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

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# **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. This consolidation trend is mainly driven by mergers of small banks, since small banks feel the need to merge in order to absorb the compliance costs of the new regulation. We document that the \$10 billion asset-size threshold has become the ceiling of the optimal scale for bank combinations, given that banks below this \$10 billion mark avoid several regulatory hurdles imposed by the Dodd-Frank Act. Results for these “less than \$10 billion mergers” suggest significant value creation for both firms’ shareholders: Bidders experience large anticipated wealth gains during the passage of the legislation since the market had ex-ante identified these bids. Consequently, at the deal announcement date, bidders experience insignificant returns, targets experience large abnormal returns and the combined abnormal returns are statistically positive. Finally, bidders experience positive abnormal returns at the deal completion date. On the contrary, results for larger bank mergers indicate a redistribution of wealth from the bidder to the target firm.

***JEL Classification:*** G14, G21, G28, G34

***Keywords:*** *Dodd-Frank regulation, shareholder wealth, market anticipation, event study*

## **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. Among the core objectives of this new regulatory framework is to limit the too-big-to-fail (TBTF) banks' exposures and 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.

We examine the shareholder wealth effects of the Dodd-Frank Act for 83 completed bank mergers announced between July 21, 2010 and December 31, 2014. Our findings provide evidence of value creation for shareholders of both merging partners after the DFA's enactment. This positive stock market reaction however, is wholly attributed to mergers among banks with post-event consolidated assets of less than \$10 billion. The Dodd-Frank Act fosters consolidation on the left side of this asset-size threshold since these banks 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.

Prior literature suggests that M&As 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 *ex-ante* bidding activity and capitalizes prior potential wealth gains emanating from the anticipated bid. The main finding of this analysis is that the market anticipates future bidders of mergers with post-event consolidated assets of less than \$10 billion. Anticipated wealth effects for these bids are significantly larger than the returns to other banking firms. Notably, bidders of larger deals were not anticipated as such during the passage of the DFA.

Our empirical approach also includes the traditional event study analysis. 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, have utilized this approach to study 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. Results for 55 mergers involving banks with post-event consolidated assets of less than \$10 billion contrast these findings. Bidders of such mergers experience insignificant announcement abnormal returns since the market had *ex-ante* capitalized potential gains related to these bids. Subsequently, combined cumulative abnormal returns (CARs) for these mergers are significantly positive, translating into an average shareholder value increase of \$23.09 million. Results for the remaining 28

mergers are consistent with the bidder to target wealth transfer hypothesis. 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 “less than \$10 billion” bidders experience positive CARs around the completion date. These returns relate to the removal of uncertainty associated with the termination of the proposed mergers. Overall, results of the cross-sectional analysis confirm that the cumulative abnormal returns are mainly explained by the \$10 billion asset-size distinction.

In short, our contribution to the literature is twofold. First, we exhibit a detailed analysis of the impact of the Dodd-Frank Act on the U.S. bank M&As activity and we identify significant shareholder value creation for small banks mergers. Second, we provide evidence suggesting that the \$10 billion asset-size threshold constitutes the upper bound of the optimal level of consolidation in the post DFA era.

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 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.<sup>1</sup> 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.<sup>2</sup> In practice, it is unlikely that these concentration limits would deter further consolidation within 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.<sup>3</sup>

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

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<sup>1</sup> 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>.

<sup>2</sup> 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.

<sup>3</sup> 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.

risk factor will be applicable to mergers between large, systemically important banks, whereas mergers of small banks will probably be unaffected.<sup>4</sup>

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*

The Dodd-Frank Act made several compromises in favor of small banks; title X requires the establishment of the Consumer Financial Protection Bureau (CFPB).<sup>5</sup> The CFPB is an independent executive agency within the Federal Reserve, authorized to promote consumer financial protection. The principal focus of 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

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<sup>4</sup> We define small banks as all the depository institutions with assets of less than \$10 billion (community banks, savings institutions, etc.).

<sup>5</sup> Section 1011 designates the creation of the CFPB.



as the Durbin Amendment. Under this section, banks that exceed the \$10 billion threshold face a cap on debit card interchange transaction fees.<sup>6</sup> Both DFA's provisions therefore 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.

Congress' main intention behind the Dodd-Frank Act was to constrain the risk of the large financial institutions. At a first glance, it seems that small banks are unaffected from the above mentioned parts of the new legislation, since they avoid primary supervision by the CFPB and proprietary trading is not central to their business activities. However, the DFA incorporates more than 500 separate regulations governing depository institutions. All these reforms are associated with increased compliance costs such as: hiring suitable employees, relying on outside compliance experts, allocating additional funds and resources to comply with the regulations, time-consuming operations by non-specialized employees, etc. Small banks cannot absorb these costs at the same rate as larger institutions. 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.

Ironically, the DFA's indirect sections would be of greater importance in determining bank M&As. The increased regulatory burdens alongside with harsh economic

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<sup>6</sup> For instance, Prosperity Bancshares, Inc. reported a revenue loss of ca\$9 million due to these caps (<http://www.bloomberg.com/news/articles/2013-10-03/dodd-frank-fills-small-banks-with-the-urge-to-merge>).

conditions and the low-interest rate environment may urge institutions to become 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 swallow the new regulatory costs and improve their profitability.

### **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.<sup>7</sup> 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. Yet, Cornett and De (1991) suggest the geographical scope to be a source of value for bank mergers. More specifically, they report positive abnormal returns for both bidders and targets engaged in interstate bank mergers. Furthermore, DeLong (2001) documents

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<sup>7</sup> See, DeYoung et al. (2009) for a detailed review of the bank M&A studies.

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. On the contrary, Peirce et al. (2014) 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. Accordingly, Aiello and Tarbert (2010), and Marsh (2015) argue that the imposition of these regulatory compliance burdens would dictate small banks 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 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 will certainly fuel 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, and are obliged to charge lower debit card interchange fees. 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. Thus, 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 consolidated assets post-event 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 large-deals 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 post-event consolidated 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 where the post-event consolidated assets do not exceed the \$10 billion threshold. On the contrary, the announcement of a non-anticipated bid might incorporate a surprise factor. Implicit in Hypothesis 1 is that bidders of mergers with post-event consolidated assets of more than \$10 billion are not identified as *ex-ante* likely bidders, since the DFA does not encourage depository institutions to merge if their post-event consolidated assets exceed the aforementioned threshold. 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 both bidder subsamples.

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

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 where the post-event consolidated assets are 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.<sup>8</sup> In such cases, the bidder is likely to withdraw its offer.<sup>9</sup> 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

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<sup>8</sup> 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.

<sup>9</sup> 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.



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 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.<sup>10</sup> We use the following five criteria to obtain the initial sample:

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 with a four-digit primary SIC code equal to 6712.<sup>11</sup>
2. The announcement of the merger is between July 21, 2010 and December 31, 2014.

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<sup>10</sup> 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.

<sup>11</sup> 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.

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%.<sup>12</sup>
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.<sup>13</sup> 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.<sup>14</sup> 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

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<sup>12</sup> 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.

<sup>13</sup> 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.

<sup>14</sup> FNB United Corp. experienced an abnormal return of 60.07% on the announcement day.

follows an upward trend throughout the decade. In terms of aggregate dollars, the annual deal value of bank mergers skyrocketed in the late 1990s.<sup>15</sup> 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.

Insert **Figure 1** here

#### *4.3. Summary statistics*

Table 1 displays summary statistics for our merger data set. Panel A of Table 1 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 bidder is substantially larger and more profitable than the average target. 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.<sup>16</sup> Bid Premium ranges from 49% to 290%.<sup>17</sup> Number of Days is the

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<sup>15</sup> 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.

<sup>16</sup> See Hagendorff et al. (2008) for an annual comparison of the U.S. bank M&A deal values.

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.<sup>18</sup>

Panel B of Table 1 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.<sup>19</sup> Additionally, 48.19% of the deals are between banks headquartered in the same state, suggesting an equally divided distribution between intrastate and interstate mergers. Markedly, the vast majority of bank M&As post-DFA involves banks, where the post-event consolidated assets do not exceed the \$10 billion threshold. In fact, these deals constitute 66.27% of the sample.<sup>20</sup>

Increased regulatory burdens and improved market discipline provide counter-motives for large banks to grow larger via M&As. On the contrary, we observe intense clustering of banks where the post-event consolidated assets do not exceed the \$10 billion threshold. Despite the DFA's burdensome reforms, it is evident that the U.S banking industry is experiencing a new merger wave at the lower end of its asset-size distribution. Hence, for the remainder of this study, we will also refer to the deals with less (more) than \$10 billion in post-event consolidated assets as small-deals (large-deals).

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<sup>17</sup> 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.

<sup>18</sup> 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.

<sup>19</sup> 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.

<sup>20</sup> The corresponding percentage for bank M&As with post-event consolidated assets of less than \$10 billion over the period of 1990 to 2010 is 49.5%.

Insert Table 1 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 multivariate regression techniques in order to explain the variation in the estimated cumulative abnormal returns.

### 5.1. The DFA anticipation effect

In measuring the effect of regulation on groups of firms, Schwert (1981) suggests analyzing the returns of firm portfolios since the legislative effect 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.<sup>21</sup> 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

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<sup>21</sup> 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  $t$ .

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).<sup>22</sup> 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):<sup>23</sup>

$$R_{p,t} = \alpha_p + \beta_p R_{m,t} + \lambda_p D_e + \varepsilon_{p,t} \quad (1)$$

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 value-weighted index (with distributions),  $D_e$  is a binary variable equals one during the event window and zero otherwise,  $\alpha_p$ ,  $\beta_p$ , the constant and slope coefficients,  $\lambda_p$  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) 35 bidders with post-event consolidated assets of less than \$10 billion; (iv) 16 bidders with post-event consolidated assets of more than \$10 billion; (v) 74 targets; and (vi) 344 bank that were neither a target nor a bidder.<sup>24</sup>

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<sup>22</sup> 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.

<sup>23</sup> We used several estimation windows (1, 1 ½, 2 years). Results remained unchanged.

<sup>24</sup> 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

## 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. 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:

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

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.<sup>25</sup> We estimate the daily abnormal returns for each firm as follows:

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

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).<sup>26</sup> To determine statistical significance, we use the standardized cross-sectional test of Boehmer et al. (1991).

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on the CRSP tapes after the event window, resulting in a final sample of 53 (74) unique bidders (targets). Finally, two bidders engaged in mergers of both bidder subsamples with post-event consolidated assets of less (more) than \$10 billion. They are therefore excluded from both subsamples of bidding banks.

<sup>25</sup> 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, according to the literature, other estimation periods had been used (-300, -51) and (-120, -31). The results obtained are qualitative similar to those presented.

<sup>26</sup> 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.

The test compensates for possible variance increases in abnormal returns, commonly found on event dates.<sup>27</sup>

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):

$$\text{Combined CAR} = \frac{MV_i^B \text{CAR}_i^B + MV_i^T \text{CAR}_i^T}{MV_i^B + MV_i^T} \quad (4)$$

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  $\text{CAR}_i^B$  and  $\text{CAR}_i^T$  are the cumulative abnormal returns for the bidder and target  $i$  over the several event windows reported.<sup>28</sup>

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:

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

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<sup>27</sup> 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).

<sup>28</sup> 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.



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  $t-1$  respectively. We then use the return of the hypothetical portfolio in equation (3) to compute its daily abnormal returns.<sup>29</sup>

### 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, target, 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 zero 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.

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<sup>29</sup> Both approaches produced identical results.

- *Ten Billion Dummy*. Expresses a dummy variable that equals 1 if the post-event consolidated assets of the combined entity are below the \$10 billion threshold, 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.
- *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 (Frq) Bidders Dummy*. Expresses a dummy variable that equals 1 if the bidder has acquired more than one target during the examination period, and 0 otherwise.
- *Bid Premium*. Gupta and Misra (2007) use bid premium as a predictor variable in their regressions analyses. 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.<sup>30</sup>

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.<sup>31</sup> Therefore, to ensure that multicollinearity is

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<sup>30</sup> 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.

<sup>31</sup> The highest correlation coefficient is 0.26 between Relative Size and Bid Premium.

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 1.03 to 1.35 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 comply 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.

Table 2 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 0.18%, and statistically significant at the 1% level, using the CRSP NYSE/Amex/Nasdaq value-weighted index. This average daily abnormal return corresponds to a compound abnormal return of 30.11% over the entire 148-day event window. Similar results are obtained using the CRSP NYSE/Amex/Nasdaq equally-weighted index, albeit the magnitude of

anticipated abnormal returns is slightly decreased. Henceforth, we report results using the value-weighted index.

Panel B of Table 2 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 0.20%, and statistically significant at the 5% level. Notably, the distinction between bidders engaged in deals where the post-event consolidated assets were below (above) the \$10 billion threshold yields conclusive results consistent with our first hypothesis. The magnitude of anticipated wealth effects for the 35 bidders of mergers that do not surpass the above mentioned asset-size threshold is substantially larger than the corresponding effect on the 16 large-deals acquirers. More specifically, the average daily abnormal returns for the banks belonging in the first bidder subsample are 0.24%, and statistically significant at the 5% level, whereas abnormal returns for the remaining 16 are insignificant. Consequently, the compound abnormal return for the 35 bidders engaged in deals with post-event consolidated assets of less than \$10 billion is 42.59% over the entire event window.

Panel C of Table 2 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. Average daily abnormal returns for the target firms are 0.15%, and statistically significant at the 5% level. Returns for these 344 firms are almost identical to the 474 banks' returns using both indices.

**Insert Table 2 here**

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 and C of Table 2. 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. In particular, these bidder gains emanate from the small-deal bidders, since the anticipated wealth effects on this set of banks is the largest among all subsamples and their large-deal rivals experience insignificant daily abnormal returns. 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 the largest compound abnormal returns during the regulatory event window.

One alternative interpretation for the magnitude of the small-deals 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-bidding banks with assets below the \$10 billion threshold to experience comparable daily abnormal returns with the small-deals bidders. We therefore compare the anticipated wealth effects of the 35 bidders with the 74 targets.<sup>32</sup> The difference in the two portfolios' coefficients indicates that the small-deals bidders' daily abnormal returns are significantly larger than the target's returns (Chow test statistic of 39.37).<sup>33</sup>

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<sup>32</sup> Only three target firms exceed the \$10 billion threshold.

<sup>33</sup> The difference in coefficients is robust even if we exclude the three targets that hold more than \$10 billion in assets from the sample.

## *6.2. Cumulative abnormal returns*

In this section, we examine bidder, target, and combined firms' announcement CARs for the 83 mergers in the post-DFA period. Table 3 reports CARs for the whole sample of firms and for two subsamples classified according to the \$10 billion asset-size distinction.

Panel A of Table 3 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 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.

Panels B and C of Table 3 segment returns in two subsamples based on the consolidated assets of the merging firms. Interestingly, abnormal returns for bidders engaged in mergers where the post-event consolidated assets were below the \$10 billion threshold are insignificant, while large-deals bidders experience negative returns that are statistically significant at the 1% level. As shown before, the market anticipates bidding activity for these "less than \$10 billion in consolidated assets" bidders and capitalizes on future synergetic gains. The announcement of such bids therefore, is not a surprise event. On the contrary, anticipated wealth effects for the

“more than \$10 billion in consolidated assets” bidders are indistinguishable from zero, justifying the significant market reaction around the announcement date. We attribute the negative CARs for these bidders to the fact that banks exceeding the \$10 billion asset-size threshold are subject to increased supervision and stricter regulations after the DFA enactment. Financial markets thus do not identify adequate synergies to offset the increased regulatory burdens at the announcement of these bids. Consequently, these results support 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 two subsamples displayed in Panels B and C of Table 3. Hypothesis 3 predicts positive combined CARs for mergers with post-event consolidated assets of less than \$10 billion. 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 merger. Conversely, results for the 28 large-deals mergers are insignificant, suggesting a bidder to target redistribution of wealth. The mean difference across these two subsamples is statistically significant at the 1% level ( $t = 5.15$ ). 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.

Insert Table 3 here

Table 4 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. Panel A of Table 4 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 and C of Table 4 provide the cumulative abnormal returns for the two bidder subsamples. Hypothesis 4 predicts that the bidders of mergers where the post-event consolidated assets are less than \$10 billion 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 large-deals bidders' cumulative abnormal returns are insignificant. Their mean difference is statistically significant at the 5% level ( $t = 1.84$ ).

**Insert Table 4 here**

### *6.3. Regressions of cumulative abnormal returns*

Table 5 displays the results from the OLS estimations. We report two separate regression models for each dependent variable. In models 1 and 2, the dependent variable is the three-day bidder CARs centered on the announcement date. In both models, the Ten Billion Dummy is positive and significant at 5%. The magnitude of its coefficients suggests that the average bidder of mergers with post-event consolidated assets of less than \$10 billion earns a 2.5% in model 1 and a 2.9% in model 2 larger cumulative abnormal return in comparison to its large-deals rivals. Additionally, Roadiff is significant at 5% in both regressions, indicating that variation in bidder gains could be attributable to the efficient management transfer from more profitable to less profitable banks. The negative and significant at 1% coefficient for



Bid Premium implies that the market regards large premiums as a sign of bidder overpayment.<sup>34</sup> The explanatory power of both models is relatively low, since the adjusted  $R^2$  is 0.7% and 6.8% respectively. This finding, however, is usually observed in bidder abnormal returns regression analyses (see, Cornett and De 1991, and DeLong 2003).

Models 3 and 4 of Table 5 examine the influence of the control variables on the targets' announcement CARs. In models 3 and 4, the variable State Dummy is positive and significant, suggesting that geographic focus is related positively to target abnormal returns. Relative Size is negative and significant at 5% in model 3, implying that targets gain more with large bidders. In regression 4 however, Relative Size loses significance. Furthermore, the estimated coefficient of the Number of Days is negative and significant at 5% in both models, suggesting that complex firms are not attractive targets in the post-DFA era. On the contrary, Frequent Bidders Dummy has a positive influence on target CARs, implying that frequent bidders tend to pay more for mergers.<sup>35</sup> Lastly, Bid Premium is the most crucial factor in explaining the variation of target abnormal returns (with the addition of Bid Premium the adjusted  $R^2$  increases from 16.5% to 65.6%). Markedly, one standard deviation increase in Bid Premium is associated with an increase in target CARs of +0.164.

The final sets of models in Table 5 provide the regression analyses for the combined CARs around the announcement date. In both models 5 and 6, the Ten Billion Dummy is positive and significant at 1%. The coefficient of the dummy variable indicates that mergers of banks where their post-event consolidated assets are below the \$10 billion threshold earn a 2.4% in model 5 and a 2.5% in model 6 more in

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<sup>34</sup> This finding is in contrast with Gupta and Misra (2007). They find a positive relation between combined CARs and bid premium, suggesting that large premiums could be a sign of deal quality.

<sup>35</sup> In fact, frequent bidders offer 11% higher premiums than non-frequent bidders (mean difference of 0.149). This difference is statistically significant at 10% ( $t = 1.66$ ).

abnormal returns in comparison to their large-deals rivals. Additionally, in both models, Relative Size is positive and significant at 1% (see, DeLong 2001). Contrary to Houston and Ryngaert (1994), Roadiff is positive and significant at 5% in model 5 and 10% in model 6, suggesting that moving assets from lesser to better managed firms is associated with larger merger gains.

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 six models however, the Stock Dummy is insignificant, suggesting that method of payment does not influence bidder, target, and combined firms' announcement abnormal returns.<sup>36</sup> In contrast with prior studies (see, Cornett and Tehranian 1992, and DeLong 2001), merger geographical scope is irrelevant in determining bidder and combined firms' abnormal returns.

Insert Table 5 here

Overall, the results of the regression analysis are supportive to our hypothesis of value creation for the merging banks that stay below the \$10 billion threshold post-event. The coefficients on the Ten Billion Dummy suggest that this asset-size threshold is paramount in explaining the bidder and combined firms' abnormal returns around the announcement day.

## **7. Conclusion**

We present evidence that U.S. bank mergers in the post-DFA era create value for both firms' shareholders. The value creation effect however, is not noticeable in the whole bank merger sample. Mergers between banks where the post-event consolidated assets

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<sup>36</sup> Results for bidders are consistent with Cornett and De (1991), and Becher (2009).

do not exceed the \$10 billion threshold experience positive wealth gains on average. U.S. bank M&A activity is dominated by such deals after the passage of the DFA, since the new financial regulatory reform: (1) motivates small banks to consolidate to absorb the DFA compliance costs, and (2) excludes banks with less than \$10 in assets from the CFPB's supervision on mortgage and credit card-related services as well as from limitations in debit card interchange fees. 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.

Extant literature suggests that the market may identify *ex-ante* bidding activity and adjust the price of the anticipated bidder before the time of the official merger announcement. We hypothesize that future bidders could be identified during the passage of the Dodd-Frank Act, where all information regarding the legislation is available. Consistent with the previous empirical work, we document substantial anticipated wealth effects for bidders of mergers where the post-event consolidated assets are below the \$10 billion threshold. More precisely, compound abnormal returns for these bidders were 42.59% on average around the passage of the DFA. These results are substantially different across all portfolios of bidding and non-bidding banks.

Abnormal returns analysis indicates that small-deals' anticipated bids were no surprise to the market, realizing insignificant announcement CARs. On the contrary, unanticipated large-deals bidders experienced significantly negative abnormal returns upon their announcement. Consequently, combined announcement CARs for the small-deals mergers (combined assets of less than \$10 billion) suggest substantial value creation for the average combined entity, whereas results for the larger deals imply a redistribution of wealth from the bidder to the target firm. We also examine

bidder CARs around the deal completion date. In line with the announcement period results, we observe positive abnormal returns for the small-deals bidders emanating from the materialization of the proposed mergers. Lastly, cross-sectional analysis provides evidence consistent with the overall hypothesis of value creation for bank mergers with less than \$10 billion in post-event consolidated assets. Bidders and combined firms of small-deals mergers earn significantly larger announcement abnormal returns, compared to their large-deals rivals.

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, where their post-event consolidated assets do not exceed the \$10 billion threshold, have both the need and the regulatory benefits to merge. Hence, this threshold may become the optimal scale of 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.

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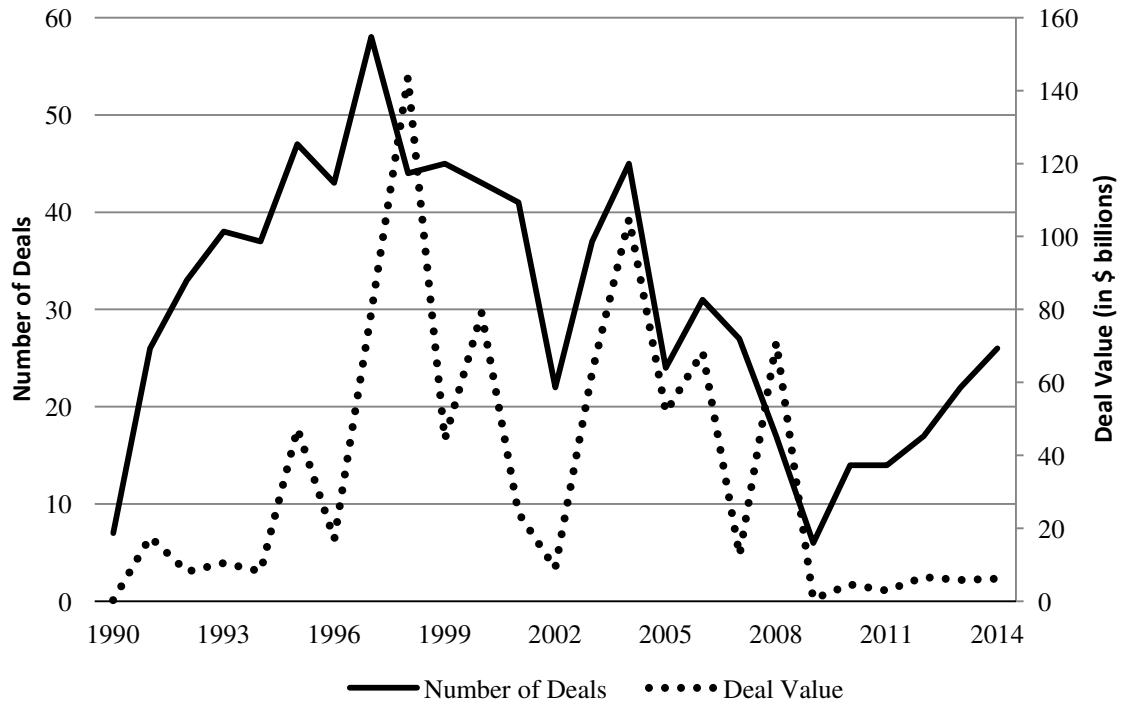
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**Figure 1**  
U.S. bank M&As from 1990 to 2014

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**  
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. 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. 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. The last statistic measures the percentage of combined firms that do not exceed the \$10 billion asset-size threshold post-event.

Panel A: Variables	Mean	Max	Min	Std. Dev
Bidder Assets (in millions \$)	13,489	183,010	616.11	30,016
Target Assets (in millions \$)	2,515	45,355	198.29	5,608
Relative Size	0.35	1.37	0.01	0.34
Bidder ROA	0.70	3.71	-1.28	0.63
Target ROA	0.27	10.57	-7.98	1.86
Roadiff	0.54	8.63	-3.31	1.51
Deal Value (in millions \$)	318.21	3,810.83	10.31	567.50
Bid Premium ( N=78)	1.40	2.90	0.49	0.37
Number of Days	209.20	1161	61	123.82
Target's equity sought in transaction (%)	100	100	100	0
Target's equity acquired after transaction (%)	99.93	100	94.29	0.63
Panel B: Deal characteristics				
% of cash deal	2.41			
% of stock deal	43.37			
% of both stock and cash deal	54.22			
% same state deals	48.19			
% of combined firms with less than \$10 bn assets	66.27			

**Table 2**  
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). 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. 35 (16) bidders engaged in mergers where the post-event consolidated assets were below (above) \$10 billion (two firms were excluded since they were bidders in both subsamples). 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 for the 344 firms that were neither a bidder nor a target. 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.

	$\alpha$	$\beta$	$\lambda$	Adj. R <sup>2</sup>
<i>Panel A: All bank 474 banks</i>				
value-weighted	-0.00122*** (-3.45)	0.70367*** (29.74)	0.00178*** (3.17)	0.700
equal-weighted	-0.00154*** (-5.14)	0.76141*** (37.01)	0.00167*** (3.50)	0.783
<i>Panel B: Portfolios of bidders</i>				
53 Bidders				
value-weighted	-0.00098 (-1.62)	1.11418*** (27.59)	0.00204** (2.13)	0.667
equal-weighted	-0.00143** (-2.52)	1.17141*** (30.11)	0.00183** (2.03)	0.705
35 Less than \$10 billion bidders				
value-weighted	-0.00120* (-1.89)	1.07330*** (25.08)	0.00240** (2.36)	0.624
equal-weighted	-0.00168*** (-2.85)	1.14762*** (28.49)	0.00222** (2.37)	0.682
16 More than \$10 billion bidders				
value-weighted	-0.00052 (-0.78)	1.17789*** (26.51)	0.00134 (1.27)	0.649
equal-weighted	-0.00092 (-1.39)	1.2009*** (26.25)	0.00107 (1.01)	0.645
<i>Panel C: Other portfolios</i>				
74 Targets				
value-weighted	-0.00062 (-1.49)	0.51975*** (18.71)	0.00145** (2.20)	0.480
equal-weighted	-0.00090** (-2.40)	0.58264*** (22.72)	0.00139** (2.34)	0.576
344 Neither				
value-weighted	-0.00130*** (-3.73)	0.67992*** (28.98)	0.00178*** (3.19)	0.689
equal-weighted	-0.00162*** (-5.42)	0.73674*** (35.95)	0.00167*** (3.52)	0.773

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

**Table 3****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 3 different panels. Panel A reports bidder, target and combined CARs for the whole sample of 83 mergers, and Panels B and C report CARs based on the \$10 billion asset-size threshold distinction. The CARs presented at the table are estimated using the market model. The results are robust to the use of other estimation models. 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.

<i>Panel A: All mergers (N=83)</i>						
Event Day	Bidders		Targets		Combined	
	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***
<i>Panel B: Less than \$10 (N=55)</i>						
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%	-1.420	31.63%	11.148***	2.54%	3.195***
<i>Panel C: More than \$10 (N=28)</i>						
Event Day	Mean CARs	StdCS test	Mean CARs	StdCS test	Mean CARs	StdCS test
(-1,+1)	-2.43%	-2.933***	25.10%	6.753***	0.13%	0.219
(-5,+1)	-1.86%	-2.762***	25.37%	6.115***	0.54%	0.695
(-10,+1)	-1.99%	-2.789***	25.61%	6.329***	0.57%	0.303
(-10,+10)	-0.90%	-0.737	25.78%	6.362***	1.67%	1.216

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

**Table 4**  
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 3 different panels. Panel A reports CARs for the bidders of the whole sample of 83 mergers, and Panels B and C report CARs based on the \$10 billion asset-size threshold distinction. The CARs presented at the table are estimated using the market model. The results are robust to the use of other estimation models. 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: Less than \$10 (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: More than \$10 (N=28)		
Event Day	Mean CARs	StdCS test
(-1,+1)	-0.08%	-0.357
(-5,+1)	0.56%	1.053
(-10,+1)	0.63%	1.604
(-10,+10)	0.13%	0.377

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

**Table 5**  
Regression analysis of CARs around the announcement date

This table summarizes the results of the OLS regression analysis 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. 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. Ten Billion is a dummy variable that equals 1 if the consolidated assets of the combined entity are below the \$10 billion threshold and zero otherwise. Roadiff is the difference between bidder and target ROA at the year-end prior the merger announcement. Number of Days is the difference between the announcement and completion date of each merger. Frq Bidders is a dummy variable that equals 1 if the bidder has acquired more than one target during the examination period 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 (N=78 because Thomson ONE does not report offer price per share for 5 deals). The dependent variable for the regressions 1-6 are the bidder, target and combined three-day CARs centered on 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	Bidder CARs		Target CARs		Combined CARs	
	Reg1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6
Constant	-0.571*** (2.79)	-0.012 (-0.49)	0.328*** (4.87)	-0.314** (-2.02)	-0.030** (-1.99)	-0.047 (-1.59)
State Dummy	-0.002 (-0.22)	-0.003 (-0.27)	0.122*** (2.63)	0.084** (2.08)	0.008 (0.91)	0.006 (0.68)
Stock Dummy	0.012 (1.21)	0.007 (0.77)	-0.006 (-0.13)	-0.004 (-0.13)	0.001 (0.15)	-0.001 (-0.15)
Relative Size	0.006 (0.27)	0.003 (0.13)	-0.146** (-2.49)	-0.051 (-1.50)	0.058*** (4.01)	0.061*** (3.91)
Ten Billion	0.025** (2.09)	0.029** (2.45)	0.012 (0.324)	-0.008 (-0.21)	0.024*** (2.65)	0.025*** (2.67)
Roadiff	0.005** (2.54)	0.005** (2.31)	0.014 (0.85)	0.001 (1.66)	0.004** (2.08)	0.004* (1.90)
Number of Days	0.000 (1.15)	0.000 (1.39)	-0.001** (-1.99)	-0.000** (-2.18)	0.000 (0.73)	0.000 (0.98)
Frq Bidders	0.009 (0.88)	0.012 (1.21)	0.090* (1.91)	0.043 (1.58)	0.008 (0.88)	0.008 (0.80)
Bid Premium		-0.032*** (-2.65)		0.446*** (4.31)		0.010 (0.61)
N	83	78	83	78	83	78
Adj. R <sup>2</sup>	0.007	0.068	0.165	0.656	0.232	0.235

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