U.S. bank M&As in the post-Dodd-Frank Act era: Do they create value?

by

George N. Leledakis[*]
Department of Accounting and Finance
Athens University of Economics and Business
Greece

and

Emmanouil G. Pyrgiotakis
Department of Accounting and Finance
Athens University of Economics and Business
Greece

First version: October, 2015
This version: December, 2016

U.S. bank M&As in the post-Dodd-Frank Act era: Do they create value?

ABSTRACT

The Dodd-Frank Act has produced a new wave of bank M&As. Increased compliance costs and heavy-handed regulation of certain activities have shaped this new consolidation trend. In fact, small banks are merging at a rapid pace, since getting larger enables them to absorb the new regulatory compliance costs. We argue that the $10 billion asset-size threshold will become the ceiling of the optimal scale for these bank combinations, since banks below $10 billion avoid several regulatory hurdles imposed by the Dodd-Frank Act. We therefore examine shareholder wealth effects for 83 bank mergers, announced between July 21, 2010 and December 31, 2014. Our findings suggest that small bank mergers, with combined firms' assets of less than $10 billion, create value due to the positive trade-off between cost savings and the DFA regulation. Results for large mergers, on the contrary, indicate redistribution of wealth from the bidder to the target firm.

1. Introduction

The Dodd-Frank Wall Street Reform and Consumer Protection Act, (henceforth the Dodd-Frank Act or the DFA) was signed into law on July 21, 2010, introducing a new epoch of financial regulation in response to the recent financial crisis. Two core objectives of this new regulatory framework are, first, to limit the too-big-to-fail (TBTF) banks' exposures and, second, to promote the financial stability of the U.S. banking industry. However, recent studies by Allen (2010), Skeel (2011), Fama and Litterman (2012), and Kane (2012) question the DFA's effectiveness in re-regulating the U.S. banking industry.

Historically, extensive regulatory reform fostered consolidation within the banking industry. The Riegle-Neal Act of 1994 and the Gramm-Leach-Bliley Act of 1999 constitute the most prominent examples; each one of these successive pieces of federal legislation produced a significant wave of bank mergers and acquisitions (M&As). Therefore, if history repeats itself, we should expect the DFA to mark the beginning of a new bank merger wave. The ongoing press discussion concerning the new bank consolidation trends motivates us to shed light on this unexamined issue. To the best of our knowledge, the Dodd-Frank Act's quantitative effect on U.S. bank mergers has yet to be analyzed.

Evidently, despite the DFA's strict concentration limits, the U.S. banking industry exhibits a discernible trend in merging activity at the lower end of its asset-size distribution. The Dodd-Frank Act fosters consolidation between small banks since these institutions are: (1) inclined to merge to cover the new regulatory compliance costs and (2) exempt from the DFA's extensive oversight on credit cards, debit cards, and mortgage-related products. In contrast, it seems that the DFA burdensome reforms over systemically important institutions provided counter-motives for large banks to grow larger through M&As.

We examine the shareholder wealth effects for 83 completed bank mergers announced between July 21, 2010 and December 31, 2014. We hypothesize that bank mergers are value-enhancing

activities in the post-DFA era, when the merger-related cost savings for DFA compliance are not offset by additional regulations. Our findings indicate that small bank mergers, with combined assets of less than $10 billion, create value for the shareholders of both merging partners. We therefore argue that there is a DFA effect on the way market participants react to merger announcements, after the passage of the new regulation. We measure these wealth gains by examining the market reaction for merging firms during the DFA passage through Congress and at the merger announcement and completion dates.

Prior literature suggests that during merger waves, M&A wealth gains may be realized before the initial merger announcement (Calomiris, 1999). Hence, we follow Becher (2009), and we examine the anticipated component, if any, during the passage of the DFA. In other words, we investigate whether the market identifies the merger activity *ex-ante* and capitalizes the potential gains from it. We find that all publicity traded banking firms gain during the passage of the legislation, but bidders of small mergers gain the most in daily average abnormal returns. The anticipation component of small bidders returns suggest that announcement period returns may underestimate the market reaction for such events. The results for larger bidders are inconclusive.

James and Wier (1987), Cornett and De (1991), Houston and Ryngaert (1997), Becher (2000), DeLong (2003), Gupta and Misra (2007), and DeLong and DeYoung (2007), among others, use the traditional event study analysis to investigate the shareholder wealth effects associated with U.S. bank mergers. Collectively, these studies document a wealth transfer from bidder to target firm upon the announcement of the merger. More precisely, bidders realize marginally negative abnormal returns, targets experience large and statistically significant positive abnormal returns and the combined firms' abnormal returns are insignificant. Contrary to these findings, we report significant combined abnormal returns for the whole sample of mergers. Segmenting by size however, we find that this value creation is only noticeable in small bank

mergers. Bidders of such mergers experience insignificant announcement abnormal returns, since the market had *ex-ante* capitalized potential gains related to these bids and targets experience large abnormal returns around the announcement date. Subsequently, the combined cumulative abnormal returns (CARs) for these mergers translate into an average shareholder value increase of $23.09 million. Results for the remaining 28 mergers illustrate a bidder to target redistribution of wealth. Furthermore, we estimated bidder abnormal returns around the dates the deals are finally completed. From the whole sample of 83 M&As, only the 55 "small merger" bidders experience positive CARs around the completion date.

Overall, results of the cross-sectional analysis confirm that small bank M&As create value in the post-DFA era. Our findings suggest that bidder and combined CARs increase for small bank mergers, and especially for those small mergers that allow for potential cost savings in DFA regulatory compliance. On the contrary, we do not find empirical support for traditional merger explanations, such as geographical scope, method of payment or TBTF.

Our study is related to the literature on U.S. bank M&As. We contribute to the existing literature in two ways. First, we exhibit a detailed analysis of the impact of the Dodd-Frank Act on the U.S. bank M&As activity and we analyze the drivers of the new merger wave. Second, we provide evidence of significant shareholder value creation for mergers with combined assets of less than $10 billion. We therefore argue that mergers below this asset-size threshold create value, since they offer a positive trade-off between economies of scale and DFA regulation.

The remainder of the paper is organized as follows. Section 2 analyzes the key provisions of the DFA that directly or indirectly affect bank M&As. Section 3 reviews the related literature and outlines the testable hypotheses. Section 4 details the data collection for the empirical analysis. Section 5 describes the methodology. Section 6 presents our empirical results and Section 7 concludes the paper.

2. The legislation

The Dodd-Frank Act is a massive piece of federal regulation (2,319 pages) designated to ''promote the financial stability of the United States by improving accountability and transparency in the financial system, to end 'too big to fail', to protect the American taxpayer by ending bail-outs, to protect consumers from abusive financial services practices, and for other purposes.'' To address the research question of this study we focus on the Act's provisions that are likely to impact the future of the U.S. bank M&As.

In fact, the new financial reform legislation incorporates a plethora of sections governing bank mergers. The DFA imposes new concentration limits and barriers for banks planning to execute a merger. At the same time, it includes several provisions that do not directly address the bank M&A issue, but could reshape the U.S. banking industry in such a way that the DFA's barriers and limitations would be irrelevant. We classify these sections based on the direct or indirect effect they have on U.S. bank M&As.

2.1. Direct sections

Section 622 of the DFA prohibits a financial company from acquiring another institution if the combined firm would control more than 10% of the U.S.-based aggregate liabilities of all the U.S.' financial institutions.[2] Additionally, Section 623 of the Act amends the Bank Holding Company Act (BHCA) of 1956 for interstate bank M&As. Under this provision, regulators may not approve a proposed merger transaction if the resulting depository institution would hold more than 10% of all Federal Deposit Insurance Corporation's (FDIC) deposits.[3] In practice, it is unlikely that these concentration limits would deter further consolidation within

---

[2] Under the DFA, the financial companies subject to these concentration limits are: insured deposit institutions, bank holding companies, savings and loan holding companies, foreign banking organizations, companies that control depository institutions and non-bank financial companies. Source: http://www.federalreserve.gov/newsevents/testimony/tarullo20140909a.htm.

[3] The 10% of total deposits of all U.S. depository institutions cap was enforced by the Riegle-Neal Act of 1994, and amended by the Dodd-Frank Act to also include thrift institutions and industrial banks.

the banking industry, since the average bank merger will not even approach these asset-size thresholds. Nevertheless, these DFA's provisions constitute an additional obstacle to bank mega-mergers, fulfilling one of the Act's main objectives.[4]

Section 604(d) of the Dodd-Frank Act adds a new element to the merger review, the systemic risk factor. Precisely, it requires the Federal Reserve to evaluate a proposed bank merger considering the extent to which it "would result in greater or more concentrated risks to the stability of the U.S. banking system." Arguably, the systemic risk factor will be applicable to mergers between large, systemically important banks, whereas mergers of small banks will probably be unaffected.

Section 607 of the Dodd-Frank Act introduces additional barriers for bank holding companies (BHCs) willing to expand interstate. The DFA requires that a BHC should be "well capitalized and well managed" in order to proceed in an interstate acquisition. Hypothetically, this provision seems particularly ambiguous, but in reality it could be problematic for banks seeking to acquire control of depository institutions in other states. Prior to the DFA, the corresponding requirement for a BHC was to be "adequately capitalized and adequately managed." In terms of capital ratio, adequately capitalized translates to a 8.0 percent total and 4.0 percent Tier 1 risk-based capital ratios, whereas the respective figures for a well capitalized institution is 10.0 and 6.0 percent.

In short, these provisions are particularly designed to discourage bank mega-mergers, whereas the vast majority of U.S. bank M&As will be unaffected. The imposition of these barriers on bank M&As is consistent with Congress' explicit intention of addressing the "too-big-to-fail" problem.

2.2. Indirect sections

---

[4] As Acharya et al. (2011) point out, given the size of the large, systemically important financial institutions, only the Bank of America and JPMorgan Chase will surpass this limitation. However, Citigroup and Wells Fargo are likely to exceed this rule as well, in case they engage in a relatively large merger or acquisition in the near future.

Critics of federal regulation often argue that financial reforms follow a "one-size-fits-all" approach and are unduly burdensome to small banks (following the Board of Governors of the Federal Reserve System we define small banks as those banks with less than $10 billion in assets).[5] Furthermore, proponents of this argument believe that the regulatory structure is sympathetic to big banks since the broad principles of financial regulation are the same for all banks, regardless of their size and activities. The Dodd-Frank Act attempts a shift from the "one-size-fits-all" approach by establishing specific asset-size thresholds tailored to benefit small banks in terms of regulatory reforms. As a matter of fact, the majority of the DFA's major provisions include some form of exemption for small banks.[6]

Title I of the DFA establishes a new powerful regulatory body; the Financial Stability Oversight Council (FSOC).[7] The main purpose of the FSOC is to identify potential risks to the stability of the U.S.' financial system associated with large BHCs or non-bank financial companies. The Council focuses primarily on BHCs and non-bank financial institutions that hold more than $50 billion in assets. The institutions that exceed this threshold are considered systemically important financial institutions (SIFIs), and are subject to increased prudential, capital, and liquidity standards. Hence, the DFA has provided an official asset-size threshold for a financial institution to be designated as systemically important or TBTF.

The Dodd-Frank Act made several compromises in favor of small banks. Title X of the DFA requires the establishment of the Consumer Financial Protection Bureau (CFPB).[8] The CFPB is an independent executive agency within the Federal Reserve, authorized to promote consumer financial protection. The new Bureau has unprecedented autonomy in issuing new rules and exclusive regulatory authority on consumer protection issues. The principal focus of

---

[5] Source: http://www.federalreserve.gov/bankinforeg/topics/community_banking.htm. The Federal Reserve defines banks with less than $10 billion in assets as community banks. The term community bank however is commonly used as a synonym of a small bank (Hoskins and Labonte, 2015).

[6] See, Hoskins and Labonte (2015).

[7] Subtitle A (sections 111-123) refers to the establishment and authorities of the FSOC.

[8] Section 1011 designates the creation of the CFPB.

the Bureau is to monitor mortgage and credit card-related issues over financial institutions with more than $10 billion in assets. Title X also incorporates Section 1075, commonly known as the Durbin Amendment. Under this section, banks that exceed the $10 billion threshold face a cap on debit card interchange transaction fees.[9] Lastly, section 165 of the Act requires banks with total consolidated assets of more than $10 billion to conduct annual stress tests to determine whether they have the necessary capital to absorb potential losses emanating from adverse economic conditions. Therefore, all these DFA's provisions effectively single out small banks.

Section 619 of the DFA, commonly known as the Volcker Rule, aims to separate non-banking activities of financial institutions from their consumer lending arms. Under this section, banks with access to Federal Reserve funds are prohibited from engaging in proprietary trading, and their exposures in private equity and hedge funds are substantially limited. The Volcker Rule is a step towards the "back to basics" direction; shifting interest to traditional banking activities. At first glance, the Dodd-Frank Act has accomplished a *de facto* shift from the unitary "one-size-fits-all" approach of bank regulation.[10] Small banks seem to be unaffected from the above-mentioned parts of the new legislation, since they avoid primary supervision by the newly established regulatory bodies and proprietary trading is not central to their business activities. However, the DFA incorporates more than 500 separate rules and mandates governing depository institutions. The implementation of such reforms is associated with additional regulatory costs. In the banking world, the cost of regulatory reforms is referred to as regulatory burden and can be borne by banks of all sizes.

Regulatory burden on banks is primarily manifested in two different ways; compliance costs and opportunity costs (Ellihausen, 1998). Compliance costs are the costs the bank must bear in

---

[9] Debit fees are limited to a $0.21 plus 0.05% of the transaction value, about half the pre-DFA average fees.

[10] Daniel K. Tarullo, member of the Board of Governors of the Federal Reserve System argues: "the unitary approach of the pre-crisis period has been abandoned". Source: https://www.federalreserve.gov/newsevents/speech/tarullo20141107a.htm

order to comply with the new regulations, such as: hiring suitable employees, relying on outside compliance experts, allocating additional funds and resources for regulatory compliance, time-consuming operations by non-specialized employees, etc.[11] Opportunity costs occur when a regulation prevents a bank from engaging in profitable activities. An example is the interest forgone as a result of the legislative increases in reserve and capital requirements.[12]

Compliance and opportunity costs influence both small and big banks, but in different ways. In relative terms, compliance costs are more burdensome to small banks since these institutions have less capacity for regulatory compliance in comparison to their larger rivals. In fact, large firms will probably commit fewer resources for regulatory compliance than small firms, as a proportion to their overall revenues. The 2014 KPMG Community Banking Survey (Depman, 2014) indicates that 45% of community banks estimate compliance costs in the scale of 5-10% of total operating costs. Consequently, it is reasonable that small banks will be inclined to merge to achieve the necessary economies of scale to distribute these compliance costs over a higher output level. On the contrary, the opportunity costs rise with size. Under the Dodd-Frank Act, banks that exceed specific asset-size thresholds ($10 billion and $50 billion respectively) are subject to enhanced prudential standards and activity-based restrictions. These reforms are designated to prevent the large banking institutions from engaging in excessively risky (and highly profitable) activities. Thus, as banks grow larger beyond the specified thresholds, the trade-off between compliance and opportunity costs does not seem particularly lucrative.

Overall, the DFA's indirect sections would be of greater importance in determining the future of the U.S. bank M&As. The increased regulatory compliance costs alongside with the harsh economic conditions and the low-interest rate environment may urge institutions to become

---

[11] The American Action Forum (AAF) estimated that, in the first five years of implementation, the DFA compliance costs were approximately $29.3 billion (Batkins and Milloy, 2015).

[12] Indicatively, Baer (1988) found a positive relation between federal increases in capital requirements and opportunity costs. He attributes this relation to the additional taxes paid by banks in order to finance assets with equity rather than debt.

bidders before the market envisages them as potential targets. In the wake of the DFA, therefore, small banks would be tempted to merge up to a relative "supervision-free" size to absorb the new regulatory costs and improve their profitability. Yet, the DFA may have an adverse effect on larger firms since the new burdensome reforms over systemically important institutions are likely to provide counter-motives for large banks to grow larger though M&As.

3. Literature review and testable hypotheses

3.1. Review on bank M&A studies

Prior studies on bank M&As generally suggest a wealth transfer from the bidder to the target company.[13] Abnormal returns for targets are large, abnormal returns for bidders are negative or insignificant, and combined firms' abnormal returns are indistinguishable from zero. Hannan and Wolken (1989) found evidence consistent with the wealth transfer hypothesis for 43 bank mergers from 1982 to 1987, and document insignificant value creation. Cornett and Tehranian (1992) examine 30 large bank mergers over the same period and document large abnormal returns for targets, whereas returns for bidders were significantly negative. Houston and Ryngaert (1994) measure the overall gains for 153 deals announced during the period 1985 to 1991, and do not report significant value creation for the combined firms' shareholders. Houston et al. (2001) provided zero evidence of wealth creation for large bank mergers announced from 1985 to 1996. DeLong and DeYoung (2007) examine the combined abnormal returns for 216 bank M&A deals between 1987 and 1999. Their findings suggest a redistribution of wealth from the bidder to target shareholders.

The fact that evidence on bank merger gains is elusive in the financial literature has encouraged researchers to investigate alternative explanations for the consolidation phenomenon in the U.S. banking industry. Unlike typical merger deals, evidence on TBTF mergers indicates the

---

[13] See, DeYoung et al. (2009) for a detailed review of the bank M&A studies.

existence of merger gains, emanating from the improved access to monopoly rents and the implicit regulatory subsidies. Kane (2000) examines bank megamergers over the period 1991-1998 and finds positive bidder abnormal returns at the merger announcement date. His findings demonstrate a differentiation in market reaction on TBTF mergers in comparison to smaller banking deals. Penas and Unal (2004) also examine bank merger announcements over the same period and observe that both equity holders and bond holders realize positive abnormal returns. The authors attribute their findings mainly to diversification and TBTF status. In their recent study on TBTF mergers, Brewer and Jagtianni (2013) document positive combined abnormal returns for the 8 merger deals during 1991-2004 that allowed the merged banks to become TBTF. They also found that bidders of those mergers paid at least $15 billion in added premiums in order to exceed the TBTF threshold.

A handful of studies also suggest geographical scope to be a source of value for bank mergers. Cornett and De (1991) examine 152 acquisition proposals during the period 1982-1986 and report positive abnormal returns for both bidders and targets engaged in interstate bank mergers. Furthermore, DeLong (2001) documents significant value creation in the scale of 3.0% for geographic and activity-focused mergers. Becher and Campbell (2005) suggest mixed results regarding geographic diversification. They report positive (negative) announcement abnormal returns for large geographically focused mergers in the pre- (post-) Riegle-Neal Act era.

Studies that examine abnormal returns for the U.S. bank mergers under a regulatory scope indicate substantial wealth creation for deals triggered by regulatory reforms. Carow and Heron (1998) study the wealth impact associated with the passage of the Riegle-Neal Act on 180 U.S. BHCs. Using several proxies for takeovers, they conclude that BHCs identified as potential targets and BHCs headquartered in states where interstate branching was prohibited, experienced significantly larger returns than the remaining firms of the sample. Brook et al.

(1998) examined 60 bank mergers in the post-Riegle-Neal Act period and found that abnormal returns for the target companies were significantly higher compared to the pre-deregulation period. Becher (2000) documents positive combined abnormal returns for bank mergers during the deregulation wave of 1990s, which are statistically larger than the mid-1980s' deals. Anderson et al. (2004) focused on 97 U.S. bank mergers announced and completed during the branching deregulation period. Their findings suggest a combined change for the average bidder-target pair in the scale of 1.70%. Additionally, Filson and Olfati (2014) examined the wealth impact of the Gramm-Leach-Bliley Act on the U.S. bank mergers and found substantial value creation associated with bank holding companies' diversification into investment banking, securities brokerage, and insurance.

The vast majority of the previously mentioned studies examine the wealth effects of bank mergers on the announcement date. Focusing on narrow announcement windows however, could severely underestimate the aggregate market reaction on these transactions. Empirical evidence on non-banking firms indicates that announcement returns incorporate mainly the surprise content of a merger. Asquith et al. (1983) argue that mergers should not be viewed as isolated events, since the market could anticipate the event before its announcement. Malatesta and Thompson (1985) analyze 35 frequent acquirers and found prior capitalization of their subsequent bids' gains at the announcement of their acquisition program. Loderer and Martin (1990) document positive market reaction for bidding firms after controlling for market anticipation of merger bids. Calomiris (1999) highlights the possibility that during a merger wave the market may anticipate a merger prior to its initial announcement and questions the accuracy of the traditional event studies. Cai et al. (2011) use a large sample from 1985 through to 2008 and report positive returns for bidding firms when they include anticipated effects in their analysis. Anticipation of merger activity could also be attributed to regulatory changes; Schipper and Thompson (1983) suggest that the primary market reaction should be identified

during the passage of a new legislation that reforms the market for corporate control. More recently, Becher (2009) found evidence of a market anticipation effect for bank bidders associated with the passage of the Riegle-Neal Act. More specifically, banks that became bidders after the enactment of this legislation experienced large, significant, positive returns around its passage.

Despite the extensive research for the regulatory effects on mergers, prior literature for the Dodd-Frank Act focuses primarily on issues other than the U.S. bank M&A activity. Balasubramnian and Cyree (2014) present evidence that the TBTF discount in yield spreads has been diminished by 94% and attribute this result to the improved market discipline associated with the DFA. Calomiris and Nissim (2014) document that in the post-crisis period and after the implementation of the Volcker Rule, higher bank leverage translates into lower market values. Furthermore, Akhigbe et al. (2016) find that excessive risk-taking by large banks has substantially declined following the passage of the DFA. These studies support the Dodd-Frank Act's effectiveness in limiting the main privilege of the TBTF banks; exploit the implicit government guarantees in order to engage in excessive risk-taking in the global capital markets. Peirce et al. (2014), on the contrary, examine the impact of the DFA on the small U.S. banks. They argue that the compliance costs of the DFA's new rules have a disproportionate effect on these banks, since small institutions lack the necessary resources and compliance expertise to absorb these costs in comparison to their larger rivals. The median number of compliance employees was doubled after the enactment of the DFA for the 200 small banks surveyed in the study, and 80% of the institutions reported at least 5% rises in compliance costs since 2010. Strikingly, more than 25% of these banks were contemplating M&A strategies to adjust to these rising costs. Cyree (2016) estimates the compliance costs for small U.S. banks around major crisis-based regulatory reforms. Using six measures of profit, cost and productivity as indicators of regulatory compliance costs, he finds that the Dodd-Frank Act

was the most burdensome reform for small banks, compared to the previous regulatory changes. Notably, Aiello and Tarbert (2010), and Marsh (2015) argue that the imposition of the DFA compliance costs on small banks would dictate these institutions to consolidate or go out of business.

3.2. Hypotheses

The Dodd-Frank Act re-regulates the market for corporate control in the U.S. banking industry. The new concentration limits, the systemic risk factor, the increased prudential capital, and liquidity standards for large SIFIs and the back-to-basics prohibition (the Volcker Rule) are all but certain to impede consolidation among large financial conglomerates. The Dodd-Frank Act however, as each successive legislative reform so far, is expected to produce a new wave of bank mergers. This merger wave will be about small banks getting bigger, rather than large financial conglomerates getting larger.

The Dodd-Frank Act encourages consolidation at the low end of the asset-size distribution of the U.S. banking industry. Incremental increases in compliance costs, emanating from the new regulatory reforms, along with the low-interest rate environment have a disproportionate effect on the small banks' profitability. These institutions therefore, would be inclined to merge to spread the DFA's compliance costs over a larger asset base. The $10 billion assets threshold however, may serve as the "rooftop" for the majority of these small bank M&A strategies. Banks that hold more than $10 billion in assets are supervised by the CFPB on their mortgage and credit card-related services, are subject to lower debit card interchange fees, and are obliged to conduct annual stress tests. Exclusion of these regulatory burdens provides small banks with a competitive advantage against their larger rivals, especially since small banks rely heavily on consumer related services. We therefore posit that small bank M&As produce economies of scale via compliance costs reduction, which are not offset by additional regulations. By contrast, as banks grow larger, the regulations become stricter and the scale economies are

often elusive. If this is the case, the market should favor small over large bank mergers. Hence, we formalize our four hypotheses based on the $10 billion asset-size distinction.

It is evident that the Dodd-Frank Act provides strong motivation for small banks to become bidders. These bank M&A motives should be anticipated during the passage of the DFA, when information regarding the Act's major provisions is available. We hypothesize thus, that the market identifies *ex-ante* bidding activity between small-sized banks that do not surpass the $10 billion in combined firms' assets and adjust their prices before any official merger announcement. We predict a positive stock reaction for these bidders originated from the prior capitalization of the compliance costs reduction and the evasion of additional regulatory oversight. We test Hypothesis 1 by estimating wealth changes for these bidders around the passage of the DFA, and comparing the results with returns for larger bidders, non-bidding rivals, and the banking industry as a whole.

> *Hypothesis 1: Around the passage of the DFA, the market identifies ex-ante bidders of mergers where the combined firms' assets do not exceed the $10 billion threshold. This bidding activity is anticipated as a wealth-creating event.*

The anticipation effect reflects the market's perception that a bank will become bidder in the future. Anticipated bids therefore, should experience insignificant returns on the announcement date since the market has already capitalized the wealth effects associated with the intention of a bidder to acquire a potential target. We therefore predict insignificant announcement abnormal returns for bidders of mergers with combined firms' assets of less than $10 billion. On the contrary, the announcement of a non-anticipated bid might incorporate a surprise factor. Implicit in Hypothesis 1 is that bidders of larger mergers are not identified as *ex-ante* likely bidders, since the DFA's stringent regulations do not encourage merging activity between large depository institutions. Consequently, we predict negative bidder abnormal returns at the announcement of these mergers. We test Hypothesis 2 by estimating and comparing announcement abnormal returns for several bidder subsamples.

Hypothesis 2: More (less) anticipated bidders experience zero (negative) abnormal returns on the merger announcement date.

Mergers often reflected perceived opportunities to increase the total value of two separate firms by consolidating them into one entity. Thus, to test whether bank M&As in the post-DFA era were value-enhancing upon their announcement for both firm's shareholders, we examine the combined abnormal returns for each bidder-target pair. Mergers motivated by synergetic reasons are considered as wealth-creating activities. We assume that an efficient stock market should be able to identify potential synergies in mergers that combine both economies of scale through cost reductions and less regulatory supervision. Therefore, we hypothesize that bank mergers with combined firms' assets below the $10 billion threshold, create value for the combined firms' shareholders when the deal is announced. We test Hypothesis 3 by computing combined abnormal announcement returns for these mergers and comparing the results with the larger deals.

Hypothesis 3: Bank mergers with consolidated assets of less than $10 billion create value for the combined firms' shareholders at the announcement date.

The announcement of a merger deal incorporates the intention of the buyer to acquire the target. Consequently, if there was no uncertainty regarding the materialization of the proposed deal, all of the market's reaction would occur at the time where the merger announcement is anticipated (either the official announcement or when the bid is *ex-ante* anticipated). However, there is a time interval between the announcement and the deal completion date, where the bidding firm conducts the due diligence process. The Dodd-Frank Act's extensive reforms on the banking industry may complicate this process, since the increased capital and liquidity standards could reveal unfavorable information for the target's financial situation.[14] In such

---

[14] Section 171 sets stricter leverage and risk-based capital requirements. Furthermore, the issuance of trust-preferred securities (TrusPS) will not qualify as Tier 1 capital under the DFA, implying potential funding problems for several institutions. Additionally, the DFA demands additional capital and leverage requirements for certain activities (Section 616). All these changes could reveal deficiencies for the target's financial situation that do not match the acquiring bank's expectations.

cases, the bidder is likely to withdraw its offer.[15] Hence, we examine bidder abnormal returns around the ultimate completion date of the proposed merger. Assuming that the market considers mergers with consolidated assets of less than $10 billion to be positive net present value investments, we hypothesize that bidders of these mergers will experience positive abnormal returns at the completion date. This positive market reaction relates to the resolution of uncertainty regarding the materialization of these deals. We test Hypothesis 4 by estimating and comparing abnormal returns at the completion date for both bidder subsamples.

> *Hypothesis 4: Bidders of mergers with consolidated assets of less than $10 billion realize positive abnormal returns on the merger completion date.*

Overall, the rationale behind these hypotheses is that there is substantial shareholder wealth creation for mergers with combined firms' consolidated assets of less than $10 billion associated with the passage of the Dodd-Frank Act.

4. Sample description and statistics

4.1. Merger sample

Our bank M&As data is collected from the Thomson ONE database. Mergers are manually confirmed against the National Information Center (NIC) database.[16] We use the following five criteria to obtain the initial sample:

---

[15] In the examination period, 4 proposed mergers were terminated due to the withdrawal of bids by the acquiring banks. In all 4 cases the combined assets of the hypothetical merging firms were below the $10 billion threshold.
[16] We do some corrections on the initial sample obtained by Thomson ONE database. For example, in the merger of Peoples Federal Bancshares, Inc. with Independent Bank Corp., Thomson ONE reports an incorrect acquirer. Following NIC, the correct acquirer is the Independent Bank Corp. (with ticker INDB) headquartered in Massachusetts. Thomson ONE reports the Independent Bank Corp. (with ticker IBCP) headquartered in Michigan as the acquiring firm.

1. Both bidders and targets are commercial banks and savings institutions with a three-digit primary SIC codes equal to 602 and 603 respectively, or bank holding companies a with four-digit primary SIC code equal to 6712.[17]

2. The announcement of the merger is between July 21, 2010 and December 31, 2014.

3. Both bidders and targets are U.S. public firms listed on NYSE, Amex, or Nasdaq.

4. The bidder acquired an interest of above 50% in a target, raising its interest from below 50% to above 50%.[18]

5. All deals are completed.

The criteria result in an initial sample of 93 bank mergers. From this sample we excluded 2 mergers due to the fact that both targets were incorrectly classified as publicly traded firms on the Thomson ONE database.[19] We also excluded 7 mergers because the target firms' stock return data were available on the Center for Research in Security Prices (CRSP), but the data ends before the announcement date. One additional merger was removed due to the fact that the bidder experienced extraordinary returns at the announcement date, distorting the calculation of the average abnormal returns.[20] The final sample consists of 83 mergers. We collect market data for both bidders and targets from the CRSP database with share codes 10 or 11. Accounting data is obtained from Standard and Poor's Compustat database.

4.2. Evolution of bank mergers overtime

Figure 1 illustrates the evolution of U.S. bank M&As from 1990 to 2014. During the 1990s, a period characterized by intense banking deregulation (Riegle-Neal Act of 1994, Gramm-Leach-Bliley Act of 1999), the U.S. banking industry underwent dramatic consolidation. As shown in the figure, the number of merger transactions follows an upward trend throughout the

---

[17] CommerceFirst Bancorp, Inc. has been assigned with a target primary four-digit SIC code of 6011 in the Thomson ONE database. NIC reports that the company operates as a BHC. We therefore include the merger of CommerceFirst Bancorp, Inc. with Sandy Spring Bancorp, Inc. in our sample.

[18] In line with the literature, we exclude leveraged buyouts, minority stake purchases, acquisitions of remaining interest, privatizations, recapitalizations, spin-offs, repurchases, exchange offers, and self-tender offers.

[19] Thomson ONE reports The Bancorp, Inc. (with ticker TBBK) headquartered in Delaware and Enterprise Bancorp, Inc. (with ticker EBTC) headquartered in Massachusetts as the target firms. Both reported institutions are listed on the Nasdaq. However, the actual deals involve two unlisted targets; The Bancorp, Inc., headquartered in Kentucky, and Enterprise Bancorp, Inc., headquartered in Florida.

[20] FNB United Corp. experienced an abnormal return of 60.07% on the announcement day.

decade. In terms of aggregate dollars, the annual deal value of bank mergers skyrocketed in the late 1990s.[21] In the 2000s, we note that the level of banking consolidation was slightly decreased, despite the fact that the industry experienced two subsequent peaks in bank M&A dollar values in 2004 and 2008. The bank merger activity then plummeted, as a result of the recent financial crisis.

Historically, regulatory intervention was a chief motivation for bank merger waves. The DFA appears to be no different, since bank merger activity was rejuvenated after its enactment, exhibiting an increasing trend. Notably, the increase in M&A deals is not followed by a corresponding increase in aggregate deal values. Undeniably, this financial regulatory overhaul fueled consolidation in the banking industry. This consolidation however, is driven by small bank mergers.

<div align="center">Insert Figure 1 here</div>

4.3. Summary statistics

Table 1 illustrates the distribution of the merging firms' total assets at year-end prior to the merger announcement. We classify our sample into four, frequently used, asset-size categories: Very small, small, medium-sized and large banking organizations are those banks with assets of less than $1 billion, more than $1 billion but less than $10 billion, between $10 billion and $50 billion, and larger than $50 billion, respectively. Panels A to C provide summary statistics for the bidder, target and combined firm's total assets respectively. Initially, we observe that the 73.49% of the bidders (61 out of 83) and the 95.18% of the targets (79 out of 83) in our sample, involve firms with assets below $10 billion. Interestingly, all 5 very small bidders crossed the $1 billion mark after the merger, while only 6 firms out of the 56 small bidders exceeded the $10 billion threshold via M&As. In contrast, none of the 16 medium-sized

---

[21] In 1998, we observe the highest aggregate deal values for the past 25 years. One notable transaction of this year was the acquisition of BankAmerica Corp. from NationsBank Corp. forming the widely-known Bank of America Corp.

bidders attempted to surpass $50 billion in total assets and be designated as systemically important under the FSOC. In particular, even the largest bidder of the medium-size category does not approach the $50 billion threshold to jump into the SIFI status.[22] It is likely that the DFA's additional prudential, capital, and liquidity standards over systemically important institutions provide counter-motives for medium-sized banks to grow large though M&As and achieve the new SIFI status. This finding is in line with previous studies examining the efficacy of the Dodd-Frank Act in addressing the TBTF problem (Balasubramnian and Cyree, 2014; Akhigbe et al., 2016; Gao et al., 2017).[23]

In Table 1, we are also interested in the distribution of assets, for the two merging firms combined. The data reported on Panel C suggest that there is no bank merger with combined firms' consolidated assets of less than $1 billion. On the contrary, the vast majority of bank M&As post-DFA falls in the small-sized category. In fact, these deals constitute 66.26% of the sample (55 out of 83). The corresponding figures for the medium and large size categories are 26.51% (22 out of 83) and 7.23% (6 out of 83) respectively. Henceforth, for convenience, we define small, medium-sized, and large banks (mergers), as those banks with total assets (combined firms' assets) of less than $10 billion, between $10 billion and $50 billion, and larger than $50 billion, respectively.

Insert **Table 1** here

Table 2 displays summary statistics for our merger data set. Panel A of Table 2 illustrates the statistics for firm-specific and deal-specific variables. The dispersion of asset-size and return on assets (ROA) among bidders and targets is in line with the extant literature. The average

---

[22] People's United Financial, Inc. (Nasdaq: PBCT) merged with Danvers Bancorp, Inc. (Nasdaq: DNBK). The combined firms' assets are $27.89 billion.

[23] To ensure the robustness of this finding, we also follow an alternative classification of a TBTF bank, outlined by Penas and Unal (2004). A bank is classified as TBTF if its assets exceed 2% of all the industry assets. We find no merger where both the bidder and the target were not TBTF in the pre-merger period, but after the merger, their combined assets would exceed this TBTF threshold. We also used one additional TBTF cutoff level, greater than 1.5% of all industry assets. Results remained unchanged.

bidder is substantially larger and more profitable than the average target. In addition, bidding banks have more employees and are better capitalized compared to the target firms. The mean deal value is $318.21 million, and the largest deal of the sample was $3.81 billion. In fact, these figures are relatively small in comparison to previous years.[24] Bid Premium ranges from 49% to 290%.[25] Number of Days is the time interval between the announcement and the completion date, and serves as the proxy for merger complexity. Deals that are more complex are associated with a time-consuming due diligence process. In our sample, the mean number of days is 209.2 for the average merger.[26] Panel B of Table 2 provides additional descriptive information. In our merger sample, the prevailing method of payment for the bank M&As transactions is the combination of cash and stock. Subsequently, stock offers occupy a large proportion of the sample (43.37%) whereas cash deals are almost vanished limited to a rough 2.41 percent of the total sample.[27] Additionally, 48.19% of the deals are between banks headquartered in the same state, suggesting an equally divided distribution between intrastate and interstate mergers.

Insert **Table 2** here

5. Methodology

We employ two approaches in order to measure the overall wealth effects of the Dodd-Frank Act on bank mergers: (1) we estimate the anticipated abnormal returns around the passage of the DFA for several portfolios of banking firms, and (2) we estimate bidder, target, and combined cumulative abnormal returns for the 83 mergers around the announcement day, and the bidder cumulative abnormal returns around the completion day. Finally, we use

---

[24] See, Hagendorff et al. (2008) for an annual comparison of the U.S. bank M&A deal values.

[25] The 49% Bid Premium represents the acquisition of Wilmington Trust Corp. by M&T Bank Corp. The acquired company agreed to fire-sell its shares at a half-price discount.

[26] Becher and Campbell (2005) report intense variation for the number of days in the 1990s. In the early years, the average number of days between announcement and completion could exceed 250, but at the end of the decade, this number shrunk substantially to less than 170.

[27] Cornett et al. (2003), Becher and Campbell (2005), and Gupta and Misra (2007) also suggest that cash is not frequently used as the method of payment.

multivariate regression techniques in order to explain the variation in the estimated cumulative abnormal returns.

5.1. The DFA anticipation effect

Schwert (1981) suggests that the legislative effect on the shareholder wealth may not be independent across firms. Thus, we examine the anticipated wealth effects associated with the passage of the DFA for several portfolios of banking firms to compare potential differences in market's reaction.[28] Binder (1985) argues that in cases of long law enactment processes, new information could be capitalized prior to the formal announcement dates and proposes that an event window should incorporate all the available information associated with a regulatory change. His approach regresses the daily return of a portfolio of firms on a market index over an estimation window and uses a binary variable to quantify the anticipated abnormal returns around the event window. The event window represents the whole procedure of legislation passing through Congress. The binary variable therefore equals one when the proposed legislation passes through Congress and zero otherwise. We employ this procedure by defining the DFA event window following Becher (2009); the event window begins on December 11, 2009 when the first version of the DFA passed the House of the Representatives, and ends on July 15, 2010 when the Senate passed the final reconciled version of the Act (148 days).[29] Subsequently, we employ the following equation using the ordinary least squares (OLS) method over a one-and-a-half-year estimation window (July 1, 2009 to December 31, 2010):[30]

$$R_{p,t} = a_p + \beta_p R_{m,t} + \lambda_p D_e + \varepsilon_{p,t} \tag{1}$$

---

[28] Firm portfolio return for a given day *t* is quantified using the following equation:

$$R_{p,t} = \frac{1}{N} \sum_{i=1}^{n} R_{i,t}$$

Where $R_{p,t}$ the portfolio return for a day *t*, *n* is the number of firms and $R_{i,t}$ the return of firm *i* on day *t*.

[29] Correspondingly, Becher (2009) uses a 155-day event window, from the day Riegle-Neal was first voted by a subcommittee of the House Banking Committee until the Senate's passage. In both cases, the time interval between the Congressional passage and the Presidential signature is a non-event, since each President had clarified their intention to sign the bill. Results do not vary however, if we extend the estimation window to include this time interval.

[30] We used several estimation windows (1, 1 ½, 2 years). Results remained unchanged.

Where $R_{p,t}$ is the return of all banks in each portfolio, $R_{m,t}$ is the daily return on the CRSP NYSE/Amex/Nasdaq equally or value-weighted index (with distributions), D_e is a binary variable equals one during the event window and zero otherwise, α_p, β_p, the constant and slope coefficients, λ_p the coefficient of the binary variable, and t indexes days of the one-and-a-half-year estimation window. The banking portfolios consist of: (i) all 474 banks (with three-digit primary SIC codes of 602-603 or with a four-digit primary SIC code of 6712) available on the CRSP database during the event window; (ii) 53 banks that became bidders after July 21, 2010 and prior to December 31, 2014; (iii) 74 targets; and (vi) 344 bank that were neither a target nor a bidder.[31] Portfolios of all, neither, and target banks are segmented based on the firms' size. The bidding banks' portfolio is segmented based on the merger size (combined firms' consolidated assets).

5.2. Event study

The second approach is to estimate the bidder, target, and combined announcement abnormal returns for the 83 mergers of our sample, and the bidder CARs around the merger completion date. We therefore employ the standard event study methodology outlined in Dodd and Warner (1983). We use the OLS to estimate the parameters of the following market model:

$$R_{i,t} = a_i + \beta_i R_{m,t} + \varepsilon_{i,t} \qquad (2)$$

Where the dependent variable $R_{i,t}$ is the daily market return for stock i, $R_{m,t}$ is the daily return on the CRSP NYSE/Amex/Nasdaq value-weighted index (with distributions), and $t = (-200, -21)$ indexes days prior to the announcement of the merger.[32] In order for a stock to be included

---

[31] The actual number of bidders (targets) engaged in a merger from July 21, 2010 until December 31, 2014 is 61 (83). However, 3 bidders became targets later in the post-DFA era. Consequently, they are removed from the bidder and the target subsamples. Additionally, 5 bidders and 6 targets were included on the CRSP tapes after the event window, resulting in a final sample of 53 (74) unique bidders (targets). Finally, to construct the neither subsample, we exclude all bidders, targets, and the 3 firms that were both bidders and targets from the sample of all banks, resulting in a final sample of 344 banks.

[32] As a robustness check on our results, we have also estimated the market adjusted return model, the mean adjusted returns model, and the market model with the Scholes-Williams beta estimation. We also conducted tests using the CRSP NYSE/Amex/Nasdaq equal-weighted index (with dividends) as the benchmark index. Finally,

at the estimation process it should provide returns for at least 60 trading days during the estimation period. We estimate the daily abnormal returns for each firm as follows:

$$AR_{i,t} = R_{i,t} - \left(\hat{a}_i + \hat{\beta}_i R_{m,t} \right) \qquad (3)$$

Where $AR_{i,t}$ is the abnormal return for the firm i on day t, $\hat{\alpha}_i$, $\hat{\beta}_i$ are the OLS estimates of the intercept and market beta coefficient respectively. To construct the cumulative abnormal returns (CARs), we sum the estimated daily abnormal returns from one day before the announcement to one day after the announcement date. We also computed cumulative abnormal returns for other event windows (−5 days to +1 days, −10 days to +1 days, and −10 days to +10 days).[33] To determine statistical significance, we use the standardized cross-sectional test of Boehmer et al. (1991). The test compensates for possible variance increases in abnormal returns, commonly found on event dates.[34]

Following Houston and Ryngaert (1994), we calculate the combined abnormal returns by constructing a hypothetical value weighted portfolio for each bidder-target pair ($i = 1$ to 83):

$$Combined\ CAR = \frac{MV_i^B CAR_i^B + MV_i^T CAR_i^T}{MV_i^B + MV_i^T} \qquad (4)$$

Where MV_i^B and MV_i^T are the market values of equity for the bidder and target i five days before the merger announcement date, and CAR_i^B and CAR_i^T are the cumulative abnormal returns for the bidder and target i over the several event windows reported.[35]

---

according to the literature, other estimation periods had been used (−300, −51) and (−120, −31). The results obtained are qualitative similar to those presented.

[33] To capture a possible run-up we examined the (−30, +5) window. Additionally, we estimated the extended (−20, completion) window suggest by Andrade et al. (2001). Results for both windows were insignificant.

[34] To ensure robustness of results against the possibility that the abnormal returns are not normally distributed, we use the rank test introduced by Corrado (1989).

[35] To adjust for a possible run-up in bidder and target returns, combined cumulative abnormal returns were also constructed with market value of equity for bidder and target stocks twenty days before the announcement date. The results were identical.

DeLong (2001) suggests that this static approach could severely under- or over-estimate the combined CARs, since changes in the market value of equity for each bidder-target pair may be asymmetric. To ensure robustness of our results we also employ her proposed methodology by constructing a hypothetical portfolio of the two merging firms and calculating its return as follows:

$$R_t^p = \ln\left(\frac{MV_{i,t}^B + MV_{i,t}^T}{MV_{i,t-1}^B + MV_{i,t-1}^T} \right) \qquad (5)$$

Where $MV_{i,t}^B$, $MV_{i,t}^T$, $MV_{i,t-1}^B$ and $MV_{i,t-1}^T$ denote the market value of equity of bidder and target i at days t and $t\text{-}1$ respectively. We then use the return of the hypothetical portfolio in equation (3) to compute its daily abnormal returns.[36]

5.3. Cross-sectional analysis of abnormal returns

The results of event study analysis suggest sizable variation in merger abnormal returns. It is likely that several factors could influence bank merger returns. To ensure the robustness of our results, we conduct numerous regressions. To control for these possible influences, we regress the bidder and combined CARs on a vector of accounting and deal-specific explanatory variables frequently used in the literature. Our control variables are defined as follows:

- *State (Dummy).* Houston and Ryngaert (1994), and DeLong (2001) support that the market reacts more favorably to mergers where both firms are located in the same state. State Dummy is a binary variable that equals 1 if the merging firms are headquartered in the same state, and 0 otherwise.
- *Stock (Dummy).* Travlos (1987) outlines the importance of the method of payment in explaining the announcement abnormal returns of non-banking bidders. We therefore use a dummy that takes the value of 1 when the deal is financed purely with stock, and 0 otherwise.
- *Relative Size.* Following Cornett et al. (2006), relative size is measured as the ratio of target to bidder total assets at year-end prior to the merger announcement.

---

[36] Both approaches produced identical results.

- *Merger Size.* Similar to DeLong (2001), we control for the size of the resulting merged entity by including the natural logarithm of the combined firms' assets at year-end prior to the merger announcement.

- *Small Mergers (Dummy).* Expresses a dummy variable that equals 1 if the combined firms' consolidated assets are less than $10 billion, and 0 otherwise.

- *Large Mergers (Dummy).* Expresses a dummy variable that equals 1 if the combined firms' consolidated assets are more than $50 billion, and 0 otherwise.

- *Roadiff.* Following Houston and Ryngaert (1994), Roadiff is the difference between bidder and target return on assets (ROA) at year-end prior to the merger announcement.

- *Target equity-to-assets.* Postmerger performance may be hampered if the target bank has low levels of capital (DeLong and DeYoung, 2007). We define target equity-to-assets as the ratio of the target bank's common equity to total assets at year-end prior to the merger announcement.

- *Target Employees.* Cyree (2016) uses the number of a bank's employees as a measure of compliance costs. We use the target firm's number of employees at year-end prior to the merger announcement to proxy for merger-related savings in regulatory compliance costs.

- *Number of Days.* Expresses the difference between the announcement and completion date of each merger. Becher and Campbell (2005) use this difference as a proxy for merger complexity.

- *Frequent Bidders (Dummy).* Bidding banks may have empire-building incentives when they frequently engage in merger deals (Becher, 2000). Frequent Bidders (Dummy) is a dummy variable that equals 1 if the bidder has acquired more than one target during the examination period, and 0 otherwise.

- *Bid Premium.* Benston et al. (1995) examine the prices that bidding banks are willing to pay for target firms. We quantify bid premium as the offer price per share divided by the target's market price per share 5 days before the announcement date.[37]

Finally, we also include interaction terms of Small Mergers with Target Employees and Large Mergers with Target Employees. Both variables measure the merger-related savings in regulatory compliance costs for small and large mergers respectively. Based on our hypotheses,

---

[37] Following Brewer and Jagtiani (2013), we also used the target's market price per share 20 days before the announcement to capture a possible run-up, and we obtained similar results.

if reducing compliance costs is meaningful to small bank mergers, we expect the coefficient of the Small Mergers*Target Employees to be positive and significant.

Hence, we conduct multiple OLS regressions to evaluate the potential influence of these control variables on the merger abnormal returns. In order to reduce a possible effect of outliers, we winsorize all variables at the 2% and 98% level. To control for heteroskedasticity, we estimate the standard errors following White (1980). Correlation coefficients of the control variables indicate a linear relationship of a modest degree among sets of variables.[38] Therefore, to ensure that multicollinearity is not a problem, we calculate the variance inflation factors (VIFs) for each control variable in each regression model. As a rule of thumb, VIF values greater than 10 suggest multicollinearity issues. However, VIFs range from 1.05 to 2.92 indicating that multicollinearity is not a primary concern in our data.

6. Results

6.1. Anticipation wealth effects

The merger anticipation hypothesis assumes that the market anticipates future bidding activity and adjusts the prices of the likely bidders accordingly before any official merger announcement. As noted before, we expect that the small-sized banks would be inclined to merge as to reduce the cost of complying with the DFA's new regulatory standards. We hypothesize therefore, that the market identifies bidding activity among these banks *ex-ante* and adjusts their prices at the time where information regarding regulatory changes is available. We compare the anticipation effect on several portfolios of banking firms to illustrate potential differences in anticipated market reaction.

---

[38] The highest correlation coefficient among continuous variables is 0.58 between Target Employees and Merger Size.

Table 3 reports the anticipated wealth effects for all portfolios of banking firms around the passage of the Dodd-Frank Act. Panel A illustrates the results for all the 474 banks listed on the CRSP database during the event window (December 11, 2009 to July 15, 2010). The average daily anticipated abnormal return of all banks, as measured by the coefficient of the binary variable, is 0.167%, and statistically significant at the 1% level, using the CRSP NYSE/Amex/Nasdaq equally-weighted index (with distributions).[39] Next, segmenting all banking firms by size (total assets), we find that only the small banks experience significant anticipated returns, in the scale of 0.169%. This average daily abnormal return corresponds to a compound abnormal return of 28.39% over the entire 148-day event window.

Panel B of Table 3 documents the anticipated wealth effects for the portfolio of the 53 banks that were subsequent bidders after the DFA's passage. The average daily abnormal returns for the bidding banks around the Act's passage are 0.183%, and statistically significant at the 5% level. Further, we classify bidders based on the merger size (combined firms' assets).[40] Notably, bidders of small mergers, where the combined firm's assets do not exceed the $10 billion threshold, experience average daily abnormal returns of 0.222%, and statistically significant at 5%. The compound abnormal return for these bidders is 38.85% over the entire event window. On the contrary, bidders of medium-sized mergers experience insignificant abnormal returns, suggesting that such bids were not anticipated during the Act's passage. Results for the 4 large-merger bidders are marginally significant. However, the small sample size robs the statistical power of such estimates.

Panels C and D of Table 3 reports results for the 74 targets and the 344 banks that were neither a bidder nor a target after the passage of the Dodd-Frank Act, respectively. Average daily abnormal returns for the target firms are 0.139%, and statistically significant at the 5% level.

---

[39] Similar results are obtained using the CRSP NYSE/Amex/Nasdaq value-weighted index (with distributions) for all portfolios of banking firms.
[40] Two bidding firms engaged in both small and medium-sized mergers in the post-DFA era. They are therefore excluded from both subsamples of bidding banks.

Segmenting again by size, small target daily abnormal returns are 0.136% (t=2.30), whereas abnormal returns for the remaining 4 medium-sized targets are insignificant. Likewise, the 344 neither firms experience abnormal returns of 0.167%, and statistically significant at 1%. From the three subsamples of neither firms, only small banks experience significant abnormal returns. It is worth mentioning that, out of these 344 neither firms, 62 banks acquired nonpublic targets. Therefore, we examine if such bids were also anticipated during the passage of the DFA. In fact, average daily abnormal returns for these bidders are 0.152% (t=2.18). Segmenting by size, the 58 small bidders experienced statistically significant abnormal returns, whereas returns for the 4 medium-sized bidders were insignificant. Finally, returns for the remaining 282 neither firms are qualitatively similar to the ones reported in Panel D.

<p align="center">Insert **Table 3** here</p>

The overall anticipated wealth effects for the several portfolios of banks indicate that the market anticipates regulatory effect on sets of firms during the DFA's passage and differentiates its reaction among the various subsamples. Using Chow tests, we document that estimates of Panel B for the 53 bidders are significantly larger than for the portfolios in panels A, C and D of Table 3. These results support that bidding is anticipated as a wealth-creating activity during the regulatory event window since bidders realize greater anticipation gains in comparison to their non-bidding rivals (Becher, 2009). In particular, these bidder gains mostly emanate from the small merger bidders, since the anticipated wealth effects on this set of banks is one of the largest among all subsamples. The market acknowledges that the DFA provides small banks with both the motivation and the regulatory exclusion benefits to engage in merger transactions. Subsequently, these institutions are anticipated as *ex-ante*-likely bidders and experience large compound abnormal returns during the regulatory event window.

One alternative interpretation for the magnitude of the small merger bidders' anticipated wealth effects could be that the market capitalizes only on the benefits of "less regulatory supervision"

for banks with less than \$10 billion in assets and does not identify any synergetic gains emanating from future bidding activity. In this case, we would expect non-merging banks with assets below the \$10 billion threshold to experience comparable daily abnormal returns with these bidders. We therefore compare the anticipated wealth effects of the 35 small merger bidders with the 303 small firms that are neither a bidder nor a target post-DFA. The difference in the two portfolios' coefficients indicates that the small merger bidders' daily abnormal returns are significantly larger than the small non-merging firms' returns (Chow test statistic of 39.72). Therefore, our results provide strong support for Hypothesis 1, and are consistent with the argument that mergers are largely anticipated prior to the official announcement date (Calomiris, 1999; Houston et al., 2001).

6.2. Ex-ante anticipation wealth effects analysis

The aforementioned results illustrate that bidding is anticipated as a wealth creating activity during the passage of the DFA. However, this approach may be problematic, since it uses information not known at the time of the regulatory event. To address this concern, we also use ex-ante measures of merging activity to quantify the anticipated wealth gains of potential merger participants.

In general, owners of small banks that are less profitable and in weak economic condition may seek to exit the industry by selling their firms, while larger, more profitable and well-capitalized banks may look for expansion opportunities (Wheelock and Wilson, 2000; Jagtianni, 2008; Hannan and Pilloff, 2009). Furthermore, Becher (2009) suggests that large, more profitable banks, and banks with more employees are more likely to be a bidder. Kowalik et al. (2015) examine acquisitions of small community banks in the post crisis period, and find that the probability of a bank being acquired is higher for small, less profitable, and in weaker financial condition firms.

Table 4 classifies all 474 banks as small, medium and large institutions. In order to identify potential bidders and targets among these banks we employ ex-ante measures of merger likelihood: firm size, profitability, number of employees and capital ratio (risk-adjusted capital to total assets).[41] Return on Assets (ROA) and Return on Equity (ROE) are used as the broadest measures of profitability (Akhibe et al. 2004; Becher, 2009). We further segment firms of each category into above and below median values.[42] The λ coefficient captures the magnitude of the anticipation wealth gains for the likely bidders and targets.

Panel A of Table 4 details the anticipated wealth gains for the small likely bidders and targets. Larger, more profitable, better capitalized banks and banks with more employees (proxies for potential bidders) experience statistically positive average daily abnormal returns during the passage of the DFA. These results suggest that small firms that could be anticipated as likely bidders, gain value. In addition, smaller, less profitable, less capitalized banks and banks with fewer employees (proxies for potential targets) also experience significant average daily abnormal returns.[43] Collectively, these results indicate that consolidation of small institutions is anticipated as a wealth creating activity for both merging partners. Finally, Panels B and C of Table 4 report the anticipated wealth effects for likely bidders and targets of the medium and large categories respectively. Segmenting by size, ROA, ROE, capital ratios, and number of employees, we find that likely bidders of both categories experience insignificant abnormal returns. However, there is evidence, albeit weak, for anticipated wealth effects on medium and large likely targets. Less profitable and less capitalized firms of the medium-sized category, and smaller with fewer employees firms of the large category (proxies for potential targets), earn marginally significant abnormal returns. Overall, these results are consistent with the ex-post

---

[41] To ensure that our findings are not driven by outliers, we also exclude all ratios over four standard deviations of the mean (Brook et al., 1998; Becher, 2009). Results remained unchanged.

[42] We also examine differences in quartiles, to account for the possibility that the test of medians have low power. Results are qualitatively similar.

[43] We also used equity capital to total assets as a measure of capitalization. Results do not vary.

analyses on anticipation wealth effects, since the market, ex-ante, reacted favourably to likely bidders that hold less than $10 billion in assets. On the contrary, likely bidders that exceed this asset-size threshold are not anticipated during the DFA's passage.

Insert Table 4 here

Finally, this ex-ante analysis may introduce a bias; small banks, with assets close to the $10 billion threshold, should not be anticipated as likely bidders during the Act's passage. We therefore examine anticipation wealth effects for small banks, that do not approach the $10 billion mark, as well as for banks that are in the verge of crossing this asset-size threshold. Remarkably, out of the 417 small banks, only 14 institutions hold assets between $8 billion and $10 billion. Abnormal returns for these 14 banks are indistinguishable from zero ($t=0.55$), whereas returns for the remaining 403 firms are qualitatively similar with the results presented in Table 4 (results not reported).[44] Consequently, small banks, that could effectively cross the $10 billion mark via M&As, are not anticipated as likely bidders.

6.3. Cumulative abnormal returns

In this section, we examine bidder, target, and combined firms' announcement CARs for the 83 mergers, and bidder CARs around the completion date. Table 5 reports CARs for the whole sample of firms. Next, the sample is segmented into three separate subsamples, small, medium-sized, and large bank mergers, based on the consolidated assets of the merging firms.

Panel A of Table 5 illustrates the results for the full sample. Announcement CARs for all bidders and targets are in line with the vast majority of studies investigating bank M&A wealth effects. Consistent with Trifts and Scanlon (1987), Hannan and Wolken (1989), Cornett and De (1991), Houston and Ryngaert (1997), DeLong (2003), and DeLong and DeYoung (2007), and others, bidders experience negative and statistically significant abnormal returns whereas targets experience positive and statistically significant abnormal returns. More precisely, the

---

[44] The analysis was also conducted using the $7 billion as a cut-off measure. Results remained unchanged.

average three-day abnormal return centered on the announcement date for bidder firms is 1.14%, and statistically significant at the 5% level. Over the same period, targets earn a mean cumulative abnormal return of 28.13%, which is statistically significant at the 1% level. Since our results are robust across the various event windows, we report the −1 day to +1 day CAR values for the remainder of this study. We report combined firms' results in a later part of this section.

Panels B, C and D of Table 5 segment returns in three subsamples based on the consolidated assets of the merging firms. Interestingly, abnormal returns for bidders engaged in mergers where the combined firms' consolidated assets were below the $10 billion threshold are indistinguishable from zero. As shown before, the market anticipates bidding activity for these small merger bidders and capitalizes on future synergetic gains. Since the announcement of such bids is not a surprise event, the observed abnormal returns would be biased towards zero (Houston et al. 2001). On the contrary, non-anticipated bids experience a significant negative reaction at the announcement date. More specifically, returns for the bidders of medium-sized mergers are −3.11%, and statistically significant at the 1% level. Evidently, financial markets do not identify adequate synergies to offset the increased regulatory burdens at the announcement of these bids. Finally, abnormal returns for the 6 large merger bidders are negative but not significant (perhaps due to sample of 6 deals). Overall, these results are supportive of our Hypothesis 2.

To measure the overall wealth effects of the U.S. bank mergers in the post-DFA era we also estimate the combined CARs around the announcement day. Houston and Ryngaert (1994), DeLong (2001, 2003), and Gupta and Misra (2007), among others, document insignificant or negligible abnormal returns for the average combined firm. Contrary to these studies, the combined CARs for all the 83 mergers of our sample are 2.32%, and statistically significant at the 1% level. To analyze the source of this value creation, we examine the differences in

abnormal returns between the three subsamples displayed in Panels B, C, and D of Table 5. Hypothesis 3 predicts positive combined CARs for small bank mergers. Markedly, combined CARs for these 55 mergers are 3.44%, and statistically significant at the 1% level. In economic terms, this figure implies a value creation of $23.09 million for the average small merger. Conversely, results for both medium-sized and large mergers are insignificant, suggesting a bidder to target redistribution of wealth. These results contrast previous studies that report substantial merger gains for large bank mergers (Kane, 2000; Houston et al., 2001; Brewer and Jagtianni, 2013). Particularly, the results for the 6 large mergers indicate that there are no significant benefits for institutions that already posses the systemically important status (DeLong, 2001). The mean difference between small and medium merger combined CARs and small and large merger combined CARs is statistical significant at the 1% ($t = 3.17$) and 5% ($t = 2.25$) level, respectively. These results are consistent with our Hypothesis 3 and suggest a clear difference in the way U.S. bank M&As are viewed by the market after the passage of the DFA.

<div align="center">Insert Table 5 here</div>

Table 6 summarizes the bidder mean CARs around the completion date. The underlying assumption behind this analysis is that the market postpones the total stock reprising to the day a proposed deal is materialized (Desai and Stover, 1985). Panel A of Table 6 displays that there is a positive three-day completion CAR for all bidders in the scale of 0.34%, and statistically significant at the 5% level. The magnitude of these abnormal returns is related to the annihilation of a bidder withdrawal probability. Panels B, C, and D of Table 6 provide the cumulative abnormal returns for the three bidder subsamples. Hypothesis 4 predicts that the bidders of small mergers should experience positive abnormal returns on the completion date. Consistent with our last hypothesis, these bidders earn a completion mean CAR of 0.55%,

which is statistically significant at the 1% level, while medium-sized and large merger bidders' cumulative abnormal returns are insignificant.

Insert **Table 6** here

6.4. Regressions of cumulative abnormal returns

In this section, we present regression analysis results, where the dependent variables are the three-day bidder or combined CARs, centered on the announcement date.[45] The estimated coefficients on Small Mergers and Small Mergers*Target Employees, support our argument that merging, below the $10 billion mark, is a value-creating activity in the post-DFA era. Table 7 displays the results from the OLS estimations of bidder CARs. Initially, in model 1, both Merger Size and Target Employees have insignificant coefficients. However, segmenting the sample by combined firms' size, we obtain more conclusive empirical results. In particular, in models 2 and 3, the Small Mergers Dummy is positive and significant at 5% and 1% levels, respectively. The magnitude of its coefficients suggests that the average small-merger bidder earns a 2.9% in model 2 and a 3.3% in model 3 larger cumulative abnormal return in comparison to its larger rivals. Similarly, the coefficient on the interaction term Small Mergers*Target Employees is positive and significant at 5% and 1%, in models 4 and 5 respectively, indicating that, bidders of small mergers gain more, when the target banks has more employees. The coefficient of the interaction term suggests that in small bank mergers, when the Target Employees increase by 1 (one thousand employees), bidder CARs increase by 9.2% and 10.7%, respectively. On the contrary, the coefficient of the Large Mergers*Target Employees is insignificant in both models. This finding could imply that large banks, with thousands of employees, do not seek for savings in regulatory compliance costs through M&As.

---

[45] We used CARs around several other event windows (−5, +1) and (−10, +1) as dependent variables, to ensure the robustness of our results. In all cases, results did not vary.

A handful of the remaining control variables bear statistical significant coefficients in the regressions of bidder CARs. Roadiff is significant at different levels in all regressions, indicating that variation in bidder gains could be attributable to the efficient management transfer from more profitable to less profitable banks. Therefore, merger-related improvements in bank performance are recognized and impounded in the bidding firm's price at the merger announcement date (Cornett and Tehranian, 1992). Target equity-to-assets is negative and also significant in all models, suggesting that banks with high levels of capital are not attractive targets for bidding firms. This finding is consistent with Hannan and Wolken (1989), which report a negative relationship between the target firm's capitalization and bidding firm's abnormal returns. Furthermore, the negative and significant at 1% coefficient for Bid Premium in models 3 and 5 implies that the market regards large premiums as a sign of bidder overpayment (Roll, 1986).[46] Contrary to James and Wier (1987), we do not find a positive relation between Relative Size and bidder returns. Finally, the explanatory power of all five models is relatively low, since the adjusted R^2 ranges from 1.7% to 18%. This finding, however, is usually observed in bidder abnormal returns regression analyses (see, Cornett and De 1991, and DeLong 2003).

Insert **Table 7** here

Table 8 illustrates the results from the OLS estimations of combined CARs. Again, in model 1, the coefficients of Merger Size and Target Employees are insignificant.[47] By contrast, in models 2 and 3, the Small Mergers Dummy is positive and significant at 1% level. The coefficient of the dummy variable indicates that small bank mergers gain more in shareholder value, compared to the larger deals. Additionally, in models 4 and 5, the interaction term of Small Mergers with Target Employees is positive and significant at 5% and 1% levels,

---

[46] Gupta and Misra (2007) find a negative relationship between bid premium and bidder CARs, but only for deals where the combined firms' returns were negative.
[47] Using also quadratic functions of size, both Small Mergers and Small Mergers*Target Employees remain positive and significant in all regressions of bidder and combined CARs.

respectively. The magnitude of its estimated coefficient suggests that in small bank mergers, when the Target Employees increase by 1 (one thousand employees), combined CARs increase by 7.2% and 9.6%, respectively. In other words, small bank mergers that allow for cost savings in regulatory compliance costs are value-enhancing investments in the post-DFA era. Among the remaining control variables, Relative Size is positive and significant at 1% in all five models (DeLong, 2001). Contrary to Houston and Ryngaert (1994), Roadiff is positive and significant at 5% in models 2 to 5, suggesting that moving assets from lesser to better managed firms is associated with larger merger gains. Lastly, the insignificant coefficient of Target equity-to-assets is consistent with the findings of DeLong and DeYoung (2007).

<div align="center">Insert Table 8 here</div>

Shleifer and Vishny (2003) argue that bidders with a substantial run-up in their market value could use their overpriced stock to acquire other institutions. In all regressions however, the Stock Dummy is insignificant, suggesting that method of payment does not influence bidder and combined firms' announcement abnormal returns.[48] In contrast with prior studies (Cornett and Tehranian 1992, and DeLong 2001), merger geographical scope is irrelevant in determining bidder and combined firms' abnormal returns.

Further, we run separate regressions on bidder and combined CARs for value-enhancing and value-reducing deals. Following Gupta and Misra (2007), we segment our sample into value-enhancing and value-reducing deals, based on positive and negative combined CARs around the merger announcement day. In value-enhancing deals, the interaction term Small Mergers*Target Employees is positive and significant for both bidders' and combined firms' CARs, whereas results for value-reducing deals are insignificant (results not reported). We therefore conclude, that small merger size and cost efficiencies are paramount in explaining the bidder and combined firms' abnormal returns in the post-DFA era. Our empirical evidence

---

[48] Results for bidders are consistent with Cornett and De (1991), DeLong (2001), and Becher (2009).

indicates the existence of a DFA effect on small bank M&As. The favorable market reaction for such mergers suggests a positive trade-off between synergies and regulation.

7. Conclusion

In this paper, we provide evidence that the Dodd-Frank Act has effected changes in the merger activity of U.S. banks. Increased compliance costs, stringent capital and prudential standards and fear of lost opportunities were all likely drivers of a new bank merger wave. In fact, we observe a surge in bank M&As after the enactment of the DFA. Notably, this recent consolidation wave is dominated by small bank mergers, since the DFA compliance costs are disproportionately more burdensome to smaller institutions and the new financial regulatory reform provides several regulatory exemptions for banks below the $10 billion mark. Unlike previous merger waves however, medium-sized institutions are reluctant to grow enough through M&As and become systemically important.

Next, we present evidence that directly addresses our research question. More precisely, our findings indicate substantial wealth gains for small bank mergers in the post-DFA era. To quantify these wealth gains, we follow two approaches; the anticipated wealth effects, and the cumulative abnormal returns analysis around the announcement and the completion day.

The anticipated wealth effects approach assumes that the market participants may identify *ex-ante* bidding activity and adjust the price of the anticipated bidder before the time of the official merger announcement. Hence, we hypothesize that future bidders could be identified during the passage of the Dodd-Frank Act, where all information regarding the legislation is available. Our empirical results are consistent with this hypothesis, since the 35 bidders of small mergers experienced significant anticipated wealth gains around the passage of the DFA. In fact, compound abnormal returns for these bidders were 38.85% on average. These results are substantially different across portfolios of bidding and non-bidding banks.

Abnormal returns analysis also suggests that bank mergers in the post-DFA era create value, particularly for smaller deals. At first, bids that were anticipated during the DFA's passage experienced insignificant announcement CARs, whereas unanticipated bidders realized significantly negative abnormal returns. However, combined abnormal returns indicate substantial value creation for the 55 small bank mergers, whereas results for larger deals imply a redistribution of wealth from the bidder to target firm. Lastly, at the deal completion date, we report positive CARs for bidders of small mergers only, associated with the final materialization of the proposed mergers.

Cross-sectional analysis provides strong support to the aforementioned results. Market participants react more favorably to small bank mergers compared to larger deals. The value creation effect is even stronger when small merger size meets cost savings opportunities. Hence, small banks combine to cover the costs of complying with the new DFA rules. On the contrary, results for larger mergers are insignificant, implying that the potential merger-related scale economies do not offset the increased opportunity costs emanating from the new regulation.

As a concluding remark, we could say that there is value creation associated with U.S. bank mergers in the post-DFA era. Mergers between small banks have both the need and the regulatory benefits to merge. Hence, we posit that the market anticipates the $10 billion threshold as the upper bound of optimal scale for bank combinations under the new regulation. We therefore expect future bidding activity in the U.S. banking industry to be concentrated at the lower end of the asset-size distribution.

References

Acharya, V.V., Cooley, T.F., Richardson, M., Walter, I., 2011. Regulating Wall Street: The Dodd-Frank Act and the New Architecture of Global Finance. John Wiley & Sons, Inc., New Jersey.

Aiello, M.J., Tarbert, H.P., 2010. Bank M&A in the wake of Dodd-Frank. Banking Law Journal 127, 909-923.

Akhigbe, A., Madura, J., Whyte, A.M., 2004. Partial anticipation and the gains to bank merger targets. Journal of Financial Services Research 26, 55-71.

Akhigbe, A., Martin, A.D., Whyte, A.M., 2016. Dodd-Frank and risk in the financial services industry. Review of Quantitative Finance and Accounting 47, 395-415.

Allen, J., 2010. Big risks in the big bill. Financial Analysts Journal 66, 6-9.

Anderson, C.W., Becher, D.A., Campbell, T.L., 2004. Bank mergers, the market for bank CEOs, and managerial incentives. Journal of Financial Intermediation 13, 6-27.

Andrade, G., Mitchell, M., Stafford, E., 2001. New evidence and perspectives on mergers. Journal of Economic Perspectives 15, 103-120.

Asquith, P., Bruner, R.F., Mullins, D.W., 1983. The gains to bidding firms from merger. Journal of Financial Economics 11, 121-139.

Baer, H.L., 1988. Regulatory burden handicaps low-risk banking. Federal Reserve Bank of Chicago, Chicago Fed Letter.

Balasubramnian, B., Cyree, K.B., 2014. Has market discipline on banks improved after the Dodd-Frank Act? Journal of Banking and Finance 41, 155-166.

Batkins, S., Milloy, M., 2015. The most expensive Dodd-Frank Rule adds to law's burden. Washington, D.C.: American Action Forum.

Becher, D.A., 2000. The valuation effects of bank mergers. Journal of Corporate Finance 6, 189-214.

Becher, D.A., 2009. Bidder returns and merger anticipation: Evidence from banking deregulation. Journal of Corporate Finance 15, 85-98.

Becher, D.A., Campbell, T.L., 2005. Interstate banking deregulation and the changing nature of bank mergers. Journal of Financial Research 28, 1-20.

Benston, G., Hunter, W.C., Wall, L., 1995. Motivations for bank mergers and acquisitions: enhancing the deposit insurance put option versus earnings diversification. Journal of Money, Credit and Banking 27, 777-788.

Binder, J.J., 1985. Measuring the effects of regulation with stock price data. RAND Journal of Economics 16, 167-183.

Boehmer, E., Masumeci, J., Poulsen, A.B., 1991. Event-study methodology under conditions of event-induced variance. Journal of Financial Economics 30, 253-272.

Brewer, E., Jagtiani, J., 2013. How much did bank pay to become too-big-to-fail and to become systemically important? Journal of Financial Services Research 43, 1-35.

Brook, Y., Hendershott, R., Lee, D., 1998. The gains from takeover deregulation: Evidence from the end of interstate banking restrictions. Journal of Finance 53, 2185-2204.

Cai, J., Song, M.H., Walking, R.A., 2011. Anticipation, acquisitions, and bidders returns: Industry shocks and the transfer of information across rivals. Review of Financial Studies 24, 2242-2285.

Calomiris, C.W., 1999. Gauging the efficiency of bank consolidation during a merger wave. Journal of Banking and Finance 23, 615-621.

Calomiris, C.W., Nissim, D., 2014. Crisis-related shifts in the market valuation of banking activities. Journal of Financial Intermediation 23, 400-435.

Carow, K.A., Heron, R.A., 1998. The interstate banking and branching efficiency act of 1994: A wealth event for acquisition targets. Journal of Banking and Finance 22, 175-196.

Cornett, M.M., De, S., 1991. Common stock returns in corporate takeover bids: Evidence from interstate bank mergers. Journal of Banking and Finance 15, 273-295.

Cornett, M.M., Hovakimian, G., Palia, D., Tehranian, H., 2003. The impact of the manager-shareholder conflict on acquiring bank returns. Journal of Banking and Finance 27, 103-131.

Cornett, M.M., McNutt, J.J., Tehranian, H., 2006. Performance changes around bank mergers: Revenue enhancements versus cost reductions. Journal of Money, Credit and Banking 38, 1013-1050.

Cornett, M.M., Tehranian, H., 1992. Changes in corporate performance associated with bank acquisitions. Journal of Financial Economics 31, 211-234.

Corrado, C.J., 1989. A nonparametric test for abnormal security-price performance in event studies. Journal of Financial Economics 23, 385-395.

Cyree, K.B., 2016. The effects of regulatory compliance for small banks around crisis-based regulation. Journal of Financial Research 39, 215-245

DeLong, G.L., 2001. Stockholder gains from focusing versus diversifying bank mergers. Journal of Financial Economics 59, 221-252.

DeLong, G.L., 2003. The announcement effects of U.S. versus non-U.S. bank mergers: Do they differ? Journal of Financial Research 26, 487-500.

DeLong, G.L., DeYoung, R., 2007. Learning by observing: Information spillovers in the execution and valuation of commercial bank M&As. Journal of Finance 62, 181-216.

DeYoung, R., Evanoff, D.D., Molyneux, P., 2009. Mergers and acquisitions of financial institutions: A review of the post-2000 literature. Journal of Financial Services Research 36, 87-110.

Depman, J., 2014, KPMG Community Banking Survey.

Desai, A.S., Stover, R.D., 1985. Bank holding company acquisitions, stockholder returns, and regulatory uncertainty. Journal of Financial Research 8, 145-156.

Dodd, P., Warner, J.B., 1983. On corporate governance: A study of proxy contests. Journal of Financial Economics 11, 401-438.

Ellihausen, G., 1998. The cost of bank regulation: A review of the evidence. Board of Governors of the Federal Reserve System.

Fama, E.F., Litterman, R., 2012. An experienced view on markets and investing. Financial Analysts Journal 68, 15-19.

Filson, D., Olfati, S., 2014. The impacts of Gramm-Leach-Bliley bank diversification on value and risk. Journal of Banking and Finance 41, 209-221.

Gao,Y., Liao, S., Wang, X., 2017. Capital markets' assessment of the economic impact of the Dodd-Frank Act on systemically important financial firms. Journal of Banking and Finance, forthcoming.

Gupta, A., Misra, L., 2007. Deal size, bid premium, and gains in bank mergers: The impact of managerial motivations. Financial Review 42, 373-400.

Hagendorff, J., Collins, M., Keasey, K., 2008. Investor protection and the value effects of bank merger announcements in Europe and the US. Journal of Banking and Finance 32, 1333-1348.

Hannan, T.H., Pilloff, S.J., 2009. Acquisition targets and motives in the banking industry. Journal of Money, Credit and Banking 41, 1167-1187.

Hannan, T.H., Wolken, J.D., 1989. Returns to bidders and targets in the acquisition process: Evidence from the banking industry. Journal of Financial Services Research 3, 5-16.

Hoskins, S.M., Labonte, M., 2015. An analysis of the regulatory burden on small banks. Congressional Research Service.

Houston, J.F., James, C.M., Ryngaert, M.D., 2001. Where do merger gains come from? Bank mergers from the perspective of insiders and outsiders. Journal of Financial Economics 60, 285-331.

Houston, J.F., Ryngaert, M.D., 1994. The overall gains from large bank mergers. Journal of Banking and Finance 18, 1155-1176.

Houston, J.F., Ryngaert, M.D., 1997. Equity issuance and adverse selection: A direct test using conditional stock offers. Journal of Finance 52, 197-219.

Jagtiani, J., 2008. Understanding the effects of the merger boom on community banks. Federal Reserve Bank of Kansas City, Economic Review 93, 29-48.

James, C.M., Wier, P., 1987. Returns to acquirers and competition in the acquisition market: The case of banking. Journal of Political Economy 95, 355-370.

Kane, E.J., 2000. Incentives for banking megamergers: what motives might regulators infer from event-study evidence? Journal of Money, Credit and Banking 32, 671–701.

Kane, E.J., 2012. Missing elements in US financial reform: A Kübler-Ross interpretation of the inadequacy of the Dodd-Frank Act. Journal of Banking and Finance 36, 654-661.

Kowalik, M., Davig, T., Morris,C.S., Regehr, K., 2015, Bank consolidation and merger activity following the crisis. Federal Reserve Bank of Kansas City, Economic Review 100, 31-49.

Loderer, C., Martin, K., 1990. Corporate acquisitions by listed firms: The experience of a comprehensive sample. Financial Management 19, 17-33.

Malatesta, P.H., Thompson, R., 1985. Partially anticipated events: A model of stock price reactions with an application to corporate acquisitions. Journal of Financial Economics 14, 237-250.

Marsh, T.D., 2015. Reforming the regulation of community banks after Dodd-Frank. Indiana Law Journal 90, 179-235.

Peirce, H., Robinson, I.C., Stratmann, T., 2014. How are small banks faring under Dodd-Frank? GMU Working Paper in Economics No. 14-49. Available at SSRN: http://ssrn.com/abstract=2435206.

Penas, M.F., Unal, H., 2004. Gains in bank mergers: evidence from the bond markets. Journal of Financial Economics 74, 149-179.

Roll. R., 1986. The hubris hypothesis of corporate takeovers. Journal of Business 59, 197-216.

Schipper, K., Thompson, R., 1983. Evidence on the capitalized value of merger activity for acquiring firms. Journal of Financial Economics 11, 85-119.

Schwert, G.W., 1981. Using financial data to measure effects of regulation. Journal of Law and Economics 1, 121-158.

Shleifer, A., Vishny, R.W., 2003. Stock market driven acquisitions. Journal of Financial Economics 70, 295-311.

Skeel, D., 2011. The New Financial Deal: Understanding the Dodd-Frank Act and its (Unintended) Consequences. John Wiley & Sons, Inc., New Jersey.

Trifts, J.W., Scanlon, K.P., 1987. Interstate bank mergers: The early evidence. Journal of Financial Research 10, 305-313.

Travlos, N.G., 1987. Corporate takeover bids, methods of payment, and bidding firms' stock returns. Journal of Finance 42, 943-963.

Wheelock, D.C., Wilson, P.W., 2000. Why do banks disappear? The determinants of U.S. bank failures and acquisitions. Review of Economics and Statistics 82, 127-138.

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica 48, 817-838.

Figure 1

U.S. bank M&As from 1990 to 2014

The figure illustrates the total number of deals and the annual aggregated deal values of completed U.S. bank mergers announced between 1990 and 2014. The data are collected from Thomson ONE database. The sample consists of mergers between banks listed on NYSE, Amex and Nasdaq exchanges.
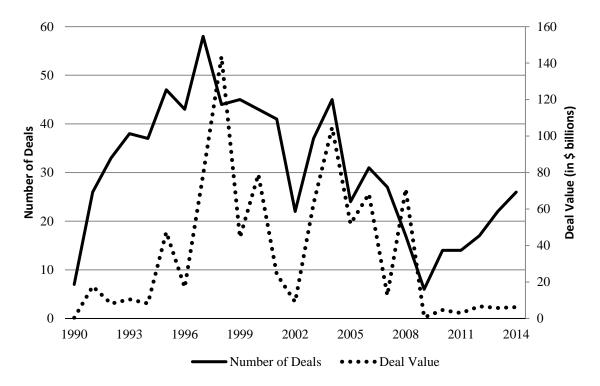
Table 1

Distribution of merging firm's assets

The table illustrates the distribution of the merging firms' total assets for the 83 completed bank mergers announced in the post-Dodd-Frank Act era (July 21, 2010 to December 31, 2014). The sample is divided into four separate asset-size categories: Very small, small, medium-sized and large banking organizations are those banks with assets of less than $1 billion, more than $1 billion but less than $10 billion, between $10 billion and $50 billion, and larger than $50 billion, respectively. Panels A to C report summary statistics for the bidder, target and combined firm's total assets at year-end prior to the merger announcement (in $ billion).

	V. Small	Small	Medium	Large
Panel A: Bidders	N=5	N=56	N=16	N=6
Mean	0.806	4.734	14.407	103.774
Median	0.811	4.200	13.759	73.402
Min	0.616	1.093	10.074	53.667
Max	0.953	9.727	25.037	183.010
Std. Dev.	0.122	2.646	3.998	62.001
Panel B: Targets	N=42	N=37	N=4	N=0
Mean	0.621	2.592	21.705	N/A
Median	0.649	1.841	15.183	N/A
Min	0.198	1.027	11.097	N/A
Max	0.985	9.463	45.356	N/A
Std. Dev.	0.236	2.201	16.110	N/A
Panel C: Combined	N=0	N=55	N=22	N=6
Mean	N/A	4.948	16.071	117.564
Median	N/A	4.401	14.712	101.629
Min	N/A	1.196	10.228	56.917
Max	N/A	9.949	27.890	201.483
Std. Dev.	N/A	2.485	5.179	63.470

Table 2

Summary statistics

This table summarizes descriptive statistics for a sample of 83 completed bank mergers announced in the post-Dodd-Frank Act era (July 21, 2010 to December 31, 2014). We obtain bank merger data from Thomson ONE database. The sample consists of mergers between commercial banks and savings institutions with three-digit SIC codes of 602 and 603 respectively, or bank holding companies with a four-digit SIC code of 6712, listed on NYSE, Amex and Nasdaq exchanges. Panel A displays statistics for several variables. Bidder (Target) Assets are the bidder (target) total assets at year-end prior to the merger announcement. Relative Size is the ratio of target to bidder total assets at year-end prior to the merger announcement. Bidder (Target) ROA is the bidder (target) return on assets at year-end prior to the merger announcement. Roadiff is the difference between bidder and target ROA. Bidder (Target) equity-to-assets is bidding (target) firms' common equity to the total assets at the year-end prior the merger announcement. Bidder (Target) Employees is the number of the bidding (target) firm's employees at the year-end prior the merger announcement. Deal Value is the dollar value of the M&A transactions. Bid Premium is the offer price per share divided by the target's market price per share 5 days before the announcement date (N=78 because Thomson ONE does not report offer price per share for 5 deals). Number of Days measures the difference between the completion and announcement date. Target's equity percentages sought and acquired represent the proportion of target's equity the bidder sought and managed to acquire. Panel B provides percentages of deal characteristics. Method of payment is expressed by the percentages of cash, stock and both cash and stock deals. Geographic diversification is measured by % same state deals.

Panel A: Variables	Mean	Median	Min	Max	Std. Dev.
Bidder Assets (in billion $)	13.489	5.536	0.616	183.010	30.016
Target Assets (in billion $)	2.515	0.985	0.198	45.355	5.608
Relative Size	0.35	0.240	0.01	1.37	0.34
Bidder ROA	0.70	0.817	-1.28	3.71	0.63
Target ROA	0.27	0.455	-7.98	10.57	1.86
Roadiff	0.54	0.256	-3.31	8.63	1.51
Bidder equity-to-assets	0.126	0.116	0.071	0.326	0.044
Target equity-to-assets	0.107	0.100	0.015	0.383	0.048
Bidder Employees (in thousands)	2.727	1.324	0.063	33.700	5.560
Target Employees (in thousands)	0.437	0.238	0.036	3.395	0.648
Deal Value (in billion $)	0.318	0.132	0.010	3.811	0.568
Bid Premium (N=78)	1.40	1.342	0.49	2.90	0.37
Number of Days	209.20	188	61	1161	123.82
Target's equity sought in transaction (%)	100	100	100	100	0
Target's equity acquired after transaction (%)	99.93	100	94.29	100	0.63
Panel B: Deal characteristics					
% of cash deal	2.41				
% of stock deal	43.37				
% of both cash and stock deal	54.22				
% same state deals	48.19				

Table 3

Anticipation effects during the passage of the DFA

This table documents the anticipated stock return around the passage of the Dodd-Frank Act for several portfolios of banking firms. Panel A details the anticipation effect for all 474 commercial banks and savings and loans institutions with three-digit primary SIC codes of 602 and 603 respectively, or bank holding companies with four-digit primary SIC code of 6712 on the CRSP database during the 148 days event window (December 11, 2009 to July 15, 2010). We also report 3 subsamples of the whole sample. Panel B focuses on firms that became bidders after July 21, 2010 and prior to December 31, 2014. From the 61 unique bidders, 3 firms became targets later in the post-DFA period and 5 firms were not in existence on the CRSP database during the event window resulting in a final sample of 53 unique bidders. We segment the bidding banks' sample based on the combined firms' total assets. 35 bidders engaged in small mergers, 12 bidders engaged in medium-size mergers (two firms were excluded since they were bidders in both small and medium subsamples) and 4 firms engaged in large mergers. Panel C details the anticipation effect for the 74 target firms (the 3 firms that were both bidders and targets during the post-DFA period were excluded and 6 firms out of 83 were not available in the CRSP database during the event window), and 2 subsamples based on the target firms' asset-size. Finally, Panel D reports the anticipation effect for the 344 firms that were neither a bidder nor a target in the post-DFA era, and 3 subsamples based on these firms' total assets. Small, medium-sized and large banks (mergers) are defined as those firms with assets (combined firms' assets) of less than $10 billion, between $10 and $50 billion, and larger than $50 billion respectively. The estimation period is from July 1, 2009 to December 31, 2010. The binary variable equals one for each day of the event window and zero otherwise. The bank portfolios returns are winsorized at 2% and 98% level. T-statistics for the regression coefficients are provided in parentheses.

	a	b	λ	Adj. R^2
Panel A: All banks				
All (N=474)	−0.00154***	0.76141***	0.00167***	0.783
	(−5.14)	(37.01)	(3.50)	
Small banks (N=417)	−0.00155***	0.68639***	0.00169***	0.755
	(−5.28)	(34.13)	(3.62)	
Medium banks (N=35)	−0.00187***	1.34501***	0.00171	0.673
	(−2.66)	(27.96)	(1.53)	
Large banks (N=22)	−0.00140*	1.37631***	0.00155	0.646
	(−1.84)	(26.35)	(1.28)	
Panel B: Bidders				
All (N=53)	−0.00143**	1.17141***	0.00183**	0.705
	(−2.52)	(30.11)	(2.03)	
Small mergers (N=35)	−0.00168***	1.14762***	0.00222**	0.682
	(−2.85)	(28.49)	(2.37)	
Medium mergers (N=12)	−0.00073	1.14478***	0.00053	0.626
	(−1.10)	(25.21)	(0.50)	
Large mergers (N=4)	−0.00151	1.36927***	0.00270*	0.534
	(−1.58)	(20.88)	(1.78)	
Panel C: Targets				
All banks(N=74)	−0.00090**	0.58264***	0.00139**	0.576
	(−2.40)	(22.72)	(2.34)	
Small banks (N=70)	−0.00087**	0.55458***	0.00136**	0.556
	(−2.34)	(21.80)	(2.30)	
Medium banks (N=4)	−0.00193*	1.40488***	0.00231	0.480
	(−1.77)	(18.76)	(1.33)	

Table 3 (continued)

	a	b	λ	Adj.R²
Panel D: Neither				
All (N=344)	−0.00162***	0.73674***	0.00167***	0.773
	(−5.42)	(35.95)	(3.52)	
Small banks (N=303)	−0.00112***	0.64766***	0.00194***	0.698
	(−3.51)	(29.50)	(3.80)	
Medium banks (N=23)	−0.00168**	1.35299***	0.00142	0.665
	(−2.33)	(27.46)	(1.24)	
Large banks (N=18)	−0.00139*	1.37764***	0.00128	0.653
	(−1.85)	(26.74)	(1.07)	

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

Table 4

Anticipation effects on ex-ante portfolios of banks around the DFA passage

The table details the anticipation effect for various ex-ante portfolios of banks around the passage of the DFA. Panels A to C classify banks according to their total assets. Small, medium-sized and large banks are defined as those firms with assets of less than $10 billion, between $10 and $50 billion, and larger than $50 billion respectively. Each Panel segments banks based on their: size, profitability (as measured by Return on Assets (ROA) and Return on Equity (ROE)), capital ratio and number of employees. High (Low) firms are those with above (below) median values. The estimation period is from July 1, 2009 to December 31, 2010. The binary variable equals one for each day of the event window and zero otherwise (December 11, 2009 to July 15, 2010). The bank portfolios returns are winsorized at 2% and 98% level. T-statistics for the regression coefficients are provided in parentheses.

Panel A: Small banks (N=417)	a	b	λ	Adj.R^2
High Assets	−0.00220***	1.039761***	0.00222***	0.766
	(−5.11)	(35.20)	(3.24)	
Low Assets	−0.00085***	0.32877***	0.00108**	0.451
	(−3.1)	(17.60)	(2.50)	
High ROA	−0.00073**	0.71209***	0.00120**	0.735
	(−2.27)	(32.46)	(2.35)	
Low ROA	−0.00220***	0.67168***	0.00209***	0.640
	(−5.82)	(25.87)	(3.47)	
High ROE	−0.00072**	0.69607***	0.00118**	0.739
	(−2.32)	(32.77)	(2.40)	
Low ROE	−0.00198***	0.67736***	0.00196***	0.673
	(−5.59)	(27.85)	(3.47)	
High Capital	−0.00117***	0.80873***	0.00143**	0.753
	(−3.36)	(33.98)	(2.59)	
Low Capital	−0.00175***	0.57536***	0.00185***	0.630
	(−5.29)	(25.36)	(3.51)	
High Employees	−0.00195***	1.01672***	0.00207***	0.769
	(−4.68)	(35.53)	(3.11)	
Low Employees	−0.00097***	0.36281***	0.00121***	0.495
	(−3.53)	(19.23)	(2.77)	
Panel B: Medium banks (N=35)				
High Assets	−0.00168**	1.30864***	0.00128	0.665
	(−2.42)	(27.45)	(1.16)	
Low Assets	−0.00204***	1.34993***	0.00196	0.623
	(−2.64)	(25.43)	(1.59)	
High ROA	−0.00066	1.10592***	0.00053	0.661
	(−1.11)	(27.18)	(0.57)	
Low ROA	−0.00294***	1.55785***	0.00275*	0.627
	(−3.28)	(25.28)	(1.93)	
High ROE	−0.00071	1.16924***	0.00077	0.652
	(−1.12)	(26.68)	(0.76)	
Low ROE	−0.00290***	1.50152***	0.00254*	0.628
	(−3.34)	(25.30)	(1.84)	
High Capital	−0.00185**	1.43183***	0.00149	0.663
	(−2.43)	(27.34)	(1.22)	
Low Capital	−0.00189**	1.25733***	0.00194*	0.620
	(−2.57)	(24.91)	(1.65)	
High Employees	−0.00138**	1.29309***	0.00151	0.668
	(−2.02)	(27.66)	(1.39)	
Low Employees	−0.00245***	1.45829***	0.00202	0.616
	(−2.84)	(24.71)	(1.47)	

Table 4 (continued)

Panel C: Large banks (N=22)	a	b	λ	Adj.R²
High Assets	−0.00120	1.29525***	0.00064	0.615
	(−1.56)	(24.64)	(0.52)	
Low Assets	−0.00161*	1.45737***	0.00247*	0.615
	(−1.87)	(24.61)	(1.80)	
High ROA	−0.00107	1.16878***	0.00078	0.631
	(−1.60)	(25.48)	(0.73)	
Low ROA	−0.00174*	1.58385***	0.00233	0.599
	(−1.79)	(23.83)	(1.51)	
High ROE	−0.00107	1.16878***	0.00078	0.631
	(−1.60)	(25.48)	(0.73)	
Low ROE	−0.00174*	1.58385***	0.00233	0.599
	(−1.79)	(23.83)	(1.51)	
High Capital	−0.00156*	1.40765***	0.00197	0.593
	(−1.79)	(23.54)	(1.42)	
Low Capital	−0.00157*	1.39213***	0.00191	0.602
	(−1.86)	(24.00)	(1.42)	
High Employees	−0.00112	1.27216***	0.00054	0.632
	(−1.55)	(25.56)	(0.47)	
Low Employees	−0.00168*	1.48046***	0.00257*	0.584
	(−1.80)	(23.11)	(1.73)	

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

Table 5

CARs around the announcement date

This table illustrates the bidder, target and combined firms' cumulative abnormal returns (CARs) around the merger announcement date for a sample of 83 completed bank mergers announced in the post Dodd-Frank Act era (July 21, 2010 to December 31, 2014). The sample consists of mergers between commercial banks and savings institutions with three-digit SIC codes of 602 and 603 respectively, or bank holding companies with a four-digit SIC code of 6712, listed on NYSE, Amex and Nasdaq exchanges. The table is separated into 4 different panels. Panel A reports bidder, target and combined CARs for the whole sample of 83 mergers, and Panels B, C and D report CARs for the small, medium, and large mergers subsamples. Small, medium-sized and large mergers represents those mergers with combined firms' assets of less than $10 billion, between $10 billion and $50 billion, and larger than $50 billion respectively. The CARs presented at the table are estimated using the market model. The estimation period consists of 180 trading days and ends 21 trading days before the event date. In order for a stock to be included at the estimation process it should provide returns for at least 60 trading days during the estimation period. The parametric test is the standardized cross-sectional test.

Panel A: All mergers (N=83)	Bidder		Target		Combined	
Event Day	Mean CARs	StdCS test	Mean CARs	StdCS test	Mean CARs	StdCS test
(−1, +1)	−1.14%	−2.009**	28.13%	12.780***	2.32%	4.360***
(−5, +1)	−1.08%	−1.881*	28.73%	12.177***	2.41%	4.718***
(−10, +1)	−1.40%	−2.485**	29.48%	13.005***	2.35%	4.152***
(−10, +10)	−1.58%	−1.578	29.65%	12.726***	2.25%	3.312***
Panel B: Small mergers (N=55)	Bidder		Target		Combined	
Event Day	Mean CARs	StdCS test	Mean CARs	StdCS test	Mean CARs	StdCS test
(−1, +1)	−0.48%	−0.402	29.67%	10.835***	3.44%	5.309***
(−5, +1)	−0.68%	−0.608	30.44%	10.629***	3.36%	5.212***
(−10, +1)	−1.10%	−1.117	31.45%	11.597***	3.26%	4.981***
(−10, +10)	−1.93%	−1.42	31.63%	11.148***	2.54%	3.195***
Panel C: Medium mergers (N=22)						
Event Day	Mean CARs	StdCS test	Mean CARs	StdCS test	Mean CARs	StdCS test
(−1, +1)	−3.11%	−2.744***	27.92%	7.775***	0.23%	0.140
(−5, +1)	−2.16%	−2.367**	28.49%	7.228***	0.71%	0.543
(−10, +1)	−2.69%	−2.735***	28.34%	6.986***	1.01%	0.377
(−10, +10)	−1.63%	−0.961	27.91%	6.590***	1.99%	0.996

Table 5 (continued)

CARs around the announcement date

Panel D: Large mergers (N=6)	Bidder		Target		Combined	
Event Day	Mean CARs	StdCS test	Mean CARs	StdCS test	Mean CARs	StdCS test
(−1, +1)	−0.88%	−0.457	14.77%	1.581	−0.25%	0.200
(−5, +1)	−0.65%	−0.351	13.93%	1.372	−0.10%	0.462
(−10, +1)	−1.77%	−0.843	15.61%	1.592	−1.03%	−0.106
(−10, +10)	−0.35%	0.106	17.97%	1.842*	0.50%	0.744

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test

Table 6

Bidder CARs around the completion date

This table illustrates the bidder cumulative abnormal returns (CARs) around the merger completion date for a sample of 83 completed bank mergers announced in the post-Dodd-Frank Act era (July 21, 2010 to December 31, 2014). The sample consists of mergers between commercial banks and savings institutions with three-digit SIC codes of 602 and 603 respectively, or bank holding companies with a four-digit SIC code of 6712, listed on NYSE, Amex and Nasdaq exchanges. The table is separated into 4 different panels. Panel A reports CARs for the bidders of the whole sample of 83 mergers, and Panels B, C and D report CARs for the bidders of the small, medium, and large mergers subsamples. Small, medium-sized and large mergers represents those mergers with combined firms' assets of less than $10 billion, between $10 billion and $50 billion, and larger than $50 billion respectively. The CARs presented at the table are estimated using the market model. The estimation period consists of 180 trading days and ends 21 trading days before the event date. In order for a stock to be included at the estimation process it should provide returns for at least 60 trading days during the estimation period. The parametric test is the standardized cross-sectional test.

Panel A: All mergers (N=83)		
Event Day	Mean CARs	StdCS test
(−1, +1)	0.34%	1.995**
(−5, +1)	0.92%	3.250***
(−10, +1)	1.26%	4.264***
(−10, +10)	0.77%	1.764*
Panel B: Small mergers (N=55)		
Event Day	Mean CARs	StdCS test
(−1, +1)	0.55%	2.724***
(−5, +1)	1.10%	3.143***
(−10, +1)	1.57%	4.023***
(−10, +10)	1.10%	2.017**
Panel C: Medium mergers (N=22)		
Event Day	Mean CARs	StdCS test
(−1, +1)	−0.03%	−0.205
(−5, +1)	0.64%	1.189
(−10, +1)	0.36%	0.802
(−10, +10)	0.12%	0.208
Panel D: Large mergers (N=6)		
Event Day	Mean CARs	StdCS test
(−1, +1)	−0.25%	−0.34
(−5, +1)	0.27%	0.019
(−10, +1)	1.65%	3.045***
(−10, +10)	0.17%	0.356

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test

Table 7

Regression analysis of bidder CARs around the announcement date

This table summarizes the OLS regression results for 83 completed bank mergers announced between July 21, 2010 and December 31, 2014. In each regression, the dependent variable is bidder announcement CARs. State is a dummy variable that takes the value of 1 if the merger is intrastate, and zero otherwise. Stock is a dummy variable that equals 1 if the deal is financed purely with stock, and zero otherwise. Relative Size is the ratio of target to bidder total assets at the year-end prior the merger announcement. Merger Size is the natural logarithm of the combined firms' assets at the year-end prior the merger announcement. Small Mergers is a dummy variable that equals 1 if the combined firms' assets are less than $10 billion, and zero otherwise. Large Mergers is a dummy variable that equals 1 if the combined firms' assets are more than $50 billion, and zero otherwise. Roadiff is the difference between bidder and target ROA at the year-end prior the merger announcement. Target equity-to-assets is the target firms' common equity to the total assets at the year-end prior the merger announcement. Target Employees is the number of the target firm's employees at the year-end prior the merger announcement. Number of Days is the difference between the merger announcement and completion date. Frequent Bidders is a dummy variable that equals 1 if the bidder has acquired more than one target, and zero otherwise. Bid Premium is the offer price paid per share divided by the target's market price per share 5 days before the announcement date. All variables are winsorized at 2% and 98% level. The t-statistics using White heteroskedasticity consistent standard errors are reported in parentheses.

Variable	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5
Constant	−0.058	−0.025	0.067**	−0.013	0.062*
	(−0.95)	(−1.15)	(2.17)	(−0.58)	(1.80)
State (dummy)	−0.003	−0.004	−0.003	−0.003	−0.004
	(−0.29)	(−0.37)	(−0.31)	(−0.29)	(−0.44)
Stock (dummy)	0.011	0.009	0.002	0.005	−0.003
	(1.13)	(0.94)	(0.24)	(0.49)	(−0.36)
Relative Size	0.030	0.003	−0.006	−0.008	−0.015
	(1.24)	(0.17)	(−0.34)	(−0.37)	(−0.80)
Merger Size	0.006				
	(0.98)				
Small Mergers (dummy)		0.029**	0.033***		
		(2.46)	(3.02)		
Large Mergers (dummy)		0.022	0.013		
		(1.26)	(0.84)		
Roadiff	0.004*	0.005***	0.005**	0.006***	0.005**
	(1.80)	(3.08)	(2.52)	(3.28)	(2.35)
Target equity-to-assets	−0.173*	−0.223**	−0.399***	−0.195*	−0.327***
	(−1.71)	(−2.26)	(−3.80)	(−1.89)	(−2.78)
Target Employees	−0.026				
	(−1.66)				
Small*Target Employees				0.092**	0.107***
				(2.41)	(2.71)
Large*Target Employees				0.008	0.005
				(1.45)	(1.14)
Number of Days	0.000	0.000	0.000	0.000	0.000
	(0.30)	(0.67)	(0.57)	(0.42)	(0.28)
Frequent Bidders	−0.005	−0.002	0.007	−0.001	0.009
	(−0.64)	(−0.22)	(0.92)	(−0.07)	(1.16)
Bid Premium			−0.048***		−0.038***
			(−3.95)		(−3.23)
N	83	83	78	83	78
Adj. R^2	0.017	0.024	0.152	0.054	0.180

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.

Table 8

Regression analysis of combined CARs around the announcement date

This table summarizes the OLS regression results for 83 completed bank mergers announced between July 21, 2010 and December 31, 2014. In each regression, the dependent variable is combined announcement CARs. State is a dummy variable that takes the value of 1 if the merger is intrastate, and zero otherwise. Stock is a dummy variable that equals 1 if the deal is financed purely with stock, and zero otherwise. Relative Size is the ratio of target to bidder total assets at the year-end prior the merger announcement. Merger Size is the natural logarithm of the combined firms' assets at the year-end prior the merger announcement. Small Mergers is a dummy variable that equals 1 if the combined firms' assets are less than $10 billion, and zero otherwise. Large Mergers is a dummy variable that equals 1 if the combined firms' assets are more than $50 billion, and zero otherwise. Roadiff is the difference between bidder and target ROA at the year-end prior the merger announcement. Target equity-to-assets is the target firms' common equity to the total assets at the year-end prior the merger announcement. Target Employees is the number of the target firm's employees at the year-end prior the merger announcement. Number of Days is the difference between the merger announcement and completion date. Frequent Bidders is a dummy variable that equals 1 if the bidder has acquired more than one target, and zero otherwise. Bid Premium is the offer price paid per share divided by the target's market price per share 5 days before the announcement date. All variables are winsorized at 2% and 98% level. The t-statistics using White heteroskedasticity consistent standard errors are reported in parentheses.

Variable	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5
Constant	0.044	−0.002	−0.010	0.008	−0.020
	(0.76)	(−0.08)	(−0.20)	(0.39)	(−0.40)
State (dummy)	0.009	0.008	0.007	0.008	0.004
	(1.04)	(0.84)	(0.74)	(0.80)	(0.38)
Stock (dummy)	0.001	−0.001	−0.003	−0.003	−0.007
	(0.06)	(−0.07)	(−0.35)	(−0.40)	(−0.85)
Relative Size	0.062***	0.052***	0.054***	0.045***	0.045***
	(3.49)	(3.98)	(3.65)	(2.94)	(2.78)
Merger Size	−0.003				
	(−0.47)				
Small Mergers (dummy)		0.024***	0.025***		
		(2.67)	(2.71)		
Large Mergers (dummy)		0.000	0.000		
		(−0.03)	(0.01)		
Roadiff	0.003	0.003**	0.003**	0.004**	0.004**
	(1.41)	(2.18)	(2.00)	(2.22)	(2.23)
Target equity-to-assets	−0.122	−0.153	−0.173	−0.125	−0.107
	(−1.17)	(−1.52)	(−1.38)	(−1.27))	(−0.85)
Target Employees	−0.011				
	(−0.99)				
Small*Target Employees				0.072**	0.096***
				(2.45)	(2.90)
Large*Target Employees				−0.002	−0.001
				(−0.45)	(−0.17)
Number of Days	−0.000	0.000	0.000	0.000	0.000
	(−0.14)	(0.22)	(0.41)	(−0.09)	(0.28)
Frequent Bidders	−0.003	−0.001	−0.002	−0.001	−0.001
	(−0.33)	(−0.17)	(−0.22)	(−0.10)	(−0.07)
Bid Premium			0.006		0.015
			(0.28)		(0.67)
N	83	83	78	83	78
Adj. R^2	0.211	0.228	0.231	0.239	0.271

The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels respectively, using a 2-tail test.