Regulatory Asset Thresholds and Acquisition Activity in the Banking Industry*

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Abstract

This paper examines how the announcement of new regulations that require significant compliance costs for banks above the $10 billion asset threshold imposed by the Dodd-Frank Act affects acquisition activity in the banking industry. We argue that the additional compliance costs increase the demand for acquisition activity by banks approaching and just above the threshold. We document that after the announcement of the additional regulations, these banks 1) become more likely to engage in an acquisition; and 2) pay larger deal premiums for these acquisitions. Additionally, we find that the relative size of target banks increases for acquisitions made by banks right around the threshold after the announcement of the regulations. These findings suggest that implementing regulations that require significant compliance costs only on banks above specific asset thresholds can contribute to consolidation in the banking industry.

Keywords: Banks, Regulation, Asset Thresholds, Acquisitions, Dodd-Frank Act

JEL Classifications: G21, G28, G34, M40

1. Introduction

This paper examines how imposing regulatory requirements only on banks above specific asset thresholds affects the acquisition activity of banks around those thresholds. The banking industry has been subject to significant regulation dating at least as far back as the Federal Reserve Act of 1913. In an effort to reduce the regulatory burden on smaller banks, much of this regulation, and the associated compliance costs, is only imposed on banks that exceed specific thresholds in terms of total assets. Examples include many of the regulations imposed by the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA), which only apply to banks above $500 million in total assets, and by the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank), which only apply to banks above either $10 billion, $50 billion, or $250 billion in total assets for different requirements. We provide evidence that the use of these asset thresholds can incentivize banks right around the threshold to increase their demand for acquisitions, thus increasing consolidation in the banking industry. Although the financial press and analysts have highlighted anecdotal cases of this behavior (Picker and Monks, 2013), we provide statistical evidence that it is a more widespread phenomenon.

To investigate the effects of regulatory asset thresholds on acquisition activity, we focus on banks surrounding the $10 billion asset threshold following the passage of Dodd-Frank in 2010.[1] Dodd-Frank imposes additional regulatory requirements on banks above this threshold, meaning that banks with total assets greater than $10 billion incur the costs necessary to comply with these regulations after the passage of Dodd-Frank, while banks below the threshold are not directly affected. Two requirements associated with the $10 billion threshold, the requirement to perform annual stress tests and oversight by the Consumer Financial Protection Bureau (CFPB), largely involve compliance costs that are unlikely to

[1] We choose this threshold for two primary reasons. First, there is a reasonable number of banks with total assets in the neighborhood of $10 billion to conduct meaningful statistical tests, which is not true of the larger thresholds. Second, the time period examined is after the relaxation of interstate branching and banking regulations which opened up the industry to many more acquisitions. Regulations contained in FDICIA came before these rule changes and thus occurred in an environment with less acquisition activity.

vary significantly with the total assets of the bank.[2] Specifically, compliance costs related to these requirements include, but are not limited to, expenditures on new software, consultants, and employee salaries.

When banks cross the $10 billion threshold and incur the additional compliance costs associated with the new regulations, their financial statement ratios, such as ROA or Tier 1 capital, will be negatively affected. Because many of the new costs do not vary significantly with total assets, engaging in an acquisition will not significantly increase the required compliance costs. Banks engage in acquisitions for a number of different reasons, but a common thread among these is the desire to improve the financial performance of the bank, which is often assessed through financial statement ratios. Thus, the decision to engage in an acquisition often involves a comparison between the bank's current financial position and the projected financial position following an acquisition. We argue that the fixed nature of the compliance costs coupled with the focus on financial statement ratios results in stronger incentives for banks right around the threshold to engage in an acquisition.

These incentives can manifest in at least two different forms. First, the negative impact of the compliance costs on financial statement ratios will lower the benchmark against which potential targets will be compared and will make some previously unattractive targets look better to banks immediately surrounding the threshold.[3] Second, banks that were already attractive targets absent the new compliance costs now become more attractive to banks right around the threshold, potentially increasing the treatment group's willingness to pay for those targets. Collectively, we argue that this increases demand for acquisitions by banks approaching and just above the threshold, which results in an increase in both the number of acquisitions completed by the treatment group of banks and the deal premiums associated with those acquisitions.

We examine changes in acquisition activity for a group of treatment banks whose

[2] The Durbin Amendment, which restricts debit card interchange fees, is another significant cost imposed on banks with total assets greater than $10 billion. However, the costs associated with this requirement are less likely to be purely fixed. Given our focus on fixed costs in the hypothesis development we do not discuss the Durbin Amendment in detail here but discuss it briefly in Section 2.1.

[3] We provide a numerical example to help illustrate this effect in Appendix A.

behavior is most likely to be affected by the additional compliance costs. We rely on two pieces of anecdotal evidence to define the treatment group. First, banks may be incentivized to engage in an acquisition in the face of new compliance costs not only after they have crossed the $10 billion threshold but also in anticipation of crossing the threshold (Picker and Monks, 2013). Second, Bloomberg estimates that once a bank crosses $10 billion, it needs to grow to at least $12 billion to earn "an appropriate return" (Smith, 2016). For these reasons we define the treatment group as observations with total assets between $9 and $12 billion. Addressing our research question involves comparing changes in acquisition activity for bank-quarters in this asset range in the pre-period (2003 - 2008) to similar activity for bank-quarters in this asset range in the post-period (2011 - 2016). This allows us to control for other costs and benefits associated with the acquisition decision for banks in this size range that are expected to remain constant from the pre- to post-period (e.g., the direct costs of acquisitions). However, by simply comparing activity of the treatment group from the pre-period to the post-period, our tests may capture general trends in acquisition activity and could lead to erroneous inferences.

To address this concern, especially given the significant macroeconomic changes that took place during the sample period, we incorporate a control group of bank-quarters that have total assets between either $5 and $9 billion or $12 and $16 billion. Thus, we effectively use a "difference-in-differences" design by comparing the changes in acquisition activity from the pre-period to the post-period for the treatment group to those same changes for the control group. Under the assumption that the treatment and control groups would have followed parallel trends absent treatment, the use of this research design allows us to mitigate concerns regarding other changes that took place during the sample period.[4]

We first document an increase in the likelihood of engaging in an acquisition for the treatment group from the pre-period to the post-period relative to the same change for the control group. The marginal effect is an increase of 5.7 percentage points in the likelihood of engaging in an acquisition, which corresponds to an increase of 62% compared to the

[4] We provide support for this assumption in Section 3.2.

unconditional probability of engaging in an acquisition for the treatment group. In our second test, we examine the amount of goodwill that is generated from the acquisition as a measure of the deal premium, because a majority of the target banks in our sample are private. We document an increase in the proportion of the deal value that is recorded as goodwill for acquisitions by the treatment group relative to those by the control group after the passage of the new regulations. The economic magnitude corresponds to a 42% increase in the goodwill to deal value ratio for the average acquisition in our treatment group. The increase in both the quantity of acquisitions and the price at which those acquisitions are executed is consistent with an increase in the demand for acquisitions by banks that are affected by the significant increase in compliance costs.

To provide further support that the increased acquisition activity is associated with the new compliance costs, we perform an additional test that examines the relative size of the target bank to the acquirer bank. More specifically, the hypothesized increase in demand for acquisition activity by banks right around the asset threshold comes from the desire to mitigate the negative effect of the regulatory compliance costs on financial statement ratios. Holding all else equal, an acquisition of a relatively larger target bank will more effectively mitigate this effect than the acquisition of a smaller target bank.[5] We test this prediction by examining the relative size of the target bank to the acquiring bank for the subset of banks in our sample that completed an acquisition. Consistent with our predictions we find that the treatment group increases the relative size of the target banks from the pre-period to the post-period relative to the same change for control group acquisitions. In terms of economic magnitude, the increase in the relative size corresponds to approximately 52% of average relative size for the treatment group. This provides further evidence that the increased demand for acquisitions documented in our main tests is indeed driven by the new regulatory compliance costs.

Although our main analyses focus on banks with incentives to engage in acquisition

[5] We do not directly examine changes in the *average* target financial statement ratio (e.g., ROA) from the pre- to post-period given that it is unclear whether the ratio would increase or decrease. This ambiguity is highlighted in the example in Appendix A.

activity, we acknowledge that implementing regulations only on banks above an asset threshold may also result in some banks taking actions in an effort to remain below the threshold to avoid the regulatory compliance costs altogether. Given that prior literature documents evidence consistent with this behavior in other settings (Gao et al., 2009) this is not a focus of our paper. Nonetheless, we perform an additional test to assess whether this behavior also exists in our setting. Specifically, we examine the demand for deposits by a treatment group with total assets between $8 and $10 billion and compare their changes to a control group.[6] We focus on the deposit mechanism since each dollar of deposits that a bank accepts increases the amount of assets on their balance sheet, and a majority of bank assets are financed by customer deposits. Results suggest that some banks below the threshold decrease both the growth rate on their deposit accounts and the interest rate paid on those accounts after the announcement of the new regulations, relative to the same changes for a control group. Taken together, these findings are consistent with a decrease in the demand for deposits by banks just below the regulatory asset threshold after passage of the new regulations, corroborating the findings in earlier studies that examine different settings and mechanisms.

We perform several additional analyses to assess the sensitivity of the main results to our research design choices and to determine whether alternative explanations might drive our results. One possibility is that there are certain bank types (i.e., "serial" acquirers) that differentially enter the treatment and control groups in the pre- versus post-periods. Thus, it might be the selection of bank types that explain our results rather than the compliance costs. We perform two different tests to address this concern. First, we perform the probability of an acquisition test using a consistent sample of banks that appear in both the pre-period and the post-period. This allows us to include bank fixed effects, which absorb any time-invariant unobservable bank characteristics.[7] Second, we perform our main tests removing likely "serial"

[6] For the group of banks with total assets between $9 and 10 billion, some will choose to cross the threshold and some will choose to remain below the threshold. We cannot cleanly identify these incentives ex-ante and therefore, take the approach of including this subset of banks in both our main tests (acquisitions) and in the additional analyses (deposits). It is important to point out that we are not arguing that banks are engaging in acquisitions *and* slowing deposit growth but are choosing either to stay below the threshold or to cross the threshold.

[7] This restriction likely results in a biased sample of banks in that we require them to exist between the upper and lower size thresholds of our sample cutoffs over a relatively long period of time.

acquirers, defined as banks with a large number of acquisitions in the pre-period. The results from these tests are consistent with those reported in the main tables, indicating that certain bank types do not appear to drive our results.

A second explanation is that some other concurrent event (e.g., the financial crisis) drives our results, rather than the compliance costs associated with the regulation. Importantly, our use of a control group mitigates this concern. However, our design would not fully rule this out if there is an event occurring at the same point in time that differentially affects the treatment and control groups. To strengthen our inferences, we perform our main tests separately using the control group of banks that are (1) only smaller than the treatment group and (2) only larger than the treatment group. As a second test with the larger only control sample, we use a continuous measure of treatment, defined as the absolute difference between $16 billion and the bank's total assets, with the presumption that the effect of compliance costs on acquisition behavior is stronger the closer a bank is to the threshold.

We find that our results continue to hold across these different specifications. This strengthens our interpretation because any alternative explanation would need to involve differences in acquisition behavior for banks immediately surrounding the threshold relative to both banks further below and those further above, ruling out explanations driven by bank size. In addition, the explanation would need to involve the treatment effect becoming stronger the closer the bank is to the threshold. These tests also suggest that our results do not hinge on the control sample used or on the imposition of a cutoff at $12 billion. Finally, the results using the larger control sample address the possibility that benefits associated with stress testing or CFPB oversight drive the behavior we document because banks in the larger control sample should also experience these benefits.

This paper should be of interest to regulators as they evaluate current regulations and implement new regulations that might include the use of bright line asset thresholds that impose requirements with fixed compliance costs. In particular, we document systematic evidence of an increase in acquisition activity for banks surrounding asset thresholds. It is important to note that we do not argue that the evidence we present indicates that bright

line thresholds in regulation should be discontinued or that the acquisitions made by banks after the implementation of the new regulations are inefficient choices. Instead, we contend that the potential for increased acquisition activity warrants consideration in evaluating the overall effect of these types of regulations.

We also make several contributions to the academic literature. Prior papers examine responses by non-financial firms to the implementation of thresholds in regulatory settings, such as the $75 million public float threshold specified in Section 404 of the Sarbanes-Oxley Act (Gao et al., 2009; Hayes, 2009). We contribute to this literature along three key dimensions. First, prior literature largely tests whether regulatory thresholds introduce incentives to stay below the threshold. We document a different incentive that can be induced by the use of regulatory thresholds, namely the increased demand for acquisition activity by banks right around the threshold. Second, prior literature does not examine the banking industry, where regulation and the use of asset thresholds are particularly prevalent. Our documentation of a mechanism used by banks in this setting constitutes novel evidence that should be of particular interest to bank regulators. Third, our focus on acquisition activity in the banking industry is relevant given recent interest in consolidation at both the top of the industry leading to banks that are "too big to fail" and at the bottom of the industry leading to the disappearance of smaller regional and community banks that serve important segments in the United States (Lux and Greene, 2015).

We also contribute to the literature examining the effects of banking regulations or accounting standards on banks' economic decisions. Prior papers in this literature typically examine the effects of specific requirements in banking regulations or accounting standards on outcomes such as risk-taking (Barth et al., 2004; Laeven and Levine, 2009; Ongena et al., 2013; Jin et al., 2013a,b) or investment decisions (Beatty, 1995; Hodder et al., 2002; Bens and Monahan, 2008; Chircop and Novotny-Farkas, 2016; Iselin and Nicoletti, 2017). We extend this literature along two dimensions. First, we examine how banks alter their behavior in response to the costs associated with regulatory requirements imposed at asset thresholds rather than the regulatory requirements themselves (e.g., the internal control provisions of

FDICIA).[8] Second, we focus on the demand for acquisition activity, which is a relatively less studied behavior with respect to the effects of banking regulation or accounting standards.

Finally, we contribute to the literature that examines the determinants of acquisition activity in the banking industry. Prior papers provide evidence of numerous reasons for banks to engage in acquisitions, including shareholder value maximization through increased market power or efficiency (Prager and Hannan, 1998; Houston et al., 2001), innovation in technology (Berger, 2003), CEO utility maximization (Hadlock et al., 1999), increased CEO compensation (Bliss and Rosen, 2001), and CEO empire building (Hughes et al., 2003).[9] We contribute to this literature by providing evidence that the use of regulatory asset thresholds that require a significant amount of fixed compliance costs also has the potential to incentivize acquisition activity in the banking industry.

2. Institutional Background and Hypothesis Development

2.1. Institutional Background

The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) was signed into law in July 2010 and includes several provisions in an effort to enhance the stability of the banking system. There are three significant requirements that are only imposed on banks with total assets greater than $10 billion, oversight by the Consumer Financial Protection Bureau (CFPB), the requirement to perform and report the results of annual stress tests (Dodd-Frank Act Stress Tests (DFAST)), and the Durbin Amendment. As previously discussed, the main aspect that makes acquisitions a viable strategy in response to the negative effect of the regulatory compliance costs on financial statement ratios is that a portion of the costs are fixed. Thus, we focus our discussion on CFPB oversight and DFAST, which are the requirements that entail more fixed compliance costs.

[8] Although Jin et al. (2013a) also examine an unintended consequence of an asset threshold, they focus on how raising the FDICIA-specified asset threshold for internal control reporting affects bank risk taking. Thus, they are interested in the removal of the requirement itself rather than banks taking actions to alter their total assets surrounding the threshold.

[9] For a complete review of this literature see De Young et al. (2009), Berger et al. (1999) or Jones and Critchfield (2005).

The CFPB is an independent bureau within the Federal Reserve that "shall seek to implement and, where applicable, enforce Federal consumer financial law consistently for the purpose of ensuring that all consumers have access to markets for consumer financial products and services and that markets for consumer financial products and services are fair, transparent, and competitive." As outlined by Dodd-Frank, the CFPB has the authority to enforce federal consumer financial laws and to conduct examinations in order to assess compliance. The 2014 CFPB enforcement report lists some of the recent targeted practices including unfair and deceptive lending, unfair billing, and credit card add-on products. The CFPB performs monitoring on a quarterly basis, at a minimum, and performs regular on-site examinations. The increased costs resulting from CFPB oversight primarily involve consultant work related to information technology systems as well as operating costs related to disclosures, back office support, and error resolutions.

The second provision related to the $10 billion threshold involves stress testing, which Dodd-Frank requires relevant banking agencies to implement. The finalized regulation includes two different stress testing requirements, "company-run" stress tests (DFAST) and "supervisory" stress tests. Mid-sized institutions, defined as those with total assets between $10 and $50 billion, are only required to conduct annual company-run stress tests, which involve assessing the sensitivity of bank health to several different scenarios issued by the Federal Reserve. The largest costs from stress testing result from the implementation of new software and data collection systems as well as expenses for consultants and other employees. In addition, banks must publicly disclose the stress test results.

An additional regulatory provision imposed on banks above the $10 billion threshold is the Durbin Amendment.[10] This provision caps the interchange fees that large banks can charge merchants for processing debit card transactions at 21 cents per transaction plus 5 basis points of the transaction value. In a typical transaction, a consumer makes a purchase from a merchant, and the merchant then remits fees to the card issuer bank and acquirer

[10]There are also other costs that banks face upon crossing this threshold, such as the requirement to maintain a stand-alone board level risk committee at public banks (Iselin, 2017). Our discussion in this section pertains to what are considered to be the most significant costs associated with the $10 billion threshold of Dodd-Frank.

bank. The Durbin Amendment applies to interchange fees, which are those remitted from the merchant to the consumer's card issuer bank. Estimates indicate that the average interchange fee received by affected banks declined from 50 cents to 24 cents pre- to post-Dodd-Frank, while the fees for unaffected banks remained relatively stable at 45 cents and 43 cents, respectively (Hayashi, 2012).

Although it is challenging to explicitly quantify the above stated costs, there is anecdotal evidence regarding the size banks need to grow to in order to "absorb" the additional costs. In a recent article, one report states that, "... a bank that crosses the $10 billion threshold will probably need to grow its assets to at least $12 billion to get 'an appropriate return'..." (Smith, 2016). This estimate is consistent with recent acquisitions involving banks surrounding the threshold. For example, Berkshire Hills Bancorp recently announced the acquisition of Commerce Bancshares, which will take the bank from $9.3 billion in total assets to about $12 billion. The CEO states that "the Commerce acquisition would enable Berkshire to "fully absorb" the impacts of crossing the $10 billion threshold (Dobbs, 2017)." Thus, although anecdotal in nature, this discussion suggests that the additional costs result in the need for banks to grow to approximately $12 billion in total assets.

2.2. Hypothesis Development

Banks that cross a regulatory asset threshold experience a large increase in compliance costs, which has a negative effect on important financial statement ratios. Because many of the costs do not vary with total assets, increasing the total assets of the bank while maintaining the same level of profitability of those assets will spread the costs over a larger asset base and reduce the negative effect on financial statement ratios.[11] Prior literature documents that bank decision making can be driven by a desire to improve regulatory capital ratios and/or accounting earnings ratios (Moyer, 1990; Collins et al., 1995; Beatty, 1995; Beatty et al., 1995; Bens and Monahan, 2008; Hodder et al., 2002; Kim and Kross, 1998; Ahmed et al., 1999). Additionally, a commonly cited reason for banks to engage in acquisitions is a

[11] We provide a numerical example to highlight this effect in Appendix A.

desire to improve financial performance of the bank, which is frequently assessed through the use of financial statement ratios such as ROA or Tier 1 capital (Prager and Hannan, 1998; Houston et al., 2001; Berger, 2003).[12] Collectively, this suggests that banks might engage in acquisitions as a means to mitigate the negative effect of new compliance costs on financial statement ratios.

Banks often evaluate acquisition opportunities by comparing their current financial position to their financial position if they engage in the acquisition. Therefore, the negative effect of new compliance costs on financial statement ratios can reduce the benchmark against which potential acquisitions are compared and turn previously unattractive banks into potential acquisition targets.[13] In addition, banks that were already attractive targets even before the new compliance costs now will become more attractive. This can increase the willingness to pay for those targets by banks right around the threshold. The increased willingness to pay will not only result in an observed increase in deal premiums, but also an increase in the probability that a treatment bank wins the bid for these potential target banks, which will increase the observed number of acquisitions made by the treatment group.

The previously discussed arguments suggest that following the imposition of additional regulations involving compliance costs at the $10 billion threshold, banks around the threshold increase their demand for acquisitions. To test for this effect, we investigate two predictions that follow from an increase in demand for acquisitions by the treatment banks. Namely, if the demand curve shifts outward we would expect to observe both an increase in the number of acquisitions made by affected banks and also an increase in the price at which those acquisitions are completed. We argue that this behavior is likely to exist at banks both just above the threshold as well as for some banks just below the threshold, who are likely making decisions in anticipation of crossing the threshold. Based on this discussion, we

[12] This is also consistent with anecdotal evidence (Bartlett, 2017; Dobbs, 2017). For example, John Asbury, CEO of Union Bankshares, states the following when discussing the pending acquisition of Xenith Bankshares: "It's a very efficient crossing of $10 billion for us with positive operating leverage. You'll see [it] is immediately accretive to earnings per share."

[13] The decision to engage in an acquisition involves other costs and benefits that are not explicitly discussed here. Our predictions and empirical tests are based on the assumption that these other costs and benefits do not differentially change from the pre-period to the post-period for the treatment vs. control groups.

formally state our two hypotheses as follows:

Hypothesis 1 *The likelihood of engaging in an acquisition increases from the pre-period to the post-period for the treatment group relative to the same change for the control group.*

Hypothesis 2 *Deal premiums increase from the pre-period to the post-period for deals made by the treatment group relative to the same change for deals made by the control group.*

3. Research Design

3.1. Treatment and Control Groups

The treatment group is defined as bank-quarters with total assets between $9 and $12 billion. Although the specific regulatory compliance costs that motivate this study apply only to banks with total assets greater than $10 billion, some banks approaching the threshold are likely anticipating the pending increase in regulatory costs. We argue that to the extent that these banks want to continue growing, they face similar incentives to those faced by banks just above the threshold. Therefore, we choose the lower bound of $9 billion to capture this behavior and be sufficiently close to the $10 billion threshold so that banks are able to effectively "leap over" the threshold (e.g., Dobbs, 2017).[14] We choose the upper bound of $12 billion based on the discussion in Section 2.1 regarding the amount of growth required to restore financial statement ratios to what they were before crossing the threshold. It is important to point out that this treatment definition does not require a bank to be classified as treatment throughout the entire sample period. However, we perform additional tests in Section 4.4 to assess whether certain bank types are driving the results.

We use a control group that includes bank-quarters with total assets both smaller than and larger than the treatment group. Specifically, the control group comprises bank-quarters with total assets between $5 and $9 billion and those with total assets between $12 and $16 billion. We include both groups as controls in an effort to mitigate the shortcomings of each.[15]

[14] We acknowledge that not all banks will take actions in anticipation of crossing the threshold. However, we note that results are qualitatively similar, if we instead define treatment as banks with total assets between $10 and $12 billion. Further, we examine incentives for some banks to remain below the threshold in Section 4.3.2.

[15] In additional analyses described in Section 4.4, we discuss results when using each of the two control groups individually.

The control group of smaller banks is advantageous in that it is not subject to the regulatory compliance costs. However, smaller banks may have incentives to remain below the threshold, making them less similar to the treatment group. Alternatively, operating strategies of the larger banks are arguably more similar to those of the treatment group, but these banks are also potentially affected by the new regulatory costs. Importantly, many of the additional costs incurred to comply with the new regulations are largely independent of the total assets of the bank, especially in the asset range of banks we examine. For this reason, we expect the impact of the regulations on acquisition activity to decrease the further above the threshold a bank gets. Thus, we argue that the acquisition incentives of these larger banks are less affected by the additional compliance costs relative to those of the treatment group.

3.2. Difference-in-differences

We use a difference-in-differences design to investigate the effects of interest. This involves comparing the acquisition activity and deal premiums of banks between $9 and $12 billion in the pre-period to those between $9 and $12 billion in the post-period (collectively, the "treatment group"). We then compare this change to the same change for the control group described above. This design is advantageous for two reasons.[16] First, it allows us to benchmark the extent of acquisition activity surrounding the threshold in the post-period with the extent of activity for banks of similar size in the pre-period. This mitigates concerns that our results are simply capturing the possibility that banks surrounding the $10 billion threshold have fundamentally different acquisition behavior. Second, assuming that the parallel trends assumption holds, it allows us to disentangle the effects of the regulatory compliance costs from other concurrent macroeconomic changes.

The parallel trends assumption is critical to this design and states that outcomes for the treatment and control groups would have followed parallel trends absent treatment. Although

[16] At first glance a regression discontinuity design (RDD) may seem more appropriate given that we are interested in changes around a threshold. However, we specifically predict that banks will be manipulating the forcing variable (total assets) by engaging in acquisition activity. While this does not completely rule out the ability to use an RDD, doing so would require an analysis of banks within a close window around the threshold and would leave us with insufficient sample size to draw valid statistical inferences.

this assumption is fundamentally untestable, we attempt to provide support for it in two ways. First, we select a control sample of banks that are as similar as possible to the treatment group with respect to bank size and examine the similarity between treatment and control banks on observable dimensions in Table 1 and Table 2. Specifically, we tabulate normalized differences for all variables used in our analyses and report that for all covariates these differences are below 0.25, which is the recommended threshold to determine specification sensitivity (Imbens and Wooldridge, 2009). Second, we calculate the quarter-to-quarter change for each of our outcome variables in the pre-period and perform t-tests to assess whether treatment and control groups are trending similarly. This analysis reveals that the majority of quarter-to-quarter changes are insignificantly different between the treatment and control groups.[17] Importantly, the parallel trends assumption does not require that the *level* of the outcome is the same in the pre-period as any difference is absorbed through inclusion of the treatment indicator (Roberts and Whited, 2013).

We formally test our first hypothesis, which examines the likelihood of engaging in an acquisition, by estimating the following logistic regression:

$$\begin{aligned} Pr(Acquire_{i,q} = 1) = {} & \delta_0 + \delta_1 Treat_{q-1} + \delta_2 Post_{i,q-1} + \boldsymbol{\delta_3 Treat_{i,q-1} * Post_q} \\ & + \delta_4 Size_{i,q-1} + \delta_5 LLR_{i,q-1} + \delta_6 NAL_{i,q-1} + \delta_7 Loans_{i,q-1} + \delta_8 ROA_{i,q-1} + \delta_9 Dep\_Loans_{i,q-1} \\ & + \delta_{10} Tier1_{i,q-1} + \delta_{11} \Delta Assets_{i,q-1} + \delta_{12} Commercial_{i,q-1} + \delta_{13} RealEstate_{i,q-1} \\ & + \delta_{14} Consumer_{i,q-1} + \delta_{15} Public_{i,q-1} + \delta_{16} Prev\_Acquire_{i,q-1} + \epsilon_{i,q} \end{aligned} \quad (1)$$

The unit of observation is the bank-quarter level and variables are defined as follows:

Acquire - an indicator variable equal to one if the bank engaged in an acquisition during quarter q and zero otherwise
Treat - an indicator variable equal to one for bank-quarters with total assets between \$9 and \$12 billion and zero for bank-quarters with total assets between either \$5 and \$9 billion or between \$12 and 16 billion
Post - an indicator equal to one for observations in 2011 - 2016 and equal to zero for observations in 2003 - 2008
Size - the natural log of total assets
LLR - the loan loss reserve as a percentage of total assets
NAL - nonaccrual loans as a percentage of total loans

[17] Specifically, for the test of Hypothesis 1 (the frequency of an acquisition), 22 out of 24 quarter changes are not significantly different. Given the sample size for Hypothesis 2 (goodwill), we perform the test at the annual level and do not document any significant differences.

Loans - total loans as a percentage of total assets
ROA - net income as a percentage of total assets
Dep_Loans - total deposits scaled by total loans
*Tier*1 - the Tier 1 capital ratio
$\Delta Assets$ - the change in total assets scaled by lagged total assets
Commercial - total commercial loans as a percentage of total loans
RealEstate - total real estate loans as a percentage of total loans
Consumer - total consumer loans as a percentage of total loans
Public - an indicator equal to one if the bank's equity is publicly traded and zero otherwise
Prev_Acquire - an indicator variable equal to one if the bank engaged in an acquisition in the prior 12 months and zero otherwise

The coefficient of interest, δ_3, captures the change in the likelihood of engaging in an acquisition from the pre-period to the post-period for the treatment group relative to the same change for the control group and is predicted to be positive. Control variables are included to capture any differences between the treatment and control groups that might also affect acquisition activity. These include bank characteristics such as size (*Size*), trading status (*Public*), growth history ($\Delta Assets$), and past acquisition activity (*Prev_Acquire*), as well as measures of bank performance by including return on assets (*ROA*), and Tier 1 capital (*Tier*1). Further, we control for several characteristics of the loan portfolio (*Loans*, *Commercial*, *RealEstate*, *Consumer*) as well as liquidity needs (*Dep_Loans*) and the current level of risk in the bank's loan portfolio (LLR, NAL). We measure the control variables as of the most recent quarter end before the acquisition is announced ($q-1$). All continuous variables are winsorized at the 1st and 99th percentiles and standard errors are clustered at the bank level.

Our second hypothesis examines whether the premium paid for acquisitions by the treatment group changes following the announcement of the additional compliance costs, relative to the changes in deal premiums for control group acquisitions. As previously discussed, because a majority of the target banks in our acquisition sample are private banks, we are unable to measure deal premiums by comparing market value to purchase price. For this reason we investigate *Goodwill* as a proxy for the deal premium.[18] We estimate a tobit

[18]This is more likely to capture deal premium for banks compared to industrial firms due to the large proportion of bank assets that have readily observable market values.

model to account for the fact that *Goodwill* is bounded below at zero, representing the possibility of a corner solution. We again use a difference-in-differences specification to test this hypothesis by estimating the following regression:

$$\begin{aligned} Goodwill_{i,q} = {} & \beta_0 + \beta_1 Treat_{q-1} + \beta_2 Post_{i,q} + \boldsymbol{\beta_3 Treat_{i,q-1} * Post_q} + \beta_4 T\_Size_{i,q-1} \\ & + \beta_5 T\_NonInt_{i,q-1} + \beta_6 T\_ROA_{i,q-1} + \beta_7 T\_Capital_{i,q-1} + \beta_8 T\_NAL_{i,q-1} + \beta_9 T\_LLR_{i,q-1} \\ & + \beta_{10} T\_Dep\_Loans_{i,q-1} + \beta_{11} B\_New\_Market_{i,q-1} + \beta_{12} B\_ROA_{i,q-1} + \epsilon_{i,q} \end{aligned} \tag{2}$$

The unit of observation is the acquisition level. Similar to Equation (1), the coefficient on the interaction term $Treat * Post$ is of primary interest. This coefficient represents the change in *Goodwill* for acquisitions completed by the treatment group from the pre-period to the post-period, relative to the same change for acquisitions by the control group. Control variables in this regression are defined the same as for the prior regression with the exception of the following:

Goodwill - the percentage of the total deal value (excluding the assumption of any liabilities) recognized as goodwill
T_NonInt - non-interest expense as a percentage of total assets
B_New_Market - an indicator variable equal to one if the acquisition expands the acquirer bank into a new geographic market and zero otherwise

In addition, each control variable that is preceded by a $T\_$ relates to the target bank and each control variable preceded by a $B\_$ relates to the buyer or acquirer. We primarily control for characteristics of the target bank in this regression as they are likely to affect the valuation of the target's net assets and thus the amount of goodwill recognized in the transaction. Additionally, we control for whether the acquisition takes the acquirer into a new geographic market (B_New_Market), and the acquirer's return on assets (B_ROA). Continuous variables are again winsorized at the 1st and 99th percentiles, and standard errors are clustered at the acquirer bank level.

4. Sample Selection and Results

4.1. Sample Selection and Descriptive Statistics

For the test examining the likelihood of engaging in an acquisition, we begin with bank holding companies filing quarterly FR Y-9C reports during the sample period that have total assets between $5 and $16 billion. We focus on bank holding companies given that the relevant regulatory requirements are applied at the top-level of the organization.[19] We obtain acquisition data from the SNL Mergers and Acquisitions database. We exclude deals that were terminated, were thrift merger conversions, were government-assisted, or involved within holding company acquisitions. The sample period for these tests include bank-quarters between 2003 - 2008 as the pre-period and bank-quarters between 2011 - 2016 as the post-period. We exclude 2009 and 2010 because this is the time period during which the Dodd-Frank regulations were discussed. The control variables are measured using financial statement data from the FR Y-9C from the end of the previous quarter. Our final sample for this test is comprised of 3,415 bank-quarter observations.

We present descriptive statistics for the acquisition frequency test in Table 1. Panel A reports the descriptives for the full sample and shows that about 20 percent of the sample consists of treatment observations, which means 80 percent are control observations (the mean value of $Treat$ is 0.207). It also shows that an acquisition occurs in 8.2% of our bank-quarter observations. Panel B presents the normalized differences for each variable between the treatment ($Treat = 1$) and control ($Treat = 0$) groups. Imbens and Wooldridge (2009) note that normalized differences greater than 0.25 can result in specification sensitivity, and argue that normalized differences can be preferable to standard t-tests to evaluate differences in covariates because they are independent of sample size. Panel B indicates that all of the control variables have a normalized difference below the recommended threshold of 0.25 suggesting that differences in the covariates of the treatment and control groups are less likely to be an issue in drawing inferences from our results.

[19] This feature prevents bank holding companies from dividing their subsidiary banks into institutions that each have total assets below $10 billion to avoid the requirements.

The sample to examine the effect of asset thresholds on *Goodwill* involves acquisition-level data and is comprised of the observations from the Hypothesis 1 sample that engaged in an acquisition during our sample period, which results in 268 unique deals. Deal characteristics are obtained from SNL while financial statement control variables are calculated from a combination of FR Y-9C and Call report data. Specifically, for targets that are bank holding companies, we use FR Y-9C data and for those that are commercial banks, we use Call report data. If the target is a bank holding company with total assets below the FR Y-9C filing threshold ($150 million until December 2005, $500 million until December 2014, $1 billion thereafter), we obtain Call report data for the subsidiary bank(s).

We present descriptive statistics for the goodwill test in Table 2. Panel A again reports the descriptives for the full sample and Panel B separately reports the descriptives for the treatment and control observations. Panel A of Table 2 shows that around 25% of the observations involve acquisitions made by the treatment group as $Treat$ takes a value of 0.246. This is the result of 66 acquisitions by treatment banks and 202 acquisitions by control banks. Additionally, the mean of *Goodwill* shows that for the average deal in our sample, 50 percent of the deal value is recognized as goodwill. Panel B shows that all variables in the test of Hypothesis 2 have a normalized difference below 0.25. These results again suggest that differences in the distributions of control variables between the treatment and control samples are unlikely to hinder our ability to draw valid inferences.

4.2. Results

4.2.1. Distribution of Bank-Quarters by Asset Size

Before proceeding to the formal hypothesis tests, Figure 1 plots the percentage of bank-quarters in the pre-period and post-period that have an ending total asset balance in each billion dollar bucket. For example, approximately 17% of observations in the post-period have total assets between $5 and $6 billion. In the pre-period, the figure illustrates that the frequency of bank-quarters across size buckets is a relatively monotonic decreasing function. However, in the post-period, there is a smaller percentage of banks with total assets between

$10 and $11 billion relative to either the $9 billion bucket or the $11 billion bucket. Although descriptive in nature, the figure provides some initial evidence in support of our prediction, that in the post-period banks do not want to remain just above the $10 billion threshold.

4.2.2. Main Results

Hypothesis 1 involves changes in the likelihood of engaging in an acquisition by banks right around the regulatory asset threshold, relative to the same changes for the control group.[20] Table 3 presents the results of estimating Equation (1). Column (1) presents the results of a logistic regression of whether the bank engaged in an acquisition on $Treat$, $Post$, and their interaction, along with control variables. Due to the incidental parameters problem we do not include fixed effects in this specification, but we present a linear probability model in Column (2) that does include year fixed effects.[21] Results in both columns show a positive and significant coefficient estimate on the interaction term between $Treat$ and $Post$, which indicates an increase in acquisition activity for the treatment group from the pre-period to post-period relative to the same change for the control group. The marginal effect of the estimate in Column (1) corresponds to an increase in the likelihood of engaging in an acquisition of 5.7 percentage points. This represents an increase of approximately 62% compared to the unconditional probability of engaging in an acquisition for the treatment group.

Testing Hypothesis 2, which relates to the deal premium, requires a reduction in the sample from all bank-quarters to only those bank-quarters that include an acquisition. Table 4 presents the results of estimating Equation (2) with *Goodwill* as the dependent variable. The coefficient of interest again relates to the interaction term, $Treat * Post$. Column (1) presents the results of a tobit regression, and Column (2) presents the results of an ordinary least squares regression that includes year fixed effects. The coefficient estimate on the

[20] An alternative strategy for treatment group banks would be to become a target bank. Untabulated analysis reveals that only 3 banks between $9 and $12 billion are acquired in the post-period.

[21] Similar to Gao et al. (2009), we do not include bank fixed effects in this specification given that a subset of our sample observations do not appear in both the pre- and post-period. However, we perform an additional test in Section 4.4 using a sample of banks present for several quarters in both the pre- and post-period and include bank fixed effects in that specification.

interaction term is positive and significant in both columns, consistent with Hypothesis 2. In terms of economic magnitude, the coefficient in Column (2) corresponds to an increase of 42% relative to the average goodwill to deal value ratio for our treatment group. This suggests that the change in the proportion of the deal recognized as goodwill in acquisitions by the treatment group from the pre-period to the post-period is larger than the same change for the control sample.

The combined results from Table 3 and Table 4 suggest that after the passage of regulations which require significant compliance costs for banks above $10 billion in total assets, the treatment group increases both the quantity of acquisitions and the price at which those acquisitions are completed. Our conclusion from these two pieces of evidence is that the demand for acquisitions by those banks increases after the passage of the new regulations. We cannot fully rule out a simultaneous change in the supply of potential acquisition targets. However, we attempt to account for any changes in target bank supply using our difference-in-differences design. Additionally, assuming a downward sloping demand curve, even if there is a differential supply effect for treatment versus control observations, a supply effect alone cannot explain our results. An increase in the supply would result in an increase in quantity but a *decrease* in price, while a decrease in supply would result in an increase in price but a *decrease* in quantity.

4.3. Additional Analyses

4.3.1. Relative Size of Target Banks

We predict that the introduction of additional regulatory compliance costs above a specific asset threshold potentially affects acquisition activity because many of the costs do not vary with total assets. Thus, increasing the total assets of the bank while maintaining the same level of profitability of those assets will spread the costs over a larger asset base and reduce the negative effect on financial statement ratios. If part of the effect that we document in our main analysis is driven by this desire for growth then holding all else equal, we should see that the treatment group is acquiring relatively larger banks in the post-period.

We test this prediction using the acquisition-level sample. Specifically, we create the variable *Rel_Size*, which is the total assets of the target bank divided by the total assets of the acquiring bank before the acquisition. We then replace the dependent variable in Equation (2) (the *Goodwill* test) with this relative size variable. We expect a positive and significant coefficient estimate on the interaction term.

We report the results of this test in Table 5. Column (1) reports results of an OLS regression without year fixed effects and Column (2) reports results including year fixed effects. Across both columns the coefficient estimate on $Treat * Post$ is positive and significant, suggesting that the increase in the relative size of targets for treatment group acquisitions is larger than the same change for control group acquisitions. The increase represents approximately 52% of the average relative size for the treatment group. This finding provides further support of the hypothesized channel through which introducing new regulations only on banks above a specific asset threshold can affect acquisition activity by the banks right around that threshold.

4.3.2. Incentives to Stay Below the Threshold

While the focus of this paper is on the effect of regulatory asset thresholds on acquisition activity, we acknowledge that the creation of these thresholds may incentivize some banks that are below the threshold to make efforts to remain below the threshold. There are several mechanisms that a bank might rely on in an effort to stay small. However, the largest source of financing on banks' balance sheets is their customer deposits, representing an average of 73% of total assets for the banks in our sample. Therefore, we argue that one of the more readily available mechanisms through which a bank can limit its total size is to reduce its demand for customer deposits. Reducing deposit growth limits the cash banks have available to invest in loans, investment securities or other assets, and will potentially result in the bank being able to remain below the $10 billion asset threshold. We explore this possibility by investigating two predictions associated with a decrease in demand for customer deposits, namely a decline in the deposit growth rate and a decline in the interest rate paid on those

deposits by banks just below the threshold.

To investigate these predictions, we run the following regressions, which follow prior literature modeling changes in deposit growth and interest rates (Martinez Peria and Schmukler, 2001; Berger and Turk-Ariss, 2015):

$$\begin{aligned} Dep\_Growth_{i,q} \text{ or } Dep\_Interest_{i,q} = {} & \gamma_0 + \gamma_1 Treat\_D_{q-1} + \gamma_2 Post_{i,q} + \boldsymbol{\gamma_3 Treat\_D_{i,q-1} * Post_q} \\ & + \gamma_4 Size_{i,q-1} + \gamma_5 LLR_{i,q-1} + \gamma_6 NAL_{i,q-1} + \gamma_7 Loans_{i,q-1} + \gamma_8 ROA_{i,q-1} + \gamma_9 Tier1_{i,q-1} \\ & + \gamma_{10} Commercial_{i,q-1} + \gamma_{11} RealEstate_{i,q-1} + \gamma_{12} Consumer_{i,q-1} + \gamma_{13} Public_{i,q-1} \\ & + \gamma_{14} FedFunds_{i,q-1} + \epsilon_{i,q} \end{aligned} \tag{3}$$

We define an alternate treatment variable $Treat\_D$, which is equal to one for bank-quarters with total assets between \$8 and \$10 billion and zero for other observations in the sample. We then separately replace the dependent variable in Equation (1) with either Dep_Growth, which is the natural log of deposits at the end of quarter q minus the natural log of deposits at the beginning of quarter or $Dep\_Interest$, which is the average interest rate paid on deposit accounts during the quarter. We expect a negative and significant coefficient on the interaction term between $Treat\_D$ and $Post$. All control variables are as previously defined except for $FedFunds$, which is the end-of-quarter federal funds rate.

Table 6 presents the results of these regressions. Columns (1) and (2) show results for Dep_Growth and Columns (3) and (4) show results for $Dep\_Interest$. Year fixed effects are excluded in Columns (1) and (3) and are included in Columns (2) and (4). Across all four columns we report negative and significant coefficients on the interaction term suggesting that bank-quarters just below the threshold decrease both the growth rate in customer deposits and the price that banks are willing to pay for those deposits, presumably in an effort to remain below the \$10 billion threshold. This evidence is consistent with some banks just below the threshold reducing their demand for deposits and complements the findings in prior literature documenting actions taken by non-financial firms to avoid crossing regulatory thresholds (Gao et al., 2009).

4.4. Alternative Explanations

In this section, we discuss three potential concerns related to our research design and perform additional analyses to determine whether those concerns might be driving our results. One concern relates to inherent bank characteristics and the fact that because banks generally grow quarter-to-quarter, banks will be entering or exiting the sample given that our treatment and control definitions are based on the total assets of the bank in each quarter. This could hinder our ability to draw valid inferences if banks that have inherently different acquisition incentives are entering or exiting the sample. Specifically, our results could be confounded if "serial" acquirers were more likely to be part of the control group in the pre-period. Although the precise mechanism that would result in the serial acquirer difference is not apparent, we take two approaches to address this concern.

First, we perform the probability of an acquisition test using only banks that appear in our sample for at least 6 quarters in the pre-period and at least 6 quarters in the post-period. This requires banks to be present for a minimum of 25% of the pre-period as well as 25% of the post-period.[22] An appealing feature of this analysis is that we are able to include bank fixed effects, which absorb any time-invariant unobservable bank characteristics. The downside is that we are biasing our sample to require banks to survive and stay within the size cutoffs for inclusion in our sample for at least 5 years. The results of this test are presented in Column (1) of Table 7 and continue to indicate a positive and significant coefficient on the interaction term $Treat * Post$. This finding mitigates concerns that there are certain bank types that are driving the results. We are unable to perform this analysis for our test of Hypothesis 2 because of the limited sample size due to the analysis taking place at the deal-level.

As a second test, we specifically examine whether there are "serial" acquirers that differentially appear in the treatment versus control groups during the pre-period. We examine the distribution in the number of acquisitions across the treatment and control

[22] Results are similar if we instead require banks to be present for at least 8 or 10 quarters in the pre- and post-periods.

groups in the pre-period and find that the distributions are largely similar. However, there are a few banks in the control group that engaged in a significant number of acquisitions in the pre-period. To determine whether this drives our results, we exclude banks for which there is no overlap between the treatment and control groups in the number of pre-period acquisitions, which is banks that engaged in more than seven acquisitions during the pre-period. Table 7 presents the results of performing this test for the *Acquire* sample in Column (2) and for the *Goodwill* sample in Column (3). Both columns indicate a positive and significant coefficient on $Treat * Post$, indicating that our results are not driven by the presence of "serial" acquirers in the control group in the pre-period.

A second concern is that some other event or trend that is unrelated to the new regulations (e.g., the financial crisis) affected bank acquisition activity. Although our sample period experienced significant changes in macroeconomic conditions, our use of a control group as well as year fixed effects mitigates this concern because it would have to be the case that the treatment banks were differentially affected relative to the control banks. To strengthen the case that such an alternative explanation is challenging to identify, we perform two additional sensitivity tests with respect to our control sample and treatment definition.

Specifically, our main tests include both banks both smaller and larger than the treatment group as control observations since both groups have different shortcomings that leave us without an ideal control group. Therefore, the first test involves performing our main tests including either (1) only the smaller banks ($5 billion to $9 billion) or (2) only the larger banks ($12 billion to $16 billion) as the control sample. The second test we perform relaxes the binary definition of treatment when we use the larger control group. We predict that although larger banks are subject to the new regulations, the impact on the financial statement ratios of these banks will be smaller, and thus the effects on acquisition activity should be smaller. To more directly test this we transform our treatment variable into a continuous variable $Treat\_Dist$ measured as $16 billion minus the total assets for the given bank-quarter expressed in billions. This variable takes a value of 7 for a $9 billion bank and

a value of 0 for a $16 billion bank.[23]

We present results for each of these alternative specifications in Table 8. Columns (1) and (4) present results using the smaller control group only for the acquisition and goodwill tests, respectively. Similarly, Columns (2) and (5) present results using the larger control group only, and Columns (3) and (6) present results using the larger control group as well as the continuous treatment measure. Across all specifications, the interaction term is positive and significant. This strengthens our inferences because any alternative explanation would need to explain why the treatment group experiences greater acquisition frequency and deal premiums relative to the same change for banks that are separately either (1) further below the threshold or (2) further above the threshold, which rules out explanations driven exclusively by bank size. Further, the alternative explanation would need to explain why the treatment is stronger the closer a bank is to the $10 billion threshold. Finally, this provides evidence that the decision to use a control group with banks that are both larger and smaller than the treatment group is not driving our results and that our results are not sensitive to the choice of $12 billion as the distinction between treatment and control observations.

A final concern is that even though the regulations surrounding Dodd-Frank may be the driver of the behavior we document, it is a different part of the regulation that is driving results. Alternatively, it could be the case that complying with the additional requirements result in benefits to the bank that make acquisitions more attractive. This is unlikely to be a significant concern given that, as shown in Table 8, we perform our tests using a group of control banks that are only larger than the treatment banks. Thus, for that specification, the control group is subject to the same regulations and would presumably experience the same benefits as the treatment group. This leaves the primary difference between these two groups as the extent to which fixed compliance costs affect bank financial statement ratios.

[23] We acknowledge that this assumes the incentives for a $9 billion bank are stronger than those for a $10 billion bank. We have also run this test excluding banks between $9 and $10 billion with qualitatively similar results.

4.5. Additional Robustness Tests

We investigate additional variations on our choices of control groups. Specifically, we assess the sensitivity of the results to the choice of the top and bottom cutoffs for the control sample. We rerun the main tests using cutoffs for the control groups that are both one billion dollars larger and one billion dollars smaller than the cutoff presented in the main tests. This translates to cutoffs of $4 and $17 billion in one specification and $6 and $15 billion in another specification. Untabulated results yield qualitatively similar inferences for each of these alternative specifications.

Finally, we examine the sensitivity of our results to the selection of the pre-period. We include observations in the pre-period through the end of 2008 as Dodd-Frank and the corresponding thresholds were first discussed in 2009. However, according to the NBER the financial crisis officially began in Q4 2007. To ensure that changes associated with the crisis in general are not affecting our inferences we rerun our analyses with two different pre-period definitions. Specifically, we run specifications that define the pre-period as either 2002 - 2007 or 2002 - Q3 2007 and find qualitatively similar results to those presented in the main tests.[24]

5. Conclusion

This paper investigates the potential effect of imposing regulations on banks that exceed a specific threshold in terms of total assets on acquisition activity of banks around that threshold. We use the additional regulations imposed on banks above the $10 billion asset threshold by the Dodd-Frank act as a setting to address this question and investigate changes in both the likelihood of engaging in an acquisition and the deal premium paid in an acquisition. We first document that after the passage of the regulations, banks just above the threshold become more likely to engage in an acquisition relative to the same change for a control sample. Second, we find that acquisitions by the treatment group in the post-period result in a larger portion of the total deal value that is recognized as goodwill relative to the same changes for acquisitions made by the control group. Collectively, these findings

[24]The post-period for both of these tests continues to be defined as 2011 - 2016.

are consistent with an increase in the demand for acquisitions by banks right around the threshold.

In subsequent analysis we find that the relative size of targets in acquisitions by the treatment group increases more from the pre- to the post-period than the same change for acquisitions by the control group. This finding supports the conclusion that the results we document are driven by the increased compliance costs associated with the new regulation. Additionally, we provide some initial evidence that there is also an effect on banks below the threshold. We show that some of these banks have an incentive to stay small to avoid incurring the additional compliance costs and that they reduce their deposit growth rate and the interest rate paid on deposit accounts in an effort to do just that.

These findings are subject to a few caveats. First, we only examine changes around the announcement of additional compliance costs surrounding one specific asset threshold. While we believe the intuition and predictions should generalize to other thresholds, we do not provide any evidence to support that conjecture. Second, it is possible that incentives related to acquisition activity change for reasons unrelated to the new compliance costs. Importantly, the use of a difference-in-differences research design mitigates this concern to the extent that those changes did not differentially affect the treatment and control groups. Although we cannot fully rule out this possibility, it is worth noting that an alternative explanation for our results would require a change that differentially affected acquisition activity for banks between $9 and $12 billion compared to both banks between $5 and $9 billion and between $12 and $16 billion. It would also have to result in those same banks engaging in acquisitions of larger targets and the main effects would have to be stronger for banks closer to the $10 billion threshold.

This paper should be of particular interest to bank regulators as they continue to evaluate how to ensure the safety and soundness of the financial system through regulation. We do not interpret our results as suggesting that the use of asset thresholds in banking regulation should be discontinued as we do not evaluate the benefits of their use or any alternative regulatory tools. Instead, this paper suggests that imposing significant additional

fixed compliance costs on banks at a specific threshold may contribute to consolidation in the banking industry, which warrants further consideration by regulators as they evaluate current regulations and future regulatory changes.

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Appendix A: Numerical example of the effect of additional compliance costs

		ROA No Compliance Costs (1)	ROA With Compliance Costs (2)	(3)
Acquirer Bank 1: $10 billion bank				
Bank Income	100	Status Quo	Status Quo	
Compliance Costs	20	1.000%	0.800%	
Bank Assets	10,000			
				Percent
Target 1 Income	20	Acquire Target 1	Acquire Target 1	**Improvement**
DV for Target 1	2,000	1.000%	0.833%	**4.2%**
Pro Forma ROA	1.00%			
Target 2 Income	17.0	Acquire Target 2	Acquire Target 2	
DV for Target 2	2,000	0.975%	0.808%	**1.0%**
Pro Forma ROA	0.85%			
Acquirer Bank 2: $15 billion bank				
Bank Income	150	Status Quo	Status Quo	
Compliance Costs	20	1.000%	0.867%	
Bank Assets	15,000			
Target 1 Income	20	Acquire Target 1	Acquire Target 1	
DV for Target 1	2,000	1.000%	0.882%	**1.8%**
Pro Forma ROA	1.00%			
Target 2 Income	17.0	Acquire Target 2	Acquire Target 2	
DV for Target 2	2,000	0.982%	0.865%	**-0.2%**
Pro Forma ROA	0.85%			

This example highlights the effect of additional fixed compliance costs on a bank's incentives to engage in an acquisition. There are two potential acquirer banks, each with two potential target banks. Acquirer Bank 1 is assumed to have $10 billion in assets and an ROA of 1%. Acquirer Bank 2 is assumed to have $15 billion in assets and also have an ROA of 1%. Each of the target banks are assumed to result in a net deal value of $2 billion, which if acquired would increase the total assets of the acquirer bank by $2 billion. Target Bank 1 reports net income of $20 million, resulting in a pro forma ROA of 1.00%. Target Bank 2 reports net income of $17 million, resulting in a pro forma ROA of 0.85%. Prior research documents that banks are incentivized to maintain performance ratios, including ROA and make decisions in an effort to maximize those ratios (Moyer, 1990; Collins et al., 1995; Beatty, 1995; Beatty et al., 1995; Bens and Monahan, 2008; Hodder et al., 2002; Kim and Kross, 1998; Ahmed et al., 1999). We lean on these findings and assume that the Acquirer Bank is interested in maximizing the reported ROA. We use this decision rule to separately evaluate whether the acquirer banks would prefer to acquire each of the target banks or forgo the acquisition under two different scenarios, with and without the additional fixed compliance costs of $20 million per year. (continued on next page)

Column (1) reports the pro forma ROA in the scenarios without the additional compliance costs. For Acquirer Bank 1 it shows that without an acquisition the ROA would remain at 1.00%, that acquiring Target Bank 1 would also leave the ROA unchanged, and that acquiring Target Bank 2 would reduce the ROA to 0.975%. Column (2) reports the pro forma ROA in the scenarios with the additional compliance costs imposed on the acquirer bank. It shows that without an acquisition the additional compliance costs would drive the ROA down to 0.80%, that by acquiring Target Bank 1 the ROA would only drop to 0.833%, and that even by acquiring Target Bank 2, which was an unattractive option without the compliance costs, would result in a 0.808% ROA, which is still preferable to the 0.80% under the no acquisition scenario. Acquiring Target Bank 1 would improve the ROA by 4.2% and acquiring Target Bank 2 would improve the ROA by 1.0%.

Comparing across the two columns we see that the introduction of the compliance costs makes the acquisition of Target Bank 1 quite attractive, which was previously a proposition that left Acquirer Bank 1 indifferent. We also see that the acquisition of Target Bank 2 is preferable to the status quo. This acquisition was an unattractive proposition absent the compliance costs.

Moving down to Acquirer Bank 2, we again see that the implementation of the compliance costs makes the acquisition of Target Bank 1 more attractive relative to the status quo. However, when we examine the effect of acquiring Target Bank 2, Acquirer 2 would prefer to forego this acquisition. Column (3) which shows the improvement over the status quo of each of the two acquisitions, we see that acquiring Target Bank 1 yields an 4.2% improvement for the $10 billion acquirer bank, but only a 1.8% improvement for the $15 billion acquirer bank. A similar comparison is shown when examining the acquisition of Target Bank 2 with an improvement of 1.0% for Acquirer Bank 1 and a decrease in ROA of 0.2% for Acquirer Bank 2. These comparisons show that the incentives to engage in an acquisition of the larger, $15 billion bank are less affected relative to the smaller $10 billion bank. This helps validate our use of banks larger than the treatment banks as a suitable group of control banks.

There are additional costs and benefits associated with acquisitions and considerations besides simply comparing ROA before and after the acquisition. However, we argue that those costs and benefits should not differentially change for the treatment banks relative to the control banks in our research design, and thus will be controlled for in our empirical tests. Additionally, this example is only meant to highlight that to the extent that banks do care about ROA, or any other financial statement ratio that is relative to firm size (e.g., Tier 1 Capital Ratio), the additional compliance costs can alter acquisition decisions in such a way that acquisitions become more common in the presence of the compliance costs.

Figure 1: Percent of bank-quarter s by asset size

This figure separately shows the percentage of bank-quarter observations in the pre-period (Q1 2003 - Q4 2008) and the post-period (Q1 2011 - Q4 2016) that have ending assets in each of the billion dollar buckets (e.g., roughly 21% of bank-quarter observations in the pre-period have end of quarter total assets between $5 and $6 billion).

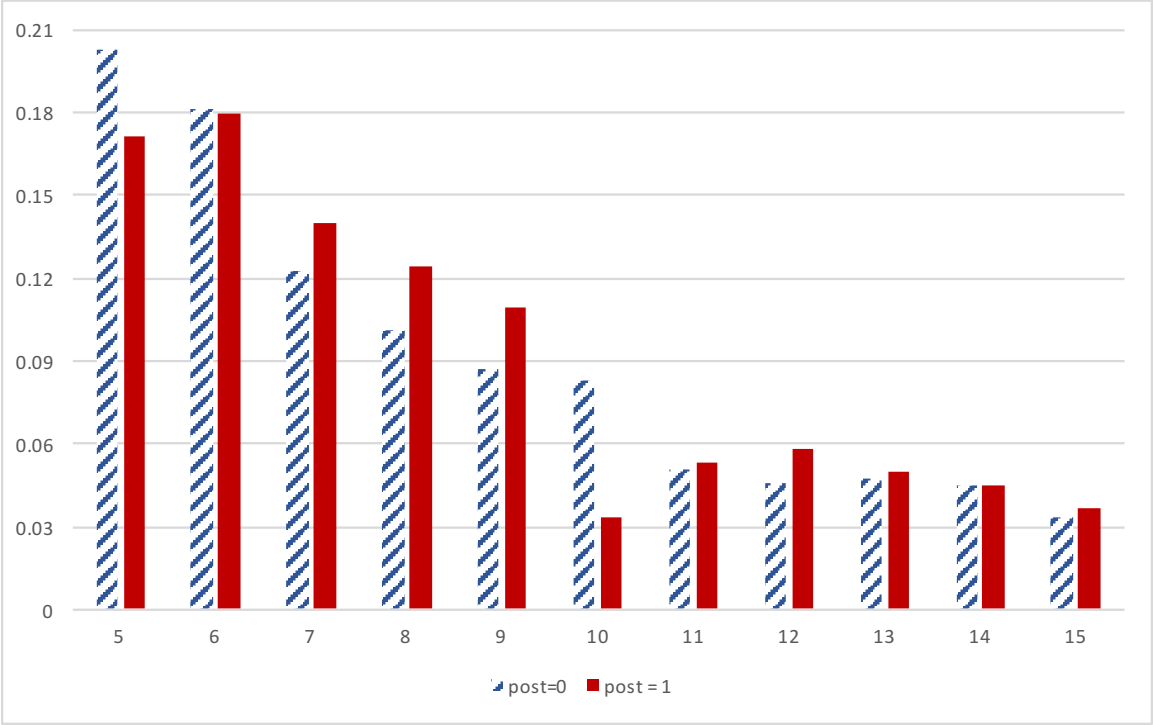

Table 1: Descriptive statistics for acquisition frequency test

This table reports descriptive statistics for the bank-quarter observations used in the acquisition frequency test. Panel A presents distributional statistics, and Panel B presents normalized differences across the treatment group, $Treat = 1$ (total assets between \$9 and \$12 billion), and the control group, $Treat = 0$ (total assets between \$12 and \$16 billion or between \$5 and \$9 billion). The normalized difference is used to assess the covariate balance between the subsamples and is calculated as follows: $\frac{\bar{X}_a - \bar{X}_b}{\sqrt{{s_a}^2 + {s_b}^2}}$ where $\bar{X}$ and s^2 are the subsample mean and subsample variance, respectively. Continuous variables are winsorized at the 1st and 99th percentiles.

Panel A: Distributional Statistics

Variable	N	Mean	Std Dev	10th Pctl	25th Pctl	Median	75th Pctl	90th Pctl
Acquire	3,415	0.082	0.274	0.000	0.000	0.000	0.000	0.000
Post	3,415	0.529	0.499	0.000	0.000	1.000	1.000	1.000
Treat	3,415	0.207	0.405	0.000	0.000	0.000	0.000	1.000
LLR	3,415	0.901	0.439	0.434	0.649	0.851	1.097	1.455
Size	3,415	15.933	0.323	15.525	15.659	15.896	16.185	16.422
Dep_Loans	3,415	1.225	0.393	0.901	1.017	1.134	1.301	1.608
ROA	3,415	0.261	0.284	0.085	0.179	0.252	0.322	0.399
Loans	3,415	63.035	14.464	44.613	57.253	66.228	72.255	77.211
NAL	3,415	1.667	2.288	0.273	0.508	0.878	1.805	3.719
*Tier*1	3,415	13.615	6.330	9.222	10.409	12.193	14.612	18.187
ΔAssets	3,415	2.366	5.704	-2.030	-0.343	1.250	3.334	7.452
Prev_Acquire	3,415	0.292	0.455	0.000	0.000	0.000	1.000	1.000
Public	3,415	0.770	0.421	0.000	1.000	1.000	1.000	1.000
Commercial	3,415	18.939	13.429	6.019	10.388	16.183	22.290	37.681
Consumer	3,415	7.429	8.465	0.298	1.168	4.006	11.771	18.406
RealEstate	3,415	67.405	18.867	43.051	59.632	70.116	78.885	89.422

Panel B: Normalized Differences

	$Treat = 0$			$Treat = 1$			Normalized
Variable	N	Mean	Std. Dev.	N	Mean	Std. Dev.	Difference
LLR	2,707	0.914	0.443	708	0.852	0.417	-0.101
NAL	2,707	1.648	2.214	708	1.739	2.548	0.027
Loans	2,707	63.421	14.303	708	61.562	14.982	-0.090
ROA	2,707	0.255	0.275	708	0.285	0.315	0.071
Dep_Loans	2,707	1.224	0.396	708	1.232	0.380	0.015
ΔAssets	2,707	2.412	5.793	708	2.192	5.354	-0.028
*Tier*1	2,707	13.634	6.298	708	13.541	6.456	-0.010
Public	2,707	0.781	0.413	708	0.729	0.445	-0.086
Prev_Acquire	2,707	0.286	0.452	708	0.316	0.465	0.048
Commercial	2,707	18.510	13.253	708	20.578	13.969	0.107
RealEstate	2,707	67.917	18.326	708	65.444	20.700	-0.089
Consumer	2,707	7.495	8.454	708	7.179	8.509	-0.026

Table 2: Descriptive statistics for acquisition observations

This table reports descriptive statistics for the sample of acquisitions. Panel A presents distributional statistics, and Panel B presents normalized differences across the treatment group, $Treat = 1$ (total assets between \$9 and \$12 billion), and the control group, $Treat = 0$ (total assets between \$12 and \$16 billion or between \$5 and \$9 billion). The normalized difference is used to assess the covariate balance between the subsamples and is calculated as follows: $\frac{\bar{X}_a - \bar{X}_b}{\sqrt{{s_a}^2 + {s_b}^2}}$ where $\bar{X}$ and s^2 are the subsample mean and subsample variance, respectively. Continuous variables are winsorized at the 1st and 99th percentiles.

Panel A: Distributional Statistics

Variable	N	Mean	Std Dev	10th Pctl	25th Pctl	Median	75th Pctl	90th Pctl
Goodwill	268	0.496	0.496	0.000	0.326	0.508	0.640	0.752
Post	268	0.534	0.534	0.000	0.000	1.000	1.000	1.000
Treat	268	0.246	0.246	0.000	0.000	0.000	0.000	1.000
T_Size	268	13.071	13.071	11.548	12.332	13.079	13.736	14.555
T_ROA	268	0.203	0.203	0.032	0.130	0.228	0.290	0.356
T_Dep_Loans	268	1.267	1.267	0.944	1.063	1.190	1.377	1.676
T_LLR	268	1.493	1.493	0.887	1.027	1.260	1.678	2.515
T_NAL	268	0.859	0.859	0.006	0.086	0.381	0.954	1.824
T_Capital	268	9.695	9.695	6.473	7.971	9.385	11.556	13.042
T_Nonint	268	0.764	0.764	0.530	0.627	0.729	0.865	1.049
B_New_Market	268	0.354	0.354	0.000	0.000	0.000	1.000	1.000
B_ROA	268	0.285	0.285	0.201	0.235	0.276	0.336	0.395

Panel B: Normalized Differences

	$Treat = 0$			$Treat = 1$			Normalized
Variable	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**Difference**
T_Size	202	13.062	1.077	66	13.096	1.247	0.021
T_ROA	202	0.208	0.152	66	0.187	0.152	-0.099
T_Dep_Loans	202	1.257	0.327	66	1.296	0.370	0.078
T_LLR	202	1.448	0.702	66	1.633	0.806	0.173
T_NAL	202	0.780	1.432	66	1.100	1.710	0.144
T_Capital	202	9.753	2.751	66	9.515	2.645	-0.062
T_Nonint	202	0.754	0.230	66	0.798	0.187	0.149
B_New_Market	202	0.371	0.484	66	0.303	0.463	-0.102
B_ROA	202	0.280	0.075	66	0.301	0.091	0.176

Table 3: Effect of asset threshold on acquisition frequency

This table reports the results of regressions where the dependent variable is *Acquire*, an indicator variable equal to one if a bank announced an acquisition in a given quarter and zero otherwise. Column (1) presents the results of a logistic regression while Column (2) presents results using a linear probability model. *Treat* is an indicator variable equal to one for observations with beginning of the quarter total assets between $9 and $12 billion and zero for observations with total assets between $12 and $16 billion or between $5 and $9 billion. *Post* is an indicator equal to one for observations between Q1 2011 and Q4 2016 and zero for observations between Q1 2003 and Q4 2008. Continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by bank and reported in parentheses below coefficient estimates. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. Because we have directional predictions, significance levels for test variables are based on one-tailed tests and significance levels for other variables are based on two-tailed tests.

VARIABLES	(1) *Acquire*	(2) *Acquire*
Treat	-0.353	-0.018
	(0.301)	(0.019)
Post	0.024	
	(0.173)	
Treat * Post	**0.792****	**0.056****
	(0.367)	**(0.028)**
Size	0.276	0.018
	(0.216)	(0.017)
LLR	0.312	0.023
	(0.266)	(0.018)
NAL	-0.133**	-0.005**
	(0.064)	(0.002)
Loans	0.002	0.000
	(0.011)	(0.001)
ROA	0.919***	0.052***
	(0.240)	(0.016)
Dep_Loans	0.047	0.008
	(0.404)	(0.020)
ΔAssets	0.001	0.000
	(0.011)	(0.001)
*Tier*1	-0.032	-0.001
	(0.020)	(0.001)
Commercial	0.044***	0.001**
	(0.017)	(0.001)
RealEstate	0.051***	0.002***
	(0.014)	(0.001)
Consumer	0.042**	0.001
	(0.018)	(0.001)
Public	0.241	0.015
	(0.220)	(0.013)
Prev_Acquire	0.733***	0.065***
	(0.161)	(0.015)
Constant	-12.100***	-0.418*
	(4.291)	(0.302)
Year Fixed Effects	No	Yes
Observations	3,415	3,415
R-squared / Psuedo R-Sq	0.058	0.037

Table 4: Effect of asset threshold on deal premiums

This table reports the results of regressions where the dependent variable, *Goodwill*, is the amount of goodwill recognized in the acquisition scaled by the total value of the acquisition. Column (1) presents the results of a tobit regression while Column (2) presents results using an OLS regression. *Treat* is an indicator variable equal to one for observations with beginning of the quarter total assets between $9 and $12 billion and zero for observations with total assets between $12 and $16 billion or between $5 and $9 billion. *Post* is an indicator equal to one for observations between Q1 2011 and Q4 2016 and zero for observations between Q1 2003 and Q4 2008. Standard errors are clustered by acquirer bank and reported in parentheses below coefficient estimates. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. Because we have directional predictions, significance levels for test variables are based on one-tailed tests and significance levels for other variables are based on two-tailed tests.

VARIABLES	(1) *Goodwill*	(2) *Goodwill*
Treat	-0.053	-0.034
	(0.100)	(0.076)
Post	-0.154***	
	(0.058)	
Treat * Post	**0.257***	**0.238***
	(0.160)	**(0.153)**
T_Size	0.081***	0.073***
	(0.022)	(0.019)
T_Capital	-0.050***	-0.047***
	(0.015)	(0.014)
T_ROA	-0.073	-0.130
	(0.266)	(0.255)
T_NAL	0.042	0.054
	(0.045)	(0.043)
T_LLR	-0.130*	-0.127**
	(0.069)	(0.063)
T_NonInt	0.153*	0.100
	(0.085)	(0.087)
T_Dep_Loans	-0.013	-0.003
	(0.050)	(0.043)
B_New_Market	0.003	0.010
	(0.057)	(0.056)
B_ROA	-0.477	-0.398
	(0.313)	(0.365)
Constant	0.168	0.184
	(0.370)	(0.374)
Year Fixed Effects	No	Yes
Observations	268	268
R-squared / Psuedo R-Sq	0.188	0.241

Table 5: Effect of asset threshold on relative size of target to acquirer

This table reports the results of OLS regressions where the dependent variable, *Rel_Size*, is the ratio of the total assets of the target bank to the total assets of the acquirer bank. *Treat* is an indicator variable equal to one for observations with beginning of the quarter total assets between $9 and $12 billion and zero for observations with total assets between $12 and $16 billion or between $5 and $9 billion. *Post* is an indicator equal to one for observations between Q1 2011 and Q4 2016 and zero for observations between Q1 2003 and Q4 2008. Standard errors are clustered by acquirer bank and reported in parentheses below coefficient estimates. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. Because we have directional predictions, significance levels for test variables are based on one-tailed tests and significance levels for other variables are based on two-tailed tests.

VARIABLES	(1) *Rel_Size*	(2) *Rel_Size*
Treat	-0.044**	-0.038**
	(0.019)	(0.018)
Post	0.044**	
	(0.021)	
Treat * Post	**0.063***	**0.052***
	(0.039)	**(0.039)**
T_Capital	-0.002	-0.002
	(0.003)	(0.003)
T_ROA	0.133*	0.115*
	(0.069)	(0.068)
T_NAL	0.007	0.002
	(0.006)	(0.007)
T_LLR	-0.014	-0.013
	(0.015)	(0.015)
T_Nonint	-0.066	-0.059
	(0.046)	(0.050)
T_Dep_Loans	-0.041	-0.044*
	(0.028)	(0.026)
B_New_Market	-0.048***	-0.057***
	(0.017)	(0.018)
B_ROA	0.027	0.023
	(0.146)	(0.140)
Constant	0.205***	0.234***
	(0.076)	(0.069)
Year Fixed Effects	No	Yes
Observations	268	268
R-squared	0.110	0.151

Table 6: Effect of asset threshold on deposit activity for banks just below the threshold

This table reports the results of OLS regressions investigating whether banks engage in behavior in an attempt to remain below the threshold. The dependent variable in Columns (1) and (2) is *Dep_Growth*, the change in the log of total deposits during the quarter, and in Columns (3) and (4) is *Dep_Interest*, the interest expense paid on deposits during the quarter scaled by total deposits. *Treat_D* is an indicator variable equal to one for observations with beginning of the quarter total assets between $8 and $10 billion and zero for observations with total assets between $10 and $16 billion or between $5 and $8 billion. *Post* is an indicator equal to one for observations between Q1 2011 and Q4 2016 and zero for observations between Q1 2003 and Q4 2008. Continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by bank and reported in parentheses below coefficient estimates. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. Because we have directional predictions, significance levels for test variables are based on one-tailed tests and significance levels for other variables are based on two-tailed tests.

VARIABLES	(1) *Dep_Growth*	(2) *Dep_Growth*	(3) *Dep_Interest*	(4) *Dep_Interest*
Treat_D	0.279	0.321	0.068***	0.054**
	(0.237)	(0.247)	(0.022)	(0.022)
Post	-0.370		-0.130***	
	(0.347)		(0.018)	
Treat_D * Post	**-0.636****	**-0.753****	**-0.069*****	**-0.055****
	(0.336)	**(0.334)**	**(0.025)**	**(0.025)**
Size	0.042	0.070	0.013	0.010
	(0.258)	(0.256)	(0.020)	(0.020)
*Tier*1	-0.019	-0.017	0.003**	0.003**
	(0.030)	(0.030)	(0.001)	(0.001)
LLR	-1.138***	-1.103***	-0.007	-0.020
	(0.276)	(0.296)	(0.016)	(0.016)
NAL	-0.152***	-0.156***	0.017***	0.015***
	(0.049)	(0.051)	(0.003)	(0.003)
Loans	0.029***	0.027**	0.001**	0.001**
	(0.011)	(0.011)	(0.001)	(0.001)
ROA	0.786	0.775	-0.101***	-0.082***
	(0.540)	(0.524)	(0.028)	(0.025)
Commercial	-0.076***	-0.074***	-0.002*	-0.002*
	(0.024)	(0.023)	(0.001)	(0.001)
RealEstate	-0.074***	-0.073***	0.000	0.000
	(0.021)	(0.021)	(0.001)	(0.001)
Consumer	-0.099***	-0.097***	-0.000	-0.000
	(0.024)	(0.024)	(0.001)	(0.001)
Public	-0.186	-0.203	-0.037**	-0.036**
	(0.222)	(0.221)	(0.018)	(0.017)
FedFunds	-1.202***	-1.892**	0.398***	0.283***
	(0.279)	(0.728)	(0.019)	(0.016)
Constant	8.140*	7.754	-0.078	-0.050
	(4.645)	(4.709)	(0.340)	(0.340)
Year Fixed Effects	No	Yes	No	Yes
Observations	3,160	3,160	3,160	3,160
R-squared	0.060	0.075	0.827	0.839

Table 7: Sensitivity tests involving a consistent sample and removing serial acquirers

This table reports the results of OLS regressions run on a consistent sample (banks existing for at least 6 quarters in both the pre- and post-periods) in Column (1) as well as those excluding "serial" acquirers (banks with more than 7 acquisitions in the pre-period) in Columns (2) and (3). The dependent variable in Columns (1) and (2) is *Acquire*, an indicator variable equal to one if a bank announced an acquisition in a given quarter and zero otherwise, and in Column (3) is *Goodwill*, the amount of goodwill recognized in the acquisition scaled by the total value of the acquisition. *Treat* is an indicator variable equal to one for observations with beginning of the quarter total assets between \$9 and \$12 billion and zero for observations with total assets between \$12 and \$16 billion or between \$5 and \$9 billion. *Post* is an indicator equal to one for observations between Q1 2011 and Q4 2016 and zero for observations between Q1 2003 and Q4 2008. Continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by bank and reported in parentheses below coefficient estimates. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. Because we have directional predictions, significance levels for test variables are based on one-tailed tests and significance levels for other variables are based on two-tailed tests.

VARIABLES	(1) *Acquire*	(2) *Acquire*	(3) *Goodwill*
Treat	-0.010	-0.025	-0.040
	(0.026)	(0.018)	(0.105)
Treat*Post	**0.051***	**0.053****	**0.232***
	(0.036)	**(0.026)**	**(0.179)**
Controls	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Bank Fixed Effects	Yes	No	No
Observations	1,732	3,325	241
R-squared	0.113	0.039	0.279

Table 8: Sensitivity tests involving alternate control groups and continuous treatment measure

This table reports the results of OLS regressions where the control groups and treatment variable are varied for both the acquisition frequency test (Hypothesis 1) and goodwill test (Hypothesis 2). The dependent variable in Columns (1) – (3) is *Acquire*, an indicator variable equal to one if a bank announced an acquisition in a given quarter and zero otherwise, and in Columns (4) – (6) is *Goodwill*, the amount of goodwill recognized in the acquisition scaled by the total value of the acquisition. *Treat* is an indicator variable equal to one for observations with beginning of the quarter total assets between \$9 and \$12 billion and zero for observations with total assets between \$12 and \$16 billion or between \$5 and \$9 billion. *Treat_Dist* is \$16 billion minus the total assets for the given bank-quarter expressed in billions. This variable takes a value of 7 for a \$9 billion bank and a value of 0 for a \$16 billion bank. *Post* is an indicator equal to one for observations between Q1 2011 and Q4 2016 and zero for observations between Q1 2003 and Q4 2008. Continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered by bank and reported in parentheses below coefficient estimates. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. Because we have directional predictions, significance levels for test variables are based on one-tailed tests and significance levels for other variables are based on two-tailed tests.

VARIABLES	(1) *Acquire*	(2) *Acquire*	(3) *Acquire*	(4) *Goodwill*	(5) *Goodwill*	(6) *Goodwill*
Control sample:	**\$5-9B**	**\$12-16B**	**\$12-16B**	**\$5-9B**	**\$12-16B**	**\$12-16B**
Treat	-0.051**	-0.005		-0.040	0.041	
	(0.020)	(0.033)		(0.077)	(0.109)	
Treat * Post	**0.054****	**0.066****		**0.227***	**0.296****	
	(0.028)	**(0.036)**		**(0.164)**	**(0.174)**	
Treat_Dist			-0.019			0.023
			(0.043)			(0.024)
Treat_Dist * Post			**0.019****			**0.075****
			(0.010)			**(0.041)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,796	1,327	1,327	226	108	108
R-squared	0.042	0.058	0.058	0.241	0.273	0.288