001 | **-0.0532** | <.0001 | **-0.0569** | <.0001 | **-0.0537** | <.0001 |
| DODDFRANK | **-0.1224** | <.0001 | **-0.1243** | <.0001 | **-0.0832** | <.0001 | **-0.1099** | <.0001 |
| DODDFRANK2 | **-0.1207** | <.0001 | **-0.1217** | <.0001 | **-0.1220** | <.0001 | **-0.1369** | <.0001 |
| Panel C: Change in Number of Employees Dependent Variable | | | | | | | | |
| | Event Window Quarter 0 to +3 | | Event Window Quarter 0 to +4 | | Event Window Quarter -1 to +2 | | Event Window Quarter -1 to +3 | |
| | Estimate | p-value | Estimate | p-value | Estimate | p-value | Estimate | p-value |
| FDICIA | -0.1361 | 0.0811 | -0.1228 | 0.1149 | -0.1441 | 0.0620 | -0.1199 | 0.0994 |
| PATRIOT | **0.5038** | <.0001 | **0.5034** | <.0001 | **0.5287** | <.0001 | **0.4606** | <.0001 |
| DODDFRANK | **-0.3051** | 0.0054 | **-0.2922** | 0.0077 | **-0.3559** | 0.0011 | **-0.4056** | <.0001 |
| DODDFRANK2 | -0.1885 | 0.0776 | -0.1801 | 0.0918 | -0.1047 | 0.3250 | -0.1658 | 0.0931 |
| Panel D: Salaries-to-assets Dependent Variable | | | | | | | | |
| | Event Window Quarter 0 to +3 | | Event Window Quarter 0 to +4 | | Event Window Quarter -1 to +2 | | Event Window Quarter -1 to +3 | |
| | Estimate | p-value | Estimate | p-value | Estimate | p-value | Estimate | p-value |
| FDICIA | 0.0001 | 0.4019 | 0.0001 | 0.4225 | **0.0002** | 0.0018 | 0.0001 | 0.0823 |
| PATRIOT | 0.0000 | 0.6806 | 0.0000 | 0.6434 | 0.0000 | 0.5086 | 0.0000 | 0.7243 |
| DODDFRANK | **-0.0006** | <.0001 | **-0.0006** | <.0001 | **-0.0007** | <.0001 | **-0.0007** | <.0001 |
| DODDFRANK2 | -0.0002 | 0.0835 | -0.0002 | 0.0755 | **-0.0002** | 0.0410 | -0.0001 | 0.4557 |
| Panel E: Average Pay Dependent Variable | | | | | | | | |
| | Event Window Quarter 0 to +3 | | Event Window Quarter 0 to +4 | | Event Window Quarter -1 to +2 | | Event Window Quarter -1 to +3 | |
| | Estimate | p-value | Estimate | p-value | Estimate | p-value | Estimate | p-value |
| FDICIA | **1.4324** | <.0001 | **1.4256** | <.0001 | **1.5377** | <.0001 | **1.5596** | <.0001 |
| PATRIOT | **-1.7867** | <.0001 | **-1.7892** | <.0001 | **-2.0170** | <.0001 | **-1.8348** | <.0001 |
| DODDFRANK | -0.5636 | 0.0797 | -0.5720 | 0.0754 | -0.5459 | 0.0874 | **-0.6237** | 0.0333 |
| DODDFRANK2 | **1.2773** | <.0001 | **1.2715** | <.0001 | **1.1408** | 0.0003 | **1.1656** | <.0001 |
| Panel F: Technology and Fixed Asset Expenditures-to-assets Dependent Variable | | | | | | | | |
| | Event Window Quarter 0 to +3 | | Event Window Quarter 0 to +4 | | Event Window Quarter -1 to +2 | | Event Window Quarter -1 to +3 | |
| | Estimate | p-value | Estimate | p-value | Estimate | p-value | Estimate | p-value |
| FDICIA | -0.0138 | 0.4263 | -0.0166 | 0.3370 | 0.0097 | 0.5695 | 0.0020 | 0.9004 |
| PATRIOT | **0.0342** | 0.0205 | **0.0338** | 0.0217 | **0.0767** | <.0001 | **0.0591** | <.0001 |
| DODDFRANK | **-0.0500** | 0.0396 | **-0.0531** | 0.0288 | -0.0241 | 0.3177 | **-0.0475** | 0.0326 |
| DODDFRANK2 | **-0.1747** | <.0001 | **-0.1768** | <.0001 | **-0.1923** | <.0001 | **-0.1899** | <.0001 |

FDICIA is an indicator variable equal to one from 1991Q4 through 1992Q2 after the passage of the FDICIA Act. PATRIOT is an indicator variable equal to one from 2001Q4 through 2002Q2 after the passage of the PATRIOT Act. DODDFRANK and DODDFRANK2 are indicator variables equal to one from 2010Q3 through 2011Q1 after the passage of the Dodd-Frank Act and from 2013Q1 to 2013Q3 for the rulemaking period of the Dodd-Frank Act, respectively. Bold coefficients indicate significance at least at the five-percent level.